

FLOAT EQUIPMENT

Halliburton's floating and guiding equipment helps provide a quality cement job under any condition.

SUPER SEAL™ II FLOAT EQUIPMENT

- Short, compact size makes handling and storage easier.
- 400°F temperature and 5,000 psi pressure rating under static conditions.
- Minimum amount of aluminum allows easy drilling even with PDC bits.
- Float shoe available in either rounded or wedge nose configuration.
- Contains exclusive Super Seal II Float Valve, which provides extra large flow area.



**SUPER SEAL II
FLOAT COLLAR**

HNO0471



**SUPER SEAL II
FLOAT SHOE**

HNO0472



HNO0478

NON-ROTATING SSR™ PLUG SET

An integral part of the cementing process, cementing plugs are pumped ahead of cement slurry to minimize contamination of the cement as it is pumped down the casing.

NON-ROTATING (NRT™) PLUG

- PDC drillable; rig time is greatly reduced since conventional bits are eliminated.
- Reduces drilling time of shoe joints up to 10 times with PDC bits.



HNO0477



NON-ROTATING 5-WIPER PLUGS

- Conventional two plug cementing techniques can be used to ensure best possible job.
- Proven five wiper design.
- Design allows use of multiple bottom plugs or no bottom plug.

FLOAT EQUIPMENT

PDF™ FLOAT SHOE

- Helps protect formations from destructive high "ram-effect" surge pressure.
- Provides surface indication that the back pressure valve has closed.
- Minimizes casing sticking. Saves up to one-third running-in time.
- Allows hole to be circulated at any time without affecting the fillup unit.



HN00474

GUIDE SHOE

- Protects casing string from impact when landing on bottom.
- Directs casing away from ledges, reducing chance of sidewall cave-in.
- Helps casing pass through narrow, deviated holes and areas with hard shoulders.

PDF FLOAT SHOE



HN00476

INSERT FLOAT COLLAR

- More economical than conventional types of floating equipment.
- Large flow area through valve.
- Dependable, easy to drill.
- Simple installation.
- No length added to casing string.
- Eliminates two threaded connections in casing string—no welding required.

GUIDE SHOE



HN00475

INSERT FLOAT VALVE

AVAILABLE FOR TUBINGLESS COMPLETIONS

SECTION No. 122

VOLUME and HEIGHT Between TUBING and HOLE and CASING and HOLE and DRILL PIPE and HOLE

NOTE:

No allowance made for couplings. For displacement of couplings see Table 130.

NOTE:

There are some differences in the values in these tables and those previously published. The differences are slight and the former values are sufficiently accurate for dependable results.

The values in these tables have been calculated on the IBM 1620 Computer.



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**Tubing Size
O.D. 1.050"**
ONE STRING

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
1 ¹ / ₂	.0468	21.3594	.0011
1 ⁵ / ₈	.0628	15.9349	.0015
1 ³ / ₄	.0800	12.5050	.0019
1 ⁷ / ₈	.0985	10.1569	.0023
2	.1182	8.4590	.0028
2 ¹ / ₈	.1393	7.1811	.0033
2 ¹ / ₄	.1616	6.1894	.0038
2 ³ / ₈	.1852	5.4009	.0044
2 ¹ / ₂	.2100	4.7615	.0050
2 ⁵ / ₈	.2362	4.2345	.0056
2 ³ / ₄	.2636	3.7941	.0063
2 ⁷ / ₈	.2923	3.4217	.0070
3	.3222	3.1035	.0077
3 ¹ / ₈	.3535	2.8292	.0084
3 ¹ / ₄	.3860	2.5909	.0092
3 ³ / ₈	.4198	2.3823	.0100
3 ¹ / ₂	.4548	2.1987	.0108
3 ⁵ / ₈	.4912	2.0360	.0117
3 ³ / ₄	.5288	1.8912	.0126
3 ⁷ / ₈	.5677	1.7616	.0135
4	.6078	1.6452	.0145
4 ¹ / ₈	.6493	1.5402	.0155
4 ¹ / ₄	.6920	1.4452	.0165
4 ³ / ₈	.7360	1.3588	.0175
4 ¹ / ₂	.7812	1.2801	.0186
4 ⁵ / ₈	.8278	1.2081	.0197
4 ³ / ₄	.8756	1.1421	.0208
4 ⁷ / ₈	.9247	1.0815	.0220
5	.9750	1.0256	.0232
5 ¹ / ₈	1.0267	.9740	.0244
5 ¹ / ₄	1.0796	.9263	.0257
5 ³ / ₈	1.1338	.8820	.0270
5 ¹ / ₂	1.1892	.8409	.0283
5 ⁵ / ₈	1.2460	.8026	.0297
5 ³ / ₄	1.3040	.7669	.0310
5 ⁷ / ₈	1.3633	.7335	.0325
6	1.4238	.7023	.0339
6 ¹ / ₈	1.4857	.6731	.0354
6 ¹ / ₄	1.5488	.6457	.0369
6 ³ / ₈	1.6132	.6199	.0384
6 ¹ / ₂	1.6788	.5957	.0400
6 ⁵ / ₈	1.7458	.5728	.0416
6 ³ / ₄	1.8140	.5513	.0432
6 ⁷ / ₈	1.8835	.5309	.0448
7	1.9542	.5117	.0465
7 ¹ / ₈	2.0263	.4935	.0482
7 ¹ / ₄	2.0996	.4763	.0500
7 ³ / ₈	2.1742	.4599	.0518
7 ¹ / ₂	2.2500	.4444	.0536
7 ⁵ / ₈	2.3272	.4297	.0554

NO.122-A

Tubing Size
O.D. 1.050"
ONE STRING

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
897.0929	.0063	159.7791	1 1/2
669.2656	.0084	119.2013	1 5/8
525.2114	.0107	93.5441	1 3/4
426.5897	.0132	75.9789	1 7/8
355.2767	.0158	63.2775	2
301.6046	.0186	53.7181	2 1/8
259.9531	.0216	46.2996	2 1/4
226.8369	.0248	40.4014	2 3/8
199.9833	.0281	35.6186	2 1/2
177.8493	.0316	31.6763	2 5/8
159.3520	.0352	28.3818	2 3/4
143.7102	.0391	25.5959	2 7/8
130.3468	.0431	23.2158	3
118.8271	.0473	21.1640	3 1/8
108.8176	.0516	19.3812	3 1/4
100.0585	.0561	17.8212	3 3/8
92.3449	.0608	16.4473	3 1/2
85.5128	.0657	15.2305	3 5/8
79.4301	.0707	14.1471	3 3/4
73.9887	.0759	13.1780	3 7/8
69.0998	.0813	12.3072	4
64.6896	.0868	11.5217	4 1/8
60.6966	.0925	10.8105	4 1/4
57.0688	.0984	10.1644	4 3/8
53.7623	.1044	9.5755	4 1/2
50.7397	.1107	9.0371	4 5/8
47.9690	.1170	8.5436	4 3/4
45.4224	.1236	8.0901	4 7/8
43.0762	.1303	7.6722	5
40.9096	.1372	7.2863	5 1/8
38.9045	.1443	6.9292	5 1/4
37.0451	.1516	6.5980	5 3/8
35.3174	.1590	6.2903	5 1/2
33.7091	.1666	6.0039	5 5/8
32.2095	.1743	5.7367	5 3/4
30.8087	.1822	5.4873	5 7/8
29.4982	.1903	5.2539	6
28.2704	.1986	5.0352	6 1/8
27.1184	.2070	4.8300	6 1/4
26.0360	.2156	4.6372	6 3/8
25.0177	.2244	4.4558	6 1/2
24.0584	.2334	4.2850	6 5/8
23.1537	.2425	4.1239	6 3/4
22.2995	.2518	3.9717	6 7/8
21.4920	.2612	3.8279	7
20.7279	.2709	3.6918	7 1/8
20.0042	.2807	3.5629	7 1/4
19.3179	.2906	3.4407	7 3/8
18.6666	.3008	3.3247	7 1/2
18.0478	.3111	3.2145	7 5/8

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.050"**
TWO STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
2 ³ / ₄	.2186	4.5749	.0052
2 ⁷ / ₈	.2473	4.0441	.0059
3	.2772	3.6070	.0066
3 ¹ / ₈	.3085	3.2418	.0073
3 ¹ / ₄	.3410	2.9327	.0081
3 ³ / ₈	.3748	2.6683	.0089
3 ¹ / ₂	.4098	2.4400	.0098
3 ⁵ / ₈	.4462	2.2413	.0106
3 ³ / ₄	.4838	2.0670	.0115
3 ⁷ / ₈	.5227	1.9132	.0124
4	.5628	1.7767	.0134
4 ¹ / ₈	.6043	1.6549	.0144
4 ¹ / ₄	.6470	1.5456	.0154
4 ³ / ₈	.6910	1.4472	.0165
4 ¹ / ₂	.7362	1.3583	.0175
4 ⁵ / ₈	.7828	1.2775	.0186
4 ³ / ₄	.8306	1.2040	.0198
4 ⁷ / ₈	.8797	1.1368	.0209
5	.9300	1.0752	.0221
5 ¹ / ₈	.9817	1.0187	.0234
5 ¹ / ₄	1.0346	.9666	.0246
5 ³ / ₈	1.0888	.9185	.0259
5 ¹ / ₂	1.1442	.8739	.0272
5 ⁵ / ₈	1.2010	.8327	.0286
5 ³ / ₄	1.2590	.7943	.0300
5 ⁷ / ₈	1.3183	.7586	.0314
6	1.3788	.7253	.0328
6 ¹ / ₈	1.4407	.6941	.0343
6 ¹ / ₄	1.5038	.6650	.0358
6 ³ / ₈	1.5682	.6377	.0373
6 ¹ / ₂	1.6338	.6121	.0389
6 ⁵ / ₈	1.7008	.5880	.0405
6 ³ / ₄	1.7690	.5653	.0421
6 ⁷ / ₈	1.8385	.5439	.0438
7	1.9092	.5238	.0455
7 ¹ / ₈	1.9813	.5047	.0472
7 ¹ / ₄	2.0546	.4867	.0489
7 ³ / ₈	2.1292	.4697	.0507
7 ¹ / ₂	2.2050	.4535	.0525
7 ⁵ / ₈	2.2822	.4382	.0543
7 ³ / ₄	2.3606	.4236	.0562
7 ⁷ / ₈	2.4403	.4098	.0581
8	2.5212	.3966	.0600
8 ¹ / ₈	2.6035	.3841	.0620
8 ¹ / ₄	2.6870	.3722	.0640
8 ³ / ₈	2.7718	.3608	.0660
8 ¹ / ₂	2.8578	.3499	.0680
8 ⁵ / ₈	2.9452	.3395	.0701
8 ³ / ₄	3.0338	.3296	.0722
8 ⁷ / ₈	3.1237	.3201	.0744

NO.122-A

Tubing Size
O.D. 1.050"
TWO STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
192.1445	.0292	34.2224	2 ³ / ₄
169.8528	.0331	30.2521	2 ⁷ / ₈
151.4958	.0371	26.9826	3
136.1546	.0412	24.2502	3 ¹ / ₈
123.1725	.0456	21.9380	3 ¹ / ₄
112.0680	.0501	19.9602	3 ³ / ₈
102.4803	.0548	18.2525	3 ¹ / ₂
94.1340	.0596	16.7660	3 ⁵ / ₈
86.8155	.0647	15.4625	3 ³ / ₄
80.3563	.0699	14.3121	3 ⁷ / ₈
74.6223	.0752	13.2908	4
69.5051	.0808	12.3794	4 ¹ / ₈
64.9166	.0865	11.5621	4 ¹ / ₄
60.7840	.0924	10.8261	4 ³ / ₈
57.0471	.0984	10.1605	4 ¹ / ₂
53.6555	.1046	9.5565	4 ⁵ / ₈
50.5668	.1110	9.0063	4 ³ / ₄
47.7451	.1176	8.5038	4 ⁷ / ₈
45.1596	.1243	8.0433	5
42.7842	.1312	7.6202	5 ¹ / ₈
40.5960	.1383	7.2305	5 ¹ / ₄
38.5756	.1455	6.8706	5 ³ / ₈
36.7058	.1530	6.5376	5 ¹ / ₂
34.9717	.1605	6.2287	5 ⁵ / ₈
33.3603	.1683	5.9417	5 ³ / ₄
31.8599	.1762	5.6745	5 ⁷ / ₈
30.4605	.1843	5.4253	6
29.1531	.1926	5.1924	6 ¹ / ₈
27.9296	.2010	4.9745	6 ¹ / ₄
26.7828	.2096	4.7702	6 ³ / ₈
25.7064	.2184	4.5785	6 ¹ / ₂
24.6947	.2274	4.3983	6 ⁵ / ₈
23.7425	.2365	4.2287	6 ³ / ₄
22.8451	.2458	4.0689	6 ⁷ / ₈
21.9984	.2552	3.9181	7
21.1985	.2649	3.7756	7 ¹ / ₈
20.4421	.2747	3.6409	7 ¹ / ₄
19.7260	.2846	3.5134	7 ³ / ₈
19.0474	.2948	3.3925	7 ¹ / ₂
18.4036	.3051	3.2778	7 ⁵ / ₈
17.7922	.3156	3.1689	7 ³ / ₄
17.2112	.3262	3.0655	7 ⁷ / ₈
16.6585	.3370	2.9670	8
16.1323	.3480	2.8733	8 ¹ / ₈
15.6309	.3592	2.7840	8 ¹ / ₄
15.1528	.3705	2.6988	8 ³ / ₈
14.6965	.3820	2.6176	8 ¹ / ₂
14.2607	.3937	2.5399	8 ⁵ / ₈
13.8441	.4056	2.4657	8 ³ / ₄
13.4457	.4176	2.3948	8 ⁷ / ₈

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.050"**
THREE STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
3	.2323	4.3056	.0055
3 ¹ / ₈	.2635	3.7952	.0063
3 ¹ / ₄	.2960	3.3783	.0070
3 ³ / ₈	.3298	3.0322	.0079
3 ¹ / ₂	.3649	2.7408	.0087
3 ⁵ / ₈	.4012	2.4926	.0096
3 ³ / ₄	.4388	2.2789	.0104
3 ⁷ / ₈	.4777	2.0934	.0114
4	.5179	1.9311	.0123
4 ¹ / ₈	.5593	1.7880	.0133
4 ¹ / ₄	.6020	1.6611	.0143
4 ³ / ₈	.6460	1.5480	.0154
4 ¹ / ₂	.6913	1.4466	.0165
4 ⁵ / ₈	.7378	1.3554	.0176
4 ³ / ₄	.7856	1.2729	.0187
4 ⁷ / ₈	.8347	1.1981	.0199
5	.8851	1.1299	.0211
5 ¹ / ₈	.9367	1.0676	.0223
5 ¹ / ₄	.9896	1.0105	.0236
5 ³ / ₈	1.0438	.9580	.0249
5 ¹ / ₂	1.0993	.9097	.0262
5 ⁵ / ₈	1.1560	.8651	.0275
5 ³ / ₄	1.2140	.8237	.0289
5 ⁷ / ₈	1.2733	.7854	.0303
6	1.3339	.7497	.0318
6 ¹ / ₈	1.3957	.7165	.0332
6 ¹ / ₄	1.4588	.6855	.0347
6 ³ / ₈	1.5232	.6565	.0363
6 ¹ / ₂	1.5889	.6294	.0378
6 ⁵ / ₈	1.6558	.6039	.0394
6 ³ / ₄	1.7240	.5800	.0410
6 ⁷ / ₈	1.7935	.5576	.0427
7	1.8642	.5364	.0444
7 ¹ / ₈	1.9363	.5165	.0461
7 ¹ / ₄	2.0096	.4976	.0478
7 ³ / ₈	2.0842	.4798	.0496
7 ¹ / ₂	2.1600	.4630	.0514
7 ⁵ / ₈	2.2372	.4470	.0533
7 ³ / ₄	2.3156	.4319	.0551
7 ⁷ / ₈	2.3953	.4175	.0570
8	2.4762	.4038	.0590
8 ¹ / ₈	2.5585	.3909	.0609
8 ¹ / ₄	2.6420	.3785	.0629
8 ³ / ₈	2.7268	.3667	.0649
8 ¹ / ₂	2.8128	.3555	.0670
8 ⁵ / ₈	2.9002	.3448	.0691
8 ³ / ₄	2.9888	.3346	.0712
8 ⁷ / ₈	3.0787	.3248	.0733
9	3.1698	.3155	.0755
9 ¹ / ₈	3.2623	.3065	.0777

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 1.050"**
THREE STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
180.8369	.0310	32.2084	3
159.3983	.0352	28.3901	3 1/8
141.8903	.0396	25.2717	3 1/4
127.3535	.0441	22.6826	3 3/8
115.1148	.0488	20.5028	3 1/2
104.6884	.0536	18.6458	3 5/8
95.7149	.0587	17.0476	3 3/4
87.9231	.0639	15.6598	3 7/8
81.1041	.0692	14.4453	4
75.0952	.0748	13.3750	4 1/8
69.7671	.0805	12.4261	4 1/4
65.0165	.0864	11.5799	4 3/8
60.7593	.0924	10.8217	4 1/2
56.9268	.0986	10.1391	4 5/8
53.4622	.1050	9.5220	4 3/4
50.3181	.1116	8.9620	4 7/8
47.4548	.1183	8.4521	5
44.8388	.1252	7.9861	5 1/8
42.4413	.1323	7.5591	5 1/4
40.2380	.1395	7.1667	5 3/8
38.2078	.1469	6.8051	5 1/2
36.3325	.1545	6.4711	5 5/8
34.5963	.1623	6.1619	5 3/4
32.9855	.1702	5.8750	5 7/8
31.4878	.1783	5.6082	6
30.0927	.1866	5.3597	6 1/8
28.7908	.1950	5.1279	6 1/4
27.5737	.2036	4.9111	6 3/8
26.4342	.2124	4.7081	6 1/2
25.3656	.2213	4.5178	6 5/8
24.3619	.2305	4.3390	6 3/4
23.4181	.2398	4.1709	6 7/8
22.5292	.2492	4.0126	7
21.6910	.2588	3.8633	7 1/8
20.8997	.2686	3.7224	7 1/4
20.1517	.2786	3.5892	7 3/8
19.4440	.2888	3.4631	7 1/2
18.7736	.2991	3.3437	7 5/8
18.1379	.3096	3.2305	7 3/4
17.5344	.3202	3.1230	7 7/8
16.9611	.3310	3.0209	8
16.4160	.3420	2.9238	8 1/8
15.8971	.3532	2.8314	8 1/4
15.4028	.3645	2.7433	8 3/8
14.9315	.3760	2.6594	8 1/2
14.4818	.3877	2.5793	8 5/8
14.0525	.3995	2.5029	8 3/4
13.6422	.4116	2.4298	8 7/8
13.2499	.4237	2.3599	9
12.8744	.4361	2.2930	9 1/8

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.050"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
3 ³ / ₈	.2848	3.5111	.0068
3 ¹ / ₂	.3199	3.1263	.0076
3 ⁵ / ₈	.3562	2.8073	.0085
3 ³ / ₄	.3938	2.5392	.0094
3 ⁷ / ₈	.4327	2.3110	.0103
4	.4729	2.1147	.0113
4 ¹ / ₈	.5143	1.9444	.0122
4 ¹ / ₄	.5570	1.7953	.0133
4 ³ / ₈	.6010	1.6639	.0143
4 ¹ / ₂	.6463	1.5473	.0154
4 ⁵ / ₈	.6928	1.4434	.0165
4 ³ / ₄	.7406	1.3502	.0176
4 ⁷ / ₈	.7897	1.2663	.0188
5	.8401	1.1904	.0200
5 ¹ / ₈	.8917	1.1214	.0212
5 ¹ / ₄	.9446	1.0586	.0225
5 ³ / ₈	.9988	1.0012	.0238
5 ¹ / ₂	1.0543	.9485	.0251
5 ⁵ / ₈	1.1110	.9001	.0265
5 ³ / ₄	1.1690	.8554	.0278
5 ⁷ / ₈	1.2283	.8141	.0292
6	1.2889	.7759	.0307
6 ¹ / ₈	1.3507	.7404	.0322
6 ¹ / ₄	1.4138	.7073	.0337
6 ³ / ₈	1.4782	.6765	.0352
6 ¹ / ₂	1.5439	.6477	.0368
6 ⁵ / ₈	1.6108	.6208	.0384
6 ³ / ₄	1.6790	.5956	.0400
6 ⁷ / ₈	1.7485	.5719	.0416
7	1.8193	.5497	.0433
7 ¹ / ₈	1.8913	.5287	.0450
7 ¹ / ₄	1.9646	.5090	.0468
7 ³ / ₈	2.0392	.4904	.0486
7 ¹ / ₂	2.1151	.4728	.0504
7 ⁵ / ₈	2.1922	.4562	.0522
7 ³ / ₄	2.2706	.4404	.0541
7 ⁷ / ₈	2.3503	.4255	.0560
8	2.4313	.4113	.0579
8 ¹ / ₈	2.5135	.3979	.0598
8 ¹ / ₄	2.5970	.3851	.0618
8 ³ / ₈	2.6818	.3729	.0639
8 ¹ / ₂	2.7679	.3613	.0659
8 ⁵ / ₈	2.8552	.3502	.0680
8 ³ / ₄	2.9438	.3397	.0701
8 ⁷ / ₈	3.0337	.3296	.0722
9	3.1249	.3200	.0744
9 ¹ / ₈	3.2173	.3108	.0766
9 ¹ / ₄	3.3110	.3020	.0788
9 ³ / ₈	3.4060	.2936	.0811
9 ¹ / ₂	3.5023	.2855	.0834

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 1.050"**
FOUR STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
147.4673	.0381	26.2651	3 ³ / ₈
131.3028	.0428	23.3860	3 ¹ / ₂
117.9084	.0476	21.0004	3 ⁵ / ₈
106.6474	.0526	18.9947	3 ³ / ₄
97.0630	.0578	17.2877	3 ⁷ / ₈
88.8192	.0632	15.8194	4
81.6631	.0688	14.5448	4 ¹ / ₈
75.4012	.0745	13.4295	4 ¹ / ₄
69.8826	.0803	12.4466	4 ³ / ₈
64.9883	.0864	11.5749	4 ¹ / ₂
60.6229	.0926	10.7974	4 ⁵ / ₈
56.7092	.0990	10.1003	4 ³ / ₄
53.1842	.1056	9.4725	4 ⁷ / ₈
49.9958	.1123	8.9046	5
47.1007	.1192	8.3890	5 ¹ / ₈
44.4623	.1263	7.9191	5 ¹ / ₄
42.0502	.1335	7.4895	5 ³ / ₈
39.8380	.1409	7.0955	5 ¹ / ₂
37.8035	.1485	6.7331	5 ⁵ / ₈
35.9276	.1563	6.3990	5 ³ / ₄
34.1934	.1642	6.0901	5 ⁷ / ₈
32.5867	.1723	5.8039	6
31.0948	.1806	5.5382	6 ¹ / ₈
29.7068	.1890	5.2910	6 ¹ / ₄
28.4128	.1976	5.0605	6 ³ / ₈
27.2044	.2064	4.8453	6 ¹ / ₂
26.0739	.2153	4.6440	6 ⁵ / ₈
25.0146	.2245	4.4553	6 ³ / ₄
24.0205	.2337	4.2782	6 ⁷ / ₈
23.0862	.2432	4.1118	7
22.2069	.2528	3.9552	7 ¹ / ₈
21.3782	.2626	3.8076	7 ¹ / ₄
20.5963	.2726	3.6684	7 ³ / ₈
19.8575	.2827	3.5368	7 ¹ / ₂
19.1588	.2931	3.4123	7 ⁵ / ₈
18.4972	.3035	3.2945	7 ³ / ₄
17.8700	.3142	3.1828	7 ⁷ / ₈
17.2749	.3250	3.0768	8
16.7097	.3360	2.9761	8 ¹ / ₈
16.1724	.3472	2.8804	8 ¹ / ₄
15.6611	.3585	2.7894	8 ³ / ₈
15.1741	.3700	2.7026	8 ¹ / ₂
14.7100	.3817	2.6200	8 ⁵ / ₈
14.2672	.3935	2.5411	8 ³ / ₄
13.8445	.4055	2.4658	8 ⁷ / ₈
13.4406	.4177	2.3939	9
13.0544	.4301	2.3251	9 ¹ / ₈
12.6849	.4426	2.2593	9 ¹ / ₄
12.3312	.4553	2.1963	9 ³ / ₈
11.9922	.4682	2.1359	9 ¹ / ₂

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.315"**
ONE STRING

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
1 ³ / ₄	.0544	18.3829	.0013
1 ⁷ / ₈	.0729	13.7201	.0017
2	.0926	10.7935	.0022
2 ¹ / ₈	.1137	8.7962	.0027
2 ¹ / ₄	.1360	7.3530	.0032
2 ³ / ₈	.1596	6.2662	.0038
2 ¹ / ₂	.1844	5.4216	.0044
2 ⁵ / ₈	.2106	4.7487	.0050
2 ³ / ₄	.2380	4.2017	.0057
2 ⁷ / ₈	.2667	3.7497	.0063
3	.2966	3.3710	.0071
3 ¹ / ₈	.3279	3.0498	.0078
3 ¹ / ₄	.3604	2.7747	.0086
3 ³ / ₈	.3942	2.5369	.0094
3 ¹ / ₂	.4292	2.3297	.0102
3 ⁵ / ₈	.4656	2.1478	.0111
3 ³ / ₄	.5032	1.9873	.0120
3 ⁷ / ₈	.5421	1.8447	.0129
4	.5822	1.7175	.0139
4 ¹ / ₈	.6237	1.6034	.0148
4 ¹ / ₄	.6664	1.5006	.0159
4 ³ / ₈	.7104	1.4077	.0169
4 ¹ / ₂	.7556	1.3234	.0180
4 ⁵ / ₈	.8022	1.2466	.0191
4 ³ / ₄	.8500	1.1765	.0202
4 ⁷ / ₈	.8991	1.1122	.0214
5	.9494	1.0532	.0226
5 ¹ / ₈	1.0011	.9989	.0238
5 ¹ / ₄	1.0540	.9488	.0251
5 ³ / ₈	1.1082	.9024	.0264
5 ¹ / ₂	1.1636	.8594	.0277
5 ⁵ / ₈	1.2204	.8194	.0291
5 ³ / ₄	1.2784	.7822	.0304
5 ⁷ / ₈	1.3377	.7476	.0318
6	1.3982	.7152	.0333
6 ¹ / ₈	1.4601	.6849	.0348
6 ¹ / ₄	1.5232	.6565	.0363
6 ³ / ₈	1.5876	.6299	.0378
6 ¹ / ₂	1.6532	.6049	.0394
6 ⁵ / ₈	1.7202	.5813	.0410
6 ³ / ₄	1.7884	.5592	.0426
6 ⁷ / ₈	1.8579	.5382	.0442
7	1.9286	.5185	.0459
7 ¹ / ₈	2.0007	.4998	.0476
7 ¹ / ₄	2.0740	.4822	.0494
7 ³ / ₈	2.1486	.4654	.0512
7 ¹ / ₂	2.2244	.4496	.0530
7 ⁵ / ₈	2.3016	.4345	.0548
7 ³ / ₄	2.3800	.4202	.0567
7 ⁷ / ₈	2.4597	.4066	.0586

NO.122-A

**Tubing Size
O.D. 1.314"**
BETWEEN TUBING & HOLE**
ONE STRING

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
772.0800	.0073	137.5133	1 ³ / ₄
576.2426	.0097	102.6332	1 ⁷ / ₈
453.3267	.0124	80.7409	2
369.4391	.0152	65.7999	2 ¹ / ₈
308.8273	.0182	55.0045	2 ¹ / ₄
263.1814	.0213	46.8746	2 ³ / ₈
227.7062	.0247	40.5562	2 ¹ / ₂
199.4438	.0282	35.5225	2 ⁵ / ₈
176.4720	.0318	31.4310	2 ³ / ₄
157.4889	.0357	28.0500	2 ⁷ / ₈
141.5820	.0397	25.2168	3
128.0935	.0438	22.8144	3 ¹ / ₈
116.5379	.0482	20.7563	3 ¹ / ₄
106.5489	.0527	18.9772	3 ³ / ₈
97.8456	.0574	17.4270	3 ¹ / ₂
90.2091	.0622	16.0669	3 ⁵ / ₈
83.4662	.0673	14.8660	3 ³ / ₄
77.4786	.0725	13.7995	3 ⁷ / ₈
72.1343	.0778	12.8477	4
67.3417	.0834	11.9941	4 ¹ / ₈
63.0255	.0891	11.2253	4 ¹ / ₄
59.1229	.0950	10.5302	4 ³ / ₈
55.5815	.1010	9.8995	4 ¹ / ₂
52.3571	.1072	9.3252	4 ⁵ / ₈
49.4120	.1136	8.8006	4 ³ / ₄
46.7142	.1202	8.3202	4 ⁷ / ₈
44.2363	.1269	7.8788	5
41.9545	.1338	7.4724	5 ¹ / ₈
39.8483	.1409	7.0973	5 ¹ / ₄
37.8999	.1481	6.7503	5 ³ / ₈
36.0935	.1556	6.4285	5 ¹ / ₂
34.4154	.1631	6.1296	5 ⁵ / ₈
32.8537	.1709	5.8515	5 ³ / ₄
31.3976	.1788	5.5921	5 ⁷ / ₈
30.0376	.1869	5.3499	6
28.7655	.1952	5.1234	6 ¹ / ₈
27.5736	.2036	4.9111	6 ¹ / ₄
26.4553	.2122	4.7119	6 ³ / ₈
25.4046	.2210	4.5248	6 ¹ / ₂
24.4160	.2300	4.3487	6 ⁵ / ₈
23.4848	.2391	4.1828	6 ³ / ₄
22.6064	.2484	4.0264	6 ⁷ / ₈
21.7770	.2578	3.8786	7
20.9928	.2675	3.7390	7 ¹ / ₈
20.2508	.2773	3.6068	7 ¹ / ₄
19.5478	.2872	3.4816	7 ³ / ₈
18.8811	.2974	3.3629	7 ¹ / ₂
18.2483	.3077	3.2502	7 ⁵ / ₈
17.6471	.3182	3.1431	7 ³ / ₄
17.0754	.3288	3.0413	7 ⁷ / ₈

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.315"**

TWO STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
3 ³ / ₈	.3236	3.0899	.0077
3 ¹ / ₂	.3587	2.7879	.0085
3 ⁵ / ₈	.3950	2.5314	.0094
3 ³ / ₄	.4326	2.3114	.0103
3 ⁷ / ₈	.4715	2.1207	.0112
4	.5117	1.9543	.0122
4 ¹ / ₈	.5531	1.8079	.0132
4 ¹ / ₄	.5958	1.6783	.0142
4 ³ / ₈	.6398	1.5629	.0152
4 ¹ / ₂	.6851	1.4597	.0163
4 ⁵ / ₈	.7316	1.3668	.0174
4 ³ / ₄	.7794	1.2830	.0186
4 ⁷ / ₈	.8285	1.2070	.0197
5	.8789	1.1378	.0209
5 ¹ / ₈	.9305	1.0747	.0222
5 ¹ / ₄	.9834	1.0168	.0234
5 ³ / ₈	1.0376	.9637	.0247
5 ¹ / ₂	1.0931	.9148	.0260
5 ⁵ / ₈	1.1498	.8697	.0274
5 ³ / ₄	1.2078	.8279	.0288
5 ⁷ / ₈	1.2671	.7892	.0302
6	1.3277	.7532	.0316
6 ¹ / ₈	1.3895	.7197	.0331
6 ¹ / ₄	1.4526	.6884	.0346
6 ³ / ₈	1.5170	.6592	.0361
6 ¹ / ₂	1.5827	.6318	.0377
6 ⁵ / ₈	1.6496	.6062	.0393
6 ³ / ₄	1.7178	.5821	.0409
6 ⁷ / ₈	1.7873	.5595	.0426
7	1.8581	.5382	.0442
7 ¹ / ₈	1.9301	.5181	.0460
7 ¹ / ₄	2.0034	.4991	.0477
7 ³ / ₈	2.0780	.4812	.0495
7 ¹ / ₂	2.1539	.4643	.0513
7 ⁵ / ₈	2.2310	.4482	.0531
7 ³ / ₄	2.3094	.4330	.0550
7 ⁷ / ₈	2.3891	.4186	.0569
8	2.4701	.4048	.0588
8 ¹ / ₈	2.5523	.3918	.0608
8 ¹ / ₄	2.6358	.3794	.0628
8 ³ / ₈	2.7206	.3676	.0648
8 ¹ / ₂	2.8067	.3563	.0668
8 ⁵ / ₈	2.8940	.3455	.0689
8 ³ / ₄	2.9826	.3353	.0710
8 ⁷ / ₈	3.0725	.3255	.0732
9	3.1637	.3161	.0753
9 ¹ / ₈	3.2561	.3071	.0775
9 ¹ / ₄	3.3498	.2985	.0798
9 ³ / ₈	3.4448	.2903	.0820
9 ¹ / ₂	3.5411	.2824	.0843

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 1.315"**
TWO STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
129.7770	.0433	23.1143	3 ³ / ₈
117.0913	.0480	20.8549	3 ¹ / ₂
106.3206	.0528	18.9365	3 ⁵ / ₈
97.0775	.0578	17.2902	3 ³ / ₄
89.0714	.0630	15.8643	3 ⁷ / ₈
82.0803	.0684	14.6191	4
75.9313	.0739	13.5239	4 ¹ / ₈
70.4883	.0797	12.5545	4 ¹ / ₄
65.6423	.0855	11.6914	4 ³ / ₈
61.3055	.0916	10.9190	4 ¹ / ₂
57.4060	.0978	10.2244	4 ⁵ / ₈
53.8846	.1042	9.5973	4 ³ / ₄
50.6921	.1108	9.0287	4 ⁷ / ₈
47.7874	.1175	8.5113	5
45.1355	.1244	8.0390	5 ¹ / ₈
42.7071	.1315	7.6065	5 ¹ / ₄
40.4768	.1387	7.2092	5 ³ / ₈
38.4231	.1461	6.8434	5 ¹ / ₂
36.5271	.1537	6.5058	5 ⁵ / ₈
34.7728	.1615	6.1933	5 ³ / ₄
33.1458	.1694	5.9035	5 ⁷ / ₈
31.6338	.1775	5.6342	6
30.2261	.1858	5.3835	6 ¹ / ₈
28.9128	.1942	5.1496	6 ¹ / ₄
27.6857	.2028	4.9310	6 ³ / ₈
26.5371	.2116	4.7265	6 ¹ / ₂
25.4603	.2205	4.5347	6 ⁵ / ₈
24.4493	.2296	4.3546	6 ³ / ₄
23.4988	.2389	4.1853	6 ⁷ / ₈
22.6038	.2484	4.0259	7
21.7602	.2580	3.8757	7 ¹ / ₈
20.9639	.2678	3.7338	7 ¹ / ₄
20.2115	.2778	3.5998	7 ³ / ₈
19.4996	.2879	3.4730	7 ¹ / ₂
18.8254	.2982	3.3529	7 ⁵ / ₈
18.1862	.3087	3.2391	7 ³ / ₄
17.5796	.3194	3.1311	7 ⁷ / ₈
17.0034	.3302	3.0284	8
16.4556	.3412	2.9309	8 ¹ / ₈
15.9342	.3524	2.8380	8 ¹ / ₄
15.4376	.3637	2.7496	8 ³ / ₈
14.9643	.3752	2.6652	8 ¹ / ₂
14.5127	.3869	2.5848	8 ⁵ / ₈
14.0815	.3987	2.5080	8 ³ / ₄
13.6695	.4107	2.4346	8 ⁷ / ₈
13.2756	.4229	2.3645	9
12.8988	.4353	2.2974	9 ¹ / ₈
12.5379	.4478	2.2331	9 ¹ / ₄
12.1922	.4605	2.1715	9 ³ / ₈
11.8608	.4734	2.1125	9 ¹ / ₂

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.315"**

THREE STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
3 ⁵ / ₈	.3245	3.0819	.0077
3 ³ / ₄	.3621	2.7617	.0086
3 ⁷ / ₈	.4010	2.4939	.0095
4	.4411	2.2668	.0105
4 ¹ / ₈	.4826	2.0722	.0115
4 ¹ / ₄	.5253	1.9037	.0125
4 ³ / ₈	.5693	1.7566	.0136
4 ¹ / ₂	.6145	1.6272	.0146
4 ⁵ / ₈	.6611	1.5127	.0157
4 ³ / ₄	.7089	1.4107	.0169
4 ⁷ / ₈	.7580	1.3193	.0180
5	.8083	1.2371	.0192
5 ¹ / ₈	.8600	1.1628	.0205
5 ¹ / ₄	.9129	1.0954	.0217
5 ³ / ₈	.9671	1.0340	.0230
5 ¹ / ₂	1.0225	.9780	.0243
5 ⁵ / ₈	1.0793	.9265	.0257
5 ³ / ₄	1.1373	.8793	.0271
5 ⁷ / ₈	1.1966	.8357	.0285
6	1.2571	.7955	.0299
6 ¹ / ₈	1.3190	.7582	.0314
6 ¹ / ₄	1.3821	.7235	.0329
6 ³ / ₈	1.4465	.6913	.0344
6 ¹ / ₂	1.5121	.6613	.0360
6 ⁵ / ₈	1.5791	.6333	.0376
6 ³ / ₄	1.6473	.6071	.0392
6 ⁷ / ₈	1.7168	.5825	.0409
7	1.7875	.5594	.0426
7 ¹ / ₈	1.8596	.5378	.0443
7 ¹ / ₄	1.9329	.5174	.0460
7 ³ / ₈	2.0075	.4981	.0478
7 ¹ / ₂	2.0833	.4800	.0496
7 ⁵ / ₈	2.1605	.4629	.0514
7 ³ / ₄	2.2389	.4467	.0533
7 ⁷ / ₈	2.3186	.4313	.0552
8	2.3995	.4167	.0571
8 ¹ / ₈	2.4818	.4029	.0591
8 ¹ / ₄	2.5653	.3898	.0611
8 ³ / ₈	2.6501	.3773	.0631
8 ¹ / ₂	2.7361	.3655	.0651
8 ⁵ / ₈	2.8235	.3542	.0672
8 ³ / ₄	2.9121	.3434	.0693
8 ⁷ / ₈	3.0020	.3331	.0715
9	3.0931	.3233	.0736
9 ¹ / ₈	3.1856	.3139	.0758
9 ¹ / ₄	3.2793	.3049	.0781
9 ³ / ₈	3.3743	.2964	.0803
9 ¹ / ₂	3.4705	.2881	.0826
9 ⁵ / ₈	3.5681	.2803	.0850
9 ³ / ₄	3.6669	.2727	.0873

NO.122-A

Tubing Size
O.D. 1.315"**BETWEEN TUBING & HOLE****

THREE STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
129.4380	.0434	23.0539	3 ⁵ / ₈
115.9926	.0484	20.6592	3 ³ / ₄
104.7435	.0536	18.6556	3 ⁷ / ₈
95.2075	.0590	16.9572	4
87.0323	.0645	15.5011	4 ¹ / ₈
79.9556	.0702	14.2407	4 ¹ / ₄
73.7775	.0761	13.1403	4 ³ / ₈
68.3436	.0822	12.1725	4 ¹ / ₂
63.5325	.0884	11.3156	4 ⁵ / ₈
59.2475	.0948	10.5524	4 ³ / ₄
55.4105	.1013	9.8690	4 ⁷ / ₈
51.9583	.1081	9.2542	5
48.8384	.1150	8.6985	5 ¹ / ₈
46.0077	.1220	8.1943	5 ¹ / ₄
43.4298	.1293	7.7352	5 ³ / ₈
41.0742	.1367	7.3156	5 ¹ / ₂
38.9149	.1443	6.9310	5 ⁵ / ₈
36.9299	.1520	6.5775	5 ³ / ₄
35.1001	.1600	6.2516	5 ⁷ / ₈
33.4092	.1681	5.9504	6
31.8429	.1763	5.6715	6 ¹ / ₈
30.3888	.1848	5.4125	6 ¹ / ₄
29.0361	.1934	5.1715	6 ³ / ₈
27.7752	.2021	4.9470	6 ¹ / ₂
26.5978	.2111	4.7373	6 ⁵ / ₈
25.4964	.2202	4.5411	6 ³ / ₄
24.4645	.2295	4.3573	6 ⁷ / ₈
23.4960	.2390	4.1848	7
22.5858	.2486	4.0227	7 ¹ / ₈
21.7291	.2584	3.8701	7 ¹ / ₄
20.9218	.2684	3.7263	7 ³ / ₈
20.1600	.2785	3.5906	7 ¹ / ₂
19.4402	.2888	3.4624	7 ⁵ / ₈
18.7593	.2993	3.3412	7 ³ / ₄
18.1146	.3099	3.2263	7 ⁷ / ₈
17.5034	.3208	3.1175	8
16.9234	.3318	3.0142	8 ¹ / ₈
16.3724	.3429	2.9161	8 ¹ / ₄
15.8486	.3543	2.8228	8 ³ / ₈
15.3501	.3658	2.7340	8 ¹ / ₂
14.8753	.3774	2.6494	8 ⁵ / ₈
14.4227	.3893	2.5688	8 ³ / ₄
13.9908	.4013	2.4919	8 ⁷ / ₈
13.5785	.4135	2.4184	9
13.1844	.4258	2.3482	9 ¹ / ₈
12.8077	.4384	2.2811	9 ¹ / ₄
12.4471	.4511	2.2169	9 ³ / ₈
12.1019	.4639	2.1554	9 ¹ / ₂
11.7711	.4770	2.0965	9 ⁵ / ₈
11.4539	.4902	2.0400	9 ³ / ₄

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.315"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4	.3706	2.6984	.0088
4 ¹ / ₈	.4120	2.4270	.0098
4 ¹ / ₄	.4547	2.1991	.0108
4 ³ / ₈	.4987	2.0051	.0119
4 ¹ / ₂	.5440	1.8383	.0130
4 ⁵ / ₈	.5905	1.6934	.0141
4 ³ / ₄	.6383	1.5666	.0152
4 ⁷ / ₈	.6874	1.4547	.0164
5	.7378	1.3554	.0176
5 ¹ / ₈	.7894	1.2667	.0188
5 ¹ / ₄	.8423	1.1872	.0201
5 ³ / ₈	.8965	1.1154	.0213
5 ¹ / ₂	.9520	1.0504	.0227
5 ⁵ / ₈	1.0087	.9913	.0240
5 ³ / ₄	1.0667	.9374	.0254
5 ⁷ / ₈	1.1260	.8881	.0268
6	1.1866	.8428	.0283
6 ¹ / ₈	1.2484	.8010	.0297
6 ¹ / ₄	1.3115	.7625	.0312
6 ³ / ₈	1.3759	.7268	.0328
6 ¹ / ₂	1.4416	.6937	.0343
6 ⁵ / ₈	1.5085	.6629	.0359
6 ³ / ₄	1.5767	.6342	.0375
6 ⁷ / ₈	1.6462	.6075	.0392
7	1.7170	.5824	.0409
7 ¹ / ₈	1.7890	.5590	.0426
7 ¹ / ₄	1.8623	.5370	.0443
7 ³ / ₈	1.9369	.5163	.0461
7 ¹ / ₂	2.0128	.4968	.0479
7 ⁵ / ₈	2.0899	.4785	.0498
7 ³ / ₄	2.1683	.4612	.0516
7 ⁷ / ₈	2.2480	.4448	.0535
8	2.3290	.4294	.0555
8 ¹ / ₈	2.4112	.4147	.0574
8 ¹ / ₄	2.4947	.4008	.0594
8 ³ / ₈	2.5795	.3877	.0614
8 ¹ / ₂	2.6656	.3752	.0635
8 ⁵ / ₈	2.7529	.3633	.0655
8 ³ / ₄	2.8415	.3519	.0677
8 ⁷ / ₈	2.9314	.3411	.0698
9	3.0226	.3308	.0720
9 ¹ / ₈	3.1150	.3210	.0742
9 ¹ / ₄	3.2087	.3116	.0764
9 ³ / ₈	3.3037	.3027	.0787
9 ¹ / ₂	3.4000	.2941	.0810
9 ⁵ / ₈	3.4975	.2859	.0833
9 ³ / ₄	3.5963	.2781	.0856
9 ⁷ / ₈	3.6964	.2705	.0880
10	3.7978	.2633	.0904
10 ¹ / ₈	3.9004	.2564	.0929

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 1.315"**
FOUR STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
113.3329	.0495	20.1855	4
101.9351	.0551	18.1554	4 1/8
92.3606	.0608	16.4501	4 1/4
84.2144	.0667	14.9992	4 3/8
77.2074	.0727	13.7512	4 1/2
71.1230	.0789	12.6675	4 5/8
65.7958	.0853	11.7187	4 3/4
61.0975	.0919	10.8819	4 7/8
56.9269	.0986	10.1391	5
53.2032	.1055	9.4759	5 1/8
49.8612	.1126	8.8807	5 1/4
46.8475	.1198	8.3439	5 3/8
44.1182	.1273	7.8578	5 1/2
41.6367	.1348	7.4158	5 5/8
39.3724	.1426	7.0125	5 3/4
37.2993	.1505	6.6433	5 7/8
35.3956	.1586	6.3042	6
33.6424	.1669	5.9920	6 1/8
32.0235	.1753	5.7036	6 1/4
30.5249	.1839	5.4367	6 3/8
29.1346	.1927	5.1891	6 1/2
27.8418	.2017	4.9588	6 5/8
26.6373	.2108	4.7443	6 3/4
25.5129	.2201	4.5440	6 7/8
24.4615	.2295	4.3568	7
23.4765	.2392	4.1813	7 1/8
22.5523	.2490	4.0167	7 1/4
21.6839	.2589	3.8621	7 3/8
20.8666	.2691	3.7165	7 1/2
20.0964	.2794	3.5793	7 5/8
19.3697	.2899	3.4499	7 3/4
18.6831	.3005	3.3276	7 7/8
18.0336	.3113	3.2119	8
17.4186	.3223	3.1024	8 1/8
16.8355	.3335	2.9985	8 1/4
16.2821	.3448	2.9000	8 3/8
15.7564	.3563	2.8063	8 1/2
15.2565	.3680	2.7173	8 5/8
14.7808	.3799	2.6326	8 3/4
14.3275	.3919	2.5518	8 7/8
13.8954	.4041	2.4749	9
13.4831	.4164	2.4014	9 1/8
13.0893	.4289	2.3313	9 1/4
12.7129	.4416	2.2643	9 3/8
12.3530	.4545	2.2002	9 1/2
12.0085	.4676	2.1388	9 5/8
11.6786	.4808	2.0800	9 3/4
11.3623	.4941	2.0237	9 7/8
11.0591	.5077	1.9697	10
10.7681	.5214	1.9179	10 1/8

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.660"**
ONE STRING

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
2 ¹ / ₈	.0718	13.9259	.0017
2 ¹ / ₄	.0941	10.6246	.0022
2 ³ / ₈	.1177	8.4955	.0028
2 ¹ / ₂	.1426	7.0140	.0034
2 ⁵ / ₈	.1687	5.9274	.0040
2 ³ / ₄	.1961	5.0989	.0047
2 ⁷ / ₈	.2248	4.4482	.0054
3	.2548	3.9251	.0061
3 ¹ / ₈	.2860	3.4964	.0068
3 ¹ / ₄	.3185	3.1395	.0076
3 ³ / ₈	.3523	2.8384	.0084
3 ¹ / ₂	.3874	2.5815	.0092
3 ⁵ / ₈	.4237	2.3601	.0101
3 ³ / ₄	.4613	2.1677	.0110
3 ⁷ / ₈	.5002	1.9992	.0119
4	.5404	1.8506	.0129
4 ¹ / ₈	.5818	1.7188	.0139
4 ¹ / ₄	.6245	1.6012	.0149
4 ³ / ₈	.6685	1.4959	.0159
4 ¹ / ₂	.7138	1.4010	.0170
4 ⁵ / ₈	.7603	1.3153	.0181
4 ³ / ₄	.8081	1.2374	.0192
4 ⁷ / ₈	.8572	1.1666	.0204
5	.9076	1.1018	.0216
5 ¹ / ₈	.9592	1.0425	.0228
5 ¹ / ₄	1.0121	.9880	.0241
5 ³ / ₈	1.0663	.9378	.0254
5 ¹ / ₂	1.1218	.8914	.0267
5 ⁵ / ₈	1.1785	.8485	.0281
5 ³ / ₄	1.2365	.8087	.0294
5 ⁷ / ₈	1.2958	.7717	.0309
6	1.3564	.7373	.0323
6 ¹ / ₈	1.4182	.7051	.0338
6 ¹ / ₄	1.4813	.6751	.0353
6 ³ / ₈	1.5457	.6470	.0368
6 ¹ / ₂	1.6114	.6206	.0384
6 ⁵ / ₈	1.6783	.5958	.0400
6 ³ / ₄	1.7465	.5726	.0416
6 ⁷ / ₈	1.8160	.5507	.0432
7	1.8868	.5300	.0449
7 ¹ / ₈	1.9588	.5105	.0466
7 ¹ / ₄	2.0321	.4921	.0484
7 ³ / ₈	2.1067	.4747	.0502
7 ¹ / ₂	2.1826	.4582	.0520
7 ⁵ / ₈	2.2597	.4425	.0538
7 ³ / ₄	2.3381	.4277	.0557
7 ⁷ / ₈	2.4178	.4136	.0576
8	2.4988	.4002	.0595
8 ¹ / ₈	2.5810	.3874	.0615
8 ¹ / ₄	2.6645	.3753	.0634

NO.122-A

Tubing Size
O.D. 1.660"
ONE STRING

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
584.8861	.0096	104.1727	2 ¹ / ₈
446.2327	.0126	79.4774	2 ¹ / ₄
356.8129	.0157	63.5511	2 ³ / ₈
294.5897	.0191	52.4687	2 ¹ / ₂
248.9499	.0226	44.3399	2 ⁵ / ₈
214.1534	.0262	38.1424	2 ³ / ₄
186.8257	.0301	33.2751	2 ⁷ / ₈
164.8540	.0341	29.3617	3
146.8489	.0382	26.1549	3 ¹ / ₈
131.8595	.0426	23.4852	3 ¹ / ₄
119.2138	.0471	21.2329	3 ³ / ₈
108.4233	.0518	19.3110	3 ¹ / ₂
99.1249	.0566	17.6549	3 ⁵ / ₈
91.0430	.0617	16.2155	3 ³ / ₄
83.9651	.0669	14.9548	3 ⁷ / ₈
77.7245	.0722	13.8433	4
72.1888	.0778	12.8574	4 ¹ / ₈
67.2516	.0835	11.9780	4 ¹ / ₄
62.8265	.0894	11.1899	4 ³ / ₈
58.8425	.0954	10.4803	4 ¹ / ₂
55.2408	.1016	9.8388	4 ⁵ / ₈
51.9725	.1080	9.2567	4 ³ / ₄
48.9963	.1146	8.7266	4 ⁷ / ₈
46.2775	.1213	8.2424	5
43.7862	.1282	7.7987	5 ¹ / ₈
41.4971	.1353	7.3909	5 ¹ / ₄
39.3883	.1425	7.0154	5 ³ / ₈
37.4409	.1500	6.6685	5 ¹ / ₂
35.6383	.1575	6.3475	5 ⁵ / ₈
33.9663	.1653	6.0497	5 ³ / ₄
32.4123	.1732	5.7729	5 ⁷ / ₈
30.9650	.1813	5.5151	6
29.6149	.1896	5.2746	6 ¹ / ₈
28.3531	.1980	5.0499	6 ¹ / ₄
27.1721	.2066	4.8396	6 ³ / ₈
26.0648	.2154	4.6423	6 ¹ / ₂
25.0252	.2244	4.4572	6 ⁵ / ₈
24.0479	.2335	4.2831	6 ³ / ₄
23.1277	.2428	4.1192	6 ⁷ / ₈
22.2603	.2522	3.9647	7
21.4417	.2619	3.8189	7 ¹ / ₈
20.6681	.2717	3.6811	7 ¹ / ₄
19.9364	.2816	3.5508	7 ³ / ₈
19.2434	.2918	3.4274	7 ¹ / ₂
18.5865	.3021	3.3104	7 ⁵ / ₈
17.9632	.3126	3.1994	7 ³ / ₄
17.3711	.3232	3.0939	7 ⁷ / ₈
16.8083	.3340	2.9937	8
16.2727	.3450	2.8983	8 ¹ / ₈
15.7627	.3562	2.8075	8 ¹ / ₄

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.660"**
TWO STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4	.4279	2.3368	.0102
4 ¹ / ₈	.4694	2.1305	.0112
4 ¹ / ₄	.5121	1.9528	.0122
4 ³ / ₈	.5561	1.7983	.0132
4 ¹ / ₂	.6013	1.6629	.0143
4 ⁵ / ₈	.6479	1.5435	.0154
4 ³ / ₄	.6957	1.4374	.0166
4 ⁷ / ₈	.7448	1.3427	.0177
5	.7951	1.2576	.0189
5 ¹ / ₈	.8468	1.1809	.0202
5 ¹ / ₄	.8997	1.1115	.0214
5 ³ / ₈	.9539	1.0484	.0227
5 ¹ / ₂	1.0093	.9907	.0240
5 ⁵ / ₈	1.0661	.9380	.0254
5 ³ / ₄	1.1241	.8896	.0268
5 ⁷ / ₈	1.1834	.8450	.0282
6	1.2439	.8039	.0296
6 ¹ / ₈	1.3058	.7658	.0311
6 ¹ / ₄	1.3689	.7305	.0326
6 ³ / ₈	1.4333	.6977	.0341
6 ¹ / ₂	1.4989	.6671	.0357
6 ⁵ / ₈	1.5659	.6386	.0373
6 ³ / ₄	1.6341	.6120	.0389
6 ⁷ / ₈	1.7036	.5870	.0406
7	1.7743	.5636	.0422
7 ¹ / ₈	1.8464	.5416	.0440
7 ¹ / ₄	1.9197	.5209	.0457
7 ³ / ₈	1.9943	.5014	.0475
7 ¹ / ₂	2.0701	.4831	.0493
7 ⁵ / ₈	2.1473	.4657	.0511
7 ³ / ₄	2.2257	.4493	.0530
7 ⁷ / ₈	2.3054	.4338	.0549
8	2.3863	.4191	.0568
8 ¹ / ₈	2.4686	.4051	.0588
8 ¹ / ₄	2.5521	.3918	.0608
8 ³ / ₈	2.6369	.3792	.0628
8 ¹ / ₂	2.7229	.3673	.0648
8 ⁵ / ₈	2.8103	.3558	.0669
8 ³ / ₄	2.8989	.3450	.0690
8 ⁷ / ₈	2.9888	.3346	.0712
9	3.0799	.3247	.0733
9 ¹ / ₈	3.1724	.3152	.0755
9 ¹ / ₄	3.2661	.3062	.0778
9 ³ / ₈	3.3611	.2975	.0800
9 ¹ / ₂	3.4573	.2892	.0823
9 ⁵ / ₈	3.5549	.2813	.0846
9 ³ / ₄	3.6537	.2737	.0870
9 ⁷ / ₈	3.7538	.2664	.0894
10	3.8551	.2594	.0918
10 ¹ / ₈	3.9578	.2527	.0942

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 1.660"**
TWO STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
98.1441	.0572	17.4802	4
89.4799	.0627	15.9370	4 1/8
82.0165	.0685	14.6078	4 1/4
75.5288	.0743	13.4523	4 3/8
69.8438	.0804	12.4397	4 1/2
64.8269	.0866	11.5462	4 5/8
60.3716	.0930	10.7526	4 3/4
56.3926	.0996	10.0439	4 7/8
52.8208	.1063	9.4078	5
49.5997	.1132	8.8341	5 1/8
46.6827	.1203	8.3145	5 1/4
44.0308	.1275	7.8422	5 3/8
41.6113	.1349	7.4113	5 1/2
39.3967	.1425	7.0169	5 5/8
37.3635	.1503	6.6547	5 3/4
35.4916	.1582	6.3213	5 7/8
33.7637	.1663	6.0136	6
32.1647	.1746	5.7288	6 1/8
30.6818	.1830	5.4647	6 1/4
29.3035	.1916	5.2192	6 3/8
28.0198	.2004	4.9905	6 1/2
26.8220	.2093	4.7772	6 5/8
25.7024	.2184	4.5778	6 3/4
24.6540	.2277	4.3911	6 7/8
23.6708	.2372	4.2159	7
22.7473	.2468	4.0515	7 1/8
21.8785	.2566	3.8967	7 1/4
21.0603	.2666	3.7510	7 3/8
20.2885	.2767	3.6135	7 1/2
19.5597	.2870	3.4837	7 5/8
18.8706	.2975	3.3610	7 3/4
18.2183	.3082	3.2448	7 7/8
17.6002	.3190	3.1347	8
17.0139	.3300	3.0303	8 1/8
16.4571	.3412	2.9311	8 1/4
15.9279	.3525	2.8369	8 3/8
15.4245	.3640	2.7472	8 1/2
14.9452	.3757	2.6618	8 5/8
14.4883	.3875	2.5805	8 3/4
14.0526	.3995	2.5029	8 7/8
13.6366	.4117	2.4288	9
13.2393	.4241	2.3580	9 1/8
12.8594	.4366	2.2904	9 1/4
12.4960	.4493	2.2256	9 3/8
12.1481	.4622	2.1637	9 1/2
11.8148	.4752	2.1043	9 5/8
11.4952	.4884	2.0474	9 3/4
11.1887	.5018	1.9928	9 7/8
10.8946	.5154	1.9404	10
10.6120	.5291	1.8901	10 1/8

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.660"**
THREE STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 ³ / ₈	.4437	2.2540	.0106
4 ¹ / ₂	.4889	2.0454	.0116
4 ⁵ / ₈	.5355	1.8676	.0127
4 ³ / ₄	.5833	1.7145	.0139
4 ⁷ / ₈	.6324	1.5814	.0151
5	.6827	1.4647	.0163
5 ¹ / ₈	.7344	1.3617	.0175
5 ¹ / ₄	.7873	1.2702	.0187
5 ³ / ₈	.8415	1.1884	.0200
5 ¹ / ₂	.8969	1.1149	.0214
5 ⁵ / ₈	.9536	1.0486	.0227
5 ³ / ₄	1.0117	.9885	.0241
5 ⁷ / ₈	1.0709	.9338	.0255
6	1.1315	.8838	.0269
6 ¹ / ₈	1.1933	.8380	.0284
6 ¹ / ₄	1.2565	.7959	.0299
6 ³ / ₈	1.3208	.7571	.0314
6 ¹ / ₂	1.3865	.7212	.0330
6 ⁵ / ₈	1.4534	.6880	.0346
6 ³ / ₄	1.5217	.6572	.0362
6 ⁷ / ₈	1.5911	.6285	.0379
7	1.6619	.6017	.0396
7 ¹ / ₈	1.7339	.5767	.0413
7 ¹ / ₄	1.8073	.5533	.0430
7 ³ / ₈	1.8818	.5314	.0448
7 ¹ / ₂	1.9577	.5108	.0466
7 ⁵ / ₈	2.0348	.4914	.0484
7 ³ / ₄	2.1133	.4732	.0503
7 ⁷ / ₈	2.1929	.4560	.0522
8	2.2739	.4398	.0541
8 ¹ / ₈	2.3561	.4244	.0561
8 ¹ / ₄	2.4397	.4099	.0581
8 ³ / ₈	2.5244	.3961	.0601
8 ¹ / ₂	2.6105	.3831	.0622
8 ⁵ / ₈	2.6978	.3707	.0642
8 ³ / ₄	2.7865	.3589	.0663
8 ⁷ / ₈	2.8763	.3477	.0685
9	2.9675	.3370	.0707
9 ¹ / ₈	3.0599	.3268	.0729
9 ¹ / ₄	3.1537	.3171	.0751
9 ³ / ₈	3.2486	.3078	.0773
9 ¹ / ₂	3.3449	.2990	.0796
9 ⁵ / ₈	3.4424	.2905	.0820
9 ³ / ₄	3.5413	.2824	.0843
9 ⁷ / ₈	3.6413	.2746	.0867
10	3.7427	.2672	.0891
10 ¹ / ₈	3.8453	.2601	.0916
10 ¹ / ₄	3.9493	.2532	.0940
10 ³ / ₈	4.0544	.2466	.0965
10 ¹ / ₂	4.1609	.2403	.0991

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 1.660"**
THREE STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
94.6690	.0593	16.8613	4 ³ / ₈
85.9048	.0654	15.3003	4 ¹ / ₂
78.4386	.0716	13.9705	4 ⁵ / ₈
72.0087	.0780	12.8253	4 ³ / ₄
66.4189	.0845	11.8297	4 ⁷ / ₈
61.5193	.0913	10.9570	5
57.1934	.0982	10.1866	5 ¹ / ₈
53.3494	.1052	9.5019	5 ¹ / ₄
49.9138	.1125	8.8900	5 ³ / ₈
46.8273	.1199	8.3403	5 ¹ / ₂
44.0413	.1275	7.8441	5 ⁵ / ₈
41.5158	.1352	7.3943	5 ³ / ₄
39.2175	.1432	6.9849	5 ⁷ / ₈
37.1185	.1513	6.6111	6
35.1951	.1595	6.2685	6 ¹ / ₈
33.4272	.1680	5.9536	6 ¹ / ₄
31.7977	.1766	5.6634	6 ³ / ₈
30.2919	.1853	5.3952	6 ¹ / ₂
28.8968	.1943	5.1467	6 ⁵ / ₈
27.6014	.2034	4.9160	6 ³ / ₄
26.3960	.2127	4.7013	6 ⁷ / ₈
25.2721	.2222	4.5012	7
24.2222	.2318	4.3142	7 ¹ / ₈
23.2396	.2416	4.1391	7 ¹ / ₄
22.3185	.2516	3.9751	7 ³ / ₈
21.4536	.2617	3.8211	7 ¹ / ₂
20.6404	.2720	3.6762	7 ⁵ / ₈
19.8745	.2825	3.5398	7 ³ / ₄
19.1523	.2932	3.4112	7 ⁷ / ₈
18.4704	.3040	3.2897	8
17.8257	.3150	3.1749	8 ¹ / ₈
17.2155	.3261	3.0662	8 ¹ / ₄
16.6373	.3375	2.9632	8 ³ / ₈
16.0888	.3490	2.8655	8 ¹ / ₂
15.5680	.3606	2.7728	8 ⁵ / ₈
15.0729	.3725	2.6846	8 ³ / ₄
14.6019	.3845	2.6007	8 ⁷ / ₈
14.1533	.3967	2.5208	9
13.7257	.4091	2.4447	9 ¹ / ₈
13.3179	.4216	2.3720	9 ¹ / ₄
12.9285	.4343	2.3027	9 ³ / ₈
12.5564	.4471	2.2364	9 ¹ / ₂
12.2006	.4602	2.1730	9 ⁵ / ₈
11.8602	.4734	2.1124	9 ³ / ₄
11.5342	.4868	2.0543	9 ⁷ / ₈
11.2218	.5003	1.9987	10
10.9223	.5140	1.9453	10 ¹ / ₈
10.6349	.5279	1.8942	10 ¹ / ₄
10.3590	.5420	1.8450	10 ³ / ₈
10.0940	.5562	1.7978	10 ¹ / ₂

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.660"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 ⁷ / ₈	.5199	1.9234	.0124
5	.5703	1.7535	.0136
5 ¹ / ₈	.6219	1.6079	.0148
5 ¹ / ₄	.6748	1.4818	.0161
5 ³ / ₈	.7290	1.3717	.0174
5 ¹ / ₂	.7845	1.2747	.0187
5 ⁵ / ₈	.8412	1.1887	.0200
5 ³ / ₄	.8992	1.1121	.0214
5 ⁷ / ₈	.9585	1.0433	.0228
6	1.0191	.9813	.0243
6 ¹ / ₈	1.0809	.9251	.0257
6 ¹ / ₄	1.1440	.8741	.0272
6 ³ / ₈	1.2084	.8275	.0288
6 ¹ / ₂	1.2741	.7849	.0303
6 ⁵ / ₈	1.3410	.7457	.0319
6 ³ / ₄	1.4092	.7096	.0336
6 ⁷ / ₈	1.4878	.6763	.0352
7	1.5495	.6454	.0369
7 ¹ / ₈	1.6215	.6167	.0386
7 ¹ / ₄	1.6948	.5900	.0404
7 ³ / ₈	1.7694	.5652	.0421
7 ¹ / ₂	1.8453	.5419	.0439
7 ⁵ / ₈	1.9224	.5202	.0458
7 ³ / ₄	2.0008	.4998	.0476
7 ⁷ / ₈	2.0805	.4806	.0495
8	2.1615	.4626	.0515
8 ¹ / ₈	2.2437	.4457	.0534
8 ¹ / ₄	2.3272	.4297	.0554
8 ³ / ₈	2.4120	.4146	.0574
8 ¹ / ₂	2.4981	.4003	.0595
8 ⁵ / ₈	2.5854	.3868	.0616
8 ³ / ₄	2.6740	.3740	.0637
8 ⁷ / ₈	2.7639	.3618	.0658
9	2.8551	.3503	.0680
9 ¹ / ₈	2.9475	.3393	.0702
9 ¹ / ₄	3.0412	.3288	.0724
9 ³ / ₈	3.1362	.3189	.0747
9 ¹ / ₂	3.2325	.3094	.0770
9 ⁵ / ₈	3.3300	.3003	.0793
9 ³ / ₄	3.4288	.2916	.0816
9 ⁷ / ₈	3.5289	.2834	.0840
10	3.6303	.2755	.0864
10 ¹ / ₈	3.7329	.2679	.0889
10 ¹ / ₄	3.8368	.2606	.0914
10 ³ / ₈	3.9420	.2537	.0939
10 ¹ / ₂	4.0485	.2470	.0964
10 ⁵ / ₈	4.1562	.2406	.0990
10 ³ / ₄	4.2652	.2345	.1016
10 ⁷ / ₈	4.3755	.2285	.1042
11	4.4871	.2229	.1068

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 1.660"**
FOUR STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
80.7813	.0695	14.3878	4 ⁷ / ₈
73.6474	.0762	13.1172	5
67.5326	.0831	12.0281	5 ¹ / ₈
62.2375	.0902	11.0850	5 ³ / ₄
57.6114	.0975	10.2610	5 ⁵ / ₈
53.5384	.1049	9.5356	5 ¹ / ₂
49.9274	.1125	8.8924	5 ⁵ / ₈
46.7064	.1202	8.3188	5 ³ / ₄
43.8175	.1281	7.8042	5 ⁷ / ₈
41.2135	.1362	7.3404	6
38.8558	.1445	6.9205	6 ¹ / ₈
36.7122	.1529	6.5387	6 ¹ / ₄
34.7561	.1615	6.1903	6 ³ / ₈
32.9649	.1703	5.8713	6 ¹ / ₂
31.3194	.1793	5.5782	6 ⁵ / ₈
29.8035	.1884	5.3082	6 ³ / ₄
28.4029	.1977	5.0588	6 ⁷ / ₈
27.1058	.2071	4.8278	7
25.9016	.2168	4.6133	7 ¹ / ₈
24.7812	.2266	4.4137	7 ¹ / ₄
23.7366	.2365	4.2277	7 ³ / ₈
22.7608	.2467	4.0539	7 ¹ / ₂
21.8475	.2570	3.8912	7 ⁵ / ₈
20.9913	.2675	3.7387	7 ³ / ₄
20.1873	.2781	3.5955	7 ⁷ / ₈
19.4311	.2889	3.4608	8
18.7189	.2999	3.3340	8 ¹ / ₈
18.0472	.3111	3.2143	8 ¹ / ₄
17.4128	.3224	3.1014	8 ³ / ₈
16.8129	.3339	2.9945	8 ¹ / ₂
16.2450	.3456	2.8934	8 ⁵ / ₈
15.7066	.3575	2.7975	8 ³ / ₄
15.1958	.3695	2.7065	8 ⁷ / ₈
14.7106	.3817	2.6201	9
14.2493	.3940	2.5379	9 ¹ / ₈
13.8102	.4066	2.4597	9 ¹ / ₄
13.3919	.4193	2.3852	9 ³ / ₈
12.9931	.4321	2.3142	9 ¹ / ₂
12.6126	.4452	2.2464	9 ⁵ / ₈
12.2491	.4584	2.1817	9 ³ / ₄
11.9017	.4717	2.1198	9 ⁷ / ₈
11.5694	.4853	2.0606	10
11.2513	.4990	2.0039	10 ¹ / ₈
10.9465	.5129	1.9497	10 ¹ / ₄
10.6545	.5270	1.8976	10 ³ / ₈
10.3743	.5412	1.8477	10 ¹ / ₂
10.1054	.5556	1.7998	10 ⁵ / ₈
9.8471	.5702	1.7538	10 ³ / ₄
9.5989	.5849	1.7096	10 ⁷ / ₈
9.3602	.5998	1.6671	11

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.900"**
ONE STRING

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
2 ³ / ₈	.0828	12.0701	.0020
2 ¹ / ₂	.1077	9.2840	.0026
2 ⁵ / ₈	.1338	7.4711	.0032
2 ³ / ₄	.1613	6.2011	.0038
2 ⁷ / ₈	.1899	5.2646	.0045
3	.2199	4.5473	.0052
3 ¹ / ₈	.2511	3.9817	.0060
3 ¹ / ₄	.2837	3.5253	.0068
3 ³ / ₈	.3174	3.1501	.0076
3 ¹ / ₂	.3525	2.8368	.0084
3 ⁵ / ₈	.3888	2.5717	.0093
3 ³ / ₄	.4265	2.3449	.0102
3 ⁷ / ₈	.4653	2.1489	.0111
4	.5055	1.9782	.0120
4 ¹ / ₈	.5469	1.8283	.0130
4 ¹ / ₄	.5897	1.6959	.0140
4 ³ / ₈	.6336	1.5782	.0151
4 ¹ / ₂	.6789	1.4729	.0162
4 ⁵ / ₈	.7254	1.3785	.0173
4 ³ / ₄	.7733	1.2932	.0184
4 ⁷ / ₈	.8223	1.2160	.0196
5	.8727	1.1459	.0208
5 ¹ / ₈	.9243	1.0818	.0220
5 ¹ / ₄	.9773	1.0233	.0233
5 ³ / ₈	1.0314	.9695	.0246
5 ¹ / ₂	1.0869	.9200	.0259
5 ⁵ / ₈	1.1436	.8744	.0272
5 ³ / ₄	1.2017	.8322	.0286
5 ⁷ / ₈	1.2609	.7931	.0300
6	1.3215	.7567	.0315
6 ¹ / ₈	1.3833	.7229	.0329
6 ¹ / ₄	1.4465	.6913	.0344
6 ³ / ₈	1.5108	.6619	.0360
6 ¹ / ₂	1.5765	.6343	.0375
6 ⁵ / ₈	1.6434	.6085	.0391
6 ³ / ₄	1.7117	.5842	.0408
6 ⁷ / ₈	1.7811	.5614	.0424
7	1.8519	.5400	.0441
7 ¹ / ₈	1.9239	.5198	.0458
7 ¹ / ₄	1.9973	.5007	.0476
7 ³ / ₈	2.0718	.4827	.0493
7 ¹ / ₂	2.1477	.4656	.0511
7 ⁵ / ₈	2.2248	.4495	.0530
7 ³ / ₄	2.3033	.4342	.0548
7 ⁷ / ₈	2.3829	.4196	.0567
8	2.4639	.4059	.0587
8 ¹ / ₈	2.5461	.3928	.0606
8 ¹ / ₄	2.6297	.3803	.0626
8 ³ / ₈	2.7144	.3684	.0646
8 ¹ / ₂	2.8005	.3571	.0667

NO.122-A

Tubing Size
O.D. 1.900"
ONE STRING

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
506.9445	.0111	90.2907	2 ³ / ₈
389.9296	.0144	69.4494	2 ¹ / ₂
313.7860	.0179	55.8877	2 ⁵ / ₈
260.4464	.0216	46.3875	2 ³ / ₄
221.1119	.0254	39.3817	2 ⁷ / ₈
190.9859	.0294	34.0160	3
167.2315	.0336	29.7852	3 ¹ / ₈
148.0639	.0379	26.3713	3 ¹ / ₄
132.3048	.0424	23.5645	3 ³ / ₈
119.1452	.0471	21.2207	3 ¹ / ₂
108.0112	.0520	19.2376	3 ⁵ / ₈
98.4850	.0570	17.5409	3 ³ / ₄
90.2550	.0622	16.0751	3 ⁷ / ₈
83.0843	.0676	14.7979	4
76.7897	.0731	13.6768	4 ¹ / ₈
71.2274	.0788	12.6861	4 ¹ / ₄
66.2829	.0847	11.8055	4 ³ / ₈
61.8638	.0908	11.0184	4 ¹ / ₂
57.8953	.0970	10.3116	4 ⁵ / ₈
54.3155	.1034	9.6740	4 ³ / ₄
51.0733	.1099	9.0965	4 ⁷ / ₈
48.1260	.1167	8.5716	5
45.4375	.1236	8.0928	5 ¹ / ₈
42.9773	.1306	7.6546	5 ¹ / ₄
40.7195	.1379	7.2525	5 ³ / ₈
38.6417	.1453	6.8824	5 ¹ / ₂
36.7246	.1529	6.5409	5 ⁵ / ₈
34.9517	.1606	6.2252	5 ³ / ₄
33.3083	.1686	5.9325	5 ⁷ / ₈
31.7819	.1767	5.6606	6
30.3612	.1849	5.4076	6 ¹ / ₈
29.0364	.1934	5.1716	6 ¹ / ₄
27.7990	.2020	4.9512	6 ³ / ₈
26.6412	.2107	4.7450	6 ¹ / ₂
25.5561	.2197	4.5517	6 ⁵ / ₈
24.5376	.2288	4.3703	6 ³ / ₄
23.5803	.2381	4.1998	6 ⁷ / ₈
22.6793	.2476	4.0394	7
21.8301	.2572	3.8881	7 ¹ / ₈
21.0288	.2670	3.7454	7 ¹ / ₄
20.2718	.2770	3.6106	7 ³ / ₈
19.5557	.2871	3.4830	7 ¹ / ₂
18.8777	.2974	3.3623	7 ⁵ / ₈
18.2351	.3079	3.2478	7 ³ / ₄
17.6253	.3186	3.1392	7 ⁷ / ₈
17.0461	.3294	3.0360	8
16.4955	.3404	2.9380	8 ¹ / ₈
15.9717	.3515	2.8447	8 ¹ / ₄
15.4728	.3629	2.7558	8 ³ / ₈
14.9973	.3744	2.6711	8 ¹ / ₂

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.900"**

TWO STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 ¹ / ₂	.5316	1.8810	.0127
4 ⁵ / ₈	.5782	1.7296	.0138
4 ³ / ₄	.6260	1.5975	.0149
4 ⁷ / ₈	.6751	1.4814	.0161
5	.7254	1.3785	.0173
5 ¹ / ₈	.7771	1.2869	.0185
5 ¹ / ₄	.8300	1.2049	.0198
5 ³ / ₈	.8842	1.1310	.0211
5 ¹ / ₂	.9396	1.0643	.0224
5 ⁵ / ₈	.9964	1.0037	.0237
5 ³ / ₄	1.0544	.9484	.0251
5 ⁷ / ₈	1.1137	.8979	.0265
6	1.1742	.8516	.0280
6 ¹ / ₈	1.2361	.8090	.0294
6 ¹ / ₄	1.2992	.7697	.0309
6 ³ / ₈	1.3636	.7334	.0325
6 ¹ / ₂	1.4292	.6997	.0340
6 ⁵ / ₈	1.4962	.6684	.0356
6 ³ / ₄	1.5644	.6392	.0372
6 ⁷ / ₈	1.6339	.6120	.0389
7	1.7046	.5866	.0406
7 ¹ / ₈	1.7767	.5629	.0423
7 ¹ / ₄	1.8500	.5405	.0440
7 ³ / ₈	1.9246	.5196	.0458
7 ¹ / ₂	2.0004	.4999	.0476
7 ⁵ / ₈	2.0776	.4813	.0495
7 ³ / ₄	2.1560	.4638	.0513
7 ⁷ / ₈	2.2357	.4473	.0532
8	2.3166	.4317	.0552
8 ¹ / ₈	2.3989	.4169	.0571
8 ¹ / ₄	2.4824	.4028	.0591
8 ³ / ₈	2.5672	.3895	.0611
8 ¹ / ₂	2.6532	.3769	.0632
8 ⁵ / ₈	2.7406	.3649	.0653
8 ³ / ₄	2.8292	.3535	.0674
8 ⁷ / ₈	2.9191	.3426	.0695
9	3.0102	.3322	.0717
9 ¹ / ₈	3.1027	.3223	.0739
9 ¹ / ₄	3.1964	.3129	.0761
9 ³ / ₈	3.2914	.3038	.0784
9 ¹ / ₂	3.3876	.2952	.0807
9 ⁵ / ₈	3.4852	.2869	.0830
9 ³ / ₄	3.5840	.2790	.0853
9 ⁷ / ₈	3.6841	.2714	.0877
10	3.7854	.2642	.0901
10 ¹ / ₈	3.8881	.2572	.0926
10 ¹ / ₄	3.9920	.2505	.0950
10 ³ / ₈	4.0972	.2441	.0976
10 ¹ / ₂	4.2036	.2379	.1001
10 ⁵ / ₈	4.3114	.2319	.1027

NO.122-A

BETWEEN TUBING & HOLE**
**Tubing Size
O.D. 1.900"**
TWO STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
79.0034	.0711	14.0711	4 $\frac{1}{2}$
72.6442	.0773	12.9385	4 $\frac{5}{8}$
67.0956	.0837	11.9502	4 $\frac{3}{4}$
62.2167	.0902	11.0813	4 $\frac{7}{8}$
57.8973	.0970	10.3120	5
54.0499	.1039	9.6267	5 $\frac{1}{8}$
50.6041	.1110	9.0130	5 $\frac{1}{4}$
47.5027	.1182	8.4606	5 $\frac{3}{8}$
44.6988	.1256	7.9612	5 $\frac{1}{2}$
42.1535	.1332	7.5079	5 $\frac{5}{8}$
39.8342	.1409	7.0948	5 $\frac{3}{4}$
37.7135	.1489	6.7171	5 $\frac{7}{8}$
35.7684	.1570	6.3706	6
33.9790	.1652	6.0519	6 $\frac{1}{8}$
32.3283	.1737	5.7579	6 $\frac{1}{4}$
30.8018	.1823	5.4860	6 $\frac{3}{8}$
29.3866	.1911	5.2340	6 $\frac{1}{2}$
28.0719	.2000	4.9998	6 $\frac{5}{8}$
26.8479	.2091	4.7818	6 $\frac{3}{4}$
25.7060	.2184	4.5784	6 $\frac{7}{8}$
24.6389	.2279	4.3884	7
23.6399	.2375	4.2104	7 $\frac{1}{8}$
22.7031	.2473	4.0436	7 $\frac{1}{4}$
21.8232	.2573	3.8869	7 $\frac{3}{8}$
20.9956	.2674	3.7395	7 $\frac{1}{2}$
20.2161	.2777	3.6006	7 $\frac{5}{8}$
19.4808	.2882	3.4697	7 $\frac{3}{4}$
18.7864	.2989	3.346	7 $\frac{7}{8}$
18.1299	.3097	3.2291	8
17.5083	.3207	3.1184	8 $\frac{1}{8}$
16.9193	.3318	3.0135	8 $\frac{1}{4}$
16.3605	.3432	2.9139	8 $\frac{3}{8}$
15.8298	.3547	2.8194	8 $\frac{1}{2}$
15.3254	.3664	2.7296	8 $\frac{5}{8}$
14.8454	.3782	2.6441	8 $\frac{3}{4}$
14.3882	.3902	2.5627	8 $\frac{7}{8}$
13.9525	.4024	2.4850	9
13.5368	.4148	2.4110	9 $\frac{1}{8}$
13.1399	.4273	2.3403	9 $\frac{1}{4}$
12.7607	.4400	2.2728	9 $\frac{3}{8}$
12.3981	.4529	2.2082	9 $\frac{1}{2}$
12.0511	.4659	2.1464	9 $\frac{5}{8}$
11.7189	.4791	2.0872	9 $\frac{3}{4}$
11.4005	.4925	2.0305	9 $\frac{7}{8}$
11.0952	.5060	1.9761	10
10.8023	.5198	1.9240	10 $\frac{1}{8}$
10.5211	.5336	1.8739	10 $\frac{1}{4}$
10.2510	.5477	1.8258	10 $\frac{3}{8}$
9.9914	.5619	1.7795	10 $\frac{1}{2}$
9.7417	.5763	1.7351	10 $\frac{5}{8}$

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.900"**

THREE STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 ⁷ / ₈	.5270	1.8977	.0125
5	.5773	1.7321	.0137
5 ¹ / ₈	.6290	1.5899	.0150
5 ¹ / ₄	.6819	1.4666	.0162
5 ³ / ₈	.7361	1.3586	.0175
5 ¹ / ₂	.7915	1.2634	.0188
5 ⁵ / ₈	.8483	1.1789	.0202
5 ³ / ₄	.9063	1.1034	.0216
5 ⁷ / ₈	.9656	1.0357	.0230
6	1.0261	.9745	.0244
6 ¹ / ₈	1.0880	.9192	.0259
6 ¹ / ₄	1.1511	.8688	.0274
6 ³ / ₈	1.2155	.8227	.0289
6 ¹ / ₂	1.2811	.7806	.0305
6 ⁵ / ₈	1.3481	.7418	.0321
6 ³ / ₄	1.4163	.7061	.0337
6 ⁷ / ₈	1.4858	.6731	.0354
7	1.5565	.6425	.0371
7 ¹ / ₈	1.6286	.6140	.0388
7 ¹ / ₄	1.7019	.5876	.0405
7 ³ / ₈	1.7765	.5629	.0423
7 ¹ / ₂	1.8523	.5399	.0441
7 ⁵ / ₈	1.9295	.5183	.0459
7 ³ / ₄	2.0079	.4980	.0478
7 ⁷ / ₈	2.0876	.4790	.0497
8	2.1685	.4611	.0516
8 ¹ / ₈	2.2508	.4443	.0536
8 ¹ / ₄	2.3343	.4284	.0556
8 ³ / ₈	2.4191	.4134	.0576
8 ¹ / ₂	2.5051	.3992	.0596
8 ⁵ / ₈	2.5925	.3857	.0617
8 ³ / ₄	2.6811	.3730	.0638
8 ⁷ / ₈	2.7710	.3609	.0660
9	2.8621	.3494	.0681
9 ¹ / ₈	2.9546	.3385	.0703
9 ¹ / ₄	3.0483	.3281	.0726
9 ³ / ₈	3.1433	.3181	.0748
9 ¹ / ₂	3.2395	.3087	.0771
9 ⁵ / ₈	3.3370	.2997	.0795
9 ³ / ₄	3.4359	.2910	.0818
9 ⁷ / ₈	3.5359	.2828	.0842
10	3.6373	.2749	.0866
10 ¹ / ₈	3.7399	.2674	.0890
10 ¹ / ₄	3.8439	.2602	.0915
10 ³ / ₈	3.9490	.2532	.0940
10 ¹ / ₂	4.0555	.2466	.0966
10 ⁵ / ₈	4.1632	.2402	.0991
10 ³ / ₄	4.2723	.2341	.1017
10 ⁷ / ₈	4.3825	.2282	.1043
11	4.4941	.2225	.1070

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 1.900"**
THREE STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
79.7030	.0704	14.1957	4 ⁷ / ₈
72.7501	.0772	12.9573	5
66.7773	.0841	11.8935	5 ¹ / ₈
61.5955	.0912	10.9706	5 ³ / ₄
57.0609	.0984	10.1630	5 ⁵ / ₈
53.0626	.1058	9.4509	5 ¹ / ₂
49.5134	.1134	8.8187	5 ⁵ / ₈
46.3439	.1212	8.2542	5 ³ / ₄
43.4983	.1291	7.7474	5 ⁷ / ₈
40.9310	.1372	7.2901	6
38.6045	.1454	6.8758	6 ¹ / ₈
36.4879	.1539	6.4988	6 ¹ / ₄
34.5550	.1625	6.1545	6 ³ / ₈
32.7839	.1713	5.8391	6 ¹ / ₂
31.1560	.1802	5.5491	6 ⁵ / ₈
29.6554	.1893	5.2819	6 ³ / ₄
28.2685	.1986	5.0348	6 ⁷ / ₈
26.9833	.2081	4.8059	7
25.7898	.2177	4.5934	7 ¹ / ₈
24.6788	.2275	4.3955	7 ¹ / ₄
23.6426	.2375	4.2109	7 ³ / ₈
22.6743	.2476	4.0385	7 ¹ / ₂
21.7678	.2579	3.8770	7 ⁵ / ₈
20.9177	.2684	3.7256	7 ³ / ₄
20.1193	.2791	3.5834	7 ⁷ / ₈
19.3681	.2899	3.4496	8
18.6604	.3009	3.3236	8 ¹ / ₈
17.9928	.3120	3.2047	8 ¹ / ₄
17.3622	.3234	3.0923	8 ³ / ₈
16.7657	.3349	2.9861	8 ¹ / ₂
16.2009	.3466	2.8855	8 ⁵ / ₈
15.6654	.3584	2.7901	8 ³ / ₄
15.1573	.3704	2.6996	8 ⁷ / ₈
14.6745	.3826	2.6136	9
14.2154	.3950	2.5319	9 ¹ / ₈
13.7783	.4075	2.4540	9 ¹ / ₄
13.3620	.4202	2.3799	9 ³ / ₈
12.9649	.4331	2.3091	9 ¹ / ₂
12.5860	.4461	2.2417	9 ⁵ / ₈
12.2240	.4593	2.1772	9 ³ / ₄
11.8780	.4727	2.1156	9 ⁷ / ₈
11.5470	.4862	2.0566	10
11.2301	.5000	2.0002	10 ¹ / ₈
10.9265	.5138	1.9461	10 ¹ / ₄
10.6355	.5279	1.8943	10 ³ / ₈
10.3563	.5421	1.8445	10 ¹ / ₂
10.0883	.5565	1.7968	10 ⁵ / ₈
9.8309	.5711	1.7510	10 ³ / ₄
9.5835	.5859	1.7069	10 ⁷ / ₈
9.3456	.6008	1.6645	11

**Note: No allowance made for couplings.

**Tubing Size
O.D. 1.900"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 ¹ / ₂	.6450	1.5503	.0154
5 ⁵ / ₈	.7018	1.4249	.0167
5 ³ / ₄	.7598	1.3161	.0181
5 ⁷ / ₈	.8191	1.2209	.0195
6	.8796	1.1368	.0209
6 ¹ / ₈	.9415	1.0622	.0224
6 ¹ / ₄	1.0046	.9954	.0239
6 ³ / ₈	1.0690	.9355	.0255
6 ¹ / ₂	1.1346	.8813	.0270
6 ⁵ / ₈	1.2016	.8322	.0286
6 ³ / ₄	1.2698	.7875	.0302
6 ⁷ / ₈	1.3393	.7467	.0319
7	1.4100	.7092	.0336
7 ¹ / ₈	1.4821	.6747	.0353
7 ¹ / ₄	1.5554	.6429	.0370
7 ³ / ₈	1.6300	.6135	.0388
7 ¹ / ₂	1.7058	.5862	.0406
7 ⁵ / ₈	1.7830	.5609	.0425
7 ³ / ₄	1.8614	.5372	.0443
7 ⁷ / ₈	1.9411	.5152	.0462
8	2.0220	.4945	.0481
8 ¹ / ₈	2.1043	.4752	.0501
8 ¹ / ₄	2.1878	.4571	.0521
8 ³ / ₈	2.2726	.4400	.0541
8 ¹ / ₂	2.3586	.4240	.0562
8 ⁵ / ₈	2.4460	.4088	.0582
8 ³ / ₄	2.5346	.3945	.0603
8 ⁷ / ₈	2.6245	.3810	.0625
9	2.7156	.3682	.0647
9 ¹ / ₈	2.8081	.3561	.0669
9 ¹ / ₄	2.9018	.3446	.0691
9 ³ / ₈	2.9968	.3337	.0714
9 ¹ / ₂	3.0930	.3233	.0736
9 ⁵ / ₈	3.1906	.3134	.0760
9 ³ / ₄	3.2894	.3040	.0783
9 ⁷ / ₈	3.3895	.2950	.0807
10	3.4908	.2865	.0831
10 ¹ / ₈	3.5935	.2783	.0856
10 ¹ / ₄	3.6974	.2705	.0880
10 ³ / ₈	3.8026	.2630	.0905
10 ¹ / ₂	3.9090	.2558	.0931
10 ⁵ / ₈	4.0168	.2490	.0956
10 ³ / ₄	4.1258	.2424	.0982
10 ⁷ / ₈	4.2361	.2361	.1009
11	4.3476	.2300	.1035
11 ¹ / ₈	4.4605	.2242	.1062
11 ¹ / ₄	4.5746	.2186	.1089
11 ³ / ₈	4.6900	.2132	.1117
11 ¹ / ₂	4.8066	.2080	.1144
11 ⁵ / ₈	4.9246	.2031	.1173

NO.122-A

Tubing Size
O.D. 1.900"
FOUR STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
65.1116	.0862	11.5969	5½
59.8475	.0938	10.6593	5⅓
55.2780	.1016	9.8454	5⅔
51.2768	.1095	9.1328	5⅔
47.7465	.1176	8.5040	6
44.6105	.1259	7.9455	6⅓
41.8079	.1343	7.4463	6⅔
39.2897	.1429	6.9978	6⅔
37.0160	.1517	6.5928	6½
34.9539	.1606	6.2256	6⅓
33.0762	.1697	5.8911	6⅔
31.3601	.1790	5.5855	6⅔
29.7863	.1885	5.3052	7
28.3385	.1981	5.0473	7⅓
27.0028	.2079	4.8094	7⅔
25.7672	.2179	4.5893	7⅔
24.6212	.2280	4.3852	7½
23.5561	.2383	4.1955	7⅓
22.5637	.2488	4.0188	7⅔
21.6374	.2595	3.8538	7⅔
20.7711	.2703	3.6995	8
19.9593	.2813	3.5549	8⅓
19.1974	.2925	3.4192	8⅔
18.4812	.3038	3.2916	8⅔
17.8069	.3153	3.1715	8½
17.1710	.3270	3.0583	8⅓
16.5707	.3388	2.9514	8⅔
16.0032	.3508	2.8503	8⅔
15.4660	.3630	2.7546	9
14.9568	.3754	2.6639	9⅓
14.4738	.3879	2.5779	9⅔
14.0151	.4006	2.4962	9⅔
13.5789	.4135	2.4185	9½
13.1638	.4265	2.3446	9⅓
12.7683	.4397	2.2741	9⅔
12.3913	.4531	2.2070	9⅔
12.0315	.4667	2.1429	10
11.6878	.4804	2.0817	10⅓
11.3594	.4943	2.0232	10⅔
11.0451	.5083	1.9672	10⅔
10.7443	.5226	1.9136	10½
10.4561	.5370	1.8623	10⅓
10.1799	.5515	1.8131	10⅔
9.9148	.5663	1.7659	10⅔
9.6604	.5812	1.7206	11
9.4160	.5963	1.6771	11⅓
9.1812	.6115	1.6352	11⅔
8.9553	.6270	1.5950	11⅔
8.7379	.6426	1.5563	11½
8.5287	.6583	1.5190	11⅓

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.063"**
ONE STRING

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
2 ¹ / ₂	.0814	12.2912	.0019
2 ⁵ / ₈	.1075	9.3026	.0026
2 ³ / ₄	.1349	7.4124	.0032
2 ⁷ / ₈	.1636	6.1126	.0039
3	.1936	5.1664	.0046
3 ¹ / ₈	.2248	4.4485	.0054
3 ¹ / ₄	.2573	3.8864	.0061
3 ³ / ₈	.2911	3.4353	.0069
3 ¹ / ₂	.3262	3.0660	.0078
3 ⁵ / ₈	.3625	2.7587	.0086
3 ³ / ₄	.4001	2.4993	.0095
3 ⁷ / ₈	.4390	2.2779	.0105
4	.4792	2.0870	.0114
4 ¹ / ₈	.5206	1.9209	.0124
4 ¹ / ₄	.5633	1.7752	.0134
4 ³ / ₈	.6073	1.6466	.0145
4 ¹ / ₂	.6526	1.5324	.0155
4 ⁵ / ₈	.6991	1.4304	.0166
4 ³ / ₄	.7469	1.3389	.0178
4 ⁷ / ₈	.7960	1.2563	.0190
5	.8464	1.1815	.0202
5 ¹ / ₈	.8980	1.1136	.0214
5 ¹ / ₄	.9509	1.0516	.0226
5 ³ / ₈	1.0051	.9949	.0239
5 ¹ / ₂	1.0606	.9429	.0253
5 ⁵ / ₈	1.1173	.8950	.0266
5 ³ / ₄	1.1753	.8508	.0280
5 ⁷ / ₈	1.2346	.8100	.0294
6	1.2952	.7721	.0308
6 ¹ / ₈	1.3570	.7369	.0323
6 ¹ / ₄	1.4201	.7042	.0338
6 ³ / ₈	1.4845	.6736	.0353
6 ¹ / ₂	1.5502	.6451	.0369
6 ⁵ / ₈	1.6171	.6184	.0385
6 ³ / ₄	1.6853	.5934	.0401
6 ⁷ / ₈	1.7548	.5699	.0418
7	1.8256	.5478	.0435
7 ¹ / ₈	1.8976	.5270	.0452
7 ¹ / ₄	1.9709	.5074	.0469
7 ³ / ₈	2.0455	.4889	.0487
7 ¹ / ₂	2.1214	.4714	.0505
7 ⁵ / ₈	2.1985	.4549	.0523
7 ³ / ₄	2.2769	.4392	.0542
7 ⁷ / ₈	2.3566	.4243	.0561
8	2.4376	.4102	.0580
8 ¹ / ₈	2.5198	.3969	.0600
8 ¹ / ₄	2.6033	.3841	.0620
8 ³ / ₈	2.6881	.3720	.0640
8 ¹ / ₂	2.7742	.3605	.0661
8 ⁵ / ₈	2.8615	.3495	.0681

NO.122-A

Tubing Size
O.D. 2.063"
ONE STRING

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
516.2300	.0109	91.9445	2 $\frac{1}{2}$
390.7103	.0144	69.5885	2 $\frac{5}{8}$
311.3211	.0180	55.4487	2 $\frac{3}{4}$
256.7294	.0219	45.7255	2 $\frac{7}{8}$
216.9883	.0259	38.6473	3
186.8359	.0301	33.2769	3 $\frac{1}{8}$
163.2281	.0344	29.0722	3 $\frac{1}{4}$
144.2823	.0389	25.6978	3 $\frac{3}{8}$
128.7717	.0436	22.9352	3 $\frac{1}{2}$
115.8634	.0485	20.6361	3 $\frac{5}{8}$
104.9716	.0535	18.6962	3 $\frac{3}{4}$
95.6729	.0587	17.0401	3 $\frac{7}{8}$
87.6537	.0641	15.6118	4
80.6768	.0696	14.3692	4 $\frac{1}{8}$
74.5596	.0753	13.2796	4 $\frac{1}{4}$
69.1591	.0812	12.3178	4 $\frac{3}{8}$
64.3621	.0872	11.4634	4 $\frac{1}{2}$
60.0777	.0935	10.7003	4 $\frac{5}{8}$
56.2319	.0998	10.0153	4 $\frac{3}{4}$
52.7642	.1064	9.3977	4 $\frac{7}{8}$
49.6244	.1131	8.8385	5
46.7709	.1200	8.3302	5 $\frac{1}{8}$
44.1684	.1271	7.8667	5 $\frac{1}{4}$
41.7871	.1344	7.4426	5 $\frac{3}{8}$
39.6018	.1418	7.0534	5 $\frac{1}{2}$
37.5908	.1494	6.6952	5 $\frac{5}{8}$
35.7354	.1571	6.3647	5 $\frac{3}{4}$
34.0193	.1650	6.0591	5 $\frac{7}{8}$
32.4285	.1731	5.7758	6
30.9508	.1814	5.5126	6 $\frac{1}{8}$
29.5753	.1898	5.2676	6 $\frac{1}{4}$
28.2925	.1984	5.0391	6 $\frac{3}{8}$
27.0941	.2072	4.8257	6 $\frac{1}{2}$
25.9725	.2162	4.6259	6 $\frac{5}{8}$
24.9213	.2253	4.4387	6 $\frac{3}{4}$
23.9345	.2346	4.2629	6 $\frac{7}{8}$
23.0067	.2440	4.0977	7
22.1333	.2537	3.9421	7 $\frac{1}{8}$
21.3100	.2635	3.7955	7 $\frac{1}{4}$
20.5330	.2734	3.6571	7 $\frac{3}{8}$
19.7987	.2836	3.5263	7 $\frac{1}{2}$
19.1040	.2939	3.4026	7 $\frac{5}{8}$
18.4461	.3044	3.2854	7 $\frac{3}{4}$
17.8224	.3150	3.1743	7 $\frac{7}{8}$
17.2304	.3259	3.0689	8
16.6681	.3368	2.9687	8 $\frac{1}{8}$
16.1333	.3480	2.8735	8 $\frac{1}{4}$
15.6245	.3593	2.7828	8 $\frac{3}{8}$
15.1398	.3709	2.6965	8 $\frac{1}{2}$
14.6777	.3825	2.6142	8 $\frac{5}{8}$

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.063"**

TWO STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 ⁷ / ₈	.6224	1.6068	.0148
5	.6727	1.4865	.0160
5 ¹ / ₈	.7244	1.3805	.0172
5 ¹ / ₄	.7773	1.2866	.0185
5 ³ / ₈	.8315	1.2027	.0198
5 ¹ / ₂	.8869	1.1275	.0211
5 ⁵ / ₈	.9436	1.0597	.0225
5 ³ / ₄	1.0017	.9983	.0238
5 ⁷ / ₈	1.0609	.9426	.0253
6	1.1215	.8917	.0267
6 ¹ / ₈	1.1833	.8451	.0282
6 ¹ / ₄	1.2465	.8023	.0297
6 ³ / ₈	1.3108	.7629	.0312
6 ¹ / ₂	1.3765	.7265	.0328
6 ⁵ / ₈	1.4434	.6928	.0344
6 ³ / ₄	1.5117	.6615	.0360
6 ⁷ / ₈	1.5811	.6325	.0376
7	1.6519	.6054	.0393
7 ¹ / ₈	1.7239	.5801	.0410
7 ¹ / ₄	1.7973	.5564	.0428
7 ³ / ₈	1.8718	.5342	.0446
7 ¹ / ₂	1.9477	.5134	.0464
7 ⁵ / ₈	2.0248	.4939	.0482
7 ³ / ₄	2.1033	.4755	.0501
7 ⁷ / ₈	2.1829	.4581	.0520
8	2.2639	.4417	.0539
8 ¹ / ₈	2.3461	.4262	.0559
8 ¹ / ₄	2.4297	.4116	.0578
8 ³ / ₈	2.5144	.3977	.0599
8 ¹ / ₂	2.6005	.3845	.0619
8 ⁵ / ₈	2.6878	.3720	.0640
8 ³ / ₄	2.7765	.3602	.0661
8 ⁷ / ₈	2.8663	.3489	.0682
9	2.9575	.3381	.0704
9 ¹ / ₈	3.0499	.3279	.0726
9 ¹ / ₄	3.1437	.3181	.0748
9 ³ / ₈	3.2386	.3088	.0771
9 ¹ / ₂	3.3349	.2999	.0794
9 ⁵ / ₈	3.4324	.2913	.0817
9 ³ / ₄	3.5313	.2832	.0841
9 ⁷ / ₈	3.6313	.2754	.0865
10	3.7327	.2679	.0889
10 ¹ / ₈	3.8353	.2607	.0913
10 ¹ / ₄	3.9393	.2539	.0938
10 ³ / ₈	4.0444	.2473	.0963
10 ¹ / ₂	4.1509	.2409	.0988
10 ⁵ / ₈	4.2586	.2348	.1014
10 ³ / ₄	4.3677	.2290	.1040
10 ⁷ / ₈	4.4779	.2233	.1066
11	4.5895	.2179	.1093

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 2.063"**
TWO STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
67.4861	.0832	12.0198	4 ⁷ / ₈
62.4338	.0899	11.1199	5
57.9830	.0968	10.3272	5 ¹ / ₈
54.0358	.1039	9.6242	5 ³ / ₄
50.5142	.1111	8.9970	5 ⁵ / ₈
47.3553	.1186	8.4343	5 ¹ / ₂
44.5080	.1261	7.9272	5 ⁵ / ₈
41.9303	.1339	7.4681	5 ³ / ₄
39.5872	.1418	7.0508	5 ⁷ / ₈
37.4494	.1499	6.6700	6
35.4925	.1582	6.3215	6 ¹ / ₈
33.6954	.1666	6.0014	6 ¹ / ₄
32.0403	.1752	5.7066	6 ³ / ₈
30.5119	.1840	5.4344	6 ¹ / ₂
29.0970	.1930	5.1824	6 ⁵ / ₈
27.7840	.2021	4.9485	6 ³ / ₄
26.5630	.2114	4.7311	6 ⁷ / ₈
25.4251	.2208	4.5284	7
24.3627	.2305	4.3392	7 ¹ / ₈
23.3689	.2403	4.1622	7 ¹ / ₄
22.4377	.2502	3.9963	7 ³ / ₈
21.5638	.2604	3.8407	7 ¹ / ₂
20.7423	.2707	3.6944	7 ⁵ / ₈
19.9690	.2812	3.5566	7 ³ / ₄
19.2400	.2918	3.4268	7 ⁷ / ₈
18.5520	.3026	3.3042	8
17.9017	.3136	3.1884	8 ¹ / ₈
17.2864	.3248	3.0788	8 ¹ / ₄
16.7035	.3361	2.9750	8 ³ / ₈
16.1507	.3476	2.8766	8 ¹ / ₂
15.6259	.3593	2.7831	8 ⁵ / ₈
15.1272	.3712	2.6943	8 ³ / ₄
14.6528	.3832	2.6098	8 ⁷ / ₈
14.2011	.3954	2.5293	9
13.7707	.4077	2.4527	9 ¹ / ₈
13.3602	.4202	2.3796	9 ¹ / ₄
12.9684	.4329	2.3098	9 ³ / ₈
12.5941	.4458	2.2431	9 ¹ / ₂
12.2362	.4589	2.1794	9 ⁵ / ₈
11.8938	.4721	2.1184	9 ³ / ₄
11.5660	.4854	2.0600	9 ⁷ / ₈
11.2519	.4990	2.0040	10
10.9508	.5127	1.9504	10 ¹ / ₈
10.6619	.5266	1.8990	10 ¹ / ₄
10.3846	.5407	1.8496	10 ³ / ₈
10.1183	.5549	1.8021	10 ¹ / ₂
9.8623	.5693	1.7566	10 ⁵ / ₈
9.6161	.5839	1.7127	10 ³ / ₄
9.3793	.5986	1.6705	10 ⁷ / ₈
9.1513	.6135	1.6299	11

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.063"**
THREE STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 ¹ / ₄	.6036	1.6567	.0144
5 ³ / ₈	.6578	1.5202	.0157
5 ¹ / ₂	.7133	1.4020	.0170
5 ⁵ / ₈	.7700	1.2987	.0183
5 ³ / ₄	.8280	1.2077	.0197
5 ⁷ / ₈	.8873	1.1270	.0211
6	.9479	1.0550	.0226
6 ¹ / ₈	1.0097	.9904	.0240
6 ¹ / ₄	1.0728	.9321	.0255
6 ³ / ₈	1.1372	.8793	.0271
6 ¹ / ₂	1.2029	.8313	.0286
6 ⁵ / ₈	1.2698	.7875	.0302
6 ³ / ₄	1.3380	.7474	.0319
6 ⁷ / ₈	1.4075	.7105	.0335
7	1.4783	.6765	.0352
7 ¹ / ₈	1.5503	.6450	.0369
7 ¹ / ₄	1.6236	.6159	.0387
7 ³ / ₈	1.6982	.5889	.0404
7 ¹ / ₂	1.7741	.5637	.0422
7 ⁵ / ₈	1.8512	.5402	.0441
7 ³ / ₄	1.9296	.5182	.0459
7 ⁷ / ₈	2.0093	.4977	.0478
8	2.0903	.4784	.0498
8 ¹ / ₈	2.1725	.4603	.0517
8 ¹ / ₄	2.2560	.4433	.0537
8 ³ / ₈	2.3408	.4272	.0557
8 ¹ / ₂	2.4269	.4121	.0578
8 ⁵ / ₈	2.5142	.3977	.0599
8 ³ / ₄	2.6028	.3842	.0620
8 ⁷ / ₈	2.6927	.3714	.0641
9	2.7839	.3592	.0663
9 ¹ / ₈	2.8763	.3477	.0685
9 ¹ / ₄	2.9700	.3367	.0707
9 ³ / ₈	3.0650	.3263	.0730
9 ¹ / ₂	3.1613	.3163	.0753
9 ⁵ / ₈	3.2588	.3069	.0776
9 ³ / ₄	3.3576	.2978	.0799
9 ⁷ / ₈	3.4577	.2892	.0823
10	3.5591	.2810	.0847
10 ¹ / ₈	3.6617	.2731	.0872
10 ¹ / ₄	3.7656	.2656	.0897
10 ³ / ₈	3.8708	.2583	.0922
10 ¹ / ₂	3.9773	.2514	.0947
10 ⁵ / ₈	4.0850	.2448	.0973
10 ³ / ₄	4.1940	.2384	.0999
10 ⁷ / ₈	4.3043	.2323	.1025
11	4.4159	.2265	.1051
11 ¹ / ₈	4.5287	.2208	.1078
11 ¹ / ₄	4.6428	.2154	.1105
11 ³ / ₈	4.7582	.2102	.1133

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 2.063"**
THREE STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
69.5804	.0807	12.3928	5 $\frac{1}{4}$
63.8487	.0879	11.3719	5 $\frac{3}{8}$
58.8839	.0954	10.4877	5 $\frac{1}{2}$
54.5451	.1029	9.7149	5 $\frac{5}{8}$
50.7236	.1107	9.0343	5 $\frac{3}{4}$
47.3344	.1186	8.4306	5 $\frac{7}{8}$
44.3100	.1267	7.8919	6
41.5963	.1350	7.4086	6 $\frac{1}{8}$
39.1493	.1434	6.9728	6 $\frac{1}{4}$
36.9327	.1520	6.5780	6 $\frac{3}{8}$
34.9166	.1608	6.2189	6 $\frac{1}{2}$
33.0760	.1697	5.8911	6 $\frac{5}{8}$
31.3898	.1789	5.5908	6 $\frac{3}{4}$
29.8401	.1882	5.3147	6 $\frac{7}{8}$
28.4117	.1976	5.0603	7
27.0915	.2072	4.8252	7 $\frac{1}{8}$
25.8682	.2170	4.6073	7 $\frac{1}{4}$
24.7320	.2270	4.4050	7 $\frac{3}{8}$
23.6744	.2372	4.2166	7 $\frac{1}{2}$
22.6880	.2475	4.0409	7 $\frac{5}{8}$
21.7660	.2580	3.8767	7 $\frac{3}{4}$
20.9028	.2686	3.7229	7 $\frac{7}{8}$
20.0932	.2794	3.5787	8
19.3326	.2904	3.4433	8 $\frac{1}{8}$
18.6169	.3016	3.3158	8 $\frac{1}{4}$
17.9426	.3129	3.1957	8 $\frac{3}{8}$
17.3063	.3244	3.0824	8 $\frac{1}{2}$
16.7051	.3361	2.9753	8 $\frac{5}{8}$
16.1364	.3479	2.8740	8 $\frac{3}{4}$
15.5977	.3600	2.7781	8 $\frac{7}{8}$
15.0870	.3721	2.6871	9
14.6021	.3845	2.6007	9 $\frac{1}{8}$
14.1414	.3970	2.5187	9 $\frac{1}{4}$
13.7031	.4097	2.4406	9 $\frac{3}{8}$
13.2858	.4226	2.3663	9 $\frac{1}{2}$
12.8882	.4356	2.2955	9 $\frac{5}{8}$
12.5089	.4488	2.2279	9 $\frac{3}{4}$
12.1468	.4622	2.1634	9 $\frac{7}{8}$
11.8009	.4758	2.1018	10
11.4701	.4895	2.0429	10 $\frac{1}{8}$
11.1536	.5034	1.9865	10 $\frac{1}{4}$
10.8505	.5175	1.9326	10 $\frac{3}{8}$
10.5600	.5317	1.8808	10 $\frac{1}{2}$
10.2815	.5461	1.8312	10 $\frac{5}{8}$
10.0143	.5607	1.7836	10 $\frac{3}{4}$
9.7577	.5754	1.7379	10 $\frac{7}{8}$
9.5112	.5903	1.6940	11
9.2742	.6054	1.6518	11 $\frac{1}{8}$
9.0462	.6207	1.6112	11 $\frac{1}{4}$
8.8269	.6361	1.5721	11 $\frac{3}{8}$

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.063"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 ³ / ₄	.6544	1.5282	.0156
5 ⁷ / ₈	.7137	1.4012	.0170
6	.7742	1.2916	.0184
6 ¹ / ₈	.8361	1.1961	.0199
6 ¹ / ₄	.8992	1.1121	.0214
6 ³ / ₈	.9636	1.0378	.0229
6 ¹ / ₂	1.0292	.9716	.0245
6 ⁵ / ₈	1.0962	.9123	.0261
6 ³ / ₄	1.1644	.8588	.0277
6 ⁷ / ₈	1.2339	.8105	.0294
7	1.3046	.7665	.0311
7 ¹ / ₈	1.3767	.7264	.0328
7 ¹ / ₄	1.4500	.6897	.0345
7 ³ / ₈	1.5246	.6559	.0363
7 ¹ / ₂	1.6004	.6248	.0381
7 ⁵ / ₈	1.6776	.5961	.0399
7 ³ / ₄	1.7560	.5695	.0418
7 ⁷ / ₈	1.8357	.5448	.0437
8	1.9166	.5218	.0456
8 ¹ / ₈	1.9989	.5003	.0476
8 ¹ / ₄	2.0824	.4802	.0496
8 ³ / ₈	2.1672	.4614	.0516
8 ¹ / ₂	2.2532	.4438	.0536
8 ⁵ / ₈	2.3406	.4272	.0557
8 ³ / ₄	2.4292	.4117	.0578
8 ⁷ / ₈	2.5191	.3970	.0600
9	2.6102	.3831	.0621
9 ¹ / ₈	2.7027	.3700	.0643
9 ¹ / ₄	2.7964	.3576	.0666
9 ³ / ₈	2.8914	.3459	.0688
9 ¹ / ₂	2.9876	.3347	.0711
9 ⁵ / ₈	3.0852	.3241	.0735
9 ³ / ₄	3.1840	.3141	.0758
9 ⁷ / ₈	3.2841	.3045	.0782
10	3.3854	.2954	.0806
10 ¹ / ₈	3.4881	.2867	.0830
10 ¹ / ₄	3.5920	.2784	.0855
10 ³ / ₈	3.6972	.2705	.0880
10 ¹ / ₂	3.8036	.2629	.0906
10 ⁵ / ₈	3.9114	.2557	.0931
10 ³ / ₄	4.0204	.2487	.0957
10 ⁷ / ₈	4.1307	.2421	.0983
11	4.2422	.2357	.1010
11 ¹ / ₈	4.3551	.2296	.1037
11 ¹ / ₄	4.4692	.2238	.1064
11 ³ / ₈	4.5846	.2181	.1092
11 ¹ / ₂	4.7012	.2127	.1119
11 ⁵ / ₈	4.8192	.2075	.1147
11 ³ / ₄	4.9384	.2025	.1176
11 ⁷ / ₈	5.0589	.1977	.1204

NO.122-A

Tubing Size
O.D. 2.063"

FOUR STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
64.1834	.0875	11.4316	5 ³ / ₄
58.8514	.0954	10.4819	5 ⁷ / ₈
54.2479	.1035	9.6620	6
50.2355	.1118	8.9473	6 ¹ / ₈
46.7096	.1202	8.3193	6 ¹ / ₄
43.5883	.1288	7.7634	6 ³ / ₈
40.8075	.1376	7.2681	6 ¹ / ₂
38.3155	.1465	6.8243	6 ⁵ / ₈
36.0709	.1557	6.4245	6 ³ / ₄
34.0395	.1649	6.0627	6 ⁷ / ₈
32.1932	.1744	5.7339	7
30.5086	.1840	5.4338	7 ¹ / ₈
28.9661	.1938	5.1591	7 ¹ / ₄
27.5489	.2038	4.9067	7 ³ / ₈
26.2431	.2139	4.6741	7 ¹ / ₂
25.0364	.2243	4.4592	7 ⁵ / ₈
23.9184	.2347	4.2600	7 ³ / ₄
22.8801	.2454	4.0751	7 ⁷ / ₈
21.9136	.2562	3.9030	8
21.0120	.2672	3.7424	8 ¹ / ₈
20.1693	.2784	3.5923	8 ¹ / ₄
19.3802	.2897	3.4518	8 ³ / ₈
18.6400	.3012	3.3199	8 ¹ / ₂
17.9444	.3129	3.1960	8 ⁵ / ₈
17.2899	.3247	3.0795	8 ³ / ₄
16.6729	.3367	2.9696	8 ⁷ / ₈
16.0906	.3489	2.8659	9
15.5403	.3613	2.7678	9 ¹ / ₈
15.0195	.3738	2.6751	9 ¹ / ₄
14.5261	.3865	2.5872	9 ³ / ₈
14.0580	.3994	2.5038	9 ¹ / ₂
13.6136	.4124	2.4247	9 ⁵ / ₈
13.1911	.4256	2.3494	9 ³ / ₄
12.7891	.4390	2.2778	9 ⁷ / ₈
12.4061	.4526	2.2096	10
12.0411	.4663	2.1446	10 ¹ / ₈
11.6928	.4802	2.0826	10 ¹ / ₄
11.3601	.4942	2.0233	10 ³ / ₈
11.0421	.5085	1.9667	10 ¹ / ₂
10.7380	.5229	1.9125	10 ⁵ / ₈
10.4468	.5374	1.8607	10 ³ / ₄
10.1679	.5522	1.8110	10 ⁷ / ₈
9.9005	.5671	1.7634	11
9.6440	.5822	1.7177	11 ¹ / ₈
9.3977	.5974	1.6738	11 ¹ / ₄
9.1612	.6129	1.6317	11 ³ / ₈
8.9339	.6285	1.5912	11 ¹ / ₂
8.7152	.6442	1.5522	11 ⁵ / ₈
8.5048	.6602	1.5148	11 ³ / ₄
8.3023	.6763	1.4787	11 ⁷ / ₈

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.375"**
ONE STRING

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
3 ¹ / ₂	.2697	3.7083	.0064
3 ⁵ / ₈	.3060	3.2680	.0073
3 ³ / ₄	.3436	2.9103	.0082
3 ⁷ / ₈	.3825	2.6144	.0091
4	.4227	2.3660	.0101
4 ¹ / ₈	.4641	2.1547	.0110
4 ¹ / ₄	.5068	1.9731	.0121
4 ³ / ₈	.5508	1.8155	.0131
4 ¹ / ₂	.5961	1.6777	.0142
4 ⁵ / ₈	.6426	1.5562	.0153
4 ³ / ₄	.6904	1.4484	.0164
4 ⁷ / ₈	.7395	1.3523	.0176
5	.7899	1.2660	.0188
5 ¹ / ₈	.8415	1.1884	.0200
5 ¹ / ₄	.8944	1.1181	.0213
5 ³ / ₈	.9486	1.0542	.0226
5 ¹ / ₂	1.0041	.9960	.0239
5 ⁵ / ₈	1.0608	.9427	.0253
5 ³ / ₄	1.1188	.8938	.0266
5 ⁷ / ₈	1.1781	.8488	.0280
6	1.2387	.8073	.0295
6 ¹ / ₈	1.3005	.7689	.0310
6 ¹ / ₄	1.3636	.7333	.0325
6 ³ / ₈	1.4280	.7003	.0340
6 ¹ / ₂	1.4937	.6695	.0356
6 ⁵ / ₈	1.5606	.6408	.0372
6 ³ / ₄	1.6288	.6139	.0388
6 ⁷ / ₈	1.6983	.5888	.0404
7	1.7691	.5653	.0421
7 ¹ / ₈	1.8411	.5432	.0438
7 ¹ / ₄	1.9144	.5224	.0456
7 ³ / ₈	1.9890	.5028	.0474
7 ¹ / ₂	2.0649	.4843	.0492
7 ⁵ / ₈	2.1420	.4669	.0510
7 ³ / ₄	2.2204	.4504	.0529
7 ⁷ / ₈	2.3001	.4348	.0548
8	2.3811	.4200	.0567
8 ¹ / ₈	2.4633	.4060	.0586
8 ¹ / ₄	2.5468	.3926	.0606
8 ³ / ₈	2.6316	.3800	.0627
8 ¹ / ₂	2.7177	.3680	.0647
8 ⁵ / ₈	2.8050	.3565	.0668
8 ³ / ₄	2.8936	.3456	.0689
8 ⁷ / ₈	2.9835	.3352	.0710
9	3.0747	.3252	.0732
9 ¹ / ₈	3.1671	.3157	.0754
9 ¹ / ₄	3.2608	.3067	.0776
9 ³ / ₈	3.3558	.2980	.0799
9 ¹ / ₂	3.4521	.2897	.0822

NO.122-A

Tubing Size
O.D. 2.375"
ONE STRING

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
155.7506	.0360	27.7404	3½
137.2552	.0409	24.4462	3⁹/₈
122.2310	.0459	21.7703	3³/₄
109.8042	.0511	19.5570	3⁷/₈
99.3703	.0565	17.6986	4
90.4979	.0620	16.1184	4¹/₈
82.8711	.0678	14.7600	4¹/₄
76.2529	.0736	13.5812	4³/₈
70.4626	.0797	12.5499	4½
65.3596	.0859	11.6410	4⁹/₈
60.8333	.0923	10.8349	4³/₄
56.7953	.0989	10.1157	4⁷/₈
53.1739	.1056	9.4707	5
49.9110	.1125	8.8895	5¹/₈
46.9583	.1196	8.3636	5¹/₄
44.2759	.1268	7.8859	5³/₈
41.8302	.1342	7.4503	5½
39.5929	.1418	7.0518	5⁹/₈
37.5399	.1496	6.6861	5³/₄
35.6507	.1575	6.3497	5⁷/₈
33.9076	.1656	6.0392	6
32.2953	.1739	5.7520	6¹/₈
30.8006	.1823	5.4858	6¹/₄
29.4118	.1909	5.2385	6³/₈
28.1189	.1997	5.0082	6½
26.9128	.2086	4.7934	6⁹/₈
25.7857	.2177	4.5926	6³/₄
24.7307	.2270	4.4047	6⁷/₈
23.7414	.2365	4.2285	7
22.8125	.2461	4.0631	7¹/₈
21.9389	.2559	3.9075	7¹/₄
21.1162	.2659	3.7610	7³/₈
20.3404	.2760	3.6228	7½
19.6079	.2863	3.4923	7⁹/₈
18.9154	.2968	3.3690	7³/₄
18.2601	.3075	3.2523	7⁷/₈
17.6392	.3183	3.1417	8
17.0503	.3293	3.0368	8¹/₈
16.4912	.3405	2.9372	8¹/₄
15.9599	.3518	2.8426	8³/₈
15.4545	.3633	2.7526	8½
14.9733	.3750	2.6669	8⁹/₈
14.5148	.3868	2.5852	8³/₄
14.0775	.3988	2.5073	8⁷/₈
13.6601	.4110	2.4330	9
13.2614	.4234	2.3620	9¹/₈
12.8803	.4359	2.2941	9¹/₄
12.5157	.4486	2.2291	9³/₈
12.1667	.4615	2.1670	9½

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.375"**

TWO STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 ¹ / ₂	.7739	1.2921	.0184
5 ⁵ / ₈	.8307	1.2039	.0198
5 ³ / ₄	.8887	1.1253	.0212
5 ⁷ / ₈	.9480	1.0549	.0226
6	1.0085	.9915	.0240
6 ¹ / ₈	1.0704	.9343	.0255
6 ¹ / ₄	1.1335	.8822	.0270
6 ³ / ₈	1.1979	.8348	.0285
6 ¹ / ₂	1.2635	.7914	.0301
6 ⁵ / ₈	1.3305	.7516	.0317
6 ³ / ₄	1.3987	.7150	.0333
6 ⁷ / ₈	1.4682	.6811	.0350
7	1.5389	.6498	.0366
7 ¹ / ₈	1.6110	.6207	.0364
7 ¹ / ₄	1.6843	.5937	.0401
7 ³ / ₈	1.7589	.5686	.0419
7 ¹ / ₂	1.8347	.5450	.0437
7 ⁵ / ₈	1.9119	.5231	.0455
7 ³ / ₄	1.9903	.5024	.0474
7 ⁷ / ₈	2.0700	.4831	.0493
8	2.1509	.4649	.0512
8 ¹ / ₈	2.2332	.4478	.0532
8 ¹ / ₄	2.3167	.4317	.0552
8 ³ / ₈	2.4015	.4164	.0572
8 ¹ / ₂	2.4875	.4020	.0592
8 ⁵ / ₈	2.5749	.3884	.0613
8 ³ / ₄	2.6635	.3755	.0634
8 ⁷ / ₈	2.7534	.3632	.0656
9	2.8445	.3516	.0677
9 ¹ / ₈	2.9370	.3405	.0699
9 ¹ / ₄	3.0307	.3300	.0722
9 ³ / ₈	3.1257	.3199	.0744
9 ¹ / ₂	3.2219	.3104	.0767
9 ⁵ / ₈	3.3195	.3013	.0790
9 ³ / ₄	3.4183	.2925	.0814
9 ⁷ / ₈	3.5184	.2842	.0838
10	3.6197	.2763	.0862
10 ¹ / ₈	3.7224	.2686	.0886
10 ¹ / ₄	3.8263	.2614	.0911
10 ³ / ₈	3.9315	.2544	.0936
10 ¹ / ₂	4.0379	.2477	.0961
10 ⁵ / ₈	4.1457	.2412	.0987
10 ³ / ₄	4.2547	.2350	.1013
10 ⁷ / ₈	4.3650	.2291	.1039
11	4.4765	.2234	.1066
11 ¹ / ₈	4.5894	.2179	.1093
11 ¹ / ₄	4.7035	.2126	.1120
11 ³ / ₈	4.8189	.2075	.1147
11 ¹ / ₂	4.9355	.2026	.1175
11 ⁵ / ₈	5.0535	.1979	.1203

NO.122-A

BETWEEN TUBING & HOLE**
**Tubing Size
O.D. 2.375"**
TWO STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
54.2690	.1035	9.6657	5½
50.5622	.1110	9.0055	5⅓
47.2615	.1188	8.4176	5⅔
44.3057	.1267	7.8912	5⅔
41.6451	.1348	7.4173	6
39.2391	.1431	6.9888	6⅓
37.0543	.1515	6.5996	6¼
35.0625	.1601	6.2449	6⅔
33.2404	.1689	5.9204	6½
31.5680	.1779	5.6225	6⅔
30.0285	.1870	5.3483	6¾
28.6073	.1963	5.0952	6⅔
27.2918	.2057	4.8609	7
26.0714	.2154	4.6435	7⅓
24.9366	.2252	4.4414	7¼
23.8791	.2351	4.2531	7⅔
22.8918	.2453	4.0772	7½
21.9682	.2556	3.9127	7⅔
21.1027	.2661	3.7585	7¾
20.2903	.2767	3.6139	7⅔
19.5265	.2875	3.4778	8
18.8075	.2985	3.3498	8⅓
18.1295	.3097	3.2290	8¼
17.4894	.3210	3.1150	8⅔
16.8843	.3325	3.0072	8½
16.3116	.3442	2.9052	8⅔
15.7689	.3561	2.8086	8¾
15.2541	.3681	2.7169	8⅔
14.7652	.3803	2.6298	9
14.3005	.3926	2.5470	9⅓
13.8583	.4051	2.4683	9¼
13.4372	.4178	2.3933	9⅔
13.0357	.4307	2.3218	9½
12.6527	.4437	2.2535	9⅔
12.2869	.4570	2.1884	9¾
11.9374	.4703	2.1261	9⅔
11.6031	.4839	2.0666	10
11.2832	.4976	2.0096	10⅓
10.9768	.5115	1.9550	10¼
10.6831	.5256	1.9027	10⅔
10.4014	.5398	1.8526	10½
10.1311	.5542	1.8044	10⅓
9.8715	.5688	1.7582	10¾
9.6221	.5835	1.7138	10⅔
9.3823	.5984	1.6711	11
9.1516	.6135	1.6300	11⅓
8.9296	.6288	1.5904	11¼
8.7158	.6442	1.5523	11⅔
8.5098	.6598	1.5157	11½
8.3112	.6755	1.4803	11⅔

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.375"**
THREE STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 ⁷ / ₈	.7178	1.3931	.0171
6	.7784	1.2847	.0185
6 ¹ / ₈	.8402	1.1902	.0200
6 ¹ / ₄	.9033	1.1070	.0215
6 ³ / ₈	.9677	1.0334	.0230
6 ¹ / ₂	1.0334	.9677	.0246
6 ⁵ / ₈	1.1003	.9088	.0262
6 ³ / ₄	1.1685	.8558	.0278
6 ⁷ / ₈	1.2380	.8077	.0295
7	1.3088	.7641	.0312
7 ¹ / ₈	1.3808	.7242	.0329
7 ¹ / ₄	1.4541	.6877	.0346
7 ³ / ₈	1.5287	.6541	.0364
7 ¹ / ₂	1.6046	.6232	.0382
7 ⁵ / ₈	1.6817	.5946	.0400
7 ³ / ₄	1.7601	.5681	.0419
7 ⁷ / ₈	1.8398	.5435	.0438
8	1.9208	.5206	.0457
8 ¹ / ₈	2.0030	.4992	.0477
8 ¹ / ₄	2.0865	.4793	.0497
8 ³ / ₈	2.1713	.4605	.0517
8 ¹ / ₂	2.2574	.4430	.0537
8 ⁵ / ₈	2.3447	.4265	.0558
8 ³ / ₄	2.4333	.4110	.0579
8 ⁷ / ₈	2.5232	.3963	.0601
9	2.6144	.3825	.0622
9 ¹ / ₈	2.7068	.3694	.0644
9 ¹ / ₄	2.8005	.3571	.0667
9 ³ / ₈	2.8955	.3454	.0689
9 ¹ / ₂	2.9918	.3342	.0712
9 ⁵ / ₈	3.0893	.3237	.0736
9 ³ / ₄	3.1881	.3137	.0759
9 ⁷ / ₈	3.2882	.3041	.0783
10	3.3896	.2950	.0807
10 ¹ / ₈	3.4922	.2864	.0831
10 ¹ / ₄	3.5961	.2781	.0856
10 ³ / ₈	3.7013	.2702	.0881
10 ¹ / ₂	3.8078	.2626	.0907
10 ⁵ / ₈	3.9155	.2554	.0932
10 ³ / ₄	4.0245	.2485	.0958
10 ⁷ / ₈	4.1348	.2418	.0984
11	4.2464	.2355	.1011
11 ¹ / ₈	4.3592	.2294	.1038
11 ¹ / ₄	4.4733	.2235	.1065
11 ³ / ₈	4.5887	.2179	.1093
11 ¹ / ₂	4.7054	.2125	.1120
11 ⁵ / ₈	4.8233	.2073	.1148
11 ³ / ₄	4.9425	.2023	.1177
11 ⁷ / ₈	5.0630	.1975	.1205
12	5.1848	.1929	.1234

NO.122-A

Tubing Size
O.D. 2.375"**BETWEEN TUBING & HOLE****

THREE STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
58.5102	.0960	10.4211	5 ⁷ / ₈
53.9578	.1041	9.6103	6
49.9867	.1123	8.9030	6 ¹ / ₈
46.4944	.1208	8.2810	6 ¹ / ₄
43.4009	.1294	7.7300	6 ³ / ₈
40.6431	.1381	7.2389	6 ¹ / ₂
38.1706	.1471	6.7985	6 ⁵ / ₈
35.9424	.1562	6.4016	6 ³ / ₄
33.9251	.1655	6.0423	6 ⁷ / ₈
32.0908	.1750	5.7156	7
30.4167	.1846	5.4174	7 ¹ / ₈
28.8832	.1944	5.1443	7 ¹ / ₄
27.4739	.2044	4.8933	7 ³ / ₈
26.1750	.2145	4.6620	7 ¹ / ₂
24.9744	.2248	4.4481	7 ⁵ / ₈
23.8618	.2353	4.2500	7 ³ / ₄
22.8283	.2459	4.0659	7 ⁷ / ₈
21.8661	.2568	3.8945	8
20.9683	.2678	3.7346	8 ¹ / ₈
20.1291	.2789	3.5851	8 ¹ / ₄
19.3431	.2903	3.4451	8 ³ / ₈
18.6056	.3018	3.3138	8 ¹ / ₂
17.9126	.3134	3.1904	8 ⁵ / ₈
17.2603	.3253	3.0742	8 ³ / ₄
16.6454	.3373	2.9647	8 ⁷ / ₈
16.0650	.3495	2.8613	9
15.5164	.3618	2.7636	9 ¹ / ₈
14.9972	.3744	2.6711	9 ¹ / ₄
14.5052	.3871	2.5835	9 ³ / ₈
14.0385	.3999	2.5004	9 ¹ / ₂
13.5952	.4130	2.4214	9 ⁵ / ₈
13.1739	.4262	2.3464	9 ³ / ₄
12.7729	.4396	2.2749	9 ⁷ / ₈
12.3909	.4531	2.2069	10
12.0267	.4668	2.1421	10 ¹ / ₈
11.6792	.4807	2.0802	10 ¹ / ₄
11.3473	.4948	2.0210	10 ³ / ₈
11.0301	.5090	1.9645	10 ¹ / ₂
10.7266	.5234	1.9105	10 ⁵ / ₈
10.4360	.5380	1.8587	10 ³ / ₄
10.1576	.5527	1.8092	10 ⁷ / ₈
9.8908	.5677	1.7616	11
9.6348	.5827	1.7160	11 ¹ / ₈
9.3890	.5980	1.6722	11 ¹ / ₄
9.1529	.6134	1.6302	11 ³ / ₈
8.9260	.6290	1.5898	11 ¹ / ₂
8.7077	.6448	1.5509	11 ⁵ / ₈
8.4977	.6607	1.5135	11 ³ / ₄
8.2955	.6768	1.4775	11 ⁷ / ₈
8.1006	.6931	1.4428	12

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.375"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
6 ¹ / ₂	.8032	1.2449	.0191
6 ⁵ / ₈	.8702	1.1492	.0207
6 ³ / ₄	.9384	1.0656	.0223
6 ⁷ / ₈	1.0079	.9922	.0240
7	1.0786	.9271	.0257
7 ¹ / ₈	1.1507	.8690	.0274
7 ¹ / ₄	1.2240	.8170	.0291
7 ³ / ₈	1.2986	.7701	.0309
7 ¹ / ₂	1.3744	.7276	.0327
7 ⁵ / ₈	1.4516	.6889	.0346
7 ³ / ₄	1.5300	.6536	.0364
7 ⁷ / ₈	1.6097	.6212	.0383
8	1.6906	.5915	.0403
8 ¹ / ₈	1.7729	.5641	.0422
8 ¹ / ₄	1.8564	.5387	.0442
8 ³ / ₈	1.9412	.5151	.0462
8 ¹ / ₂	2.0272	.4933	.0483
8 ⁵ / ₈	2.1146	.4729	.0503
8 ³ / ₄	2.2032	.4539	.0525
8 ⁷ / ₈	2.2931	.4361	.0546
9	2.3842	.4194	.0568
9 ¹ / ₈	2.4767	.4038	.0590
9 ¹ / ₄	2.5704	.3890	.0612
9 ³ / ₈	2.6654	.3752	.0635
9 ¹ / ₂	2.7616	.3621	.0658
9 ⁵ / ₈	2.8592	.3498	.0681
9 ³ / ₄	2.9580	.3381	.0704
9 ⁷ / ₈	3.0581	.3270	.0728
10	3.1594	.3165	.0752
10 ¹ / ₈	3.2621	.3066	.0777
10 ¹ / ₄	3.3660	.2971	.0801
10 ³ / ₈	3.4712	.2881	.0826
10 ¹ / ₂	3.5776	.2795	.0852
10 ⁵ / ₈	3.6854	.2713	.0877
10 ³ / ₄	3.7944	.2635	.0903
10 ⁷ / ₈	3.9047	.2561	.0930
11	4.0162	.2490	.0956
11 ¹ / ₈	4.1291	.2422	.0983
11 ¹ / ₄	4.2432	.2357	.1010
11 ³ / ₈	4.3586	.2294	.1038
11 ¹ / ₂	4.4752	.2235	.1066
11 ⁵ / ₈	4.5932	.2177	.1094
11 ³ / ₄	4.7124	.2122	.1122
11 ⁷ / ₈	4.8329	.2069	.1151
12	4.9546	.2018	.1180
12 ¹ / ₈	5.0777	.1969	.1209
12 ¹ / ₄	5.2020	.1922	.1239
12 ³ / ₈	5.3276	.1877	.1268
12 ¹ / ₂	5.4544	.1833	.1299
12 ⁵ / ₈	5.5826	.1791	.1329

NO.122-A

Tubing Size
O.D. 2.375"
FOUR STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
52.2877	.1074	9.3128	6 1/2
48.2656	.1163	8.5965	6 5/8
44.7571	.1254	7.9716	6 3/4
41.6714	.1347	7.4220	6 7/8
38.9377	.1442	6.9351	7
36.5000	.1538	6.5009	7 1/8
34.3138	.1636	6.1116	7 1/4
32.3429	.1736	5.7605	7 3/8
30.5578	.1837	5.4426	7 1/2
28.9339	.1940	5.1533	7 5/8
27.4510	.2045	4.8892	7 3/4
26.0921	.2152	4.6472	7 7/8
24.8426	.2260	4.4247	8
23.6902	.2370	4.2194	8 1/8
22.6245	.2482	4.0296	8 1/4
21.6363	.2595	3.8536	8 3/8
20.7178	.2710	3.6900	8 1/2
19.8621	.2827	3.5376	8 5/8
19.0632	.2945	3.3953	8 3/4
18.3160	.3065	3.2622	8 7/8
17.6156	.3187	3.1375	9
16.9582	.3311	3.0204	9 1/8
16.3399	.3436	2.9103	9 1/4
15.7576	.3563	2.8065	9 3/8
15.2083	.3692	2.7087	9 1/2
14.6895	.3822	2.6163	9 5/8
14.1988	.3954	2.5289	9 3/4
13.7341	.4088	2.4461	9 7/8
13.2935	.4224	2.3677	10
12.8752	.4361	2.2932	10 1/8
12.4777	.4500	2.2224	10 1/4
12.0996	.4640	2.1550	10 3/8
11.7396	.4783	2.0909	10 1/2
11.3964	.4927	2.0298	10 5/8
11.0690	.5072	1.9715	10 3/4
10.7563	.5220	1.9158	10 7/8
10.4575	.5369	1.8626	11
10.1718	.5520	1.8117	11 1/8
9.8982	.5672	1.7629	11 1/4
9.6362	.5827	1.7163	11 3/8
9.3850	.5983	1.6715	11 1/2
9.1440	.6140	1.6286	11 5/8
8.9127	.6300	1.5874	11 3/4
8.6905	.6461	1.5478	11 7/8
8.4769	.6623	1.5098	12
8.2715	.6788	1.4732	12 1/8
8.0738	.6954	1.4380	12 1/4
7.8835	.7122	1.4041	12 3/8
7.7002	.7292	1.3715	12 1/2
7.5234	.7463	1.3400	12 5/8

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.875"**
ONE STRING

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
3 ¹ / ₂	.1626	6.1515	.0039
3 ⁵ / ₈	.1989	5.0277	.0047
3 ³ / ₄	.2365	4.2281	.0056
3 ⁷ / ₈	.2754	3.6311	.0066
4	.3156	3.1690	.0075
4 ¹ / ₈	.3570	2.8011	.0085
4 ¹ / ₄	.3997	2.5018	.0095
4 ³ / ₈	.4437	2.2538	.0106
4 ¹ / ₂	.4890	2.0452	.0116
4 ⁵ / ₈	.5355	1.8674	.0127
4 ³ / ₄	.5833	1.7144	.0139
4 ⁷ / ₈	.6324	1.5813	.0151
5	.6828	1.4646	.0163
5 ¹ / ₈	.7344	1.3617	.0175
5 ¹ / ₄	.7873	1.2701	.0187
5 ³ / ₈	.8415	1.1884	.0200
5 ¹ / ₂	.8970	1.1149	.0214
5 ⁵ / ₈	.9537	1.0486	.0227
5 ³ / ₄	1.0117	.9884	.0241
5 ⁷ / ₈	1.0710	.9337	.0255
6	1.1316	.8837	.0269
6 ¹ / ₈	1.1934	.8379	.0284
6 ¹ / ₄	1.2565	.7959	.0299
6 ³ / ₈	1.3209	.7571	.0314
6 ¹ / ₂	1.3866	.7212	.0330
6 ⁵ / ₈	1.4535	.6880	.0346
6 ³ / ₄	1.5217	.6572	.0362
6 ⁷ / ₈	1.5912	.6285	.0379
7	1.6620	.6017	.0396
7 ¹ / ₈	1.7340	.5767	.0413
7 ¹ / ₄	1.8073	.5533	.0430
7 ³ / ₈	1.8819	.5314	.0448
7 ¹ / ₂	1.9578	.5108	.0466
7 ⁵ / ₈	2.0349	.4914	.0484
7 ³ / ₄	2.1133	.4732	.0503
7 ⁷ / ₈	2.1930	.4560	.0522
8	2.2740	.4398	.0541
8 ¹ / ₈	2.3562	.4244	.0561
8 ¹ / ₄	2.4397	.4099	.0581
8 ³ / ₈	2.5245	.3961	.0601
8 ¹ / ₂	2.6106	.3831	.0622
8 ⁵ / ₈	2.6979	.3707	.0642
8 ³ / ₄	2.7865	.3589	.0663
8 ⁷ / ₈	2.8764	.3477	.0685
9	2.9676	.3370	.0707
9 ¹ / ₈	3.0600	.3268	.0729
9 ¹ / ₄	3.1537	.3171	.0751
9 ³ / ₈	3.2487	.3078	.0773
9 ¹ / ₂	3.3450	.2990	.0796

NO.122-A

Tubing Size
O.D. 2.875"
ONE STRING

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
258.3628	.0217	46.0164	3½
211.1619	.0266	37.6095	3⅓
177.5809	.0316	31.6285	3⅔
152.5058	.0368	27.1624	3⅗
133.0960	.0422	23.7054	4
117.6473	.0477	20.9539	4⅓
105.0758	.0534	18.7148	4⅔
94.6588	.0593	16.8594	4⅔
85.8964	.0654	15.2988	4⅓
78.4316	.0716	13.9693	4⅔
72.0027	.0780	12.8242	4⅔
66.4138	.0845	11.8288	4⅔
61.5149	.0913	10.9563	5
57.1897	.0982	10.1859	5⅓
53.3462	.1052	9.5014	5⅔
49.9110	.1125	8.8895	5⅔
46.8248	.1199	8.3399	5½
44.0391	.1275	7.8437	5⅔
41.5139	.1352	7.3939	5⅔
39.2158	.1432	6.9846	5⅔
37.1169	.1513	6.6108	6
35.1936	.1595	6.2683	6⅓
33.4259	.1680	5.9534	6⅔
31.7966	.1766	5.6632	6⅔
30.2908	.1854	5.3950	6½
28.8958	.1943	5.1466	6⅔
27.6005	.2034	4.9159	6⅔
26.3952	.2127	4.7012	6⅔
25.2714	.2222	4.5010	7
24.2215	.2318	4.3140	7⅓
23.2390	.2416	4.1390	7⅔
22.3179	.2516	3.9750	7⅔
21.4531	.2617	3.8210	7½
20.6399	.2720	3.6761	7⅔
19.8741	.2825	3.5397	7⅔
19.1519	.2923	3.4111	7⅔
18.4700	.3040	3.2896	8
17.8254	.3150	3.1748	8⅓
17.2152	.3261	3.0662	8⅔
16.6370	.3375	2.9632	8⅔
16.0885	.3490	2.8655	8½
15.5677	.3607	2.7727	8⅓
15.0726	.3725	2.6846	8⅔
14.6016	.3845	2.6007	8⅔
14.1531	.3967	2.5208	9
13.1531	.4091	2.4446	9⅓
13.3177	.4216	2.3720	9⅔
12.9283	.4343	2.3026	9⅔
12.5562	.4472	2.2364	9½

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.875"**

TWO STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
6 ¹ / ₂	1.0493	.9530	.0250
6 ⁵ / ₈	1.1163	.8958	.0266
6 ³ / ₄	1.1845	.8443	.0282
6 ⁷ / ₈	1.2540	.7975	.0299
7	1.3247	.7549	.0315
7 ¹ / ₈	1.3968	.7159	.0333
7 ¹ / ₄	1.4701	.6802	.0350
7 ³ / ₈	1.5447	.6474	.0368
7 ¹ / ₂	1.6205	.6171	.0386
7 ⁵ / ₈	1.6977	.5890	.0404
7 ³ / ₄	1.7761	.5630	.0423
7 ⁷ / ₈	1.8558	.5389	.0442
8	1.9367	.5163	.0461
8 ¹ / ₈	2.0190	.4953	.0481
8 ¹ / ₄	2.1025	.4756	.0501
8 ³ / ₈	2.1873	.4572	.0521
8 ¹ / ₂	2.2733	.4399	.0541
8 ⁵ / ₈	2.3607	.4236	.0562
8 ³ / ₄	2.4493	.4083	.0583
8 ⁷ / ₈	2.5392	.3938	.0605
9	2.6303	.3802	.0626
9 ¹ / ₈	2.7228	.3673	.0648
9 ¹ / ₄	2.8165	.3551	.0671
9 ³ / ₈	2.9115	.3435	.0693
9 ¹ / ₂	3.0077	.3325	.0716
9 ⁵ / ₈	3.1053	.3220	.0739
9 ³ / ₄	3.2041	.3121	.0763
9 ⁷ / ₈	3.3042	.3026	.0787
10	3.4055	.2936	.0811
10 ¹ / ₈	3.5082	.2851	.0835
10 ¹ / ₄	3.6121	.2768	.0860
10 ³ / ₈	3.7173	.2690	.0885
10 ¹ / ₂	3.8237	.2615	.0910
10 ⁵ / ₈	3.9315	.2544	.0936
10 ³ / ₄	4.0405	.2475	.0962
10 ⁷ / ₈	4.1508	.2409	.0988
11	4.2623	.2346	.1015
11 ¹ / ₈	4.3752	.2286	.1042
11 ¹ / ₄	4.4893	.2228	.1069
11 ³ / ₈	4.6047	.2172	.1096
11 ¹ / ₂	4.7213	.2118	.1124
11 ⁵ / ₈	4.8393	.2066	.1152
11 ³ / ₄	4.9585	.2017	.1181
11 ⁷ / ₈	5.0790	.1969	.1209
12	5.2007	.1923	.1238
12 ¹ / ₈	5.3238	.1878	.1268
12 ¹ / ₄	5.4481	.1836	.1297
12 ³ / ₈	5.5736	.1794	.1327
12 ¹ / ₂	5.7005	.1754	.1357
12 ⁵ / ₈	5.8286	.1716	.1388

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 2.875"**
TWO STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
40.0258	.1403	7.1289	6 1/2
37.6256	.1492	6.7014	6 5/8
35.4588	.1583	6.3155	6 3/4
33.4939	.1676	5.9655	6 7/8
31.7048	.1771	5.6469	7
30.0696	.1867	5.3556	7 1/8
28.5700	.1965	5.0885	7 1/4
27.1905	.2065	4.8428	7 3/8
25.9176	.2166	4.6161	7 1/2
24.7400	.2269	4.4064	7 5/8
23.6477	.2374	4.2118	7 3/4
22.6323	.2481	4.0310	7 7/8
21.6861	.2589	3.8625	8
20.8028	.2699	3.7051	8 1/8
19.9765	.2811	3.5580	8 1/4
19.2021	.2924	3.4200	8 3/8
18.4752	.3039	3.2906	8 1/2
17.7917	.3156	3.1688	8 5/8
17.1480	.3274	3.0542	8 3/4
16.5409	.3394	2.9461	8 7/8
15.9676	.3516	2.8440	9
15.4255	.3640	2.7474	9 1/8
14.9123	.3765	2.6560	9 1/4
14.4258	.3892	2.5693	9 3/8
13.9641	.4021	2.4871	9 1/2
13.5255	.4151	2.4090	9 5/8
13.1083	.4283	2.3347	9 3/4
12.7113	.4417	2.2640	9 7/8
12.3329	.4553	2.1966	10
11.9721	.4690	2.1323	10 1/8
11.6277	.4829	2.0710	10 1/4
11.2987	.4969	2.0124	10 3/8
10.9841	.5112	1.9563	10 1/2
10.6831	.5256	1.9027	10 5/8
10.3948	.5401	1.8514	10 3/4
10.1186	.5549	1.8022	10 7/8
9.8538	.5698	1.7550	11
9.5997	.5849	1.7098	11 1/8
9.3557	.6001	1.6663	11 1/4
9.1212	.6156	1.6246	11 3/8
8.8958	.6311	1.5844	11 1/2
8.6790	.6469	1.5458	11 5/8
8.4704	.6629	1.5086	11 3/4
8.2694	.6790	1.4728	11 7/8
8.0758	.6952	1.4384	12
7.8892	.7117	1.4051	12 1/8
7.7092	.7283	1.3731	12 1/4
7.5355	.7451	1.3421	12 3/8
7.3678	.7620	1.3123	12 1/2
7.2058	.7792	1.2834	12 5/8

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.875"**
THREE STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	.9875	1.0127	.0235
7 ¹ / ₈	1.0595	.9438	.0252
7 ¹ / ₄	1.1328	.8827	.0270
7 ³ / ₈	1.2074	.8282	.0287
7 ¹ / ₂	1.2833	.7793	.0306
7 ⁵ / ₈	1.3604	.7351	.0324
7 ³ / ₄	1.4388	.6950	.0343
7 ⁷ / ₈	1.5185	.6585	.0362
8	1.5995	.6252	.0381
8 ¹ / ₈	1.6817	.5946	.0400
8 ¹ / ₄	1.7652	.5665	.0420
8 ³ / ₈	1.8500	.5405	.0440
8 ¹ / ₂	1.9361	.5165	.0461
8 ⁵ / ₈	2.0234	.4942	.0482
8 ³ / ₄	2.1120	.4735	.0503
8 ⁷ / ₈	2.2019	.4541	.0524
9	2.2931	.4361	.0546
9 ¹ / ₈	2.3855	.4192	.0568
9 ¹ / ₄	2.4792	.4034	.0590
9 ³ / ₈	2.5742	.3885	.0613
9 ¹ / ₂	2.6705	.3745	.0636
9 ⁵ / ₈	2.7680	.3613	.0659
9 ³ / ₄	2.8668	.3488	.0683
9 ⁷ / ₈	2.9669	.3371	.0706
10	3.0683	.3259	.0731
10 ¹ / ₈	3.1709	.3154	.0755
10 ¹ / ₄	3.2748	.3054	.0780
10 ³ / ₈	3.3800	.2959	.0805
10 ¹ / ₂	3.4865	.2868	.0830
10 ⁵ / ₈	3.5942	.2782	.0856
10 ³ / ₄	3.7032	.2700	.0882
10 ⁷ / ₈	3.8135	.2622	.0908
11	3.9251	.2548	.0935
11 ¹ / ₈	4.0379	.2477	.0961
11 ¹ / ₄	4.1520	.2408	.0989
11 ³ / ₈	4.2674	.2343	.1016
11 ¹ / ₂	4.3841	.2281	.1044
11 ⁵ / ₈	4.5020	.2221	.1072
11 ³ / ₄	4.6212	.2164	.1100
11 ⁷ / ₈	4.7417	.2109	.1129
12	4.8635	.2056	.1158
12 ¹ / ₈	4.9865	.2005	.1187
12 ¹ / ₄	5.1108	.1957	.1217
12 ³ / ₈	5.2364	.1910	.1247
12 ¹ / ₂	5.3633	.1865	.1277
12 ⁵ / ₈	5.4914	.1821	.1307
12 ³ / ₄	5.6208	.1779	.1338
12 ⁷ / ₈	5.7515	.1739	.1369
13	5.8835	.1700	.1401
13 ¹ / ₈	6.0167	.1662	.1433

NO.122-A

Tubing Size
O.D. 2.875"
THREE STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
42.5323	.1320	7.5753	7
39.6405	.1416	7.0603	7 1/8
37.0751	.1514	6.6034	7 1/4
34.7849	.1614	6.1954	7 3/8
32.7285	.1716	5.8292	7 1/2
30.8728	.1819	5.4987	7 5/8
29.1903	.1923	5.1990	7 3/4
27.6585	.2030	4.9262	7 7/8
26.2585	.2138	4.6768	8
24.9744	.2248	4.4481	8 1/8
23.7929	.2360	4.2377	8 1/4
22.7024	.2473	4.0435	8 3/8
21.6933	.2588	3.8637	8 1/2
20.7569	.2705	3.6970	8 5/8
19.8861	.2823	3.5419	8 3/4
19.0743	.2944	3.3973	8 7/8
18.3160	.3065	3.2622	9
17.6062	.3189	3.1358	9 1/8
16.9407	.3314	3.0173	9 1/4
16.3156	.3441	2.9059	9 3/8
15.7275	.3570	2.8012	9 1/2
15.1733	.3700	2.7025	9 5/8
14.6503	.3832	2.6093	9 3/4
14.1561	.3966	2.5213	9 7/8
13.6884	.4102	2.4380	10
13.2454	.4239	2.3591	10 1/8
12.8251	.4378	2.2842	10 1/4
12.4260	.4518	2.2132	10 3/8
12.0465	.4661	2.1456	10 1/2
11.6854	.4805	2.0813	10 5/8
11.3415	.4950	2.0200	10 3/4
11.0135	.5098	1.9616	10 7/8
10.7004	.5247	1.9058	11
10.4014	.5398	1.8526	11 1/8
10.1155	.5550	1.8017	11 1/4
9.8420	.5705	1.7529	11 3/8
9.5801	.5861	1.7063	11 1/2
9.3292	.6018	1.6616	11 5/8
9.0885	.6178	1.6187	11 3/4
8.8576	.6339	1.5776	11 7/8
8.6358	.6502	1.5381	12
8.4227	.6666	1.5002	12 1/8
8.2179	.6832	1.4637	12 1/4
8.0208	.7000	1.4286	12 3/8
7.8310	.7170	1.3948	12 1/2
7.6483	.7341	1.3622	12 5/8
7.4722	.7514	1.3309	12 3/4
7.3024	.7689	1.3006	12 7/8
7.1386	.7865	1.2714	13
6.9806	.8043	1.2433	13 1/8

**Note: No allowance made for couplings.

**Tubing Size
O.D. 2.875"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7 ³ / ₄	1.1016	.9078	.0262
7 ⁷ / ₈	1.1813	.8465	.0281
8	1.2622	.7922	.0301
8 ¹ / ₈	1.3445	.7438	.0320
8 ¹ / ₄	1.4280	.7003	.0340
8 ³ / ₈	1.5128	.6610	.0360
8 ¹ / ₂	1.5988	.6255	.0381
8 ⁵ / ₈	1.6862	.5931	.0401
8 ³ / ₄	1.7748	.5634	.0423
8 ⁷ / ₈	1.8647	.5363	.0444
9	1.9558	.5113	.0466
9 ¹ / ₈	2.0483	.4882	.0488
9 ¹ / ₄	2.1420	.4669	.0510
9 ³ / ₈	2.2370	.4470	.0533
9 ¹ / ₂	2.3332	.4286	.0556
9 ⁵ / ₈	2.4308	.4114	.0579
9 ³ / ₄	2.5296	.3953	.0602
9 ⁷ / ₈	2.6297	.3803	.0626
10	2.7310	.3662	.0650
10 ¹ / ₈	2.8337	.3529	.0675
10 ¹ / ₄	2.9376	.3404	.0699
10 ³ / ₈	3.0428	.3286	.0724
10 ¹ / ₂	3.1492	.3175	.0750
10 ⁵ / ₈	3.2570	.3070	.0775
10 ³ / ₄	3.3660	.2971	.0801
10 ⁷ / ₈	3.4763	.2877	.0828
11	3.5878	.2787	.0854
11 ¹ / ₈	3.7007	.2702	.0881
11 ¹ / ₄	3.8148	.2621	.0908
11 ³ / ₈	3.9302	.2544	.0936
11 ¹ / ₂	4.0468	.2471	.0964
11 ⁵ / ₈	4.1648	.2401	.0992
11 ³ / ₄	4.2840	.2334	.1020
11 ⁷ / ₈	4.4045	.2270	.1049
12	4.5262	.2209	.1078
12 ¹ / ₈	4.6493	.2151	.1107
12 ¹ / ₄	4.7736	.2095	.1137
12 ³ / ₈	4.8992	.2041	.1166
12 ¹ / ₂	5.0260	.1990	.1197
12 ⁵ / ₈	5.1542	.1940	.1227
12 ³ / ₄	5.2836	.1893	.1258
12 ⁷ / ₈	5.4143	.1847	.1289
13	5.5462	.1803	.1321
13 ¹ / ₈	5.6795	.1761	.1352
13 ¹ / ₄	5.8140	.1720	.1384
13 ³ / ₈	5.9498	.1681	.1417
13 ¹ / ₂	6.0868	.1643	.1449
13 ⁵ / ₈	6.2252	.1606	.1482
13 ³ / ₄	6.3648	.1571	.1515
13 ⁷ / ₈	6.5057	.1537	.1549

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 2.875"**
FOUR STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
38.1265	.1473	6.7906	7 ³ / ₄
35.5545	.1579	6.3325	7 ⁷ / ₈
33.2740	.1687	5.9264	8
31.2387	.1797	5.5639	8 ¹ / ₈
29.4118	.1909	5.2385	8 ¹ / ₄
27.7634	.2022	4.9449	8 ³ / ₈
26.2689	.2137	4.6787	8 ¹ / ₂
24.9083	.2254	4.4364	8 ⁵ / ₈
23.6647	.2373	4.2149	8 ³ / ₄
22.5239	.2493	4.0117	8 ⁷ / ₈
21.4741	.2615	3.8247	9
20.5050	.2738	3.6521	9 ¹ / ₈
19.6079	.2863	3.4923	9 ¹ / ₄
18.7753	.2990	3.3440	9 ³ / ₈
18.0007	.3119	3.2061	9 ¹ / ₂
17.2784	.3249	3.0774	9 ⁵ / ₈
16.6035	.3382	2.9572	9 ³ / ₄
15.9715	.3515	2.8446	9 ⁷ / ₈
15.3787	.3651	2.7391	10
14.8217	.3788	2.6399	10 ¹ / ₈
14.2974	.3927	2.5465	10 ¹ / ₄
13.8032	.4068	2.4584	10 ³ / ₈
13.3365	.4210	2.3753	10 ¹ / ₂
12.8954	.4354	2.2968	10 ⁵ / ₈
12.4777	.4500	2.2224	10 ³ / ₄
12.0819	.4647	2.1519	10 ⁷ / ₈
11.7062	.4796	2.0850	11
11.3493	.4947	2.0214	11 ¹ / ₈
11.0098	.5100	1.9609	11 ¹ / ₄
10.6865	.5254	1.9034	11 ³ / ₈
10.3785	.5410	1.8485	11 ¹ / ₂
10.0846	.5567	1.7961	11 ⁵ / ₈
9.8039	.5727	1.7462	11 ³ / ₄
9.5358	.5888	1.6984	11 ⁷ / ₈
9.2792	.6051	1.6527	12
9.0337	.6215	1.6090	12 ¹ / ₈
8.7984	.6381	1.5671	12 ¹ / ₄
8.5729	.6549	1.5269	12 ³ / ₈
8.3565	.6719	1.4884	12 ¹ / ₂
8.1487	.6890	1.4514	12 ⁵ / ₈
7.9491	.7063	1.4158	12 ³ / ₄
7.7573	.7238	1.3816	12 ⁷ / ₈
7.5727	.7414	1.3488	13
7.3951	.7592	1.3171	13 ¹ / ₈
7.2240	.7772	1.2866	13 ¹ / ₄
7.0591	.7954	1.2573	13 ³ / ₈
6.9001	.8137	1.2290	13 ¹ / ₂
6.7468	.8322	1.2017	13 ⁵ / ₈
6.5988	.8508	1.1753	13 ³ / ₄
6.4559	.8697	1.1498	13 ⁷ / ₈

**Note: No allowance made for couplings.

**Tubing Size
O.D. 3.500"**
ONE STRING

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4	.1530	6.5360	.0036
4 ¹ / ₈	.1944	5.1431	.0046
4 ¹ / ₄	.2371	4.2168	.0056
4 ³ / ₈	.2811	3.5570	.0067
4 ¹ / ₂	.3264	3.0637	.0078
4 ⁵ / ₈	.3729	2.6814	.0089
4 ³ / ₄	.4207	2.3767	.0100
4 ⁷ / ₈	.4698	2.1284	.0112
5	.5202	1.9223	.0124
5 ¹ / ₈	.5718	1.7488	.0136
5 ¹ / ₄	.6247	1.6006	.0149
5 ³ / ₈	.6789	1.4729	.0162
5 ¹ / ₂	.7344	1.3617	.0175
5 ⁵ / ₈	.7911	1.2640	.0188
5 ³ / ₄	.8491	1.1777	.0202
5 ⁷ / ₈	.9084	1.1008	.0216
6	.9690	1.0320	.0231
6 ¹ / ₈	1.0308	.9701	.0245
6 ¹ / ₄	1.0939	.9141	.0260
6 ³ / ₈	1.1583	.8633	.0267
6 ¹ / ₂	1.2240	.8170	.0291
6 ⁵ / ₈	1.2909	.7746	.0307
6 ³ / ₄	1.3591	.7358	.0324
6 ⁷ / ₈	1.4286	.7000	.0340
7	1.4994	.6669	.0357
7 ¹ / ₈	1.5714	.6364	.0374
7 ¹ / ₄	1.6447	.6080	.0392
7 ³ / ₈	1.7193	.5816	.0409
7 ¹ / ₂	1.7952	.5570	.0427
7 ⁵ / ₈	1.8723	.5341	.0446
7 ³ / ₄	1.9507	.5126	.0464
7 ⁷ / ₈	2.0304	.4925	.0483
8	2.1114	.4736	.0503
8 ¹ / ₈	2.1936	.4559	.0522
8 ¹ / ₄	2.2771	.4391	.0542
8 ³ / ₈	2.3619	.4234	.0562
8 ¹ / ₂	2.4480	.4085	.0583
8 ⁵ / ₈	2.5353	.3944	.0604
8 ³ / ₄	2.6239	.3811	.0625
8 ⁷ / ₈	2.7138	.3685	.0646
9	2.8050	.3565	.0668
9 ¹ / ₈	2.8974	.3451	.0690
9 ¹ / ₄	2.9911	.3343	.0712
9 ³ / ₈	3.0861	.3240	.0735
9 ¹ / ₂	3.1824	.3142	.0758
9 ⁵ / ₈	3.2799	.3049	.0781
9 ³ / ₄	3.3787	.2960	.0804
9 ⁷ / ₈	3.4788	.2875	.0828
10	3.5802	.2793	.0852

NO.122-A

Tubing Size
O.D. 3.500"
ONE STRING

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
274.5104	.0205	48.8924	4
216.0082	.0260	38.4727	4 1/8
177.1035	.0317	31.5435	4 1/4
149.3934	.0376	26.6081	4 3/8
128.6768	.0436	22.9183	4 1/2
112.6197	.0499	20.0584	4 5/8
99.8220	.0562	17.7791	4 3/4
89.3928	.0628	15.9215	4 7/8
80.7384	.0695	14.3801	5
73.4475	.0764	13.0816	5 1/8
67.2270	.0835	11.9736	5 1/4
61.8615	.0908	11.0180	5 3/8
57.1897	.0982	10.1859	5 1/2
53.0882	.1058	9.4454	5 5/8
49.4613	.1135	8.8094	5 3/4
46.2333	.1214	8.2345	5 7/8
43.3438	.1295	7.7199	6
40.7437	.1378	7.2568	6 1/8
38.3931	.1462	6.8381	6 1/4
36.2589	.1548	6.4580	6 3/8
34.3138	.1636	6.1115	6 1/2
32.5346	.1726	5.7947	6 5/8
30.9017	.1817	5.5038	6 3/4
29.3987	.1910	5.2361	6 7/8
28.0113	.2004	4.9890	7
26.7272	.2101	4.7603	7 1/8
25.5359	.2199	4.5481	7 1/4
24.4281	.2298	4.3508	7 3/8
23.3958	.2400	4.1670	7 1/2
22.4319	.2503	3.9953	7 5/8
21.5302	.2608	3.8347	7 3/4
20.6852	.2714	3.6842	7 7/8
19.8921	.2823	3.5429	8
19.1463	.2932	3.4101	8 1/8
18.4442	.3044	3.2850	8 1/4
17.7821	.3157	3.1671	8 3/8
17.1569	.3272	3.0558	8 1/2
16.5659	.3389	2.9505	8 5/8
16.0064	.3508	2.8509	8 3/4
15.4763	.3628	2.7564	8 7/8
14.9733	.3750	2.6669	9
14.4956	.3873	2.5818	9 1/8
14.0415	.3999	2.5009	9 1/4
13.6093	.4126	2.4239	9 3/8
13.1976	.4254	2.3506	9 1/2
12.8052	.4385	2.2807	9 5/8
12.4307	.4517	2.2140	9 3/4
12.0730	.4651	2.1503	9 7/8
11.7312	.4786	2.0894	10

**Note: No allowance made for couplings.

**Tubing Size
O.D. 3.500"**
TWO STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7 ³ / ₄	1.4509	.6892	.0345
7 ⁷ / ₈	1.5306	.6533	.0364
8	1.6116	.6205	.0384
8 ¹ / ₈	1.6938	.5904	.0403
8 ¹ / ₄	1.7773	.5626	.0423
8 ³ / ₈	1.8621	.5370	.0443
8 ¹ / ₂	1.9482	.5133	.0464
8 ⁵ / ₈	2.0355	.4913	.0485
8 ³ / ₄	2.1241	.4708	.0506
8 ⁷ / ₈	2.2140	.4517	.0527
9	2.3052	.4338	.0549
9 ¹ / ₈	2.3976	.4171	.0571
9 ¹ / ₄	2.4913	.4014	.0593
9 ³ / ₈	2.5863	.3866	.0616
9 ¹ / ₂	2.6826	.3728	.0639
9 ⁵ / ₈	2.7801	.3597	.0662
9 ³ / ₄	2.8789	.3473	.0685
9 ⁷ / ₈	2.9790	.3357	.0709
10	3.0804	.3246	.0733
10 ¹ / ₈	3.1830	.3142	.0758
10 ¹ / ₄	3.2869	.3042	.0783
10 ³ / ₈	3.3921	.2948	.0808
10 ¹ / ₂	3.4986	.2858	.0833
10 ⁵ / ₈	3.6063	.2773	.0859
10 ³ / ₄	3.7153	.2692	.0885
10 ⁷ / ₈	3.8256	.2614	.0911
11	3.9372	.2540	.0937
11 ¹ / ₈	4.0500	.2469	.0964
11 ¹ / ₄	4.1641	.2401	.0991
11 ³ / ₈	4.2795	.2337	.1019
11 ¹ / ₂	4.3962	.2275	.1047
11 ⁵ / ₈	4.5141	.2215	.1075
11 ³ / ₄	4.6333	.2158	.1103
11 ⁷ / ₈	4.7538	.2104	.1132
12	4.8756	.2051	.1161
12 ¹ / ₈	4.9986	.2001	.1190
12 ¹ / ₄	5.1229	.1952	.1220
12 ³ / ₈	5.2485	.1905	.1250
12 ¹ / ₂	5.3754	.1860	.1280
12 ⁵ / ₈	5.5035	.1817	.1310
12 ³ / ₄	5.6329	.1775	.1341
12 ⁷ / ₈	5.7636	.1735	.1372
13	5.8956	.1696	.1404
13 ¹ / ₈	6.0288	.1659	.1435
13 ¹ / ₄	6.1633	.1622	.1467
13 ³ / ₈	6.2991	.1588	.1500
13 ¹ / ₂	6.4362	.1554	.1532
13 ⁵ / ₈	6.5745	.1521	.1565
13 ³ / ₄	6.7141	.1489	.1599
13 ⁷ / ₈	6.8550	.1459	.1632

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 3.500"**
TWO STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
28.9466	.1940	5.1556	7 ³ / ₄
27.4396	.2046	4.8872	7 ¹ / ₈
26.0611	.2154	4.6417	8
24.7958	.2264	4.4163	8 ¹ / ₈
23.6307	.2376	4.2088	8 ¹ / ₄
22.5548	.2489	4.0172	8 ³ / ₈
21.5584	.2604	3.8397	8 ¹ / ₂
20.6334	.2721	3.6750	8 ⁵ / ₈
19.7727	.2840	3.5217	8 ³ / ₄
18.9699	.2960	3.3787	8 ⁷ / ₈
18.2197	.3082	3.2451	9
17.5173	.3205	3.1200	9 ¹ / ₈
16.8584	.3330	3.0026	9 ¹ / ₄
16.2392	.3457	2.8923	9 ³ / ₈
15.6565	.3586	2.7885	9 ¹ / ₂
15.1072	.3716	2.6907	9 ⁵ / ₈
14.5887	.3849	2.5984	9 ³ / ₄
14.0985	.3982	2.5111	9 ⁷ / ₈
13.6346	.4118	2.4284	10
13.1950	.4255	2.3501	10 ¹ / ₈
12.7778	.4394	2.2758	10 ¹ / ₄
12.3816	.4535	2.2053	10 ³ / ₈
12.0048	.4677	2.1382	10 ¹ / ₂
11.6462	.4821	2.0743	10 ⁵ / ₈
11.3045	.4967	2.0134	10 ³ / ₄
10.9786	.5114	1.9554	10 ⁷ / ₈
10.6675	.5263	1.9000	11
10.3703	.5414	1.8470	11 ¹ / ₈
10.0861	.5567	1.7964	11 ¹ / ₄
9.8142	.5721	1.7480	11 ³ / ₈
9.5537	.5877	1.7016	11 ¹ / ₂
9.304T	.6035	1.6571	11 ⁵ / ₈
9.0647	.6194	1.6145	11 ³ / ₄
8.8350	.6355	1.5736	11 ⁷ / ₈
8.6143	.6518	1.5343	12
8.4023	.6682	1.4965	12 ¹ / ₈
8.1984	.6848	1.4602	12 ¹ / ₄
8.0022	.7016	1.4253	12 ³ / ₈
7.8134	.7186	1.3916	12 ¹ / ₂
7.6315	.7357	1.3592	12 ⁵ / ₈
7.4561	.7530	1.3280	12 ³ / ₄
7.2871	.7705	1.2979	12 ⁷ / ₈
7.1240	.7881	1.2688	13
6.9665	.8059	1.2408	13 ¹ / ₈
6.8145	.8239	1.2137	13 ¹ / ₄
6.6676	.8421	1.1875	13 ³ / ₈
6.5256	.8604	1.1623	13 ¹ / ₂
6.3883	.8789	1.1378	13 ⁵ / ₈
6.2555	.8975	1.1141	13 ³ / ₄
6.1269	.9164	1.0912	13 ⁷ / ₈

**Note: No allowance made for couplings.

**Tubing Size
O.D. 3.500"**
THREE STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8 ¹ / ₄	1.2775	.7828	.0304
8 ³ / ₈	1.3623	.7340	.0324
8 ¹ / ₂	1.4484	.6904	.0345
8 ⁵ / ₈	1.5357	.6512	.0366
8 ³ / ₄	1.6243	.6156	.0387
8 ⁷ / ₈	1.7142	.5834	.0408
9	1.8054	.5539	.0430
9 ¹ / ₈	1.8978	.5269	.0452
9 ¹ / ₄	1.9915	.5021	.0474
9 ³ / ₈	2.0865	.4793	.0497
9 ¹ / ₂	2.1828	.4581	.0520
9 ⁵ / ₈	2.2803	.4385	.0543
9 ³ / ₄	2.3791	.4203	.0566
9 ⁷ / ₈	2.4792	.4034	.0590
10	2.5806	.3875	.0614
10 ¹ / ₈	2.6832	.3727	.0639
10 ¹ / ₄	2.7871	.3588	.0664
10 ³ / ₈	2.8923	.3457	.0689
10 ¹ / ₂	2.9988	.3335	.0714
10 ⁵ / ₈	3.1065	.3219	.0740
10 ³ / ₄	3.2155	.3110	.0766
10 ⁷ / ₈	3.3258	.3007	.0792
11	3.4374	.2909	.0818
11 ¹ / ₈	3.5502	.2817	.0845
11 ¹ / ₄	3.6643	.2729	.0872
11 ³ / ₈	3.7797	.2646	.0900
11 ¹ / ₂	3.8964	.2566	.0928
11 ⁵ / ₈	4.0143	.2491	.0956
11 ³ / ₄	4.1335	.2419	.0984
11 ⁷ / ₈	4.2540	.2351	.1013
12	4.3758	.2285	.1042
12 ¹ / ₈	4.4988	.2223	.1071
12 ¹ / ₄	4.6231	.2163	.1101
12 ³ / ₈	4.7487	.2106	.1131
12 ¹ / ₂	4.8756	.2051	.1161
12 ⁵ / ₈	5.0037	.1999	.1191
12 ³ / ₄	5.1331	.1948	.1222
12 ⁷ / ₈	5.2638	.1900	.1253
13	5.3958	.1853	.1285
13 ¹ / ₈	5.5290	.1809	.1316
13 ¹ / ₄	5.6635	.1766	.1348
13 ³ / ₈	5.7993	.1724	.1381
13 ¹ / ₂	5.9364	.1685	.1413
13 ⁵ / ₈	6.0747	.1646	.1446
13 ³ / ₄	6.2143	.1609	.1480
13 ⁷ / ₈	6.3552	.1574	.1513
14	6.4974	.1539	.1547
14 ¹ / ₈	6.6408	.1506	.1581
14 ¹ / ₄	6.7855	.1474	.1616
14 ³ / ₈	6.9315	.1443	.1650

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 3.500"**
THREE STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
32.8755	.1708	5.8554	8 ¹ / ₄
30.8294	.1821	5.4910	8 ³ / ₈
28.9976	.1936	5.1647	8 ¹ / ₂
27.3485	.2053	4.8710	8 ⁵ / ₈
25.8566	.2171	4.6052	8 ³ / ₄
24.5007	.2292	4.3638	8 ⁷ / ₈
23.2636	.2413	4.1434	9
22.1305	.2537	3.9416	9 ¹ / ₈
21.0892	.2662	3.7561	9 ¹ / ₄
20.1291	.2789	3.5851	9 ³ / ₈
19.2414	.2918	3.4270	9 ¹ / ₂
18.4184	.3048	3.2805	9 ⁵ / ₈
17.6534	.3180	3.1442	9 ³ / ₄
16.9407	.3314	3.0173	9 ⁷ / ₈
16.2753	.3450	2.8988	10
15.6528	.3587	2.7879	10 ¹ / ₈
15.0692	.3726	2.6839	10 ¹ / ₄
14.5212	.3866	2.5863	10 ³ / ₈
14.0056	.4009	2.4945	10 ¹ / ₂
13.5199	.4153	2.4080	10 ⁵ / ₈
13.0616	.4299	2.3264	10 ³ / ₄
12.6284	.4446	2.2492	10 ⁷ / ₈
12.2186	.4595	2.1762	11
11.8302	.4746	2.1071	11 ¹ / ₈
11.4618	.4899	2.0414	11 ¹ / ₄
11.1119	.5053	1.9791	11 ³ / ₈
10.7792	.5209	1.9199	11 ¹ / ₂
10.4625	.5366	1.8635	11 ⁵ / ₈
10.1608	.5526	1.8097	11 ³ / ₄
9.8730	.5687	1.7585	11 ⁷ / ₈
9.5983	.5850	1.7095	12
9.3358	.6014	1.6628	12 ¹ / ₈
9.0847	.6180	1.6181	12 ¹ / ₄
8.8445	.6348	1.5753	12 ³ / ₈
8.6143	.6518	1.5343	12 ¹ / ₂
8.3937	.6689	1.4950	12 ⁵ / ₈
8.1821	.6862	1.4573	12 ³ / ₄
7.9790	.7037	1.4211	12 ⁷ / ₈
7.7839	.7213	1.3864	13
7.5963	.7391	1.3530	13 ¹ / ₈
7.4159	.7571	1.3208	13 ¹ / ₄
7.2422	.7753	1.2899	13 ³ / ₈
7.0750	.7936	1.2601	13 ¹ / ₂
6.9139	.8121	1.2314	13 ⁵ / ₈
6.7586	.8307	1.2038	13 ³ / ₄
6.6087	.8496	1.1771	13 ⁷ / ₈
6.4641	.6686	1.1513	14
6.3245	.8877	1.1264	14 ¹ / ₈
6.1896	.9071	1.1024	14 ¹ / ₄
6.0593	.9266	1.0792	14 ³ / ₈

**Note: No allowance made for couplings.

**Tubing Size
O.D. 3.500"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
9 ¹ / ₄	1.4917	.6704	.0355
9 ³ / ₈	1.5867	.6302	.0378
9 ¹ / ₂	1.6830	.5942	.0401
9 ⁵ / ₈	1.7805	.5616	.0424
9 ³ / ₄	1.8793	.5321	.0447
9 ⁷ / ₈	1.9794	.5052	.0471
10	2.0808	.4806	.0495
10 ¹ / ₈	2.1834	.4580	.0520
10 ¹ / ₄	2.2873	.4372	.0545
10 ³ / ₈	2.3925	.4180	.0570
10 ¹ / ₂	2.4990	.4002	.0595
10 ⁵ / ₈	2.6067	.3836	.0621
10 ³ / ₄	2.7157	.3682	.0647
10 ⁷ / ₈	2.8260	.3539	.0673
11	2.9376	.3404	.0699
11 ¹ / ₈	3.0504	.3278	.0726
11 ¹ / ₄	3.1645	.3160	.0753
11 ³ / ₈	3.2799	.3049	.0781
11 ¹ / ₂	3.3966	.2944	.0809
11 ⁵ / ₈	3.5145	.2845	.0837
11 ³ / ₄	3.6337	.2752	.0865
11 ⁷ / ₈	3.7542	.2664	.0894
12	3.8760	.2580	.0923
12 ¹ / ₈	3.9990	.2501	.0952
12 ¹ / ₄	4.1233	.2425	.0982
12 ³ / ₈	4.2489	.2354	.1012
12 ¹ / ₂	4.3758	.2285	.1042
12 ⁵ / ₈	4.5039	.2220	.1072
12 ³ / ₄	4.6333	.2158	.1103
12 ⁷ / ₈	4.7640	.2099	.1134
13	4.8960	.2042	.1166
13 ¹ / ₈	5.0292	.1988	.1197
13 ¹ / ₄	5.1637	.1937	.1229
13 ³ / ₈	5.2995	.1887	.1262
13 ¹ / ₂	5.4366	.1839	.1294
13 ⁵ / ₈	5.5749	.1794	.1327
13 ³ / ₄	5.7145	.1750	.1361
13 ⁷ / ₈	5.8554	.1708	.1394
14	5.9976	.1667	.1428
14 ¹ / ₈	6.1410	.1628	.1462
14 ¹ / ₄	6.2857	.1591	.1497
14 ³ / ₈	6.4317	.1555	.1531
14 ¹ / ₂	6.5790	.1520	.1566
14 ⁵ / ₈	6.7275	.1486	.1602
14 ³ / ₄	6.8773	.1454	.1637
14 ⁷ / ₈	7.0284	.1423	.1673
15	7.1808	.1393	.1710
15 ¹ / ₈	7.3344	.1363	.1746
15 ¹ / ₄	7.4893	.1335	.1783
15 ³ / ₈	7.6455	.1308	.1820

NO.122-A

BETWEEN TUBING & HOLE**

**Tubing Size
O.D. 3.5005"**
FOUR STRINGS

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
28.1549	.1994	5.0146	9 ¹ / ₄
26.4695	.2121	4.7144	9 ³ / ₈
24.9555	.2250	4.4448	9 ¹ / ₂
23.5884	.2380	4.2013	9 ⁵ / ₈
22.3482	.2512	3.9804	9 ³ / ₄
21.2182	.2646	3.7791	9 ⁷ / ₈
20.1846	.2782	3.5950	10
19.2358	.2919	3.4260	10 ¹ / ₈
18.3619	.3058	3.2704	10 ¹ / ₄
17.5546	.3198	3.1266	10 ³ / ₈
16.8068	.3341	2.9934	10 ¹ / ₂
16.1121	.3485	2.8697	10 ⁵ / ₈
15.4654	.3630	2.7545	10 ³ / ₄
14.8618	.3778	2.6470	10 ⁷ / ₈
14.2974	.3927	2.5465	11
13.7685	.4078	2.4523	11 ¹ / ₈
13.2721	.4230	2.3639	11 ¹ / ₄
12.8052	.4385	2.2807	11 ³ / ₈
12.3653	.4541	2.2024	11 ¹ / ₂
11.9504	.4698	2.1285	11 ⁵ / ₈
11.5583	.4858	2.0586	11 ³ / ₄
11.1874	.5019	1.9926	11 ⁷ / ₈
10.8359	.5181	1.9300	12
10.5026	.5346	1.8706	12 ¹ / ₈
10.1859	.5512	1.8142	12 ¹ / ₄
9.8848	.5680	1.7606	12 ³ / ₈
9.5983	.5850	1.7095	12 ¹ / ₂
9.3252	.6021	1.6609	12 ⁵ / ₈
9.0647	.6194	1.6145	12 ³ / ₄
8.8161	.6369	1.5702	12 ⁷ / ₈
8.5785	.6545	1.5279	13
8.3512	.6723	1.4874	13 ¹ / ₈
8.1336	.6903	1.4487	13 ¹ / ₄
7.9252	.7084	1.4115	13 ³ / ₈
7.7254	.7268	1.3760	13 ¹ / ₂
7.5337	.7453	1.3418	13 ⁵ / ₈
7.3497	.7639	1.3090	13 ³ / ₄
7.1728	.7828	1.2775	13 ⁷ / ₈
7.0028	.8018	1.2473	14
6.8393	.8209	1.2181	14 ¹ / ₈
6.6818	.8403	1.1901	14 ¹ / ₄
6.5301	.8598	1.1631	14 ³ / ₈
6.3840	.8795	1.1370	14 ¹ / ₂
6.2430	.8993	1.1119	14 ⁵ / ₈
6.1070	.9194	1.0877	14 ³ / ₄
5.9757	.9396	1.0643	14 ⁷ / ₈
5.8489	.9599	1.0417	15
5.7264	.9805	1.0199	15 ¹ / ₈
5.6080	1.0012	.9988	15 ¹ / ₄
5.4934	1.0221	.9784	15 ³ / ₈

**Note: No allowance made for couplings.

**Tubing Size
O.D. 4.000"**
ONE STRING

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 ¹ / ₄	.0841	11.8836	.0020
4 ³ / ₈	.1281	7.8041	.0031
4 ¹ / ₂	.1734	5.7670	.0041
4 ⁵ / ₈	.2199	4.5468	.0052
4 ³ / ₄	.2677	3.7348	.0064
4 ⁷ / ₈	.3168	3.1562	.0075
5	.3672	2.7233	.0087
5 ¹ / ₈	.4188	2.3876	.0100
5 ¹ / ₄	.4717	2.1198	.0112
5 ³ / ₈	.5259	1.9014	.0125
5 ¹ / ₂	.5814	1.7200	.0138
5 ⁵ / ₈	.6381	1.5671	.0152
5 ³ / ₄	.6961	1.4365	.0166
5 ⁷ / ₈	.7554	1.3237	.0180
6	.8160	1.2255	.0194
6 ¹ / ₈	.8778	1.1392	.0209
6 ¹ / ₄	.9409	1.0628	.0224
6 ³ / ₈	1.0053	.9947	.0239
6 ¹ / ₂	1.0710	.9337	.0255
6 ⁵ / ₈	1.1379	.8788	.0271
6 ³ / ₄	1.2061	.8291	.0287
6 ⁷ / ₈	1.2756	.7839	.0304
7	1.3464	.7427	.0321
7 ¹ / ₈	1.4184	.7050	.0338
7 ¹ / ₄	1.4917	.6704	.0355
7 ³ / ₈	1.5663	.6384	.0373
7 ¹ / ₂	1.6422	.6089	.0391
7 ⁵ / ₈	1.7193	.5816	.0409
7 ³ / ₄	1.7977	.5563	.0428
7 ⁷ / ₈	1.8774	.5326	.0447
8	1.9584	.5106	.0466
8 ¹ / ₈	2.0406	.4900	.0486
8 ¹ / ₄	2.1241	.4708	.0506
8 ³ / ₈	2.2089	.4527	.0526
8 ¹ / ₂	2.2950	.4357	.0546
8 ⁵ / ₈	2.3823	.4198	.0567
8 ³ / ₄	2.4709	.4047	.0588
8 ⁷ / ₈	2.5608	.3905	.0610
9	2.6520	.3771	.0631
9 ¹ / ₈	2.7444	.3644	.0653
9 ¹ / ₄	2.8381	.3523	.0676
9 ³ / ₈	2.9331	.3409	.0698
9 ¹ / ₂	3.0294	.3301	.0721
9 ⁵ / ₈	3.1269	.3198	.0745
9 ³ / ₄	3.2257	.3100	.0768
9 ⁷ / ₈	3.3258	.3007	.0792
10	3.4272	.2918	.0816

NO.122-A

Tubing Size
O.D. 4.000"
ONE STRING

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
499.1100	.0112	88.8953	4 ¹ / ₄
327.7737	.0171	58.3790	4 ³ / ₈
242.2151	.0232	43.1403	4 ¹ / ₂
190.9638	.0294	34.0121	4 ⁵ / ₈
156.8631	.0358	27.9385	4 ³ / ₄
132.5604	.0424	23.6100	4 ⁷ / ₈
114.3794	.0491	20.3718	5
100.2778	.0560	17.8602	5 ¹ / ₈
89.0304	.0631	15.8570	5 ¹ / ₄
79.8576	.0703	14.2232	5 ³ / ₈
72.2396	.0777	12.8664	5 ¹ / ₂
65.8167	.0853	11.7225	5 ⁵ / ₈
60.3320	.0931	10.7456	5 ³ / ₄
55.5971	.1010	9.9023	5 ⁷ / ₈
51.4707	.1091	9.1673	6
47.8450	.1173	8.5216	6 ¹ / ₈
44.6358	.1258	7.9500	6 ¹ / ₄
41.7771	.1344	7.4408	6 ³ / ₈
39.2158	.1432	6.9846	6 ¹ / ₂
36.9090	.1521	6.5738	6 ⁵ / ₈
34.8216	.1612	6.2020	6 ³ / ₄
32.9248	.1705	5.8642	6 ⁷ / ₈
31.1944	.1800	5.5560	7
29.6101	.1896	5.2738	7 ¹ / ₈
28.1549	.1994	5.0146	7 ¹ / ₄
26.8142	.2094	4.7758	7 ³ / ₈
25.5755	.2195	4.5552	7 ¹ / ₂
24.4281	.2298	4.3508	7 ⁵ / ₈
23.3626	.2403	4.1611	7 ³ / ₄
22.3710	.2510	3.9844	7 ⁷ / ₈
21.4461	.2618	3.8197	8
20.5819	.2728	3.6658	8 ¹ / ₈
19.7727	.2840	3.5217	8 ¹ / ₄
19.0137	.2953	3.3865	8 ³ / ₈
18.3007	.3068	3.2595	8 ¹ / ₂
17.6298	.3185	3.1400	8 ⁵ / ₈
16.9976	.3303	3.0274	8 ³ / ₄
16.4009	.3423	2.9211	8 ⁷ / ₈
15.8371	.3545	2.8207	9
15.3037	.3669	2.7257	9 ¹ / ₈
14.7984	.3794	2.6357	9 ¹ / ₄
14.3192	.3921	2.5504	9 ³ / ₈
13.8642	.4050	2.4693	9 ¹ / ₂
13.4317	.4180	2.3923	9 ⁵ / ₈
13.0203	.4312	2.3190	9 ³ / ₄
12.6284	.4446	2.2492	9 ⁷ / ₈
12.2549	.4581	2.1827	10

**Note: No allowance made for couplings.

Tubing Size

O.D. 4½"

4.500"

TABLE NO. 122-A
VOLUME & HEIGHT BETWEEN

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5	.1938	5.1600	.0046
5⅛	.2454	4.0744	.0058
5⅓	.2983	3.3518	.0071
5⅔	.3525	2.8366	.0084
5⅖	.4080	2.4510	.0097
5⅗	.4647	2.1518	.0111
5⅘	.5227	1.9130	.0124
5⅙	.5820	1.7181	.0139
6	.6426	1.5562	.0153
6⅛	.7044	1.4196	.0168
6⅓	.7675	1.3029	.0183
6⅔	.8319	1.2020	.0198
6⅕	.8976	1.1141	.0214
6⅖	.9645	1.0368	.0230
6⅗	1.0327	.9683	.0246
6⅘	1.1022	.9072	.0262
7	1.1730	.8525	.0279
7⅛	1.2450	.8032	.0296
7⅓	1.3183	.7585	.0314
7⅔	1.3929	.7179	.0332
7⅕	1.4688	.6808	.0350
7⅖	1.5459	.6469	.0368
7⅗	1.6243	.6156	.0387
7⅘	1.7040	.5868	.0406
8	1.7850	.5602	.0425
8⅛	1.8672	.5356	.0445
8⅓	1.9507	.5126	.0464
8⅔	2.0355	.4913	.0485
8⅕	2.1216	.4713	.0505
8⅖	2.2089	.4527	.0526
8⅗	2.2975	.4352	.0547
8⅘	2.3874	.4189	.0568
9	2.4786	.4035	.0590
9⅛	2.5710	.3889	.0612
9⅓	2.6647	.3753	.0634
9⅔	2.7597	.3624	.0657
9⅕	2.8560	.3501	.0680
9⅖	2.9535	.3386	.0703
9⅗	3.0523	.3276	.0727
9⅘	3.1524	.3172	.0751
10	3.2538	.3073	.0775
10⅛	3.3564	.2979	.0799
10⅓	3.4603	.2890	.0824
10⅔	3.5655	.2805	.0849
10⅕	3.6720	.2723	.0874
10⅖	3.7797	.2646	.0900
10⅗	3.8887	.2572	.0926
10⅘	3.9990	.2501	.0952

Tubing or Csg. Size
O.D. 4½"
4.500"

AND NO. 122-B
{O.D. 4 ½"-4.500" Tubing } & HOLE**
(or 4½" O.D. 4.500" Casing)

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
216.7189	.0259	38.5993	5
171.1235	.0328	30.4784	5⅛
140.7747	.0399	25.0730	5¼
119.1366	.0471	21.2191	5⅜
102.9415	.0545	18.3347	5½
90.3739	.0621	16.0963	5⅝
80.3446	.0699	14.3100	5¾
72.1605	.0778	12.8523	5⅞
65.3597	.0859	11.6411	6
59.6222	.0942	10.6192	6⅛
54.7197	.1026	9.7460	6¼
50.4847	.1112	8.9917	6⅓
46.7916	.1200	8.3339	6½
43.5443	.1289	7.7556	6⅝
40.6682	.1381	7.2433	6¾
38.1044	.1473	6.7867	6⅞
35.8057	.1568	6.3773	7
33.7340	.1664	6.0083	7⅛
31.8581	.1762	5.6742	7¼
30.1522	.1862	5.3703	7⅓
28.5949	.1963	5.0930	7½
27.1681	.2067	4.8388	7⅝
25.8566	.2171	4.6053	7¾
24.6474	.2278	4.3899	7⅞
23.5295	.2386	4.1908	8
22.4932	.2496	4.0062	8⅛
21.5302	.2608	3.8347	8¼
20.6334	.2721	3.6750	8⅓
19.7964	.2836	3.5259	8½
19.0137	.2953	3.3865	8⅝
18.2804	.3071	3.2559	8¾
17.5921	.3192	3.1333	8⅞
16.9451	.3313	3.0181	9
16.3359	.3437	2.9095	9⅛
15.7614	.3562	2.8072	9¼
15.2189	.3689	2.7106	9⅓
14.7059	.3818	2.6192	9½
14.2203	.3948	2.5327	9⅝
13.7599	.4080	2.4507	9¾
13.3231	.4214	2.3729	9⅞
12.9080	.4350	2.2990	10
12.5133	.4487	2.2287	10⅛
12.1375	.4626	2.1618	10¼
11.7795	.4766	2.0980	10⅓
11.4379	.4909	2.0372	10½
11.1119	.5053	1.9791	10⅝
10.8004	.5198	1.9236	10⅔
10.5026	.5346	1.8706	10⅞

**Note: No allowance made for couplings.

Tubing Size**O.D. 4½"****4.500"****TABLE NO. 122-A****VOLUME & HEIGHT BETWEEN**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
11	4.1106	.2433	.0979
11½	4.2234	.2368	.1006
11¾	4.3375	.2305	.1033
11½	4.4529	.2246	.1060
11½	4.5696	.2188	.1088
11¾	4.6875	.2133	.1116
11¾	4.8067	.2080	.1144
11¾	4.9272	.2030	.1173
12	5.0490	.1981	.1202
12½	5.1720	.1933	.1231
12¾	5.2963	.1888	.1261
12¾	5.4219	.1844	.1291
12½	5.5488	.1802	.1321
12¾	5.6769	.1762	.1352
12¾	5.8063	.1722	.1382
12¾	5.9370	.1684	.1414
13	6.0690	.1648	.1445
13½	6.2022	.1612	.1477
13¾	6.3367	.1578	.1509
13¾	6.4725	.1545	.1541
13½	6.6096	.1513	.1574
13¾	6.7479	.1482	.1607
13¾	6.8875	.1452	.1640
13¾	7.0284	.1423	.1673
14	7.1706	.1395	.1707
14½	7.3140	.1367	.1741
14¾	7.4587	.1341	.1776
14¾	7.6047	.1315	.1811
14½	7.7520	.1290	.1846
14¾	7.9005	.1266	.1881
14¾	8.0503	.1242	.1917
14¾	8.2014	.1219	.1953
15	8.3538	.1197	.1989
15½	8.5074	.1175	.2026
15¾	8.6623	.1154	.2062
15¾	8.8185	.1134	.2100
15½	8.9760	.1114	.2137
15¾	9.1347	.1095	.2175
15¾	9.2947	.1076	.2213
15¾	9.4560	.1058	.2251
16	9.6186	.1040	.2290

Tubing or Csg. Size
O.D. 4½"
4.500"

AND NO. 122-B
{O.D. 4 ½"-4.500" Tubing } & HOLE**
(or 4½" O.D. 4.500" Casing)

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
10.2175	.5495	1.8198	11
9.9445	.5646	1.7712	11½
9.6829	.5798	1.7246	11¼
9.4320	.5953	1.6799	11¾
9.1912	.6109	1.6370	11½
8.9600	.6266	1.5958	11⁹/₈
8.7377	.6426	1.5563	11¾
8.5241	.6587	1.5182	11⁷/₈
8.3185	.6750	1.4816	12
8.1206	.6914	1.4463	12¹/₈
7.9300	.7080	1.4124	12¹/₄
7.7463	.7248	1.3797	12³/₈
7.5692	.7418	1.3481	12½
7.3984	.7589	1.3177	12⁹/₈
7.2335	.7762	1.2883	12¾
7.0743	.7937	1.2600	12⁷/₈
6.9204	.8113	1.2326	13
6.7718	.8291	1.2061	13¹/₈
6.6280	.8471	1.1805	13¹/₄
6.4890	.8653	1.1557	13¾
6.3544	.8836	1.1318	13½
6.2241	.9021	1.1086	13⁹/₈
6.0980	.9207	1.0861	13¾
5.9757	.9396	1.0643	13⁷/₈
5.8573	.9586	1.0432	14
5.7424	.9777	1.0228	14¹/₈
5.6310	.9971	1.0029	14¹/₄
5.5229	1.0166	.9837	14³/₈
5.4180	1.0363	.9650	14½
5.3161	1.0561	.9468	14⁹/₈
5.2172	1.0762	.9292	14¾
5.1211	1.0964	.9121	14⁷/₈
5.0277	1.1167	.8955	15
4.9369	1.1373	.8793	15¹/₈
4.8486	1.1580	.8636	15¹/₄
4.7627	1.1789	.8483	15¾
4.6792	1.1999	.8334	15½
4.5978	1.2211	.8189	15⁹/₈
4.5187	1.2455	.8048	15¾
4.4416	1.2641	.7911	15⁷/₈
4.3666	1.2858	.7777	16

**Note: No allowance made for couplings.

**Casing Size
O.D. 4 $\frac{3}{4}$ "
4.750"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5	.0994	10.0553	.0024
5 $\frac{1}{8}$.1511	6.6187	.0036
5 $\frac{1}{4}$.2040	4.9020	.0049
5 $\frac{3}{8}$.2582	3.8732	.0061
5 $\frac{1}{2}$.3136	3.1883	.0075
5 $\frac{5}{8}$.3704	2.6999	.0088
5 $\frac{3}{4}$.4284	2.3343	.0102
5 $\frac{7}{8}$.4877	2.0505	.0116
6	.5482	1.8240	.0131
6 $\frac{1}{8}$.6101	1.6391	.0145
6 $\frac{1}{4}$.6732	1.4854	.0160
6 $\frac{3}{8}$.7376	1.3558	.0176
6 $\frac{1}{2}$.8032	1.2449	.0191
6 $\frac{5}{8}$.8702	1.1492	.0207
6 $\frac{3}{4}$.9384	1.0656	.0223
6 $\frac{7}{8}$	1.0079	.9922	.0240
7	1.0786	.9271	.0257
7 $\frac{1}{8}$	1.1507	.8690	.0274
7 $\frac{1}{4}$	1.2240	.8170	.0291
7 $\frac{3}{8}$	1.2986	.7701	.0309
7 $\frac{1}{2}$	1.3744	.7276	.0327
7 $\frac{5}{8}$	1.4516	.6889	.0346
7 $\frac{3}{4}$	1.5300	.6536	.0364
7 $\frac{7}{8}$	1.6097	.6212	.0383
8	1.6906	.5915	.0403
8 $\frac{1}{8}$	1.7729	.5641	.0422
8 $\frac{1}{4}$	1.8564	.5387	.0442
8 $\frac{3}{8}$	1.9412	.5151	.0462
8 $\frac{1}{2}$	2.0272	.4933	.0483
8 $\frac{5}{8}$	2.1146	.4729	.0503
8 $\frac{3}{4}$	2.2032	.4539	.0525
8 $\frac{7}{8}$	2.2931	.4361	.0546
9	2.3842	.4194	.0568
9 $\frac{1}{8}$	2.4767	.4038	.0590
9 $\frac{1}{4}$	2.5704	.3890	.0612
9 $\frac{3}{8}$	2.6654	.3752	.0635
9 $\frac{1}{2}$	2.7616	.3621	.0658
9 $\frac{5}{8}$	2.8592	.3498	.0681
9 $\frac{3}{4}$	2.9580	.3381	.0704
9 $\frac{7}{8}$	3.0581	.3270	.0728
10	3.1594	.3165	.0752
10 $\frac{1}{8}$	3.2621	.3066	.0777
10 $\frac{1}{4}$	3.3660	.2971	.0801
10 $\frac{3}{8}$	3.4712	.2881	.0826
10 $\frac{1}{2}$	3.5776	.2795	.0852
10 $\frac{5}{8}$	3.6854	.2713	.0877
10 $\frac{3}{4}$	3.7944	.2635	.0903
10 $\frac{7}{8}$	3.9047	.2561	.0930
11	4.0162	.2490	.0956

NO.122-B

Casing Size

O.D. 4 $\frac{3}{4}$ "

4.750"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
422.3237	.0133	75.2191	5
277.9853	.0202	49.5113	5 $\frac{1}{8}$
205.8828	.0273	36.6693	5 $\frac{1}{4}$
162.6729	.0345	28.9733	5 $\frac{3}{8}$
133.9075	.0419	23.8500	5 $\frac{1}{2}$
113.3950	.0495	20.1965	5 $\frac{5}{8}$
98.0394	.0573	17.4616	5 $\frac{3}{4}$
86.1209	.0652	15.3388	5 $\frac{7}{8}$
76.6076	.0733	13.6444	6
68.8427	.0816	12.2614	6 $\frac{1}{8}$
62.3887	.0900	11.1119	6 $\frac{1}{4}$
56.9425	.0986	10.1419	6 $\frac{3}{8}$
52.2877	.1074	9.3128	6 $\frac{1}{2}$
48.2656	.1163	8.5965	6 $\frac{5}{8}$
44.7571	.1254	7.9716	6 $\frac{3}{4}$
41.6714	.1347	7.4220	6 $\frac{7}{8}$
38.9377	.1442	6.9351	7
36.5000	.1538	6.5009	7 $\frac{1}{8}$
34.3138	.1636	6.1115	7 $\frac{1}{4}$
32.3429	.1736	5.7605	7 $\frac{3}{8}$
30.5577	.1837	5.4426	7 $\frac{1}{2}$
28.9339	.1940	5.1533	7 $\frac{5}{8}$
27.4510	.2045	4.8892	7 $\frac{3}{4}$
26.0921	.2152	4.6472	7 $\frac{7}{8}$
24.8426	.2260	4.4247	8
23.6902	.2370	4.2194	8 $\frac{1}{8}$
22.6245	.2482	4.0296	8 $\frac{1}{4}$
21.6363	.2595	3.8536	8 $\frac{3}{8}$
20.7178	.2710	3.6900	8 $\frac{1}{2}$
19.8621	.2827	3.5376	8 $\frac{5}{8}$
19.0632	.2945	3.3953	8 $\frac{3}{4}$
18.3160	.3065	3.2622	8 $\frac{7}{8}$
17.6156	.3187	3.1375	9
16.9582	.3311	3.0204	9 $\frac{1}{8}$
16.3399	.3436	2.9103	9 $\frac{1}{4}$
15.7576	.3563	2.8065	9 $\frac{3}{8}$
15.2083	.3692	2.7087	9 $\frac{1}{2}$
14.6895	.3822	2.6163	9 $\frac{5}{8}$
14.1988	.3954	2.5289	9 $\frac{3}{4}$
13.7341	.4088	2.4461	9 $\frac{7}{8}$
13.2935	.4224	2.3677	10
12.8752	.4361	2.2932	10 $\frac{1}{8}$
12.4777	.4500	2.2224	10 $\frac{1}{4}$
12.0996	.4640	2.1550	10 $\frac{3}{8}$
11.7396	.4783	2.0909	10 $\frac{1}{2}$
11.3964	.4927	2.0298	10 $\frac{5}{8}$
11.0690	.5072	1.9715	10 $\frac{3}{4}$
10.7563	.5220	1.9158	10 $\frac{7}{8}$
10.4575	.5369	1.8626	11

**Note: No allowance made for couplings.

Casing Size
O.D. 5"
5.000"

TABLE
VOLUME & HEIGHT

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 ¹ / ₂	.2142	4.6685	.0051
5 ⁵ / ₈	.2709	3.6909	.0065
5 ³ / ₄	.3289	3.040	.0078
5 ⁷ / ₈	.3882	2.5757	.0092
6	.4488	2.2282	.0107
6 ¹ / ₈	.5106	1.9583	.0122
6 ¹ / ₄	.5737	1.7429	.0137
6 ³ / ₈	.6381	1.5671	.0152
6 ¹ / ₂	.7038	1.4209	.0168
6 ⁵ / ₈	.7707	1.2975	.0184
6 ³ / ₄	.8389	1.192	.0200
6 ⁷ / ₈	.9084	1.1008	.0216
7	.9792	1.0212	.0233
7 ¹ / ₈	1.0512	.9512	.0250
7 ¹ / ₄	1.1245	.8892	.0268
7 ³ / ₈	1.1991	.8339	.0286
7 ¹ / ₂	1.2750	.7843	.0304
7 ⁵ / ₈	1.3521	.7396	.0322
7 ³ / ₄	1.4305	.6990	.0341
7 ⁷ / ₈	1.5102	.6621	.0360
8	1.5912	.5285	.0379
8 ¹ / ₈	1.6734	.5976	.0398
8 ¹ / ₄	1.7569	.5692	.0418
8 ³ / ₈	1.8417	.5430	.0439
8 ¹ / ₂	1.9278	.5187	.0459
8 ⁵ / ₈	2.0151	.4962	.0480
8 ³ / ₄	2.1037	.4753	.0501
8 ⁷ / ₈	2.1936	.4559	.0522
9	2.2848	.4377	.0544
9 ¹ / ₈	2.3772	.4207	.0566
9 ¹ / ₄	2.4709	.4047	.0588
9 ³ / ₈	2.5659	.3897	.0611
9 ¹ / ₂	2.6622	.3756	.0634
9 ⁵ / ₈	2.7597	.3624	.0657
9 ³ / ₄	2.8585	.3498	.0681
9 ⁷ / ₈	2.9586	.3380	.0704
10	3.0600	.3268	.0729
10 ¹ / ₈	3.1626	.3162	.0753
10 ¹ / ₄	3.2665	.3061	.0778
10 ³ / ₈	3.3717	.2966	.0803
10 ¹ / ₂	3.4782	.2875	.0828
10 ⁵ / ₈	3.5859	.2789	.0845
10 ³ / ₄	3.6949	.2706	.0880
10 ⁷ / ₈	3.8052	.2628	.0906
11	3.9168	.2553	.0933
11 ¹ / ₈	4.0296	.2482	.0959
11 ¹ / ₄	4.1437	.2413	.0987
11 ³ / ₈	4.2591	.2348	.1014
11 ¹ / ₂	4.3758	.2285	.1042

NO.122-B

Casing Size
O.D. 5"
5.000"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
196.0789	.0286	34.9231	5½
155.0177	.0362	27.6098	5⅓
127.6793	.0440	22.7407	5⅔
108.1815	.0519	19.2679	5⅖
93.5831	.0600	16.6679	6
82.2503	.0683	14.6494	6⅓
73.2028	.0767	13.0380	6¼
65.8167	.0853	11.7225	6⅔
59.6762	.0941	10.6288	6½
54.4934	.1030	9.7057	6⅔
50.0627	.1122	8.9165	6¾
46.2333	.1214	8.2345	6⅖
42.8923	.1309	7.6394	7
39.9530	.1405	7.1159	7⅓
37.3484	.1503	6.6520	7¼
35.0253	.1603	6.2383	7⅔
32.9413	.1704	5.8671	7½
31.0620	.1808	5.5324	7⅔
29.3594	.1912	5.2291	7¾
27.8103	.2019	4.9532	7⅖
26.3952	.2127	4.7012	8
25.0981	.2237	4.4702	8⅓
23.9051	.2349	4.2577	8¼
22.8046	.2462	4.0617	8⅔
21.7865	.2577	3.8803	8½
20.8423	.2694	3.7122	8⅔
19.9644	.2812	3.5558	8¾
19.1463	.2932	3.4101	8⅖
18.3824	.3054	3.2740	9
17.6676	.3178	3.1467	9⅓
16.9976	.3303	3.0274	9¼
16.3683	.3430	2.9153	9⅔
15.7765	.3559	2.8099	9½
15.2189	.3689	2.7106	9⅔
14.6928	.3821	2.6169	9¾
14.1958	.3955	2.5284	9⅖
13.7255	.4091	2.4446	10
13.2801	.4228	2.3653	10⅓
12.8576	.4367	2.2900	10¼
12.4565	.4507	2.2186	10⅔
12.0752	.4650	2.1507	10½
11.7124	.4794	2.0861	10⅔
11.3669	.4939	2.0245	10¾
11.0374	.5087	1.9659	10⅖
10.7231	.5236	1.9099	11
10.4228	.5387	1.8564	11⅓
10.1358	.5539	1.8053	11¼
9.8612	.5694	1.7564	11⅔
9.5983	.5850	1.7095	11½

**Note: No allowance made for couplings.

**Casing Size
O.D. 5 $\frac{1}{2}$ "
5.500"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 $\frac{5}{8}$.0567	17.6251	.0014
5 $\frac{3}{4}$.1147	8.7146	.0027
5 $\frac{7}{8}$.1740	5.7459	.0041
6	.2346	4.2626	.0056
6 $\frac{1}{8}$.2964	3.3734	.0071
6 $\frac{1}{4}$.3595	2.7813	.0086
6 $\frac{3}{8}$.4239	2.3588	.0101
6 $\frac{1}{2}$.4896	2.0425	.0117
6 $\frac{5}{8}$.5565	1.7968	.0133
6 $\frac{3}{4}$.6247	1.6006	.0149
6 $\frac{7}{8}$.6942	1.4404	.0165
7	.7650	1.3072	.0182
7 $\frac{1}{8}$.8370	1.1947	.0199
7 $\frac{1}{4}$.9103	1.0985	.0217
7 $\frac{3}{8}$.9849	1.0153	.0235
7 $\frac{1}{2}$	1.0608	.9427	.0253
7 $\frac{5}{8}$	1.1379	.8788	.0271
7 $\frac{3}{4}$	1.2163	.8221	.0290
7 $\frac{7}{8}$	1.2960	.7716	.0309
8	1.3770	.7262	.0328
8 $\frac{1}{8}$	1.4592	.6853	.0347
8 $\frac{1}{4}$	1.5427	.6482	.0367
8 $\frac{3}{8}$	1.6275	.6144	.0388
8 $\frac{1}{2}$	1.7136	.5836	.0408
8 $\frac{5}{8}$	1.8009	.5553	.0429
8 $\frac{3}{4}$	1.8895	.5292	.0450
8 $\frac{7}{8}$	1.9794	.5052	.0471
9	2.0706	.4830	.0493
9 $\frac{1}{8}$	2.1630	.4623	.0515
9 $\frac{1}{4}$	2.2567	.4431	.0537
9 $\frac{3}{8}$	2.3517	.4252	.0560
9 $\frac{1}{2}$	2.4480	.4085	.0583
9 $\frac{5}{8}$	2.5455	.3928	.0606
9 $\frac{3}{4}$	2.6443	.3782	.0630
9 $\frac{7}{8}$	2.7444	.3644	.0653
10	2.8458	.3514	.0678
10 $\frac{1}{8}$	2.9484	.3392	.0702
10 $\frac{1}{4}$	3.0523	.3276	.0727
10 $\frac{3}{8}$	3.1575	.3167	.0752
10 $\frac{1}{2}$	3.2640	.3064	.0777
10 $\frac{5}{8}$	3.3717	.2966	.0803
10 $\frac{3}{4}$	3.4807	.2873	.0829
10 $\frac{7}{8}$	3.5910	.2785	.0855
11	3.7026	.2701	.0882
11 $\frac{1}{8}$	3.8154	.2621	.0908
11 $\frac{1}{4}$	3.9295	.2545	.0936
11 $\frac{3}{8}$	4.0449	.2472	.0963
11 $\frac{1}{2}$	4.1616	.2403	.0991
11 $\frac{5}{8}$	4.2795	.2337	.1019
11 $\frac{3}{4}$	4.3987	.2273	.1047
11 $\frac{7}{8}$	4.5192	.2213	.1076

NO.122-B

Casing Size
O.D. 5 $\frac{1}{2}$ "
5.500"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
740.2533	.0076	131.84473	5 $\frac{5}{8}$
366.0142	.0153	65.1899	5 $\frac{3}{4}$
241.3280	.0233	42.9823	5 $\frac{7}{8}$
179.0287	.0314	31.8864	6
141.6829	.0396	25.2348	6 $\frac{1}{8}$
116.8130	.0481	20.8053	6 $\frac{1}{4}$
99.0715	.0567	17.6454	6 $\frac{3}{8}$
85.7846	.0654	15.2789	6 $\frac{1}{2}$
75.4668	.0744	13.4412	6 $\frac{5}{8}$
67.2271	.0835	11.9737	6 $\frac{3}{4}$
60.4982	.0928	10.7752	6 $\frac{7}{8}$
54.9021	.1023	9.7785	7
50.1771	.1119	8.9369	7 $\frac{1}{8}$
46.1362	.1217	8.2172	7 $\frac{1}{4}$
42.6424	.1317	7.5949	7 $\frac{3}{8}$
39.5929	.1418	7.0518	7 $\frac{1}{2}$
36.9090	.1521	6.5738	7 $\frac{5}{8}$
34.5296	.1626	6.1500	7 $\frac{3}{4}$
32.4066	.1733	5.7719	7 $\frac{7}{8}$
30.5012	.1841	5.4325	8
28.7822	.1951	5.1263	8 $\frac{1}{8}$
27.2242	.2062	4.8488	8 $\frac{1}{4}$
25.8059	.2176	4.5962	8 $\frac{3}{8}$
24.5099	.2291	4.3654	8 $\frac{1}{2}$
23.3213	.2407	4.1537	8 $\frac{5}{8}$
22.2276	.2526	3.9589	8 $\frac{3}{4}$
21.2182	.2646	3.7791	8 $\frac{7}{8}$
20.2840	.2768	3.6127	9
19.4172	.2892	3.4583	9 $\frac{1}{8}$
18.6109	.3017	3.3147	9 $\frac{1}{4}$
17.8592	.3144	3.1809	9 $\frac{3}{8}$
17.1569	.3272	3.0558	9 $\frac{1}{2}$
16.4995	.3403	2.9387	9 $\frac{5}{8}$
15.8830	.3535	2.8289	9 $\frac{3}{4}$
15.3037	.3669	2.7257	9 $\frac{7}{8}$
14.7586	.3804	2.6286	10
14.2449	.3941	2.5371	10 $\frac{1}{8}$
13.7599	.4080	2.4507	10 $\frac{1}{4}$
13.3015	.4221	2.3691	10 $\frac{3}{8}$
12.8677	.4363	2.2918	10 $\frac{1}{2}$
12.4565	.4507	2.2186	10 $\frac{5}{8}$
12.0664	.4653	2.1491	10 $\frac{3}{4}$
11.6958	.4801	2.0831	10 $\frac{7}{8}$
11.3434	.4950	2.0203	11
11.0079	.5100	1.9606	11 $\frac{1}{8}$
10.6883	.5253	1.9037	11 $\frac{1}{4}$
10.3834	.5407	1.8494	11 $\frac{3}{8}$
10.0923	.5563	1.7975	11 $\frac{1}{2}$
9.8142	.5721	1.7480	11 $\frac{5}{8}$
9.5482	.5880	1.7006	11 $\frac{3}{4}$
9.2936	.6041	1.6553	11 $\frac{7}{8}$

**Note: No allowance made for couplings.

**Casing Size
O.D. 5 $\frac{1}{2}$ "
5.500"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
12	4.6410	.2155	.1105
12 $\frac{1}{8}$	4.7640	.2099	.1134
12 $\frac{1}{4}$	4.8883	.2046	.1164
12 $\frac{3}{8}$	5.0139	.1994	.1194
12 $\frac{1}{2}$	5.1408	.1945	.1224
12 $\frac{5}{8}$	5.2689	.1898	.1255
12 $\frac{3}{4}$	5.3983	.1852	.1285
12 $\frac{7}{8}$	5.5290	.1809	.1316
13	5.6610	.1766	.1348
13 $\frac{1}{8}$	5.7942	.1727	.1380
13 $\frac{1}{4}$	5.9287	.1687	.1412
13 $\frac{3}{8}$	6.0645	.1649	.1444
13 $\frac{1}{2}$	6.2016	.1612	.1477
13 $\frac{5}{8}$	6.3399	.1577	.1510
13 $\frac{3}{4}$	6.4795	.1543	.1543
13 $\frac{7}{8}$	6.6204	.1510	.1576
14	6.7626	.1479	.1610
14 $\frac{1}{8}$	6.9060	.1448	.1644
14 $\frac{1}{4}$	7.0507	.1418	.1679
14 $\frac{3}{8}$	7.1967	.1390	.1714
14 $\frac{1}{2}$	7.3440	.1362	.1749
14 $\frac{5}{8}$	7.4925	.1335	.1784
14 $\frac{3}{4}$	7.6423	.1309	.1820
14 $\frac{7}{8}$	7.7934	.1283	.1856
15	7.9458	.1259	.1892
15 $\frac{1}{8}$	8.0994	.1235	.1928
15 $\frac{1}{4}$	8.2543	.1211	.1965
15 $\frac{3}{8}$	8.4105	.1189	.2003
15 $\frac{1}{2}$	8.5680	.1167	.2040
15 $\frac{5}{8}$	8.7267	.1146	.2078
15 $\frac{3}{4}$	8.8867	.1125	.2116
15 $\frac{7}{8}$	9.0480	.1105	.2154
16	9.2106	.1086	.2193

NO.122-B

Casing Size
O.D. 5 $\frac{1}{2}$ "
5.500"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
9.0498	.6204	1.6118	12
8.8161	.6369	1.5702	12 $\frac{1}{8}$
8.5919	.6535	1.5303	12 $\frac{1}{4}$
8.3767	.6703	1.4919	12 $\frac{3}{8}$
8.1700	.6872	1.4551	12 $\frac{1}{2}$
7.9713	.7044	1.4197	12 $\frac{5}{8}$
7.7802	.7217	1.3857	12 $\frac{3}{4}$
7.5963	.7391	1.3530	12 $\frac{7}{8}$
7.4192	.7568	1.3214	13
7.2486	.7746	1.2910	13 $\frac{1}{8}$
7.0841	.7926	1.2617	13 $\frac{1}{4}$
6.9255	.8107	1.2335	13 $\frac{3}{8}$
6.7725	.8290	1.2062	13 $\frac{1}{2}$
6.6247	.8475	1.1799	13 $\frac{5}{8}$
6.4819	.8662	1.1545	13 $\frac{3}{4}$
6.3440	.8850	1.1299	13 $\frac{7}{8}$
6.2106	.9040	1.1062	14
6.0817	.9232	1.0832	14 $\frac{1}{8}$
5.9568	.9425	1.0610	14 $\frac{1}{4}$
5.8360	.9621	1.0394	14 $\frac{3}{8}$
5.7190	.9817	1.0186	14 $\frac{1}{2}$
5.6056	1.0016	.9984	14 $\frac{5}{8}$
5.4957	1.0216	.9788	14 $\frac{3}{4}$
5.3892	1.0418	.9599	14 $\frac{7}{8}$
5.2858	1.0622	.9414	15
5.1856	1.0827	.9236	15 $\frac{1}{8}$
5.0882	1.1034	.9063	15 $\frac{1}{4}$
4.9937	1.1243	.8894	15 $\frac{3}{8}$
4.9020	1.1454	.8731	15 $\frac{1}{2}$
4.8128	1.1666	.8572	15 $\frac{5}{8}$
4.7262	1.1880	.8418	15 $\frac{3}{4}$
4.6419	1.2095	.8268	15 $\frac{7}{8}$
4.5600	1.2313	.8122	16

**Note: No allowance made for couplings.

Casing Size***O.D. 5³/₄"****5.750"**
TABLE
VOLUME & HEIGHT

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
6	.1198	8.3438	.0029
6 ¹ / ₈	.1817	5.5040	.0043
6 ¹ / ₄	.2448	4.0850	.0058
6 ³ / ₈	.3092	3.2343	.0074
6 ¹ / ₂	.3748	2.6677	.0089
6 ⁵ / ₈	.4418	2.2635	.0105
6 ³ / ₄	.5100	1.9608	.0121
6 ⁷ / ₈	.5795	1.7257	.0138
7	.6502	1.5379	.0155
7 ¹ / ₈	.7223	1.3845	.0172
7 ¹ / ₄	.7956	1.2569	.0189
7 ³ / ₈	.8702	1.1492	.0207
7 ¹ / ₂	.9460	1.0570	.0225
7 ⁵ / ₈	1.0232	.9773	.0244
7 ³ / ₄	1.1016	.9078	.0262
7 ⁷ / ₈	1.1813	.8465	.0281
8	1.2622	.7922	.0301
8 ¹ / ₈	1.3445	.7438	.0320
8 ¹ / ₄	1.4280	.7003	.0340
8 ³ / ₈	1.5128	.6610	.0360
8 ¹ / ₂	1.5988	.6255	.0381
8 ⁵ / ₈	1.6862	.5931	.0401
8 ³ / ₄	1.7748	.5634	.0423
8 ⁷ / ₈	1.8647	.5363	.0444
9	1.9558	.5113	.0466
9 ¹ / ₈	2.0483	.4882	.0488
9 ¹ / ₄	2.1420	.4669	.0510
9 ³ / ₈	2.2370	.4470	.0533
9 ¹ / ₂	2.3332	.4286	.0556
9 ⁵ / ₈	2.4308	.4114	.0579
9 ³ / ₄	2.5296	.3953	.0602
9 ⁷ / ₈	2.6297	.3803	.0626
10	2.7310	.3662	.0650
10 ¹ / ₈	2.8337	.3529	.0675
10 ¹ / ₄	2.9376	.3404	.0699
10 ³ / ₈	3.0428	.3286	.0724
10 ¹ / ₂	3.1492	.3175	.0750
10 ⁵ / ₈	3.2570	.3070	.0775
10 ³ / ₄	3.3660	.2971	.0801
10 ⁷ / ₈	3.4763	.2877	.0828
11	3.5878	.2787	.0854
11 ¹ / ₈	3.7007	.2702	.0881
11 ¹ / ₄	3.8148	.2621	.0908
11 ³ / ₈	3.9302	.2544	.0936
11 ¹ / ₂	4.0468	.2471	.0964
11 ⁵ / ₈	4.1648	.2401	.0992
11 ³ / ₄	4.2840	.2334	.1020
11 ⁷ / ₈	4.4045	.2270	.1049
12	4.5262	.2209	.1078

NO.122-B

Casing Size

*O.D. 5 $\frac{3}{4}$ "

5.750"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
350.4388	.0160	62.4158	6
231.1667	.0243	41.1726	6 $\frac{1}{8}$
171.5690	.0327	30.5577	6 $\frac{1}{4}$
135.8402	.0413	24.1942	6 $\frac{3}{8}$
112.0451	.0501	19.9561	6 $\frac{1}{2}$
95.0686	.0591	16.9324	6 $\frac{5}{8}$
82.3531	.0682	14.6677	6 $\frac{3}{4}$
72.4780	.0775	12.9089	6 $\frac{7}{8}$
64.5907	.0869	11.5041	7
58.1487	.0966	10.3567	7 $\frac{1}{8}$
52.7905	.1064	9.4024	7 $\frac{1}{4}$
48.2656	.1163	8.5965	7 $\frac{3}{8}$
44.3952	.1265	7.9071	7 $\frac{1}{2}$
41.0483	.1368	7.3110	7 $\frac{5}{8}$
38.1265	.1473	6.7906	7 $\frac{3}{4}$
35.5545	.1579	6.3325	7 $\frac{7}{8}$
33.2740	.1687	5.9264	8
31.2387	.1797	5.5639	8 $\frac{1}{8}$
29.4118	.1909	5.2385	8 $\frac{1}{4}$
27.7634	.2022	4.9449	8 $\frac{3}{8}$
26.2689	.2137	4.6787	8 $\frac{1}{2}$
24.9083	.2254	4.4364	8 $\frac{5}{8}$
23.6647	.2373	4.2149	8 $\frac{3}{4}$
22.5239	.2493	4.0117	8 $\frac{7}{8}$
21.4741	.2615	3.8247	9
20.5050	.2738	3.6521	9 $\frac{1}{8}$
19.6079	.2863	3.4923	9 $\frac{1}{4}$
18.7753	.2990	3.3440	9 $\frac{3}{8}$
18.0007	.3119	3.2061	9 $\frac{1}{2}$
17.2784	.3249	3.0774	9 $\frac{5}{8}$
16.6035	.3382	2.9572	9 $\frac{3}{4}$
15.9715	.3515	2.8446	9 $\frac{7}{8}$
15.3787	.3651	2.7391	10
14.8217	.3788	2.6399	10 $\frac{1}{8}$
14.2974	.3927	2.5465	10 $\frac{1}{4}$
13.8032	.4068	2.4584	10 $\frac{3}{8}$
13.3365	.4210	2.3753	10 $\frac{1}{2}$
12.8954	.4354	2.2968	10 $\frac{5}{8}$
12.4777	.4500	2.2224	10 $\frac{3}{4}$
12.0819	.4647	2.1519	10 $\frac{7}{8}$
11.7062	.4796	2.0850	11
11.3493	.4947	2.0214	11 $\frac{1}{8}$
11.0098	.5100	1.9609	11 $\frac{1}{4}$
10.6865	.5254	1.9034	11 $\frac{3}{8}$
10.3785	.5410	1.8485	11 $\frac{1}{2}$
10.0846	.5567	1.7961	11 $\frac{5}{8}$
9.8039	.5727	1.7462	11 $\frac{3}{4}$
9.5358	.5888	1.6984	11 $\frac{7}{8}$
9.2792	.6051	1.6527	12

**Note: No allowance made for couplings.

**Casing Size
*O.D. 6"
6.000"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
6 ¹ / ₈	.0618	16.1715	.0015
6 ¹ / ₄	.1249	8.0032	.0030
6 ³ / ₈	.1893	5.2816	.0045
6 ¹ / ₂	.2550	3.9216	.0061
6 ⁵ / ₈	.3219	3.1062	.0077
6 ³ / ₄	.3901	2.5631	.0093
6 ⁷ / ₈	.4596	2.1756	.0109
7	.5304	1.8854	.0126
7 ¹ / ₈	.6024	1.6599	.0143
7 ¹ / ₄	.6757	1.4798	.0161
7 ³ / ₈	.7503	1.3327	.0179
7 ¹ / ₂	.8262	1.2104	.0197
7 ⁵ / ₈	.9033	1.1070	.0215
7 ³ / ₄	.9817	1.0186	.0234
7 ⁷ / ₈	1.0614	.9421	.0253
8	1.1424	.8754	.0272
8 ¹ / ₈	1.2246	.8166	.0292
8 ¹ / ₄	1.3081	.7644	.0311
8 ³ / ₈	1.3929	.7179	.0332
8 ¹ / ₂	1.4790	.6761	.0352
8 ⁵ / ₈	1.5663	.6384	.0373
8 ³ / ₄	1.6459	.6042	.0394
8 ⁷ / ₈	1.7448	.5731	.0415
9	1.8360	.5447	.0437
9 ¹ / ₈	1.9284	.5186	.0459
9 ¹ / ₄	2.0221	.4945	.0481
9 ³ / ₈	2.1171	.4723	.0504
9 ¹ / ₂	2.2134	.4518	.0527
9 ⁵ / ₈	2.3109	.4327	.0550
9 ³ / ₄	2.4097	.4150	.0574
9 ⁷ / ₈	2.5098	.3984	.0598
10	2.6112	.3830	.0622
10 ¹ / ₈	2.7138	.3685	.0646
10 ¹ / ₄	2.8177	.3549	.0671
10 ³ / ₈	2.9229	.3421	.0696
10 ¹ / ₂	3.0294	.3301	.0721
10 ⁵ / ₈	3.1371	.3188	.0747
10 ³ / ₄	3.2461	.3081	.0773
10 ⁷ / ₈	3.3564	.2979	.0799
11	3.4680	.2884	.0826
11 ¹ / ₈	3.5808	.2793	.0853
11 ¹ / ₄	3.6949	.2706	.0880
11 ³ / ₈	3.8103	.2624	.0907
11 ¹ / ₂	3.9270	.2546	.0935
11 ⁵ / ₈	4.0449	.2472	.0963
11 ³ / ₄	4.1641	.2401	.0991
11 ⁷ / ₈	4.2846	.2334	.1020
12	4.4064	.2269	.1049

NO.122-B

BETWEEN CASING & HOLE****Casing Size*****O.D. 6"****6.000"**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
679.2011	.0083	120.9709	6 1/8
336.1353	.0167	159.8682	6 1/4
221.8266	.0253	39.5090	6 3/8
164.7063	.0341	29.3354	6 1/2
130.4604	.0430	23.2360	6 5/8
107.6512	.0522	19.1735	6 3/4
91.3766	.0614	16.2749	6 7/8
79.1857	.0709	14.1036	7
69.7169	.0805	12.4171	7 1/8
62.1533	.0903	11.0700	7 1/4
55.9749	.1003	9.9696	7 3/8
50.8353	.1104	9.0541	7 1/2
46.4944	.1208	8.2810	7 5/8
42.7808	.1312	7.6196	7 3/4
39.5691	.1419	7.0476	7 7/8
36.7648	.1527	6.5481	8
34.2959	.1637	6.1084	8 1/8
32.1065	.1749	5.7184	8 1/4
30.1522	.1862	5.3703	8 3/8
28.3976	.1977	5.0578	8 1/2
26.8142	.2094	4.7758	8 5/8
25.3785	.2212	4.5201	8 3/4
24.0711	.2333	4.2872	8 7/8
22.8759	.2454	4.0744	9
21.7793	.2578	3.8791	9 1/8
20.7700	.2703	3.6993	9 1/4
19.8382	.2830	3.5333	9 3/8
18.9754	.2959	3.3797	9 1/2
18.1745	.3089	3.2370	9 5/8
17.4292	.3221	3.1043	9 3/4
16.7342	.3355	2.9805	9 7/8
16.0846	.3491	2.8648	10
15.4763	.3628	2.7564	10 1/8
14.9055	.3767	2.6548	10 1/4
14.3691	.3907	2.5593	10 3/8
13.8642	.4050	2.4693	10 1/2
13.3880	.4194	2.3845	10 5/8
12.9384	.4339	2.3044	10 3/4
12.5133	.4487	2.2287	10 7/8
12.1108	.4636	2.1570	11
11.7291	.4787	2.0890	11 1/8
11.3669	.4939	2.0245	11 1/4
11.0227	.5094	1.9632	11 3/8
10.6952	.5250	1.9040	11 1/2
10.3834	.5407	1.8494	11 5/8
10.0861	.5567	1.7964	11 3/4
9.8025	.5728	1.7459	11 7/8
9.5316	.5890	1.6977	12

**Note: No allowance made for couplings.

**Casing Size
O.D. 6⁵/₈"
6.625"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	.2085	4.7970	.0050
7 ¹ / ₈	.2805	3.5651	.0067
7 ¹ / ₄	.3538	2.8264	.0084
7 ³ / ₈	.4284	2.3343	.0102
7 ¹ / ₂	.5043	1.9831	.0120
7 ⁵ / ₈	.5814	1.7200	.0138
7 ³ / ₄	.6598	1.5156	.0157
7 ⁷ / ₈	.7395	1.3523	.0176
8	.8205	1.2188	.0195
8 ¹ / ₈	.9027	1.1078	.0215
8 ¹ / ₄	.9862	1.0140	.0235
8 ³ / ₈	1.0710	.9337	.0255
8 ¹ / ₂	1.1571	.8643	.0275
8 ⁵ / ₈	1.2444	.8036	.0296
8 ³ / ₄	1.3330	.7502	.0317
8 ⁷ / ₈	1.4229	.7028	.0339
9	1.5141	.6605	.0360
9 ¹ / ₈	1.6065	.6225	.0382
9 ¹ / ₄	1.7002	.5882	.0405
9 ³ / ₈	1.7952	.5570	.0427
9 ¹ / ₂	1.8915	.5287	.0450
9 ⁵ / ₈	1.9890	.5028	.0474
9 ³ / ₄	2.0878	.4790	.0497
9 ⁷ / ₈	2.1879	.4571	.0521
10	2.2893	.4368	.0545
10 ¹ / ₈	2.3919	.4181	.0569
10 ¹ / ₄	2.4958	.4007	.0594
10 ³ / ₈	2.6010	.3845	.0619
10 ¹ / ₂	2.7075	.3694	.0645
10 ⁵ / ₈	2.8152	.3552	.0670
10 ³ / ₄	2.9242	.3420	.0696
10 ⁷ / ₈	3.0345	.3295	.0722
11	3.1461	.3179	.0749
11 ¹ / ₈	3.2589	.3069	.0776
11 ¹ / ₄	3.3730	.2965	.0803
11 ³ / ₈	3.4884	.2867	.0831
11 ¹ / ₂	3.6051	.2774	.0858
11 ⁵ / ₈	3.7230	.2686	.0886
11 ³ / ₄	3.8422	.2603	.0915
11 ⁷ / ₈	3.9627	.2524	.0943
12	4.0845	.2448	.0972
12 ¹ / ₈	4.2075	.2377	.1002
12 ¹ / ₄	4.3318	.2309	.1031
12 ³ / ₈	4.4574	.2243	.1061
12 ¹ / ₂	4.5843	.2181	.1091
12 ⁵ / ₈	4.7124	.2122	.1122
12 ³ / ₄	4.8418	.2065	.1153
12 ⁷ / ₈	4.9725	.2011	.1184
13	5.1045	.1959	.1215

NO.122-B

Casing Size
O.D. $6\frac{5}{8}$ "
6.625"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
201.4756	.0279	35.8843	7
149.7330	.0375	26.6686	$7\frac{1}{8}$
118.7072	.0473	21.1427	$7\frac{1}{4}$
98.0394	.0573	17.4616	$7\frac{3}{8}$
83.2901	.0674	14.8346	$7\frac{1}{2}$
72.2396	.0777	12.8664	$7\frac{5}{8}$
63.6546	.0882	11.3374	$7\frac{3}{4}$
56.7953	.0989	10.1157	$7\frac{7}{8}$
51.1908	.1097	9.1175	8
46.5272	.1207	8.2868	$8\frac{1}{8}$
42.5873	.1318	7.5851	$8\frac{1}{4}$
39.2158	.1432	6.9846	$8\frac{3}{8}$
36.2989	.1547	6.4651	$8\frac{1}{2}$
33.7513	.1664	6.0114	$8\frac{5}{8}$
31.5077	.1782	5.6118	$8\frac{3}{4}$
29.5173	.1902	5.2572	$8\frac{7}{8}$
27.7400	.2024	4.9407	9
26.1439	.2148	4.6564	$9\frac{1}{8}$
24.7029	.2273	4.3998	$9\frac{1}{4}$
23.3958	.2400	4.1670	$9\frac{3}{8}$
22.2051	.2529	3.9549	$9\frac{1}{2}$
21.1162	.2659	3.7610	$9\frac{5}{8}$
20.1168	.2791	3.5830	$9\frac{3}{4}$
19.1965	.2925	3.4190	$9\frac{7}{8}$
18.3466	.3060	3.2677	10
17.5593	.3197	3.1274	$10\frac{1}{8}$
16.8282	.3336	2.9972	$10\frac{1}{4}$
16.1477	.3477	2.8760	$10\frac{3}{8}$
15.5127	.3619	2.7629	$10\frac{1}{2}$
14.9190	.3763	2.6572	$10\frac{5}{8}$
14.3629	.3909	2.5581	$10\frac{3}{4}$
13.8409	.4057	2.4652	$10\frac{7}{8}$
13.3501	.4206	2.3777	11
12.8878	.4357	2.2954	$11\frac{1}{8}$
12.4518	.4509	2.2178	$11\frac{1}{4}$
12.0399	.4663	2.1444	$11\frac{3}{8}$
11.6503	.4819	2.0750	$11\frac{1}{2}$
11.2813	.4977	2.0093	$11\frac{5}{8}$
10.9312	.5136	1.9469	$11\frac{3}{4}$
10.5989	.5297	1.8877	$11\frac{7}{8}$
10.2829	.5460	1.8315	12
9.9822	.5625	1.7779	$12\frac{1}{8}$
9.6957	.5791	1.7269	$12\frac{1}{4}$
9.4226	.5959	1.6782	$12\frac{3}{8}$
9.1618	.6128	1.6318	$12\frac{1}{2}$
8.9127	.6300	1.5874	$12\frac{5}{8}$
8.6745	.6473	1.5450	$12\frac{3}{4}$
8.4465	.6647	1.5044	$12\frac{7}{8}$
8.2281	.6824	1.4655	13

**Note: No allowance made for couplings.

**Casing Size
O.D. 7"**
7.000"

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7 ¹ / ₈	.0720	13.8817	.0017
7 ¹ / ₄	.1453	6.8800	.0035
7 ³ / ₈	.2199	4.5468	.0052
7 ¹ / ₂	.2958	3.3807	.0070
7 ⁵ / ₈	.3729	2.6814	.0089
7 ³ / ₄	.4513	2.2156	.0107
7 ⁷ / ₈	.5310	1.8831	.0126
8	.6120	1.6340	.0146
8 ¹ / ₈	.6942	1.4404	.0165
8 ¹ / ₄	.7777	1.2858	.0185
8 ³ / ₈	.8625	1.1594	.0205
8 ¹ / ₂	.9486	1.0542	.0226
8 ⁵ / ₈	1.0359	.9653	.0247
8 ³ / ₄	1.1245	.8892	.0268
8 ⁷ / ₈	1.2144	.8234	.0289
9	1.3056	.7659	.0311
9 ¹ / ₈	1.3980	.7153	.0333
9 ¹ / ₄	1.4917	.6704	.0355
9 ³ / ₈	1.5867	.6302	.0378
9 ¹ / ₂	1.6830	.5942	.0401
9 ⁵ / ₈	1.7805	.5616	.0424
9 ³ / ₄	1.8793	.5321	.0447
9 ⁷ / ₈	1.9794	.5052	.0471
10	2.0808	.4806	.0495
10 ¹ / ₈	2.1834	.4580	.0520
10 ¹ / ₄	2.2873	.4372	.0545
10 ³ / ₈	2.3925	.4180	.0570
10 ¹ / ₂	2.4990	.4002	.0595
10 ⁵ / ₈	2.6067	.3836	.0621
10 ³ / ₄	2.7157	.3682	.0647
10 ⁷ / ₈	2.8260	.3539	.0673
11	2.9376	.3404	.0699
11 ¹ / ₈	3.0504	.3278	.0726
11 ¹ / ₄	3.1645	.3160	.0753
11 ³ / ₈	3.2799	.3049	.0781
11 ¹ / ₂	3.3966	.2944	.0809
11 ⁵ / ₈	3.5145	.2845	.0837
11 ³ / ₄	3.6337	.2752	.0865
11 ⁷ / ₈	3.7542	.2664	.0894
12	3.8760	.2580	.0923
12 ¹ / ₈	3.9990	.2501	.0952
12 ¹ / ₄	4.1233	.2425	.0982
12 ³ / ₈	4.2489	.2354	.1012
12 ¹ / ₂	4.3758	.2285	.1042
12 ⁵ / ₈	4.5039	.2220	.1072
12 ³ / ₄	4.6333	.2158	.1103
12 ⁷ / ₈	4.7640	.2099	.1134

NO.122-B

BETWEEN CASING & HOLE****Casing Size****O.D. 7"****7.000"**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
583.0313	.0096	103.84230	7 ¹ / ₈
288.9585	.0194	51.4657	7 ¹ / ₄
190.9639	.0294	34.0121	7 ³ / ₈
141.9883	.0395	25.2892	7 ¹ / ₂
112.6197	.0499	20.0584	7 ⁵ / ₈
93.0545	.0603	16.5737	7 ³ / ₄
79.0907	.0710	14.0867	7 ⁷ / ₈
68.6277	.0818	12.2231	8
60.4982	.0928	10.7752	8 ¹ / ₈
54.0021	.1040	9.6182	8 ¹ / ₄
48.6937	.1153	8.6727	8 ³ / ₈
44.2759	.1268	7.8859	8 ¹ / ₂
40.5431	.1385	7.2210	8 ⁵ / ₈
37.3484	.1503	6.6520	8 ³ / ₄
34.5840	.1623	6.1597	8 ⁷ / ₈
32.1692	.1745	5.7296	9
30.0422	.1869	5.3507	9 ¹ / ₈
28.1549	.1994	5.0146	9 ¹ / ₄
26.4695	.2121	4.7144	9 ³ / ₈
24.9555	.2250	4.4448	9 ¹ / ₂
23.5884	.2380	4.2013	9 ⁵ / ₈
22.3482	.2512	3.9804	9 ³ / ₄
21.2182	.2646	3.7791	9 ⁷ / ₈
20.1846	.2782	3.5950	10
19.2358	.2919	3.4260	10 ¹ / ₈
18.3619	.3058	3.2704	10 ¹ / ₄
17.5546	.3198	3.1266	10 ³ / ₈
16.8068	.3341	2.9934	10 ¹ / ₂
16.1121	.3485	2.8697	10 ⁵ / ₈
15.4654	.3630	2.7545	10 ³ / ₄
14.8618	.3778	2.6470	10 ⁷ / ₈
14.2974	.3927	2.5465	11
13.7686	.4078	2.4523	11 ¹ / ₈
13.2721	.4230	2.3639	11 ¹ / ₄
12.8052	.4385	2.2807	11 ³ / ₈
12.3653	.4541	2.2024	11 ¹ / ₂
11.9504	.4698	2.1285	11 ⁵ / ₈
11.5583	.4858	2.0586	11 ³ / ₄
11.1874	.5019	1.9926	11 ⁷ / ₈
10.8359	.5181	1.9300	12
10.5026	.5346	1.8706	12 ¹ / ₈
10.1859	.5512	1.8142	12 ¹ / ₄
9.8849	.5680	1.7606	12 ³ / ₈
9.5983	.5850	1.7095	12 ¹ / ₂
9.3252	.6021	1.6609	12 ⁵ / ₈
9.0647	.6194	1.6145	12 ³ / ₄
8.8161	.6369	1.5702	12 ⁷ / ₈

**Note: No allowance made for couplings.

**Casing Size
O.D. 7"
7.000"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
13	4.8960	.2042	.1166
13 ¹ / ₈	5.0292	.1988	.1197
13 ¹ / ₄	5.1637	.1937	.1229
13 ³ / ₈	5.2995	.1887	.1262
13 ¹ / ₂	5.4366	.1839	.1294
13 ⁵ / ₈	5.5749	.1794	.1327
13 ³ / ₄	5.7145	.1750	.1361
13 ⁷ / ₈	5.8554	.1708	.1394
14	5.9976	.1667	.1428
14 ¹ / ₈	6.1410	.1628	.1462
14 ¹ / ₄	6.2875	.1591	.1497
14 ³ / ₈	6.4317	.1555	.1531
14 ¹ / ₂	6.5790	.1520	.1566
14 ⁵ / ₈	6.7275	.1486	.1602
14 ³ / ₄	6.8773	.1454	.1637
14 ⁷ / ₈	7.0284	.1423	.1673
15	7.1808	.1393	.1710
15 ¹ / ₈	7.3344	.1363	.1746
15 ¹ / ₄	7.4893	.1335	.1783
15 ³ / ₈	7.6455	.1308	.1820
15 ¹ / ₂	7.8030	.1282	.1858
15 ⁵ / ₈	7.9617	.1256	.1896
15 ³ / ₄	8.1217	.1231	.1934
15 ⁷ / ₈	8.2830	.1207	.1972
16	8.4456	.1184	.2011

NO.122-B

BETWEEN CASING & HOLE****Casing Size****O.D. 7"****7.000"**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
8.5785	.6545	1.5279	13
8.3512	.6723	1.4874	13 $\frac{1}{8}$
8.1336	.6903	1.4487	13 $\frac{1}{4}$
7.9252	.7084	1.4115	13 $\frac{3}{8}$
7.7254	.7268	1.3760	13 $\frac{1}{2}$
7.5337	.7453	1.3418	13 $\frac{5}{8}$
7.3497	.7639	1.3090	13 $\frac{3}{4}$
7.1728	.7828	1.2775	13 $\frac{7}{8}$
7.0028	.8018	1.2473	14
6.8393	.8209	1.2181	14 $\frac{1}{8}$
6.6818	.8403	1.1901	14 $\frac{1}{4}$
6.5301	.8598	1.1631	14 $\frac{3}{8}$
6.3840	.8795	1.1370	14 $\frac{1}{2}$
6.2430	.8993	1.1119	14 $\frac{5}{8}$
6.1070	.9194	1.0877	14 $\frac{3}{4}$
5.9757	.9396	1.0643	14 $\frac{7}{8}$
5.8489	.9599	1.0417	15
5.7264	.9805	1.0199	15 $\frac{1}{8}$
5.6080	1.0012	.9988	15 $\frac{1}{4}$
5.4934	1.0221	.9784	15 $\frac{3}{8}$
5.3826	1.0431	.9587	15 $\frac{1}{2}$
5.2752	1.0643	.9396	15 $\frac{5}{8}$
5.1713	1.0857	.9211	15 $\frac{3}{4}$
5.0706	1.1073	.9031	15 $\frac{7}{8}$
4.9730	1.1290	.8857	16

**Note: No allowance made for couplings.

**Casing Size
O.D. 7⁵/₈"
7.625"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8	.2391	4.1830	.0057
8 ¹ / ₈	.3213	3.1124	.0076
8 ¹ / ₄	.4048	2.4703	.0096
8 ³ / ₈	.4896	2.0425	.0117
8 ¹ / ₂	.5757	1.7371	.0137
8 ⁵ / ₈	.6630	1.5083	.0158
8 ³ / ₄	.7516	1.3305	.0179
8 ⁷ / ₈	.8415	1.1884	.0200
9	.9327	1.0722	.0222
9 ¹ / ₈	1.0251	.9755	.0244
9 ¹ / ₄	1.1188	.8938	.0266
9 ³ / ₈	1.2138	.8239	.0289
9 ¹ / ₂	1.3101	.7633	.0312
9 ⁵ / ₈	1.4076	.7104	.0335
9 ³ / ₄	1.5064	.6638	.0359
9 ⁷ / ₈	1.6065	.6225	.0382
10	1.7079	.5855	.0407
10 ¹ / ₈	1.8105	.5523	.0431
10 ¹ / ₄	1.9144	.5224	.0456
10 ³ / ₈	2.0196	.4951	.0481
10 ¹ / ₂	2.1261	.4704	.0506
10 ⁵ / ₈	2.2338	.4477	.0532
10 ³ / ₄	2.3428	.4268	.0558
10 ⁷ / ₈	2.4531	.4076	.0584
11	2.5647	.3899	.0611
11 ¹ / ₈	2.6775	.3735	.0637
11 ¹ / ₄	2.7916	.3582	.0665
11 ³ / ₈	2.9070	.3440	.0692
11 ¹ / ₂	3.0237	.3307	.0720
11 ⁵ / ₈	3.1416	.3183	.0748
11 ³ / ₄	3.2608	.3067	.0776
11 ⁷ / ₈	3.3813	.2957	.0805
12	3.5031	.2855	.0834
12 ¹ / ₈	3.6261	.2758	.0863
12 ¹ / ₄	3.7504	.2666	.0893
12 ³ / ₈	3.8760	.2580	.0923
12 ¹ / ₂	4.0029	.2498	.0953
12 ⁵ / ₈	4.1310	.2421	.0984
12 ³ / ₄	4.2604	.2347	.1014
12 ⁷ / ₈	4.3911	.2277	.1045
13	4.5231	.2211	.1077
13 ¹ / ₈	4.6563	.2148	.1109
13 ¹ / ₄	4.7908	.2087	.1141
13 ³ / ₈	4.9266	.2030	.1173
13 ¹ / ₂	5.0637	.1975	.1206
13 ⁵ / ₈	5.2020	.1922	.1239
13 ³ / ₄	5.3416	.1872	.1272
13 ⁷ / ₈	5.4825	.1824	.1305
14	5.6246	.1778	.1339
14 ¹ / ₈	5.7681	.1734	.1373
14 ¹ / ₄	5.9128	.1691	.1408
14 ³ / ₈	6.0588	.1650	.1443
14 ¹ / ₂	6.2060	.1611	.1478

NO.122-B

Casing Size
*O.D. 7⁵/₈"
7.625"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
175.6867	.0320	31.2911	8
130.7193	.0430	23.2821	8 ¹ / ₈
103.7520	.0541	18.4790	8 ¹ / ₄
85.7845	.0654	15.2789	8 ³ / ₈
72.9596	.0770	12.9947	8 ¹ / ₂
63.3486	.0886	11.2829	8 ⁵ / ₈
55.8800	.1005	9.9527	8 ³ / ₄
49.9110	.1125	8.8895	8 ⁷ / ₈
45.0325	.1247	8.0206	9
40.9717	.1370	7.2974	9 ¹ / ₈
37.5399	.1496	6.6861	9 ¹ / ₄
34.6022	.1623	6.1629	9 ³ / ₈
32.0596	.1751	5.7101	9 ¹ / ₂
29.8381	.1882	5.3144	9 ⁵ / ₈
27.8809	.2014	4.9658	9 ³ / ₄
26.1439	.2148	4.6564	9 ⁷ / ₈
24.5922	.2283	4.3801	10
23.1981	.2420	4.1318	10 ¹ / ₈
21.9389	.2559	3.9075	10 ¹ / ₄
20.7962	.2700	3.7040	10 ³ / ₈
19.7549	.2842	3.5185	10 ¹ / ₂
18.8021	.2986	3.3488	10 ⁵ / ₈
17.9272	.3132	3.1930	10 ³ / ₄
17.1212	.3279	3.0494	10 ⁷ / ₈
16.3765	.3428	2.9168	11
15.6863	.3579	2.7939	11 ¹ / ₈
15.0451	.3732	2.6796	11 ¹ / ₄
14.4479	.3886	2.5733	11 ³ / ₈
13.8905	.4042	2.4740	11 ¹ / ₂
13.3690	.4200	2.3811	11 ⁵ / ₈
12.8803	.4359	2.2941	11 ³ / ₄
12.4213	.4520	2.2123	11 ⁷ / ₈
11.9895	.4683	2.1354	12
11.5827	.4847	2.0630	12 ¹ / ₈
11.1988	.5014	1.9946	12 ¹ / ₄
10.8359	.5181	1.9300	12 ³ / ₈
10.4925	.5351	1.8688	12 ¹ / ₂
10.1671	.5522	1.8108	12 ⁵ / ₈
9.8582	.5695	1.7558	12 ³ / ₄
9.5648	.5870	1.7036	12 ⁷ / ₈
9.2858	.6046	1.6539	13
9.0201	.6225	1.6065	13 ¹ / ₈
8.7668	.6404	1.5614	13 ¹ / ₄
8.5252	.6586	1.5184	13 ³ / ₈
8.2944	.6769	1.4773	13 ¹ / ₂
8.0738	.6954	1.4380	13 ⁵ / ₈
7.8628	.7141	1.4004	13 ³ / ₄
7.6608	.7329	1.3644	13 ⁷ / ₈
7.4671	.75191	1.3300	14
7.2814	.7711	1.2969	14 ¹ / ₈
7.1032	.7904	1.2651	14 ¹ / ₄
6.9321	.8099	1.2347	14 ³ / ₈
6.7676	.8296	1.2054	14 ¹ / ₂

**Note: No allowance made for couplings.

**Casing Size
O.D. 7 $\frac{3}{4}$ "
7.750"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8	.1606	6.2247	.0038
8 $\frac{1}{8}$.2429	4.1171	.0058
8 $\frac{1}{4}$.3264	3.0637	.0078
8 $\frac{3}{8}$.4112	2.4320	.0098
8 $\frac{1}{2}$.4972	2.0111	.0118
8 $\frac{5}{8}$.5846	1.7106	.0139
8 $\frac{3}{4}$.6732	1.4854	.0160
8 $\frac{7}{8}$.7631	1.3105	.0182
9	.8542	1.1706	.0203
9 $\frac{1}{8}$.9467	1.0563	.0225
9 $\frac{1}{4}$	1.0404	.9612	.0248
9 $\frac{3}{8}$	1.1354	.8808	.0270
9 $\frac{1}{2}$	1.2316	.8119	.0293
9 $\frac{5}{8}$	1.3292	.7523	.0316
9 $\frac{3}{4}$	1.4280	.7003	.0340
9 $\frac{7}{8}$	1.5281	.6544	.0364
10	1.6294	.6137	.0388
10 $\frac{1}{8}$	1.7321	.5773	.0412
10 $\frac{1}{4}$	1.8360	.5447	.0437
10 $\frac{3}{8}$	1.9412	.5152	.0462
10 $\frac{1}{2}$	2.0476	.4884	.0488
10 $\frac{5}{8}$	2.1554	.4640	.0513
10 $\frac{3}{4}$	2.2644	.4416	.0539
10 $\frac{7}{8}$	2.3747	.4211	.0565
11	2.4862	.4022	.0592
11 $\frac{1}{8}$	2.5991	.3848	.0619
11 $\frac{1}{4}$	2.7132	.3686	.0646
11 $\frac{3}{8}$	2.8286	.3535	.0673
11 $\frac{1}{2}$	2.9452	.3395	.0701
11 $\frac{5}{8}$	3.0632	.3265	.0729
11 $\frac{3}{4}$	3.1824	.3142	.0758
11 $\frac{7}{8}$	3.3029	.3028	.0786
12	3.4246	.2920	.0815
12 $\frac{1}{8}$	3.5477	.2819	.0845
12 $\frac{1}{4}$	3.6720	.2723	.0874
12 $\frac{3}{8}$	3.7976	.2633	.0904
12 $\frac{1}{2}$	3.9244	.2548	.0934
12 $\frac{5}{8}$	4.0526	.2468	.0965
12 $\frac{3}{4}$	4.1820	.2391	.0996
12 $\frac{7}{8}$	4.3127	.2319	.1027
13	4.4446	.2250	.1058
13 $\frac{1}{8}$	4.5779	.2184	.1090
13 $\frac{1}{4}$	4.7124	.2122	.1122
13 $\frac{3}{8}$	4.8482	.2063	.1154
13 $\frac{1}{2}$	4.9852	.2006	.1187
13 $\frac{5}{8}$	5.1236	.1952	.1220
13 $\frac{3}{4}$	5.2632	.1900	.1253
13 $\frac{7}{8}$	5.4041	.1850	.1287
14	5.5462	.1803	.1321
14 $\frac{1}{8}$	5.6897	.1758	.1355
14 $\frac{1}{4}$	5.8344	.1714	.1389
14 $\frac{3}{8}$	5.9804	.1672	.1424
14 $\frac{1}{2}$	6.1276	.1632	.1459

NO.122-B

BETWEEN CASING & HOLE**

Casing Size
O.D. 7 $\frac{3}{4}$ "
7.750"

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
261.4386	.0215	46.5642	8
172.9201	.0325	30.7984	8 $\frac{1}{8}$
128.6769	.0436	22.9183	8 $\frac{1}{4}$
102.1435	.0550	18.1925	8 $\frac{3}{8}$
84.4648	.0665	15.0438	8 $\frac{1}{2}$
71.8457	.0781	12.7963	8 $\frac{5}{8}$
62.3888	.0900	11.1119	8 $\frac{3}{4}$
55.0397	.1020	9.8030	8 $\frac{7}{8}$
49.1661	.1142	8.7569	9
44.3653	.1266	7.9018	9 $\frac{1}{8}$
40.3692	.1391	7.1901	9 $\frac{1}{4}$
36.9919	.1518	6.5885	9 $\frac{3}{8}$
34.1007	.1646	6.0736	9 $\frac{1}{2}$
31.5983	.1777	5.6279	9 $\frac{5}{8}$
29.4118	.1909	5.2385	9 $\frac{3}{4}$
27.4854	.2043	4.8954	9 $\frac{7}{8}$
25.7756	.2178	4.5908	10
24.2483	.2315	4.3188	10 $\frac{1}{8}$
22.8759	.2454	4.0744	10 $\frac{1}{4}$
21.6363	.2595	3.8536	10 $\frac{3}{8}$
20.5114	.2737	3.6532	10 $\frac{1}{2}$
19.4861	.2881	3.4706	10 $\frac{5}{8}$
18.5480	.3027	3.3035	10 $\frac{3}{4}$
17.6866	.3174	3.1501	10 $\frac{7}{8}$
16.8930	.3324	3.0088	11
16.1596	.3474	2.8781	11 $\frac{1}{8}$
15.4799	.3627	2.7571	11 $\frac{1}{4}$
14.8484	.3781	2.6446	11 $\frac{3}{8}$
14.2603	.3937	2.5399	11 $\frac{1}{2}$
13.7112	.4095	2.4421	11 $\frac{5}{8}$
13.1976	.4254	2.3506	11 $\frac{3}{4}$
12.7162	.4415	2.2648	11 $\frac{7}{8}$
12.2641	.4578	2.1843	12
11.8387	.4743	2.1086	12 $\frac{1}{8}$
11.4379	.4909	2.0372	12 $\frac{1}{4}$
11.0597	.5077	1.9698	12 $\frac{3}{8}$
10.7022	.5246	1.9061	12 $\frac{1}{2}$
10.3638	.5418	1.8459	12 $\frac{5}{8}$
10.0431	.5591	1.7887	12 $\frac{3}{4}$
9.7387	.5765	1.7345	12 $\frac{7}{8}$
9.4496	.5942	1.6830	13
9.1746	.6120	1.6341	13 $\frac{1}{8}$
8.9127	.6300	1.5874	13 $\frac{1}{4}$
8.6631	.6481	1.5430	13 $\frac{3}{8}$
8.4249	.6664	1.5005	13 $\frac{1}{2}$
8.1974	.6849	1.4600	13 $\frac{5}{8}$
7.9800	.7036	1.4213	13 $\frac{3}{4}$
7.7719	.7224	1.3842	13 $\frac{7}{8}$
7.5727	.7414	1.3488	14
7.3818	.7606	1.3148	14 $\frac{1}{8}$
7.1987	.7799	1.2821	14 $\frac{1}{4}$
7.0230	.7995	1.2508	14 $\frac{3}{8}$
6.8542	.8191	1.2208	14 $\frac{1}{2}$

**Note: No allowance made for couplings.

Casing Size
O.D. 8"
8.000"

TABLE
VOLUME & HEIGHT

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8 ¹ / ₂	.3366	2.9709	.0080
8 ⁵ / ₈	.4239	2.3588	.0101
8 ³ / ₄	.5125	1.9510	.0122
8 ⁷ / ₈	.6024	1.6599	.0143
9	.6936	1.4418	.0165
9 ¹ / ₈	.7860	1.2722	.0187
9 ¹ / ₄	.8797	1.1367	.0209
9 ³ / ₈	.9747	1.0259	.0232
9 ¹ / ₂	1.0710	.9337	.0255
9 ⁵ / ₈	1.1685	.8558	.0278
9 ³ / ₄	1.2673	.7890	.0302
9 ⁷ / ₈	1.3674	.7313	.0326
10	1.4688	.6808	.0350
10 ¹ / ₈	1.5714	.6364	.0374
10 ¹ / ₄	1.6753	.5969	.0399
10 ³ / ₈	1.7805	.5616	.0424
10 ¹ / ₂	1.8870	.5299	.0449
10 ⁵ / ₈	1.9470	.5013	.0475
10 ³ / ₄	2.1037	.4753	.0501
10 ⁷ / ₈	2.2140	.4517	.0527
11	2.3256	.4300	.0554
11 ¹ / ₈	2.4384	.4101	.0581
11 ¹ / ₄	2.5525	.3918	.0608
11 ³ / ₈	2.6679	.3748	.0635
11 ¹ / ₂	2.7846	.3591	.0663
11 ⁵ / ₈	2.9025	.3445	.0691
11 ³ / ₄	3.0217	.3309	.0719
11 ⁷ / ₈	3.1422	.3182	.0748
12	3.2640	.3064	.0777
12 ¹ / ₈	3.3870	.2952	.0806
12 ¹ / ₄	3.5113	.2848	.0836
12 ³ / ₈	3.6369	.2750	.0866
12 ¹ / ₂	3.7638	.2657	.0896
12 ⁵ / ₈	3.8919	.2569	.0927
12 ³ / ₄	4.0213	.2487	.0957
12 ⁷ / ₈	4.1520	.2408	.0989
13	4.2840	.2334	.1020
13 ¹ / ₈	4.4172	.2264	.1052
13 ¹ / ₄	4.5517	.2197	.1084
13 ³ / ₈	4.6875	.2133	.1116
13 ¹ / ₂	4.8246	.2073	.1149
13 ⁵ / ₈	4.9629	.2015	.1182
13 ³ / ₄	5.1025	.1960	.1215
13 ⁷ / ₈	5.2434	.1907	.1248
14	5.3856	.1857	.1282
14 ¹ / ₈	5.5290	.1809	.1316
14 ¹ / ₄	5.6737	.1763	.1351
14 ³ / ₈	5.8197	.1718	.1386
14 ¹ / ₂	5.9670	.1676	.1421

NO.122-B

Casing Size
O.D. 8"
8.000"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
124.7775	.0450	22.2238	8½
99.0714	.0567	17.6454	8⅝
81.9434	.0685	14.5947	8⅓₄
69.7169	.0805	12.4171	8⅗₈
60.5538	.0927	10.7851	9
53.4327	.1051	9.5168	9⅛₈
47.7409	.1176	8.5030	9⅓₄
43.0886	.1303	7.6744	9⅔₈
39.2158	.1432	6.9846	9½
35.9424	.1562	6.4016	9⅖₈
33.1401	.1694	5.9025	9⅓₄
30.7145	.1828	5.4705	9⅗₈
28.5948	.1963	5.0930	10
26.7272	.2101	4.7603	10⅓₈
25.0694	.2240	4.4651	10⅓₄
23.5884	.2380	4.2013	10⅔₈
22.2576	.2523	3.9642	10½
21.0555	.2667	3.7501	10⅕₈
19.9644	.2812	3.5558	10⅓₄
18.9699	.2960	3.3787	10⅗₈
18.0599	.3109	3.2166	11
17.2242	.3260	3.0678	11⅓₈
16.4542	.3412	2.9306	11⅓₄
15.7425	.3567	2.8039	11⅔₈
15.0830	.3722	2.6864	11½
14.4701	.3880	2.5772	11⅕₈
13.8993	.4039	2.4756	11⅓₄
13.3663	.4201	2.3806	11⅗₈
12.8677	.4363	2.2918	12
12.4002	.4528	2.2086	12⅓₈
11.9612	.4694	2.1304	12⅓₄
11.5482	.4862	2.0568	12⅔₈
11.1590	.5031	1.9875	12½
10.7916	.5203	1.9221	12⅕₈
10.4443	.5376	1.8602	12⅓₄
10.1155	.5550	1.8017	12⅗₈
9.8039	.5727	1.7462	13
9.5082	.5905	1.6935	13⅓₈
9.2272	.6085	1.6434	13⅓₄
8.9599	.6266	1.5958	13⅔₈
8.7054	.6450	1.5505	13½
8.4627	.6634	1.5073	13⅕₈
8.2312	.6821	1.4660	13⅓₄
8.0100	.7009	1.4266	13⅗₈
7.7986	.7199	1.3890	14
7.5963	.7391	1.3530	14⅓₈
7.4025	.7585	1.3184	14⅓₄
7.2168	.7780	1.2854	14⅔₈
7.0387	.7977	1.2537	14½

**Note: No allowance made for couplings.

**Casing Size
O.D. 8¹/₈"
8.125"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8 ¹ / ₂	.2544	3.9314	.0061
8 ⁵ / ₈	.3417	2.9266	.0081
8 ³ / ₄	.4303	2.3239	.0102
8 ⁷ / ₈	.5202	1.9223	.0124
9	.6114	1.6357	.0146
9 ¹ / ₈	.7038	1.4209	.0168
9 ¹ / ₄	.7975	1.2539	.0190
9 ³ / ₈	.8925	1.1205	.0212
9 ¹ / ₂	.9888	1.0114	.0235
9 ⁵ / ₈	1.0863	.9206	.0259
9 ³ / ₄	1.1851	.8438	.0282
9 ⁷ / ₈	1.2852	.7781	.0306
10	1.3866	.7212	.0330
10 ¹ / ₈	1.4892	.6715	.0355
10 ¹ / ₄	1.5931	.6277	.0379
10 ³ / ₈	1.6983	.5888	.0404
10 ¹ / ₂	1.8048	.5541	.0430
10 ⁵ / ₈	1.9125	.5229	.0455
10 ³ / ₄	2.0215	.4947	.0481
10 ⁷ / ₈	2.1318	.4691	.0508
11	2.2434	.4458	.0534
11 ¹ / ₈	2.3562	.4244	.0561
11 ¹ / ₄	2.4703	.4048	.0588
11 ³ / ₈	2.5857	.3867	.0616
11 ¹ / ₂	2.7024	.3700	.0643
11 ⁵ / ₈	2.8203	.3546	.0671
11 ³ / ₄	2.9395	.3402	.0700
11 ⁷ / ₈	3.0600	.3268	.0729
12	3.1818	.3143	.0758
12 ¹ / ₈	3.3048	.3026	.0787
12 ¹ / ₄	3.4291	.2916	.0816
12 ³ / ₈	3.5547	.2813	.0846
12 ¹ / ₂	3.6816	.2716	.0877
12 ⁵ / ₈	3.8097	.2625	.0907
12 ³ / ₄	3.9391	.2539	.0938
12 ⁷ / ₈	4.0698	.2457	.0969
13	4.2018	.2380	.1000
13 ¹ / ₈	4.3350	.2307	.1032
13 ¹ / ₄	4.4695	.2237	.1064
13 ³ / ₈	4.6053	.2171	.1096
13 ¹ / ₂	4.7424	.2109	.1129
13 ⁵ / ₈	4.8807	.2049	.1162
13 ³ / ₄	5.0203	.1992	.1195
13 ⁷ / ₈	5.1612	.1938	.1229
14	5.3034	.1886	.1263
14 ¹ / ₈	5.4468	.1836	.1297
14 ¹ / ₄	5.5915	.1788	.1331
14 ³ / ₈	5.7375	.1743	.1366
14 ¹ / ₂	5.8847	.1699	.1401

NO.122-B

Casing Size
O.D. $8\frac{1}{8}$ "
8.125"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
165.1191	.0340	29.4090	$8\frac{1}{2}$
122.9151	.0457	21.8921	$8\frac{5}{8}$
97.6037	.0575	17.3840	$8\frac{3}{4}$
80.7384	.0695	14.3801	$8\frac{7}{8}$
68.6992	.0817	12.2358	9
59.6762	.0941	10.6288	$9\frac{1}{8}$
52.6639	.1066	9.3798	$9\frac{1}{4}$
47.0589	.1193	8.3816	$9\frac{3}{8}$
42.4774	.1322	7.5656	$9\frac{1}{2}$
38.6634	.1452	6.8863	$9\frac{5}{8}$
35.4398	.1584	6.3121	$9\frac{3}{4}$
32.6798	.1718	5.8205	$9\frac{7}{8}$
30.2908	.1854	5.3950	10
28.2031	.1991	5.0232	$10\frac{1}{8}$
26.3635	.2130	4.6955	$10\frac{1}{4}$
24.7307	.2270	4.4047	$10\frac{3}{8}$
23.2718	.2413	4.1449	$10\frac{1}{2}$
21.9608	.2557	3.9114	$10\frac{5}{8}$
20.7766	.2702	3.7005	$10\frac{3}{4}$
19.7017	.2850	3.5090	$10\frac{7}{8}$
18.7219	.2999	3.3345	11
17.8254	.3150	3.1748	$11\frac{1}{8}$
17.0019	.3302	3.0282	$11\frac{1}{4}$
16.2432	.3457	2.8930	$11\frac{3}{8}$
15.5420	.3613	2.7681	$11\frac{1}{2}$
14.8921	.3770	2.6524	$11\frac{5}{8}$
14.2881	.3930	2.5448	$11\frac{3}{4}$
13.7255	.4091	2.4446	$11\frac{7}{8}$
13.2003	.4253	2.3511	12
12.7088	.4418	2.2635	$12\frac{1}{8}$
12.2481	.4584	2.1815	$12\frac{1}{4}$
11.8154	.4752	2.1044	$12\frac{3}{8}$
11.4082	.4922	2.0319	$12\frac{1}{2}$
11.0245	.5093	1.9636	$12\frac{5}{8}$
10.6623	.5266	1.8990	$12\frac{3}{4}$
10.3199	.5441	1.8381	$12\frac{7}{8}$
9.9958	.5617	1.7803	13
9.6886	.5795	1.7256	$13\frac{1}{8}$
9.3970	.5975	1.6737	$13\frac{1}{4}$
9.1199	.6156	1.6243	$13\frac{3}{8}$
8.8564	.6340	1.5774	$13\frac{1}{2}$
8.6053	.6525	1.5327	$13\frac{5}{8}$
8.3660	.6711	1.4901	$13\frac{3}{4}$
8.1377	.6900	1.4494	$13\frac{7}{8}$
7.9195	.7090	1.4105	14
7.7110	.7281	1.3734	$14\frac{1}{8}$
7.5114	.7475	1.3378	$14\frac{1}{4}$
7.3203	.7670	1.3038	$14\frac{3}{8}$
7.1371	.7867	1.2712	$14\frac{1}{2}$

**Note: No allowance made for couplings.

**Casing Size
O.D. 8⁵/₈"
8.625"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
9	.2697	3.7083	.0064
9 ¹ / ₈	.3621	2.7617	.0086
9 ¹ / ₄	.4558	2.1939	.0109
9 ³ / ₈	.5508	1.8155	.0131
9 ¹ / ₂	.6471	1.5454	.0154
9 ⁵ / ₈	.7446	1.3430	.0177
9 ³ / ₄	.8434	1.1857	.0201
9 ⁷ / ₈	.9435	1.0599	.0225
10	1.0449	.9571	.0249
10 ¹ / ₈	1.1475	.8715	.0273
10 ¹ / ₄	1.2514	.7991	.0298
10 ³ / ₈	1.3566	.7371	.0323
10 ¹ / ₂	1.4631	.6835	.0348
10 ⁵ / ₈	1.5708	.6366	.0374
10 ³ / ₄	1.6798	.5953	.0400
10 ⁷ / ₈	1.7901	.5586	.0426
11	1.9017	.5259	.0453
11 ¹ / ₈	2.0145	.4964	.0480
11 ¹ / ₄	2.1286	.4698	.0507
11 ³ / ₈	2.2440	.4456	.0534
11 ¹ / ₂	2.3607	.4236	.0562
11 ⁵ / ₈	2.4786	.4035	.0590
11 ³ / ₄	2.5978	.3849	.0619
11 ⁷ / ₈	2.7183	.3679	.0647
12	2.8401	.3521	.0676
12 ¹ / ₈	2.9631	.3375	.0705
12 ¹ / ₄	3.0874	.3239	.0735
12 ³ / ₈	3.2130	.3112	.0765
12 ¹ / ₂	3.3399	.2994	.0795
12 ⁵ / ₈	3.4680	.2884	.0826
12 ³ / ₄	3.5974	.2780	.0857
12 ⁷ / ₈	3.7281	.2682	.0888
13	3.8601	.2591	.0919
13 ¹ / ₈	3.9933	.2504	.0951
13 ¹ / ₄	4.1278	.2423	.0983
13 ³ / ₈	4.2636	.2345	.1015
13 ¹ / ₂	4.4007	.2272	.1048
13 ⁵ / ₈	4.5390	.2203	.1081
13 ³ / ₄	4.6786	.2137	.1114
13 ⁷ / ₈	4.8195	.2075	.1147
14	4.9617	.2015	.1181
14 ¹ / ₈	5.1051	.1959	.1215
14 ¹ / ₄	5.2498	.1905	.1250
14 ³ / ₈	5.3958	.1853	.1285
14 ¹ / ₂	5.5430	.1804	.1320
14 ⁵ / ₈	5.6916	.1757	.1355
14 ³ / ₄	5.8414	.1712	.1391
14 ⁷ / ₈	5.9925	.1669	.1427
15	6.1448	.1627	.1463

NO.122-B

Casing Size
O.D. 8⁵/₈"
8.625"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
155.7506	.0360	27.7404	9
115.9903	.0484	20.6588	9 ¹ / ₈
92.1434	.0609	16.4114	9 ¹ / ₄
76.2529	.0736	13.5812	9 ³ / ₈
64.9089	.0865	11.5608	9 ¹ / ₂
56.4063	.0995	10.0464	9 ⁵ / ₈
49.7978	.1127	8.8694	9 ³ / ₄
44.5152	.1261	7.9285	9 ⁷ / ₈
40.1968	.1397	7.1594	10
36.6014	.1534	6.5190	10 ¹ / ₈
33.5622	.1673	5.9777	10 ¹ / ₄
30.9598	.1814	5.5142	10 ³ / ₈
28.7070	.1956	5.1129	10 ¹ / ₂
26.7380	.2100	4.7622	10 ⁵ / ₈
25.0028	.2246	4.4532	10 ³ / ₄
23.4624	.2393	4.1788	10 ⁷ / ₈
22.0860	.2542	3.9337	11
20.8489	.2693	3.7133	11 ¹ / ₈
19.7312	.2846	3.5143	11 ¹ / ₄
18.7166	.3000	3.3336	11 ³ / ₈
17.7917	.3156	3.1688	11 ¹ / ₂
16.9451	.3313	3.0180	11 ⁵ / ₈
16.1675	.3473	2.8796	11 ³ / ₄
15.4509	.3634	2.7519	11 ⁷ / ₈
14.7884	.3797	2.6339	12
14.1744	.3961	2.5246	12 ¹ / ₈
13.6037	.4127	2.4229	12 ¹ / ₄
13.0719	.4295	2.3282	12 ³ / ₈
12.5754	.4465	2.2398	12 ¹ / ₂
12.1108	.4636	2.1570	12 ⁵ / ₈
11.6751	.4809	2.0794	12 ³ / ₄
11.2658	.4984	2.0065	12 ⁷ / ₈
10.8807	.5160	1.9379	13
10.5176	.5338	1.8733	13 ¹ / ₈
10.1749	.5518	1.8122	13 ¹ / ₄
9.8509	.5700	1.7545	13 ³ / ₈
9.5440	.5883	1.6999	13 ¹ / ₂
9.2532	.6068	1.6481	13 ⁵ / ₈
8.9770	.6254	1.5989	13 ³ / ₄
8.7146	.6443	1.5521	13 ⁷ / ₈
8.4649	.6633	1.5077	14
8.2271	.6825	1.4653	14 ¹ / ₈
8.0003	.7018	1.4249	14 ¹ / ₄
7.7839	.7213	1.3864	14 ³ / ₈
7.5771	.7410	1.3495	14 ¹ / ₂
7.3793	.7609	1.3143	14 ⁵ / ₈
7.1901	.7809	1.2806	14 ³ / ₄
7.0088	.8011	1.2483	14 ⁷ / ₈
6.8350	.8214	1.2174	15

**Note: No allowance made for couplings.

Casing Size
***O.D. 9"**
9.000"

TABLE
VOLUME & HEIGHT

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
9 ¹ / ₈	.0924	10.8181	.0022
9 ¹ / ₄	.1861	5.3720	.0044
9 ³ / ₈	.2811	3.5570	.0067
9 ¹ / ₂	.3774	2.6497	.0090
9 ⁵ / ₈	.4749	2.1055	.0113
9 ³ / ₄	.5737	1.7429	.0137
9 ⁷ / ₈	.6738	1.4840	.0160
10	.7752	1.2900	.0185
10 ¹ / ₈	.8778	1.1392	.0209
10 ¹ / ₄	.9817	1.0186	.0234
10 ³ / ₈	1.0869	.9200	.0259
10 ¹ / ₂	1.1934	.8379	.0284
10 ⁵ / ₈	1.3011	.7686	.0310
10 ³ / ₄	1.4101	.7091	.0336
10 ⁷ / ₈	1.5204	.6577	.0362
11	1.6320	.6127	.0389
11 ¹ / ₈	1.7448	.5731	.0415
11 ¹ / ₄	1.8589	.5379	.0443
11 ³ / ₈	1.9743	.5065	.0470
11 ¹ / ₂	2.0910	.4782	.0498
11 ⁵ / ₈	2.2089	.4527	.0526
11 ³ / ₄	2.3281	.4295	.0554
11 ⁷ / ₈	2.4486	.4084	.0583
12	2.5704	.3890	.0612
12 ¹ / ₈	2.6934	.3713	.0641
12 ¹ / ₄	2.8177	.3549	.0671
12 ³ / ₈	2.9433	.3398	.0701
12 ¹ / ₂	3.0702	.3257	.0731
12 ⁵ / ₈	3.1983	.3127	.0762
12 ³ / ₄	3.3277	.3005	.0792
12 ⁷ / ₈	3.4584	.2891	.0823
13	3.5904	.2785	.0855
13 ¹ / ₈	3.7236	.2686	.0887
13 ¹ / ₄	3.8581	.2592	.0919
13 ³ / ₈	3.9939	.2504	.0951
13 ¹ / ₂	4.1310	.2421	.0984
13 ⁵ / ₈	4.2693	.2342	.1017
13 ³ / ₄	4.4089	.2268	.1050
13 ⁷ / ₈	4.5498	.2198	.1083
14	4.6920	.2131	.1117
14 ¹ / ₈	4.8354	.2068	.1151
14 ¹ / ₄	4.9801	.2008	.1186
14 ³ / ₈	5.1261	.1951	.1221
14 ¹ / ₂	5.2734	.1896	.1256
14 ⁵ / ₈	5.4219	.1844	.1291
14 ³ / ₄	5.5717	.1795	.1327
14 ⁷ / ₈	5.7228	.1747	.1363
15	5.8752	.1702	.1399

NO.122-B

Casing Size
*O.D. 9"
9.000"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
454.3622	.0124	80.9254	9 ¹ / ₈
225.6250	.0249	40.1855	9 ¹ / ₄
149.3934	.0376	26.6081	9 ³ / ₈
111.2880	.0505	19.8212	9 ¹ / ₂
88.4329	.0635	15.7506	9 ⁵ / ₈
73.2028	.0767	13.0380	9 ³ / ₄
62.3297	.0901	11.1014	9 ⁷ / ₈
54.1797	.1036	9.6498	10
47.8450	.1173	8.5216	10 ¹ / ₈
42.7808	.1312	7.6196	10 ¹ / ₄
38.6408	.1453	6.8822	10 ³ / ₈
35.1936	.1595	6.2683	10 ¹ / ₂
32.2795	.1739	5.7492	10 ⁵ / ₈
29.7841	.1885	5.3048	10 ³ / ₄
27.6237	.2033	4.9200	10 ⁷ / ₈
25.7354	.2182	4.5837	11
24.0711	.2333	4.2872	11 ¹ / ₈
22.5935	.2485	4.0241	11 ¹ / ₄
21.2730	.2639	3.7889	11 ³ / ₈
20.0861	.2795	3.5775	11 ¹ / ₂
19.0137	.2953	3.3865	11 ⁵ / ₈
18.0401	.3112	3.2131	11 ³ / ₄
17.1524	.3273	3.0550	11 ⁷ / ₈
16.3399	.3436	2.9103	12
15.5935	.3601	2.7773	12 ¹ / ₈
14.9055	.3767	2.6548	12 ¹ / ₄
14.2695	.3935	2.5415	12 ³ / ₈
13.6799	.4104	2.4365	12 ¹ / ₂
13.1319	.4276	2.3389	12 ⁵ / ₈
12.6212	.4449	2.2479	12 ³ / ₄
12.1442	.4623	2.1630	12 ⁷ / ₈
11.6979	.4800	2.0835	13
11.2793	.4978	2.0089	13 ¹ / ₈
10.8861	.5158	1.9389	13 ¹ / ₄
10.5160	.5339	1.8730	13 ³ / ₈
10.1671	.5522	1.8108	13 ¹ / ₂
9.8376	.5707	1.7522	13 ⁵ / ₈
9.5261	.5894	1.6967	13 ³ / ₄
9.2311	.6082	1.6441	13 ⁷ / ₈
8.9514	.6272	1.5943	14
8.6859	.6464	1.5470	14 ¹ / ₈
8.4335	.6657	1.5021	14 ¹ / ₄
8.1933	.6853	1.4593	14 ³ / ₈
7.9645	.7049	1.4185	14 ¹ / ₂
7.7463	.7248	1.3797	14 ⁵ / ₈
7.5380	.7448	1.3426	14 ³ / ₄
7.3390	.7650	1.3071	14 ⁷ / ₈
7.1487	.7854	1.2732	15

**Note: No allowance made for couplings.

**Casing Size
O.D. 9⁵/₈"
9.625"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
10	.3003	3.3304	.0071
10 ¹ / ₈	.4029	2.4820	.0096
10 ¹ / ₄	.5068	1.9731	.0121
10 ³ / ₈	.6120	1.6340	.0146
10 ¹ / ₂	.7185	1.3919	.0171
10 ⁵ / ₈	.8262	1.2104	.0197
10 ³ / ₄	.9352	1.0693	.0223
10 ⁷ / ₈	1.0455	.9565	.0249
11	1.1571	.8643	.0275
11 ¹ / ₈	1.2699	.7875	.0302
11 ¹ / ₄	1.3840	.7225	.0330
11 ³ / ₈	1.4994	.6669	.0357
11 ¹ / ₂	1.6161	.6188	.0385
11 ⁵ / ₈	1.7340	.5767	.0413
11 ³ / ₄	1.8532	.5396	.0441
11 ⁷ / ₈	1.9737	.5067	.0470
12	2.0955	.4772	.0499
12 ¹ / ₈	2.2185	.4508	.0528
12 ¹ / ₄	2.3428	.4268	.0558
12 ³ / ₈	2.4684	.4051	.0588
12 ¹ / ₂	2.5953	.3853	.0618
12 ⁵ / ₈	2.7234	.3672	.0648
12 ³ / ₄	2.8528	.3505	.0679
12 ⁷ / ₈	2.9835	.3352	.0710
13	3.1155	.3210	.0742
13 ¹ / ₈	3.2487	.3078	.0773
13 ¹ / ₄	3.3832	.2956	.0806
13 ³ / ₈	3.5190	.2842	.0838
13 ¹ / ₂	3.6561	.2735	.0870
13 ⁵ / ₈	3.7944	.2635	.0903
13 ³ / ₄	3.9340	.2542	.0937
13 ⁷ / ₈	4.0749	.2454	.0970
14	4.2171	.2371	.1004
14 ¹ / ₈	4.3605	.2293	.1038
14 ¹ / ₄	4.5052	.2220	.1073
14 ³ / ₈	4.6512	.2150	.1107
14 ¹ / ₂	4.7985	.2084	.1142
14 ⁵ / ₈	4.9470	.2021	.1178
14 ³ / ₄	5.0968	.1962	.1214
14 ⁷ / ₈	5.2479	.1906	.1249
15	5.4002	.1852	.1286
15 ¹ / ₈	5.5539	.1801	.1322
15 ¹ / ₄	5.7088	.1752	.1359
15 ³ / ₈	5.8650	.1705	.1396
15 ¹ / ₂	6.0224	.1660	.1434
15 ⁵ / ₈	6.1812	.1618	.1472
15 ³ / ₄	6.3412	.1577	.1510
15 ⁷ / ₈	6.5025	.1538	.1548
16	6.6650	.1500	.1587

NO.122-B

Casing Size
O.D. 9⁵/₈"
9.625"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
139.8779	.0401	24.9133	10
104.2445	.0539	18.5667	10 ¹ / ₈
82.8711	.0678	14.7600	10 ¹ / ₄
68.6276	.0818	12.2231	10 ³ / ₈
58.4583	.0960	10.4119	10 ¹ / ₂
50.8353	.1104	9.0541	10 ⁵ / ₈
44.9097	.1250	7.9988	10 ³ / ₄
40.1723	.1398	7.1550	10 ⁷ / ₈
36.2989	.1547	6.4651	11
33.0735	.1698	5.8907	11 ¹ / ₈
30.3466	.1850	5.4050	11 ¹ / ₄
28.0113	.2004	4.9890	11 ³ / ₈
25.9892	.2160	4.6289	11 ¹ / ₂
24.2215	.2318	4.3140	11 ⁵ / ₈
22.6634	.2477	4.0365	11 ³ / ₄
21.2799	.2638	3.7901	11 ⁷ / ₈
20.0434	.2801	3.5699	12
18.9318	.2966	3.3719	12 ¹ / ₈
17.9272	.3132	3.1930	12 ¹ / ₄
17.0151	.3300	3.0305	12 ³ / ₈
16.1834	.3469	2.8824	12 ¹ / ₂
15.4219	.3641	2.7468	12 ⁵ / ₈
14.7223	.3814	2.6222	12 ³ / ₄
14.0775	.3988	2.5073	12 ⁷ / ₈
13.4812	.4165	2.4011	13
12.9283	.4343	2.3026	13 ¹ / ₈
12.4143	.4523	2.2111	13 ¹ / ₄
11.9352	.4704	2.1258	13 ³ / ₈
11.4878	.4887	2.0461	13 ¹ / ₂
11.0690	.5072	1.9715	13 ⁵ / ₈
10.6761	.5259	1.9015	13 ³ / ₄
10.3070	.5447	1.8358	13 ⁷ / ₈
9.9596	.5637	1.7739	14
9.6319	.5829	1.7155	14 ¹ / ₈
9.3226	.6023	1.6604	14 ¹ / ₄
9.0299	.6218	1.6083	14 ³ / ₈
8.7528	.6415	1.5589	14 ¹ / ₂
8.4900	.6613	1.5121	14 ⁵ / ₈
8.2405	.6813	1.4677	14 ³ / ₄
8.0032	.7015	1.4254	14 ⁷ / ₈
7.7774	.7219	1.3852	15
7.5623	.7424	1.3469	15 ¹ / ₈
7.3571	.7632	1.3103	15 ¹ / ₄
7.1611	.7840	1.2755	15 ³ / ₈
6.9739	.8051	1.2421	15 ¹ / ₂
6.7948	.8263	1.2102	15 ⁵ / ₈
6.6234	.8477	1.1797	15 ³ / ₄
6.4591	.8693	1.1504	15 ⁷ / ₈
6.3015	.8910	1.1224	16

**Note: No allowance made for couplings.

Casing Size
***O.D. 10"**
10.000"

TABLE
VOLUME & HEIGHT

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
10 ¹ / ₈	.1026	9.7430	.0024
10 ¹ / ₄	.2065	4.8415	.0049
10 ³ / ₈	.3117	3.2078	.0074
10 ¹ / ₂	.4182	2.3912	.0100
10 ⁵ / ₈	.5259	1.9014	.0125
10 ³ / ₄	.6349	1.5749	.0151
10 ⁷ / ₈	.7452	1.3419	.0177
11	.8568	1.1671	.0204
11 ¹ / ₈	.9696	1.0313	.0231
11 ¹ / ₄	1.0837	.9227	.0258
11 ³ / ₈	1.1991	.8339	.0286
11 ¹ / ₂	1.3158	.7600	.0313
11 ⁵ / ₈	1.4337	.6975	.0341
11 ³ / ₄	1.5529	.6439	.0370
11 ⁷ / ₈	1.6734	.5976	.0398
12	1.7952	.5570	.0427
12 ¹ / ₈	1.9182	.5213	.0457
12 ¹ / ₄	2.0425	.4896	.0486
12 ³ / ₈	2.1681	.4612	.0516
12 ¹ / ₂	2.2950	.4357	.0546
12 ⁵ / ₈	2.4231	.4127	.0577
12 ³ / ₄	2.5525	.3918	.0608
12 ⁷ / ₈	2.6832	.3727	.0639
13	2.8152	.3552	.0670
13 ¹ / ₈	2.9484	.3392	.0702
13 ¹ / ₄	3.0829	.3244	.0734
13 ³ / ₈	3.2187	.3107	.0766
13 ¹ / ₂	3.3558	.2980	.0799
13 ⁵ / ₈	3.4941	.2862	.0832
13 ³ / ₄	3.6337	.2752	.0865
13 ⁷ / ₈	3.7746	.2649	.0899
14	3.9168	.2553	.0933
14 ¹ / ₈	4.0602	.2463	.0967
14 ¹ / ₄	4.2049	.2378	.1001
14 ³ / ₈	4.3509	.2298	.1036
14 ¹ / ₂	4.4982	.2223	.1071
14 ⁵ / ₈	4.6467	.2152	.1106
14 ³ / ₄	4.7965	.2085	.1142
14 ⁷ / ₈	4.9476	.2021	.1178
15	5.1000	.1961	.1214
15 ¹ / ₈	5.2536	.1903	.1251
15 ¹ / ₄	5.4085	.1849	.1288
15 ³ / ₈	5.5647	.1797	.1325
15 ¹ / ₂	5.7222	.1748	.1362
15 ⁵ / ₈	5.8809	.1700	.1400
15 ³ / ₄	6.0409	.1655	.1438
15 ⁷ / ₈	6.2022	.1612	.1477
16	6.3648	.1571	.1515

NO.122-B

Casing Size
*O.D. 10"
10.000"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
409.2081	.0137	72.8831	10 ¹ / ₈
203.3411	.0276	36.2166	10 ¹ / ₄
134.7291	.0417	23.9963	10 ³ / ₈
100.4307	.0559	17.8875	10 ¹ / ₂
79.8576	.0703	14.2232	10 ⁵ / ₈
66.1471	.0849	11.7813	10 ³ / ₄
56.3580	.0996	10.0378	10 ⁷ / ₈
49.0197	.1145	8.7308	11
43.3153	.1296	7.7148	11 ¹ / ₈
38.7544	.1449	6.9025	11 ¹ / ₄
35.0253	.1603	6.2383	11 ³ / ₈
31.9198	.1759	5.6852	11 ¹ / ₂
29.2941	.1917	5.2175	11 ⁵ / ₈
27.0454	.2076	4.8170	11 ³ / ₄
25.0981	.2237	4.4702	11 ⁷ / ₈
23.3958	.2400	4.1670	12
21.8952	.2564	3.8997	12 ¹ / ₈
20.5626	.2730	3.6624	12 ¹ / ₄
19.3715	.2898	3.4502	12 ³ / ₈
18.3007	.3068	3.2595	12 ¹ / ₂
17.3329	.3239	3.0871	12 ⁵ / ₈
16.4542	.3412	2.9306	12 ³ / ₄
15.6528	.3587	2.7879	12 ⁷ / ₈
14.9190	.3763	2.6572	13
14.2449	.3941	2.5371	13 ¹ / ₈
13.6233	.4121	2.4264	13 ¹ / ₄
13.0486	.4303	2.3241	13 ³ / ₈
12.5157	.4486	2.2291	13 ¹ / ₂
12.0202	.4671	2.1409	13 ⁵ / ₈
11.5583	.4858	2.0586	13 ³ / ₄
11.1269	.5046	1.9818	13 ⁷ / ₈
10.7231	.5236	1.9099	14
10.3442	.5428	1.8424	14 ¹ / ₈
9.9883	.5621	1.7790	14 ¹ / ₄
9.6531	.5816	1.7193	14 ⁵ / ₈
9.3371	.6013	1.6630	14 ¹ / ₂
9.0386	.6212	1.6098	14 ⁵ / ₈
8.7563	.6412	1.5596	14 ³ / ₄
8.4889	.6614	1.5119	14 ⁷ / ₈
8.2353	.6818	1.4668	15
7.9945	.7023	1.4239	15 ¹ / ₈
7.7655	.7230	1.3831	15 ¹ / ₄
7.5475	.7439	1.3443	15 ³ / ₈
7.3399	.7649	1.3073	15 ¹ / ₂
7.1417	.7862	1.2720	15 ⁵ / ₈
6.9526	.8076	1.2383	15 ³ / ₄
6.7718	.8291	1.2061	15 ⁷ / ₈
6.5988	.8508	1.1753	16

**Note: No allowance made for couplings.

**Casing Size
O.D. 10 $\frac{3}{4}$ "
10.750"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
11 $\frac{1}{2}$.6808	1.4688	.0162
11 $\frac{5}{8}$.7988	1.2519	.0190
11 $\frac{3}{4}$.9180	1.0893	.0219
11 $\frac{7}{8}$	1.0385	.9629	.0247
12	1.1602	.8619	.0276
12 $\frac{1}{8}$	1.2833	.7793	.0306
12 $\frac{1}{4}$	1.4076	.7104	.0335
12 $\frac{3}{8}$	1.5332	.6522	.0365
12 $\frac{1}{2}$	1.6600	.6024	.0395
12 $\frac{5}{8}$	1.7882	.5592	.0426
12 $\frac{3}{4}$	1.9176	.5215	.0457
12 $\frac{7}{8}$	2.0483	.4882	.0488
13	2.1802	.4587	.0519
13 $\frac{1}{8}$	2.3135	.4322	.0551
13 $\frac{1}{4}$	2.4480	.4085	.0583
13 $\frac{3}{8}$	2.5838	.3870	.0615
13 $\frac{1}{2}$	2.7208	.3675	.0648
13 $\frac{5}{8}$	2.8592	.3498	.0681
13 $\frac{3}{4}$	2.9988	.3335	.0714
13 $\frac{7}{8}$	3.1397	.3185	.0748
14	3.2818	.3047	.0781
14 $\frac{1}{8}$	3.4253	.2919	.0816
14 $\frac{1}{4}$	3.5700	.2801	.0850
14 $\frac{3}{8}$	3.7160	.2691	.0885
14 $\frac{1}{2}$	3.8632	.2589	.0920
14 $\frac{5}{8}$	4.0118	.2493	.0955
14 $\frac{3}{4}$	4.1616	.2403	.0991
14 $\frac{7}{8}$	4.3127	.2319	.1027
15	4.4650	.2240	.1063
15 $\frac{1}{8}$	4.6187	.2165	.1100
15 $\frac{1}{4}$	4.7736	.2095	.1137
15 $\frac{3}{8}$	4.9298	.2028	.1174
15 $\frac{1}{2}$	5.0872	.1966	.1211
15 $\frac{5}{8}$	5.2460	.1906	.1249
15 $\frac{3}{4}$	5.4060	.1850	.1287
15 $\frac{7}{8}$	5.5673	.1796	.1326
16	5.7298	.1745	.1364
16 $\frac{1}{8}$	5.8937	.1697	.1403
16 $\frac{1}{4}$	6.0588	.1650	.1443
16 $\frac{3}{8}$	6.2252	.1606	.1482
16 $\frac{1}{2}$	6.3928	.1564	.1522
16 $\frac{5}{8}$	6.5618	.1524	.1562
16 $\frac{3}{4}$	6.7320	.1485	.1603
16 $\frac{7}{8}$	6.9035	.1449	.1644
17	7.0762	.1413	.1685
17 $\frac{1}{4}$	7.4256	.1347	.1768
17 $\frac{1}{2}$	7.7800	.1285	.1852
17 $\frac{3}{4}$	8.1396	.1229	.1938
18	8.5042	.1176	.2025

NO.122-B

Casing Size
O.D. 10 $\frac{3}{4}$ "
10.750"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
61.6877	.0910	10.9871	11 $\frac{1}{2}$
52.5798	.1068	9.3649	11 $\frac{5}{8}$
45.7517	.1227	8.1487	11 $\frac{3}{4}$
40.4435	.1388	7.2033	11 $\frac{7}{8}$
36.1992	.1551	6.4473	12
32.7285	.1716	5.8292	12 $\frac{1}{8}$
29.8381	.1882	5.3144	12 $\frac{1}{4}$
27.3940	.2050	4.8791	12 $\frac{7}{8}$
25.3005	.2219	4.5062	12 $\frac{1}{2}$
23.4875	.2390	4.1833	12 $\frac{5}{8}$
21.9024	.2563	3.9010	12 $\frac{3}{4}$
20.5050	.2738	3.6521	12 $\frac{7}{8}$
19.2639	.2915	3.4310	13
18.1545	.3093	3.2334	13 $\frac{1}{8}$
17.1569	.3272	3.0558	13 $\frac{1}{4}$
16.2552	.3454	2.8952	13 $\frac{3}{8}$
15.4364	.3637	2.7493	13 $\frac{1}{2}$
14.6895	.3882	2.6163	13 $\frac{5}{8}$
14.0056	.4009	2.4945	13 $\frac{3}{4}$
13.3772	.4197	2.3826	13 $\frac{7}{8}$
12.7977	.4387	2.2794	14
12.2618	.4579	2.1839	14 $\frac{1}{8}$
11.7647	.4772	2.0954	14 $\frac{1}{4}$
11.3025	.4968	2.0131	14 $\frac{3}{8}$
10.8717	.5164	1.9363	14 $\frac{1}{2}$
10.4692	.5363	1.8646	14 $\frac{5}{8}$
10.0923	.5563	1.7975	14 $\frac{3}{4}$
9.7387	.5765	1.7345	14 $\frac{7}{8}$
9.4064	.5969	1.6754	15
9.0935	.6174	1.6196	15 $\frac{1}{8}$
8.7984	.6381	1.5671	15 $\frac{1}{4}$
8.5197	.6590	1.5174	15 $\frac{3}{8}$
8.2560	.6801	1.4704	15 $\frac{1}{2}$
8.0061	.7013	1.4260	15 $\frac{5}{8}$
7.7692	.7227	1.3837	15 $\frac{3}{4}$
7.5441	.7442	1.3437	15 $\frac{7}{8}$
7.3301	.7660	1.3055	16
7.1263	.7879	1.2692	16 $\frac{1}{8}$
6.9321	.8099	1.2347	16 $\frac{1}{4}$
6.7468	.8322	1.2017	16 $\frac{3}{8}$
6.5699	.8546	1.1701	16 $\frac{1}{2}$
6.4007	.8772	1.1400	16 $\frac{5}{8}$
6.2387	.8999	1.1112	16 $\frac{3}{4}$
6.0839	.9229	1.0836	16 $\frac{7}{8}$
5.9354	.9460	1.0571	17
5.6661	.9927	1.0074	17 $\frac{1}{4}$
5.3984	1.0400	.9615	17 $\frac{1}{2}$
5.1600	1.0881	.9190	17 $\frac{3}{4}$
4.9387	1.1369	.8796	18

**Note: No allowance made for couplings.

**Casing Size
O.D. 11 $\frac{3}{4}$ "
11.750"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
12	.2422	4.1280	.0058
12 $\frac{1}{8}$.3653	2.7376	.0087
12 $\frac{1}{4}$.4896	2.0425	.0117
12 $\frac{3}{8}$.6152	1.6255	.0146
12 $\frac{1}{2}$.7420	1.3476	.0177
12 $\frac{5}{8}$.8702	1.1492	.0207
12 $\frac{3}{4}$.9996	1.0004	.0238
12 $\frac{7}{8}$	1.1303	.8847	.0269
13	1.2622	.7922	.0301
13 $\frac{1}{8}$	1.3955	.7166	.0332
13 $\frac{1}{4}$	1.5300	.6536	.0364
13 $\frac{3}{8}$	1.6658	.6003	.0397
13 $\frac{1}{2}$	1.8028	.5547	.0429
13 $\frac{5}{8}$	1.9412	.5151	.0462
13 $\frac{3}{4}$	2.0808	.4806	.0495
13 $\frac{7}{8}$	2.2217	.4501	.0529
14	2.3638	.4230	.0563
14 $\frac{1}{8}$	2.5073	.3988	.0597
14 $\frac{1}{4}$	2.6520	.3771	.0631
14 $\frac{3}{8}$	2.7980	.3574	.0666
14 $\frac{1}{2}$	2.9452	.3395	.0701
14 $\frac{5}{8}$	3.0938	.3232	.0737
14 $\frac{3}{4}$	3.2436	.3083	.0772
14 $\frac{7}{8}$	3.3947	.2946	.0808
15	3.5470	.2819	.0845
15 $\frac{1}{8}$	3.7007	.2702	.0881
15 $\frac{1}{4}$	3.8556	.2594	.0918
15 $\frac{3}{8}$	4.0118	.2493	.0955
15 $\frac{1}{2}$	4.1692	.2399	.0993
15 $\frac{5}{8}$	4.3280	.2311	.1030
15 $\frac{3}{4}$	4.4880	.2228	.1069
15 $\frac{7}{8}$	4.6493	.2151	.1107
16	4.8118	.2078	.1146
16 $\frac{1}{4}$	5.1408	.1945	.1224
16 $\frac{1}{2}$	5.4748	.1827	.1304
16 $\frac{3}{4}$	5.8140	.1720	.1384
17	6.1582	.1624	.1466
17 $\frac{1}{4}$	6.5076	.1537	.1549
17 $\frac{1}{2}$	6.8620	.1457	.1634
17 $\frac{3}{4}$	7.2216	.1385	.1719
18	7.5862	.1318	.1806
18 $\frac{1}{4}$	7.9560	.1257	.1894
18 $\frac{1}{2}$	8.3308	.1200	.1984
18 $\frac{3}{4}$	8.7108	.1148	.2074
19	9.0958	.1099	.2166
19 $\frac{1}{4}$	9.4860	.1054	.2259
19 $\frac{1}{2}$	9.8812	.1012	.2353
19 $\frac{3}{4}$	10.2816	.0973	.2448
20	10.6870	.0936	.2545

NO.122-B

Casing Size
O.D. 11 $\frac{3}{4}$ "
11.750"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
173.3750	.0324	30.8794	12
114.9782	.0488	20.4785	12 $\frac{1}{8}$
85.7845	.0654	15.2789	12 $\frac{1}{4}$
68.2720	.0822	12.1598	12 $\frac{3}{8}$
56.6001	.0992	10.0809	12 $\frac{1}{2}$
48.2656	.1163	8.5965	12 $\frac{5}{8}$
42.0169	.1336	7.4835	12 $\frac{3}{4}$
37.1588	.1511	6.6183	12 $\frac{7}{8}$
33.2740	.1687	5.9264	13
30.0971	.1865	5.3605	13 $\frac{1}{8}$
27.4510	.2045	4.8892	13 $\frac{1}{4}$
25.2134	.2227	4.4907	13 $\frac{3}{8}$
23.2965	.2410	4.1493	13 $\frac{1}{2}$
21.6363	.2595	3.8536	13 $\frac{5}{8}$
20.1846	.2782	3.5950	13 $\frac{3}{4}$
18.9046	.2970	3.3671	13 $\frac{7}{8}$
17.7677	.3160	3.1646	14
16.7512	.3352	2.9835	14 $\frac{1}{8}$
15.8371	.3545	2.8207	14 $\frac{1}{4}$
15.0108	.3740	2.6735	14 $\frac{3}{8}$
14.2603	.3937	2.5399	14 $\frac{1}{2}$
13.5756	.4136	2.4179	14 $\frac{5}{8}$
12.9486	.4336	2.3062	14 $\frac{3}{4}$
12.3723	.4538	2.2036	14 $\frac{7}{8}$
11.8409	.4742	2.1089	15
11.3493	.4947	2.0214	15 $\frac{1}{8}$
10.8933	.5154	1.9402	15 $\frac{1}{4}$
10.4692	.5363	1.8646	15 $\frac{3}{8}$
10.0738	.5573	1.7942	15 $\frac{1}{2}$
9.7043	.5786	1.7284	15 $\frac{5}{8}$
9.3583	.6000	1.6668	15 $\frac{3}{4}$
9.0337	.6215	1.6090	15 $\frac{7}{8}$
8.7285	.6432	1.5546	16
8.1700	.6872	1.4551	16 $\frac{1}{4}$
7.6715	.7319	1.3663	16 $\frac{1}{2}$
7.2240	.7772	1.2866	16 $\frac{3}{4}$
6.8201	.8232	1.2147	17
6.4540	.8699	1.1495	17 $\frac{1}{4}$
6.1206	.9173	1.0901	17 $\frac{1}{2}$
5.8159	.9654	1.0359	17 $\frac{3}{4}$
5.5363	1.0141	.9861	18
5.2790	1.0636	.9402	18 $\frac{1}{4}$
5.0415	1.1137	.8979	18 $\frac{1}{2}$
4.8216	1.1645	.8588	18 $\frac{3}{4}$
4.6175	1.2159	.8224	19
4.4276	1.2681	.7886	19 $\frac{1}{4}$
4.2505	1.3209	.7570	19 $\frac{1}{2}$
4.0850	1.3744	.7276	19 $\frac{3}{4}$
3.9300	1.4286	.7000	20

**Note: No allowance made for couplings.

Casing Size***O.D. 12³/₄"****12.750"**
TABLE
VOLUME & HEIGHT

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
15	2.5474	.3926	.0607
15 ¹ / ₈	2.7011	.3702	.0643
15 ¹ / ₄	2.8560	.3501	.0680
15 ³ / ₈	3.0122	.3320	.0717
15 ¹ / ₂	3.1696	.3155	.0755
15 ⁵ / ₈	3.3284	.3004	.0792
15 ³ / ₄	3.4884	.2867	.0831
15 ⁷ / ₈	3.6497	.2740	.0869
16	3.8122	.2623	.0908
16 ¹ / ₈	3.9761	.2515	.0947
16 ¹ / ₄	4.1412	.2415	.0986
16 ³ / ₈	4.3076	.2321	.1026
16 ¹ / ₂	4.4752	.2235	.1066
16 ⁵ / ₈	4.6442	.2153	.1106
16 ³ / ₄	4.8144	.2077	.1146
16 ⁷ / ₈	4.9859	.2006	.1187
17	5.1586	.1938	.1228
17 ¹ / ₈	5.3327	.1875	.1270
17 ¹ / ₄	5.5080	.1816	.1311
17 ³ / ₈	5.6846	.1759	.1353
17 ¹ / ₂	5.8624	.1706	.1396
17 ⁵ / ₈	6.0416	.1655	.1438
17 ³ / ₄	6.2220	.1607	.1481
17 ⁷ / ₈	6.4037	.1562	.1525
18	6.5866	.1518	.1568
18 ¹ / ₈	6.7709	.1477	.1612
18 ¹ / ₄	6.9564	.1438	.1656
18 ³ / ₈	7.1432	.1400	.1701
18 ¹ / ₂	7.3312	.1364	.1746
18 ⁵ / ₈	7.5206	.1330	.1791
18 ³ / ₄	7.7112	.1297	.1836
18 ⁷ / ₈	7.9031	.1265	.1882
19	8.0962	.1235	.1928
19 ¹ / ₈	8.2907	.1206	.1974
19 ¹ / ₄	8.4864	.1178	.2021
19 ³ / ₈	8.6834	.1152	.2067
19 ¹ / ₂	8.8816	.1126	.2115
19 ⁵ / ₈	9.0812	.1101	.2162
19 ³ / ₄	9.2820	.1077	.2210
19 ⁷ / ₈	9.4841	.1054	.2258
20	9.6874	.1032	.2307

NO.122-B

Casing Size
*O.D. 12³/₄"

BETWEEN CASING & HOLE**

12.750"

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
16.4871	.3405	2.9365	15
15.5493	.3611	2.7695	15 ¹ / ₈
14.7059	.3818	2.6192	15 ¹ / ₄
13.9434	.4027	2.4834	15 ³ / ₈
13.2507	.4237	2.3601	15 ¹ / ₂
12.6188	.4449	2.2475	15 ⁵ / ₈
12.0399	.4663	2.1444	15 ³ / ₄
11.5079	.4879	2.0496	15 ⁷ / ₈
11.0171	.5096	1.9622	16
10.5632	.5315	1.8814	16 ¹ / ₈
10.1420	.5536	1.8064	16 ¹ / ₄
9.7503	.5758	1.7366	16 ³ / ₈
9.3850	.5983	1.6715	16 ¹ / ₂
9.0436	.6208	1.6107	16 ⁵ / ₈
8.7239	.6436	1.5538	16 ³ / ₄
8.4238	.6665	1.5003	16 ⁷ / ₈
8.1417	.6896	1.4501	17
7.8760	.7129	1.4028	17 ¹ / ₈
7.6253	.7363	1.3581	17 ¹ / ₄
7.3884	.7599	1.3159	17 ³ / ₈
7.1643	.7837	1.2760	17 ¹ / ₂
6.9518	.8076	1.2382	17 ⁵ / ₈
6.7503	.8318	1.2023	17 ³ / ₄
6.5587	.8560	1.1682	17 ⁷ / ₈
6.3766	.8805	1.1357	18
6.2030	.9051	1.1048	18 ¹ / ₈
6.0376	.9299	1.0753	18 ¹ / ₄
5.8797	.9549	1.0472	18 ³ / ₈
5.7289	.9800	1.0204	18 ¹ / ₂
5.5847	1.0054	.9947	18 ⁵ / ₈
5.4466	1.0308	.9701	18 ³ / ₄
5.3144	1.0565	.9465	18 ⁷ / ₈
5.1876	1.0823	.9240	19
5.0659	1.1083	.9023	19 ¹ / ₈
4.9491	1.1345	.8815	19 ¹ / ₄
4.8368	1.1608	.8615	19 ³ / ₈
4.7289	1.1873	.8422	19 ¹ / ₂
4.6250	1.2140	.8237	19 ⁵ / ₈
4.5249	1.2408	.8059	19 ³ / ₄
4.4285	1.2678	.7887	19 ⁷ / ₈
4.3355	1.2950	.7722	20

**Note: No allowance made for couplings.

Casing Size
***O.D. 13"**
13.000"

TABLE
VOLUME & HEIGHT

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
14	1.1016	.9078	.0262
14 ¹ / ₈	1.2450	.8032	.0296
14 ¹ / ₄	1.3897	.7196	.0331
14 ³ / ₈	1.5357	.6512	.0366
14 ¹ / ₂	1.6830	.5942	.0401
14 ⁵ / ₈	1.8315	.5460	.0436
14 ³ / ₄	1.9813	.5047	.0472
14 ⁷ / ₈	2.1324	.4689	.0508
15	2.2848	.4377	.0544
15 ¹ / ₈	2.4384	.4101	.0581
15 ¹ / ₄	2.5933	.3856	.0617
15 ³ / ₈	2.7495	.3637	.0655
15 ¹ / ₂	2.9070	.3440	.0692
15 ⁵ / ₈	3.0657	.3262	.0730
15 ³ / ₄	3.2257	.3100	.0768
15 ⁷ / ₈	3.3870	.2952	.0806
16	3.5496	.2817	.0845
16 ¹ / ₄	3.8785	.2578	.0923
16 ¹ / ₂	4.2126	.2374	.1003
16 ³ / ₄	4.5517	.2197	.1084
17	4.8960	.2042	.1166
17 ¹ / ₄	5.2453	.1906	.1249
17 ¹ / ₂	5.5998	.1786	.1333
17 ³ / ₄	5.9593	.1678	.1419
18	6.3240	.1581	.1506
18 ¹ / ₄	6.6937	.1494	.1594
18 ¹ / ₂	7.0686	.1415	.1683
18 ³ / ₄	7.4485	.1343	.1773
19	7.8336	.1277	.1865
19 ¹ / ₄	8.2237	.1216	.1958
19 ¹ / ₂	8.6190	.1160	.2052
19 ³ / ₄	9.0193	.1109	.2147
20	9.4248	.1061	.2244
20 ¹ / ₄	9.8353	.1017	.2342
20 ¹ / ₂	10.2510	.0976	.2441
20 ³ / ₄	10.6717	.0937	.2541
21	11.0976	.0901	.2642
21 ¹ / ₄	11.5285	.0867	.2745
21 ¹ / ₂	11.9646	.0836	.2849
21 ³ / ₄	12.4057	.0806	.2954
22	12.8520	.0778	.3060
22 ¹ / ₄	13.3033	.0752	.3167
22 ¹ / ₂	13.7598	.0727	.3276
22 ³ / ₄	14.2213	.0703	.3386
23	14.6880	.0681	.3497
23 ¹ / ₄	15.1597	.0660	.3609
23 ¹ / ₂	15.6366	.0640	.3723
23 ³ / ₄	16.1185	.0620	.3838
24	16.6056	.0602	.3954

*Not API Standard. Shown for information only.

NO.122-B

BETWEEN CASING & HOLE****Casing Size*****O.D. 13"****13.000"**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
38.1265	.1473	6.7906	14
33.7340	.1664	6.0083	14 $\frac{1}{8}$
30.2213	.1858	5.3826	14 $\frac{1}{4}$
27.3485	.2053	4.8710	14 $\frac{3}{8}$
24.9555	.2250	4.4448	14 $\frac{1}{2}$
22.9316	.2448	4.0843	14 $\frac{5}{8}$
21.1977	.2649	3.7755	14 $\frac{3}{4}$
19.6958	.2851	3.5080	14 $\frac{7}{8}$
18.3824	.3054	3.2740	15
17.2242	.3260	3.0678	15 $\frac{1}{8}$
16.1953	.3467	2.8845	15 $\frac{1}{4}$
15.2753	.3676	2.7207	15 $\frac{3}{8}$
14.4479	.3886	2.5733	15 $\frac{1}{2}$
13.6998	.4098	2.4400	15 $\frac{5}{8}$
13.0203	.4312	2.3190	15 $\frac{3}{4}$
12.4002	.4528	2.2086	15 $\frac{7}{8}$
11.8323	.4745	2.1074	16
10.8288	.5185	1.9287	16 $\frac{1}{4}$
9.9701	.5631	1.7758	16 $\frac{1}{2}$
9.2272	.6085	1.6434	16 $\frac{3}{4}$
8.5785	.6545	1.5279	17
8.0071	.7012	1.4261	17 $\frac{1}{4}$
7.5003	.7486	1.3359	17 $\frac{1}{2}$
7.0478	.7966	1.2553	17 $\frac{3}{4}$
6.6414	.8454	1.1829	18
6.2745	.8948	1.1175	18 $\frac{1}{4}$
5.9418	.9449	1.0583	18 $\frac{1}{2}$
5.6387	.9957	1.0043	18 $\frac{3}{4}$
5.3615	1.0472	.9549	19
5.1072	1.0994	.9096	19 $\frac{1}{4}$
4.8730	1.1522	.8679	19 $\frac{1}{2}$
4.6567	1.2057	.8294	19 $\frac{3}{4}$
4.4563	1.2599	.7937	20
4.2703	1.3148	.7606	20 $\frac{1}{4}$
4.0972	1.3704	.7297	20 $\frac{1}{2}$
3.9356	1.4266	.7010	20 $\frac{3}{4}$
3.7846	1.4835	.6741	21
3.6431	1.5411	.6489	21 $\frac{1}{4}$
3.5104	1.5994	.6252	21 $\frac{1}{2}$
3.3855	1.6584	.6030	21 $\frac{3}{4}$
3.2680	1.7181	.5821	22
3.1571	1.7784	.5623	22 $\frac{1}{4}$
3.0524	1.8394	.5437	22 $\frac{1}{2}$
2.9533	1.9011	.5260	22 $\frac{3}{4}$
2.8595	1.9635	.5093	23
2.7705	2.0266	.4934	23 $\frac{1}{4}$
2.6860	2.0903	.4784	23 $\frac{1}{2}$
2.6057	2.1547	.4641	23 $\frac{3}{4}$
2.5293	2.2198	.4505	24

**Note: No allowance made for couplings.

**Casing Size
O.D. 13³/₈"
13.375"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
14	.6981	1.4325	.0166
14 ¹ / ₈	.8415	1.1884	.0200
14 ¹ / ₄	.9862	1.0140	.0235
14 ³ / ₈	1.1322	.8832	.0270
14 ¹ / ₂	1.2795	.7816	.0305
14 ⁵ / ₈	1.4280	.7003	.0340
14 ³ / ₄	1.5778	.6338	.0376
14 ⁷ / ₈	1.7289	.5784	.0412
15	1.8813	.5316	.0448
15 ¹ / ₈	2.0349	.4914	.0484
15 ¹ / ₄	2.1898	.4567	.0521
15 ³ / ₈	2.3460	.4263	.0559
15 ¹ / ₂	2.5035	.3994	.0596
15 ⁵ / ₈	2.6622	.3756	.0634
15 ³ / ₄	2.8222	.3543	.0672
15 ⁷ / ₈	2.9835	.3352	.0710
16	3.1461	.3179	.0749
16 ¹ / ₄	3.4750	.2878	.0827
16 ¹ / ₂	3.8091	.2625	.0907
16 ³ / ₄	4.1482	.2411	.0988
17	4.4925	.2226	.1070
17 ¹ / ₄	4.8418	.2065	.1153
17 ¹ / ₂	5.1963	.1924	.1237
17 ³ / ₄	5.5558	.1800	.1323
18	5.9204	.1689	.1410
18 ¹ / ₄	6.2902	.1590	.1498
18 ¹ / ₂	6.6650	.1500	.1587
18 ³ / ₄	7.0450	.1419	.1677
19	7.4300	.1346	.1769
19 ¹ / ₄	7.8202	.1279	.1862
19 ¹ / ₂	8.2154	.1217	.1956
19 ³ / ₄	8.6158	.1161	.2051
20	9.0212	.1108	.2148
20 ¹ / ₄	9.4318	.1060	.2246
20 ¹ / ₂	9.8474	.1015	.2345
20 ³ / ₄	10.2682	.0974	.2445
21	10.6940	.0935	.2546
21 ¹ / ₄	11.1250	.0899	.2649
21 ¹ / ₂	11.5610	.0865	.2753
21 ³ / ₄	12.0022	.0833	.2858
22	12.4484	.0803	.2964
22 ¹ / ₄	12.8998	.0775	.3071
22 ¹ / ₂	13.3562	.0749	.3180
22 ³ / ₄	13.8178	.0724	.3290
23	14.2844	.0700	.3401
23 ¹ / ₄	14.7562	.0678	.3513
23 ¹ / ₂	15.2330	.0656	.3627
23 ³ / ₄	15.7150	.0636	.3742
24	16.2020	.0617	.3858

NO.122-B

Casing Size
O.D. 13³/₈"
13.375"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
60.1667	.0933	10.7161	14
49.9110	.1125	8.8895	14 ¹ / ₈
42.5873	.1318	7.5851	14 ¹ / ₄
37.0960	.1514	6.6071	14 ³ / ₈
32.8264	.1710	5.8466	14 ¹ / ₂
29.4118	.1909	5.2385	14 ⁵ / ₈
26.6192	.2109	4.7411	14 ³ / ₄
24.2930	.2311	4.3268	14 ⁷ / ₈
22.3255	.2515	3.9763	15
20.6399	.2720	3.6761	15 ¹ / ₈
19.1798	.2927	3.4161	15 ¹ / ₄
17.9029	.3136	3.1886	15 ³ / ₈
16.7768	.3347	2.9881	15 ¹ / ₂
15.7765	.3559	2.8099	15 ⁵ / ₈
14.8820	.3773	2.6506	15 ³ / ₄
14.0775	.3988	2.5073	15 ⁷ / ₈
13.3501	.4206	2.3777	16
12.0863	.4645	2.1527	16 ¹ / ₄
11.0264	.5092	1.9639	16 ¹ / ₂
10.1249	.5545	1.8033	16 ³ / ₄
9.3490	.6006	1.6651	17
8.6745	.6473	1.5450	17 ¹ / ₄
8.0828	.6946	1.4396	17 ¹ / ₂
7.5597	.7427	1.3464	17 ³ / ₄
7.0941	.7914	1.2635	18
6.6771	.8409	1.1892	18 ¹ / ₄
6.3015	.8910	1.1224	18 ¹ / ₂
5.9617	.9418	1.0618	18 ³ / ₄
5.6527	.9933	1.0068	19
5.3707	1.0454	.9566	19 ¹ / ₄
5.1123	1.0982	.9105	19 ¹ / ₂
4.8748	1.1518	.8682	19 ³ / ₄
4.6557	1.2060	.6995	20
4.4530	1.2608	.6724	20 ¹ / ₄
4.2651	1.3164	.6470	20 ¹ / ₂
4.0903	1.3727	.7285	20 ³ / ₄
3.9274	1.4296	.8292	21
3.7753	1.4872	.7931	21 ¹ / ₄
3.6329	1.5455	.7596	21 ¹ / ₂
3.4994	1.6045	.6233	21 ³ / ₄
3.3739	1.6641	.6009	22
3.2559	1.7245	.5799	22 ¹ / ₄
3.1446	1.7855	.5601	22 ¹ / ₂
3.0396	1.8472	.5414	22 ³ / ₄
2.9403	1.9096	.5237	23
2.8463	1.9726	.5069	23 ¹ / ₄
2.7572	2.0364	.4911	23 ¹ / ₂
2.6726	2.1008	.4760	23 ³ / ₄
2.5923	2.1659	.4617	24

**Note: No allowance made for couplings.

**Casing Size
*O.D. 14"
14.000"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
15	1.1832	.8452	.0282
15 ¹ / ₈	1.3368	.7480	.0318
15 ¹ / ₄	1.4917	.6704	.0355
15 ³ / ₈	1.6479	.6068	.0392
15 ¹ / ₂	1.8054	.5539	.0430
15 ⁵ / ₈	1.9641	.5091	.0468
15 ³ / ₄	2.1241	.4708	.0506
15 ⁷ / ₈	2.2854	.4376	.0544
16	2.4480	.4085	.0583
16 ¹ / ₄	2.7769	.3601	.0661
16 ¹ / ₂	3.1110	.3214	.0741
16 ³ / ₄	3.4501	.2898	.0821
17	3.7944	.2635	.0903
17 ¹ / ₄	4.1437	.2413	.0987
17 ¹ / ₂	4.4982	.2223	.1071
17 ³ / ₄	4.8577	.2059	.1157
18	5.2224	.1915	.1243
18 ¹ / ₄	5.5921	.1788	.1331
18 ¹ / ₂	5.9670	.1676	.1421
18 ³ / ₄	6.3469	.1576	.1511
19	6.7320	.1485	.1603
19 ¹ / ₄	7.1221	.1404	.1696
19 ¹ / ₂	7.5174	.1330	.1790
19 ³ / ₄	7.9177	.1263	.1885
20	8.3232	.1201	.1982
20 ¹ / ₄	8.7337	.1145	.2079
20 ¹ / ₂	9.1494	.1093	.2178
20 ³ / ₄	9.5701	.1045	.2279
21	9.9960	.1000	.2380
21 ¹ / ₄	10.4269	.0959	.2483
21 ¹ / ₂	10.8630	.0921	.2586
21 ³ / ₄	11.3041	.0885	.2691
22	11.7504	.0851	.2798
22 ¹ / ₄	12.2017	.0820	.2905
22 ¹ / ₂	12.6582	.0790	.3014
22 ³ / ₄	13.1197	.0762	.3124
23	13.5864	.0736	.3235
23 ¹ / ₄	14.0581	.0711	.3347
23 ¹ / ₂	14.5350	.0688	.3461
23 ³ / ₄	15.0169	.0666	.3575
24	15.5040	.0645	.3691
24 ¹ / ₄	15.9961	.0625	.3809
24 ¹ / ₂	16.4934	.0606	.3927
24 ³ / ₄	16.9957	.0588	.4047
25	17.5032	.0571	.4167
25 ¹ / ₄	18.0157	.0555	.4289
25 ¹ / ₂	18.5334	.0540	.4413
25 ³ / ₄	19.0561	.0525	.4537
26	19.5840	.0511	.4663

NO.122-B

Casing Size

*O.D. 14"

14.000"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
35.4970	.1582	6.3223	15
31.4175	.1787	5.5957	15 $\frac{1}{8}$
28.1549	.1994	5.0146	15 $\frac{1}{4}$
25.4865	.2203	4.5393	15 $\frac{3}{8}$
23.2636	.2413	4.1434	15 $\frac{1}{2}$
21.3835	.2626	3.8086	15 $\frac{5}{8}$
19.7727	.2840	3.5217	15 $\frac{3}{4}$
18.3773	.3055	3.2731	15 $\frac{7}{8}$
17.1569	.3272	3.0558	16
15.1245	.3712	2.6938	16 $\frac{1}{4}$
13.5005	.4159	2.4045	16 $\frac{1}{2}$
12.1734	.4612	2.1682	16 $\frac{3}{4}$
11.0690	.5072	1.9715	17
10.1358	.5539	1.8053	17 $\frac{1}{4}$
9.3371	.6013	1.6630	17 $\frac{1}{2}$
8.6460	.6494	1.5399	17 $\frac{3}{4}$
8.0423	.6981	1.4324	18
7.5105	.7476	1.3377	18 $\frac{1}{4}$
7.0387	.7977	1.2537	18 $\frac{1}{2}$
6.6174	.8485	1.1786	18 $\frac{3}{4}$
6.2389	.8999	1.1112	19
5.8971	.9521	1.0503	19 $\frac{1}{4}$
5.5871	1.0049	.9951	19 $\frac{1}{2}$
5.3045	1.0584	.9448	19 $\frac{3}{4}$
5.0461	1.1126	.8988	20
4.8089	1.1675	.8565	20 $\frac{1}{4}$
4.5905	1.2231	.8176	20 $\frac{1}{2}$
4.3887	1.2793	.7817	20 $\frac{3}{4}$
4.2017	1.3363	.7484	21
4.0280	1.3939	.7174	21 $\frac{1}{4}$
3.8663	1.4522	.6886	21 $\frac{1}{2}$
3.7155	1.5111	.6618	21 $\frac{3}{4}$
3.5744	1.5708	.6366	22
3.4421	1.6311	.6131	22 $\frac{1}{4}$
3.3180	1.6922	.5910	22 $\frac{1}{2}$
3.2013	1.7539	.5702	22 $\frac{3}{4}$
3.0913	1.8162	.5506	23
2.9876	1.8793	.5321	23 $\frac{1}{4}$
2.8896	1.9430	.5147	23 $\frac{1}{2}$
2.7968	2.0075	.4981	23 $\frac{3}{4}$
2.7090	2.0726	.4825	24
2.6256	2.1384	.4676	24 $\frac{1}{4}$
2.5465	2.2048	.4535	24 $\frac{1}{2}$
2.4712	2.2720	.4401	24 $\frac{3}{4}$
2.3996	2.3398	.4274	25
2.3313	2.4083	.4152	25 $\frac{1}{4}$
2.2662	2.4775	.4036	25 $\frac{1}{2}$
2.2040	2.5474	.3926	25 $\frac{3}{4}$
2.1446	2.6180	.3820	26

**Note: No allowance made for couplings.

**Casing Size
O.D. 16"
16.000"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
17	1.3464	.7427	.0321
17 ¹ / ₈	1.5204	.6577	.0362
17 ¹ / ₄	1.6957	.5897	.0404
17 ³ / ₈	1.8723	.5341	.0446
17 ¹ / ₂	2.0502	.4878	.0488
17 ⁵ / ₈	2.2293	.4486	.0531
17 ³ / ₄	2.4097	.4150	.0574
17 ⁷ / ₈	2.5914	.3859	.0617
18	2.7744	.3604	.0661
18 ¹ / ₄	3.1441	.3181	.0749
18 ¹ / ₂	3.5190	.2842	.0838
18 ³ / ₄	3.8989	.2565	.0928
19	4.2840	.2334	.1020
19 ¹ / ₄	4.6741	.2139	.1113
19 ¹ / ₂	5.0694	.1973	.1207
19 ³ / ₄	5.4697	.1828	.1302
20	5.8752	.1702	.1399
20 ¹ / ₄	6.2857	.1591	.1497
20 ¹ / ₂	6.7014	.1492	.1596
20 ³ / ₄	7.1221	.1404	.1696
21	7.5480	.1325	.1797
21 ¹ / ₄	7.9789	.1253	.1900
21 ¹ / ₂	8.4150	.1188	.2004
21 ³ / ₄	8.8561	.1129	.2109
22	9.3024	.1075	.2215
22 ¹ / ₄	9.7537	.1025	.2322
22 ¹ / ₂	10.2102	.0979	.2431
22 ³ / ₄	10.6717	.0937	.2541
23	11.1384	.0898	.2652
23 ¹ / ₄	11.6101	.0861	.2764
23 ¹ / ₂	12.0870	.0827	.2878
23 ³ / ₄	12.5689	.0796	.2993
24	13.0560	.0766	.3109
24 ¹ / ₄	13.5481	.0738	.3226
24 ¹ / ₂	14.0454	.0712	.3344
24 ³ / ₄	14.5477	.0687	.3464
25	15.0552	.0664	.3585
25 ¹ / ₄	15.5677	.0642	.3707
25 ¹ / ₂	16.0854	.0622	.3830
25 ³ / ₄	16.6081	.0602	.3954
26	17.1360	.0584	.4080
26 ¹ / ₄	17.6689	.0566	.4207
26 ¹ / ₂	18.2070	.0549	.4335
26 ³ / ₄	18.7501	.0533	.4464
27	19.2984	.0518	.4595
27 ¹ / ₄	19.8517	.0504	.4727
27 ¹ / ₂	20.4102	.0490	.4860
27 ³ / ₄	20.9737	.0477	.4994
28	21.5423	.0464	.5129

NO.122-B

Casing Size
O.D. 16"
16.000"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
31.1944	.1800	5.5560	17
27.6237	.2033	4.9200	17 $\frac{1}{8}$
24.7679	.2267	4.4113	17 $\frac{1}{4}$
22.4319	.2503	3.9953	17 $\frac{3}{8}$
20.4859	.2741	3.6487	17 $\frac{1}{2}$
18.8397	.2980	3.3555	17 $\frac{5}{8}$
17.4292	.3221	3.1043	17 $\frac{3}{4}$
16.2073	.3464	2.8866	17 $\frac{7}{8}$
15.1384	.3709	2.6963	18
13.3582	.4203	2.3792	18 $\frac{1}{4}$
11.9352	.4704	2.1258	18 $\frac{1}{2}$
10.7722	.5212	1.9186	18 $\frac{3}{4}$
9.8039	.5727	1.7462	19
8.9856	.6248	1.6004	19 $\frac{1}{4}$
8.2850	.6777	1.4756	19 $\frac{1}{2}$
7.6786	.7312	1.3676	19 $\frac{3}{4}$
7.1487	.7854	1.2732	20
6.6818	.8403	1.1901	20 $\frac{1}{4}$
6.2674	.8958	1.1163	20 $\frac{1}{2}$
5.8971	.9521	1.0503	20 $\frac{3}{4}$
5.5644	1.0090	.9911	21
5.2639	1.0666	.9375	21 $\frac{1}{4}$
4.9911	1.1249	.8890	21 $\frac{1}{2}$
4.7425	1.1839	.8447	21 $\frac{3}{4}$
4.5150	1.2435	.8042	22
4.3060	1.3039	.7669	22 $\frac{1}{4}$
4.1135	1.3649	.7327	22 $\frac{1}{2}$
3.9356	1.4266	.7010	22 $\frac{3}{4}$
3.7707	1.4890	.6716	23
3.6175	1.5520	.6443	23 $\frac{1}{4}$
3.4748	1.6158	.6189	23 $\frac{1}{2}$
3.3416	1.6802	.5952	23 $\frac{3}{4}$
3.2169	1.7453	.5730	24
3.1001	1.8111	.5521	24 $\frac{1}{4}$
2.9903	1.8776	.5326	24 $\frac{1}{2}$
2.8871	1.9447	.5142	24 $\frac{3}{4}$
2.7897	2.0126	.4969	25
2.6979	2.0811	.4805	25 $\frac{1}{4}$
2.6111	2.1503	.4651	25 $\frac{1}{2}$
2.5289	2.2202	.4504	25 $\frac{3}{4}$
2.4510	2.2907	.4365	26
2.3771	2.3620	.4234	26 $\frac{1}{4}$
2.3068	2.4339	.4109	26 $\frac{1}{2}$
2.2400	2.5065	.3990	26 $\frac{3}{4}$
2.1764	2.5798	.3876	27
2.1157	2.6538	.3768	27 $\frac{1}{4}$
2.0578	2.7284	.3665	27 $\frac{1}{2}$
2.0025	2.8038	.3567	27 $\frac{3}{4}$
1.9496	2.8798	.3472	28

**Note: No allowance made for couplings.

**Casing Size
O.D. 18^{5/8}"
18.625"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
19	.5757	1.7371	.0137
19 ^{1/8}	.7701	1.2985	.0183
19 ^{1/4}	.9658	1.0354	.0230
19 ^{3/8}	1.1628	.8600	.0277
19 ^{1/2}	1.3611	.7347	.0324
19 ^{5/8}	1.5606	.6408	.0372
19 ^{3/4}	1.7614	.5677	.0419
19 ^{7/8}	1.9635	.5093	.0467
20	2.1669	.4615	.0516
20 ^{1/4}	2.5774	.3880	.0614
20 ^{1/2}	2.9931	.3341	.0713
20 ^{3/4}	3.4138	.2929	.0813
21	3.8397	.2604	.0914
21 ^{1/4}	4.2706	.2342	.1017
21 ^{1/2}	4.7067	.2125	.1121
21 ^{3/4}	5.1478	.1943	.1226
22	5.5940	.1788	.1332
22 ^{1/4}	6.0454	.1654	.1439
22 ^{1/2}	6.5018	.1538	.1548
22 ^{3/4}	6.9634	.1436	.1658
23	7.4300	.1346	.1769
23 ^{1/4}	7.9018	.1266	.1881
23 ^{1/2}	8.3786	.1194	.1995
23 ^{3/4}	8.8606	.1129	.2110
24	9.3476	.1070	.2226
24 ^{1/4}	9.8398	.1016	.2343
24 ^{1/2}	10.3370	.0967	.2461
24 ^{3/4}	10.8394	.0923	.2581
25	11.3468	.0881	.2702
25 ^{1/4}	11.8594	.0843	.2824
25 ^{1/2}	12.3770	.0808	.2947
25 ^{3/4}	12.8998	.0775	.3071
26	13.4276	.0745	.3197
26 ^{1/4}	13.9606	.0716	.3324
26 ^{1/2}	14.4986	.0690	.3452
26 ^{3/4}	15.0418	.0665	.3581
27	15.5900	.0641	.3712
27 ^{1/4}	16.1434	.0619	.3844
27 ^{1/2}	16.7018	.0599	.3977
27 ^{3/4}	17.2654	.0579	.4111
28	17.8340	.0561	.4246
28 ^{1/4}	18.4078	.0543	.4383
28 ^{1/2}	18.9866	.0527	.4521
28 ^{3/4}	19.5706	.0511	.4660
29	20.1596	.0496	.4800
29 ^{1/4}	20.7538	.0482	.4941
29 ^{1/2}	21.3530	.0468	.5084
29 ^{3/4}	21.9574	.0455	.5228
30	22.5668	.0443	.5373

NO.122-B

Casing Size
O.D. 18⁵/₈"
18.625"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
72.9596	.0770	12.9947	19
54.5385	.1029	9.7137	19 ¹ / ₈
43.4868	.1291	7.7453	19 ¹ / ₄
36.1198	.1554	6.4332	19 ³ / ₈
30.8583	.1819	5.4961	19 ¹ / ₂
26.9128	.2086	4.7934	19 ⁵ / ₈
23.8446	.2355	4.2469	19 ³ / ₄
21.3904	.2625	3.8098	19 ⁷ / ₈
19.3829	.2897	3.4522	20
16.2955	.3445	2.9023	20 ¹ / ₄
14.0325	.4001	2.4993	20 ¹ / ₂
12.3030	.4564	2.1913	20 ³ / ₄
10.9385	.5133	1.9482	21
9.9385	.5709	1.7516	21 ¹ / ₄
8.9235	.6292	1.5894	21 ¹ / ₂
8.1588	.6882	1.4531	21 ³ / ₄
7.5080	.7478	1.3372	22
6.9474	.8082	1.2374	22 ¹ / ₄
6.4597	.8692	1.1505	22 ¹ / ₂
6.0315	.9309	1.0743	22 ³ / ₄
5.6527	.9933	1.0068	23
5.3152	1.0563	.9467	23 ¹ / ₄
5.0127	1.1201	.8928	23 ¹ / ₂
4.7401	1.1845	.8442	23 ³ / ₄
4.4931	1.2496	.8003	24
4.2684	1.3154	.7602	24 ¹ / ₄
4.0631	1.3819	.7237	24 ¹ / ₂
3.8748	1.4490	.6901	24 ³ / ₄
3.7015	1.5169	.6593	25
3.5415	1.5854	.6308	25 ¹ / ₄
3.3934	1.6546	.6044	25 ¹ / ₂
3.2559	1.7245	.5799	25 ³ / ₄
3.1279	1.7950	.5571	26
3.0085	1.8663	.5358	26 ¹ / ₄
2.8968	1.9382	.5159	26 ¹ / ₂
2.7922	2.0108	.4973	26 ³ / ₄
2.6940	2.0841	.4798	27
2.6017	2.1581	.4634	27 ¹ / ₄
2.5147	2.2327	.4479	27 ¹ / ₂
2.4326	2.3080	.4333	27 ³ / ₄
2.3550	2.3841	.4195	28
2.2816	2.4608	.4064	28 ¹ / ₄
2.2121	2.5381	.3940	28 ¹ / ₂
2.1461	2.6162	.3822	28 ³ / ₄
2.0834	2.6949	.3711	29
2.0237	2.7744	.3604	29 ¹ / ₄
1.9669	2.8545	.3503	29 ¹ / ₂
1.9128	2.9353	.3407	29 ³ / ₄
1.8611	3.0167	.3315	30

**Note: No allowance made for couplings.

**Casing Size
O.D. 20"
20.000"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
21	1.6728	.5978	.0398
21 ¹ / ₈	1.8876	.5298	.0449
21 ¹ / ₄	2.1037	.4753	.0501
21 ³ / ₈	2.3211	.4308	.0553
21 ¹ / ₂	2.5398	.3937	.0605
21 ⁵ / ₈	2.7597	.3624	.0657
21 ³ / ₄	2.9809	.3355	.0710
21 ⁷ / ₈	3.2034	.3122	.0763
22	3.4272	.2918	.0816
22 ¹ / ₈	3.6522	.2738	.0870
22 ¹ / ₄	3.8785	.2578	.0923
22 ³ / ₈	4.1061	.2435	.0978
22 ¹ / ₂	4.3350	.2307	.1032
22 ⁵ / ₈	4.5651	.2191	.1087
22 ³ / ₄	4.7965	.2085	.1142
22 ⁷ / ₈	5.0292	.1988	.1197
23	5.2632	.1900	.1253
23 ¹ / ₈	5.4984	.1819	.1309
23 ¹ / ₄	5.7349	.1744	.1365
23 ³ / ₈	5.9727	.1674	.1422
23 ¹ / ₂	6.2118	.1610	.1479
23 ⁵ / ₈	6.4521	.1550	.1536
23 ³ / ₄	6.6937	.1494	.1594
23 ⁷ / ₈	6.9366	.1442	.1652
24	7.1808	.1393	.1710
24 ¹ / ₄	7.6729	.1303	.1827
24 ¹ / ₂	8.1702	.1224	.1945
24 ³ / ₄	8.6725	.1153	.2065
25	9.1800	.1089	.2186
25 ¹ / ₄	9.6925	.1032	.2308
25 ¹ / ₂	10.2102	.0979	.2431
25 ³ / ₄	10.7329	.0932	.2555
26	11.2608	.0888	.2681
26 ¹ / ₄	11.7937	.0848	.2808
26 ¹ / ₂	12.3318	.0811	.2936
26 ³ / ₄	12.8749	.0777	.3065
27	13.4232	.0745	.3196
27 ¹ / ₄	13.9765	.0715	.3328
27 ¹ / ₂	14.5350	.0688	.3461
27 ³ / ₄	15.0985	.0662	.3595
28	15.6672	.0638	.3730
28 ¹ / ₄	16.2409	.0616	.3867
28 ¹ / ₂	16.8198	.0595	.4005
28 ³ / ₄	17.4037	.0575	.4144
29	17.9928	.0556	.4284
29 ¹ / ₄	18.5869	.0538	.4425
29 ¹ / ₂	18.1862	.0521	.4568
29 ³ / ₄	19.7905	.0505	.4712
30	20.4000	.0490	.4857

NO.122-B

Casing Size
O.D. 20"
20.000"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
25.1077	.2236	4.4719	21
22.2501	.2523	3.9629	21 $\frac{1}{8}$
19.9644	.2812	3.5558	21 $\frac{1}{4}$
18.0946	.3103	3.2228	21 $\frac{3}{8}$
16.5368	.3395	2.9453	21 $\frac{1}{2}$
15.2189	.3689	2.7106	21 $\frac{5}{8}$
14.0895	.3985	2.5094	21 $\frac{3}{4}$
13.1109	.4282	2.3352	21 $\frac{7}{8}$
12.2549	.4581	2.1827	22
11.4998	.4882	2.0482	22 $\frac{1}{8}$
10.8288	.5185	1.9287	22 $\frac{1}{4}$
10.2286	.5489	1.8218	22 $\frac{3}{8}$
9.6886	.5795	1.7256	22 $\frac{1}{2}$
9.2002	.6103	1.6386	22 $\frac{5}{8}$
8.7563	.6412	1.5596	22 $\frac{3}{4}$
8.3512	.6723	1.4874	22 $\frac{7}{8}$
7.9800	.7036	1.4213	23
7.6386	.7350	1.3605	23 $\frac{1}{8}$
7.3235	.7666	1.3044	23 $\frac{1}{4}$
7.0320	.7984	1.2524	23 $\frac{3}{8}$
6.7613	.8304	1.2042	23 $\frac{1}{2}$
6.5095	.8625	1.1594	23 $\frac{5}{8}$
6.2745	.8948	1.1175	23 $\frac{3}{4}$
6.0548	.9273	1.0784	23 $\frac{7}{8}$
5.8489	.9599	1.0417	24
5.4738	1.0257	.9749	24 $\frac{1}{4}$
5.1406	1.0922	.9156	24 $\frac{1}{2}$
4.8429	1.1593	.8626	24 $\frac{3}{4}$
4.5752	1.2272	.8149	25
4.3332	1.2957	.7718	25 $\frac{1}{4}$
4.1135	1.3649	.7327	25 $\frac{1}{2}$
3.9132	1.4348	.6970	25 $\frac{3}{4}$
3.7298	1.5053	.6643	26
3.5612	1.5766	.6343	26 $\frac{1}{4}$
3.4058	1.6485	.6066	26 $\frac{1}{2}$
3.2622	1.7211	.5810	26 $\frac{3}{4}$
3.1289	1.7944	.5573	27
3.0050	1.8684	.5352	27 $\frac{1}{4}$
2.8896	1.9430	.5147	27 $\frac{1}{2}$
2.7817	2.0184	.4954	27 $\frac{3}{4}$
2.6808	2.0944	.4775	28
2.5861	2.1711	.4606	28 $\frac{1}{4}$
2.4971	2.2485	.4447	28 $\frac{1}{2}$
2.4133	2.3265	.4298	28 $\frac{3}{4}$
2.3343	2.4053	.4158	29
2.2597	2.4847	.4025	29 $\frac{1}{4}$
2.1891	2.5648	.3899	29 $\frac{1}{2}$
2.1222	2.6456	.3780	29 $\frac{3}{4}$
2.0588	2.7271	.3667	30

**Note: No allowance made for couplings.

Casing Size***O.D. 21½"****21.500"**
TABLE
VOLUME & HEIGHT

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
22	.8874	1.1269	.0211
22 ¹ / ₈	1.1124	.8989	.0265
22 ¹ / ₄	1.3387	.7470	.0319
22 ³ / ₈	1.5663	.6384	.0373
22 ¹ / ₂	1.7952	.5570	.0427
22 ⁵ / ₈	2.0253	.4937	.0482
22 ³ / ₄	2.2567	.4431	.0537
22 ⁷ / ₈	2.4894	.4017	.0593
23	2.7234	.3672	.0648
23 ¹ / ₈	2.9586	.3380	.0704
23 ¹ / ₄	3.1951	.3130	.0761
23 ³ / ₈	3.4329	.2913	.0817
23 ¹ / ₂	3.6720	.2723	.0874
23 ⁵ / ₈	3.9123	.2556	.0932
23 ³ / ₄	4.1539	.2407	.0989
23 ⁷ / ₈	4.3968	.2274	.1047
24	4.6410	.2155	.1105
24 ¹ / ₄	5.1331	.1948	.1222
24 ¹ / ₂	5.6304	.1776	.1341
24 ³ / ₄	6.1327	.1631	.1460
25	6.6402	.1506	.1581
25 ¹ / ₄	7.1527	.1398	.1703
25 ¹ / ₂	7.6704	.1304	.1826
25 ³ / ₄	8.1931	.1221	.1951
26	8.7210	.1147	.2076
26 ¹ / ₄	9.2539	.1081	.2203
26 ¹ / ₂	9.7920	.1021	.2331
26 ³ / ₄	10.3351	.0968	.2461
27	10.8834	.0919	.2591
27 ¹ / ₄	11.4367	.0874	.2723
27 ¹ / ₂	11.9952	.0834	.2856
27 ³ / ₄	12.5587	.0796	.2990
28	13.1274	.0762	.3126
28 ¹ / ₄	13.7011	.0730	.3262
28 ¹ / ₂	14.2800	.0700	.3400
28 ³ / ₄	14.8639	.0673	.3539
29	15.4530	.0647	.3679
29 ¹ / ₄	16.0471	.0623	.3821
29 ¹ / ₂	16.6464	.0601	.3963
29 ³ / ₄	17.2507	.0580	.4107
30	17.8602	.0560	.4252
30 ¹ / ₄	18.4747	.0541	.4399
30 ¹ / ₂	19.0944	.0524	.4546
30 ³ / ₄	19.7191	.0507	.4695
31	20.3490	.0491	.4845
31 ¹ / ₄	20.9839	.0477	.4996
31 ¹ / ₂	21.6239	.0462	.5149
31 ³ / ₄	22.2691	.0449	.5302
32	22.9193	.0436	.5457

NO.122-B

Casing Size
*O.D. 21 $\frac{1}{2}$ "
21.500"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
47.3294	.1186	8.4297	22
37.7550	.1487	6.7245	22 $\frac{1}{8}$
31.3726	.1790	5.5877	22 $\frac{1}{4}$
26.8142	.2094	4.7758	22 $\frac{3}{8}$
23.3958	.2400	4.1670	22 $\frac{1}{2}$
20.7373	.2707	3.6935	22 $\frac{5}{8}$
18.6109	.3017	3.3147	22 $\frac{3}{4}$
16.8713	.3328	3.0049	22 $\frac{7}{8}$
15.4219	.3641	2.7468	23
14.1958	.3955	2.5284	23 $\frac{1}{8}$
13.1450	.4271	2.3412	23 $\frac{1}{4}$
12.2344	.4589	2.1790	23 $\frac{3}{8}$
11.4379	.4909	2.0372	23 $\frac{1}{2}$
10.7353	.5230	1.9120	23 $\frac{5}{8}$
10.1109	.5553	1.8008	23 $\frac{3}{4}$
9.5523	.5878	1.7013	23 $\frac{7}{8}$
9.0498	.6204	1.6118	24
8.1821	.6862	1.4573	24 $\frac{1}{4}$
7.4595	.7527	1.3286	24 $\frac{1}{2}$
6.8485	.8198	1.2198	24 $\frac{3}{4}$
6.3251	.8877	1.1266	25
5.8719	.9562	1.0458	25 $\frac{1}{4}$
5.4756	1.0254	.9752	25 $\frac{1}{2}$
5.1262	1.0953	.9130	25 $\frac{3}{4}$
4.8160	1.1658	.8578	26
4.5386	1.2371	.8084	26 $\frac{1}{4}$
4.2892	1.3090	.7639	26 $\frac{1}{2}$
4.0638	1.3816	.7238	26 $\frac{3}{4}$
3.8591	1.4549	.6873	27
3.6724	1.5289	.6541	27 $\frac{1}{4}$
3.5014	1.6035	.6236	27 $\frac{1}{2}$
3.3443	1.6789	.5956	27 $\frac{3}{4}$
3.1994	1.7549	.5698	28
3.0654	1.8316	.5460	28 $\frac{1}{4}$
2.9412	1.9090	.5238	28 $\frac{1}{2}$
2.8256	1.9870	.5033	28 $\frac{3}{4}$
2.7179	2.0658	.4841	29
2.6173	2.1452	.4662	29 $\frac{1}{4}$
2.5231	2.2253	.4494	29 $\frac{1}{2}$
2.4347	2.3061	.4336	29 $\frac{3}{4}$
2.3516	2.3876	.4188	30
2.2734	2.4697	.4049	30 $\frac{1}{4}$
2.1996	2.5525	.3918	30 $\frac{1}{2}$
2.1299	2.6361	.3794	30 $\frac{3}{4}$
2.0640	2.7203	.3676	31
2.0015	2.8051	.3565	31 $\frac{1}{4}$
1.9423	2.8907	.3459	31 $\frac{1}{2}$
1.8860	2.9769	.3359	31 $\frac{3}{4}$
1.8325	3.0639	.3264	32

**Note: No allowance made for couplings.

Casing Size
***O.D. 24½"**
24.500"

TABLE
VOLUME & HEIGHT

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
25	1.0098	.9903	.0240
25⅛	1.2654	.7902	.0301
25⅓₄	1.5223	.6569	.0362
25⅔₈	1.7805	.5616	.0424
25½	2.0400	.4902	.0486
25⅝₈	2.3007	.4346	.0548
25⅗₄	2.5627	.3902	.0610
25⅞₈	2.8260	.3539	.0673
26	3.0906	.3236	.0736
26⅓₄	3.6235	.2760	.0863
26½	4.1616	.2403	.0991
26⅝₄	4.7047	.2126	.1120
27	5.2530	.1904	.1251
27⅓₄	5.8063	.1722	.1382
27½	6.3648	.1571	.1515
27⅝₄	6.9283	.1443	.1650
28	7.4970	.1334	.1785
28⅓₄	8.0707	.1239	.1922
28½	8.6496	.1156	.2059
28⅝₄	9.2335	.1083	.2198
29	9.8226	.1018	.2339
29⅓₄	10.4167	.0960	.2480
29½	11.0160	.0908	.2623
29⅝₄	11.6203	.0861	.2767
30	12.2298	.0818	.2912
30⅓₄	12.8443	.0779	.3058
30½	13.4640	.0743	.3206
30⅝₄	14.0887	.0710	.3354
31	14.7186	.0679	.3504
31⅓₄	15.3535	.0651	.3656
31½	15.9936	.0625	.3808
31⅝₄	16.6387	.0601	.3962
32	17.2890	.0578	.4116
32⅓₄	17.9443	.0557	.4272
32½	18.6048	.0537	.4430
32⅝₄	19.2703	.0519	.4588
33	19.9410	.0501	.4748
33⅓₄	20.6167	.0485	.4909
33½	21.2976	.0470	.5071
33⅝₄	21.9835	.0455	.5234
34	22.6745	.0441	.5399
34⅓₄	23.3707	.0428	.5564
34½	24.0719	.0415	.5731
34⅝₄	24.7783	.0404	.5900
35	25.4897	.0392	.6069
35⅓₄	26.2063	.0382	.6240
35½	26.9279	.0371	.6411
35⅝₄	27.6547	.0362	.6584
36	28.3865	.0352	.6759

NO.122-B

Casing Size
***O.D. 24 $\frac{1}{2}$ "**
24.500"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
41.5925	.1350	7.4079	25
33.1902	.1692	5.9114	25 $\frac{1}{8}$
27.5890	.2035	4.9138	25 $\frac{1}{4}$
23.5884	.2380	4.2013	25 $\frac{3}{8}$
20.5883	.2727	3.6669	25 $\frac{1}{2}$
18.2551	.3076	3.2514	25 $\frac{5}{8}$
16.3887	.3426	2.9189	25 $\frac{3}{4}$
14.8618	.3778	2.6470	25 $\frac{7}{8}$
13.5896	.4132	2.4204	26
11.5909	.4844	2.0644	26 $\frac{1}{4}$
10.0923	.5563	1.7975	26 $\frac{1}{2}$
8.9272	.6289	1.5900	26 $\frac{3}{4}$
7.9954	.7022	1.4241	27
7.2335	.7762	1.2883	27 $\frac{1}{4}$
6.5988	.8508	1.1753	27 $\frac{1}{2}$
6.0621	.9262	1.0797	27 $\frac{3}{4}$
5.6023	1.0022	.9978	28
5.2040	1.0789	.9269	28 $\frac{1}{4}$
4.8557	1.1563	.8648	28 $\frac{1}{2}$
4.5486	1.2343	.8101	28 $\frac{3}{4}$
4.2759	1.3131	.7616	29
4.0320	1.3925	.7181	29 $\frac{1}{4}$
3.8126	1.4726	.6791	29 $\frac{1}{2}$
3.6144	1.5534	.6437	29 $\frac{3}{4}$
3.4342	1.6349	.6117	30
3.2699	1.7170	.5824	30 $\frac{1}{4}$
3.1194	1.7999	.5556	30 $\frac{1}{2}$
2.9811	1.8834	.5310	30 $\frac{3}{4}$
2.8535	1.9676	.5082	31
2.7355	2.0525	.4872	31 $\frac{1}{4}$
2.6261	2.1380	.4677	31 $\frac{1}{2}$
2.5242	2.2243	.4496	31 $\frac{3}{4}$
2.4293	2.3112	.4327	32
2.3406	2.3988	.4169	32 $\frac{1}{4}$
2.2575	2.4871	.4021	32 $\frac{1}{2}$
2.1795	2.5761	.3882	32 $\frac{3}{4}$
2.1062	2.6657	.3751	33
2.0372	2.7561	.3628	33 $\frac{1}{4}$
1.9721	2.8471	.3512	33 $\frac{1}{2}$
1.9105	2.9388	.3403	33 $\frac{3}{4}$
1.8523	3.0311	.3299	34
1.7971	3.1242	.3201	34 $\frac{1}{4}$
1.7448	3.2180	.3108	34 $\frac{1}{2}$
1.6950	3.3124	.3019	34 $\frac{3}{4}$
1.6477	3.4075	.2935	35
1.6027	3.5033	.2854	35 $\frac{1}{4}$
1.5597	3.5997	.2778	35 $\frac{1}{2}$
1.5187	3.6969	.2705	35 $\frac{3}{4}$
1.4796	3.7947	.2635	36

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 2.375"**

**TABLE
VOLUME & HEIGHT BETWEEN**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
3 ¹ / ₂	.2697	3.7083	.0064
3 ⁵ / ₈	.3060	3.2680	.0073
3 ³ / ₄	.3436	2.9103	.0082
3 ⁷ / ₈	.3825	2.6144	.0091
4	.4227	2.3660	.0101
4 ¹ / ₈	.4641	2.1547	.0110
4 ¹ / ₄	.5068	1.9731	.0121
4 ³ / ₈	.5508	1.8155	.0131
4 ¹ / ₂	.5961	1.6777	.0142
4 ⁵ / ₈	.6426	1.5562	.0153
4 ³ / ₄	.6904	1.4484	.0164
4 ⁷ / ₈	.7395	1.3523	.0176
5	.7899	1.2660	.0188
5 ¹ / ₈	.8415	1.1884	.0200
5 ¹ / ₄	.8944	1.1181	.0213
5 ³ / ₈	.9486	1.0542	.0226
5 ¹ / ₂	1.0041	.9960	.0239
5 ⁵ / ₈	1.0608	.9427	.0253
5 ³ / ₄	1.1188	.8938	.0266
5 ⁷ / ₈	1.1781	.8488	.0280
6	1.2387	.8073	.0295
6 ¹ / ₈	1.3005	.7689	.0310
6 ¹ / ₄	1.3636	.7333	.0325
6 ³ / ₈	1.4280	.7003	.0340
6 ¹ / ₂	1.4937	.6695	.0356
6 ⁵ / ₈	1.5606	.6408	.0372
6 ³ / ₄	1.6288	.6139	.0388
6 ⁷ / ₈	1.6983	.5888	.0404
7	1.7691	.5653	.0421
7 ¹ / ₈	1.8411	.5432	.0438
7 ¹ / ₄	1.9144	.5224	.0456
7 ³ / ₈	1.9890	.5028	.0474
7 ¹ / ₂	2.0649	.4843	.0492
7 ⁵ / ₈	2.1420	.4669	.0510
7 ³ / ₄	2.2204	.4504	.0529
7 ⁷ / ₈	2.3001	.4348	.0548
8	2.3811	.4200	.0567
8 ¹ / ₈	2.4633	.4060	.0586
8 ¹ / ₄	2.5468	.3926	.0606
8 ³ / ₈	2.6316	.3800	.0627
8 ¹ / ₂	2.7177	.3680	.0647
8 ⁵ / ₈	2.8050	.3565	.0668
8 ³ / ₄	2.8936	.3456	.0689
8 ⁷ / ₈	2.9835	.3352	.0710
9	3.0747	.3252	.0732
9 ¹ / ₈	3.1671	.3157	.0754
9 ¹ / ₄	3.2608	.3067	.0776
9 ³ / ₈	3.3558	.2980	.0799
9 ¹ / ₂	3.4521	.2897	.0822

NO.122-A

Drill Pipe Size
O.D. 2.375"**DRILL PIPE & HOLE****

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
155.7506	.0360	27.7404	3½
137.2552	.0409	24.4462	3⁹/₁₆
122.2310	.0459	21.7703	3³/₄
109.8042	.0511	19.5570	3⁷/₈
99.3703	.0565	17.6986	4
90.4979	.0620	16.1184	4¹/₈
82.8711	.0678	14.7600	4¹/₄
76.2529	.0736	13.5812	4³/₈
70.4626	.0797	12.5499	4½
65.3596	.0859	11.6410	4⁹/₁₆
60.8333	.0923	10.8349	4³/₄
56.7953	.0989	10.1157	4⁷/₈
53.1739	.1056	9.4707	5
49.9110	.1125	8.8895	5¹/₈
46.9583	.1196	8.3636	5¹/₄
44.2759	.1268	7.8859	5³/₈
41.8302	.1342	7.4503	5½
39.5929	.1418	7.0518	5⁹/₈
37.5399	.1496	6.6861	5³/₄
35.6507	.1575	6.3497	5⁷/₈
33.9076	.1656	6.0392	6
32.2953	.1739	5.7520	6¹/₈
30.8006	.1823	5.4858	6¹/₄
29.4118	.1909	5.2385	6³/₈
28.1189	.1997	5.0082	6½
26.9128	.2086	4.7934	6⁹/₈
25.7857	.2177	4.5926	6³/₄
24.7307	.2270	4.4047	6⁷/₈
23.7414	.2365	4.2285	7
22.8125	.2461	4.0631	7¹/₈
21.9389	.2559	3.9075	7¹/₄
21.1162	.2659	3.7610	7³/₈
20.3404	.2760	3.6228	7½
19.6079	.2863	3.4923	7⁹/₈
18.9154	.2968	3.3690	7³/₄
18.2601	.3075	3.2523	7⁷/₈
17.6392	.3183	3.1417	8
17.0503	.3293	3.0368	8¹/₈
16.4912	.3405	2.9372	8¹/₄
15.9599	.3518	2.8426	8³/₈
15.4545	.3633	2.7526	8½
14.9733	.3750	2.6669	8³/₈
14.5148	.3868	2.5852	8³/₄
14.0775	.3988	2.5073	8⁷/₈
13.6601	.4110	2.4330	9
13.2614	.4234	2.3620	9¹/₈
12.8803	.4359	2.2941	9¹/₄
12.5157	.4486	2.2291	9³/₈
12.1667	.4615	2.1670	9½

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 2.875"**

**TABLE
VOLUME & HEIGHT BETWEEN**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
3 ¹ / ₂	.1626	6.1515	.0039
3 ⁵ / ₈	.1989	5.0277	.0047
3 ³ / ₄	.2365	4.2281	.0056
3 ⁷ / ₈	.2754	3.6311	.0066
4	.3156	3.1690	.0075
4 ¹ / ₈	.3570	2.8011	.0085
4 ¹ / ₄	.3997	2.5018	.0095
4 ³ / ₈	.4437	2.2538	.0106
4 ¹ / ₂	.4890	2.0452	.0116
4 ⁵ / ₈	.5355	1.8674	.0127
4 ³ / ₄	.5833	1.7144	.0139
4 ⁷ / ₈	.6324	1.5813	.0151
5	.6828	1.4646	.0163
5 ¹ / ₈	.7344	1.3617	.0175
5 ¹ / ₄	.7873	1.2701	.0187
5 ³ / ₈	.8415	1.1884	.0200
5 ¹ / ₂	.8970	1.1149	.0214
5 ⁵ / ₈	.9537	1.0486	.0227
5 ³ / ₄	1.0117	.9884	.0241
5 ⁷ / ₈	1.0710	.9337	.0255
6	1.1316	.8837	.0269
6 ¹ / ₈	1.1934	.8379	.0284
6 ¹ / ₄	1.2565	.7959	.0299
6 ³ / ₈	1.3209	.7571	.0314
6 ¹ / ₂	1.3866	.7212	.0330
6 ⁵ / ₈	1.4535	.6880	.0346
6 ³ / ₄	1.5217	.6572	.0362
6 ⁷ / ₈	1.5912	.6285	.0379
7	1.6620	.6017	.0396
7 ¹ / ₈	1.7340	.5767	.0413
7 ¹ / ₄	1.8073	.5533	.0430
7 ³ / ₈	1.8819	.5314	.0448
7 ¹ / ₂	1.9578	.5108	.0466
7 ⁵ / ₈	2.0349	.4914	.0484
7 ³ / ₄	2.1133	.4732	.0503
7 ⁷ / ₈	2.1930	.4560	.0522
8	2.2740	.4398	.0541
8 ¹ / ₈	2.3562	.4244	.0561
8 ¹ / ₄	2.4397	.4099	.0581
8 ³ / ₈	2.5245	.3961	.0601
8 ¹ / ₂	2.6106	.3831	.0622
8 ⁵ / ₈	2.6979	.3707	.0642
8 ³ / ₄	2.7865	.3589	.0663
8 ⁷ / ₈	2.8764	.3477	.0685
9	2.9676	.3370	.0707
9 ¹ / ₈	3.0600	.3268	.0729
9 ¹ / ₄	3.1537	.3171	.0751
9 ³ / ₈	3.2487	.3078	.0773
9 ¹ / ₂	3.3450	.2990	.0796

NO.122-A

Drill Pipe Size
O.D. 2.875"**DRILL PIPE & HOLE****

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
258.3628	.0217	46.0164	3½
211.1619	.0266	37.6095	3⁹/₈
177.5809	.0316	31.6285	3³/₄
152.5058	.0368	27.1624	3⁷/₈
133.0960	.0422	23.7054	4
117.6473	.0477	20.9539	4¹/₈
105.0758	.0534	18.7148	4¹/₄
94.6588	.0593	16.8594	4³/₈
85.8964	.0654	15.2988	4¹/₂
78.4316	.0716	13.9693	4⁵/₈
72.0027	.0780	12.8242	4³/₄
66.4138	.0845	11.8288	4⁷/₈
61.5149	.0913	10.9563	5
57.1897	.0982	10.1859	5¹/₈
53.3462	.1052	9.5014	5¹/₄
49.9110	.1125	8.8895	5³/₈
46.8248	.1199	8.3399	5½
44.0391	.1275	7.8437	5⁵/₈
41.5139	.1352	7.3939	5³/₄
39.2158	.1432	6.9846	5⁷/₈
37.1169	.1513	6.6108	6
35.1936	.1595	6.2683	6¹/₈
33.4259	.1680	5.9534	6¹/₄
31.7966	.1766	5.6632	6³/₈
30.2908	.1854	5.3950	6½
28.8958	.1943	5.1466	6⁵/₈
27.6005	.2034	4.9159	6³/₄
26.3952	.2127	4.7012	6⁷/₈
25.2714	.2222	4.5010	7
24.2215	.2318	4.3140	7¹/₈
23.2390	.2416	4.1390	7¹/₄
22.3179	.2516	3.9750	7³/₈
21.4531	.2617	3.8210	7¹/₂
20.6399	.2720	3.6761	7⁵/₈
19.8741	.2825	3.5397	7³/₄
19.1519	.2923	3.4111	7⁷/₈
18.4700	.3040	3.2896	8
17.8254	.3150	3.1748	8¹/₈
17.2152	.3261	3.0662	8¹/₄
16.6370	.3375	2.9632	8³/₈
16.0885	.3490	2.8655	8¹/₂
15.5677	.3607	2.7727	8⁵/₈
15.0726	.3725	2.6846	8³/₄
14.6016	.3845	2.6007	8⁷/₈
14.1531	.3967	2.5208	9
13.7255	.4091	2.4446	9¹/₈
13.3177	.4216	2.3720	9¹/₄
12.9283	.4343	2.3026	9³/₈
12.5562	.4472	2.2364	9½

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 3.500"**

**TABLE
VOLUME & HEIGHT BETWEEN**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4	.1530	6.5360	.0036
4 ¹ / ₈	.1944	5.1431	.0046
4 ¹ / ₄	.2371	4.2168	.0056
4 ³ / ₈	.2811	3.5570	.0067
4 ¹ / ₂	.3264	3.0637	.0078
4 ⁵ / ₈	.3729	2.6814	.0089
4 ³ / ₄	.4207	2.3767	.0100
4 ⁷ / ₈	.4698	2.1284	.0112
5	.5202	1.9223	.0124
5 ¹ / ₈	.5718	1.7488	.0136
5 ¹ / ₄	.6247	1.6006	.0149
5 ³ / ₈	.6789	1.4729	.0162
5 ¹ / ₂	.7344	1.3617	.0175
5 ⁵ / ₈	.7911	1.2640	.0188
5 ³ / ₄	.8491	1.1777	.0202
5 ⁷ / ₈	.9084	1.1008	.0216
6	.9690	1.0320	.0231
6 ¹ / ₈	1.0308	.9701	.0245
6 ¹ / ₄	1.0939	.9141	.0260
6 ³ / ₈	1.1583	.8633	.0267
6 ¹ / ₂	1.2240	.8170	.0291
6 ⁵ / ₈	1.2909	.7746	.0307
6 ³ / ₄	1.3591	.7358	.0324
6 ⁷ / ₈	1.4286	.7000	.0340
7	1.4994	.6669	.0357
7 ¹ / ₈	1.5714	.6364	.0374
7 ¹ / ₄	1.6447	.6080	.0392
7 ³ / ₈	1.7193	.5816	.0409
7 ¹ / ₂	1.7952	.5570	.0427
7 ⁵ / ₈	1.8723	.5341	.0484
7 ³ / ₄	1.9507	.5126	.0446
7 ⁷ / ₈	2.0304	.4925	.0483
8	2.1114	.4736	.0503
8 ¹ / ₈	2.1936	.4559	.0522
8 ¹ / ₄	2.2771	.4391	.0542
8 ³ / ₈	2.3619	.4234	.0562
8 ¹ / ₂	2.4480	.4085	.0583
8 ⁵ / ₈	2.5353	.3944	.0604
8 ³ / ₄	2.6239	.3811	.0625
8 ⁷ / ₈	2.7138	.3685	.0646
9	2.8050	.3565	.0668
9 ¹ / ₈	2.8974	.3451	.0690
9 ¹ / ₄	2.9911	.3343	.0712
9 ³ / ₈	3.0861	.3240	.0735
9 ¹ / ₂	3.1824	.3142	.0758
9 ⁵ / ₈	3.2799	.3049	.0781
9 ³ / ₄	3.3787	.2960	.0804
9 ⁷ / ₈	3.4788	.2875	.0828
10	3.5802	.2793	.0852

NO.122-A

Drill Pipe Size
O.D. 3.500"**DRILL PIPE & HOLE****

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
274.5104	.0205	48.8924	4
216.0082	.0260	38.4727	4 $\frac{1}{8}$
177.1035	.0317	31.5435	4 $\frac{1}{4}$
149.3934	.0376	26.6081	4 $\frac{3}{8}$
128.6768	.0436	22.9183	4 $\frac{1}{2}$
112.6197	.0499	20.0584	4 $\frac{5}{8}$
99.8220	.0562	17.7791	4 $\frac{3}{4}$
89.3928	.0628	15.9215	4 $\frac{7}{8}$
80.7384	.0695	14.3801	5
73.4476	.0764	13.0816	5 $\frac{1}{8}$
67.2270	.0835	11.9736	5 $\frac{1}{4}$
61.8615	.0908	11.0180	5 $\frac{3}{8}$
57.1897	.0982	10.1859	5 $\frac{1}{2}$
53.0882	.1058	9.4454	5 $\frac{5}{8}$
49.4613	.1135	8.8094	5 $\frac{3}{4}$
46.2333	.1214	8.2345	5 $\frac{7}{8}$
43.3438	.1295	7.7199	6
40.7437	.1378	7.2568	6 $\frac{1}{8}$
38.3931	.1462	6.8381	6 $\frac{1}{4}$
36.2589	.1548	6.4580	6 $\frac{3}{8}$
34.3138	.1636	6.1115	6 $\frac{1}{2}$
32.5346	.1726	5.7947	6 $\frac{5}{8}$
30.9017	.1817	5.5038	6 $\frac{3}{4}$
29.3987	.1910	5.2361	6 $\frac{7}{8}$
28.0113	.2004	4.9890	7
26.7272	.2101	4.7603	7 $\frac{1}{8}$
25.5359	.2199	4.5481	7 $\frac{1}{4}$
24.4281	.2298	4.3508	7 $\frac{3}{8}$
23.3958	.2400	4.1670	7 $\frac{1}{2}$
22.4319	.2503	3.9953	7 $\frac{5}{8}$
21.5302	.2608	3.8347	7 $\frac{3}{4}$
20.6852	.2714	3.6842	7 $\frac{7}{8}$
19.8921	.2823	3.5429	8
19.1463	.2932	3.4101	8 $\frac{1}{8}$
18.4442	.3044	3.2850	8 $\frac{1}{4}$
17.7821	.3157	3.1671	8 $\frac{3}{8}$
17.1569	.3272	3.0558	8 $\frac{1}{2}$
16.5659	.3389	2.9505	8 $\frac{5}{8}$
16.0064	.3508	2.8509	8 $\frac{3}{4}$
15.4763	.3628	2.7564	8 $\frac{7}{8}$
14.9733	.3750	2.6669	9
14.4956	.3873	2.5818	9 $\frac{1}{8}$
14.0415	.3999	2.5009	9 $\frac{1}{4}$
13.6093	.4126	2.4239	9 $\frac{3}{8}$
13.1976	.4254	2.3506	9 $\frac{1}{2}$
12.8052	.4385	2.2807	9 $\frac{5}{8}$
12.4307	.4517	2.2140	9 $\frac{3}{4}$
12.0730	.4651	2.1503	9 $\frac{7}{8}$
11.7312	.4786	2.0894	10

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 4.000"**

**TABLE
VOLUME & HEIGHT BETWEEN**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 ¹ / ₄	.0841	11.8836	.0020
4 ³ / ₈	.1281	7.8041	.0031
4 ¹ / ₂	.1734	5.7670	.0041
4 ⁵ / ₈	.2199	4.5468	.0052
4 ³ / ₄	.2677	3.7348	.0064
4 ⁷ / ₈	.3168	3.1562	.0075
5	.3672	2.7233	.0087
5 ¹ / ₈	.4188	2.3876	.0100
5 ¹ / ₄	.4717	2.1198	.0112
5 ³ / ₈	.5259	1.9014	.0125
5 ¹ / ₂	.5814	1.7200	.0138
5 ⁵ / ₈	.6381	1.5671	.0152
5 ³ / ₄	.6961	1.4365	.0166
5 ⁷ / ₈	.7554	1.3237	.0180
6	.8160	1.2255	.0194
6 ¹ / ₈	.8778	1.1392	.0209
6 ¹ / ₄	.9409	1.0628	.0224
6 ³ / ₈	1.0053	.9947	.0239
6 ¹ / ₂	1.0710	.9337	.0255
6 ⁵ / ₈	1.1379	.8788	.0271
6 ³ / ₄	1.2061	.8291	.0287
6 ⁷ / ₈	1.2756	.7839	.0304
7	1.3464	.7427	.0321
7 ¹ / ₈	1.4184	.7050	.0338
7 ¹ / ₄	1.4917	.6704	.0355
7 ³ / ₈	1.5663	.6384	.0373
7 ¹ / ₂	1.6422	.6089	.0391
7 ⁵ / ₈	1.7193	.5816	.0409
7 ³ / ₄	1.7977	.5563	.0428
7 ⁷ / ₈	1.8774	.5326	.0447
8	1.9584	.5106	.0466
8 ¹ / ₈	2.0406	.4900	.0486
8 ¹ / ₄	2.1241	.4708	.0506
8 ³ / ₈	2.2089	.4527	.0526
8 ¹ / ₂	2.2950	.4357	.0546
8 ⁵ / ₈	2.3823	.4198	.0567
8 ³ / ₄	2.4709	.4047	.0588
8 ⁷ / ₈	2.5608	.3905	.0610
9	2.6520	.3771	.0631
9 ¹ / ₈	2.7444	.3644	.0653
9 ¹ / ₄	2.8381	.3523	.0676
9 ³ / ₈	2.9331	.3409	.0698
9 ¹ / ₂	3.0294	.3301	.0721
9 ⁵ / ₈	3.1269	.3198	.0745
9 ³ / ₄	3.2257	.3100	.0768
9 ⁷ / ₈	3.3258	.3007	.0792
10	3.4272	.2918	.0816

NO.122-A

Drill Pipe Size
O.D. 4.000"**DRILL PIPE & HOLE****

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
499.1100	.0112	88.8953	4 ¹ / ₄
327.7737	.0171	58.3790	4 ³ / ₈
242.2151	.0232	43.1403	4 ¹ / ₂
190.9638	.0294	34.0121	4 ⁵ / ₈
156.8631	.0358	27.9385	4 ³ / ₄
132.5604	.0424	23.6100	4 ⁷ / ₈
114.3794	.0491	20.3718	5
100.2778	.0560	17.8602	5 ¹ / ₈
89.0304	.0631	15.8570	5 ¹ / ₄
79.8576	.0703	14.2232	5 ³ / ₈
72.2396	.0777	12.8664	5 ¹ / ₂
65.8167	.0853	11.7225	5 ⁵ / ₈
60.3320	.0931	10.7456	5 ³ / ₄
55.5971	.1010	9.9023	5 ⁷ / ₈
51.4707	.1091	9.1673	6
47.8450	.1173	8.5216	6 ¹ / ₈
44.6358	.1258	7.9500	6 ¹ / ₄
41.7771	.1344	7.4408	6 ³ / ₈
39.2158	.1432	6.9846	6 ¹ / ₂
36.9090	.1521	6.5738	6 ⁵ / ₈
34.8216	.1612	6.2020	6 ³ / ₄
32.9248	.1705	5.8642	6 ⁷ / ₈
31.1944	.1800	5.5560	7
29.6101	.1896	5.2738	7 ¹ / ₈
28.1549	.1994	5.0146	7 ¹ / ₄
26.8142	.2094	4.7758	7 ³ / ₈
25.5755	.2195	4.5552	7 ¹ / ₂
24.4281	.2298	4.3508	7 ⁵ / ₈
23.3626	.2403	4.1611	7 ³ / ₄
22.3710	.2510	3.9844	7 ⁷ / ₈
21.4461	.2618	3.8197	8
20.5819	.2728	3.6658	8 ¹ / ₈
19.7727	.2840	3.5217	8 ¹ / ₄
19.0137	.2953	3.3865	8 ³ / ₈
18.3007	.3068	3.2595	8 ¹ / ₂
17.6298	.3185	3.1400	8 ⁵ / ₈
16.9976	.3303	3.0274	8 ³ / ₄
16.4009	.3423	2.9211	8 ⁷ / ₈
15.8371	.3545	2.8207	9
15.3037	.3669	2.7257	9 ¹ / ₈
14.7984	.3794	2.6357	9 ¹ / ₄
14.3192	.3921	2.5504	9 ³ / ₈
13.8642	.4050	2.4693	9 ¹ / ₂
13.4317	.4180	2.3923	9 ⁵ / ₈
13.0203	.4312	2.3190	9 ³ / ₄
12.6284	.4446	2.2492	9 ⁷ / ₈
12.2549	.4581	2.1827	10

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 4 $\frac{1}{2}$ "
4.500"**

**TABLE NO. 122-A
VOLUME & HEIGHT BETWEEN**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5	.1938	5.1600	.0046
5 $\frac{1}{8}$.2454	4.0744	.0058
5 $\frac{1}{4}$.2983	3.3518	.0071
5 $\frac{3}{8}$.3525	2.8366	.0084
5 $\frac{1}{2}$.4080	2.4510	.0097
5 $\frac{5}{8}$.4647	2.1518	.0111
5 $\frac{3}{4}$.5227	1.9130	.0124
5 $\frac{7}{8}$.5820	1.7181	.0139
6	.6426	1.5562	.0153
6 $\frac{1}{8}$.7044	1.4196	.0168
6 $\frac{1}{4}$.7675	1.3029	.0183
6 $\frac{3}{8}$.8319	1.2020	.0198
6 $\frac{1}{2}$.8976	1.1141	.0214
6 $\frac{5}{8}$.9645	1.0368	.0230
6 $\frac{3}{4}$	1.0327	.9683	.0246
6 $\frac{7}{8}$	1.1022	.9072	.0262
7	1.1730	.8525	.0279
7 $\frac{1}{8}$	1.2450	.8032	.0296
7 $\frac{1}{4}$	1.3183	.7585	.0314
7 $\frac{3}{8}$	1.3929	.7179	.0332
7 $\frac{1}{2}$	1.4688	.6808	.0350
7 $\frac{5}{8}$	1.5459	.6469	.0368
7 $\frac{3}{4}$	1.6243	.6156	.0387
7 $\frac{7}{8}$	1.7040	.5868	.0406
8	1.7850	.5602	.0425
8 $\frac{1}{8}$	1.8672	.5356	.0445
8 $\frac{1}{4}$	1.9507	.5126	.0464
8 $\frac{3}{8}$	2.0355	.4913	.0485
8 $\frac{1}{2}$	2.1216	.4713	.0505
8 $\frac{5}{8}$	2.2089	.4527	.0526
8 $\frac{3}{4}$	2.2975	.4352	.0547
8 $\frac{7}{8}$	2.3874	.4189	.0568
9	2.4786	.4035	.0590
9 $\frac{1}{8}$	2.5710	.3889	.0612
9 $\frac{1}{4}$	2.6647	.3753	.0634
9 $\frac{3}{8}$	2.7597	.3624	.0657
9 $\frac{1}{2}$	2.8560	.3501	.0680
9 $\frac{5}{8}$	2.9535	.3386	.0703
9 $\frac{3}{4}$	3.0523	.3276	.0727
9 $\frac{7}{8}$	3.1524	.3172	.0751
10	3.2538	.3073	.0775
10 $\frac{1}{8}$	3.3564	.2979	.0799
10 $\frac{1}{4}$	3.4603	.2890	.0824
10 $\frac{3}{8}$	3.5655	.2805	.0849
10 $\frac{1}{2}$	3.6720	.2723	.0874
10 $\frac{5}{8}$	3.7797	.2646	.0900
10 $\frac{3}{4}$	3.8887	.2572	.0926
10 $\frac{7}{8}$	3.9990	.2501	.0952

Drill Pipe Size
O.D. 4 $\frac{1}{2}$ "
4.500"

AND NO. 122-B
{O.D. 4 $\frac{1}{2}$ "-4.500" Tubing } & HOLE**
(or 4 $\frac{1}{2}$ " O.D. 4.500" Casing)

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
216.7189	.0259	38.5993	5
171.1235	.0328	30.4784	5 $\frac{1}{8}$
140.7747	.0399	25.0730	5 $\frac{1}{4}$
119.1366	.0471	21.2191	5 $\frac{3}{8}$
102.9415	.0545	18.3347	5 $\frac{1}{2}$
90.3739	.0621	16.0963	5 $\frac{5}{8}$
80.3446	.0699	14.3100	5 $\frac{3}{4}$
72.1605	.0778	12.8523	5 $\frac{7}{8}$
65.3597	.0859	11.6411	6
59.6222	.0942	10.6192	6 $\frac{1}{8}$
54.7197	.1026	9.7460	6 $\frac{1}{4}$
50.4847	.1112	8.9917	6 $\frac{3}{8}$
46.7916	.1200	8.3339	6 $\frac{1}{2}$
43.5443	.1289	7.7556	6 $\frac{5}{8}$
40.6682	.1381	7.2433	6 $\frac{3}{4}$
38.1044	.1473	6.7867	6 $\frac{7}{8}$
35.8057	.1568	6.3773	7
33.7340	.1664	6.0083	7 $\frac{1}{8}$
31.8581	.1762	5.6742	7 $\frac{1}{4}$
30.1522	.1862	5.3703	7 $\frac{3}{8}$
28.5949	.1963	5.0930	7 $\frac{1}{2}$
27.1681	.2067	4.8388	7 $\frac{5}{8}$
25.8566	.2171	4.6053	7 $\frac{3}{4}$
24.6474	.2278	4.3899	7 $\frac{7}{8}$
23.5295	.2386	4.1908	8
22.4932	.2496	4.0062	8 $\frac{1}{8}$
21.5302	.2608	3.8347	8 $\frac{1}{4}$
20.6334	.2721	3.6750	8 $\frac{3}{8}$
19.7964	.2836	3.5259	8 $\frac{1}{2}$
19.0137	.2953	3.3865	8 $\frac{5}{8}$
18.2804	.3071	3.2559	8 $\frac{3}{4}$
17.5921	.3192	3.1333	8 $\frac{7}{8}$
16.9451	.3313	3.0181	9
16.3359	.3437	2.9095	9 $\frac{1}{8}$
15.7614	.3562	2.8072	9 $\frac{1}{4}$
15.2189	.3689	2.7106	9 $\frac{3}{8}$
14.7059	.3818	2.6192	9 $\frac{1}{2}$
14.2203	.3948	2.5327	9 $\frac{5}{8}$
13.7599	.4080	2.4507	9 $\frac{3}{4}$
13.3231	.4214	2.3729	9 $\frac{7}{8}$
12.9080	.4350	2.2990	10
12.5133	.4487	2.2287	10 $\frac{1}{8}$
12.1375	.4626	2.1618	10 $\frac{1}{4}$
11.7795	.4766	2.0980	10 $\frac{3}{8}$
11.4379	.4909	2.0372	10 $\frac{1}{2}$
11.1119	.5053	1.9791	10 $\frac{5}{8}$
10.8004	.5198	1.9236	10 $\frac{3}{4}$
10.5026	.5346	1.8706	10 $\frac{7}{8}$

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 5"
5.000"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 ¹ / ₂	.2142	4.6685	.0051
5 ⁵ / ₈	.2709	3.6909	.0065
5 ³ / ₄	.3289	3.0400	.0078
5 ⁷ / ₈	.3882	2.5757	.0092
6	.4488	2.2282	.0107
6 ¹ / ₈	.5106	1.9583	.0122
6 ¹ / ₄	.5737	1.7429	.0137
6 ³ / ₈	.6381	1.5671	.0152
6 ¹ / ₂	.7038	1.4209	.0168
6 ⁵ / ₈	.7707	1.2975	.0184
6 ³ / ₄	.8389	1.1920	.0200
6 ⁷ / ₈	.9084	1.1008	.0216
7	.9792	1.0212	.0233
7 ¹ / ₈	1.0512	.9513	.0250
7 ¹ / ₄	1.1245	.8892	.0268
7 ³ / ₈	1.1991	.8339	.0286
7 ¹ / ₂	1.2750	.7843	.0304
7 ⁵ / ₈	1.3521	.7396	.0322
7 ³ / ₄	1.4305	.6990	.0341
7 ⁷ / ₈	1.5102	.6621	.0360
8	1.5912	.6285	.0379
8 ¹ / ₈	1.6734	.5976	.0398
8 ¹ / ₄	1.7569	.5692	.0418
8 ³ / ₈	1.8417	.5430	.0439
8 ¹ / ₂	1.9278	.5187	.0459
8 ⁵ / ₈	2.0151	.4962	.0480
8 ³ / ₄	2.1037	.4753	.0501
8 ⁷ / ₈	2.1936	.4559	.0522
9	2.2848	.4377	.0544
9 ¹ / ₈	2.3772	.4207	.0566
9 ¹ / ₄	2.4709	.4047	.0588
9 ³ / ₈	2.5659	.3897	.0611
9 ¹ / ₂	2.6622	.3756	.0634
9 ⁵ / ₈	2.7597	.3624	.0657
9 ³ / ₄	2.8585	.3498	.0681
9 ⁷ / ₈	2.9586	.3380	.0704
10	3.0600	.3268	.0729
10 ¹ / ₈	3.1626	.3162	.0753
10 ¹ / ₄	3.2665	.3061	.0778
10 ³ / ₈	3.3717	.2966	.0803
10 ¹ / ₂	3.4782	.2875	.0828
10 ⁵ / ₈	3.5859	.2789	.0845
10 ³ / ₄	3.6949	.2706	.0880
10 ⁷ / ₈	3.8052	.2628	.0906
11	3.9168	.2553	.0933
11 ¹ / ₈	4.0296	.2482	.0959
11 ¹ / ₄	4.1437	.2413	.0987
11 ³ / ₈	4.2591	.2348	.1014
11 ¹ / ₂	4.3758	.2285	.1042

NO.122-B

Drill Pipe Size

O.D. 5"

5.000"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
196.0789	.0286	34.9231	5 1/2
155.0177	.0362	27.6098	5 5/8
127.6793	.0440	22.7407	5 3/4
108.1815	.0519	19.2679	5 7/8
93.5831	.0600	16.6679	6
82.2503	.0683	14.6494	6 1/8
73.2028	.0767	13.0380	6 1/4
65.8167	.0853	11.7225	6 3/8
59.6762	.0941	10.6288	6 1/2
54.4934	.1030	9.7057	6 5/8
50.0627	.1122	8.9165	6 3/4
46.2333	.1214	8.2345	6 7/8
42.8923	.1309	7.6394	7
39.9530	.1405	7.1159	7 1/8
37.3484	.1503	6.6520	7 1/4
35.0253	.1603	6.2383	7 3/8
32.9413	.1704	5.8671	7 1/2
31.0620	.1808	5.5324	7 5/8
29.3594	.1912	5.2291	7 3/4
27.8103	.2019	4.9532	7 7/8
26.3952	.2127	4.7012	8
25.0981	.2237	4.4702	8 1/8
23.9051	.2349	4.2577	8 1/4
22.8046	.2462	4.0617	8 3/8
21.7865	.2577	3.8803	8 1/2
20.8423	.2694	3.7122	8 5/8
19.9644	.2812	3.5558	8 3/4
19.1463	.2932	3.4101	8 7/8
18.3824	.3054	3.2740	9
17.6676	.3178	3.1467	9 1/8
16.9976	.3303	3.0274	9 1/4
16.3683	.3430	2.9153	9 3/8
15.7765	.3559	2.8099	9 1/2
15.2189	.3689	2.7106	9 5/8
14.6928	.3821	2.6169	9 3/4
14.1958	.3955	2.5284	9 7/8
13.7255	.4091	2.4446	10
13.2801	.4228	2.3653	10 1/8
12.8576	.4367	2.2900	10 1/4
12.4565	.4507	2.2186	10 3/8
12.0752	.4650	2.1507	10 1/2
11.7124	.4794	2.0861	10 5/8
11.3669	.4939	2.0245	10 3/4
11.0374	.5087	1.9659	10 7/8
10.7231	.5236	1.9099	11
10.4228	.5387	1.8564	11 1/8
10.1358	.5539	1.8053	11 1/4
19.8612	.5694	1.7564	11 3/8
19.5983	.5850	1.7095	11 1/2

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 5 $\frac{1}{2}$ "
5.500"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 $\frac{5}{8}$.0567	17.6251	.0014
5 $\frac{3}{4}$.1147	8.7146	.0027
5 $\frac{7}{8}$.1740	5.7459	.0041
6	.2346	4.2626	.0056
6 $\frac{1}{8}$.2964	3.3734	.0071
6 $\frac{1}{4}$.3595	2.7813	.0086
6 $\frac{3}{8}$.4239	2.3588	.0101
6 $\frac{1}{2}$.4896	2.0425	.0117
6 $\frac{5}{8}$.5565	1.7968	.0133
6 $\frac{3}{4}$.6247	1.6006	.0149
6 $\frac{7}{8}$.6942	1.4404	.0165
7	.7650	1.3072	.0182
7 $\frac{1}{8}$.8370	1.1947	.0199
7 $\frac{1}{4}$.9103	1.0985	.0217
7 $\frac{3}{8}$.9849	1.0153	.0235
7 $\frac{1}{2}$	1.0608	.9427	.0253
7 $\frac{5}{8}$	1.1379	.8788	.0271
7 $\frac{3}{4}$	1.2163	.8221	.0290
7 $\frac{7}{8}$	1.2960	.7716	.0309
8	1.3770	.7262	.0328
8 $\frac{1}{8}$	1.4592	.6853	.0347
8 $\frac{1}{4}$	1.5427	.6482	.0367
8 $\frac{3}{8}$	1.6275	.6144	.0388
8 $\frac{1}{2}$	1.7136	.5836	.0408
8 $\frac{5}{8}$	1.8009	.5553	.0429
8 $\frac{3}{4}$	1.8895	.5292	.0450
8 $\frac{7}{8}$	1.9794	.5052	.0471
9	2.0706	.4830	.0493
9 $\frac{1}{8}$	2.1630	.4623	.0515
9 $\frac{1}{4}$	2.2567	.4431	.0537
9 $\frac{3}{8}$	2.3517	.4252	.0560
9 $\frac{1}{2}$	2.4480	.4085	.0583
9 $\frac{5}{8}$	2.5455	.3928	.0606
9 $\frac{3}{4}$	2.6443	.3782	.0630
9 $\frac{7}{8}$	2.7444	.3644	.0653
10	2.8458	.3514	.0678
10 $\frac{1}{8}$	2.9484	.3392	.0702
10 $\frac{1}{4}$	3.0523	.3276	.0727
10 $\frac{3}{8}$	3.1575	.3167	.0752
10 $\frac{1}{2}$	3.2640	.3064	.0777
10 $\frac{5}{8}$	3.3717	.2966	.0803
10 $\frac{3}{4}$	3.4807	.2873	.0829
10 $\frac{7}{8}$	3.5910	.2785	.0855
11	3.7026	.2701	.0882
11 $\frac{1}{8}$	3.8154	.2621	.0908
11 $\frac{1}{4}$	3.9295	.2545	.0936
11 $\frac{3}{8}$	4.0449	.2472	.0963
11 $\frac{1}{2}$	4.1616	.2403	.0991
11 $\frac{5}{8}$	4.2795	.2337	.1019
11 $\frac{3}{4}$	4.3987	.2273	.1047
11 $\frac{7}{8}$	4.5192	.2213	.1076

NO.122-B

Drill Pipe Size

O.D. 5 $\frac{1}{2}$ "**BETWEEN CASING & HOLE****

5.500"

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
740.2533	.0076	131.84473	5 $\frac{5}{8}$
366.0142	.0153	65.1899	5 $\frac{3}{4}$
241.3280	.0233	42.9823	5 $\frac{7}{8}$
179.0287	.0314	31.8864	6
141.6829	.0396	25.2348	6 $\frac{1}{8}$
116.8130	.0481	20.8053	6 $\frac{1}{4}$
99.0715	.0567	17.6454	6 $\frac{3}{8}$
85.7846	.0654	15.2789	6 $\frac{1}{2}$
75.4668	.0744	13.4412	6 $\frac{5}{8}$
67.2271	.0835	11.9737	6 $\frac{3}{4}$
60.4982	.0928	10.7752	6 $\frac{7}{8}$
54.9091	.1023	9.7785	7
50.1771	.1119	8.9369	7 $\frac{1}{8}$
46.1362	.1217	8.2172	7 $\frac{1}{4}$
42.6424	.1317	7.5949	7 $\frac{3}{8}$
39.5929	.1418	7.0518	7 $\frac{1}{2}$
36.9090	.1521	6.5738	7 $\frac{5}{8}$
34.5296	.1626	6.1500	7 $\frac{3}{4}$
32.4066	.1733	5.7719	7 $\frac{7}{8}$
30.5012	.1841	5.4325	8
28.7822	.1951	5.1263	8 $\frac{1}{8}$
27.2242	.2062	4.8488	8 $\frac{1}{4}$
25.8059	.2176	4.5962	8 $\frac{3}{8}$
24.5099	.2291	4.3654	8 $\frac{1}{2}$
23.3213	.2407	4.1537	8 $\frac{5}{8}$
22.2276	.2526	3.9589	8 $\frac{3}{4}$
21.2182	.2646	3.7791	8 $\frac{7}{8}$
20.2840	.2768	3.6127	9
19.4172	.2892	3.4583	9 $\frac{1}{8}$
18.6109	.4017	3.3147	9 $\frac{1}{4}$
17.8592	.3144	3.1809	9 $\frac{3}{8}$
17.1569	.3272	3.0558	9 $\frac{1}{2}$
16.4995	.3403	2.9387	9 $\frac{5}{8}$
15.8830	.3535	2.8289	9 $\frac{3}{4}$
15.3037	.3669	2.7257	9 $\frac{7}{8}$
14.7586	.3804	2.6286	10
14.2449	.3941	2.5371	10 $\frac{1}{8}$
13.7599	.4080	2.4507	10 $\frac{1}{4}$
13.3015	.4221	2.3691	10 $\frac{3}{8}$
12.8677	.4363	2.2918	10 $\frac{1}{2}$
12.4565	.4507	2.2186	10 $\frac{5}{8}$
12.0664	.4653	2.1491	10 $\frac{3}{4}$
11.6958	.4801	2.0831	10 $\frac{7}{8}$
11.3434	.4950	2.0203	11
11.0079	.5100	1.9606	11 $\frac{1}{8}$
10.6883	.5253	1.9037	11 $\frac{1}{4}$
10.3834	.5407	1.8494	11 $\frac{3}{8}$
10.0923	.5563	1.7975	11 $\frac{1}{2}$
9.8142	.5721	1.7480	11 $\frac{5}{8}$
9.5482	.5880	1.7006	11 $\frac{3}{4}$
9.2936	.6041	1.6553	11 $\frac{7}{8}$

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 5⁹/₁₆"
5.562"**

**TABLE
VOLUME & HEIGHT BETWEEN**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 ³ / ₄	.0868	11.5250	.0021
5 ⁷ / ₈	.1461	6.8467	.0035
6	.2066	4.8399	.0049
6 ¹ / ₈	.2685	3.7250	.0064
6 ¹ / ₄	.3316	3.0160	.0079
6 ³ / ₈	.3960	2.5255	.0094
6 ¹ / ₂	.4616	2.1663	.0110
6 ⁵ / ₈	.5286	1.8920	.0126
6 ³ / ₄	.5968	1.6757	.0142
6 ⁷ / ₈	.6663	1.5009	.0159
7	.7370	1.3568	.0175
7 ¹ / ₈	.8091	1.2360	.0193
7 ¹ / ₄	.8824	1.1333	.0210
7 ³ / ₈	.9570	1.0450	.0228
7 ¹ / ₂	1.0328	.9682	.0246
7 ⁵ / ₈	1.1100	.9009	.0264
7 ³ / ₄	1.1884	.8415	.0283
7 ⁷ / ₈	1.2681	.7886	.0302
8	1.3490	.7413	.0321
8 ¹ / ₈	1.4313	.6987	.0341
8 ¹ / ₄	1.5148	.6602	.0361
8 ³ / ₈	1.5996	.6252	.0381
8 ¹ / ₂	1.6856	.5933	.0401
8 ⁵ / ₈	1.7730	.5640	.0422
8 ³ / ₄	1.8616	.5372	.0443
8 ⁷ / ₈	1.9515	.5124	.0465
9	2.0426	.4896	.0486
9 ¹ / ₈	2.1351	.4684	.0508
9 ¹ / ₄	2.2288	.4487	.0531
9 ³ / ₈	2.3237	.4303	.0553
9 ¹ / ₂	2.4200	.4132	.0576
9 ⁵ / ₈	2.5175	.3972	.0599
9 ³ / ₄	2.6164	.3822	.0623
9 ⁷ / ₈	2.7164	.3681	.0647
10	2.8178	.3549	.0671
10 ¹ / ₈	2.9204	.3424	.0695
10 ¹ / ₄	3.0244	.3306	.0720
10 ³ / ₈	3.1295	.3195	.0745
10 ¹ / ₂	3.2360	.3090	.0770
10 ⁵ / ₈	3.3437	.2991	.0796
10 ³ / ₄	3.4528	.2896	.0822
10 ⁷ / ₈	3.5630	.2807	.0848
11	3.6746	.2721	.0875
11 ¹ / ₈	3.7874	.2640	.0902
11 ¹ / ₄	3.9016	.2563	.0929
11 ³ / ₈	4.0169	.2489	.0956
11 ¹ / ₂	4.1336	.2419	.0984
11 ⁵ / ₈	4.2515	.2352	.1012
11 ³ / ₄	4.3708	.2288	.1041
11 ⁷ / ₈	4.4912	.2227	.1069
12	4.6130	.2168	.1098

NO.122-D

Drill Pipe Size
O.D. 2.375"**DRILL PIPE & CASING**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
484.0516	.0116	86.2133	5 ³ / ₄
287.5630	.0195	51.2172	5 ⁷ / ₈
203.2744	.0276	36.2047	6
156.4510	.0359	27.8651	6 ¹ / ₈
126.6713	.0443	22.5611	6 ¹ / ₄
106.0729	.0529	18.8924	6 ³ / ₈
90.9846	.0617	16.2050	6 ¹ / ₂
79.4621	.0707	14.1528	6 ⁵ / ₈
70.3793	.0798	12.5351	6 ³ / ₄
63.0391	.0891	11.2277	6 ⁷ / ₈
56.9866	.0985	10.1497	7
51.9125	.1082	9.2460	7 ¹ / ₈
47.5993	.1180	8.4778	7 ¹ / ₄
43.8893	.1279	7.8170	7 ³ / ₈
40.6656	.1381	7.2428	7 ¹ / ₂
37.8395	.1484	6.7395	7 ⁵ / ₈
35.3427	.1589	6.2948	7 ³ / ₄
33.1217	.1695	5.8992	7 ⁷ / ₈
31.1338	.1803	5.5452	8
29.3449	.1913	5.2266	8 ¹ / ₈
27.7271	.2025	4.9384	8 ¹ / ₄
26.2574	.2138	4.6766	8 ³ / ₈
24.9167	.2253	4.4379	8 ¹ / ₂
23.6893	.2370	4.2192	8 ⁵ / ₈
22.5617	.2489	4.0184	8 ³ / ₄
21.5225	.2609	3.8333	8 ⁷ / ₈
20.5619	.2731	3.6622	9
19.6717	.2854	3.5037	9 ¹ / ₈
18.8445	.2979	3.3564	9 ¹ / ₄
18.0742	.3106	3.2192	9 ³ / ₈
17.3553	.3235	3.0911	9 ¹ / ₂
16.6829	.3365	2.9714	9 ⁵ / ₈
16.0528	.3498	2.8591	9 ³ / ₄
15.4614	.3631	2.7538	9 ⁷ / ₈
14.9052	.3767	2.6547	10
14.3814	.3904	2.5614	10 ¹ / ₈
13.8872	.4043	2.4734	10 ¹ / ₄
13.4205	.4184	2.3903	10 ³ / ₈
12.9790	.4326	2.3116	10 ¹ / ₂
12.5608	.4470	2.2372	10 ⁵ / ₈
12.1642	.4616	2.1665	10 ³ / ₄
11.7877	.4763	2.0995	10 ⁷ / ₈
11.4298	.4912	2.0357	11
11.0893	.5063	1.9751	11 ¹ / ₈
10.7649	.5216	1.9173	11 ¹ / ₄
10.4557	.5370	1.8622	11 ³ / ₈
10.1606	.5526	1.8097	11 ¹ / ₂
9.8788	.5683	1.7595	11 ⁵ / ₈
9.6093	.5843	1.7115	11 ³ / ₄
9.3515	.6004	1.6656	11 ⁷ / ₈
9.1047	.6167	1.6216	12

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 6⁵/₈"
6.625"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	.2085	4.7970	.0050
7 ¹ / ₈	.2805	3.5651	.0067
7 ¹ / ₄	.3538	2.8264	.0084
7 ³ / ₈	.4284	2.3343	.0102
7 ¹ / ₂	.5043	1.9831	.0120
7 ⁵ / ₈	.5814	1.7200	.0138
7 ³ / ₄	.6598	1.5156	.0157
7 ⁷ / ₈	.7395	1.3523	.0176
8	.8205	1.2188	.0195
8 ¹ / ₈	.9027	1.1078	.0215
8 ¹ / ₄	.9862	1.0140	.0235
8 ³ / ₈	1.0710	.9337	.0255
8 ¹ / ₂	1.1571	.8643	.0275
8 ⁵ / ₈	1.2444	.8036	.0296
8 ³ / ₄	1.3330	.7502	.0317
8 ⁷ / ₈	1.4229	.7028	.0339
9	1.5141	.6605	.0360
9 ¹ / ₈	1.6065	.6225	.0382
9 ¹ / ₄	1.7002	.5882	.0405
9 ³ / ₈	1.7952	.5570	.0427
9 ¹ / ₂	1.8915	.5287	.0450
9 ⁵ / ₈	1.9890	.5028	.0474
9 ³ / ₄	2.0878	.4790	.0497
9 ⁷ / ₈	2.1879	.4571	.0521
10	2.2893	.4368	.0545
10 ¹ / ₈	2.3919	.4181	.0569
10 ¹ / ₄	2.4958	.4007	.0594
10 ³ / ₈	2.6010	.3845	.0619
10 ¹ / ₂	2.7075	.3694	.0645
10 ⁵ / ₈	2.8152	.3552	.0670
10 ³ / ₄	2.9242	.3420	.0696
10 ⁷ / ₈	3.0345	.3295	.0722
11	3.1461	.3179	.0749
11 ¹ / ₈	3.2589	.3069	.0776
11 ¹ / ₄	3.3730	.2965	.0803
11 ³ / ₈	3.4884	.2867	.0831
11 ¹ / ₂	3.6051	.2774	.0858
11 ⁵ / ₈	3.7230	.2686	.0886
11 ³ / ₄	3.8422	.2603	.0915
11 ⁷ / ₈	3.9627	.2524	.0943
12	4.0845	.2448	.0972
12 ¹ / ₈	4.2075	.2377	.1002
12 ¹ / ₄	4.3318	.2309	.1031
12 ³ / ₈	4.4574	.2243	.1061
12 ¹ / ₂	4.5843	.2181	.1091
12 ⁵ / ₈	4.7124	.2122	.1122
12 ³ / ₄	4.8418	.2065	.1153
12 ⁷ / ₈	4.9725	.2011	.1184
13	5.1045	.1959	.1215

NO.122-B

Drill Pipe Size

O.D. 6⁵/₈"

6.625"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
201.4756	.0279	35.8843	7
149.7330	.0375	26.6686	7 ¹ / ₈
118.7072	.0473	21.1427	7 ¹ / ₄
98.0394	.0573	17.4616	7 ³ / ₈
83.2901	.0674	14.8346	7 ¹ / ₂
72.2396	.0777	12.8664	7 ⁵ / ₈
63.6546	.0882	11.3374	7 ³ / ₄
56.7953	.0989	10.1157	7 ⁷ / ₈
51.1908	.1097	9.1175	8
46.5272	.1207	8.2868	8 ¹ / ₈
42.5873	.1318	7.5851	8 ¹ / ₄
39.2158	.1432	6.9846	8 ³ / ₈
36.2989	.1547	6.4651	8 ¹ / ₂
33.7513	.1664	6.0114	8 ⁵ / ₈
31.5077	.1782	5.6118	8 ³ / ₄
29.5173	.1902	5.2572	8 ⁷ / ₈
27.7400	.2024	4.9407	9
26.1439	.2148	4.6564	9 ¹ / ₈
24.7029	.2273	4.3998	9 ¹ / ₄
23.3958	.2400	4.1670	9 ³ / ₈
22.2051	.2529	3.9549	9 ¹ / ₂
21.1162	.2659	3.7610	9 ⁵ / ₈
20.1168	.2791	3.5830	9 ³ / ₄
19.1965	.2925	3.4190	9 ⁷ / ₈
18.3466	.3060	3.2677	10
17.5593	.3197	3.1274	10 ¹ / ₈
16.8282	.3336	2.9972	10 ¹ / ₄
16.1477	.3477	2.8760	10 ³ / ₈
15.5127	.3619	2.7629	10 ¹ / ₂
14.9190	.3763	2.6572	10 ⁵ / ₈
14.3629	.3909	2.5581	10 ³ / ₄
13.8409	.4057	2.4652	10 ⁷ / ₈
13.3501	.4206	2.3777	11
12.8878	.4357	2.2954	11 ¹ / ₈
12.4518	.4509	2.2178	11 ¹ / ₄
12.0399	.4663	2.1444	11 ³ / ₈
11.6503	.4819	2.0750	11 ¹ / ₂
11.2813	.4977	2.0093	11 ⁵ / ₈
10.9312	.5136	1.9469	11 ³ / ₄
10.5989	.5297	1.8877	11 ⁷ / ₈
10.2829	.5460	1.8315	12
9.9822	.5625	1.7779	12 ¹ / ₈
9.6957	.5791	1.7269	12 ¹ / ₄
9.4226	.5959	1.6782	12 ³ / ₈
9.1618	.6128	1.6318	12 ¹ / ₂
8.9127	.6300	1.5874	12 ⁵ / ₈
8.6745	.6473	1.5450	12 ³ / ₄
8.4465	.6647	1.5044	12 ⁷ / ₈
8.2281	.6824	1.4655	13

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 7⁵/₈"
7.625"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8	.2391	4.1830	.0057
8 ¹ / ₈	.3213	3.1124	.0076
8 ¹ / ₄	.4048	2.4703	.0096
8 ³ / ₈	.4896	2.0425	.0117
8 ¹ / ₂	.5757	1.7371	.0137
8 ⁵ / ₈	.6630	1.5083	.0158
8 ³ / ₄	.7516	1.3305	.0179
8 ⁷ / ₈	.8415	1.1884	.0200
9	.9327	1.0722	.0222
9 ¹ / ₈	1.0251	.9755	.0244
9 ¹ / ₄	1.1188	.8938	.0266
9 ³ / ₈	1.2138	.8239	.0289
9 ¹ / ₂	1.3101	.7633	.0312
9 ⁵ / ₈	1.4076	.7104	.0335
9 ³ / ₄	1.5064	.6638	.0359
9 ⁷ / ₈	1.6065	.6225	.0382
10	1.7079	.5855	.0407
10 ¹ / ₈	1.8105	.5523	.0431
10 ¹ / ₄	1.9144	.5224	.0456
10 ³ / ₈	2.0196	.4951	.0481
10 ¹ / ₂	2.1261	.4704	.0506
10 ⁵ / ₈	2.2338	.4477	.0532
10 ³ / ₄	2.3428	.4268	.0558
10 ⁷ / ₈	2.4531	.4076	.0584
11	2.5647	.3899	.0611
11 ¹ / ₈	2.6775	.3735	.0637
11 ¹ / ₄	2.7916	.3582	.0665
11 ³ / ₈	2.9070	.3440	.0692
11 ¹ / ₂	3.0237	.3307	.0720
11 ⁵ / ₈	3.1416	.3183	.0748
11 ³ / ₄	3.2608	.3067	.0776
11 ⁷ / ₈	3.3813	.2957	.0805
12	3.5031	.2855	.0834
12 ¹ / ₈	3.6261	.2758	.0863
12 ¹ / ₄	3.7504	.2666	.0893
12 ³ / ₈	3.8760	.2580	.0923
12 ¹ / ₂	4.0029	.2498	.0953
12 ⁵ / ₈	4.1310	.2421	.0984
12 ³ / ₄	4.2604	.2347	.1014
12 ⁷ / ₈	4.3911	.2277	.1045
13	4.5231	.2211	.1077
13 ¹ / ₈	4.6563	.2148	.1109
13 ¹ / ₄	4.7908	.2087	.1141
13 ³ / ₈	4.9266	.2030	.1173
13 ¹ / ₂	5.0637	.1975	.1206
13 ⁵ / ₈	5.2020	.1922	.1239
13 ³ / ₄	5.3416	.1872	.1272
13 ⁷ / ₈	5.4825	.1824	.1305
14	5.6246	.1778	.1339
14 ¹ / ₈	5.7681	.1734	.1373
14 ¹ / ₄	5.9128	.1691	.1408
14 ³ / ₈	6.0588	.1650	.1443
14 ¹ / ₂	6.2060	.1611	.1478

No.122-A

Drill Pipe Size

O.D. 7⁵/₈"**BETWEEN CASING & HOLE****

7.625"

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
175.6867	.0320	31.2911	8
130.7193	.0430	23.2821	8 ¹ / ₈
103.7520	.0541	18.4790	8 ¹ / ₄
85.7845	.0654	15.2789	8 ³ / ₈
72.9596	.0770	12.9947	8 ¹ / ₂
63.3486	.0886	11.2829	8 ⁵ / ₈
55.8800	.1005	9.9527	8 ³ / ₄
49.9110	.1125	8.8895	8 ⁷ / ₈
45.0325	.1247	8.0206	9
40.9717	.1370	7.2974	9 ¹ / ₈
37.5399	.1496	6.6861	9 ¹ / ₄
34.6022	.1623	6.1629	9 ³ / ₈
32.0596	.1751	5.7101	9 ¹ / ₂
29.8381	.1882	5.3144	9 ⁵ / ₈
27.8809	.2014	4.9658	9 ³ / ₄
26.1439	.2148	4.6564	9 ⁷ / ₈
24.5922	.2283	4.3801	10
23.1981	.2420	4.1318	10 ¹ / ₈
21.9389	.2559	3.9075	10 ¹ / ₄
20.7962	.2700	3.7040	10 ³ / ₈
19.7549	.2842	3.5185	10 ¹ / ₂
18.8021	.2986	3.3488	10 ⁵ / ₈
17.9272	.3132	3.1930	10 ³ / ₄
17.1212	.3279	3.0494	10 ⁷ / ₈
16.3765	.3428	2.9168	11
15.6863	.3579	2.7939	11 ¹ / ₈
15.0451	.3732	2.6796	11 ¹ / ₄
14.4479	.3886	2.5733	11 ³ / ₈
13.8905	.4042	2.4740	11 ¹ / ₂
13.3690	.4200	2.3811	11 ⁵ / ₈
12.8803	.4359	2.2941	11 ³ / ₄
12.4213	.4520	2.2123	11 ⁷ / ₈
11.9895	.4683	2.1354	12
11.5827	.4847	2.0630	12 ¹ / ₈
11.1988	.5014	1.9946	12 ¹ / ₄
10.8359	.5181	1.9300	12 ³ / ₈
10.4925	.5351	1.8688	12 ¹ / ₂
10.1671	.5522	1.8108	12 ⁵ / ₈
9.8582	.5695	1.7558	12 ³ / ₄
9.5648	.5870	1.7036	12 ⁷ / ₈
9.2858	.6046	1.6539	13
9.0201	.6225	1.6065	13 ¹ / ₈
8.7668	.6404	1.5614	13 ¹ / ₄
8.5252	.6586	1.5184	13 ³ / ₈
8.2944	.6769	1.4773	13 ¹ / ₂
8.0738	.6954	1.4380	13 ⁵ / ₈
7.8628	.7141	1.4004	13 ³ / ₄
7.6608	.7329	1.3644	13 ⁷ / ₈
7.4671	.75191	1.3300	14
7.2814	.7711	1.2969	14 ¹ / ₈
7.1032	.7904	1.2651	14 ¹ / ₄
6.9321	.8099	1.2347	14 ³ / ₈
6.7676	.8296	1.2054	14 ¹ / ₂

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 8⁵/₈"
8.625"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
9	.2697	3.7083	.0064
9 ¹ / ₈	.3621	2.7617	.0086
9 ¹ / ₄	.4558	2.1939	.0109
9 ³ / ₈	.5508	1.8155	.0131
9 ¹ / ₂	.6471	1.5454	.0154
9 ⁵ / ₈	.7446	1.3430	.0177
9 ³ / ₄	.8434	1.1857	.0201
9 ⁷ / ₈	.9435	1.0599	.0225
10	1.0449	.9571	.0249
10 ¹ / ₈	1.1475	.8715	.0273
10 ¹ / ₄	1.2514	.7991	.0298
10 ³ / ₈	1.3566	.7371	.0323
10 ¹ / ₂	1.4631	.6835	.0348
10 ⁵ / ₈	1.5708	.6366	.0374
10 ³ / ₄	1.6798	.5953	.0400
10 ⁷ / ₈	1.7901	.5586	.0426
11	1.9017	.5259	.0453
11 ¹ / ₈	2.0145	.4964	.0480
11 ¹ / ₄	2.1286	.4698	.0507
11 ³ / ₈	2.2440	.4456	.0534
11 ¹ / ₂	2.3607	.4236	.0562
11 ⁵ / ₈	2.4786	.4035	.0590
11 ³ / ₄	2.5978	.3849	.0619
11 ⁷ / ₈	2.7183	.3679	.0647
12	2.8401	.3521	.0676
12 ¹ / ₈	2.9631	.3375	.0705
12 ¹ / ₄	3.0874	.3239	.0735
12 ³ / ₈	3.2130	.3112	.0765
12 ¹ / ₂	3.3399	.2994	.0795
12 ⁵ / ₈	3.4680	.2884	.0826
12 ³ / ₄	3.5974	.2780	.0857
12 ⁷ / ₈	3.7281	.2682	.0888
13	3.8601	.2591	.0919
13 ¹ / ₈	3.9933	.2504	.0951
13 ¹ / ₄	4.1278	.2423	.0983
13 ³ / ₈	4.2636	.2345	.1015
13 ¹ / ₂	4.4007	.2272	.1048
13 ⁵ / ₈	4.5390	.2203	.1081
13 ³ / ₄	4.6786	.2137	.1114
13 ⁷ / ₈	4.8195	.2075	.1147
14	4.9617	.2015	.1181
14 ¹ / ₈	5.1051	.1959	.1215
14 ¹ / ₄	5.2498	.1905	.1250
14 ³ / ₈	5.3958	.1853	.1285
14 ¹ / ₂	5.5430	.1804	.1320
14 ⁵ / ₈	5.6916	.1757	.1355
14 ³ / ₄	5.8414	.1712	.1391
14 ⁷ / ₈	5.9925	.1669	.1427
15	6.1448	.1627	.1463

No.122-A

Drill Pipe Size

O.D. 8⁵/₈"

8.625"

BETWEEN CASING & HOLE**

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
155.7506	.0360	27.7404	9
115.9903	.0484	20.6588	9 ¹ / ₈
92.1434	.0609	16.4114	9 ¹ / ₄
76.2529	.0736	13.5812	9 ³ / ₈
64.9089	.0865	11.5608	9 ¹ / ₂
56.4063	.0995	10.0464	9 ⁵ / ₈
49.7978	.1127	8.8694	9 ³ / ₄
44.5152	.1261	7.9285	9 ⁷ / ₈
40.1968	.1397	7.1594	10
36.6014	.1534	6.5190	10 ¹ / ₈
33.5622	.1673	5.9777	10 ¹ / ₄
30.9598	.1814	5.5142	10 ³ / ₈
28.7070	.1956	5.1129	10 ¹ / ₂
26.7380	.2100	4.7622	10 ⁵ / ₈
25.0028	.2246	4.4532	10 ³ / ₄
23.4624	.2393	4.1788	10 ⁷ / ₈
22.0860	.2542	3.9337	11
20.8489	.2693	3.7133	11 ¹ / ₈
19.7312	.2846	3.5143	11 ¹ / ₄
18.7166	.3000	3.3336	11 ³ / ₈
17.7917	.3156	3.1688	11 ¹ / ₂
16.9451	.3313	3.0180	11 ⁵ / ₈
16.1675	.3473	2.8796	11 ³ / ₄
15.4509	.3634	2.7519	11 ⁷ / ₈
14.7884	.3797	2.6339	12
14.1744	.3961	2.5246	12 ¹ / ₈
13.6037	.4127	2.4229	12 ¹ / ₄
13.0719	.4295	2.3282	12 ³ / ₈
12.5754	.4465	2.2398	12 ¹ / ₂
12.1108	.4636	2.1570	12 ⁵ / ₈
11.6751	.4809	2.0794	12 ³ / ₄
11.2658	.4984	2.0065	12 ⁷ / ₈
10.8807	.5160	1.9379	13
10.5176	.5338	1.8733	13 ¹ / ₈
10.1749	.5518	1.8122	13 ¹ / ₄
9.8509	.5700	1.7545	13 ³ / ₈
9.5440	.5883	1.6999	13 ¹ / ₂
9.2532	.6068	1.6481	13 ⁵ / ₈
8.9770	.6254	1.5989	13 ³ / ₄
8.7146	.6443	1.5521	13 ⁷ / ₈
8.4649	.6633	1.5077	14
8.2271	.6825	1.4653	14 ¹ / ₈
8.0003	.7018	1.4249	14 ¹ / ₄
7.7839	.7213	1.3864	14 ³ / ₈
7.5771	.7410	1.3495	14 ¹ / ₂
7.3793	.7609	1.3143	14 ⁵ / ₈
7.1901	.7809	1.2806	14 ³ / ₄
7.0088	.8011	1.2483	14 ⁷ / ₈
6.8350	.8214	1.2174	15

**Note: No allowance made for couplings.

**Drill Pipe Size
O.D. 5⁹/₁₆"
5.562"**

**TABLE
VOLUME & HEIGHT**

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5 ³ / ₄	.0868	11.5250	.0021
5 ⁷ / ₈	.1461	6.8467	.0035
6	.2066	4.8399	.0049
6 ¹ / ₈	.2685	3.7250	.0064
6 ¹ / ₄	.3316	3.0160	.0079
6 ³ / ₈	.3960	2.5255	.0094
6 ¹ / ₂	.4616	2.1663	.0110
6 ⁵ / ₈	.5286	1.8920	.0126
6 ³ / ₄	.5968	1.6757	.0142
6 ⁷ / ₈	.6663	1.5009	.0159
7	.7370	1.3568	.0175
7 ¹ / ₈	.8091	1.2360	.0193
7 ¹ / ₄	.8824	1.1333	.0210
7 ³ / ₈	.9570	1.0450	.0228
7 ¹ / ₂	1.0328	.9682	.0246
7 ⁵ / ₈	1.1100	.9009	.0264
7 ³ / ₄	1.1884	.8415	.0283
7 ⁷ / ₈	1.2681	.7886	.0302
8	1.3490	.7413	.0321
8 ¹ / ₈	1.4313	.6987	.0341
8 ¹ / ₄	1.5148	.6602	.0361
8 ³ / ₈	1.5996	.6252	.0381
8 ¹ / ₂	1.6856	.5933	.0401
8 ⁵ / ₈	1.7730	.5640	.0422
8 ³ / ₄	1.8616	.5372	.0443
8 ⁷ / ₈	1.9515	.5124	.0465
9	2.0426	.4896	.0486
9 ¹ / ₈	2.1351	.4684	.0508
9 ¹ / ₄	2.2288	.4487	.0531
9 ³ / ₈	2.3237	.4303	.0553
9 ¹ / ₂	2.4200	.4132	.0576
9 ⁵ / ₈	2.5175	.3972	.0599
9 ³ / ₄	2.6164	.3822	.0623
9 ⁷ / ₈	2.7164	.3681	.0647
10	2.8178	.3549	.0671
10 ¹ / ₈	2.9204	.3424	.0695
10 ¹ / ₄	3.0244	.3306	.0720
10 ³ / ₈	3.1295	.3195	.0745
10 ¹ / ₂	3.2360	.3090	.0770
10 ⁵ / ₈	3.3437	.2991	.0796
10 ³ / ₄	3.4528	.2896	.0822
10 ⁷ / ₈	3.5630	.2807	.0848
11	3.6746	.2721	.0875
11 ¹ / ₈	3.7874	.2640	.0902
11 ¹ / ₄	3.9016	.2563	.0929
11 ³ / ₈	4.0169	.2489	.0956
11 ¹ / ₂	4.1336	.2419	.0984
11 ⁵ / ₈	4.2515	.2352	.1012
11 ³ / ₄	4.3708	.2288	.1041
11 ⁷ / ₈	4.4912	.2227	.1069
12	4.6130	.2168	.1098

NO.122-B

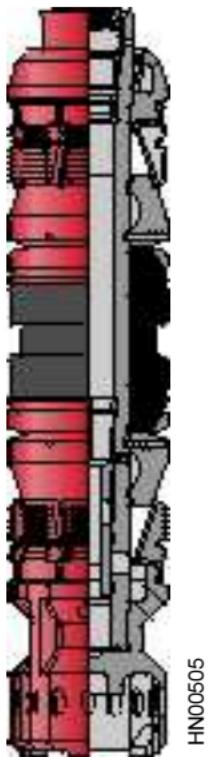
Drill Pipe Size

O.D. 5⁹/₁₆"**BETWEEN DRILL PIPE & HOLE******5.562"**

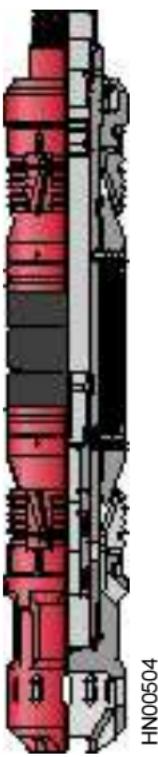
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
484.0516	.0116	86.2133	5 ³ / ₄
287.5630	.0195	51.2172	5 ⁷ / ₈
203.2744	.0276	36.2047	6
156.4510	.0359	27.8651	6 ¹ / ₈
126.6713	.0443	22.5611	6 ¹ / ₄
106.0729	.0529	18.8924	6 ³ / ₈
90.9846	.0617	16.2050	6 ¹ / ₂
79.4621	.0707	14.1528	6 ⁵ / ₈
70.3793	.0798	12.5351	6 ³ / ₄
63.0391	.0891	11.2277	6 ⁷ / ₈
56.9866	.0985	10.1497	7
51.9125	.1082	9.2460	7 ¹ / ₈
47.5993	.1180	8.4778	7 ¹ / ₄
43.8893	.1279	7.8170	7 ³ / ₈
40.6656	.1381	7.2428	7 ¹ / ₂
37.8395	.1484	6.7395	7 ⁵ / ₈
35.3427	.1589	6.2948	7 ³ / ₄
33.1217	.1695	5.8992	7 ⁷ / ₈
31.1338	.1803	5.5452	8
29.3449	.1913	5.2266	8 ¹ / ₈
27.7271	.2025	4.9384	8 ¹ / ₄
26.2574	.2138	4.6766	8 ³ / ₈
24.9167	.2253	4.4379	8 ¹ / ₂
23.6893	.2370	4.2192	8 ⁵ / ₈
22.5617	.2489	4.0184	8 ³ / ₄
21.5225	.2609	3.8333	8 ⁷ / ₈
20.5619	.2731	3.6622	9
19.6717	.2854	3.5037	9 ¹ / ₈
18.8445	.2979	3.3564	9 ¹ / ₄
18.0742	.3106	3.2192	9 ³ / ₈
17.3553	.3235	3.0911	9 ¹ / ₂
16.6829	.3365	2.9714	9 ⁵ / ₈
16.0528	.3498	2.8591	9 ³ / ₄
15.4614	.3631	2.7538	9 ⁷ / ₈
14.9052	.3767	2.6547	10
14.3814	.3904	2.5614	10 ¹ / ₈
13.8872	.4043	2.4734	10 ¹ / ₄
13.4205	.4184	2.3903	10 ³ / ₈
12.9790	.4326	2.3116	10 ¹ / ₂
12.5608	.4470	2.2372	10 ⁵ / ₈
12.1642	.4616	2.1665	10 ³ / ₄
11.7877	.4763	2.0995	10 ⁷ / ₈
11.4298	.4912	2.0357	11
11.0893	.5063	1.9751	11 ¹ / ₈
10.7649	.5216	1.9173	11 ¹ / ₄
10.4557	.5370	1.8622	11 ³ / ₈
10.1606	.5526	1.8097	11 ¹ / ₂
9.8788	.5683	1.7595	11 ⁵ / ₈
9.6093	.5843	1.7115	11 ³ / ₄
9.3515	.6004	1.6656	11 ⁷ / ₈
9.1047	.6167	1.6216	12

**Note: No allowance made for couplings.

EZ DRILL® PACKERS



HN00505



HN00504

Displacement

EZ DRILL SV PACKER

- Designed to control pressure and fluid flow for remedial cementing operations.
- Controls flow and pressure differential in either direction.
- Can be removed with conventional drilling methods and equipment.
- Fluid movement is controlled with a pressure-balanced sliding valve (SV) that may be opened or closed by reciprocation of the tubing, before and after squeeze cementing.
- Allows pressure testing of workstring.
- Runs in quickly and sets in a wide variety of casing grades.
- Can be set with wireline, tubing, or drillpipe.

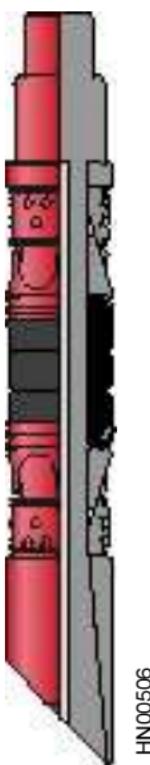
EZ DRILL SVB PACKER

- Offers performance features similar to SV model but with additional capabilities.
- The brass mandrel in the SVB model is stronger and more ductile than the cast iron mandrel in the SV model but just as drillable.
- Improved slips allow the packer to be set in all grades of casing up to V150.
- Improved valve performance in high-temperature and high-pressure conditions, especially when the valve is repeatedly cycled.

AVAILABLE FOR TUBINGLESS COMPLETIONS

FASDRILL™ PACKERS AND BRIDGE PLUGS

Displacement



FASDRILL PACKER

- Helps reduce costs by saving rig time.
- Excellent as a cement retainer for squeeze cementing operations and in multi-zone stimulation operations.
- Drills out with conventional tricone or junk-mill bits.
- Very drillable with coiled tubing and mud motors.

FASDRILL BRIDGE PLUG

- Made almost entirely of composites with minimal ferrous content.
- Can be run and set on tubing or drillpipe or with electric wireline.
- Reduces chance of casing damage caused by long drillout processes.

AVAILABLE FOR TUBINGLESS COMPLETIONS

SECTION No. 130

DISPLACEMENT

Table 131	Displacement of Rotary Tool Joints
Table 132	Buoyancy Factors
Table 133	Displacement of Tubing, Upsets, and Couplings
Table 134	Displacement of Drill Pipe, Upsets, and Couplings
Table 135	Displacement of Casing and Couplings

NOTE:

Displacement as used herein is the amount at space taken up by the metal in a string of pipe. For the purpose of calculations the tables show this displacement separated into displacement of pipe, upsets, couplings and tool joints.

The purpose is to show the amount of space taken up by the metal in a string of pipe and to provide a basis for making allowance for couplings, upsets or tool joints, not shown in other tables in this handbook.

When it is desired to make allowance for inner restrictions of upsets, etc., when calculating the capacity of a string of pipe, first determine the capacity exclusive of inner restrictions as shown in tables in the Capacity section, then deduct the amount of inner restrictions determined by using tables in this section.

When it is desired to make allowance for outer extensions of couplings, etc. when calculating annular space behind a string of pipe first determine the volume exclusive of outer extensions, (couplings, etc.) by using the tables in the Annular Space Section. then deduct the amount of outer extension determined by using tables in this section.

NOTE:

There are some differences in the values in these tables and those previously published. The differences are slight and the former values are sufficiently accurate for dependable results. The values in these tables have been calculated on the IBM 1620 Computer.



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TABLE NO. 131
DISPLACEMENT OF ROTARY TOOL JOINTS*

A.P.I. Size (Ins.)	Inner Restriction of Tool Joints**		Outer Extension of Tool Joints	
	(Amount of space taken up by metal smaller than the I.D. of drill pipe)		(Amount of space taken up by metal larger than the O.D. of drill pipe)	
	Tool Jts. Per Gallon	Tool Jts. Per Cu. Ft.	Tool Jts. Per Gallon	Tool Jts. Per Cu. Ft.
2 ³ / ₈	28.30	211.68	3.71	27.72
2 ⁷ / ₈	22.06	164.97	2.38	17.79
3 ¹ / ₂	15.55	116.32	1.94	14.47
4	49.85	372.84	0.86	6.45
4 ¹ / ₂	7.79	58.26	1.10	8.25
5 ¹ / ₂	2.62	19.62	0.78	5.86
6 ⁵ / ₈	1.33	9.98	0.68	5.05

*Figures show average displacement for the various types of Standard API tool joints for each size.

**The amount of inner Restriction is approximate, as the API standards do not specify all the internal dimensions.

TABLE NO. 132
**BUOYANCY FACTORS FOR STEEL PIPE
 IN VARIOUS WEIGHT FLUIDS**
 (Fluid Density — lb./gal.)

Lb./Gal.	Buoyancy Factor	Lb./Gal.	Buoyancy Factor	Lb./Gal.	Buoyancy Factor
6.0	.9083	11.0	.8319	16.0	.7555
6.1	.9068	11.1	.8304	16.1	.7540
6.2	.9053	11.2	.8289	16.2	.7524
6.3	.9037	11.3	.8273	16.3	.7509
6.4	.9022	11.4	.8258	16.4	.7494
6.5	.9007	11.5	.8243	16.5	.7479
6.6	.8991	11.6	.8227	16.6	.7463
6.7	.8976	11.7	.8212	16.7	.7448
6.8	.8961	11.8	.8197	16.8	.7433
6.9	.8946	11.9	.8182	16.9	.7417
7.0	.8930	12.0	.8166	17.0	.7402
7.1	.8915	12.1	.8151	17.1	.7387
7.2	.8900	12.2	.8136	17.2	.7372
7.3	.8884	12.3	.8120	17.3	.7356
7.4	.8869	12.4	.8105	17.4	.7341
7.5	.8854	12.5	.8090	17.5	.7326
7.6	.8839	12.6	.8075	17.6	.7311
7.7	.8823	12.7	.8059	17.7	.7295
7.8	.8808	12.8	.8044	17.8	.7280
7.9	.8793	12.9	.8029	17.9	.7265
8.0	.8778	13.0	.8013	18.0	.7249
8.1	.8762	13.1	.7998	18.1	.7234
8.2	.8747	13.2	.7983	18.2	.7219
8.3	.8732	13.3	.7968	18.3	.7204
8.33*	.8727	13.4	.7952	18.4	.7188
8.4	.8716	13.5	.7937	18.5	.7173
8.5	.8701	13.6	.7922	18.6	.7158
8.6	.8686	13.7	.7906	18.7	.7142
8.7	.8671	13.8	.7891	18.8	.7127
8.8	.8655	13.9	.7876	18.9	.7112
8.9	.8640	14	.7861	19	.7097
9.0	.8625	14.1	.7845	19.1	.7081
9.1	.8609	14.2	.7830	19.2	.7066
9.2	.8594	14.3	.7815	19.3	.7051
9.3	.8579	14.4	.7800	19.4	.7035
9.4	.8564	14.5	.7784	19.5	.7020
9.5	.8548	14.6	.7769	19.6	.7005
9.6	.8533	14.7	.7754	19.7	.6990
9.7	.8518	14.8	.7738	19.8	.6974
9.8	.8502	14.9	.7723	19.9	.6960
9.9	.8487	15.0	.7708	20.0	.6944
10.0	.8472	15.1	.7693		
10.1	.8457	15.2	.7677		
10.2	.8441	15.3	.7662		
10.3	.8426	15.4	.7647		
10.4	.8411	15.5	.7631		
10.5	.8395	15.6	.7616		
10.6	.8380	15.7	.7601		
10.7	.8365	15.8	.7586		
10.8	.8350	15.9	.7570		
10.9	.8334				

FOR OPEN ENDED PIPE
 Pipe Wt. (in Fluid) = Pipe Wt. (In Air) x Buoyancy Factor
 *Weight of Water at 68°F (20°C)

TABLE
DISPLACEMENT OF API TUBING, EXTERNAL

Size O.D. (Inches)	Wt. Per Ft. With Couplings Lbs.	I.D. (Inches)	Drift Dia.	Displacement of Tubing†	
				Lin. Ft. Per Gallon	Lin. Ft. Per Cu. Ft.
1.050	1.14 *1.20	.824 .824	.730 .730	57.8712 57.8712	432.9070 432.9070
1.315	1.7 ‡1.72 *1.80 ‡2.25	1.049 1.049 1.049 .957	.955 .955 .955 .848	38.9773 38.9773 38.9773 30.1335	291.5705 291.5705 291.5705 225.4143
1.660	‡2.10 2.3 ‡2.33 *2.40 ‡3.02	1.410 1.380 1.380 1.380 1.278	1.286 1.286 1.286 1.286 1.184	31.9347 28.7945 28.7945 28.7945 21.8387	238.8879 215.3977 215.3977 215.3977 163.3645
1.900	‡2.40 2.75 ‡2.76 *2.90 ‡3.64	1.650 1.610 1.610 1.610 1.500	1.516 1.516 1.516 1.516 1.406	27.6167 24.0789 24.0789 24.0789 18.0220	206.5876 180.1223 180.1223 180.1223 134.8137
2.063	‡3.25	1.751	1.657	20.5971	154.0768
2.375	4.00 4.60 *4.70 ‡5.30 5.80 *5.95 ‡6.20 ‡7.70	2.041 1.995 1.995 1.939 1.867 1.867 1.853 1.703	1.947 1.901 1.901 1.845 1.773 1.773 1.759 1.609	16.6175 14.7596 14.7596 13.0309 11.3738 11.3738 11.1054 8.9438	124.3074 110.4098 110.4098 97.4779 85.0821 85.0821 83.0744 66.9046

* External upset

‡ Integral Joint

† Figures show the amount of space taken up by the metal in the tubing, exclusive of outer extensions of upsets and couplings.

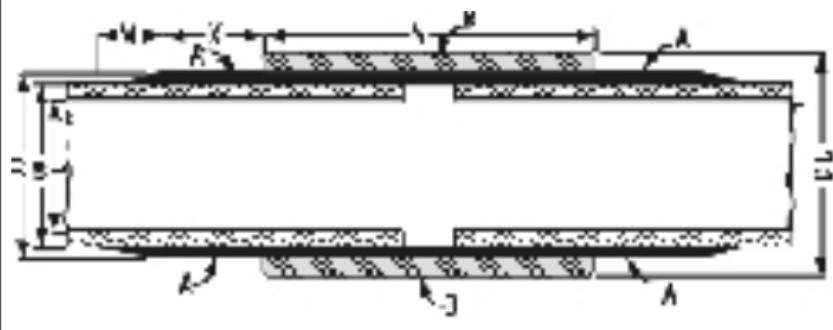
NO. 133

UPSETS, COUPLINGS, & INTEGRAL JOINTS

Displacement of External Upsets**		Displacement of Couplings***		Displacement of Integral Joints		Size O.D. (Inches)
Pair of Upsets Per Gallon	Pair of Upsets Per cu. Ft.	Cplgs. Per Gallon	Cplgs. Per Cu. Ft.	Joints Per Gallon	Joints Per Cu. Ft.	
— 135.53	— 1013.84	188.9 59.4	1413.0 444.6	— —	— —	1.050
— 197.04	— 1473.97	108.7 — 49.4	812.8 — 369.5	— 168.53 — 73.37	— 1260.71 — 548.62	1.315
— — 159.90	— — 1196.13	— 68.9 — 42.2	— 515.2 — 315.9	126.65 — 134.55 —	947.42 — 1006.47 —	1.660
— — 108.99	— — 815.29	— 81.8 — 31.9	— 612.1 — 238.8	106.53 — 116.14 —	796.89 — 868.80 —	1.900
— — — — — — —	— — — — — — —	108.1	808.7	84.11	629.22	2.063
— — 52.89	— — 395.63	30.4 31.0 17.7	227.3 231.7 132.7	— — —	— — 34.2	2.375
— — 52.89	— — 395.63	— 32.7 18.3	— 244.4 136.8	— — —	255.81 — 20.58	— — 153.92
— — — — — —	— — — — — —	— — —	— — —	— — 15.81	— — 118.28	— — —

** Figures show the amount of space taken up by a pair of upsets above the O.D. of tubing as indicated in drawings below by the solid black area marked A-A'. As there are two upsets in each joint of tubing the upsets are figured in pairs; therefore, when using this table, it is only necessary to divide the number of joints of tubing by the above figures.

*** Figures show the amount of space taken up by metal in Couplings larger than the O.D. of the tubing.



TABLE

DISPLACEMENT OF API TUBING, EXTERNAL

Size O.D. (Inches)	Wt. Per Ft. With Couplings Lbs.	I.D. (Inches)	Drift Dia. In.	Displacement of Tubing†	
				Lin. Ft. Per Gallon	Lin. Ft. Per Cu. Ft.
2.875	6.40	2.441	2.347	10.6235	79.4690
	*6.50	2.441	2.347	10.6235	79.4690
	‡7.90	2.323	2.229	8.5421	63.8995
	8.60	2.259	2.165	7.7500	57.9744
	*8.70	2.259	2.165	7.7500	57.9744
	‡9.50	2.195	2.101	7.1093	53.1809
	‡10.70	2.091	1.997	6.2953	47.0923
	‡11.00	2.065	1.971	6.1253	45.8206
3.500	7.70	3.068	2.943	8.6382	64.6183
	9.20	2.992	2.867	7.4319	55.5943
	*9.30	2.992	2.867	7.4319	55.5943
	10.20	2.922	2.797	6.6030	49.3940
	12.70	2.750	2.625	5.2288	39.1139
	*12.95	2.750	2.625	5.2288	39.1139
	‡12.80	2.764	2.639	5.3163	39.7689
	‡15.80	2.548	2.423	4.2569	31.8437
	‡16.70	2.480	2.355	4.0183	30.0588
4.000	9.50	3.548	3.423	7.1841	53.7406
	*11.00	3.476	3.351	6.2566	46.8028
	‡11.60	3.428	3.303	5.7686	43.1524
	‡13.40	3.340	3.215	5.0594	37.8471
4.500	12.60	3.958	3.833	5.3466	39.9950
	*12.75	3.958	3.833	5.3466	39.9950
	‡13.50	3.920	3.795	5.0188	37.5433
	‡15.50	3.826	3.701	4.3676	32.6720
	‡19.20	3.640	3.515	3.5012	26.1909

* External upset

‡ Integral Joint

† Figures show the amount of space taken up by the metal in the tubing, exclusive of outer extensions of upsets and couplings.

NO. 134

UPSETS, COUPLINGS, & INTEGRAL JOINTS

Displacement of External Upsets**		Displacement of Couplings***		Displacement of Integral Joints		Size O.D. (Inches)
Pair of Upsets Per Gallon	Pair of Upsets Per cu. Ft.	Cplgs. Per Gallon	Cplgs. Per Cu. Ft.	Joints Per Gallon	Joints Per Cu. Ft.	
—	—	16.2	121.5	—	—	2.875
42.96	321.34	11.8	88.2	—	—	
—	—	—	—	17.17	128.43	
—	—	17.0	127.5	—	—	
42.96	321.34	12.2	91.4	—	—	
—	—	—	—	13.02	97.39	
—	—	—	—	11.69	87.42	
—	—	—	—	10.94	81.81	
—	—	9.9	73.7	—	—	3.500
—	—	10.0	74.8	—	—	
30.98	231.72	6.9	51.5	—	—	
—	—	10.1	75.9	—	—	
—	—	10.5	78.6	—	—	
30.98	231.72	7.1	53.3	—	—	
—	—	—	—	8.47	63.37	
—	—	—	—	7.51	56.21	
—	—	—	—	7.07	52.90	
—	—	8.6	64.1	—	—	4.000
28.58	213.78	5.9	43.9	—	—	
—	—	—	—	9.75	72.94	
—	—	—	—	—	—	
—	—	7.9	59.5	—	—	4.500
24.27	181.53	4.7	35.3	—	—	
—	—	—	—	—	—	
—	—	—	—	8.72	65.25	
—	—	—	—	6.37	47.68	

** Figures show the amount of space taken up by a pair of upsets above the O.D. of tubing as indicated in drawings below by the solid black area marked A-A'. As there are two upsets in each joint of tubing the upsets are figured in pairs; therefore, when using this table, it is only necessary to divide the number of joints of tubing by the above figures.

*** Figures show the amount of space taken up by metal in Couplings larger than the O.D. of the tubing.

TABLE
DISPLACEMENT OF API DRILL PIPE

Size O.D. (Inches)	Wt. Per Ft. With Couplings Lbs.	I.D. (Inches)	Displacement of Drill Pipe*	
			Lin. Ft. Per Gallon	Lin. Ft. Per Cu. Ft.
$2\frac{3}{8}$	‡4.80	2.000	14.9393	111.7541
	4.85	1.995	14.7596	110.4098
	6.65	1.815	10.4457	78.1395
$2\frac{7}{8}$	‡6.45	2.469	11.2966	84.5046
	6.85	2.441	10.6235	79.4691
	‡8.35	2.323	8.5421	63.8995
	10.40	2.151	6.7357	50.3862
$3\frac{1}{2}$	8.50	3.063	8.5459	63.9277
	9.50	2.992	7.4319	55.5943
	‡11.20	2.900	6.3828	47.7465
	13.30	2.764	5.3163	39.7689
	15.50	2.602	4.4729	33.4599
4	11.85	3.476	6.2570	46.8030
	14.00	3.340	5.0594	37.8471
$4\frac{1}{2}$	‡12.75	4.000	5.7670	43.1404
	‡13.75	3.958	5.3466	39.9950
	16.60	3.826	4.3676	32.6720
	20.00	3.640	3.5012	26.1909
5	16.25	4.408	4.4007	32.9195
	19.50	4.276	3.6496	27.3007
$5\frac{1}{2}$	21.90	4.778	3.3029	24.7074
	24.70	4.670	2.9036	21.7207
$\frac{59}{16}$	19.00	4.975	3.9555	29.5895
	22.20	4.859	3.3405	24.9890
	25.25	4.733	2.8681	21.4549
$\frac{65}{8}$	22.20	6.065	3.4490	25.8002
	25.20	5.965	2.9497	22.0649
	31.90	5.761	2.2903	17.1328
$\frac{75}{8}$	29.25	6.969	2.5601	19.1511
$\frac{85}{8}$	40.00	7.825	1.8625	13.9321

† Not API Standard. Shown for information only.

* Figures show the amount of space taken up by the metal in the drill pipe, exclusive of the inner restrictions and outer extensions of Upsets, Couplings and Tool Joints.

NO. 134

INTERNAL UPSETS AND COUPLINGS

Displacement of Internal Upsets**		Displacement of Couplings***		Weight Per Ft. With Cplgs. (Lbs.)	Size O.D. (Inches)
Pairs of Upsets Per Gallon	Pairs of Upsets Per Cu. Ft.	Cplgs. Per Gallon	Cplgs. Per Cu. Ft.		
18.82	140.79	14.11	105.56	\$4.80	2 ³ / ₈
19.05	142.10	—	—	4.85	
20.28	151.70	14.67	109.75	6.65	
13.30	99.51	8.35	62.44	\$6.45	2 ⁷ / ₈
14.10	105.82	—	—	6.85	
14.22	106.40	8.54	63.86	\$8.35	
12.07	90.32	8.76	65.51	10.40	
9.99	74.73	8.51	63.67	8.50	3 ¹ / ₂
11.50	85.95	—	—	9.50	
10.70	80.02	8.79	65.75	\$11.20	
10.39	77.73	9.02	67.50	13.30	
11.68	87.41	9.30	69.59	15.50	
15.47	115.73	4.83	36.16	11.85	4
5.28	39.46	4.92	36.79	14.00	
4.78	35.77	3.91	29.25	\$12.75	4 ¹ / ₂
4.53	33.91	3.93	29.40	\$13.75	
3.92	29.29	3.99	29.86	16.60	
5.05	37.79	4.08	30.50	20.00	
4.12	30.23	—	—	16.25	5
6.97	52.17	3.66	27.35	19.50	
3.39	25.39	2.41	18.06	21.90	5 ¹ / ₂
2.88	21.56	2.44	18.23	24.70	
3.39	25.35	2.51	18.76	19.00	\$5 ⁹ / ₁₆
3.06	22.89	2.54	18.97	22.20	
2.69	20.14	2.57	19.20	25.25	
2.69	20.16	2.14	16.00	22.20	\$6 ⁵ / ₈
2.67	20.00	2.16	16.15	25.20	
2.42	18.10	2.20	16.48	31.90	
2.00	14.94	1.55	11.56	29.25	\$7 ⁵ / ₈
1.29	9.64	1.16	8.66	40.00	\$8 ⁵ / ₈

** Figures show the amount of space taken up by metal in a pair of upsets smaller than the I.D. of drillpipe. As there are two upsets in each joint of drill pipe the upsets are figured in pairs; therefore, when using this table, it is only necessary to divide the number of joints of drill pipe by the above figures.

*** Figures show the amount of space taken up by metal in Couplings larger than the O.D. of drill pipe.

For restrictions and extensions of tool joints see Table 131.

TABLE
DISPLACEMENT OF

Size O.D. (In.)	Wt. Per Ft. With Cplgs. Lbs.	Inside Dia. In.	Drift Dia. In.	Displacement of Casing**		Displacement of Couplings (Long)***	
				Lin. Ft. Per Gallon	Lin. Ft. Per Cu. Ft.	Cplgs. Per Gal.	Cplgs. Per Cu. Ft.
$4\frac{1}{2}$	9.50	4.090	3.965	6.959	52.059	—	—
	10.50	4.052	3.927	6.397	47.855	—	—
	11.60	4.000	3.875	5.767	43.140	10.14	75.9
	13.50	3.920	3.795	5.019	37.543	10.37	77.6
	15.10	3.826	3.701	4.368	32.672	10.64	79.6
	*16.60	3.754	3.629	3.980	29.776	—	—
	*18.80	3.640	3.515	3.501	26.191	—	—
$*4\frac{3}{4}$	16.00	4.082	3.957	4.154	31.077	7.23	54.1
5	11.50	4.560	4.435	5.827	43.588	—	—
	13.00	4.494	4.369	5.102	38.166	7.12	53.3
	15.00	4.408	4.283	4.401	32.920	7.26	54.3
	18.00	4.276	4.151	3.650	27.301	7.47	55.9
	*20.30	4.184	4.059	3.270	24.465	—	—
	*20.80	4.156	4.031	3.172	23.726	7.67	57.4
	*23.20	4.044	3.919	2.835	21.206	—	—
	*24.20	4.000	3.875	2.723	20.372	7.93	59.3
$5\frac{1}{2}$	*13.00	5.044	4.919	5.098	38.133	—	—
	14.00	5.012	4.887	4.778	35.741	—	—
	15.50	4.950	4.825	4.264	31.900	6.53	48.8
	17.00	4.892	4.767	3.879	29.018	6.61	49.4
	20.00	4.778	4.653	3.303	24.707	6.78	50.7
	23.00	4.670	4.545	2.904	21.721	6.94	51.9
	*26.00	4.548	4.423	2.562	19.167	—	—
$*5\frac{3}{4}$	14.00	5.290	5.165	4.826	36.103	—	—
	17.00	5.190	5.065	4.001	29.927	—	—
	19.50	5.090	4.965	3.426	25.627	—	—
	22.50	4.990	4.865	3.003	22.462	5.47	40.9
*6	15.00	5.524	5.399	4.468	33.424	—	—
	18.00	5.424	5.299	3.725	27.863	4.86	36.4
	20.00	5.352	5.227	3.332	24.924	4.93	36.8
	23.00	5.240	5.115	2.869	21.463	5.03	37.6
	26.00	5.140	5.015	2.537	18.975	5.12	38.3
$6\frac{5}{8}$	*17.00	6.135	6.010	3.920	29.324	—	—
	20.00	6.049	5.924	3.357	25.115	3.40	25.4
	24.00	5.921	5.796	2.775	20.758	3.46	25.9
	28.00	5.791	5.666	2.367	17.706	3.52	26.4
	32.00	5.675	5.550	2.098	15.691	3.58	26.8
7	17.00	6.538	6.413	3.919	29.314	—	—
	20.00	6.456	6.331	3.348	25.047	—	—
	23.00	6.366	6.241	2.892	21.636	3.77	28.2
	*24.00	6.336	6.211	2.768	20.705	3.79	28.3
	26.00	6.276	6.151	2.550	19.075	3.82	28.6
	29.00	6.184	6.059	2.278	17.043	3.88	29.0
	32.00	6.094	5.969	2.066	15.455	3.94	29.5
	35.00	6.004	5.879	1.892	14.156	4.00	29.9
	38.00	5.920	5.795	1.757	13.140	4.05	30.3

* Not API Standard. Shown for information only.

** Figures show the amount of space taken up by the metal in the casing, exclusive of the outer extensions of couplings.

NO. 135

UPSETS, COUPLINGS, & INTEGRAL JOINTS

Displacement of Cplgs. (Short)**		Displacement of Cplgs. Buttress***		Displacement of Extreme Line Joints***		Size O.D. (In.)
Cplgs. Per Gallon	Cplgs. Per cu. Ft.	Cplgs. Per Gallon	Cplgs. Per Cu. Ft.	Joints Per Gallon	Joints Per Cu. Ft.	
13.51	101.1	—	—	—	—	4 $\frac{1}{2}$
11.38	85.1	7.7	57.4	—	—	—
11.56	86.5	7.8	58.0	—	—	—
—	—	7.9	59.0	—	—	—
—	—	7.9	59.0	—	—	—
—	—	—	—	—	—	—
—	—	—	—	—	—	—
8.94	66.8	—	—	—	—	*4 $\frac{3}{4}$
9.09	68.0	—	—	—	—	5
8.69	65.0	5.9	44.5	—	—	—
8.89	66.5	6.0	45.2	6.5	48.6	—
—	—	6.2	46.3	8.4	62.7	—
—	—	—	—	—	—	—
—	—	6.3	47.3	—	—	—
—	—	—	—	—	—	—
—	—	6.5	48.6	—	—	—
8.25	61.7	—	—	—	—	5 $\frac{1}{2}$
7.79	58.3	—	—	—	—	—
7.92	59.3	5.5	41.5	5.8	43.6	—
8.04	60.2	5.6	42.0	6.1	45.5	—
—	—	5.7	42.9	7.6	57.2	—
—	—	5.8	43.7	7.9	59.4	—
—	—	—	—	—	—	—
5.37	40.1	—	—	—	—	*5 $\frac{3}{4}$
5.50	41.1	—	—	—	—	—
5.63	42.1	—	—	—	—	—
5.77	43.2	—	—	—	—	—
5.91	44.2	—	—	—	—	*6
6.05	45.2	—	—	—	—	—
6.14	46.0	—	—	—	—	—
6.30	47.1	—	—	—	—	—
—	—	—	—	—	—	—
4.11	30.8	—	—	—	—	6 $\frac{5}{8}$
4.18	31.2	3.1	22.9	—	—	—
4.27	31.9	3.1	23.3	5.4	40.4	—
—	—	3.2	23.7	6.4	47.6	—
—	—	3.2	24.0	6.4	47.6	—
5.44	40.7	—	—	—	—	7
4.71	35.3	—	—	—	—	—
4.80	35.9	3.4	25.1	4.5	33.5	—
4.83	36.2	—	—	—	—	—
4.89	36.6	3.4	25.4	5.3	39.6	—
—	—	3.4	25.8	5.8	43.5	—
—	—	3.5	26.1	5.8	43.4	—
—	—	3.5	26.4	3.9	29.2	—
—	—	3.6	26.8	3.9	29.4	—

*** Figures show the amount of space taken up by metal in couplings larger than the O.D. of Casings.

TABLE
DISPLACEMENT OF

Size O.D. (In.)	Wt. Per Ft. With Cplgs. Lbs.	Inside Dia. In.	Drift Dia. In.	Displacement of Casing**		Displacement of Couplings (Long)***	
				Lin. Ft. Per Gallon	Lin. Ft. Per Cu. Ft.	Cplgs. Per Gal.	Cplgs. Per Cu. Ft.
$7\frac{5}{8}$	*20.00	7.125	7.000	3.323	24.861	—	—
	24.00	7.025	6.900	2.788	20.859	—	—
	26.40	6.969	6.844	2.560	19.151	2.43	18.2
	29.70	6.875	6.750	2.254	16.859	2.46	18.4
	33.70	6.765	6.640	1.981	14.815	2.49	18.6
	39.00	6.625	6.500	1.720	12.866	2.53	18.9
	*45.30	6.435	6.310	1.465	10.958	2.58	19.3
	*8	26.00	7.386	2.594	19.408	—	—
$8\frac{1}{8}$	28.00	7.485	7.360	2.453	18.352	—	—
	32.00	7.385	7.260	2.135	15.975	—	—
	35.50	7.285	7.160	1.893	14.164	—	—
	39.50	7.185	7.060	1.703	12.740	—	—
$8\frac{5}{8}$	24.00	8.097	7.972	2.776	20.766	—	—
	28.00	8.017	7.892	2.422	18.120	—	—
	32.00	7.921	7.796	2.104	15.740	1.72	12.9
	36.00	7.825	7.700	1.862	13.932	1.74	13.0
	40.00	7.725	7.600	1.666	12.460	1.75	13.1
	44.00	7.625	7.500	1.508	1.283	1.77	13.2
	49.00	7.511	7.386	1.364	10.200	1.79	13.4
*9	34.00	8.290	8.134	1.997	14.935	1.61	12.1
	38.00	8.196	8.040	1.773	13.261	1.63	12.2
	40.00	8.150	7.994	1.681	12.577	1.63	12.2
	45.00	8.032	7.876	1.487	11.121	1.65	12.3
$9\frac{3}{8}$	*29.30	9.063	8.907	2.334	17.457	—	—
	32.30	9.001	8.845	2.109	15.775	—	—
	36.00	8.921	8.765	1.877	14.043	1.47	11.0
	40.00	8.835	8.679	1.681	12.572	1.49	11.1
	43.50	8.755	8.599	1.533	11.466	1.50	11.2
	47.00	8.681	8.525	1.418	10.610	1.51	11.3
	53.50	8.535	8.379	1.238	9.263	1.53	11.4
	*58.40	8.435	8.279	1.140	8.531	1.54	11.5
	*61.10	8.375	8.219	1.089	8.149	1.55	11.6
	*71.80	8.125	7.969	.921	6.886	1.58	11.8
	*10	33.00	9.384	9.228	2.053	15.355	—
$10\frac{3}{4}$	32.75	10.192	10.036	2.097	15.690	—	—
	40.50	10.050	9.894	1.683	12.592	—	—
	45.50	9.950	9.794	1.480	11.072	—	—
	51.00	9.850	9.694	1.322	9.889	—	—
	55.50	9.760	9.604	1.207	9.030	—	—
	60.70	9.660	9.504	1.102	8.241	—	—
	65.70	9.560	9.404	1.014	7.586	—	—
	*71.10	9.450	9.294	.933	6.982	—	—

* Not API Standard. Shown for information only.

** Figures show the amount of space taken up by the metal in the casing, exclusive of the outer extensions of couplings.

NO. 135

CASING AND COUPLINGS

Displacement of Cplgs. (Short)**		Displacement of Cplgs. Buttress***		Displacement of Extreme Line Joints***		Size O.D. (In.)
Cplgs. Per Gallon	Cplgs. Per cu. Ft.	Cplgs. Per Gallon	Cplgs. Per Cu. Ft.	Joints Per Gallon	Joints Per Cu. Ft.	
3.17	23.7	—	—	—	—	7 $\frac{1}{8}$
3.03	22.7	—	—	—	—	
3.06	22.9	2.1	16.1	4.1	30.9	
—	—	2.2	16.2	4.9	36.9	
—	—	2.2	16.4	5.4	40.6	
—	—	2.2	16.7	5.4	40.6	
—	—	2.3	17.0	—	—	
2.76	20.7	—	—	—	—	*8
1.91	14.3	—	—	—	—	*8 $\frac{1}{8}$
1.94	14.5	—	—	—	—	
1.96	14.7	—	—	—	—	
1.99	14.8	—	—	—	—	
2.33	17.5	—	—	—	—	8 $\frac{5}{8}$
2.24	16.8	—	—	—	—	
2.27	17.0	1.6	12.1	2.3	17.3	
2.29	17.2	1.6	12.2	2.6	19.8	
—	—	1.6	12.3	2.8	20.9	
—	—	1.7	12.4	2.8	21.0	
—	—	1.7	12.5	2.8	21.0	
2.18	16.3	—	—	—	—	*9
2.20	16.5	—	—	—	—	
2.22	16.6	—	—	—	—	
2.25	16.8	—	—	—	—	
2.05	15.3	—	—	—	—	9 $\frac{5}{8}$
2.02	15.1	—	—	—	—	
2.04	15.3	1.5	10.9	—	—	
2.07	15.5	1.5	11.0	2.2	16.6	
2.09	15.6	1.5	11.0	2.5	18.7	
2.11	15.8	1.5	11.1	2.6	19.6	
2.14	16.0	1.5	11.3	2.6	19.6	
—	—	1.5	11.4	—	—	
—	—	1.5	11.4	—	—	
—	—	1.6	11.7	—	—	
1.94	14.5	—	—	—	—	*10
1.95	14.6	—	—	—	—	10 $\frac{3}{4}$
1.78	13.3	1.3	9.8	—	—	
1.80	13.5	1.3	9.9	1.3	9.7	
1.82	13.6	1.3	10.0	1.3	9.7	
1.84	13.8	1.3	10.1	1.3	9.7	
1.86	13.9	—	—	—	—	
1.89	14.1	—	—	—	—	
1.91	14.3	1.4	10.3	—	—	

*** Figures show the amount of space taken up by metal in couplings larger than the O.D. of Casings.

TABLE
DISPLACEMENT OF

Size O.D. (In.)	Wt. Per Ft. With Cplgs. Lbs.	Inside Dia. In.	Drift Dia. In.	Displacement of Casing**		Displacement of Couplings (Long)***	
				Lin. Ft. Per Gallon	Lin. Ft. Per Cu. Ft.	Cplgs. Per Gal.	Cplgs. Per Cu. Ft.
11 ³ / ₄	*38.00	11.150	10.994	1.784	13.344	—	—
	42.00	11.084	10.928	1.612	12.056	—	—
	47.00	11.000	10.844	1.436	10.746	—	—
	54.00	10.880	10.724	1.245	9.313	—	—
	60.00	10.772	10.616	1.113	8.324	—	—
*12	40.00	11.384	11.228	1.702	12.728	—	—
*13	40.00	12.438	12.282	1.714	12.825	—	—
	45.00	12.360	12.204	1.510	11.296	—	—
	50.00	12.282	12.126	1.350	10.100	—	—
	54.00	12.220	12.064	1.246	9.320	—	—
13 ³ / ₈	48.00	12.715	12.559	1.423	10.648	—	—
	54.50	12.615	12.459	1.241	9.282	—	—
	61.00	12.515	12.359	1.101	8.235	—	—
	68.00	12.415	12.259	.990	7.405	—	—
	72.00	12.347	12.191	.927	6.934	—	—
	85.00	12.159	12.003	.789	5.905	—	—
	98.00	11.937	11.781	.673	5.037	—	—
*14	50.00	13.344	13.156	1.366	10.221	—	—
16	*55.00	15.376	15.187	1.252	9.365	—	—
	65.00	15.250	15.062	1.046	7.823	—	—
	75.00	15.124	14.936	.899	6.725	—	—
	84.00	15.010	14.822	.798	5.972	—	—
	*109.00	14.688	14.500	.609	4.554	—	—
*18 ⁵ / ₈	78.00	17.855	17.667	.873	6.527	—	—
	87.50	17.755	17.567	.774	5.793	—	—
	96.50	17.655	17.467	.696	5.210	—	—
20	94.00	19.124	18.936	.715	5.350	—	—
	106.50	19.000	18.812	.628	4.701	.68	5.1
	133.00	18.730	18.542	.498	3.728	.70	5.2
*21 ¹ / ₂	92.50	20.710	20.522	.735	5.498	—	—
	103.00	20.610	20.422	.654	4.892	—	—
	114.00	20.510	20.322	.589	4.408	—	—
*24 ¹ / ₂	100.50	23.750	23.562	.677	5.067	—	—
	113.00	23.650	23.462	.599	4.480	—	—

* Not API Standard. Shown for information only.

** Figures show the amount of space taken up by the metal in the casing, exclusive of the outer extensions of couplings.

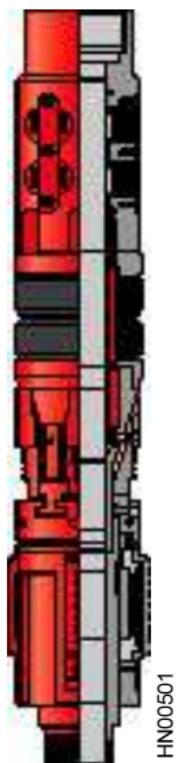
NO. 133

CASING AND COUPLINGS

Displacement of Cplgs. (Short)**		Displacement of Cplgs. Buttress***		Displacement of Extreme Line Joints***		Size O.D. (In.)
Cplgs. Per Gallon	Cplgs. Per cu. Ft.	Cplgs. Per Gallon	Cplgs. Per Cu. Ft.	Joints Per Gallon	Joints Per Cu. Ft.	
1.68	12.5	—	—	—	—	11 ³ / ₄
1.63	12.2	—	—	—	—	—
1.64	12.3	1.2	9.0	—	—	—
1.67	12.5	1.2	9.1	—	—	—
1.69	12.6	1.2	9.2	—	—	—
1.64	12.2	—	—	—	—	*12
1.32	9.9	—	—	—	—	*13
1.34	10.0	—	—	—	—	—
1.36	10.2	—	—	—	—	—
1.37	10.3	—	—	—	—	—
1.44	10.7	—	—	—	—	13 ³ / ₈
1.45	10.9	1.1	8.0	—	—	—
1.47	11.0	1.1	8.1	—	—	—
1.49	11.2	1.1	8.1	—	—	—
1.50	11.3	1.1	8.2	—	—	—
1.54	11.5	1.1	8.3	—	—	—
1.58	11.9	1.1	8.5	—	—	—
1.06	7.9	—	—	—	—	*14
1.06	7.9	—	—	—	—	16
1.08	8.0	—	—	—	—	—
1.09	8.2	.9	6.8	—	—	—
1.10	8.3	.9	6.9	—	—	—
1.15	8.6	.9	7.1	—	—	—
.95	7.1	—	—	—	—	*18 ⁵ / ₈
.97	7.2	—	—	—	—	—
.98	7.3	—	—	—	—	—
.88	6.6	—	—	—	—	20
.80	6.7	—	—	—	—	—
.92	6.9	—	—	—	—	—
.83	6.2	—	—	—	—	*21 ¹ / ₂
.84	6.3	—	—	—	—	—
.85	6.4	—	—	—	—	—
.73	5.4	—	—	—	—	*24 ¹ / ₂
.74	5.5	—	—	—	—	—

*** Figures show the amount of space taken up by metal in couplings larger than the O.D. of Casings.

RTTS™ PACKER AND SSC™ II VALVE



RTTS PACKER

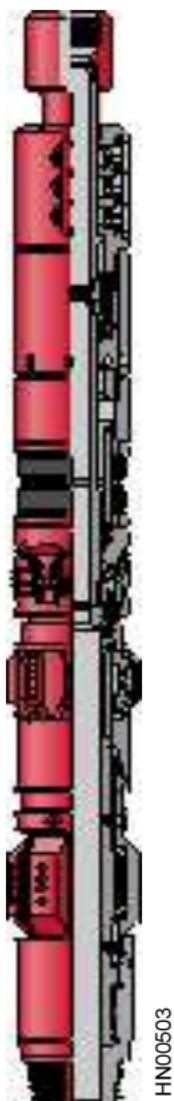
- Hookwall type retrievable packer designed for testing, treating, and squeezing.
- Optional integral circulating valve may be opened and locked at any time to allow circulation above the packer.
- Designed to hold pressure from either direction.
- Ideal for performing multiple operations on one or more zones with only one trip in the well.
- Large mandrel ID allows pumping large volumes of fluid with minimum pressure drop.
- Large ID also allows passage of tubing-type perforating guns.
- Sizes available to run in all standard casing sizes from 2³/₈-in. through 20-in. O.D.

SSC II VALVE

- Full-opening, ball-type, subsurface control valve.
- Can be installed without left-hand rotation eliminating the problems inherent when unscrewing pipe joints.
- Ball valve automatically closes to shut in the well when the SSC II is set down.
- Ball valve is opened by picking up and can be reclosed by setting back down if high pressure is detected below the valve.
- Only right-hand rotation is required to release the workstring from the valve.
- Rotation is not required to reattach the workstring to the valve.
- Can be used to test the blowout preventers during drilling.

CHAMP® PACKERS

Dimensions
and Strengths



HN00503

CHAMP L/L PACKER

- Liner-lock feature allows the Champ packer to be locked in the running position until it lands on the appropriate liner.
- Excellent for use in highly deviated wells with deep liners.
- Hookwall-type retrievable packer with a concentric bypass.
- Design helps eliminate problems associated with accidentally opening a conventional bypass during circulation around the bottom of the packer.
- Excellent for use in highly deviated wells or where pipe manipulation is difficult.
- Bypass can be opened by picking straight up (no torque required).
- Easy to relocate in multiple zones with only one trip in the well for treating, testing, or squeezing.



HN00502

CHAMP PACKER

SECTION No. 200

DIMENSIONS and STRENGTHS



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TABLE
DIMENSIONS AND STRENGTHS OF NON-UPSET

Size O.D. In.	Grade	Wt. per Ft. With Coupings, Lb.			Inside Diameter In.	Drift Diameter In.
		Non- Upset	Upset	Integral Joint		
1.050	*F-25	—	1.20	—	.824	.730
	H-40	1.14	1.20	—	.824	.730
	J-55	1.14	1.20	1.20	.824	.730
	C-75	1.14	1.20	1.20	.824	.730
	N-80	1.14	1.20	1.20	.824	.730
1.315	*F-25	—	1.80	—	1.049	.955
	H-40	1.70	1.80	1.72	1.049	.955
	J-55	1.70	1.80	1.72	1.049	.955
	*J-55	—	—	2.25	.957	.848
	C-75	1.70	1.80	1.72	1.049	.955
	*C-75	—	—	2.25	.957	.848
	N-80	1.70	1.80	1.72	1.049	.955
	*N-80	—	—	2.25	.957	.848
	*P-105	—	—	2.25	.957	.848
1.660	*F-25	—	2.40	—	1.380	1.286
	H-40	—	—	2.10	1.410	1.286
	H-40	2.30	2.40	2.33	1.380	1.286
	J-55	—	—	2.10	1.410	1.286
	J-55	2.30	2.40	2.33	1.380	1.286
	*J-55	—	—	3.02	1.278	1.184
	C-75	2.30	2.40	2.33	1.380	1.286
	*C-75	—	—	3.02	1.278	1.184
	N-80	2.30	2.40	2.33	1.380	1.286
	*N-80	—	—	3.02	1.278	1.184
	*P-105	—	—	3.02	1.278	1.184
1.900	*F-25	2.75	2.90	—	1.610	1.516
	H-40	—	—	2.40	1.650	1.516
	H-40	2.75	2.90	2.76	1.610	1.516
	J-55	—	—	2.40	1.650	1.516
	J-55	2.75	2.90	2.76	1.610	1.516
	*J-55	—	—	3.64	1.500	1.406
	C-75	2.75	2.90	2.76	1.610	1.516
	*C-75	—	—	3.64	1.500	1.406
	N-80	2.75	2.90	2.76	1.610	1.516
	*N-80	—	—	3.64	1.500	1.406
	*P-105	—	—	3.64	1.500	1.406
2.063	H-40	—	—	3.25	1.751	1.657
	J-55	—	—	3.25	1.751	1.657
	C-75	—	—	3.25	1.751	1.657
	N-80	—	—	3.25	1.751	1.657

*Non API Standard. Shown for information only.

NO. 201

EXTERNAL UPSET & INTEGRAL JOINT TUBING

Threaded & Coupled		Integral Joint Box O.D. In.	** Collapse Resist. psi	** Internal Yield Pressure psi	Joint Yield Strength, Lb.***		
O.D. of Cplg., In.	O.D. of Upset In.				Threaded & Coupled	Non-Upset	Integral Joint
Non-Upset	Upset						
—	1.660	1.315	—	5,960	4,710	8,320	—
1.313	1.660	1.315	—	7,680	7,530	6,360	13,310
1.313	1.660	1.315	1.327	10,560	10,360	8,740	18,290
1.313	1.660	1.315	1.327	14,410	14,120	11,920	24,950
1.313	1.660	1.315	1.327	15,370	15,070	12,710	26,610
—	1.900	1.469	—	5,540	4,430	—	12,350
1.660	1.900	1.469	1.550	7,270	7,080	10,960	19,760
1.660	1.900	1.469	1.550	10,000	9,730	15,060	27,160
—	—	—	1.600	12,940	13,100	—	35,000
1.660	1.900	1.469	1.550	13,640	13,270	20,540	37,040
—	—	—	1.600	17,640	17,870	—	48,000
1.660	1.900	1.469	1.550	14,550	14,160	21,910	39,510
—	—	—	1.600	18,820	19,060	—	51,000
—	—	—	1.600	24,700	25,010	—	67,000
—	2.200	1.812	—	4,440	3,690	—	16,710
—	—	—	1.880	5,570	5,270	—	22,180
2.054	2.200	1.812	1.880	6,180	5,900	15,530	26,740
—	—	—	1.880	7,660	7,250	—	30,500
2.054	2.200	1.812	1.880	8,490	8,120	21,360	36,770
—	—	—	1.927	11,200	11,070	—	48,000
2.054	2.200	1.812	1.880	11,580	11,070	29,120	50,140
—	—	—	1.927	15,270	15,100	—	66,000
2.054	2.200	1.812	1.880	12,360	11,810	31,060	53,480
—	—	—	1.927	16,290	16,110	—	71,000
—	—	—	1.927	21,380	21,140	—	93,000
2.200	2.500	2.094	—	3,920	3,340	11,930	19,990
—	—	—	2.110	4,920	4,610	—	26,890
2.200	2.500	2.094	2.110	5,640	5,340	19,090	31,980
—	—	—	2.110	6,640	6,330	—	36,970
2.200	2.500	2.094	2.110	7,750	7,350	26,250	43,970
—	—	—	2.162	10,360	10,130	—	57,000
2.200	2.500	2.094	2.110	10,570	10,020	35,800	59,960
—	—	—	2.162	14,130	13,820	—	80,000
2.200	2.500	2.094	2.110	11,280	10,680	38,180	63,960
—	—	—	2.162	15,070	14,740	—	84,000
—	—	—	2.162	19,780	19,340	—	110,000
—	—	—	2.325	5,590	5,290	—	35,690
—	—	—	2.325	7,690	7,280	—	49,070
—	—	—	2.325	10,480	9,920	—	66,910
—	—	—	2.325	11,180	10,590	—	71,370

** Collapse, Internal Yield Strengths are minimum values with no safety factor,
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Properties of Casing and Tubing.

TABLE
DIMENSIONS AND STRENGTHS OF NON-UPSET

Size O.D. In.	Grade	Wt. per Ft. With Coupings, Lb.			Inside Diameter In.	Drift Diameter In.
		Non- Upset	Upset	Integral Joint		
2.375	*F-25	4.00	—	—	2.041	1.947
	*F-25	4.60	4.70	—	1.995	1.901
	H-40	4.00	—	—	2.041	1.947
	H-40	4.60	4.70	—	1.995	1.901
	J-55	4.00	—	—	2.041	1.947
	J-55	4.60	4.70	4.70	1.995	1.901
	*J-55	—	—	5.30	1.939	1.845
	*J-55	—	—	6.20	1.853	1.759
	*J-55	—	—	7.70	1.703	1.609
	C-75	4.00	—	—	2.041	1.947
	C-75	4.60	4.70	4.70	1.995	1.901
	*C-75	—	—	5.30	1.939	1.845
	C-75	5.80	5.95	5.95	1.867	1.773
	*C-75	—	—	6.20	1.853	1.759
	*C-75	—	—	7.70	1.703	1.609
	N-80	4.00	—	—	2.041	1.947
	N-80	4.60	4.70	4.70	1.995	1.901
	*N-80	—	—	5.30	1.939	1.845
	N-80	5.80	5.95	5.95	1.867	1.773
	*N-80	—	—	6.20	1.853	1.759
	*N-80	—	—	7.70	1.703	1.609
	P-105	4.60	4.70	4.70	1.995	1.901
	*P-105	—	—	5.30	1.939	1.845
	P-105	5.80	5.95	5.95	1.867	1.773
	*P-105	—	—	6.20	1.853	1.759
	*P-105	—	—	7.70	1.703	1.609
	*P-110	4.60	4.70	—	1.995	1.901
	*P-110	5.80	5.95	—	1.867	1.773
2.875	*F-25	6.40	6.50	—	2.441	2.347
	H-40	6.40	6.50	—	2.441	2.347
	J-55	6.40	6.50	6.50	2.441	2.347
	*J-55	—	—	7.90	2.323	2.229
	*J-55	—	—	8.70	2.259	2.165
	*J-55	—	—	9.50	2.195	2.101
	*J-55	—	—	10.70	2.091	1.997
	*J-55	—	—	11.00	2.065	1.971
	C-75	6.40	6.50	6.50	2.441	2.347
	*C-75	—	—	7.90	2.323	2.229
	C-75	8.60	8.70	8.70	2.259	2.165
	*C-75	—	—	9.50	2.195	2.101
	*C-75	—	—	10.70	2.091	1.997
	*C-75	—	—	11.00	2.065	1.971
	N-80	6.40	6.50	6.50	2.441	2.347
	*N-80	—	—	7.90	2.323	2.229
	N-80	8.60	8.70	8.70	2.259	2.165
	*N-80	—	—	9.50	2.195	2.101
	*N-80	—	—	10.70	2.091	1.997
	*N-80	—	—	11.00	2.065	1.971
	P-105	6.40	6.50	6.50	2.441	2.347
	*P-105	—	—	7.90	2.323	2.229
	P-105	8.60	8.70	8.70	2.259	2.165
	*P-105	—	—	9.50	2.195	2.101
	*P-105	—	—	10.70	2.091	1.997
	*P-110	6.40	6.50	—	2.441	2.347

*Non API Standard. Shown for information only.

NO. 201

EXTERNAL UPSET & INTEGRAL JOINT TUBING

Threaded & Coupled		Integral Joint Box O.D. In.	** Collapse Resist. psi	** Internal Yield Pressure psi	Joint Yield Strength, Lb.***		
O.D. of Cplg., In.	O.D. of Upset In.				Threaded & Coupled	Non-Upset	Integral Joint
Non-Upset	Upset						
2.875	—	—	3,530	3,080	18,830	—	—
2.875	3.063	2.594	—	4,160	3,500	22,480	32,600
2.875	—	—	—	5,230	4,920	30,130	—
2.875	3.063	2.594	—	5,890	5,600	35,960	52,170
2.875	—	—	—	7,190	6,770	41,430	—
2.875	3.063	2.594	2.700	8,100	7,700	49,450	71,730
—	—	—	2.740	9,170	8,840	—	81,000
—	—	—	2.937	10,760	10,580	—	95,000
—	—	—	3.125	13,360	13,620	—	118,000
2.875	—	—	—	9,520	9,230	56,500	—
2.875	3.063	2.594	2.700	11,040	10,500	67,430	97,820
—	—	—	2.740	12,510	12,050	—	111,000
2.875	3.063	2.594	2.906	14,330	14,040	96,560	126,940
—	—	—	2.937	14,670	14,420	—	130,000
—	—	—	3.125	18,220	18,570	—	161,000
2.875	—	—	—	9,980	9,840	60,260	—
2.875	3.063	2.594	2.700	11,780	11,200	71,930	104,340
—	—	—	2.740	13,340	12,860	—	118,000
2.875	3.063	2.594	2.906	15,280	14,970	102,990	135,400
—	—	—	2.937	15,650	15,390	—	139,000
—	—	—	3.125	19,430	19,810	—	172,000
2.875	3.063	2.594	2.700	15,460	14,700	94,410	136,940
—	—	—	2.740	17,510	16,870	—	155,000
12.875	3.063	2.594	2.906	20,060	19,650	135,180	177,710
—	—	—	2.937	20,540	20,200	—	182,000
—	—	—	3.125	25,510	26,010	—	226,000
2.875	3.063	2.594	—	13,800	15,400	98,900	143,470
2.875	3.063	2.594	—	17,910	20,590	141,610	186,170
3.500	3.668	3.094	—	3,870	3,300	32,990	45,300
3.500	3.668	3.094	—	5,580	5,280	52,780	72,480
3.500	3.668	3.094	3.220	7,680	7,260	72,580	99,660
—	—	—	3.437	9,550	9,250	—	124,000
—	—	—	3.500	10,530	10,320	—	137,000
—	—	—	3.625	11,470	11,390	—	149,000
—	—	—	3.687	12,960	13,120	—	168,000
—	—	—	3.750	13,310	13,570	—	173,000
3.500	3.668	3.094	3.220	10,470	9,910	98,970	135,900
—	—	—	3.437	13,020	12,600	—	169,000
3.500	3.668	3.094	3.500	14,350	14,060	149,360	186,290
—	—	—	3.625	15,640	15,520	—	203,000
—	—	—	3.687	17,670	17,890	—	229,000
—	—	—	3.750	18,150	18,490	—	236,000
3.500	3.668	3.094	3.220	11,160	10,570	105,570	144,960
—	—	—	3.437	13,890	13,450	—	180,000
3.500	3.668	3.094	3.500	15,300	15,000	159,310	198,710
—	—	—	3.625	16,690	16,560	—	217,000
—	—	—	3.687	18,850	19,090	—	245,000
—	—	—	3.750	19,360	19,730	—	251,000
3.500	3.668	3.094	3.220	14,010	13,870	138,560	190,260
—	—	—	3.437	18,230	17,650	—	236,000
3.500	3.668	3.094	3.500	20,090	19,690	209,100	260,810
—	—	—	3.625	21,900	21,730	—	285,000
—	—	—	3.687	24,740	25,050	—	321,000
3.500	3.668	3.094	—	13,080	14,530	145,160	199,320

** Collapse, Internal Yield Strengths are minimum values with no safety factor,
reproduced by permission from API Bul. 5C2, Bulletin on Performance
Properties of Casing and Tubing.

TABLE
DIMENSIONS AND STRENGTHS OF NON-UPSET

Size O.D. In.	Grade	Wt. per Ft. With Coupings, Lb.			Inside Diameter In.	Drift Diameter In.
		Non- Upset	Upset	Integral Joint		
3.500	*F-25	7.70	—	—	3.068	2.943
	*F-25	9.20	9.30	—	2.992	2.867
	*F-25	10.20	—	—	2.922	2.797
	H-40	7.70	—	—	3.068	2.943
	H-40	9.20	9.30	—	2.992	2.867
	H-40	10.20	—	—	2.922	2.797
	J-55	7.70	—	—	3.068	2.943
	J-55	9.20	9.30	9.30	2.992	2.867
	J-55	10.20	—	10.30	2.922	2.797
	*J-55	—	—	12.80	2.764	2.639
	*J-55	—	—	12.95	2.750	2.625
	*J-55	—	—	15.80	2.548	2.423
	*J-55	—	—	16.70	2.480	2.355
	C-75	7.70	—	—	3.068	2.943
	C-75	9.20	9.30	9.30	2.992	2.867
	C-75	10.20	—	10.30	2.922	2.797
	*C-75	—	—	12.80	2.764	2.639
	C-75	12.70	12.95	12.95	2.750	2.625
	*C-75	—	—	15.80	2.548	2.423
	*C-75	—	—	16.70	2.480	2.355
	N-80	7.70	—	—	3.068	2.943
	N-80	9.20	9.30	9.30	2.992	2.867
	N-80	10.20	—	10.30	2.922	2.797
	*N-80	—	—	12.80	2.764	2.639
	N-80	12.70	12.95	12.95	2.750	2.625
	*N-80	—	—	15.80	2.548	2.423
	*N-80	—	—	16.70	2.480	2.355
	P-105	9.20	9.30	9.30	2.992	2.867
	*P-105	—	—	10.30	2.922	2.797
	*P-105	—	—	12.80	2.764	2.639
	P-105	12.70	12.95	12.95	2.750	2.625
	*P-105	—	—	15.80	2.548	2.423
	*P-105	—	—	16.70	2.480	2.355
	*P-110	9.20	9.30	—	2.992	2.867
	*P-110	12.70	12.95	—	2.750	2.625
4.000	*F-25	9.50	—	—	3.548	3.423
	*F-25	—	11.00	—	3.476	3.351
	H-40	9.50	—	—	3.548	3.423
	H-40	—	11.00	—	3.476	3.351
	J-55	9.50	—	—	3.548	3.423
	J-55	—	11.00	11.00	3.476	3.351
	*J-55	—	—	11.60	3.428	3.303
	C-75	9.50	—	—	3.548	3.423
	*C-75	—	11.00	11.00	3.476	3.351
	C-75	—	—	13.40	3.340	3.215
	N-80	9.50	—	—	3.548	3.423
	N-80	—	11.00	11.00	3.476	3.351
	*N-80	—	—	13.40	3.340	3.215
	*P-105	—	—	11.00	3.476	3.351
	*P-105	—	—	13.40	3.340	3.215

*Non API Standard. Shown for information only.

NO. 201

EXTERNAL UPSET & INTEGRAL JOINT TUBING

Threaded & Coupled		Integral Joint Box O.D. In.	** Collapse Resist. psi	** Internal Yield Pressure psi	Joint Yield Strength, Lb.***		
O.D. of Cplg., In.	O.D. of Upset In.				Threaded & Coupled	Non-Upset	Upset
Non-Upset	Upset						
4.250	—	—	2,970	2,700	40,670	—	—
4.250	4.500	3.750	3,680	3,180	49,710	64,760	—
4.250	—	—	4,330	3,610	57,840	—	—
4.250	—	—	4,630	4,320	65,070	—	—
4.250	4.500	3.750	5,380	5,080	79,540	103,610	—
4.250	—	—	6,060	5,780	92,550	—	—
4.250	—	—	5,970	5,940	89,470	—	—
4.250	4.500	3.750	3,905	7,400	6,980	109,370	142,460
4.250	—	—	3,955	8,330	7,950	127,250	142,000
—	—	—	4.312	10,350	10,120	—	160,000
—	—	—	4.312	10,530	10,230	—	199,000
—	—	—	4.500	12,950	13,090	—	203,000
—	—	—	4.562	13,690	14,020	—	249,000
4.250	—	—	—	7,540	8,100	122,010	264,000
4.250	4.500	3.750	3,905	10,040	9,520	149,140	194,260
4.250	—	—	3,955	11,360	10,840	173,530	194,000
—	—	—	4.312	14,110	13,800	—	219,000
4.250	4.500	3.750	4.312	14,350	14,060	230,990	272,000
—	—	—	4.500	17,630	17,850	—	276,120
—	—	—	4.562	18,670	19,130	—	276,000
4.250	—	—	—	7,870	8,640	130,140	339,000
4.250	4.500	3.750	3,905	10,530	10,160	159,090	359,000
4.250	—	—	3,955	12,120	11,560	185,100	207,220
—	—	—	4.312	15,060	14,730	—	207,000
4.250	4.500	3.750	4.312	15,310	15,000	246,390	233,000
—	—	—	4.500	18,800	19,040	—	290,000
—	—	—	4.562	19,920	20,400	—	362,000
4.250	4.500	3.750	3,905	13,050	13,330	208,800	383,000
—	—	—	3,955	15,920	15,180	—	271,970
—	—	—	4.312	19,760	19,320	—	306,000
4.250	4.500	3.750	4.312	20,090	19,690	323,390	380,000
—	—	—	4.500	24,680	24,990	—	386,560
—	—	—	4.562	26,140	26,770	—	387,000
4.250	4.500	3.750	—	12,620	13,970	218,740	475,000
4250	4.500	3.750	—	17,940	20,630	338,790	503,000
4.750	—	—	—	2,630	2,470	45,000	—
—	5.000	4.250	—	3,220	2,870	—	76,920
4.750	—	—	—	4,060	3,960	72,000	—
—	5.000	4.250	—	4,900	4,590	—	123,070
4.750	—	—	—	5,110	5,440	99,010	—
—	5.000	4.250	4.405	6,590	6,300	—	169,220
—	—	—	4.000	7,300	6,880	—	169,000
4.750	—	—	—	6,350	7,420	135,010	137,000
—	5.000	4.250	4.405	8,410	8,600	—	230,760
—	—	—	4.625	11,350	10,830	—	231,000
4.750	—	—	—	6,590	7,910	144,010	285,000
—	5.000	4.250	4.405	8,800	9,170	—	246,140
—	—	—	4.625	12,110	11,550	—	246,000
4.750	—	—	—	4.405	10,700	12,040	—
—	—	—	4.625	15,900	15,160	—	304,000
—	—	—	—	—	—	—	323,000
—	—	—	—	—	—	—	400,000

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TABLE
DIMENSIONS AND STRENGTHS OF NON-UPSET

Size O.D. In.	Grade	Wt. per Ft. With Coupings, Lb.			Inside Diameter In.	Drift Diameter In.
		Non- Upset	Upset	Integral Joint		
4.500	*F-25	12.60	12.75	—	3.958	3.833
	H-40	12.60	12.75	—	3.958	3.833
	J-55	12.60	12.75	12.75	3.958	3.833
	*J-55	—	—	13.50	3.920	3.795
	C-75	12.60	12.75	12.75	3.958	3.833
	*C-75	—	—	13.50	3.920	3.795
	*C-75	—	—	15.50	3.826	3.701
	*C-75	—	—	19.20	3.640	3.515
	N-80	12.60	12.75	12.75	3.958	3.833
	*N-80	—	—	13.50	3.920	3.795
	*N-80	—	—	15.50	3.826	3.701
	*N-80	—	—	19.20	3.640	3.515
	*P-105	—	—	12.75	3.958	3.833
	*P-105	—	—	13.50	3.920	3.795
	*P-105	—	—	15.50	3.826	3.701
	*P-105	—	—	19.20	3.640	3.515

*Non API Standard. Shown for information only.

NO. 201

EXTERNAL UPSET & INTEGRAL JOINT TUBING

Threaded & Coupled		Integral Joint Box O.D. In.	** Collapse Resist. psi	** Internal Yield Pressure psi	Joint Yield Strength, Lb.***		
O.D. of Cplg., In.	O.D. of Upset In.				Threaded & Coupled		Integral Joint
Non-Upset	Upset	Non-Upset	Upset	Integral Joint			
5.200	5.563	4.750	—	2,870	2,630	65,230	90,010
5.200	5.563	4.750	—	4,500	4,220	104,360	144,020
5.200	5.563	4.750	4.910	5,720	5,800	143,500	198,030
—	—	—	4.935	6,420	6,200	—	211,000
5.200	5.563	4.750	4.910	7,200	7,900	195,680	270,030
—	—	—	4.935	8,170	8,460	—	288,000
—	—	—	5.125	10,390	9,830	—	331,000
—	—	—	5.312	12,960	12,540	—	412,000
5.200	5.563	4.750	4.910	7,500	8,430	208,730	288,040
—	—	—	4.935	8,540	9,020	—	307,000
—	—	—	5.125	11,090	10,480	—	353,000
—	—	—	5.312	13,820	13,380	—	439,000
—	—	—	4.910	8,950	11,070	—	378,000
—	—	—	4.935	10,350	11,840	—	403,000
—	—	—	5.125	13,820	13,760	—	463,000
—	—	—	5.312	18,140	17,560	—	567,000

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**TABLE
DIMENSIONS AND STRENGTHS OF API**

Size O.D. In.	Wt. Per Ft. W/Cplg. Lb.	I.D. In.	I.D. At. Full Upset In.	Collapse Pressure**			
				D PSI	E PSI	G PSI *	S-135 PSI *
2 ³ / ₈	4.85	1.995	1.437	*6,850	11,040	13,250	16,560
2 ³ / ₈	6.65	1.815	1.125	11,440	15,600	18,720	23,400
2 ⁷ / ₈	6.85	2.441	1.875	—	10,470	12,560	15,700
2 ⁷ / ₈	10.40	2.151	1.187	12,110	16,510	19,810	24,760
3 ¹ / ₂	9.50	2.992	2.250	—	10,040	12,110	15,140
3 ¹ / ₂	13.30	2.764	1.875	10,350	14,110	16,940	21,170
3 ¹ / ₂	15.50	2.602	1.750	12,300	16,770	20,130	25,160
4	11.85	3.476	2.937	—	8,410	10,310	12,820
4	14.00	3.340	2.375	8,330	11,350	14,630	17,030
4 ¹ / ₂	13.75	3.958	3.156	—	7,200	8,920	10,910
4 ¹ / ₂	16.60	3.826	2.812	7,620	10,390	12,470	15,590
4 ¹ / ₂	20.00	3.640	2.812	9,510	12,960	15,560	19,450
5	16.25	4.408	3.750	—	6,970	8,640	10,550
5	19.50	4.276	3.687	7,390	10,000	12,090	15,110
5 ¹ / ₂	21.90	4.778	3.812	6,610	8,440	10,350	12,870
5 ¹ / ₂	24.70	4.670	3.500	7,670	10,460	12,560	15,700
5 ⁹ / ₁₆	*19.00	4.975	4.125	4,580	5,640	—	—
5 ⁹ / ₁₆	*22.20	4.859	3.812	5,480	6,740	—	—
5 ⁹ / ₁₆	*25.25	4.733	3.500	6,730	8,290	—	—
6 ⁵ / ₈	*22.20	6.065	5.187	3,260	4,020	—	—
6 ⁵ / ₈	25.20	5.965	5.000	4,010	4,810	6,160	6,430
6 ⁵ / ₈	*31.90	5.761	4.625	5,020	6,170	—	—

*Non API Standard. Shown for information only.

**Collapse, Internal Yield and Tensile Strength are minimum values with no safety factor.

NO. 202

SEAMLESS INTERNAL UPSET DRILL PIPE

Internal Yield Pressure**				Tensile Strength**				Size O.D. In.
D PSI	E PSI	G PSI *	S-135 PSI *	D 1000 Lb.	E 1000 Lb.	G 1000 Lb. *	S-135 1000 Lb. *	
*7,110	10,500	14,700	18,900	70	98	137	176	2 ³ / ₈
11,350	15,470	21,660	27,850	101	138	194	249	2 ³ / ₈
—	9,910	13,870	17,830	—	136	190	245	2 ⁷ / ₈
12,120	16,530	23,140	29,750	157	214	300	386	2 ⁷ / ₈
—	9,520	13,340	17,140	—	194	272	350	3 ¹ / ₂
10,120	13,800	19,320	24,840	199	272	380	489	3 ¹ / ₂
12,350	16,840	23,570	30,310	237	323	452	581	3 ¹ / ₂
—	8,600	12,040	15,470	—	231	323	415	4
7,940	10,830	15,160	19,500	209	285	400	514	4
—	7,900	11,070	14,230	—	270	378	486	4 ¹ / ₂
7,210	9,830	13,760	17,690	242	331	463	595	4 ¹ / ₂
9,200	12,540	17,560	22,580	302	412	577	742	4 ¹ / ₂
—	7,770	10,880	13,980	—	328	459	591	5
6,970	9,500	13,300	17,100	290	396	554	712	5
6,320	8,610	12,060	15,500	321	437	612	787	5 ¹ / ₂
7,260	9,900	13,860	17,820	365	497	696	895	5 ¹ / ₂
5,090	6,950	—	—	267	365	—	—	5 ⁹ / ₁₆
6,090	8,300	—	—	317	432	—	—	5 ⁹ / ₁₆
7,180	9,790	—	—	369	503	—	—	5 ⁹ / ₁₆
4,160	5,530	—	—	307	418	—	—	6 ⁵ / ₈
4,790	6,540	9,150	11,770	359	489	685	881	6 ⁵ / ₈
6,275	8,540	—	—	463	631	—	—	6 ⁵ / ₈

TABLE
DIMENSIONS AND

Size O.D. In.	Grade	Wt. Per Ft. With Cplg., Lb.	Inside Dia. In.	Thread & Cplg.		Extreme Line		** Col'pse Resis- tance PSI
				Drift Dia. In.	O.D. of Cplg. In.	Drift Dia. In.	O.D. of Box In.	
4 ¹ / ₂	*F-25	9.50	4.090	3.965	5.000	—	—	1,920
	H-40	9.50	4.090	3.965	5.000	—	—	2,770
	J-55	9.50	4.090	3.965	5.000	—	—	3,310
	J-55	10.50	4.052	3.927	5.000	—	—	4,010
	J-55	11.60	4.000	3.875	5.000	—	—	4,960
	K-55	9.50	4.090	3.965	5.000	—	—	3,310
	K-55	10.50	4.052	3.927	5.000	—	—	4,010
	K-55	11.60	4.000	3.875	5.000	—	—	4,960
	C-75	11.60	4.000	3.875	5.000	—	—	6,130
	C-75	13.50	3.920	3.795	5.000	—	—	8,170
	N-80	11.60	4.000	3.875	5.000	—	—	6,350
	N-80	13.50	3.920	3.795	5.000	—	—	8,540
	C-95	11.60	4.000	3.875	5.000	—	—	7,010
	C-95	13.50	3.920	3.795	5.000	—	—	9,650
	P-110	11.60	4.000	3.875	5.000	—	—	7,560
	P-110	13.50	3.920	3.795	5.000	—	—	10,670
	P-110	15.10	3.826	3.701	5.000	—	—	14,320
	*V-150	15.10	3.826	3.701	5.000	—	—	18,110
5	*F25	11.50	4.560	4.435	5.563	—	—	1,820
	J-55	11.50	4.560	4.435	5.563	—	—	3,060
	J-55	13.00	4.494	4.369	5.563	—	—	4,140
	J-55	15.00	4.408	4.283	5.563	4.151	5.360	5,550
	K-55	11.50	4.560	4.435	5.563	—	—	3,060
	K-55	13.00	4.494	4.369	5.563	—	—	4,140
	K-55	15.00	4.408	4.283	5.563	4.151	5.360	5,550
	C-75	15.00	4.408	4.283	5.563	4.151	5.360	6,970
	C-75	18.00	4.276	4.151	5.563	4.151	5.360	10,000
	*C-75	20.30	4.184	—	—	4.059	5.094	11,240
	*C-75	23.20	4.044	—	—	3.919	5.094‡	12,970
	N-80	15.00	4.408	4.283	5.563	4.151	5.360	7,250
	N-80	18.00	4.276	4.151	5.563	4.151	5.360	10,490
	*N-80	20.30	4.184	—	—	4.059	5.250	11,990
	*N-80	23.20	4.044	—	—	3.919	5.094‡	13,830
	C-95	15.00	4.408	4.283	5.563	4.151	5.360	8,090
	C-95	18.00	4.276	4.151	5.563	4.151	5.360	12,010
	*C-95	20.30	4.184	—	—	4.059	5.250	14,250
	*C-95	23.20	4.044	—	—	3.919	5.094‡	16,430
	P-110	15.00	4.408	4.283	5.563	4.151	5.360	8,830
	P-110	18.00	4.276	4.151	5.563	4.151	5.360	13,450
	P-110	20.30	4.184	—	—	4.059	5.094‡	16,490
	*P-110	23.20	4.044	—	—	3.919	5.094‡	19,020
	*V-150	15.00	4.408	4.283	5.563	—	—	10,260
	*V-150	18.00	4.276	4.151	5.563	—	—	16,860
	*V-150	20.80	4.156	4.031	5.563	—	—	22,860
	*V-150	24.20	4.000	3.875	5.563	—	—	27,000

*Non API Standard. Shown for information only.

** Collapse, Internal Yield and Joint Yield Strengths are minimum values with no safety factor, reproduced by permission from API Bul. 5C2, Bulletin on Performance Properties of Casing and Tubing.

NO. 203

STRENGTHS OF CASING

Plain End or Ext. Line	Internal Yield Pressure PSI**			** Body Yield Stgth. 1,000 Lbs.	Joint Strength - 1000 Lbs.**			
	Round Thread		But- tress Thd.		Threaded & Cplg. Joint		Ext. Line Joint	
	Short	Long			Round	Thread		
—	1,990	—	—	69	71	—	—	—
3,190	3,190	—	—	111	77	—	—	—
4,380	4,380	—	—	152	101	—	—	—
4,790	4,790	—	4,790	165	132	—	203	—
5,350	5,350	5,350	5,350	184	154	162	225	—
4,380	4,380	—	—	152	112	—	—	—
4,790	4,790	—	4,790	165	146	—	249	—
5,350	5,350	5,350	5,350	184	170	180	277	—
7,290	—	7,290	7,290	250	—	212	288	—
8,460	—	8,460	8,460	288	—	257	331	—
7,780	—	7,780	7,780	267	—	223	304	—
9,020	—	9,020	9,020	307	—	270	349	—
9,240	—	9,240	9,240	317	—	234	325	—
10,710	—	10,710	10,710	364	—	284	374	—
10,690	—	10,690	10,690	367	—	279	385	—
12,410	—	12,410	12,410	422	—	338	443	—
14,420	—	14,420	13,460	485	—	406	509	—
—	—	19,660	18,360	661	—	519	683	—
—	1,930	—	—	83	84	—	—	—
4,240	4,240	—	—	182	133	—	—	—
4,870	4,870	4,870	4,870	208	169	182	252	—
5,700	5,700	5,700	5,700	241	207	223	293	328
4,240	4,240	—	—	182	147	—	—	—
4,870	4,870	4,870	4,870	208	186	201	309	—
5,700	5,700	5,700	5,700	241	228	246	359	416
7,770	7,770	7,770	—	328	—	295	375	416
9,500	9,500	9,290	—	396	—	376	452	446
10,710	—	—	—	—	369†	—	—	529‡
12,550	—	—	—	—	369†	—	—	529‡
8,290	—	8,290	8,290	350	—	311	396	437
10,140	—	10,140	9,910	422	—	396	477	469
11,420	—	—	—	—	388†	284††	363‡	556‡
13,380	—	—	—	—	388†	284††	363‡	556‡
9,840	—	9,840	9,840	416	—	326	424	459
12,040	—	12,040	11,770	501	—	416	512	493
13,560	—	—	—	—	—	—	—	584‡
15,890	—	—	—	—	—	—	—	584‡
11,400	—	11,400	11,400	481	—	388	503	547
13,940	—	13,940	13,620	580	—	495	606	587
15,710	—	—	—	—	485†	354††	454‡	696‡
18,400	—	—	—	—	485†	354††	454‡	696‡
—	—	15,540	15,540	656	—	497	685	—
—	—	19,000	18,580	791	—	634	826	—
—	—	20,280	18,580	910	—	755	847	—
—	—	20,280	18,580	1,060	—	905	847	—

† Hydril TS

†† Hydril FJ-P

‡ Hydril Super FJ-P

‡‡ Hydril Super EU.

TABLE
DIMENSIONS AND

Size O.D. In.	Grade	Wt. Per Ft. With Cplg., Lb.	Inside Dia. In.	Thread & Cplg.		Extreme Line		** Col'pse Resis- tance PSI
				Drift Dia. In.	O.D. of Cplg. In.	Drift Dia. In.	O.D. of Box In.	
5 ¹ / ₂	*F-25	13.00	5.044	4.919	6.050	—	—	1,660
	H-40	14.00	5.012	4.887	6.050	—	—	2,630
	J-55	14.00	5.012	4.887	6.050	—	—	3,120
	J-55	15.50	4.950	4.825	6.050	4.653	5.860	4,040
	J-55	17.00	4.892	4.767	6.050	4.653	5.860	4,910
	K-55	14.00	5.012	4.887	6.050	—	—	3,120
	K-55	15.50	4.950	4.825	6.050	4.653	5.860	4,040
	K-55	17.00	4.892	4.767	6.050	4.653	5.860	4,910
	C-75	17.00	4.892	4.767	6.050	4.653	5.860	6,070
	C-75	20.00	4.778	4.653	6.050	4.653	5.860	8,440
	C-75	23.00	4.670	4.545	6.050	4.545	5.860	10,460
	*C-75	26.00	4.548	—	—	4.423	5.656	11,860
	N-80	17.00	4.892	4.767	6.050	4.653	5.860	6,280
	N-80	20.00	4.778	4.653	6.050	4.653	5.860	8,830
	N-80	23.00	4.670	4.545	6.050	4.545	5.860	11,160
	*N-80	26.00	4.548	—	—	4.423	5.656‡	12,650
	C-95	17.00	4.892	4.767	6.050	4.653	5.860	6,930
	C-95	20.00	4.778	4.653	6.050	4.653	5.860	10,000
	C-95	23.00	4.670	4.545	6.050	4.545	5.860	12,920
	*C-95	26.00	4.548	—	—	4.423	5.656‡	15,020
P-110	P-110	17.00	4.892	4.767	6.050	4.653	5.860	7,460
	P-110	20.00	4.778	4.653	6.050	4.653	5.860	11,080
	P-110	23.00	4.670	4.545	6.050	4.545	5.860	14,520
	*P-110	26.00	4.548	—	—	4.423	5.656‡	17,390
	*V-150	20.00	4.778	4.653	6.050	—	—	13,480
*V-150	*V-150	23.00	4.670	4.545	6.050	—	—	18,390
	*V-150	26.00	4.548	4.423	6.050	—	—	23,720

*Non API Standard. Shown for information only.

** Collapse, Internal Yield and Joint Yield Strengths are minimum values with no safety factor, reproduced by permission from API Bul. 5C2, Bulletin on Performance Properties of Casing and Tubing.

NO. 203

STRENGTHS OF CASING

Plain End or Ext. Line	Internal Yield Pressure PSI**			** Body Yield Stgth. 1,000 Lbs.	Joint Strength - 1000 Lbs.**					
	Round Thread		But- tress Thd.		Threaded & Cplg. Joint			Ext. Line Joint		
	Short	Long			Round Thread					
	Short	Long			Short	Long	But- tress Thd.			
—	1,810	—	—	94	95	—	—	—		
3,110	3,110	—	—	161	130	—	—	—		
4,270	4,270	—	—	222	172	—	—	—		
4,810	4,810	4,810	4,810	248	202	217	300	339		
5,320	5,320	5,320	5,320	273	229	247	329	372		
4,270	4,270	—	—	222	189	—	—	—		
4,810	4,810	4,810	4,810	248	222	239	366	429		
5,320	5,320	5,320	5,320	273	252	272	402	471		
7,250	—	7,250	7,250	372	—	327	423	471		
8,610	—	8,610	8,430	437	—	403	497	497		
9,900	—	9,260	8,430	497	—	473	550	549		
11,360	—	—	—	—	432†	—	—	678‡		
7,740	—	7,740	7,740	397	—	348	446	496		
9,190	—	9,190	8,990	466	—	428	524	523		
10,560	—	9,880	8,990	530	—	502	579	577		
12,120	—	—	—	—	455†	315††	451‡	713‡		
9,190	—	9,190	9,190	471	—	374	480	521		
10,910	—	10,910	10,680	554	—	460	563	549		
12,540	—	11,730	10,680	630	—	540	608	606		
14,390	—	—	—	—	—	—	—	749‡		
10,640	—	10,640	10,640	546	—	445	568	620		
12,640	—	12,640	12,360	641	—	548	667	654		
14,520	—	13,580	12,360	729	—	643	724	722		
16,660	—	—	—	—	569†	393††	564‡	892‡		
—	—	17,230	16,860	874	—	701	908	—		
—	—	18,520	16,860	994	—	823	910	—		
—	—	22,720	—	—	—	—	—	722‡		

† Hydril TS

†† Hydril FJ-P

‡ Hydril Super FJ-P

‡‡ Hydril Super EU.

TABLE
DIMENSIONS AND

Size O.D. In.	Grade	Wt. Per Ft. With Cplg., Lb.	Inside Dia. In.	Thread & Cplg.		Extreme Line		** Col'pse Resis- tance PSI
				Drift Dia. In.	O.D. of Cplg. In.	Drift Dia. In.	O.D. of Box In.	
*6	F-25	15.00	5.524	5.399	6.625	—	—	1,540
	H-40	18.00	5.424	5.299	6.625	—	—	2,780
	J-55	18.00	5.424	5.299	6.625	—	—	3,620
	N-80	18.00	5.424	5.299	6.625	—	—	4,740
	N-80	20.00	5.352	5.227	6.625	—	—	5,690
	N-80	23.00	5.240	5.115	6.625	—	—	7,180
	P-110	23.00	5.240	5.115	6.625	—	—	10,380
	P-110	26.00	5.132	5.007	6.625	—	—	12,380
$6\frac{5}{8}$	*F-25	17.00	6.135	6.010	7.390	—	—	1,370
	H-40	20.00	6.049	5.924	7.390	—	—	2,520
	J-55	20.00	6.049	5.924	7.390	—	—	2,970
	J-55	24.00	5.921	5.796	7.390	5.730	7.000	4,560
	K-55	20.00	6.049	5.924	7.390	—	—	2,970
	K-55	24.00	5.921	5.796	7.390	5.730	7.000	4,560
	C-75	24.00	5.921	5.796	7.390	5.730	7.000	5,570
	C-75	28.00	5.791	5.666	7.390	5.666	7.000	7,830
	C-75	32.00	5.675	5.550	7.390	5.550	7.000	9,830
	N-80	24.00	5.921	5.796	7.390	5.730	7.000	5,760
	N-80	28.00	5.791	5.666	7.390	5.666	7.000	8,170
	N-80	32.00	5.675	5.550	7.390	5.550	7.000	10,320
	C-95	24.00	5.921	5.796	7.390	5.730	7.000	6,290
	C-95	28.00	5.791	5.666	7.390	5.666	7.000	9,200
	C-95	32.00	5.675	5.550	7.390	5.550	7.000	11,800
	P-110	24.00	5.921	5.796	7.390	5.730	7.000	6,710
	P-110	28.00	5.791	5.666	7.390	5.666	7.000	10,140
	P-110	32.00	5.675	5.550	7.390	5.550	7.000	13,200

*Non API Standard. Shown for information only.

NO. 203

STRENGTHS OF CASING

Plain End or Ext. Line	Internal Yield Pressure PSI**			** Body Yield Stgth. 1,000 Lbs.	Joint Strength - 1000 Lbs.**			
	Round Thread		But- tress Thd.		Threaded & Cplg. Joint		Ext. Line Joint	
	Short	Long			Round Thread	But- tress Thd.		
—	1,740	—	—	107	108	—	—	
—	3,360	—	—	206	179	—	—	
—	4,620	—	—	283	239	279	—	
—	—	6,720	—	412	—	323	—	
—	—	7,560	—	461	—	366	—	
—	—	8,870	—	536	—	432	—	
—	—	12,190	—	737	—	565	—	
—	—	13,920	—	833	—	646	—	
—	1,620	—	—	123	121	—	—	
3,040	3,040	—	—	229	184	—	—	
4,180	4,180	4,180	4,180	315	245	266	374	
5,110	5,110	5,110	5,110	382	314	340	453	
4,180	4,180	4,180	4,180	315	267	290	453	
5,110	5,110	5,110	5,110	382	342	372	548	
6,970	—	6,970	6,970	520	—	453	583	
8,260	—	8,260	8,260	610	—	552	683	
9,410	—	9,410	9,200	688	—	638	771	
7,440	—	7,440	7,440	555	—	481	615	
8,810	—	8,810	8,810	651	—	586	721	
10,040	—	10,040	9,820	734	—	677	814	
8,830	—	8,830	8,830	659	—	546	665	
10,460	—	10,460	10,460	773	—	665	780	
11,920	—	11,920	11,660	872	—	769	880	
10,230	—	10,230	10,230	763	—	641	786	
12,120	—	12,120	12,120	895	—	781	922	
13,800	—	13,800	13,500	1,009	—	904	1,040	
							944	

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TABLE
DIMENSIONS AND

Size O.D. In.	Grade	Wt. Per Ft. With Cplg., Lb.	Inside Dia. In.	Thread & Cplg.		Extreme Line		** Col'pse Resis- tance PSI
				Drift Dia. In.	O.D. of Cplg. In.	Drift Dia. In.	O.D. of Box In.	
7	*F-25	17.00	6.538	6.413	7.656	—	—	1,100
	H-40	17.00	6.538	6.413	7.656	—	—	1,450
	H-40	20.00	6.456	6.331	7.656	—	—	1,980
	J-55	20.00	6.456	6.331	7.656	—	—	2,270
	J-55	23.00	6.366	6.241	7.656	6.151	7.390	3,270
	J-55	26.00	6.276	6.151	7.656	6.151	7.390	4,320
	K-55	20.00	6.456	6.331	7.656	—	—	2,270
	K-55	23.00	6.366	6.241	7.656	6.151	7.390	3,270
	K-55	26.00	6.276	6.151	7.656	6.151	7.390	4,320
	C-75	23.00	6.366	6.241	7.656	6.151	7.390	3,770
	C-75	26.00	6.276	6.151	7.656	6.151	7.390	5,250
	C-75	29.00	6.184	6.059	7.656	6.059	7.390	6,760
	C-75	32.00	6.094	5.969	7.656	5.969	7.390	8,230
	C-75	35.00	6.004	5.879	7.656	5.879	7.530	9,710
	C-75	38.00	5.920	5.795	7.656	5.795	7.530	10,680
	N-80	23.00	6.366	6.241	7.656	6.151	7.390	3,830
	N-80	26.00	6.276	6.151	7.656	6.151	7.390	5,410
	N-80	29.00	6.184	6.059	7.656	6.059	7.390	7,020
	N-80	32.00	6.094	5.969	7.656	5.969	7.390	8,600
	N-80	35.00	6.004	5.879	7.656	5.879	7.530	10,180
	N-80	38.00	5.920	5.795	7.656	5.795	7.530	11,390
	C-95	23.00	6.366	6.241	7.656	6.151	7.390	4,150
	C-95	26.00	6.276	6.151	7.656	6.151	7.390	5,870
	C-95	29.00	6.184	6.059	7.656	6.059	7.390	7,820
	C-95	32.00	6.094	5.969	7.656	5.969	7.390	9,730
	C-95	35.00	6.004	5.879	7.656	5.879	7.530	11,640
	C-95	38.00	5.920	5.795	7.656	5.795	7.530	13,420
	P-110	26.00	6.276	6.151	7.656	6.151	7.390	6,210
	P-110	29.00	6.184	6.059	7.656	6.059	7.390	8,510
	P-110	32.00	6.094	5.969	7.656	5.969	7.390	10,760
	P-110	35.00	6.004	5.879	7.656	5.879	7.530	13,010
	P-110	38.00	5.920	5.795	7.656	5.795	7.530	15,110
	*V-150	29.00	6.184	6.059	7.656	—	—	9,800
	*V-150	32.00	6.094	5.969	7.656	—	—	13,020
	*V-150	35.00	6.004	5.879	7.656	—	—	16,230
	*V-150	38.00	5.920	5.795	7.656	—	—	19,240

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NO. 203

STRENGTHS OF CASING

Plain End or Ext. Line	Internal Yield Pressure PSI**			** Body Yield Stgth. 1,000 Lbs.	Joint Strength - 1000 Lbs.**			
	Round Thread		But- tress Thd.		Threaded & Cplg. Joint		Ext. Line Joint	
	Short	Long			Round	Thread		
—	1,440	—	—	123	118	—	—	—
2,310	2,310	—	—	196	122	—	—	—
2,720	2,720	—	—	230	176	—	—	—
3,740	3,740	—	—	316	234	—	—	—
4,360	4,360	4,360	4,360	366	284	313	432	499
4,980	4,980	4,980	4,980	415	334	367	490	506
3,740	3,740	—	—	316	254	—	—	—
4,360	4,360	4,360	4,360	366	309	341	522	632
4,980	4,980	4,980	4,980	415	364	401	592	641
5,940	—	5,940	5,940	499	—	416	557	632
6,790	—	6,790	6,790	566	—	489	631	641
7,650	—	7,650	7,650	634	—	562	707	685
8,490	—	8,490	7,930	699	—	633	779	761
9,340	—	8,660	7,930	763	—	703	833	850
10,120	—	8,660	7,930	822	—	767	833	917
6,340	—	6,340	6,340	532	—	442	588	666
7,240	—	7,240	7,240	604	—	519	667	675
8,160	—	8,160	8,160	676	—	597	746	721
9,060	—	9,060	8,460	745	—	672	823	801
9,960	—	9,240	8,460	814	—	746	876	895
10,800	—	9,240	8,460	877	—	814	876	965
7,530	—	7,530	7,530	632	—	505	636	699
8,600	—	8,600	8,600	717	—	593	722	709
9,690	—	9,690	9,690	803	—	683	808	757
10,760	—	10,760	10,050	885	—	768	891	841
11,830	—	10,970	10,050	966	—	853	920	940
12,820	—	10,970	10,050	1,041	—	931	920	1,013
9,960	—	9,960	9,960	830	—	693	853	844
11,220	—	11,220	11,220	929	—	797	955	902
12,460	—	12,460	11,640	1,025	—	897	1,053	1,002
13,700	—	12,700	11,640	1,119	—	996	1,096	1,118
14,850	—	12,700	11,640	1,205	—	1,087	1,096	1,207
—	—	15,300	15,300	1,267	—	1,049	1,296	—
—	—	16,990	15,870	1,398	—	1,180	1,363	—
—	—	17,320	15,870	1,526	—	1,311	1,363	—
—	—	17,320	15,870	1,644	—	1,430	1,363	—

**Collapse, Internal Yield and Joint Yield Strengths are minimum values with no safety factor, reproduced by permission from API Bul. 5C2, Bulletin on Performance properties of Casing and Tubing.

TABLE
DIMENSIONS AND

Size O.D. In.	Grade	Wt. Per Ft. With Cplg., Lb.	Inside Dia. In.	Thread & Cplg.		Extreme Line		** Col'pse Resis- tance PSI
				Drift Dia. In.	O.D. of Cplg. In.	Drift Dia. In.	O.D. of Box In.	
<i>7⁵/₈</i>	*F-25	20.00	7.125	7.000	8.500	—	—	1,100
	H-40	24.00	7.025	6.900	8.500	—	—	2,040
	J-55	26.40	6.969	6.844	8.500	6.750	8.010	2,890
	K-55	26.40	6.969	6.844	8.500	6.750	8.010	2,890
	C-75	26.40	6.969	6.844	8.500	6.750	8.010	3,280
	C-75	29.70	6.875	6.750	8.500	6.750	8.010	4,670
	C-75	33.70	6.765	6.640	8.500	6.640	8.010	6,320
	C-75	39.00	6.625	6.500	8.500	6.500	8.010	8,430
	N-80	26.40	6.969	6.844	8.500	6.750	8.010	3,400
	N-80	29.70	6.875	6.750	8.500	6.750	8.010	4,790
	N-80	33.70	6.765	6.640	8.500	6.640	8.010	6,560
	N-80	39.00	6.625	6.500	8.500	6.500	8.010	8,810
	C-95	26.40	6.969	6.844	8.500	6.750	8.010	3,710
	C-95	29.70	6.875	6.750	8.500	6.750	8.010	5,120
	C-95	33.70	6.765	6.640	8.500	6.640	8.010	7,260
	C-95	39.00	6.625	6.500	8.500	6.500	8.010	9,980
	P-110	29.70	6.875	6.750	8.500	6.750	8.010	5,340
	P-110	33.70	6.765	6.640	8.500	6.640	8.010	7,850
	P-110	39.00	6.625	6.500	8.500	6.500	8.010	11,060
	V-150	33.70	6.765	6.640	8.500	—	—	8,860
	V-150	39.00	6.625	6.500	8.500	—	—	13,450
	V-150	45.30	6.435	6.310	8.500	—	—	19,680
<i>8⁵/₈</i>	*F-25	24.00	8.097	7.972	9.625	—	—	950
	H-40	28.00	8.017	7.892	9.625	—	—	1,640
	H-40	32.00	7.921	7.796	9.625	—	—	2,210
	J-55	24.00	8.097	7.972	9.625	—	—	1,370
	J-55	32.00	7.921	7.796	9.625	7.700	9.120	2,530
	J-55	36.00	7.825	7.700	9.625	7.700	9.120	3,450
	K-55	24.00	8.097	7.972	9.625	—	—	1,370
	K-55	32.00	7.921	7.796	9.625	7.700	9.120	2,530
	K-55	36.00	7.825	7.700	9.625	7.700	9.120	3,450
	C-75	36.00	7.825	7.700	9.625	7.700	9.120	4,020
	C-75	40.00	7.725	7.600	9.625	7.600	9.120	5,350
	C-75	44.00	7.625	7.500	9.625	7.500	9.120	6,680
	C-75	49.00	7.511	7.386	9.625	7.386	9.120	8,200
	N-80	36.00	7.825	7.700	9.625	7.700	9.120	4,100
	N-80	40.00	7.725	7.600	9.625	7.600	9.120	5,520
	N-80	44.00	7.625	7.500	9.625	7.500	9.120	6,950
	N-80	49.00	7.511	7.386	9.625	7.386	9.120	8,570
	C-95	36.00	7.825	7.700	9.625	7.700	9.120	4,360
	C-95	40.00	7.725	7.600	9.625	7.600	9.120	6,010
	C-95	44.00	7.625	7.500	9.625	7.500	9.120	7,730
	C-95	49.00	7.511	7.386	9.625	7.386	9.120	9,690
	P-110	40.00	7.725	7.600	9.625	7.600	9.120	6,380
	P-110	44.00	7.625	7.500	9.625	7.500	9.120	8,400
	P-110	49.00	7.511	7.386	9.625	7.386	9.120	10,720
	*V-150	44.00	7.625	7.500	9.625	—	—	9,640
	*V-150	49.00	7.511	7.386	9.625	—	—	12,950

*Non API Standard. Shown for information only.

NO. 203

STRENGTHS OF CASING

Plain End or Ext. Line	Internal Yield Pressure PSI**			** Body Yield Stgth. 1,000 Lbs.	Joint Strength - 1000 Lbs.**			
	Round Thread		But- tress Thd.		Threaded & Cplg. Joint		Ext. Line Joint	
	Short	Long			Round	Thread		
—	1,430	—	145	138	—	—	—	—
2,750	2,750	—	276	212	—	—	—	—
4,140	4,140	4,140	4,140	414	315	346	483	553
4,140	4,140	4,140	4,140	414	342	377	581	700
5,650	—	5,650	5,650	564	—	461	624	700
6,450	—	6,450	6,450	641	—	542	709	700
7,400	—	7,400	7,400	729	—	635	806	766
8,610	—	8,610	8,610	839	—	751	929	851
6,020	—	6,020	6,020	602	—	490	659	737
6,890	—	6,890	6,890	683	—	575	749	737
7,900	—	7,900	7,900	778	—	674	852	806
9,180	—	9,180	9,180	895	—	798	981	896
7,150	—	7,150	7,150	714	—	560	716	774
8,180	—	8,180	8,180	811	—	659	813	774
9,380	—	9,380	9,380	923	—	772	925	846
10,900	—	10,900	10,900	1,063	—	914	1,065	941
9,470	—	9,470	9,470	940	—	769	960	922
10,860	—	10,860	10,860	1,069	—	901	1,093	1,008
12,620	—	12,620	12,620	1,231	—	1,066	1,258	1,120
—	—	14,800	14,800	1,458	—	1,207	1,482	—
—	—	17,210	17,210	1,679	—	1,428	1,706	—
—	—	19,680	18,350	1,971	—	1,721	1,932	—
—	1,340	—	173	161	—	—	—	—
2,470	2,470	—	318	233	—	—	—	—
2,860	2,860	—	366	279	—	—	—	—
2,950	2,950	—	381	244	—	—	—	—
3,930	3,930	3,930	3,930	503	372	417	579	686
4,460	4,460	4,460	4,460	568	434	486	654	688
2,950	2,950	—	—	381	263	—	—	—
3,930	3,930	3,930	3,930	503	402	452	690	869
4,460	4,460	4,460	4,460	568	468	526	780	871
6,090	—	6,090	6,090	775	—	648	847	871
6,850	—	6,850	6,850	867	—	742	947	942
7,610	—	7,610	7,610	957	—	834	1,046	1,007
8,480	—	8,480	8,480	1,059	—	939	1,157	1,007
6,490	—	6,490	6,490	827	—	688	895	917
7,300	—	7,300	7,300	925	—	788	1,001	992
8,120	—	8,120	8,120	1,021	—	887	1,105	1,060
9,040	—	9,040	9,040	1,129	—	997	1,222	1,060
7,710	—	7,710	7,710	982	—	789	976	963
8,670	—	8,670	8,670	1,098	—	904	1,092	1,042
9,640	—	9,640	9,640	1,212	—	1,017	1,206	1,113
10,740	—	10,740	10,740	1,341	—	1,144	1,334	1,113
10,040	—	10,040	10,040	1,271	—	1,055	1,288	1,240
11,160	—	11,160	11,160	1,404	—	1,186	1,423	1,326
12,430	—	12,430	12,430	1,553	—	1,335	1,574	1,326
—	—	15,220	15,220	1,914	—	1,591	1,925	—
—	—	16,950	16,950	2,118	—	1,789	2,130	—

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TABLE
DIMENSIONS AND

Size O.D. In.	Grade	Wt. Per Ft. With Cplg., Lb.	Inside Dia. In.	Thread & Cplg.		Extreme Line		** Col'pse Resis- tance PSI
				Drift Dia. In.	O.D. of Cplg. In.	Drift Dia. In.	O.D. of Box In.	
9 ⁵ / ₈	*F-25	29.30	9.063	8.907	10.625	—	—	860
	H-40	32.30	9.001	8.845	10.625	—	—	1,400
	H-40	36.00	8.921	8.765	10.625	—	—	1,740
	J-55	36.00	8.921	8.765	10.625	—	—	2,020
	J-55	40.00	8.835	8.679	10.625	8.599	10.100	2,570
	K-55	36.00	8.921	8.765	10.625	—	—	2,020
	K-55	40.00	8.835	8.679	10.625	8.599	10.100	2,570
	C-75	40.00	8.835	8.679	10.625	8.599	10.100	2,980
	C-75	43.50	8.755	8.599	10.625	8.599	10.100	3,750
	C-75	47.00	8.681	8.525	10.625	8.525	10.100	4,630
	C-75	53.50	8.535	8.379	10.625	8.379	10.100	6,380
	N-80	40.00	8.835	8.679	10.625	8.599	10.100	3,090
	N-80	43.50	8.755	8.599	10.625	8.599	10.100	3,810
	N-80	47.00	8.681	8.525	10.625	8.525	10.100	4,750
	N-80	53.50	8.535	8.379	10.625	8.379	10.100	6,620
	C-95	40.00	8.835	8.679	10.625	8.599	10.100	3,330
	C-95	43.50	8.755	8.599	10.625	8.599	10.100	4,130
	C-95	47.00	8.681	8.525	10.625	8.525	10.100	5,080
	C-95	53.50	8.535	8.379	10.625	8.379	10.100	7,330
	P-110	43.50	8.755	8.599	10.625	8.599	10.100	4,430
	P-1110	47.00	8.681	8.525	10.625	8.525	10.100	5,310
	P-110	53.50	8.535	8.379	10.625	8.379	10.100	7,930
*V-150	53.50	8.535	8.379	10.625	—	—	—	8,970
	*V-150	58.40	8.435	8.279	10.625	—	—	11,570
	*V-150	61.10	8.375	8.219	10.625	—	—	13,130
	*V-150	71.80	8.125	7.969	10.625	—	—	19,640
	*F-25	32.75	10.192	10.036	11.750	—	—	650
10 ³ / ₄	H-40	32.75	10.192	10.036	11.750	—	—	—
	H-40	40.50	10.050	9.894	11.750	—	—	1,420
	J-55	40.50	10.050	9.894	11.750	—	—	1,580
	J-55	45.50	9.950	9.794	11.750	9.794	11.460	2,090
	J-55	51.00	9.850	9.694	11.750	9.694	11.460	2,700
	K-55	40.50	10.050	9.894	11.750	—	—	1,580
	K-55	45.50	9.950	9.794	11.750	9.794	11.460	2,090
	K-55	51.00	9.850	9.694	11.750	9.694	11.460	2,700
	C-75	51.00	9.850	9.694	11.750	9.694	11.460	3,100
	C-75	55.50	9.760	9.604	11.750	9.604	11.460	3,950
	N-80	51.00	9.850	9.694	11.750	9.694	11.460	3,220
	N-80	55.50	9.760	9.604	11.750	9.604	11.460	4,020
	C-95	51.00	9.850	9.694	11.750	9.694	11.460	3,490
	C-95	55.50	9.760	9.604	11.750	9.604	11.460	4,300
	P-110	51.00	9.850	9.694	11.750	9.694	11.460	3,670
	P-110	55.50	9.760	9.604	11.750	9.604	11.460	4,630
	P-110	60.70	9.660	9.504	11.750	9.504	11.460	5,860
	P-110	65.70	9.560	9.404	11.750	—	—	7,490
	*P-110	71.10	9.450	9.294	11.750	—	—	9,280
	*V-150	65.70	9.560	9.404	11.750	—	—	8,330
	*V-150	71.10	9.450	9.294	11.750	—	—	10,890

*Non API Standard. Shown for information only.

NO. 203

STRENGTHS OF CASING

Plain End or Ext. Line	Internal Yield Pressure PSI**			** Body Yield Stgth. 1,000 Lbs.	Joint Strength - 1000 Lbs.**			
	Round Thread		But- tress Thd.		Threaded & Cplg. Joint		Ext. Line Joint	
	Short	Long			Round	Thread		
—	1,280	—	206	185	—	—	—	—
2,270	2,270	—	365	254	—	—	—	—
2,560	2,560	—	410	294	—	—	—	—
3,520	3,520	3,520	3,520	564	394	453	639	—
3,950	3,950	3,950	3,950	630	452	520	714	770
3,520	3,520	3,520	3,520	564	423	489	755	—
3,950	3,950	3,950	3,950	630	486	561	843	975
5,390	—	5,390	5,390	859	—	694	926	975
5,930	—	5,930	5,930	942	—	776	1,016	975
6,440	—	6,440	6,440	1,018	—	852	1,098	1,032
7,430	—	7,430	7,430	1,166	—	999	1,257	1,173
5,750	—	5,750	5,750	916	—	737	979	1,027
6,330	—	6,330	6,330	1,005	—	825	1,074	1,027
6,870	—	6,870	6,870	1,086	—	905	1,161	1,086
7,930	—	7,930	7,930	1,244	—	1,062	1,329	1,235
6,820	—	6,820	6,820	1,088	—	847	1,074	1,078
7,510	—	7,510	7,510	1,193	—	948	1,178	1,078
8,150	—	8,150	8,150	1,289	—	1,040	1,273	1,141
9,410	—	9,410	9,410	1,477	—	1,220	1,458	1,297
8,700	—	8,700	8,700	1,381	—	1,106	1,388	1,283
9,440	—	9,440	9,440	1,493	—	1,213	1,500	1,358
10,900	—	10,900	10,900	1,710	—	1,422	1,718	1,544
—	—	14,860	14,860	2,332	—	1,909	2,321	—
—	—	16,230	16,230	2,532	—	2,098	2,519	—
—	—	17,050	16,560	2,651	—	2,211	2,638	—
—	—	18,060	16,560	3,136	—	2,672	2,692	—
—	1,140	—	—	229	196	—	—	—
1,820	1,820	—	—	367	205	—	—	—
2,280	2,280	—	—	457	314	—	—	—
3,130	3,130	—	3,130	629	420	—	700	—
3,580	3,580	—	3,580	715	493	—	796	975
4,030	4,030	—	4,030	801	565	—	891	1,092
3,130	3,130	—	3,130	629	450	—	819	—
3,580	3,580	—	3,580	715	528	—	931	1,236
4,030	4,030	—	4,030	801	606	—	1,043	1,383
5,490	5,490	—	5,490	1,092	756	—	1,160	1,383
6,040	6,040	—	6,040	1,196	843	—	1,271	1,515
5,860	5,860	—	5,860	1,165	804	—	1,228	1,456
6,450	6,450	—	6,450	1,276	895	—	1,345	1,595
6,960	6,960	—	6,960	1,383	927	—	1,354	1,529
7,660	7,660	—	7,660	1,515	1,032	—	1,483	1,675
8,060	8,060	—	8,060	1,602	1,080	—	1,594	1,820
8,860	8,860	—	8,860	1,754	1,203	—	1,745	1,993
9,760	9,760	—	9,760	1,922	1,338	—	1,912	2,000
10,650	10,650	—	10,650	2,088	1,472	—	2,077	—
—	11,240	—	10,980	2,269	1,618	—	2,418	—
—	14,530	—	14,530	2,847	1,978	—	2,799	—
—	15,330	—	14,970	3,094	2,174	—	2,957	—

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TABLE
DIMENSIONS AND

Size O.D. In.	Grade	Wt. Per Ft. With Cplg., Lb.	Inside Dia. In.	Thread & Cplg.		Extreme Line		** Col'pse Resis- tance PSI
				Drift Dia. In.	O.D. of Cplg. In.	Drift Dia. In.	O.D. of Box In.	
11 ³ / ₄	*F-25	38.00	11.150	10.994	12.750	—	—	620
	H-40	42.00	11.084	10.928	12.750	—	—	1,070
	J-55	47.00	11.000	10.844	12.750	—	—	1,510
	J-55	54.00	10.880	10.724	12.750	—	—	2,070
	J-55	60.00	10.772	10.616	12.750	—	—	2,660
	K-55	47.00	11.000	10.844	12.750	—	—	1,510
	K-55	54.00	10.880	10.724	12.750	—	—	2,070
	K-55	60.00	10.772	10.616	12.750	—	—	2,660
	C-75	60.00	10.772	10.616	12.750	—	—	3,070
	N-80	60.00	10.772	10.616	12.750	—	—	3,180
	C-95	60.00	10.772	10.616	12.750	—	—	3,440
13 ³ / ₈	*F-25	48.00	12.715	12.559	14.375	—	—	560
	H-40	48.00	12.715	12.559	14.375	—	—	770
	J-55	54.50	12.615	12.459	14.375	—	—	1,130
	J-55	61.00	12.515	12.359	14.375	—	—	1,540
	J-55	68.00	12.415	12.259	14.375	—	—	1,950
	K-55	54.50	12.615	12.459	14.375	—	—	1,130
	K-55	61.00	12.515	12.359	14.375	—	—	1,540
	K-55	68.00	12.415	12.259	14.375	—	—	1,950
	C-75	72.00	12.347	12.191	14.375	—	—	2,590
	*C-75	77.00	12.275	12.119	14.375	—	—	2,990
	*C-75	85.00	12.159	12.003	14.375	—	—	3,810
	*C-75	98.00	11.937	11.781	14.375	—	—	5,720
	N-80	72.00	12.347	12.191	14.375	—	—	2,670
	*N-80	77.00	12.275	12.119	14.375	—	—	3,100
	N-80	85.00	12.159	12.003	14.375	—	—	3,870
	*N-80	98.00	11.937	11.781	14.375	—	—	5,910
	C-95	72.00	12.347	12.191	14.375	—	—	2,820
	*P-110	72.00	12.347	12.191	14.375	—	—	2,880
	*V-150	72.00	12.347	12.191	14.375	—	—	2,880
16	*F-25	55.00	15.376	15.188	17.000	—	—	290
	H-40	65.00	15.250	15.062	17.000	—	—	670
	J-55	75.00	15.124	14.936	17.000	—	—	1,020
	J-55	84.00	15.010	14.822	17.000	—	—	1,410
	K-55	75.00	15.124	14.936	17.000	—	—	1,020
	K-55	84.00	15.010	14.822	17.000	—	—	1,410
	*K-55	109.00	14.688	14.500	17.000	—	—	2,560
	*C-75	109.00	14.688	14.500	17.000	—	—	2,980
	*N-80	109.00	14.688	14.500	17.000	—	—	3,080

*Non API Standard. Shown for information only.

NO. 203

STRENGTHS OF CASING

Plain End or Ext. Line	Internal Yield Pressure PSI**			** Body Yield Stgth. 1,000 Lbs.	Joint Strength - 1000 Lbs.**			
	Round Thread		But- tress Thd.		Threaded & Cplg. Joint		Ext. Line Joint	
	Short	Long			Round	Thread		
—	1,120	—	—	270	222	—	—	
1,980	1,980	—	—	478	307	—	—	
3,070	3,070	—	3,070	737	477	—	807	
3,560	3,560	—	3,560	850	568	—	931	
4,010	4,010	—	4,010	952	649	—	1,042	
3,070	3,070	—	3,070	737	509	—	935	
3,560	3,560	—	3,560	850	606	—	1,079	
4,010	4,010	—	4,010	952	693	—	1,208	
5,460	5,460	—	5,460	1,298	869	—	1,361	
5,830	5,830	—	5,830	1,384	924	—	1,440	
6,920	6,920	—	6,920	1,644	1,066	—	1,596	
—	1,080	—	—	338	260	—	—	
1,730	1,730	—	—	541	322	—	—	
2,730	2,730	—	2,730	853	514	—	909	
3,090	3,090	—	3,090	962	595	—	1,025	
3,450	3,450	—	3,450	1,069	675	—	1,140	
2,730	2,730	—	2,730	853	547	—	1,038	
3,090	3,090	—	3,090	962	633	—	1,169	
3,450	3,450	—	3,450	1,069	718	—	1,300	
5,040	5,040	—	5,040	1,558	978	—	1,598	
—	5,400	—	5,400	1,662	1,054	—	2,054	
—	5,970	—	5,970	1,829	1,177	—	2,261	
—	6,270	—	6,120	2,144	1,408	—	2,296	
5,380	5,380	—	5,380	1,661	1,040	—	1,693	
—	5,760	—	5,760	1,773	1,122	—	2,148	
—	6,360	—	6,360	1,951	1,252	—	2,364	
—	6,680	—	6,530	2,287	1,498	—	2,400	
6,390	6,390	—	6,390	1,973	1,204	—	1,893	
—	7,400	—	7,400	2,596	1,402	—	2,433	
—	10,090	—	10,090	3,323	1,887	—	2,976	
—	850	—	—	384	258	—	—	
1,640	1,640	—	—	736	439	—	—	
2,630	2,630	—	2,630	1,178	710	—	1,200	
2,980	2,980	—	2,980	1,326	817	—	1,351	
2,630	2,630	—	2,630	1,178	752	—	1,331	
2,980	2,980	—	2,980	1,326	865	—	1,499	
—	3,950	—	3,950	1,739	1,181	—	1,962	
—	5,380	—	—	2,372	1,499	—	—	
—	5,740	—	—	2,530	1,594	—	—	

**Collapse, Internal Yield and Joint Yield Strengths are minimum values with no safety factor, reproduced by permission from API Bul. 5C2, Bulletin on Performance properties of Casing and Tubing.

TABLE
DIMENSIONS AND

Size O.D. In.	Grade	Wt. Per Ft. With Cplg., Lb.	Inside Dia. In.	Thread & Cplg.		Extreme Line		** Col'pse Resis- tance PSI
				Drift Dia. In.	O.D. of Cplg. In.	Drift Dia. In.	O.D. of Box In.	
18 ⁵ / ₈	H-40	87.50	17.755	17.567	19.625	—	—	630
	J-55	87.50	17.755	17.567	19.625	—	—	630
	K-55	87.50	17.755	17.567	19.625	—	—	630
20	*F-25	94.00	19.124	18.936	21.000	—	—	410
	H-40	94.00	19.124	18.936	21.000	—	—	520
	J-55	94.00	19.124	18.936	21.000	—	—	520
	J-55	106.50	19.000	18.812	21.000	—	—	770
	J-55	133.00	18.730	18.542	21.000	—	—	1,500
	K-55	94.00	19.124	18.936	21.000	—	—	520
	K-55	106.50	19.000	18.812	21.000	—	—	770
	K-55	133.00	18.730	18.542	21.000	—	—	1,500

*Non API Standard. Shown for information only.

NO. 203

STRENGTHS OF CASING

Plain End or Ext. Line	Internal Yield Pressure PSI**			** Body Yield Stgth. 1,000 Lbs.	Joint Strength - 1000 Lbs.**			
	Round	Thread	But- tress Thd.		Threaded & Cplg. Joint		Ext. Line Joint	
					Round	Thread		
					Short	Long		
1,630	1,630	—	—	994	559	—	—	
2,250	2,250	—	—	1,367	754	—	1,329	
2,250	2,250	—	—	1,367	794	—	1,427	
—	960	—	—	673	359	—	—	
1,530	1,530	—	—	1,077	581	—	—	
2,110	2,110	2,110	—	1,480	784	907	1,402	
2,410	2,410	2,410	—	1,685	913	1,057	1,596	
3,060	3,060	3,060	—	2,125	1,192	1,380	2,012	
2,110	2,110	2,110	—	1,480	824	955	1,479	
2,410	2,410	2,410	—	1,685	960	1,113	1,683	
3,060	3,060	3,060	—	2,125	1,253	1,453	2,123	

**Collapse, Internal Yield and Joint Yield Strengths are minimum values with no safety factor, reproduced by permission from API Bul. 5C2, Bulletin on Performance properties of Casing and Tubing.

TABLE 204

STRETCH DATA FOR DRILL PIPE, TUBING AND CASING

Size of Tubing, D.P. or Casing	Stretch Per Length of Pipe Suspended in Well, Feet	Pull Above 1000 Lb. Pull Above Wt. of Pipe, Inches Factor C	Stretch Weight of Pipe Per In. Stretch of Pipe Pounds	Due To Own Weight Suspended in Water, Inches
2.375" Upset Tubing 4.70#/Ft.	500	.115	6,450	.14
	1,000	.310	3,225	.56
	2,000	.620	1,612	2.22
	3,000	.930	1,075	5.00
	4,000	1.240	806	8.88
	5,000	1.550	644	13.88
	10,000	3.100	322	55.51
2.875" Upset Tubing 6.50#/Ft.	500	.110	9,080	.14
	1,000	.220	4,540	.56
	2,000	.440	2,270	2.22
	3,000	.660	1,513	5.00
	4,000	.880	1,135	8.88
	5,000	1.100	908	13.88
	10,000	2.200	454	55.51
3.500" Upset Tubing 9.30#/Ft.	500	.0772	12,960	.14
	1,000	.1544	6,480	.56
	2,000	.3088	3,240	2.22
	3,000	.4632	2,160	5.00
	4,000	.6176	1,620	8.88
	5,000	.7720	1,296	13.88
	10,000	1.544	648	55.51
2.875" Drill Pipe 10.40#/Ft.	500	.070	14,300	.14
	1,000	.140	7,150	.56
	2,000	.280	3,575	2.22
	3,000	.420	2,383	5.00
	4,000	.560	1,787	8.88
	5,000	.700	1,430	13.88
	10,000	1.40	715	55.51

FORMULA FOR DETERMINING STRETCH IN PIPE

$$S = \frac{L \times P \times C}{1000 \times 1000}$$

(use to set tension packer with no weight indication)

FORMULA FOR DETERMINING PULL OF PIPE

$$P = \frac{1000 \times 1000 \times S}{C \times L}$$

FORMULA FOR FREE PIPE DEPTH

$$L = \frac{S \times 1000 \times 1000}{P \times C}$$

Where: L = Length of free pipe in feet.

S = Stretch pulled in pipe, in inches.

P = Pull on pipe to get the stretch "S" in pounds

C = Constant for given pipe size and weight being stretched.
(For this equation use C factor at pipe length of 1000 ft.)

TABLE 204

STRETCH DATA FOR DRILL PIPE, TUBING AND CASING

Size of Tubing, D.P. or Casing	Stretch Per Length of Pipe Suspended in Well, Feet	Pull Above 1000 Lb. Pull Above Wt. of Pipe, Inches Factor C	Stretch Weight of Pipe Per In. Stretch of Pipe Pounds	Due To Own Weight Suspended in Water, Inches
3.500" Drill Pipe 13.30 #/Ft.	500	.055	18,200	.14
	1,000	.110	9,100	.56
	2,000	.220	4,550	2.22
	3,000	.330	3,033	5.00
	4,000	.440	2,275	8.88
	5,000	.550	1,820	13.88
	10,000	1.10	910	55.51
4.500" Drill Pipe 16.60 #/Ft.	500	.0450	22,200	.14
	1,000	.0900	11,100	.56
	2,000	.180	5,550	2.22
	3,000	.270	3,700	5.00
	4,000	.360	2,775	8.88
	5,000	.450	2,220	13.88
	10,000	.900	1,110	55.51
5.500" Casing 17 #/Ft.	500	.0402	24,800	.14
	1,000	.0804	12,400	.56
	2,000	.160	6,230	2.22
	3,000	.240	4,133	5.00
	4,000	.320	3,100	8.88
	5,000	.402	2,480	13.88
	10,000	.804	1,240	55.51
7.000" Casing 23 #/Ft.	500	.0301	33,220	.14
	1,000	.0602	16,610	.56
	2,000	.120	8,305	2.22
	3,000	.181	5,537	5.00
	4,000	.241	4,152	8.88
	5,000	.301	3,322	13.88
	10,000	.602	1,661	55.51

NOTE: The above figures apply only to steel pipe that has not been stretched or is not being stretched beyond its elastic limit.

Example:

A 7" RTTS is set at 15,000 feet on 2 3/8: 4.7 #/ft. EUE tubing. There are indications that the casing has collapsed above the tool. Pick up pipe weight, mark pipe and pull 20,000 pounds above pipe weight. This 20,000 pounds stretches pipe 25 inches. Where is the casing collapsed?

$$S = 25 \text{ inches}$$

$$P = 20,000 \text{ pounds}$$

$$C = .31 \text{ (C factor from table at 1000 ft.)}$$

$$L = \frac{25 \times 1000 \times 1000}{20,000 \times .31}$$

$$L = 4032 \text{ feet}$$

TABLE 205

SLACK-OFF DATA FOR TUBING AND DRILL PIPE

Size of Tubing or Drill Pipe	Slack-Off Factor*
1.900 O.D. EUE Tubing	0.68
2.375 O.D. EUE Tubing	0.39
2.875 O.D. EUE Tubing	0.26
3.500 O.D. EUE Tubing	0.17
2.875 O.D. 10.40 lb/ft DP	0.16
3.500 O.D. 13.30 lb/ft DP	0.12
4.500 O.D. 16.60 lb/ft DP	0.10

* Inches to slack-off to obtain 1000 lbs. weight on packer for each 1000 ft. of depth.
An allowance is included for coiling and friction.

$$\text{Required slack (inc.)} = \frac{\text{Desired Weight}}{1000} \times \frac{\text{Packer Depth}}{1000} \times \text{Factor}$$

Example:

Weight desired on packer 15,000 lbs.

Depth packer set 5,000"

Size of Tubing 2.375" EUE

Slack-off factor for 2.375" EUE from table = 0.39

$$\frac{15,000}{1000} \times \frac{5,000}{1000} \times 0.39 = 29.25 \text{ (use 29 inches)}$$

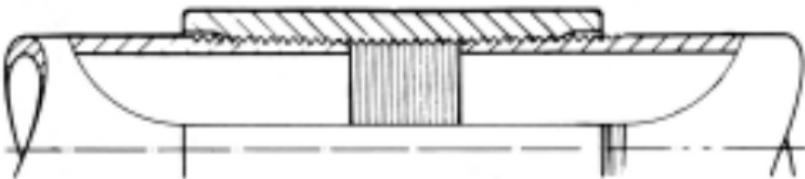
The setting stroke required to set any particular tool is not included in these figures and will have to be added.

NOTE: The above figures apply only to pipe that has not been stretched, or is not being stretched beyond its elastic limit.

TUBING

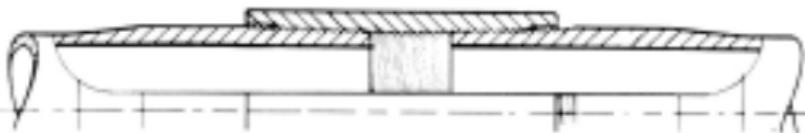
API Non-Upset Tubing

Sizes: 1.050" - 4 $\frac{1}{2}$ "



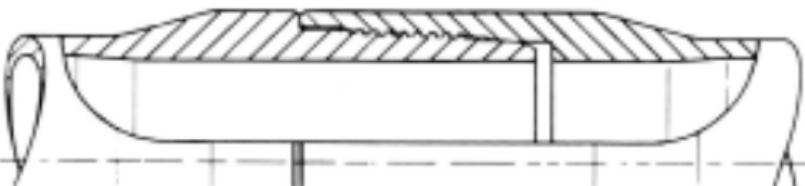
API External Upset Tubing

Sizes: 1.050" - 4 $\frac{1}{2}$ "



Extreme-Line Tubing

Sizes: 2 $\frac{3}{8}$ " - 3 $\frac{1}{2}$ "



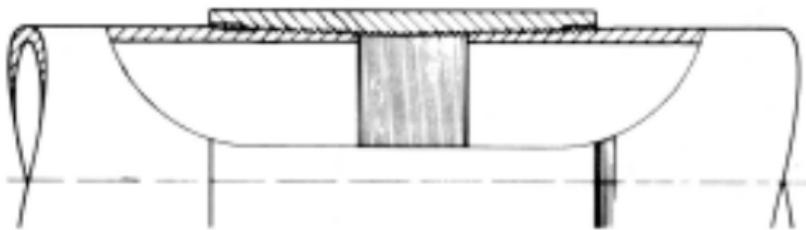
CASING

API SHORT OR LONG

Round-Thread Casing

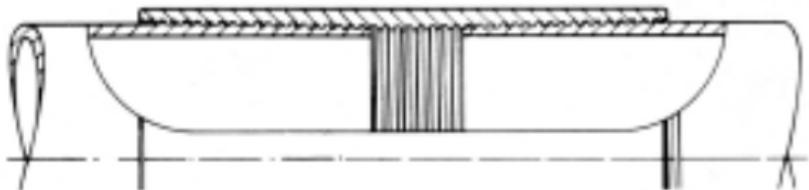
Sizes: $4\frac{1}{2}''$ - $20''$

($2\frac{1}{2}''$ and $24\frac{1}{2}''$)



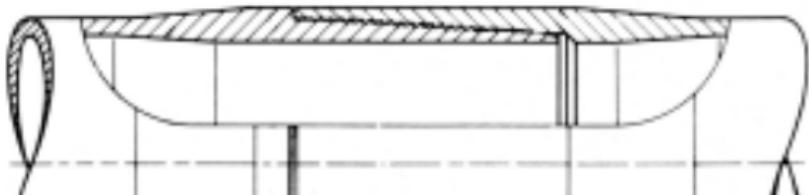
API Buttress-Thread Casing

Sizes: $4\frac{1}{2}''$ - $20''$

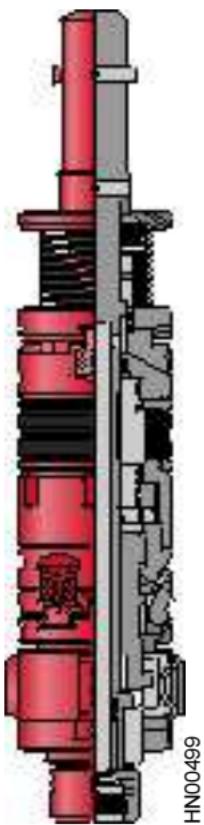


API Extreme-Line Casing

Sizes: $5''$ - $10\frac{3}{4}''$



BRIDGE PLUGS



MODEL 3L RETRIEVABLE BRIDGE PLUG

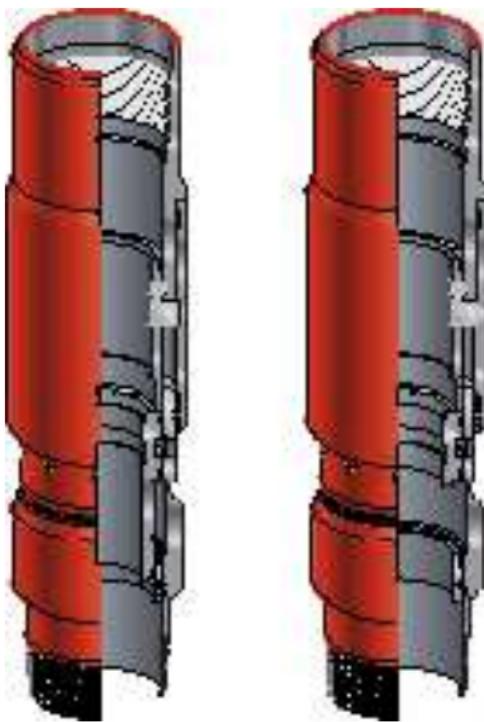
- Packer-type bridge plug highly adaptable to any zonal isolation procedure.
- Excellent for testing, fracturing, acidizing, or squeezing.
- Reduced tool body OD and a high-volume center-flow ID provides rapid run-in and retrieval, even through heavy wellbore fluids.
- Setting is simple, requiring only tubing manipulation and application of workstring weight.
- A Model 3L used with a Champ or RTTS packer provides reliable set/seal/release performance.



MODEL N QUICK RETRIEVABLE BRIDGE PLUG

- Utilizes differential pressure above or below to seal.
- Plug is easily released by opening concentric, integral bypass.
- Can be run with Champ or RTTS packers to treat, squeeze or test multiple zones.

ES™ MULTI-STAGE CEMENTER



TYPE H

TYPE P

MULTI-STAGE CEMENTER

Halliburton's full range of innovation products and techniques offers greater flexibility when planning the cementing program. One important method is multiple stage cementing, perfected by Halliburton. During this process, the slurry is placed around a casing string in several stages at predetermined points. Multiple stage cementing can be used when:

- The hydrostatic pressure of the cement is too great for the formation or casing.
- It is necessary to separate different types or blends of cement.
- Limited pump time is available.
- It is necessary to cement only certain sections of the annulus.

ES™ CEMENTER TOOLS

- Two configurations
 - Type P, plug-operated stage cementer.
 - Type H, hydraulically-opened stage cementer.
- PDC drillable.
- Smooth-bore drillout.
- Short, single piece mandrel.
- Adjustable operating pressure.

SECTION No. 210

CAPACITY

NOTE:

There are some differences in the values in these tables and those previously published. The differences are slight and the former values are sufficiently accurate for dependable results.

The Values in these tables have been calculated on the IBM Computer.

NOTE: Plastic lined pipe may have variable ID's to those shown therein.



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**TABLE
CAPACITY**

Size O.D. In.	Wt. per Ft. With Coupings, Lb.			Inside Diameter In.	Drift Diameter In.
	Non- Upset	Upset	Integral Joint		
1.050	1.14	1.20	1.20	.824	.730
1.315	1.70	1.80	1.72 *2.25	1.049 .957	.955 .848
1.660	— 2.30 —	— 2.40 —	2.10 2.33 *3.02	1.410 1.380 1.278	1.286 1.286 1.184
1.900	— 2.75 —	— 2.90 —	2.40 2.76 *3.64	1.650 1.610 1.500	1.516 1.516 1.406
2.063	—	—	3.25	1.751	1.657
2.375	4.00 4.60 — 5.80 — —	— 4.70 — 5.95 — —	— 4.70 5.30 5.95 *6.20 *7.70	2.041 1.995 1.939 1.867 1.853 1.703	1.947 1.901 1.845 1.773 1.759 1.609
2.875	6.40 — 8.60 — —	6.50 — 8.70 — —	6.50 7.90 8.70 *9.50 *10.70 *11.00	2.441 2.323 2.259 2.195 2.091 2.065	2.347 2.229 2.165 2.101 1.997 1.971
3.500	7.70 9.20 10.20 — 12.70 — —	— 9.30 — — 12.95 — —	— 9.30 10.30 *12.80 12.95 *15.80 *16.70	3.068 2.992 2.922 2.764 2.750 2.548 2.480	2.943 2.867 2.797 2.639 2.625 2.423 2.355
4.000	9.50 — — —	— 11.00 — —	— 11.00 *11.60 *13.40	3.548 3.476 3.428 3.340	3.423 3.351 3.303 3.215
4.500	12.60 — — —	12.75 — — —	12.75 *13.50 *15.50 *19.20	3.958 3.920 3.826 3.640	3.833 3.795 3.701 3.515

*Non API Standard. Shown for information only.

NO. 211
OF TUBING

Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.	Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.
.0277	36.0983	.00066	1516.13	.00370	270.034
.0449	22.2736	.00107	935.49	.00600	166.618
.0374	26.7619	.00089	1124.00	.00500	200.193
.0811	12.3283	.00193	517.79	.01084	92.222
.0777	12.8701	.00185	540.55	.01039	96.275
.0666	15.0065	.00159	630.27	.00891	112.256
.1111	9.0027	.00264	378.11	.01485	67.345
.1058	9.4556	.00252	397.14	.01414	70.733
.0918	10.8933	.00219	457.52	.01227	81.487
.1251	7.9941	.00298	335.75	.01672	59.800
.1700	5.8838	.00405	247.12	.02272	44.014
.1624	6.1582	.00387	258.65	.02171	46.067
.1534	6.5191	.00365	273.80	.02051	48.766
.1422	7.0316	.00339	295.33	.01901	52.600
.1401	7.1382	.00334	299.81	.01873	53.398
.1183	8.4511	.00282	354.95	.01582	63.218
.2431	4.1134	.00579	172.76	.03250	30.771
.2202	4.5420	.00524	190.76	.02943	33.976
.2082	4.8030	.00496	201.72	.02783	35.929
.1966	5.0871	.00468	213.66	.02628	38.054
.1784	5.6057	.00425	235.44	.02385	41.934
.1740	5.7478	.00414	241.41	.02326	42.996
.3840	2.6039	.00914	109.37	.05134	19.479
.3652	2.7379	.00870	114.99	.04883	20.481
.3484	2.8707	.00829	120.57	.04657	21.474
.3117	3.2082	.00742	134.75	.04167	23.999
.3085	3.2410	.00735	136.12	.04125	24.244
.2649	3.7752	.00631	158.56	.03541	28.241
.2509	3.9851	.00597	167.37	.03355	29.811
.5136	1.9474	.01223	81.78	.06866	14.565
.4930	2.0285	.01174	85.20	.06590	15.174
.4794	2.0857	.01142	87.60	.06409	15.602
.4551	2.1971	.01084	92.28	.06084	16.435
.6392	1.5645	.01522	65.71	.08544	11.704
.6269	1.5950	.01493	66.99	.08381	11.932
.5972	1.6744	.01422	70.32	.07984	12.525
.5406	1.8499	.01287	77.69	.07227	13.838

TABLE
CAPACITY OF

Size O.D. In.	Weight Per Ft. With Couplings Lb.	I.D. In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon
$2\frac{3}{8}$	4.85 *6.65	1.995 1.815	.1624 .1344	6.1582 7.4403
$2\frac{7}{8}$	*6.45 6.85 *8.35 10.40	2.469 2.441 2.323 2.150	.2487 .2431 .2202 .1888	4.0207 4.1134 4.5420 5.2974
$3\frac{1}{2}$	*8.50 9.50 *11.20 13.30 15.50	3.063 2.992 2.900 2.764 2.602	.3828 .3652 .3431 .3117 .2762	2.6124 2.7379 2.9144 3.2082 3.6201
4	11.85 14.00 *15.70	3.476 3.340 3.240	.4930 .4551 .4283	2.0285 2.1971 2.3348
$4\frac{1}{2}$	*12.75 13.75 16.60 20.00	4.000 3.958 3.826 3.640	.6528 .6392 .5972 .5406	1.5319 1.5645 1.6744 1.8499
5	16.25 *19.50 *20.50	4.408 4.276 4.214	.7928 .7460 .7245	1.2614 1.3405 1.3802
$5\frac{1}{2}$	*21.90 *24.70	4.778 4.670	.9314 .8898	1.0736 1.1238
$5\frac{9}{16}$	*19.00 *22.20 *25.25	4.975 4.859 4.733	1.0098 .9633 .9140	.9903 1.0381 1.0941
$6\frac{5}{8}$	*22.20 *25.20 *31.90	6.065 5.965 5.761	1.5008 1.4517 1.3541	.6663 .6888 .7385
$7\frac{5}{8}$	*29.25	6.969	1.9815	.5047

NO. 212

INTERNAL UPSET DRILL PIPE**

Barrels Per Lin. Ft.	Lin. Ft. Per Barel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. ft.	Weight Per Ft. With Couplings Lb.	Size O.D. In.
.00386	258.65	.0217	46.067	4.85	$2\frac{3}{8}$
.00320	312.49	.0180	55.657	*6.65	
.00592	168.87	.0332	30.077	*6.45	$2\frac{7}{8}$
.00579	172.76	.0325	30.771	6.85	
.00524	190.76	.0294	33.976	*8.35	
.00449	222.49	.0252	39.627	10.40	
.00911	109.72	.0512	19.542	*8.50	$3\frac{1}{2}$
.00870	114.99	.0488	20.481	9.50	
.00817	122.40	.0459	21.801	*11.20	
.00742	134.75	.0417	23.999	13.30	
.00658	152.05	.0369	27.081	15.50	
.01174	85.20	.0659	15.174	11.85	4
.01084	92.28	.0608	16.435	14.00	
.01020	98.06	.0573	17.466	*15.70	
.01554	64.34	.0873	11.459	*12.75	$4\frac{1}{2}$
.01522	65.71	.0854	11.704	13.75	
.01422	70.32	.0798	12.525	16.60	
.01287	77.69	.0723	13.838	20.00	
.01888	52.98	.1059	9.436	16.25	5
.01776	56.30	.0997	10.028	*19.50	
.01730	57.97	.0969	10.325	*20.50	
.02218	45.09	.1245	8.031	*21.90	$5\frac{1}{2}$
.02119	47.20	.1189	8.407	*24.70	
.02404	41.59	.1350	7.408	*19.00	$5\frac{9}{16}$
.02294	43.60	.1288	7.766	*22.20	
.02176	45.95	.1222	8.185	*25.25	
.03573	27.99	.2006	4.984	*22.20	$6\frac{5}{8}$
.03456	28.93	.1941	5.153	*25.20	
.03224	31.02	.1810	5.524	*31.90	
.04718	21.20	.2649	3.775	*29.25	$7\frac{5}{8}$

** No allowance made for internal restrictions of upsets and tool joints in this table. To allow for them, first find the capacity of the entire drill stem by using this Table, then deduct the total amount of internal restrictions of upsets obtained by using Table 132, and of Tool Joints obtained by using Table 133.

* Not API Standard. Shown for information only.

TABLE
CAPACITY OF EXTERNAL

Size O.D. In.	Weight Per Ft. With Couplings Lb.	I.D. In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon
2 ³ / ₈	*4.85 6.65	1.995 1.815	.1624 .1344	6.1582 7.4403
2 ⁷ / ₈	*6.85 10.40	2.441 2.151	.2431 .1888	4.1134 5.2974
3 ¹ / ₂	*9.50 .13.30 15.50	2.992 2.764 2.602	.3652 .3117 .2762	2.7379 3.2082 3.6201
4	*11.85 14.00	3.476 3.340	.4930 .4551	2.0285 2.1971
4 ¹ / ₂	*13.75 16.60 *18.15 20.00	3.958 3.826 3.754 3.640	.6392 .5972 .5750 .5406	1.5646 1.6744 1.7392 1.8499
5	20.50	4.214	.7245	1.3802

NO. 212A

UPSET DRILL PIPE**

Barrels Per Lin. Ft.	Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft. With Couplings Lb.	Size O.D. In.
.00386	258.65	.0217	46.067	*4.85	2 ³ / ₈
.00320	312.49	.0180	55.657	6.65	
.00579	172.76	.0325	30.771	*6.85	2 ⁷ / ₈
.00449	222.49	.0252	39.627	10.40	
.00870	114.99	.0488	20.481	*9.50	3 ¹ / ₂
.00742	134.75	.0417	23.999	13.30	
.00658	152.05	.0369	27.081	15.50	
.01174	85.20	.0659	15.174	*11.85	4
.01084	92.28	.0608	16.435	14.00	
.01522	65.71	.0854	11.704	*13.75	4 ¹ / ₂
.01422	70.32	.0798	12.525	16.60	
.01369	73.05	.0769	13.010	18.15	
.01287	77.69	.0723	13.838	20.00	
.01730	57.97	.0969	10.325	20.50	5

** No allowance made for Internal Restrictions of Joints and Upsets.

* Not Standard. Shown for information only.

**TABLE
CAPACITY OF INTERNAL &**

Size O.D. In.	Weight Per Ft. With Couplings Lb.	I.D. In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon
2 ⁷ / ₈	*10.40	2.151	.1888	5.2974
3 ¹ / ₂	*13.30 *15.50	2.764 2.602	.3117 .2762	3.2082 3.6201
4	*14.00 *15.30	3.340 3.244	.4551 .4294	2.1971 2.3291
4 ¹ / ₂	*16.60 *18.15 20.00	3.826 3.754 3.640	.5972 .5750 .5406	1.6744 1.7392 1.8499
5	*16.25 19.50	4.408 4.276	.7928 .7460	1.2614 1.3405
5 ¹ / ₂	21.90 24.70	4.778 4.670	.9314 .8898	1.0736 1.1238
5 ⁹ / ₁₆	*22.20	4.859	.9633	1.0381
6 ⁵ / ₈	25.20	5.965	1.4517	.6888

NO. 212B

EXTERNAL UPSET DRILL PIPE**

Barrels Per Lin. Ft.	Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft. With Couplings Lb.	Size O.D. In.
.00449	222.49	.0252	39.627	*10.40	2 ⁷ / ₈
.00742	134.75	.0417	23.999	*13.30	3 ¹ / ₂
.00658	152.05	.0369	27.081	*15.50	
.01084	92.28	.0608	16.435	*14.00	4
.01022	97.85	.0574	17.423	*15.30	
.01422	70.32	.0798	12.525	*16.60	4 ¹ / ₂
.01369	73.05	.0769	13.010	*18.15	
.01287	77.69	.0723	13.838	20.00	
.01888	52.98	.1059	9.436	*16.25	5
.01776	56.30	.0997	10.028	19.50	
.02218	45.09	.1245	8.031	21.90	5 ¹ / ₂
.02119	47.20	.1189	8.407	24.70	
.02294	43.60	.1288	7.766	22.20	5 ⁹ / ₁₆
.03456	28.93	.1941	5.153	25.20	6 ⁵ / ₈

** No allowance made for Internal Restrictions of Joints and Upsets.

* Not Standard. Shown for information only.

TABLE
CAPACITY

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
2	.1632	6.1275	.0039
2 $\frac{1}{8}$.1842	5.4278	.0044
2 $\frac{1}{4}$.2065	4.8415	.0049
2 $\frac{3}{8}$.2301	4.3452	.0055
2 $\frac{1}{2}$.2550	3.9216	.0061
2 $\frac{5}{8}$.2811	3.5570	.0067
2 $\frac{3}{4}$.3085	3.2410	.0073
2 $\frac{7}{8}$.3372	2.9653	.0080
3	.3672	2.7233	.0087
3 $\frac{1}{8}$.3984	2.5098	.0095
3 $\frac{1}{4}$.4309	2.3205	.0103
3 $\frac{3}{8}$.4647	2.1518	.0111
3 $\frac{1}{2}$.4998	2.0008	.0119
3 $\frac{5}{8}$.5361	1.8652	.0128
3 $\frac{3}{4}$.5737	1.7429	.0137
3 $\frac{7}{8}$.6126	1.6323	.0146
4	.6528	1.5319	.0155
4 $\frac{1}{8}$.6942	1.4404	.0165
4 $\frac{1}{4}$.7369	1.3569	.0175
4 $\frac{3}{8}$.7809	1.2805	.0186
4 $\frac{1}{2}$.8262	1.2104	.0197
4 $\frac{5}{8}$.8727	1.1458	.0208
4 $\frac{3}{4}$.9205	1.0863	.0219
4 $\frac{7}{8}$.9696	1.0313	.0231
5	1.0200	.9804	.0243
5 $\frac{1}{8}$	1.0716	.9332	.0255
5 $\frac{1}{4}$	1.1245	.8892	.0268
5 $\frac{3}{8}$	1.1787	.8484	.0281
5 $\frac{1}{2}$	1.2342	.8102	.0294
5 $\frac{5}{8}$	1.2909	.7746	.0307
5 $\frac{3}{4}$	1.3489	.7413	.0321
5 $\frac{7}{8}$	1.4082	.7101	.0335
6	1.4688	.6808	.0350
6 $\frac{1}{8}$	1.5306	.6533	.0364
6 $\frac{1}{4}$	1.5937	.6275	.0379
6 $\frac{3}{8}$	1.6581	.6031	.0395
6 $\frac{1}{2}$	1.7238	.5801	.0410
6 $\frac{5}{8}$	1.7907	.5584	.0426
6 $\frac{3}{4}$	1.8589	.5379	.0443
6 $\frac{7}{8}$	1.9284	.5186	.0459
7	1.9992	.5002	.0476
7 $\frac{1}{8}$	2.0712	.4828	.0493
7 $\frac{1}{4}$	2.1445	.4663	.0511
7 $\frac{3}{8}$	2.2191	.4506	.0528
7 $\frac{1}{2}$	2.2950	.4357	.0546
7 $\frac{5}{8}$	2.3721	.4216	.0565
7 $\frac{3}{4}$	2.4505	.4081	.0583
7 $\frac{7}{8}$	2.5302	.3932	.0602

NO. 213
OF HOLE

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
257.3536	.0218	45.8366	2
227.9672	.0246	40.6027	2 ¹ / ₈
203.3411	.0276	36.2166	2 ¹ / ₄
182.5000	.0308	32.5046	2 ³ / ₈
164.7063	.0341	29.3354	2 ¹ / ₂
149.3934	.0376	26.6081	2 ⁵ / ₈
136.1209	.0412	24.2442	2 ³ / ₄
124.5416	.0451	22.1818	2 ⁷ / ₈
114.3794	.0491	20.3718	3
105.4120	.0533	18.7747	3 ¹ / ₈
97.4593	.0576	17.3582	3 ¹ / ₄
90.3738	.0621	16.0963	3 ³ / ₈
84.0338	.0668	14.9671	3 ¹ / ₂
78.3383	.0717	13.9526	3 ⁵ / ₈
73.2028	.0767	13.0380	3 ³ / ₄
68.5562	.0819	12.2104	3 ⁷ / ₈
64.3384	.0873	11.4592	4
60.4982	.0928	10.7752	4 ¹ / ₈
56.9918	.0985	10.1507	4 ¹ / ₄
53.7816	.1044	9.5789	4 ³ / ₈
50.8353	.1104	9.0541	4 ¹ / ₂
48.1245	.1167	8.5713	4 ⁵ / ₈
45.6250	.1231	8.1262	4 ³ / ₄
43.3153	.1296	7.7148	4 ⁷ / ₈
41.1766	.1364	7.3339	5
39.1924	.1433	6.9805	5 ¹ / ₈
37.3484	.1503	6.6520	5 ¹ / ₄
35.6314	.1576	6.3462	5 ³ / ₈
34.0302	.1650	6.0610	5 ¹ / ₂
32.5346	.1726	5.7947	5 ⁵ / ₈
31.1354	.1803	5.5455	5 ³ / ₄
29.8246	.1883	5.3120	5 ⁷ / ₈
28.5948	.1963	5.0930	6
27.4396	.2046	4.8872	6 ¹ / ₈
26.3530	.2131	4.6937	6 ¹ / ₄
25.3297	.2217	4.5114	6 ³ / ₈
24.3648	.2304	4.3396	6 ¹ / ₂
23.4541	.2394	4.1773	6 ⁵ / ₈
22.5935	.2485	4.0241	6 ³ / ₄
21.7793	.2578	3.8791	6 ⁷ / ₈
21.0085	.2673	3.7418	7
20.2778	.2769	3.6116	7 ¹ / ₈
19.5846	.2867	3.4882	7 ¹ / ₄
18.9263	.2967	3.3709	7 ³ / ₈
18.3007	.3068	3.2595	7 ¹ / ₂
17.7056	.3171	3.1535	7 ⁵ / ₈
17.1390	.3276	3.0526	7 ³ / ₄
16.5993	.3382	2.9565	7 ⁷ / ₈

TABLE
CAPACITY

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8	2.6112	.3830	.0622
8 $\frac{1}{8}$	2.6934	.3713	.0641
8 $\frac{1}{4}$	2.7769	.3601	.0661
8 $\frac{3}{8}$	2.8617	.3494	.0681
8 $\frac{1}{2}$	2.9478	.3392	.0702
8 $\frac{5}{8}$	3.0351	.3295	.0723
8 $\frac{3}{4}$	3.1237	.3201	.0744
8 $\frac{7}{8}$	3.2136	.3112	.0765
9	3.3048	.3026	.0787
9 $\frac{1}{8}$	3.3972	.2944	.0809
9 $\frac{1}{4}$	3.4909	.2865	.0831
9 $\frac{3}{8}$	3.5859	.2789	.0854
9 $\frac{1}{2}$	3.6822	.2716	.0877
9 $\frac{5}{8}$	3.7797	.2646	.0900
9 $\frac{3}{4}$	3.8785	.2578	.0923
9 $\frac{7}{8}$	3.9786	.2513	.0947
10	4.0800	.2451	.0971
10 $\frac{1}{8}$	4.1826	.2391	.0996
10 $\frac{1}{4}$	4.2865	.2333	.1021
10 $\frac{3}{8}$	4.3917	.2277	.1046
10 $\frac{1}{2}$	4.4982	.2223	.1071
10 $\frac{5}{8}$	4.6059	.2171	.1097
10 $\frac{3}{4}$	4.7149	.2121	.1123
10 $\frac{7}{8}$	4.8252	.2072	.1149
11	4.9368	.2026	.1175
11 $\frac{1}{8}$	5.0496	.1980	.1202
11 $\frac{1}{4}$	5.1637	.1937	.1229
11 $\frac{3}{8}$	5.2791	.1894	.1257
11 $\frac{1}{2}$	5.3958	.1853	.1285
11 $\frac{5}{8}$	5.5137	.1814	.1313
11 $\frac{3}{4}$	5.6329	.1775	.1341
11 $\frac{7}{8}$	5.7534	.1738	.1370
12	5.8752	.1702	.1399
12 $\frac{1}{8}$	5.9982	.1667	.1428
12 $\frac{1}{4}$	6.1225	.1633	.1458
12 $\frac{3}{8}$	6.2481	.1600	.1488
12 $\frac{1}{2}$	6.3750	.1569	.1518
12 $\frac{5}{8}$	6.5031	.1538	.1548
12 $\frac{3}{4}$	6.6325	.1508	.1579
12 $\frac{7}{8}$	6.7632	.1479	.1610
13	6.8952	.1450	.1642
13 $\frac{1}{8}$	7.0284	.1423	.1673
13 $\frac{1}{4}$	7.1629	.1396	.1705
13 $\frac{3}{8}$	7.2987	.1370	.1738
13 $\frac{1}{2}$	7.4358	.1345	.1770
13 $\frac{5}{8}$	7.5741	.1320	.1803
13 $\frac{3}{4}$	7.7137	.1296	.1837
13 $\frac{7}{8}$	7.8546	.1273	.1870

NO. 213
OF HOLE

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
16.0846	.3491	2.8648	8
15.5935	.3601	2.7773	8 $\frac{1}{8}$
15.1245	.3712	2.6938	8 $\frac{1}{4}$
14.6764	.3826	2.6140	8 $\frac{3}{8}$
14.2479	.3941	2.5377	8 $\frac{1}{2}$
13.8380	.4057	2.4646	8 $\frac{5}{8}$
13.4454	.4176	2.3947	8 $\frac{3}{4}$
13.0693	.4296	2.3277	8 $\frac{7}{8}$
12.7088	.4418	2.2635	9
12.3630	.4541	2.2019	9 $\frac{1}{8}$
12.0311	.4667	2.1428	9 $\frac{1}{4}$
11.7124	.4794	2.0861	9 $\frac{3}{8}$
11.4063	.4922	2.0315	9 $\frac{1}{2}$
11.1119	.5053	1.9791	9 $\frac{5}{8}$
10.8288	.5185	1.9287	9 $\frac{3}{4}$
10.5564	.5319	1.8802	9 $\frac{7}{8}$
10.2941	.5454	1.8335	10
10.0415	.5591	1.7885	10 $\frac{1}{8}$
9.7981	.5730	1.7451	10 $\frac{1}{4}$
9.5634	.5871	1.7033	10 $\frac{3}{8}$
9.3371	.6013	1.6630	10 $\frac{1}{2}$
9.1187	.6157	1.6241	10 $\frac{5}{8}$
8.9079	.6303	1.5866	10 $\frac{3}{4}$
8.7043	.6450	1.5503	10 $\frac{7}{8}$
8.5076	.6600	1.5153	11
8.3174	.6750	1.4814	11 $\frac{1}{8}$
8.1336	.6903	1.4487	11 $\frac{1}{4}$
7.9559	.7057	1.4170	11 $\frac{3}{8}$
7.7839	.7213	1.3864	11 $\frac{1}{2}$
7.6174	.7371	1.3567	11 $\frac{5}{8}$
7.4561	.7530	1.3280	11 $\frac{3}{4}$
7.3000	.7691	1.3002	11 $\frac{7}{8}$
7.1487	.7854	1.2732	12
7.0021	.8018	1.2471	12 $\frac{1}{8}$
6.8599	.8185	1.2218	12 $\frac{1}{4}$
6.7220	.8353	1.1972	12 $\frac{3}{8}$
6.5883	.8522	1.1734	12 $\frac{1}{2}$
6.4584	.8693	1.1503	12 $\frac{5}{8}$
6.3324	.8866	1.1279	12 $\frac{3}{4}$
6.2101	.9041	1.1061	12 $\frac{7}{8}$
6.0912	.9218	1.0849	13
5.9757	.9396	1.0643	13 $\frac{1}{8}$
5.8635	.9575	1.0443	13 $\frac{1}{4}$
5.7544	.9757	1.0249	13 $\frac{3}{8}$
5.6484	.9940	1.0060	13 $\frac{1}{2}$
5.5452	1.0125	.9876	13 $\frac{5}{8}$
5.4448	1.0312	.9698	13 $\frac{3}{4}$
5.3472	1.0500	.9524	13 $\frac{7}{8}$

TABLE
CAPACITY

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
14	7.9968	.1251	.1904
14 $\frac{1}{8}$	8.1402	.1228	.1938
14 $\frac{1}{4}$	8.2849	.1207	.1973
14 $\frac{3}{8}$	8.4309	.1186	.2007
14 $\frac{1}{2}$	8.5782	.1166	.2042
14 $\frac{5}{8}$	8.7267	.1146	.2078
14 $\frac{3}{4}$	8.8765	.1127	.2113
14 $\frac{7}{8}$	9.0276	.1108	.2149
15	9.1800	.1089	.2186
15 $\frac{1}{8}$	9.3336	.1071	.2222
15 $\frac{1}{4}$	9.4885	.1054	.2259
15 $\frac{3}{8}$	9.6447	.1037	.2296
15 $\frac{1}{2}$	9.8022	.1020	.2334
15 $\frac{5}{8}$	9.9609	.1004	.2372
15 $\frac{3}{4}$	10.1209	.0988	.2410
15 $\frac{7}{8}$	10.2822	.0973	.2448
16	10.4448	.0957	.2487
16 $\frac{1}{4}$	10.7737	.0928	.2565
16 $\frac{1}{2}$	11.1078	.0900	.2645
16 $\frac{3}{4}$	11.4469	.0874	.2725
17	11.7912	.0848	.2807
17 $\frac{1}{4}$	12.1405	.0824	.2891
17 $\frac{1}{2}$	12.4950	.0800	.2975
17 $\frac{3}{4}$	12.8545	.0778	.3061
18	13.2192	.0756	.3147
18 $\frac{1}{4}$	13.5889	.0736	.3235
18 $\frac{1}{2}$	13.9638	.0716	.3325
18 $\frac{3}{4}$	14.3437	.0697	.3415
19	14.7288	.0679	.3507
19 $\frac{1}{4}$	15.1189	.0661	.3600
19 $\frac{1}{2}$	15.5142	.0645	.3694
19 $\frac{3}{4}$	15.9145	.0628	.3789
20	16.3200	.0613	.3886
20 $\frac{1}{4}$	16.7305	.0598	.3983
20 $\frac{1}{2}$	17.1462	.0583	.4082
20 $\frac{3}{4}$	17.5669	.0569	.4183
21	17.9928	.0556	.4284
21 $\frac{1}{4}$	18.4237	.0543	.4387
21 $\frac{1}{2}$	18.8598	.0530	.4490
21 $\frac{3}{4}$	19.3009	.0518	.4595
22	19.7472	.0506	.4702
22 $\frac{1}{4}$	20.1985	.0495	.4809
22 $\frac{1}{2}$	20.6550	.0484	.4918
22 $\frac{3}{4}$	21.1165	.0474	.5028
23	21.5831	.0463	.5139
23 $\frac{1}{4}$	22.0549	.0453	.5251
23 $\frac{1}{2}$	22.5317	.0444	.5365
23 $\frac{3}{4}$	23.0137	.0435	.5479

NO. 213
OF HOLE

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
5.2521	1.0690	.9354	14
5.1596	1.0882	.9190	14 $\frac{1}{8}$
5.0694	1.1075	.9029	14 $\frac{1}{4}$
4.9817	1.1270	.8873	14 $\frac{3}{8}$
4.8961	1.1467	.8720	14 $\frac{1}{2}$
4.8128	1.1666	.8572	14 $\frac{5}{8}$
4.7316	1.1866	.8427	14 $\frac{3}{4}$
4.6524	1.2068	.8286	14 $\frac{7}{8}$
4.5752	1.2272	.8149	15
4.4999	1.2477	.8015	15 $\frac{1}{8}$
4.4264	1.2684	.7884	15 $\frac{1}{4}$
4.3547	1.2893	.7756	15 $\frac{3}{8}$
4.2848	1.3104	.7631	15 $\frac{1}{2}$
4.2165	1.3316	.7510	15 $\frac{5}{8}$
4.1498	1.3530	.7391	15 $\frac{3}{4}$
4.0847	1.3745	.7275	15 $\frac{7}{8}$
4.0211	1.3963	.7162	16
3.8984	1.4402	.6943	16 $\frac{1}{4}$
3.7811	1.4849	.6734	16 $\frac{1}{2}$
3.6691	1.5302	.6535	16 $\frac{3}{4}$
3.5620	1.5763	.6344	17
3.4595	1.6230	.6162	17 $\frac{1}{4}$
3.3614	1.6703	.5987	17 $\frac{1}{2}$
3.2673	1.7184	.5819	17 $\frac{3}{4}$
3.1772	1.7671	.5659	18
3.0908	1.8166	.5505	18 $\frac{1}{4}$
3.0078	1.8667	.5357	18 $\frac{1}{2}$
2.9281	1.9175	.5215	18 $\frac{3}{4}$
2.8516	1.9689	.5079	19
2.7780	2.0211	.4948	19 $\frac{1}{4}$
2.7072	2.0739	.4822	19 $\frac{1}{2}$
2.6391	2.1275	.4700	19 $\frac{3}{4}$
2.5735	2.1817	.4584	20
2.5104	2.2365	.4471	20 $\frac{1}{4}$
2.4495	2.2921	.4363	20 $\frac{1}{2}$
2.3909	2.3484	.4258	20 $\frac{3}{4}$
2.3343	2.4053	.4158	21
2.2797	2.4629	.4060	21 $\frac{1}{4}$
2.2270	2.5212	.3966	21 $\frac{1}{2}$
2.1761	2.5802	.3876	21 $\frac{3}{4}$
2.1269	2.6398	.3788	22
2.0794	2.7001	.3704	22 $\frac{1}{4}$
2.0334	2.7612	.3622	22 $\frac{1}{2}$
1.9890	2.8229	.3542	22 $\frac{3}{4}$
1.9460	2.8852	.3466	23
1.9043	2.9483	.3392	23 $\frac{1}{4}$
1.8640	3.0121	.3320	23 $\frac{1}{2}$
1.8250	3.0765	.3250	23 $\frac{3}{4}$

TABLE
CAPACITY

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
24	23.5007	.0426	.5595
24 ¹ / ₄	23.9929	.0417	.5713
24 ¹ / ₂	24.4901	.0408	.5831
24 ³ / ₄	24.9925	.0400	.5951
25	25.4999	.0392	.6071
25 ¹ / ₄	26.0125	.0384	.6193
25 ¹ / ₂	26.5301	.0377	.6317
25 ³ / ₄	27.0529	.0370	.6441
26	27.5807	.0363	.6567
26 ¹ / ₄	28.1137	.0356	.6694
26 ¹ / ₂	28.6517	.0349	.6822
26 ³ / ₄	29.1949	.0343	.6951
27	29.7431	.0336	.7082
27 ¹ / ₄	30.2965	.0330	.7213
27 ¹ / ₂	30.8549	.0324	.7346
27 ³ / ₄	31.4185	.0318	.7481
28	31.9871	.0313	.7616
28 ¹ / ₄	32.5609	.0307	.7753
28 ¹ / ₂	33.1397	.0302	.7890
28 ³ / ₄	33.7237	.0297	.8029
29	34.3127	.0291	.8170
29 ¹ / ₄	34.9069	.0286	.8311
29 ¹ / ₂	35.5061	.0282	.8454
29 ³ / ₄	36.1105	.0277	.8598
30	36.7199	.0272	.8743
30 ¹ / ₄	37.3345	.0268	.8889
30 ¹ / ₂	37.9541	.0263	.9037
30 ³ / ₄	38.5789	.0259	.9185
31	39.2087	.0255	.9335
31 ¹ / ₄	39.8437	.0251	.9487
31 ¹ / ₂	40.4837	.0247	.9639
31 ³ / ₄	41.1289	.0243	.9793
32	41.7791	.0239	.9947
32 ¹ / ₄	42.4345	.0236	1.0103
32 ¹ / ₂	43.0949	.0232	1.0261
32 ³ / ₄	43.7604	.0229	1.0419
33	44.4311	.0225	1.0579
33 ¹ / ₄	45.1068	.0222	1.0740
33 ¹ / ₂	45.7877	.0218	1.0902
33 ³ / ₄	46.4736	.0215	1.1065
34	47.1647	.0212	1.1230
34 ¹ / ₄	47.8608	.0209	1.1395
34 ¹ / ₂	48.5621	.0206	1.1562
34 ³ / ₄	49.2684	.0203	1.1731
35	49.9799	.0200	1.1900
35 ¹ / ₄	50.6964	.0197	1.2071
35 ¹ / ₂	51.4181	.0194	1.2242
35 ³ / ₄	52.1448	.0192	1.2415

NO. 213
OF HOLE

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
1.7872	3.1416	.3183	24
1.7505	3.2074	.3118	24 $\frac{1}{4}$
1.7150	3.2739	.3055	24 $\frac{1}{2}$
1.6805	3.3410	.2993	24 $\frac{3}{4}$
1.6471	3.4088	.2934	25
1.6146	3.4774	.2876	25 $\frac{1}{4}$
1.5831	3.5466	.2820	25 $\frac{1}{2}$
1.5525	3.6164	.2765	25 $\frac{3}{4}$
1.5228	3.6870	.2712	26
1.4939	3.7583	.2661	26 $\frac{1}{4}$
1.4659	3.8302	.2611	26 $\frac{1}{2}$
1.4386	3.9028	.2562	26 $\frac{3}{4}$
1.4121	3.9761	.2515	27
1.3863	4.0501	.2469	27 $\frac{1}{4}$
1.3612	4.1247	.2424	27 $\frac{1}{2}$
1.3368	4.2000	.2381	27 $\frac{3}{4}$
1.3130	4.2761	.2339	28
1.2899	4.3528	.2297	28 $\frac{1}{4}$
1.2674	4.4301	.2257	28 $\frac{1}{2}$
1.2454	4.5082	.2218	28 $\frac{3}{4}$
1.2240	4.5869	.2180	29
1.2032	4.6664	.2143	29 $\frac{1}{4}$
1.1829	4.7465	.2107	29 $\frac{1}{2}$
1.1631	4.8273	.2072	29 $\frac{3}{4}$
1.1438	4.9087	.2037	30
1.1250	4.9909	.2004	30 $\frac{1}{4}$
1.1066	5.0737	.1971	30 $\frac{1}{2}$
1.0887	5.1572	.1939	30 $\frac{3}{4}$
1.0712	5.2414	.1908	31
1.0541	5.3263	.1877	31 $\frac{1}{4}$
1.0375	5.4119	.1848	31 $\frac{1}{2}$
1.0212	5.4981	.1819	31 $\frac{3}{4}$
1.0053	5.5851	.1790	32
.9898	5.6727	.1763	32 $\frac{1}{4}$
.9746	5.7610	.1736	32 $\frac{1}{2}$
.9598	5.8499	.1709	32 $\frac{3}{4}$
.9453	5.9396	.1684	33
.9311	6.0299	.1658	33 $\frac{1}{4}$
.9173	6.1209	.1634	33 $\frac{1}{2}$
.9037	6.2126	.1610	33 $\frac{3}{4}$
.8905	6.3050	.1586	34
.8775	6.3981	.1563	34 $\frac{1}{4}$
.8649	6.4918	.1540	34 $\frac{1}{2}$
.8525	6.5862	.1518	34 $\frac{3}{4}$
.8403	6.6813	.1497	35
.8285	6.7771	.1476	35 $\frac{1}{4}$
.8168	6.8736	.1455	35 $\frac{1}{2}$
.8054	6.9707	.1435	35 $\frac{3}{4}$

TABLE
CAPACITY

Diameter of Hole In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
36	52.8767	.0189	1.25897
36 $\frac{1}{2}$	54.3557	.0184	1.29418
37	55.8551	.0179	1.32988
37 $\frac{1}{2}$	57.3749	.0174	1.36607
38	58.9151	.0170	1.40274
38 $\frac{1}{2}$	60.4757	.0165	1.43990
39	62.0566	.0161	1.47754
39 $\frac{1}{2}$	63.6580	.0157	1.51567
40	65.2798	.0153	1.55428
40 $\frac{1}{2}$	66.9220	.0149	1.59338
41	68.5846	.0146	1.63297
41 $\frac{1}{2}$	70.2676	.0142	1.67304
42	71.9710	.0139	1.71360
42 $\frac{1}{2}$	73.6948	.0136	1.75464
43	75.4390	.0133	1.79617
43 $\frac{1}{2}$	77.2036	.0130	1.83818
44	78.9886	.0127	1.88068
44 $\frac{1}{2}$	80.7940	.0124	1.92367
45	82.6198	.0121	1.96714
45 $\frac{1}{2}$	84.4660	.0118	2.01110
46	86.3326	.0116	2.05554
46 $\frac{1}{2}$	88.2196	.0113	2.10047
47	90.1270	.0111	2.14588
47 $\frac{1}{2}$	92.0548	.0109	2.19178
48	94.0030	.0106	2.23817
48 $\frac{1}{2}$	95.9716	.0104	2.28504
49	97.9606	.0102	2.33239
49 $\frac{1}{2}$	99.9700	.0100	2.38024
50	101.9998	.0098	2.42857
50 $\frac{1}{2}$	104.0499	.0096	2.47738
51	106.1206	.0094	2.52668
51 $\frac{1}{2}$	108.2115	.0092	2.57647
52	110.3229	.0091	2.62674
52 $\frac{1}{2}$	112.4547	.0089	2.67749
53	114.6069	.0087	2.72874
53 $\frac{1}{2}$	116.7795	.0086	2.78046
54	118.9725	.0084	2.83268
54 $\frac{1}{2}$	121.1859	.0083	2.88538
55	123.4197	.0081	2.93856
55 $\frac{1}{2}$	125.6739	.0080	2.99224
56	127.9485	.0078	3.04639
56 $\frac{1}{2}$	130.2435	.0077	3.10104
57	132.5589	.0075	3.15616
57 $\frac{1}{2}$	134.8947	.0074	3.21178
58	137.2509	.0073	3.26788
58 $\frac{1}{2}$	139.6275	.0072	3.32446
59	142.0245	.0070	3.38153
59 $\frac{1}{2}$	144.4418	.0069	3.43909
60	146.8797	.0068	3.49713

NO. 213
OF HOLE

Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Diameter of Hole In.
.79	7.06858	.141	36
.77	7.26630	.138	36½
.75	7.46674	.134	37
.73	7.66990	.130	37½
.71	7.87580	.127	38
.69	8.08442	.124	38½
.68	8.29577	.121	39
.66	8.50984	.118	39½
.64	8.72665	.115	40
.63	8.94618	.112	40½
.61	9.16843	.109	41
.60	9.39342	.106	41½
.58	9.62113	.104	42
.57	9.85157	.102	42½
.56	10.08473	.099	43
.54	10.32062	.097	43½
.53	10.55924	.095	44
.52	10.80059	.093	44½
.51	11.04466	.091	45
.50	11.29146	.089	45½
.49	11.54099	.087	46
.48	11.79324	.085	46½
.47	12.04823	.083	47
.46	12.30593	.081	47½
.45	12.56637	.080	48
.44	12.82953	.078	48½
.43	13.09542	.076	49
.42	13.36404	.075	49½
.41	13.63538	.073	50
.40	13.90946	.072	50½
.40	14.18626	.070	51
.39	14.46578	.069	51½
.38	14.74803	.068	52
.37	15.03301	.067	52½
.37	15.32072	.065	53
.36	15.61115	.064	53½
.35	15.90431	.063	54
.35	16.20020	.062	54½
.34	16.49881	.061	55
.33	16.80016	.060	55½
.33	17.10423	.058	56
.32	17.41102	.057	56½
.32	17.72055	.056	57
.31	18.03279	.055	57½
.31	18.34777	.055	58
.30	18.66548	.054	58½
.30	18.98591	.053	59
.29	19.30907	.052	59½
.29	19.63495	.051	60

TABLE
CAPACITY

Size O.D. In.	Wt. Per Ft. With Couplings Lb.	Inside Diameter In.	Drift Diameter In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon
4½	9.50	4.090	3.965	.6825	1.4652
4½	10.50	4.052	3.927	.6699	1.4928
4½	11.60	4.000	3.875	.6528	1.5319
4½	13.50	3.920	3.795	.6269	1.5950
4½	15.10	3.826	3.701	.5972	1.6744
*4½	16.60	3.754	3.629	.5750	1.7392
*4½	18.80	3.640	3.515	.5406	1.8499
*4¾	16.00	4.082	3.957	.6798	1.4709
5	11.50	4.560	4.435	.8484	1.1787
5	13.00	4.494	4.369	.8240	1.2136
5	15.00	4.408	4.283	.7928	1.2614
5	18.00	4.276	4.151	.7460	1.3405
*5	20.30	4.184	4.059	.7142	1.4001
*5	20.80	4.156	4.031	.7047	1.4190
*5	21.00	4.154	4.029	.7040	1.4204
*5	23.20	4.044	3.919	.6672	1.4987
*5	24.20	4.000	3.875	.6528	1.5319
*5½	13.00	5.044	4.919	1.0380	.9634
5½	14.00	5.012	4.887	1.0249	.9757
*5½	15.00	4.974	4.849	1.0094	.9907
5½	15.50	4.950	4.825	.9997	1.0003
5½	17.00	4.892	4.767	.9764	1.0242
5½	20.00	4.778	4.653	.9314	1.0736
5½	23.00	4.670	4.545	.8898	1.1238
*5½	26.00	4.548	4.423	.8439	1.1850
*5¾	14.00	5.290	5.165	1.1417	.8758
*5¾	17.00	5.190	5.065	1.0990	.9099
*5¾	19.50	5.090	4.965	1.0570	.9460
*5¾	22.50	4.990	4.865	1.0159	.9843
*6	15.00	5.524	5.399	1.2450	.8032
*6	16.00	5.500	5.375	1.2342	.8102
*6	17.00	5.450	5.325	1.2119	.8252
*6	18.00	5.424	5.299	1.2003	.8331
*6	20.00	5.352	5.227	1.1687	.8557
*6	23.00	5.240	5.115	1.1203	.8926
*6	26.00	5.140	5.015	1.0779	.9277
*6½	17.00	6.135	6.010	1.5356	.6512
6½	20.00	6.049	5.924	1.4929	.6698
*6½	22.00	5.989	5.864	1.4634	.6833
6½	24.00	5.921	5.796	1.4304	.6991
*6½	26.00	5.855	5.730	1.3987	.7150
6½	28.00	5.791	5.666	1.3683	.7309
*6½	29.00	5.761	5.636	1.3541	.7385
6½	32.00	5.675	5.550	1.3140	.7610
7	17.00	6.538	6.413	1.7440	.5734
7	20.00	6.456	6.331	1.7005	.5880
*7	22.00	6.398	6.273	1.6701	.5988
7	23.00	6.366	6.241	1.6535	.6048
*7	24.00	6.336	6.211	1.6379	.6105
7	26.00	6.276	6.151	1.6070	.6223
*7	28.00	6.214	6.089	1.5754	.6347
7	29.00	6.184	6.059	1.5603	.6409
*7	30.00	6.154	6.029	1.5452	.6472
7	32.00	6.094	5.969	1.5152	.6600
*7	33.70	6.048	5.923	1.4924	.6701
7	35.00	6.004	5.879	1.4708	.6799
7	38.00	5.920	5.795	1.4299	.6994
*7	40.00	5.836	5.711	1.3896	.7196

**NO. 214
OF CASING**

Barrels Per Lin. Ft.	Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt. Per Ft. With Couplings Lb.	Size O.D. In.
.0162	61.54	.0912	10.960	9.50	4½
.0159	62.70	.0895	11.167	10.50	4½
.0155	64.34	.0872	11.459	11.60	4½
.0149	66.99	.0838	11.932	13.50	4½
.0142	70.32	.0798	12.525	15.10	4½
.0136	73.05	.0768	13.010	16.60	*4½
.0128	77.69	.0722	13.838	18.80	*4½
.0161	61.78	.0908	11.003	16.00	*4¾
.0202	49.51	.1134	8.817	11.50	5
.0196	50.97	.1101	9.078	13.00	5
.0188	52.98	.1059	9.436	15.00	5
.0177	56.30	.0997	10.028	18.00	5
.0170	58.80	.0954	10.473	20.30	*5
.0167	59.60	.0942	10.615	20.80	*5
.0167	59.66	.0941	10.625	21.00	*5
.0158	62.95	.0892	11.211	23.20	*5
.0155	64.34	.0872	11.459	24.20	*5
.0247	40.46	.1387	7.206	13.00	*5½
.0244	40.98	.1370	7.299	14.00	5½
.0240	41.61	.1349	7.411	15.00	*5½
.0238	42.01	.1336	7.483	15.50	5½
.0232	43.01	.1305	7.661	17.00	5½
.0221	45.09	.1245	8.031	20.00	5½
.0211	47.20	.1189	8.407	23.00	5½
.0200	49.77	.1128	8.864	26.00	*5½
.0271	36.79	.1526	6.552	14.00	*5¾
.0261	38.22	.1469	6.807	17.00	*5¾
.0251	39.73	.1413	7.077	19.50	*5¾
.0241	41.34	.1358	7.363	22.50	*5¾
.0296	33.74	.1664	6.008	15.00	*6
.0293	34.03	.1649	6.061	16.00	*6
.0288	34.66	.1620	6.173	17.00	*6
.0285	34.99	.1604	6.232	18.00	*6
.0278	35.94	.1562	6.401	20.00	*6
.0266	37.49	.1497	6.677	23.00	*6
.0256	38.96	.1441	6.940	26.00	*6
.0365	27.35	.2052	4.871	17.00	*6½
.0355	28.13	.1995	5.011	20.00	6½
.0348	28.70	.1956	5.112	22.00	*6½
.0340	29.36	.1912	5.230	24.00	6½
.0333	30.03	.1869	5.348	26.00	*6½
.0325	30.70	.1829	5.467	28.00	6½
.0322	31.02	.1810	5.524	29.00	*6½
.0312	31.96	.1756	5.693	32.00	6½
.0415	24.08	.2331	4.289	17.00	7
.0404	24.70	.2273	4.399	20.00	7
.0397	25.15	.2232	4.479	22.00	*7
.0393	25.40	.2210	4.524	23.00	7
.0390	25.64	.2189	4.567	24.00	*7
.0382	26.14	.2148	4.655	26.00	7
.0375	26.66	.2106	4.748	28.00	*7
.0371	26.92	.2085	4.794	29.00	7
.0367	27.18	.2065	4.841	30.00	*7
.0360	27.72	.2025	4.937	32.00	7
.0355	28.14	.1995	5.012	33.70	*7
.0350	28.56	.1966	5.086	35.00	7
.0340	29.37	.1911	5.232	38.00	7
.0330	30.22	.1857	5.383	40.00	*7

*Not API Standard. Shown for information only.

TABLE
CAPACITY

Size O.D. In.	Wt. Per Ft. With Couplings Lb.	Inside Diameter In.	Drift Diameter In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon
*7 ⁵ / ₈	20.00	7.125	7.000	2.0712	.4828
7 ⁵ / ₈	24.00	7.025	6.900	2.0135	.4966
7 ⁵ / ₈	26.40	6.969	6.844	1.9815	.5047
7 ⁵ / ₈	29.70	6.875	6.750	1.9284	.5186
7 ⁵ / ₈	33.70	6.765	6.640	1.8672	.5356
7 ⁵ / ₈	39.00	6.625	6.500	1.7907	.5584
*7 ⁵ / ₈	45.30	6.435	6.310	1.6895	.5919
*7 ³ / ₄	45.30	6.560	6.500	1.7558	.5696
*8	26.00	7.386	7.261	2.2258	.4493
*8 ¹ / ₈	28.00	7.485	7.360	2.2858	.4375
*8 ¹ / ₈	32.00	7.385	7.260	2.2252	.4494
*8 ¹ / ₈	35.50	7.285	7.160	2.1653	.4618
*8 ¹ / ₈	39.50	7.185	7.060	2.1063	.4748
*8 ⁵ / ₈	20.00	8.191	8.066	2.7374	.3653
*8 ⁵ / ₈	24.00	8.097	7.972	2.6749	.3738
8 ⁵ / ₈	28.00	8.017	7.892	2.6223	.3813
8 ⁵ / ₈	32.00	7.921	7.796	2.5599	.3906
8 ⁵ / ₈	36.00	7.825	7.700	2.4982	.4003
*8 ⁵ / ₈	38.00	7.775	7.650	2.4664	.4055
8 ⁵ / ₈	40.00	7.725	7.600	2.4348	.4107
*8 ⁵ / ₈	43.00	7.651	7.526	2.3883	.4187
8 ⁵ / ₈	44.00	7.625	7.500	2.3721	.4216
8 ⁵ / ₈	49.00	7.511	7.386	2.3017	.4345
*9	34.00	8.290	8.134	2.8039	.3566
*9	38.00	8.196	8.040	2.7407	.3649
*9	40.00	8.150	7.994	2.7100	.3690
*9	45.00	8.032	7.876	2.6321	.3799
*9	55.00	7.812	7.656	2.4899	.4016
*9 ⁵ / ₈	29.30	9.063	8.907	3.3512	.2984
9 ⁵ / ₈	32.30	9.001	8.845	3.3055	.3025
9 ⁵ / ₈	36.00	8.921	8.765	3.2470	.3080
*9 ⁵ / ₈	38.00	8.885	8.760	3.2209	.3105
9 ⁵ / ₈	40.00	8.835	8.679	3.1847	.3140
9 ⁵ / ₈	43.50	8.755	8.599	3.1273	.3198
9 ⁵ / ₈	47.00	8.681	8.525	3.0747	.3252
9 ⁵ / ₈	53.50	8.535	8.379	2.9721	.3365
*9 ⁵ / ₈	58.40	8.435	8.279	2.9029	.3445
*9 ⁵ / ₈	61.10	8.375	8.219	2.8617	.3494
*9 ⁵ / ₈	71.80	8.125	7.969	2.6934	.3713
*10	33.00	9.384	9.228	3.5928	.2783
10 ³ / ₄	32.75	10.192	10.036	4.2382	.2360
*10 ³ / ₄	35.75	10.136	9.980	4.1917	.2386
10 ³ / ₄	40.50	10.050	9.894	4.1209	.2427
10 ³ / ₄	45.50	9.950	9.794	4.0393	.2476
10 ³ / ₄	51.00	9.850	9.694	3.9585	.2526
*10 ³ / ₄	54.00	9.784	9.628	3.9056	.2560
10 ³ / ₄	55.50	9.760	9.604	3.8865	.2573
10 ³ / ₄	60.70	9.660	9.504	3.8073	.2627
10 ³ / ₄	65.70	9.560	9.404	3.7288	.2682
*10 ³ / ₄	71.10	9.450	9.294	3.6435	.2745

NO. 214
OF CASING

Barrels Per Lin. Ft.	Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt. Per Ft. With Couplings Lb.	Size O.D. In.
.0493	20.28	.2768	3.612	20.00	*7 ⁵ / ₈
.0479	20.86	.2691	3.715	24.00	7 ⁵ / ₈
.0471	21.20	.2648	3.775	26.40	7 ⁵ / ₈
.0459	21.78	.2577	3.879	29.70	7 ⁵ / ₈
.0444	22.49	.2496	4.006	33.70	7 ⁵ / ₈
.0426	23.45	.2393	4.177	39.00	7 ⁵ / ₈
.0402	24.86	.2258	4.428	45.30	*7 ⁵ / ₈
.0418	23.92	.2347	4.261	45.30	*7 ³ / ₄
.0529	18.87	.2975	3.361	26.00	*8
.0544	18.37	.3055	3.273	28.00	*8 ¹ / ₈
.0529	18.88	.2974	3.362	32.00	*8 ¹ / ₈
.0515	19.40	.2894	3.455	35.50	*8 ¹ / ₈
.0501	19.94	.2815	3.552	39.50	*8 ¹ / ₈
.0652	15.34	.3659	2.733	20.00	*8 ⁵ / ₈
.0636	15.70	.3575	2.797	24.00	*8 ⁵ / ₈
.0624	16.02	.3505	2.853	28.00	8 ⁵ / ₈
.0609	16.41	.3422	2.922	32.00	8 ⁵ / ₈
.0594	16.81	.3339	2.994	36.00	8 ⁵ / ₈
.0587	17.03	.3297	3.033	38.00	*8 ⁵ / ₈
.0579	17.25	.3254	3.072	40.00	8 ⁵ / ₈
.0568	17.59	.3192	3.132	43.00	*8 ⁵ / ₈
.0564	17.71	.3171	3.154	44.00	8 ⁵ / ₈
.0548	18.25	.3077	3.250	49.00	8 ⁵ / ₈
.0667	14.98	.3748	2.668	34.00	*9
.0653	15.32	.3664	2.729	38.00	*9
.0645	15.50	.3622	2.760	40.00	*9
.0626	15.96	.3518	2.842	45.00	*9
.0592	16.87	.3328	3.004	55.00	*9
.0797	12.53	.4479	2.232	29.30	*9 ⁵ / ₈
.0787	12.71	.4418	2.263	32.30	9 ⁵ / ₈
.0773	12.93	.4340	2.304	36.00	9 ⁵ / ₈
.0766	13.04	.4305	2.323	38.00	*9 ⁵ / ₈
.0758	13.19	.4257	2.349	40.00	9 ⁵ / ₈
.0744	13.43	.4180	2.392	43.50	9 ⁵ / ₈
.0732	13.66	.4110	2.433	47.00	9 ⁵ / ₈
.0707	14.13	.3973	2.517	53.50	9 ⁵ / ₈
.0691	14.47	.3880	2.577	58.40	*9 ⁵ / ₈
.0681	14.68	.3825	2.614	61.10	*9 ⁵ / ₈
.0641	15.59	.3600	2.777	71.80	*9 ⁵ / ₈
.0855	11.69	.4802	2.082	33.00	*10
.1009	9.91	.5665	1.765	32.75	10 ³ / ₄
.0998	10.02	.5603	1.785	35.75	*10 ³ / ₄
.0981	10.19	.5508	1.815	40.50	10 ³ / ₄
.0961	10.40	.5399	1.852	45.50	10 ³ / ₄
.0942	10.61	.5291	1.890	51.00	10 ³ / ₄
.0929	10.75	.5221	1.915	54.00	*10 ³ / ₄
.0925	10.81	.5195	1.925	55.50	10 ³ / ₄
.0906	11.03	.5089	1.965	60.70	10 ³ / ₄
.0887	11.26	.4984	2.006	65.70	10 ³ / ₄
.0867	11.53	.4870	2.053	71.10	*10 ³ / ₄

*Not API Standard. Shown for information only.

**TABLE
CAPACITY**

Size O.D. In.	Wt. Per Ft. With Couplings Lb.	Inside Diameter In.	Drift Diameter In.	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon
*11 ³ / ₄	38.00	11.150	10.994	5.0723	.1971
11 ³ / ₄	42.00	11.084	10.928	5.0125	.1995
11 ³ / ₄	47.00	11.000	10.844	4.9368	.2026
11 ³ / ₄	54.00	10.880	10.724	4.8297	.2071
11 ³ / ₄	60.00	10.772	10.616	4.7343	.2112
*11 ³ / ₄	65.00	10.682	10.526	4.6555	.2148
*12	40.00	11.384	11.228	5.2875	.1891
*13	40.00	12.438	12.282	6.3119	.1584
*13	45.00	12.360	12.204	6.2330	.1604
*13	50.00	12.282	12.126	6.1546	.1625
*13	54.00	12.220	12.064	6.0926	.1641
13 ³ / ₈	48.00	12.715	12.559	6.5962	.1516
13 ³ / ₈	54.50	12.615	12.459	6.4928	.1540
13 ³ / ₈	61.00	12.515	12.359	6.3903	.1565
13 ³ / ₈	68.00	12.415	12.259	6.2886	.1590
13 ³ / ₈	72.00	12.347	12.191	6.2199	.1608
*13 ³ / ₈	77.00	12.275	12.119	6.1476	.1627
*13 ³ / ₈	83.00	12.175	12.019	6.0478	.1653
*13 ³ / ₈	85.00	12.159	12.003	6.0319	.1658
*13 ³ / ₈	98.00	11.937	11.781	5.8137	.1720
*14	50.00	13.344	13.156	7.2649	.1376
16	65.00	15.250	15.062	9.4885	.1054
*16	70.00	15.198	15.010	9.4239	.1061
16	75.00	15.124	14.936	9.3324	.1072
16	84.00	15.010	14.822	9.1922	.1088
*16	109.00	14.688	14.500	8.8021	.1136
*18 ⁵ / ₈	78.00	17.855	17.667	13.0070	.0769
18 ⁵ / ₈	87.50	17.755	17.567	12.8618	.0777
*18 ⁵ / ₈	96.50	17.655	17.467	12.7173	.0786
*20	90.00	19.166	18.978	14.9872	.0667
20	94.00	19.124	18.936	14.9216	.0670
20	106.50	19.000	18.812	14.7288	.0679
20	133.00	18.730	18.542	14.3131	.0699
*21 ¹ / ₂	92.50	20.710	20.522	17.4992	.0571
*21 ¹ / ₂	103.00	20.610	20.422	17.3307	.0577
*21 ¹ / ₂	114.00	20.510	20.322	17.1629	.0583
*24 ¹ / ₂	100.50	23.750	23.562	23.0137	.0435
*24 ¹ / ₂	113.00	23.650	23.462	22.8203	.0438

**NO. 214
OF CASING**

Barrels Per Lin. Ft.	Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt. Per Ft. With Couplings Lb.	Size O.D. In.
.1207	8.28	.6780	1.475	38.00	*11 ³ / ₄
.1193	8.38	.6700	1.492	42.00	11 ³ / ₄
.1175	8.51	.6599	1.515	47.00	11 ³ / ₄
.1149	8.70	.6456	1.549	54.00	11 ³ / ₄
.1127	8.87	.6328	1.580	60.00	11 ³ / ₄
.1108	9.02	.6223	1.607	65.00	*11 ³ / ₄
.1258	7.94	.7068	1.415	40.00	*12
.1502	6.65	.8437	1.185	40.00	*13
.1484	6.74	.8332	1.200	45.00	*13
.1465	6.82	.8227	1.215	50.00	*13
.1450	6.89	.8144	1.228	54.00	*13
.1570	6.37	.8817	1.134	48.00	13 ³ / ₈
.1545	6.47	.8679	1.152	54.50	13 ³ / ₈
.1521	6.57	.8542	1.171	61.00	13 ³ / ₈
.1497	6.68	.8406	1.190	68.00	13 ³ / ₈
.1480	6.75	.8314	1.203	72.00	13 ³ / ₈
.1463	6.83	.8218	1.217	77.00	*13 ³ / ₈
.1440	6.94	.8084	1.237	83.00	*13 ³ / ₈
.1436	6.96	.8063	1.240	85.00	*13 ³ / ₈
.1384	7.22	.7771	1.287	98.00	*13 ³ / ₈
.1729	5.78	.9711	1.030	50.00	*14
.2259	4.43	1.2684	.788	65.00	16
.2243	4.46	1.2598	.794	70.00	*16
.2222	4.50	1.2475	.802	75.00	16
.2188	4.57	1.2288	.814	84.00	16
.2095	4.77	1.1766	.850	109.00	*16
.3096	3.23	1.7387	.575	78.00	*18 ⁵ / ₈
.3062	3.27	1.7193	.582	87.50	18 ⁵ / ₈
.3027	3.30	1.7000	.588	96.50	*18 ⁵ / ₈
.3568	2.80	2.0035	.499	90.00	*20
.3552	2.81	1.9947	.501	94.00	20
.3506	2.85	1.9689	.508	106.50	20
.3407	2.93	1.9133	.523	133.00	20
.4166	2.40	2.3393	.427	92.50	*21 ¹ / ₂
.4126	2.42	2.3167	.432	103.00	*21 ¹ / ₂
.4086	2.45	2.2943	.436	114.00	*21 ¹ / ₂
.5479	1.83	3.0764	.325	100.50	*24 ¹ / ₂
.5433	1.84	3.0506	.328	113.00	*24 ¹ / ₂

*Not API Standard. Shown for information only.

**TABLE
CAPACITY OF HYDRIL**

Size O.D. In.	Wt. Per Ft. Lb.	Inside Diameter In.	Drift Diameter In.	Joint Dimensions		Gallons Per Lin. Ft.
				O.D. In.	I.D. In.	
4½	11.00	4.026	3.901	4.718	3.930	.6613
4½	11.60	4.000	3.875	4.718	3.920	.6528
4½	12.60	3.958	3.833	4.718	3.878	.6392
4½	13.50	3.920	3.795	4.718	3.840	.6269
4½	15.10	3.826	3.701	4.750	3.746	.5972
4½	16.60	3.754	3.629	4.750	3.674	.5750
4½	18.80	3.640	3.515	4.750	3.560	.5406
5	13.00	4.494	4.369	5.218	4.414	.8240
5	15.00	4.408	4.283	5.218	4.328	.7928
5	18.00	4.276	4.151	5.250	4.196	.7460
5	20.30	4.184	4.059	5.250	4.104	.7142
5	23.20	4.044	3.919	5.250	3.964	.6672
5½	14.00	5.012	4.887	5.750	4.932	1.0249
5½	15.50	4.950	4.825	5.750	4.870	.9997
5½	17.00	4.892	4.767	5.781	4.812	.9764
5½	20.00	4.778	4.653	5.781	4.698	.9314
5½	23.00	4.670	4.545	5.781	4.590	.8898
5½	26.00	4.548	4.423	5.781	4.468	.8439
7	20.00	6.456	6.331	7.312	6.376	1.7005
7	23.00	6.366	6.241	7.312	6.286	1.6535
7	26.00	6.276	6.151	7.312	6.196	1.6070
7	29.00	6.184	6.059	7.312	6.104	1.5603
7	32.00	6.094	5.969	7.343	6.014	1.5152
7	35.00	6.004	5.879	7.343	5.924	1.4708
7	38.00	5.920	5.795	7.343	5.840	1.4299
7½	26.40	6.969	6.844	7.937	6.889	1.9815
7½	29.70	6.875	6.750	7.937	6.795	1.9284
7½	33.70	6.765	6.640	8.000	6.685	1.8672
7½	39.00	6.625	6.500	8.000	6.545	1.7907
7½	45.30	6.435	6.310	8.000	6.355	1.6895
8½	32.00	7.921	7.796	8.937	7.811	2.5599
8½	36.00	7.825	7.700	8.937	7.745	2.4982
8½	40.00	7.725	7.600	8.937	7.645	2.4348
8½	44.00	7.625	7.500	9.031	7.545	2.3721
8½	49.00	7.511	7.386	9.031	7.431	2.3017
9½	36.00	8.921	8.765	10.000	8.781	3.2470
9½	40.00	8.835	8.679	10.000	8.755	3.1847
9½	43.50	8.755	8.599	10.000	8.675	3.1273
9½	47.00	8.681	8.525	10.000	8.601	3.0747
9½	53.50	8.535	8.379	10.062	8.455	2.9721
9½	58.40	8.435	8.279	9.750	8.355	2.9029
10¾	40.50	10.050	9.894	11.187	9.910	4.1209
10¾	45.50	9.950	9.794	11.187	9.870	4.0393
10¾	51.00	9.850	9.694	11.187	9.770	3.9585
10¾	55.50	9.760	9.604	11.187	9.680	3.8865
10¾	60.70	9.660	9.504	11.250	9.580	3.8073
10¾	65.70	9.560	9.404	11.250	9.480	3.7288
11¾	47.00	11.000	10.844	11.937	10.890	4.9368
11¾	54.00	10.880	10.724	11.937	10.800	4.8297
11¾	60.00	10.772	10.616	11.937	10.692	4.7343
11¾	65.00	10.682	10.526	11.937	10.600	4.6555

NO. 216

EXTERNAL UPSET CASING*

Lin. Ft. Per Gallon	Barrels Per Lin. Ft.	Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt. Per Ft. Lb.	Size O.D. In.
1.5121	.0157	63.51	.0884	11.312	11.00	4 ¹ / ₂
1.5319	.0155	64.34	.0872	11.459	11.60	4 ¹ / ₂
1.5646	.0152	65.71	.0854	11.704	12.60	4 ¹ / ₂
1.5950	.0149	66.99	.0838	11.932	13.50	4 ¹ / ₂
1.6744	.0142	70.32	.0798	12.525	15.10	4 ¹ / ₂
1.7392	.0136	73.05	.0768	13.010	16.60	4 ¹ / ₂
1.8499	.0128	77.69	.0722	13.838	18.80	4 ¹ / ₂
1.2136	.0196	50.97	.1101	9.078	13.00	5
1.2614	.0188	52.98	.1059	9.436	15.00	5
1.3405	.0177	56.30	.0997	10.028	18.00	5
1.4001	.0170	58.80	.0954	10.473	20.30	5
1.4987	.0158	62.95	.0892	11.211	23.20	5
.9757	.0244	40.98	.1370	7.299	14.00	5 ¹ / ₂
1.0003	.0238	42.01	.1336	7.483	15.50	5 ¹ / ₂
1.0242	.0232	43.01	.1305	7.661	17.00	5 ¹ / ₂
1.0736	.0221	45.09	.1245	8.031	20.00	5 ¹ / ₂
1.1238	.0211	47.20	.1189	8.407	23.00	5 ¹ / ₂
1.1850	.0200	49.77	.1128	8.864	26.00	5 ¹ / ₂
.5880	.0404	24.70	.2273	4.399	20.00	7
.6048	.0393	25.40	.2210	4.524	23.00	7
.6223	.0382	26.14	.2148	4.655	26.00	7
.6409	.0371	26.92	.2085	4.794	29.00	7
.6600	.0360	27.72	.2025	4.937	32.00	7
.6799	.0350	28.56	.1966	5.086	35.00	7
.6994	.0340	29.37	.1911	5.232	38.00	7
.5047	.0471	21.20	.2648	3.775	26.40	7 ⁵ / ₈
.5186	.0459	21.78	.2577	3.879	29.70	7 ⁵ / ₈
.5356	.0444	22.49	.2496	4.006	33.70	7 ⁵ / ₈
.5584	.0426	23.45	.2393	4.177	39.00	7 ⁵ / ₈
.5919	.0402	24.86	.2258	4.428	45.30	7 ⁵ / ₈
.3906	.0609	16.41	.3422	2.922	32.00	8 ⁵ / ₈
.4003	.0594	16.81	.3339	2.994	36.00	8 ⁵ / ₈
.4107	.0579	17.25	.3254	3.072	40.00	8 ⁵ / ₈
.4216	.0564	17.71	.3171	3.154	44.00	8 ⁵ / ₈
.4345	.0548	18.25	.3077	3.250	49.00	8 ⁵ / ₈
.3080	.0773	12.93	.4340	2.304	36.00	9 ⁵ / ₈
.3140	.0758	13.19	.4257	2.349	40.00	9 ⁵ / ₈
.3198	.0744	13.43	.4180	2.392	43.50	9 ⁵ / ₈
.3252	.0732	13.66	.4110	2.433	47.00	9 ⁵ / ₈
.3365	.0707	14.13	.3973	2.517	53.50	9 ⁵ / ₈
.3445	.0691	14.47	.3880	2.577	58.40	9 ⁵ / ₈
.2427	.0981	10.19	.5508	1.815	40.50	10 ³ / ₄
.2476	.0961	10.40	.5399	1.852	45.50	10 ³ / ₄
.2526	.0942	10.61	.5291	1.890	51.00	10 ³ / ₄
.2573	.0925	10.81	.5195	1.925	55.50	10 ³ / ₄
.2627	.0906	11.03	.5089	1.965	60.70	10 ³ / ₄
.2682	.0887	11.26	.4984	2.006	65.70	10 ³ / ₄
.2026	.1175	8.51	.6599	1.515	47.00	11 ³ / ₄
.2071	.1149	8.70	.6456	1.549	54.00	11 ³ / ₄
.2112	.1127	8.87	.6328	1.580	60.00	11 ³ / ₄
.2148	.1108	9.02	.6223	1.607	65.00	11 ³ / ₄

*No Allowance Made for Internal Restrictions of Joints and Upsets.

Not API Standard. Shown for information only.

TABLE
CAPACITY OF

Size O.D. In.	Wt. Per Ft. Lb.	Inside Diameter In.	Drift Diameter In.	Joint Dimensions		Gallons Per Lin. Ft.
				O.D. In.	I.D. In.	
5	15.00	4.408	4.151	5.360	4.198	.7928
5	18.00	4.276	4.151	5.360	4.198	.7460
5½	15.50	4.950	4.653	5.860	4.736	.9997
5½	17.00	4.892	4.653	4.860	4.701	.9764
5½	20.00	4.778	4.653	5.860	4.701	.9314
5½	23.00	4.670	4.545	5.860	4.610	.8898
6½	24.00	5.921	5.730	7.000	5.781	1.4304
6½	28.00	5.791	5.666	7.000	5.731	1.3683
6½	32.00	5.675	5.550	7.000	5.615	1.3140
7	23.00	6.366	6.151	7.390	6.171	1.6535
7	26.00	6.276	6.151	7.390	6.171	1.6070
7	29.00	6.184	6.059	7.390	6.123	1.5603
7	32.00	6.094	5.969	7.390	6.032	1.5152
7	35.00	6.004	5.879	7.530	5.940	1.4708
7	38.00	5.920	5.795	7.530	5.860	1.4299
7½	26.40	6.969	6.750	8.010	6.770	1.9815
7½	29.70	6.875	6.750	8.010	6.770	1.9284
7½	33.70	6.765	6.640	8.010	6.705	1.8672
7½	39.00	6.625	6.500	8.010	6.565	1.7907
8½	32.00	7.921	7.700	9.120	7.725	2.5599
8½	36.00	7.825	7.700	9.120	7.725	2.4982
8½	40.00	7.725	7.600	9.120	7.663	2.4348
8½	44.00	7.625	7.500	9.120	7.565	2.3721
8½	49.00	7.511	7.386	9.120	7.451	2.3017
9½	40.00	8.835	8.599	10.100	8.665	3.1847
9½	43.50	8.755	8.599	10.100	8.665	3.1273
9½	47.00	8.681	8.525	10.100	8.621	3.0747
9½	53.50	8.535	8.379	10.100	8.475	2.9721
*10¾	45.50	9.950	9.794	11.460	9.819	4.0393
10¾	51.00	9.850	9.694	11.460	9.719	3.9585
10¾	55.50	9.760	9.604	11.460	9.629	3.8865
10¾	60.70	9.660	9.504	11.460	9.529	3.8073

NO. 217

EXTREME LINE CASING**

Lin. Ft. Per Gallon	Barrels Per Lin. Ft.	Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt. Per Ft. Lb.	Size O.D. In.
1.2614	.0188	52.98	.1059	9.436	15.00	5
1.3405	.0177	56.30	.0997	10.028	18.00	5
1.0003	.0238	42.01	.1336	7.483	15.50	5½
1.0242	.0232	43.01	.1305	7.661	17.00	5½
1.0736	.0221	45.09	.1245	8.031	20.00	5½
1.1238	.0211	47.20	.1189	8.407	23.00	5½
.6991	.0340	29.36	.1912	5.230	24.00	6⁹/₈
.7309	.0325	30.70	.1829	5.467	28.00	6⁹/₈
.7610	.0312	31.96	.1756	5.693	32.00	6⁹/₈
.6048	.0393	25.40	.2210	4.524	23.00	7
.6223	.0382	26.14	.2148	4.655	26.00	7
.6409	.0371	26.92	.2085	4.794	29.00	7
.6600	.0360	27.72	.2025	4.937	32.00	7
.6799	.0350	28.56	.1966	5.086	35.00	7
.6994	.0340	29.37	.1911	5.232	38.00	7
.5047	.0471	21.20	.2648	3.775	26.40	7⁹/₈
.5186	.0459	21.78	.2577	3.879	29.70	7⁹/₈
.5356	.0444	22.49	.2496	4.006	33.70	7⁹/₈
.5584	.0426	23.45	.2393	4.177	39.00	7⁹/₈
.3906	.0609	16.41	.3422	2.922	32.00	8⁹/₈
.4003	.0594	16.81	.3339	2.994	36.00	8⁹/₈
.4107	.0579	17.25	.3254	3.072	40.00	8⁹/₈
.4216	.0564	17.71	.3171	3.154	44.00	8⁹/₈
.4345	.0548	18.25	.3077	3.250	49.00	8⁹/₈
.3140	.0758	13.19	.4257	2.349	40.00	9⁹/₈
.3198	.0744	13.43	.4180	2.392	43.50	9⁹/₈
.3252	.0732	13.66	.4110	2.433	47.00	9⁹/₈
.3365	.0707	14.13	.3973	2.517	53.50	9⁹/₈
.2476	.0961	10.40	.5399	1.852	45.50	*10³/₄
.2526	.0942	10.61	.5291	1.890	51.00	10³/₄
.2573	.0925	10.81	.5195	1.925	55.50	10³/₄
.2627	.0906	11.03	.5089	1.965	60.70	10³/₄

**No Allowance Made for Internal Restrictions of Joints and Upsets.

*Not API Standard. Shown for information only.

**ENGLISH
CAPACITIES**

O.D. D, inches	I.D. d, inches	Wall Thickness t, inches	Weight lbs./ft.	Gallons per Lin. Ft.
20	18.25	0.875	178.72	13.5889
20	18.00	1.000	202.92	13.2191
20	17.75	1.125	226.78	12.8545
20	17.50	1.250	250.31	12.4949
20	17.25	1.375	273.51	12.1405
22	21.50	0.250	58.07	18.8597
22	21.25	0.375	86.61	18.4237
22	21.00	0.500	114.81	17.9927
22	20.75	0.625	142.68	17.5669
22	20.50	0.750	170.21	17.1461
22	20.25	0.875	197.41	16.7305
22	20.00	1.000	224.28	16.3199
22	19.75	1.125	250.81	15.9145
22	19.50	1.250	277.01	15.5141
22	19.25	1.375	302.88	15.1189
22	19.00	1.500	328.41	14.7287
24	23.50	0.250	63.41	22.5317
24	23.25	0.375	94.62	22.0548
24	23.00	0.500	125.49	21.5831
24	22.75	0.625	156.03	21.1164
24	22.50	0.750	186.23	20.6549
24	22.25	0.875	216.10	20.1985
24	22.00	1.000	245.64	19.7471
24	21.75	1.125	274.84	19.3009
24	21.50	1.250	303.71	18.8597
24	21.25	1.375	332.25	18.4237
24	21.00	1.500	360.45	17.9927
26	25.50	0.250	68.75	26.5301
26	25.25	0.375	102.63	26.0124
26	25.00	0.500	136.17	25.4999
26	24.75	0.625	169.38	24.9924
26	24.50	0.750	202.25	24.4901
26	24.25	0.875	234.79	23.9928
26	24.00	1.000	267.00	23.5007
28	27.50	0.250	74.09	30.8548
28	27.25	0.375	110.64	30.2964
28	27.00	0.500	146.85	29.7431
28	26.75	0.625	182.73	29.1948
28	26.50	0.750	218.27	28.6517
28	26.25	0.875	253.48	28.1136
28	26.00	1.000	288.36	27.5807

UNITS**OF LINE PIPE**

Lin. Ft. per Lin. Ft.	Barrels per Barrel	Lin. Ft. per Lin. Ft.	Cu. Ft. per Cu. Ft.	Lin. Ft. per
0.0736	0.3235	3.0908	1.8166	0.5505
0.0756	0.3147	3.1772	1.7671	0.5659
0.0778	0.3061	3.2673	1.7184	0.5819
0.0800	0.2975	3.3614	1.6703	0.5987
0.0824	0.2891	3.4595	1.6230	0.6162
0.0530	0.4490	2.2270	2.5212	0.3966
0.0543	0.4387	2.2797	2.4629	0.4060
0.0556	0.4284	2.3343	2.4053	0.4158
0.0569	0.4183	2.3909	2.3484	0.4258
0.0583	0.4082	2.4495	2.2921	0.4363
0.0598	0.3983	2.5104	2.2365	0.4471
0.0613	0.3886	2.5735	2.1817	0.4584
0.0628	0.3789	2.6391	2.1275	0.4700
0.0645	0.3694	2.7072	2.0739	0.4822
0.0661	0.3600	2.7780	2.0211	0.4948
0.0679	0.3507	2.8516	1.9689	0.5079
0.0444	0.5365	1.8640	3.0121	0.3320
0.0453	0.5251	1.9043	2.9483	0.3392
0.0463	0.5139	1.9460	2.8852	0.3466
0.0474	0.5028	1.9890	2.8229	0.3542
0.0484	0.4918	2.0334	2.7612	0.3622
0.0495	0.4809	2.0794	2.7001	0.3704
0.0506	0.4702	2.1269	2.6398	0.3788
0.0518	0.4595	2.1761	2.5802	0.3876
0.0530	0.4490	2.2270	2.5212	0.3966
0.0543	0.4387	2.2797	2.4629	0.4060
0.0556	0.4284	2.3343	2.4053	0.4158
0.0377	0.6317	1.5831	3.5466	0.2820
0.0384	0.6193	1.6146	3.4774	0.2876
0.0392	0.6071	1.6471	3.4088	0.2934
0.0400	0.5951	1.6805	3.3410	0.2993
0.0408	0.5831	1.7150	3.2739	0.3055
0.0417	0.5713	1.7505	3.2074	0.3118
0.0426	0.5595	1.7872	3.1416	0.3183
0.0324	0.7346	1.3612	4.1247	0.2424
0.0330	0.7213	1.3863	4.0501	0.2469
0.0336	0.7082	1.4121	3.9761	0.2515
0.0343	0.6951	1.4386	3.9028	0.2562
0.0349	0.6822	1.4659	3.8302	0.2611
0.0356	0.6694	1.4939	3.7583	0.2661
0.0363	0.6567	1.5228	3.6870	0.2712

**ENGLISH
CAPACITIES**

O.D. D, inches	I.D. d, inches	Wall Thickness t, inches	Weight lbs./ft.	Gallons per Lin. Ft.
30	29.50	0.250	79.43	35.5060
30	29.25	0.375	118.65	34.9068
30	29.00	0.500	157.53	34.3126
30	28.75	0.625	196.08	33.7236
30	28.50	0.750	234.29	33.1396
30	28.25	0.875	272.17	32.5608
30	28.00	1.000	309.72	31.9870
30	27.75	1.125	346.93	31.4184
30	27.50	1.250	383.81	30.8548
32	31.50	0.250	84.77	40.4836
32	31.25	0.375	126.66	39.8436
32	31.00	0.500	168.21	39.2086
32	30.75	0.625	209.43	38.5788
32	30.50	0.750	250.31	37.9540
32	30.25	0.875	290.86	37.3344
32	30.00	1.000	331.08	36.7198
32	29.75	1.125	370.96	36.1104
32	29.50	1.250	410.51	35.5060
34	33.50	0.250	90.11	45.7876
34	33.25	0.375	134.67	45.1067
34	33.00	0.500	178.89	44.4310
34	32.75	0.625	222.78	43.7603
34	32.50	0.750	266.33	43.0948
34	32.25	0.875	309.55	42.4343
34	32.00	1.000	352.44	41.7790
34	31.75	1.125	394.99	41.1287
34	31.50	1.250	437.21	40.4836
36	35.50	0.250	95.45	51.4179
36	35.25	0.375	142.68	50.6963
36	35.00	0.500	189.57	49.9798
36	34.75	0.625	236.13	49.2683
36	34.50	0.750	282.35	48.5620
36	34.25	0.875	328.24	47.8607
36	34.00	1.000	373.80	47.1646
36	33.75	1.125	419.02	46.4735
36	33.50	1.250	463.91	45.7876

**UNITS
OF LINE PIPE**

Lin. Ft. per Lin. Ft.	Barrels per Barrel	Lin. Ft. per Lin. Ft.	Cu. Ft. per Cu. Ft.	Lin. Ft. per
0.0282	0.8454	1.1829	4.7465	0.2107
0.0286	0.8311	1.2032	4.6664	0.2143
0.0291	0.8170	1.2240	4.5869	0.2180
0.0297	0.8029	1.2454	4.5082	0.2218
0.0302	0.7890	1.2674	4.4301	0.2257
0.0307	0.7753	1.2899	4.3528	0.2297
0.0313	0.7616	1.3130	4.2761	0.2339
0.0318	0.7481	1.3368	4.2000	0.2381
0.0324	0.7346	1.3612	4.1247	0.2424
0.0247	0.9639	1.0375	5.4119	0.1848
0.0251	0.9487	1.0541	5.3263	0.1877
0.0255	0.9335	1.0712	5.2414	0.1908
0.0259	0.9185	1.0887	5.1572	0.1939
0.0263	0.9037	1.1066	5.0737	0.1971
0.0268	0.8889	1.1250	4.9909	0.2004
0.0272	0.8743	1.1438	4.9087	0.2037
0.0277	0.8598	1.1631	4.8273	0.2072
0.0282	0.8454	1.1829	4.7465	0.2107
0.0218	1.0902	0.9173	6.1209	0.1634
0.0222	1.0740	0.9311	6.0299	0.1658
0.0225	1.0579	0.9453	5.9396	0.1684
0.0229	1.0419	0.9598	5.8499	0.1709
0.0232	1.0261	0.9746	5.7610	0.1736
0.0236	1.0103	0.9898	5.6727	0.1763
0.0239	0.9947	1.0053	5.5851	0.1790
0.0243	0.9793	1.0212	5.4981	0.1819
0.0247	0.9639	1.0375	5.4119	0.1848
0.0194	1.2242	0.8168	6.8736	0.1455
0.0197	1.2071	0.8285	6.7771	0.1476
0.0200	1.1900	0.8403	6.6813	0.1497
0.0203	1.1731	0.8525	6.5862	0.1518
0.0206	1.1562	0.8649	6.4918	0.1540
0.0209	1.1395	0.8775	6.3981	0.1563
0.0212	1.1230	0.8905	6.3050	0.1586
0.0215	1.1065	0.9037	6.2126	0.1610
0.0218	1.0902	0.9173	6.1209	0.1634

DRILL COLLARS

Drill Collar Number	O.D., inches D	I.D., inches d	Bevel Diameter Df	Gallons per Lin. Ft.	Lin. Ft. per Gallon	Barrels per Lin. Ft.	Lin. Ft. per Barrel	Cu. Ft. per Lin. Ft.	Lin. Ft. per Cu. Ft.
NC23-31	3 ¹ / ₈	1 ¹ / ₄	3	0.0637	15.69	0.0015	658.83	0.0085	117.34
NC26-35 (2 3/8 IF)	3 ¹ / ₂	1 ¹ / ₂	3 ¹⁷ / ₆₄	0.0918	10.89	0.0022	457.52	0.0123	81.49
NC31-41 (2 7/8 IF)	4 ¹ / ₈	2	3 ⁶¹ / ₆₄	0.1632	6.13	0.0039	257.35	0.0218	45.84
NC35-47	4 ³ / ₄	2	4 ³³ / ₆₄	0.1632	6.13	0.0039	257.35	0.0218	45.84
NC38-50 (3 1/2 IF)	5	2 ¹ / ₄	4 ⁴⁹ / ₆₄	0.2065	4.84	0.0049	203.34	0.0276	36.22
NC44-60	6	2 ¹ / ₄	5 ¹¹ / ₁₆	0.2065	4.84	0.0049	203.34	0.0276	36.22
NC44-60	6	2 ¹³ / ₁₆	5 ¹¹ / ₁₆	0.3227	3.10	0.0077	130.14	0.0431	23.18
NC46-62	6 ¹ / ₄	2 ¹ / ₄	5 ⁷ / ₈	0.2065	4.84	0.0049	203.34	0.0276	36.22
NC46-62 (4 IF)	6 ¹ / ₄	2 ¹³ / ₁₆	5 ²⁹ / ₃₂	0.3227	3.10	0.0077	130.14	0.0431	23.18
NC46-65 (4 IF)	6 ¹ / ₂	2 ¹ / ₄	6 ³ / ₃₂	0.2065	4.84	0.0049	203.34	0.0276	36.22
NC46-65 (4 IF)	6 ¹ / ₂	2 ¹³ / ₁₆	6 ³ / ₃₂	0.3227	3.10	0.0077	130.14	0.0431	23.18
NC46-67 (4 IF)	6 ³ / ₄	2 ¹ / ₄	6 ⁹ / ₃₂	0.2065	4.84	0.0049	203.34	0.0276	36.22
NC50-70 (4 1/2 IF)	7	2 ¹ / ₄	6 ³¹ / ₆₄	0.2065	4.84	0.0049	203.34	0.0276	36.22
NC50-70 (4 1/2 IF)	7	2 ¹³ / ₁₆	6 ³¹ / ₆₄	0.3227	3.10	0.0077	130.14	0.0431	23.18
NC50-72 (4 1/2 IF)	7 ¹ / ₄	2 ¹³ / ₁₆	6 ⁴³ / ₆₄	0.3227	3.10	0.0077	130.14	0.0431	23.18

DRILL COLLARS (continued)

Drill Collar Number	O.D., inches D	I.D., inches d	Bevel Diameter Df	Gallons per Lin. Ft.	Lin. Ft. per Gallon	Barrels per Lin. Ft.	Lin. Ft. per Barrel	Cu. Ft. per Lin. Ft.	Lin. Ft. per Cu. Ft.
NC56-77	7 ³ / ₄	2 ¹³ / ₁₆	7 ¹⁹ / ₆₄	0.3227	3.10	0.0077	130.14	0.0431	23.18
NC56-80	8	2 ¹³ / ₁₆	7 ³¹ / ₆₄	0.3227	3.10	0.0077	130.14	0.0431	23.18
6 5/8 REG	8 ¹ / ₄	2 ¹³ / ₁₆	7 ⁴⁵ / ₆₄	0.3227	3.10	0.0077	130.14	0.0431	23.18
NC61-90	9	2 ¹³ / ₁₆	8 ³ / ₈	0.3227	3.10	0.0077	130.14	0.0431	23.18
7 5/8 REG	9 ¹ / ₂	3	8 ¹³ / ₁₆	0.3672	2.72	0.0087	114.38	0.0491	20.37
NC70-97	9 ³ / ₄	3	9 ⁵ / ₃₂	0.3672	2.72	0.0087	114.38	0.0491	20.37
NC70-100	10	3	9 ¹¹ / ₃₂	0.3672	2.72	0.0087	114.38	0.0491	20.37
8 5/8 REG	11	3	10 ¹ / ₂	0.3672	2.72	0.0087	114.38	0.0491	20.37

API Specification 7, Table 13 - The drill collar number consists of two parts separated by a hyphen. The first part is the connection number in the NC style. The second part, consisting of 2 (or 3) digits, indicates the drill collar outside diameter in units and tenths of inches. The connection shown in parentheses in the first column are not part of the drill collar number; they indicate interchangeability of drill collars made with the standard (NC) connections as shown. If the connections shown in parentheses in the first column are made with V-0.038R thread form, the connections and drill collars are identical with those in the NC style. Drill collars with 8¹/₄, 9¹/₂, and 11 inch outside diameters are shown with 6-5/8, 7-5/8, and 8-5/8 REG connections, since there are no NC connections in the recommended bending strength ratio range.

FLUID LOSS ADDITIVES

Halliburton's fluid loss additives can be used to tailor a slurry precisely to the well's requirements for the most effective cementing job possible.

Halad®-9 & Halad 9 LXP Additive

- Applicable to primary and squeeze cementing through a wide temperature range-60 to 300°F (16 to 149°C)
- Compatible with all classes of cement and a wide variety of typical cement additives
- Available as a powder or a liquid.

Halad®-22A and Halad-22A LXP Additive

- Recommended for high temperature control of fluid loss in fresh or saltwater (18%) slurries.
- Ideal for circulating long columns of cement on primary casing jobs and for deep liner cementing.
- Helps maintain fluidity, eliminate premature dehydration, and helps prevent annular bridging in a tight annulus.
- Free-flowing powder compatible with most additives used in deep well cementing.

Halad®-100A and Halad-100AL Additive

- Effective up to 400°F.
- Excellent Versatility — works well in saturated salt, sea water, and fresh water at high and low temperatures.
- Ideal for high temperature casing and liner cement slurry designs.

Halad®-322 and Halad-322 LXP Additive

- Specially designed for shallow wells at temperatures as low as 100°F.
- Designed not to retard compressive strength development.
- May be used in salt concentrations up to 18%.
- Easy-to-mix dispersant that facilitates low viscosity slurries.

Halad®-344 and Halad -344 LXP Additive

- Non-retarding additive for low temperature applications.
- Ideal for lightweight slurries with long thickening times.
- Effective up to 400°F
- Salt tolerant up to 18% salt.

Halad®-413 and Halad 413 Liquid Additive

- Excellent for high temperature wells.
- Excellent for densified slurries or slurries mixed with high salt concentrations.
- Even above 400°F, displays no tendency to increase viscosity.

Halad®-447 Additive

- Effective up to 200°F.
- For use in fresh water slurries, not compatible with salt or dispersants.
- Improves cement resistance to acid/corrosive fluids.

Halad®-567 & Halad 567L Additive

- Effective up to 250°F.
- Excellent for densified slurries or slurries mixed with high salt concentrations.
- For use in cement designs requiring low viscosity slurry properties.

Halad®-600LE+ Additive

- Effective from 125°F to 300°F.
- Excellent versatility - works well in fresh water, sea water and salt concentrations up to saturation.
- Environmentally friendly and offers excellent fluid loss control.

LAP-1

- Effective up to 180°F.
- For use in fresh water slurries, not compatible with salt or dispersants.
- Improves cement resistance to acid/corrosive fluids.

Latex 2000™ Additive

- Liquid latex with excellent acid resistance and fluid loss control properties.
- Provides resiliency and improved bond strength.
- Good choice for wells in a CO₂ flood.

RETARDERS

Retarders are necessary in cementing compositions for high-temperature well conditions or situations where pumping time is critical.

HR®-5 and HR®-6L Retarder

- Useful in cementing operations with BHCT's of 206°F (97°C) either freshwater or saltwater cement slurries.
- A chemically modified lignosulfonate that provides a uniform thickening time for each increase in retarder concentration.
- Liquid version (HR-6L) available for use offshore or where bulk blending facilities do not exist.

HR®-7 Retarder

- Similar to HR-4, but with superior dispersing properties.
- Designed primarily for use with high percentages of gel cement. When cements contain 8 to 25% Halliburton gel, the dispersing action of HR-7 reduces the viscosity and yields smoother, more uniform slurries.

HR®-12 and HR®-12L Retarder

- Organic compound that can be used to retard slurries up to about 500°F (260°C) BHST.
- Provides excellent early strengths.
- Dispersing action of this retarder permits the use of less weighting material necessary to obtain a given slurry weight.

HR®-13L Retarder

- Effective from 248°F to 380°F.
- Good dispersing properties, care should be used with other dispersing additives.
- Ideal retarders for high temperature casing, liner, and squeeze applications.

HR®-25 and HR®-25L Retarder

- Retarder/intensifier intended for high-temperature cementing designs.
- Mainly used as an intensifier for common retarders.
- Used at concentrations of 0.2 to 2.0% at BHCT's of about 220° to 400°F (104° to 204°C).
- Has high water solubility and may be added to the mixing water or dry-blended.
- Less influence on compressive strength development, especially at the top of long columns of cement.

SCR-100™ and SCR-100™ Liquid Retarder

- A synthetic product (not a lignosulfonate) that provides very uniform characteristics and superior versatility.
- Can provide thixotropy when used with Halad®-9, Halad®-22A, or ZoneSeal Retarder. This combination will provide short transition times in freshwater cement systems at temperatures up to 250°F (121°C) bottomhole circulating temperature.
- In salt-saturated cement, SCR-100 will give predictable retarder response and excellent short-term compressive strength at BHCT's ranging from 250° to 350°F (121° to 177°C).
- When combined with certain retarder-enhancing agents, SCR-100 may be used in freshwater cement systems at bottomhole circulating temperatures as high as 360°F (182°C)

SCR-500™ and SCR-500L™ Retarder

- A synthetic product effective from 160°F to 500°F.
- Can provide thixotropy when used with Halad®-9, Halad®-22A, or ZoneSeal Retarder in fresh water cement slurries.
- In salt-saturated cement, SCR-500 will give predictable retarder response and excellent short-term compressive strength.

ZoneSeal Retarder

- Effective from 110°F to 300°F for ZoneSeal slurries.
- A non-dispersing retarder that is very effective at stabilizing solids settling by viscosifying slurries.
- ZoneSeal Retarder is incompatible with Calcium Chloride.

SECTION No. 221

VOLUME and HEIGHT BETWEEN TUBINGS Between TUBING and CASING and BETWEEN CASINGS and DRILL PIPE and CASING

NOTE:

No allowance made for couplings and upsets.

To allow for these, refer to Section No. 130.

NOTE:

There are some differences in the values in these tables and those previously published. The differences are slight and the former values are sufficiently accurate for dependable results.

The Values in these tables have been calculated on the IBM 1620 Electronic Computer.



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**Inside Tubing
O.D. 1.050"
ONE STRING**

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
2 ³ / ₈	4.00	2.041	.1250	8.0014	.0030
2 ³ / ₈	4.60	1.995	.1174	8.5177	.0028
2 ³ / ₈	—	1.939	.1084	9.2239	.0026
2 ³ / ₈	5.80	1.867	.0972	10.2845	.0023
2 ⁷ / ₈	6.40	2.441	.1981	5.0474	.0047
2 ⁷ / ₈	—	2.323	.1752	5.7082	.0042
2 ⁷ / ₈	8.60	2.259	.1632	6.1266	.0039
3 ¹ / ₂	7.70	3.068	.3391	2.9494	.0081
3 ¹ / ₂	9.20	2.992	.3203	3.1224	.0076
3 ¹ / ₂	10.20	2.922	.3034	3.2963	.0072
3 ¹ / ₂	12.70	2.750	.2636	3.7941	.0063

**Inside Tubing
O.D. 1.315"
ONE STRING**

2 ³ / ₈	4.00	2.041	.0994	10.0595	.0024
2 ³ / ₈	4.60	1.995	.0918	10.8893	.0022
2 ³ / ₈	—	1.939	.0828	12.0709	.0020
2 ³ / ₈	5.80	1.867	.0717	13.9539	.0017
2 ⁷ / ₈	6.40	2.441	.1726	5.7953	.0041
2 ⁷ / ₈	—	2.323	.1496	6.6837	.0036
2 ⁷ / ₈	8.60	2.259	.1377	7.2646	.0033
3 ¹ / ₂	7.70	3.068	.3135	3.1900	.0075
3 ¹ / ₂	9.20	2.992	.2947	3.3934	.0070
3 ¹ / ₂	10.20	2.922	.2778	3.5997	.0066
3 ¹ / ₂	12.70	2.750	.2380	4.2017	.0057

**Inside Tubing
O.D. 1.660"
ONE STRING**

2 ³ / ₈	4.00	2.041	.0575	17.3819	.0014
2 ³ / ₈	4.60	1.995	.0500	20.0174	.0012
2 ³ / ₈	—	1.939	.0410	24.4093	.0010
2 ³ / ₈	5.80	1.867	.0298	33.5711	.0007
2 ⁷ / ₈	6.40	2.441	.1307	7.6524	.0031
2 ⁷ / ₈	—	2.323	.1077	9.2815	.0026
2 ⁷ / ₈	8.60	2.259	.0958	10.4409	.0023
3 ¹ / ₂	7.70	3.068	.2716	3.6818	.0065
3 ¹ / ₂	9.20	2.992	.2528	3.9555	.0060
3 ¹ / ₂	10.20	2.922	.2359	4.2386	.0056
3 ¹ / ₂	12.70	2.750	.1961	5.0989	.0047

NO. 221-A

BETWEEN TUBINGS**

**Inside Tubing
O.D. 1.050"**
ONE STRING

OUTSIDE CASING				
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
336.06	.0167	59.855	—	2 $\frac{3}{8}$
357.74	.0157	63.717	4.70	2 $\frac{3}{8}$
387.40	.0145	68.999	5.30	2 $\frac{3}{8}$
431.95	.0130	76.933	5.95	2 $\frac{3}{8}$
211.99	.0265	37.757	6.50	2 $\frac{7}{8}$
239.74	.0234	42.700	7.70	2 $\frac{7}{8}$
257.32	.0218	45.830	8.70	2 $\frac{7}{8}$
123.87	.0453	22.063	—	3 $\frac{1}{2}$
131.14	.0428	23.358	9.30	3 $\frac{1}{2}$
138.44	.0406	24.658	—	3 $\frac{1}{2}$
159.35	.0352	28.382	12.95	3 $\frac{1}{2}$

Inside Tubing**O.D. 1.315"****ONE STRING**

422.50	.0133	75.251	—	2 $\frac{3}{8}$
457.35	.0123	81.458	4.70	2 $\frac{3}{8}$
506.98	.0111	90.296	5.30	2 $\frac{3}{8}$
586.06	.0096	104.382	5.95	2 $\frac{3}{8}$
243.40	.0231	43.352	6.50	2 $\frac{7}{8}$
280.72	.0200	49.998	7.90	2 $\frac{7}{8}$
305.11	.0184	54.343	8.70	2 $\frac{7}{8}$
133.98	.0419	23.863	—	3 $\frac{1}{2}$
142.52	.0394	25.384	9.30	3 $\frac{1}{2}$
151.19	.0371	26.928	—	3 $\frac{1}{2}$
176.47	.0318	31.431	12.95	3 $\frac{1}{2}$

Inside Tubing**O.D. 1.660"****ONE STRING**

730.04	.0077	130.026	—	2 $\frac{3}{8}$
840.73	.0067	149.741	4.70	2 $\frac{3}{8}$
1025.19	.0055	182.594	5.30	2 $\frac{3}{8}$
409.98	.0040	251.129	5.95	2 $\frac{3}{8}$
321.40	.0175	57.244	6.50	2 $\frac{7}{8}$
389.82	.0144	69.430	7.90	2 $\frac{7}{8}$
438.52	.0128	78.104	8.70	2 $\frac{7}{8}$
154.64	.0363	27.542	—	3 $\frac{1}{2}$
166.13	.0338	29.589	9.30	3 $\frac{1}{2}$
178.02	.0315	31.707	—	3 $\frac{1}{2}$
214.15	.0262	38.142	12.95	3 $\frac{1}{2}$

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.050"**
ONE STRING

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4½	9.50	4.090	.6375	1.5686	.0152
4½	10.50	4.052	.6249	1.6003	.0149
4½	11.60	4.000	.6078	1.6452	.0145
4½	13.50	3.920	.5820	1.7183	.0139
*4½	15.10	3.826	.5523	1.8107	.0131
*4¾	16.00	4.082	.6349	1.5752	.0151
5	11.50	4.560	.8034	1.2447	.0191
5	13.00	4.494	.7790	1.2837	.0185
5	15.00	4.408	.7478	1.3373	.0178
5	18.00	4.276	.7010	1.4265	.0167
*5	21.00	4.154	.6590	1.5173	.0157
*5½	13.00	5.044	.9930	1.0070	.0236
5½	14.00	5.012	.9799	1.0205	.0233
*5½	15.00	4.974	.9644	1.0369	.0230
5½	15.50	4.950	.9547	1.0474	.0227
5½	17.00	4.892	.9314	1.0736	.0222
5½	20.00	4.778	.8865	1.1281	.0211
5½	23.00	4.670	.8448	1.1837	.0201
*5¾	14.00	5.290	1.0968	.9118	.0261
*5¾	17.00	5.190	1.0540	.9488	.0251
*5¾	19.50	5.090	1.0121	.9881	.0241
*5¾	22.50	4.990	.9709	1.0299	.0231
*6	15.00	5.524	1.2000	.8333	.0286
*6	16.00	5.500	1.1892	.8409	.0283
*6	17.00	5.450	1.1669	.8570	.0278
*6	18.00	5.424	1.1553	.8655	.0275
*6	20.00	5.352	1.1237	.8899	.0268
*6	23.00	5.240	1.0753	.9300	.0256
*6	26.00	5.132	1.0296	.9713	.0245
*6½	17.00	6.135	1.4907	.6708	.0355
6½	20.00	6.049	1.4479	.6907	.0345
*6½	22.00	5.989	1.4184	.7050	.0338
6½	24.00	5.921	1.3854	.7218	.0330
*6½	26.00	5.855	1.3537	.7387	.0322
6½	28.00	5.791	1.3233	.7557	.0315
*6½	29.00	5.761	1.3091	.7639	.0312
6½	32.00	5.675	1.2690	.7880	.0302
7	17.00	6.538	1.6990	.5886	.0405
7	20.00	6.456	1.6556	.6040	.0394
*7	22.00	6.398	1.6251	.6153	.0387
7	23.00	6.366	1.6085	.6217	.0383
*7	24.00	6.336	1.5929	.6278	.0379
7	26.00	6.276	1.5621	.6402	.0372
*7	28.00	6.214	1.5305	.6534	.0364
7	29.00	6.184	1.5153	.6599	.0361
*7	30.00	6.154	1.5002	.6666	.0357
7	32.00	6.094	1.4702	.6802	.0350
*7	34.00	6.040	1.4435	.6928	.0344
7	35.00	6.004	1.4258	.7014	.0339
7	38.00	5.920	1.3849	.7221	.0330
*7	40.00	5.836	1.3446	.7437	.0320
*7½	20.00	7.125	2.0263	.4935	.0482
7½	24.00	7.025	1.9685	.5080	.0469
7½	26.40	6.969	1.9365	.5164	.0461
7½	29.70	6.875	1.8835	.5309	.0448
7½	33.70	6.765	1.8222	.5488	.0434
7½	39.00	6.625	1.7458	.5728	.0416

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
O.D. 1.050"**
ONE STRING

BETWEEN TUBING & CASING**

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
65.88	.0852	11.734	9.50	4½
67.21	.0835	11.971	10.50	4½
69.10	.0813	12.307	11.60	4½
72.17	.0778	12.854	13.50	4½
76.05	.0738	13.545	15.10	*4½
66.16	.0849	11.783	16.00	*4¾
52.28	.1074	9.311	11.50	5
53.91	.1041	9.603	13.00	5
56.17	.1000	10.004	15.00	5
59.91	.0937	10.671	18.00	5
63.73	.0881	11.351	21.00	*5
42.29	.1328	7.533	13.00	*5½
42.86	.1310	7.634	14.00	5½
43.55	.1289	7.756	15.00	*5½
43.99	.1276	7.835	15.50	5½
45.09	.1245	8.031	17.00	5½
47.38	.1185	8.439	20.00	5½
49.71	.1129	8.855	23.00	5½
38.29	.1466	6.821	14.00	*5¾
39.85	.1409	7.097	17.00	*5¾
41.50	.1353	7.391	19.50	*5¾
43.26	.1298	7.704	22.50	*5¾
35.00	.1604	6.234	15.00	*6
35.32	.1590	6.290	16.00	*6
35.99	.1560	6.411	17.00	*6
36.35	.1544	6.475	18.00	*6
37.38	.1502	6.657	20.00	*6
39.06	.1437	6.957	23.00	*6
40.79	.1376	7.266	26.00	*6
28.18	.1993	5.018	17.00	*6½
29.01	.1936	5.167	20.00	6½
29.61	.1896	5.274	22.00	*6½
30.32	.1852	5.400	24.00	6½
31.03	.1810	5.526	26.00	*6½
31.74	.1769	5.653	28.00	6½
32.08	.1750	5.714	29.00	*6½
33.10	.1696	5.895	32.00	6½
24.72	.2271	4.403	17.00	7
25.37	.2213	4.518	20.00	7
25.84	.2172	4.603	22.00	*7
26.11	.2150	4.651	23.00	7
26.37	.2129	4.696	24.00	*7
26.89	.2088	4.789	26.00	7
27.44	.2046	4.888	28.00	*7
27.72	.2026	4.937	29.00	7
28.00	.2005	4.986	30.00	*7
28.57	.1965	5.088	32.00	7
29.10	.1930	5.182	34.00	*7
29.46	.1906	5.247	35.00	7
30.33	.1851	5.402	38.00	7
31.24	.1797	5.563	40.00	*7
20.73	.2709	3.692	20.00	*7½
21.34	.2632	3.800	24.00	7½
21.69	.2589	3.863	26.40	7½
22.30	.2518	3.972	29.70	7½
23.05	.2436	4.105	33.70	7½
24.06	.2334	4.285	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.050"**
TWO STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4½	9.50	4.090	.5925	1.6876	.0141
4½	10.50	4.052	.5799	1.7244	.0138
4½	11.60	4.000	.5628	1.7767	.0134
4½	13.50	3.920	.5370	1.8623	.0128
*4½	15.10	3.826	.5073	1.9713	.0121
*4¾	16.00	4.082	.5899	1.6953	.0140
5	11.50	4.560	.7584	1.3185	.0181
5	13.00	4.494	.7340	1.3623	.0175
5	15.00	4.408	.7028	1.4229	.0167
5	18.00	4.276	.6560	1.5243	.0156
*5	21.00	4.154	.6141	1.6285	.0146
*5½	13.00	5.044	.9481	1.0548	.0226
5½	14.00	5.012	.9349	1.0696	.0223
*5½	15.00	4.974	.9195	1.0876	.0219
5½	15.50	4.950	.9097	1.0992	.0217
5½	17.00	4.892	.8864	1.1281	.0211
5½	20.00	4.778	.8415	1.1884	.0200
5½	23.00	4.670	.7998	1.2503	.0190
*5¾	14.00	5.290	1.0518	.9508	.0250
*5¾	17.00	5.190	1.0090	.9911	.0240
*5¾	19.50	5.090	.9671	1.0340	.0230
*5¾	22.50	4.990	.9260	1.0800	.0220
*6	15.00	5.524	1.1550	.8658	.0275
*6	16.00	5.500	1.1442	.8739	.0272
*6	17.00	5.450	1.1219	.8913	.0267
*6	18.00	5.424	1.1104	.9006	.0264
*6	20.00	5.352	1.0787	.9270	.0257
*6	23.00	5.240	1.0303	.9706	.0245
*6	26.00	5.132	.9846	1.0156	.0234
*6½	17.00	6.135	1.4457	.6917	.0344
6½	20.00	6.049	1.4029	.7128	.0334
*6½	22.00	5.989	1.3735	.7281	.0327
6½	24.00	5.921	1.3404	.7460	.0319
*6½	26.00	5.855	1.3087	.7641	.0312
6½	28.00	5.791	1.2783	.7823	.0304
*6½	29.00	5.761	1.2641	.7910	.0301
6½	32.00	5.675	1.2240	.8170	.0291
7	17.00	6.538	1.6540	.6046	.0394
7	20.00	6.456	1.6106	.6209	.0383
*7	22.00	6.398	1.5802	.6328	.0376
7	23.00	6.366	1.5635	.6396	.0372
*7	24.00	6.336	1.5479	.6460	.0369
7	26.00	6.276	1.5171	.6592	.0361
*7	28.00	6.214	1.4855	.6732	.0354
7	29.00	6.184	1.4703	.6801	.0350
*7	30.00	6.154	1.4552	.6872	.0346
7	32.00	6.094	1.4252	.7016	.0339
*7	34.00	6.040	1.3985	.7151	.0333
7	35.00	6.004	1.3808	.7242	.0329
7	38.00	5.920	1.3399	.7463	.0319
*7	40.00	5.836	1.2996	.7694	.0309
*7½	20.00	7.125	1.9813	.5047	.0472
7½	24.00	7.025	1.9235	.5199	.0458
7½	26.40	6.969	1.8916	.5287	.0450
7½	29.70	6.875	1.8385	.5439	.0438
7½	33.70	6.765	1.7773	.5627	.0423
7½	39.00	6.625	1.7008	.5880	.0405

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.050"**
TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
70.88	.0792	12.625	9.50	4½
72.42	.0775	12.899	10.50	4½
74.62	.0752	13.291	11.60	4½
78.21	.0718	13.931	13.50	4½
82.80	.0678	14.746	15.10	*4½
71.20	.0789	12.682	16.00	*4¾
55.38	.1014	9.863	11.50	5
57.22	.0981	10.191	13.00	5
59.76	.0940	10.644	15.00	5
64.02	.0877	11.403	18.00	5
68.40	.0821	12.182	21.00	*5
44.30	.1267	7.890	13.00	*5½
44.92	.1250	8.001	14.00	5½
45.68	.1229	8.136	15.00	*5½
46.17	.1216	8.223	15.50	5½
47.38	.1185	8.439	17.00	5½
49.91	.1125	8.890	20.00	5½
52.51	.1069	9.353	23.00	5½
39.93	.1406	7.112	14.00	*5¾
41.62	.1349	7.414	17.00	*5¾
43.43	.1293	7.735	19.50	*5¾
45.36	.1238	8.079	22.50	*5¾
36.36	.1544	6.477	15.00	*6
36.71	.1530	6.538	16.00	*6
37.44	.1500	6.668	17.00	*6
37.83	.1484	6.737	18.00	*6
38.94	.1442	6.935	20.00	*6
40.76	.1377	7.261	23.00	*6
42.66	.1316	7.598	26.00	*6
29.05	.1933	5.174	17.00	*6½
29.94	.1875	5.332	20.00	6½
30.58	.1836	5.447	22.00	*6½
31.33	.1792	5.581	24.00	6½
32.09	.1749	5.716	26.00	*6½
32.86	.1709	5.852	28.00	6½
33.22	.1690	5.917	29.00	*6½
34.31	.1636	6.111	32.00	6½
25.39	.2211	4.523	17.00	7
26.08	.2153	4.645	20.00	7
26.58	.2112	4.734	22.00	*7
26.86	.2090	4.785	23.00	7
27.13	.2069	4.833	24.00	*7
27.68	.2028	4.931	26.00	7
28.27	.1986	5.036	28.00	*7
28.57	.1966	5.088	29.00	7
28.86	.1945	5.141	30.00	*7
29.47	.1905	5.249	32.00	7
30.03	.1869	5.349	34.00	*7
30.42	.1846	5.418	35.00	7
31.35	.1791	5.583	38.00	7
32.32	.1737	5.756	40.00	*7
21.20	.2649	3.776	20.00	*7½
21.83	.2571	3.889	24.00	7½
22.20	.2529	3.955	26.40	7½
22.85	.2458	4.069	29.70	7½
23.63	.2376	4.209	33.70	7½
24.69	.2274	4.398	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.050"**
THREE STRINGS
TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 1/2	9.50	4.090	.5476	1.8263	.0130
4 1/2	10.50	4.052	.5349	1.8694	.0127
4 1/2	11.60	4.000	.5179	1.9311	.0123
4 1/2	13.50	3.920	.4920	2.0325	.0117
*4 1/2	15.10	3.826	.4623	2.1631	.0110
*4 3/4	16.00	4.082	.5449	1.8352	.0130
5	11.50	4.560	.7134	1.4017	.0170
5	13.00	4.494	.6891	1.4513	.0164
5	15.00	4.408	.6578	1.5202	.0157
5	18.00	4.276	.6110	1.6365	.0145
*5	21.00	4.154	.5691	1.7572	.0135
*5 1/2	13.00	5.044	.9031	1.1073	.0215
5 1/2	14.00	5.012	.8900	1.1237	.022
*5 1/2	15.00	4.974	.8745	1.1435	.0208
5 1/2	15.50	4.950	.8648	1.1564	.0206
5 1/2	17.00	4.892	.8415	1.1884	.0200
5 1/2	20.00	4.778	.7965	1.2555	.0190
5 1/2	23.00	4.670	.7549	1.3248	.0180
*5 3/4	14.00	5.290	1.0068	.9932	.0240
*5 3/4	17.00	5.190	.9640	1.0373	.0230
*5 3/4	19.50	5.090	.9221	1.0845	.0220
*5 3/4	22.50	4.990	.8810	1.1351	.0210
*6	15.00	5.524	1.1100	.9009	.0264
*6	16.00	5.500	1.0993	.9097	.0262
*6	17.00	5.450	1.0769	.9286	.0256
*6	18.00	5.424	1.0654	.9386	.0254
*6	20.00	5.352	1.0337	.9674	.0246
*6	23.00	5.240	.9853	1.0149	.0235
*6	26.00	5.132	.9396	1.0643	.0224
*6 5/8	17.00	6.135	1.4007	.7139	.0333
6 5/8	20.00	6.049	1.3579	.7364	.0323
*6 5/8	22.00	5.989	1.3285	.7527	.0316
6 5/8	24.00	5.921	1.2954	.7719	.0308
*6 5/8	26.00	5.855	1.2637	.7913	.0301
6 5/8	28.00	5.791	1.2333	.8108	.0294
*6 5/8	29.00	5.761	1.2192	.8202	.0290
6 5/8	32.00	5.675	1.1790	.8481	.0281
7	17.00	6.538	1.6091	.6215	.0383
7	20.00	6.456	1.5656	.6387	.0373
*7	22.00	6.398	1.5352	.6514	.0366
7	23.00	6.366	1.5185	.6585	.0362
*7	24.00	6.336	1.5030	.6654	.0358
7	26.00	6.276	1.4721	.6793	.0350
*7	28.00	6.214	1.4405	.6942	.0343
7	29.00	6.184	1.4253	.7016	.0339
*7	30.00	6.154	1.4102	.7091	.0336
7	32.00	6.094	1.3802	.7245	.0329
*7	34.00	6.040	1.3535	.7388	.0322
7	35.00	6.004	1.3358	.7486	.0318
7	38.00	5.920	1.2949	.7722	.0308
*7	40.00	5.836	1.2547	.7970	.0299
*7 5/8	20.00	7.125	1.9363	.5165	.0461
7 5/8	24.00	7.025	1.8786	.5323	.0447
7 5/8	26.40	6.969	1.8466	.5415	.0440
7 5/8	29.70	6.875	1.7935	.5576	.0427
7 5/8	33.70	6.765	1.7323	.5773	.0412
7 5/8	39.00	6.625	1.6558	.6039	.0394

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.050"**
THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
76.70	.0732	13.662	9.50	4½
78.51	.0715	13.984	10.50	4½
81.10	.0692	14.445	11.60	4½
85.37	.0658	15.204	13.50	4½
90.85	.0618	16.181	15.10	*4½
77.08	.0728	13.728	16.00	*4¾
58.87	.0954	10.485	11.50	5
60.95	.0921	10.856	13.00	5
63.85	.0879	11.372	15.00	5
68.73	.0817	12.242	18.00	5
73.80	.0761	13.145	21.00	*5
46.51	.1207	8.283	13.00	*5½
47.19	.1190	8.406	14.00	5½
48.03	.1169	8.554	15.00	*5½
48.57	.1156	8.651	15.50	5½
49.91	.1125	8.890	17.00	5½
52.73	.1065	9.392	20.00	5½
55.64	.1009	9.910	23.00	5½
41.72	.1346	7.430	14.00	*5¾
43.57	.1289	7.760	17.00	*5¾
45.55	.1233	8.113	19.50	*5¾
47.67	.1178	8.491	22.50	*5¾
37.84	.1484	6.739	15.00	*6
38.21	.1469	6.805	16.00	*6
39.00	.1440	6.946	17.00	*6
39.42	.1424	7.022	18.00	*6
40.63	.1382	7.237	20.00	*6
42.63	.1317	7.592	23.00	*6
44.70	.1256	7.961	26.00	*6
29.99	.1872	5.341	17.00	*6½
30.93	.1815	5.509	20.00	6½
31.62	.1776	5.631	22.00	*6½
32.42	.1732	5.775	24.00	6½
33.24	.1689	5.920	26.00	*6½
34.05	.1649	6.065	28.00	6½
34.45	.1630	6.136	29.00	*6½
35.62	.1576	6.345	32.00	6½
26.10	.2151	4.649	17.00	7
26.83	.2093	4.778	20.00	7
27.36	.2052	4.873	22.00	*7
27.66	.2030	4.926	23.00	7
27.94	.2009	4.977	24.00	*7
28.53	.1968	5.082	26.00	7
29.16	.1926	5.193	28.00	*7
29.47	.1905	5.248	29.00	7
29.78	.1885	5.305	30.00	*7
30.43	.1845	5.420	32.00	7
31.03	.1809	5.527	34.00	*7
31.44	.1786	5.600	35.00	7
32.43	.1731	5.777	38.00	7
33.48	.1677	5.962	40.00	*7
21.69	.2588	3.863	20.00	*7½
22.36	.2511	3.982	24.00	7½
22.74	.2469	4.051	26.40	7½
23.42	.2398	4.171	29.70	7½
24.25	.2316	4.318	33.70	7½
25.37	.2213	4.518	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.050"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4½	9.50	4.090	.5026	1.9897	.0120
4½	10.50	4.052	.4900	2.0410	.0117
4½	11.60	4.000	.4729	2.1147	.0113
4½	13.50	3.920	.4470	2.2370	.0106
*4½	15.10	3.826	.4173	2.3963	.0099
*4¾	16.00	4.082	.4999	2.0004	.0119
5	11.50	4.560	.6684	1.4960	.0159
5	13.00	4.494	.6441	1.5526	.0153
5	15.00	4.408	.6128	1.6318	.0146
5	18.00	4.276	.5661	1.7666	.0135
*5	21.00	4.154	.5241	1.9080	.0125
*5½	13.00	5.044	.8581	1.1654	.0204
5½	14.00	5.012	.8450	1.1835	.0201
*5½	15.00	4.974	.8295	1.2056	.0197
5½	15.50	4.950	.8198	1.2199	.0195
5½	17.00	4.892	.7965	1.2555	.0190
5½	20.00	4.778	.7515	1.3307	.0179
5½	23.00	4.670	.7099	1.4087	.0169
*5¾	14.00	5.290	.9618	1.0397	.0229
*5¾	17.00	5.190	.9191	1.0881	.0219
*5¾	19.50	5.090	.8771	1.1401	.0209
*5¾	22.50	4.990	.8360	1.1962	.0199
*6	15.00	5.524	1.0651	.9389	.0254
*6	16.00	5.500	1.0543	.9485	.0251
*6	17.00	5.450	1.0319	.9691	.0246
*6	18.00	5.424	1.0204	.9800	.0243
*6	20.00	5.352	.9887	1.0114	.0235
*6	23.00	5.240	.9403	1.0634	.0224
*6	26.00	5.132	.8946	1.1178	.0213
*6½	17.00	6.135	1.3557	.7376	.0323
6½	20.00	6.049	1.3130	.7616	.0313
*6½	22.00	5.989	1.2835	.7791	.0306
6½	24.00	5.921	1.2504	.7997	.0298
*6½	26.00	5.855	1.2187	.8205	.0290
6½	28.00	5.791	1.1883	.8415	.0283
*6½	29.00	5.761	1.1742	.8517	.0280
6½	32.00	5.675	1.1341	.8818	.0270
7	17.00	6.538	1.5641	.6394	.0372
7	20.00	6.456	1.5206	.6576	.0362
*7	22.00	6.398	1.4902	.6711	.0355
7	23.00	6.366	1.4735	.6786	.0351
*7	24.00	6.336	1.4580	.6859	.0347
7	26.00	6.276	1.4271	.7007	.0340
*7	28.00	6.214	1.3955	.7166	.0332
7	29.00	6.184	1.3803	.7245	.0329
*7	30.00	6.154	1.3652	.7325	.0325
7	32.00	6.094	1.3353	.7489	.0318
*7	34.00	6.040	1.3085	.7642	.0312
7	35.00	6.004	1.2908	.7747	.0307
7	38.00	5.920	1.2500	.8000	.0298
*7	40.00	5.836	1.2097	.8267	.0288
*7½	20.00	7.125	1.8913	.5287	.0450
7½	24.00	7.025	1.8336	.5454	.0437
7½	26.40	6.969	1.8016	.5551	.0429
7½	29.70	6.875	1.7485	.5719	.0416
7½	33.70	6.765	1.6873	.5927	.0402
7½	39.00	6.625	1.6108	.6208	.0384

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.050"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
83.57	.0672	14.884	9.50	4½
85.72	.0655	15.268	10.50	4½
88.82	.0632	15.819	11.60	4½
93.96	.0598	16.734	13.50	4½
100.64	.0558	17.926	15.10	*4½
84.02	.0668	14.964	16.00	*4¾
62.83	.0894	11.191	11.50	5
65.21	.0861	11.615	13.00	5
68.53	.0819	12.206	15.00	5
74.20	.0757	13.215	18.00	5
80.14	.0701	14.273	21.00	*5
48.95	.1147	8.718	13.00	*5½
49.71	.1130	8.853	14.00	5½
50.63	.1109	9.018	15.00	*5½
51.23	.1096	9.125	15.50	5½
52.73	.1065	9.392	17.00	5½
55.89	.1005	9.954	20.00	5½
59.17	.0949	10.538	23.00	5½
43.67	.1286	7.778	14.00	*5¾
45.70	.1229	8.139	17.00	*5¾
47.88	.1173	8.529	19.50	*5¾
50.24	.1118	8.948	22.50	*5¾
39.43	.1424	7.024	15.00	*6
39.84	.1409	7.096	16.00	*6
40.70	.1379	7.249	17.00	*6
41.16	.1364	7.331	18.00	*6
42.48	.1322	7.566	20.00	*6
44.66	.1257	7.955	23.00	*6
46.95	.1196	8.362	26.00	*6
30.98	.1812	5.518	17.00	*6½
31.99	.1755	5.698	20.00	6½
32.72	.1716	5.828	22.00	*6½
33.59	.1672	5.982	24.00	6½
34.46	.1629	6.138	26.00	*6½
35.34	.1589	6.295	28.00	6½
35.77	.1570	6.371	29.00	*6½
37.04	.1516	6.596	32.00	6½
26.85	.2091	4.783	17.00	7
27.62	.2033	4.919	20.00	7
28.18	.1992	5.020	22.00	*7
28.50	.1970	5.077	23.00	7
28.81	.1949	5.131	24.00	7
29.43	.1908	5.242	26.00	7
30.10	.1866	5.360	28.00	*7
30.43	.1845	5.419	29.00	7
30.76	.1825	5.479	30.00	*7
31.45	.1785	5.602	32.00	7
32.10	.1749	5.717	34.00	*7
32.54	.1726	5.795	35.00	7
33.60	.1671	5.985	38.00	7
34.72	.1617	6.184	40.00	*7
22.21	.2528	3.955	20.00	*7½
22.91	.2451	4.080	24.00	7½
23.31	.2408	4.152	26.40	7½
24.02	.2337	4.278	29.70	7½
24.89	.2256	4.434	33.70	7½
26.07	.2153	4.644	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.315"**
ONE STRING

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 1/2	9.50	4.090	.6120	1.6341	.0146
4 1/2	10.50	4.052	.5993	1.6685	.0143
4 1/2	11.60	4.000	.5822	1.7175	.0139
4 1/2	13.50	3.920	.5564	1.7973	.0132
*4 1/2	15.10	3.826	.5267	1.8987	.0125
*4 3/4	16.00	4.082	.6093	1.6413	.0145
5	11.50	4.560	.7778	1.2856	.0185
5	13.00	4.494	.7534	1.3272	.0179
5	15.00	4.408	.7222	1.3846	.0172
5	18.00	4.276	.6754	1.4805	.0161
*5	21.00	4.154	.6335	1.5786	.0151
*5 1/2	13.00	5.044	.9675	1.0336	.0230
5 1/2	14.00	5.012	.9543	1.0478	.0227
*5 1/2	15.00	4.974	.9389	1.0651	.0224
5 1/2	15.50	4.950	.9291	1.0763	.0221
5 1/2	17.00	4.892	.9059	1.1039	.0216
5 1/2	20.00	4.778	.8609	1.1616	.0205
5 1/2	23.00	4.670	.8192	1.2206	.0195
*5 3/4	14.00	5.290	1.0712	.9335	.0255
*5 3/4	17.00	5.190	1.0284	.9723	.0245
*5 3/4	19.50	5.090	.9865	1.0137	.0235
*5 3/4	22.50	4.990	.9454	1.0578	.0225
*6	15.00	5.524	1.1744	.8515	.0280
*6	16.00	5.500	1.1636	.8594	.0277
*6	17.00	5.450	1.1413	.8762	.0272
*6	18.00	5.424	1.1298	.8851	.0269
*6	20.00	5.352	1.0981	.9106	.0261
*6	23.00	5.240	1.0497	.9526	.0250
*6	26.00	5.132	1.0040	.9960	.0239
*6 5/8	17.00	6.135	1.4651	.6826	.0349
6 5/8	20.00	6.049	1.4223	.7031	.0339
*6 5/8	22.00	5.989	1.3929	.7179	.0332
6 5/8	24.00	5.921	1.3598	.7354	.0324
*6 5/8	26.00	5.855	1.3281	.7529	.0316
6 5/8	28.00	5.791	1.2977	.7706	.0309
*6 5/8	29.00	5.761	1.2836	.7791	.0306
6 5/8	32.00	5.675	1.2434	.8042	.0296
7	17.00	6.538	1.6735	.5976	.0398
7	20.00	6.456	1.6300	.6135	.0388
*7	22.00	6.398	1.5996	.6252	.0381
7	23.00	6.366	1.5829	.6318	.0377
*7	24.00	6.336	1.5674	.6380	.0373
7	26.00	6.276	1.5365	.6508	.0366
*7	28.00	6.214	1.5049	.6645	.0358
7	29.00	6.184	1.4897	.6713	.0355
*7	30.00	6.154	1.4746	.6781	.0351
7	32.00	6.094	1.4446	.6922	.0344
*7	34.00	6.040	1.4179	.7053	.0338
7	35.00	6.004	1.4002	.7142	.0333
7	38.00	5.920	1.3593	.7357	.0324
*7	40.00	5.836	1.3190	.7581	.0314
*7 5/8	20.00	7.125	2.0007	.4998	.0476
7 5/8	24.00	7.025	1.9429	.5147	.0463
7 5/8	26.40	6.969	1.9110	.5233	.0455
7 5/8	29.70	6.875	1.8579	.5382	.0442
7 5/8	33.70	6.765	1.7967	.5566	.0428
7 5/8	39.00	6.625	1.7202	.5813	.0410

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
O.D. 1.315"**
ONE STRING

BETWEEN TUBING & CASING**

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
68.63	.0818	12.224	9.50	4½
70.08	.0801	12.481	10.50	4½
72.13	.0778	12.848	11.60	4½
75.49	.0744	13.445	13.50	4½
79.74	.0704	14.203	15.10	*4½
68.93	.0814	12.278	16.00	*4¾
54.00	.1040	9.617	11.50	5
55.74	.1007	9.928	13.00	5
58.15	.0965	10.358	15.00	5
62.18	.0903	11.075	18.00	5
66.30	.0847	11.809	21.00	*5
43.41	.1293	7.732	13.00	*5½
44.01	.1276	7.838	14.00	5½
44.73	.1255	7.968	15.00	*5½
45.20	.1242	8.051	15.50	5½
46.36	.1211	8.258	17.00	5½
48.79	.1151	8.689	20.00	5½
51.27	.1095	9.131	23.00	5½
39.21	.1432	6.983	14.00	*5¾
40.84	.1375	7.274	17.00	*5¾
42.57	.1319	7.583	19.50	*5¾
44.43	.1264	7.913	22.50	*5¾
35.76	.1570	6.369	15.00	*6
36.09	.1556	6.429	16.00	*6
36.80	.1526	6.554	17.00	*6
37.18	.1510	6.621	18.00	*6
38.25	.1468	6.812	20.00	*6
40.01	.1403	7.126	23.00	*6
41.83	.1342	7.451	26.00	*6
28.67	.1959	5.106	17.00	*6½
29.53	.1901	5.259	20.00	6½
30.15	.1862	5.371	22.00	*6½
30.89	.1818	5.501	24.00	6½
31.62	.1775	5.632	26.00	*6½
32.36	.1735	5.764	28.00	6½
32.72	.1716	5.828	29.00	*6½
33.78	.1662	6.016	32.00	6½
25.10	.2237	4.470	17.00	7
25.77	.2179	4.589	20.00	7
26.26	.2138	4.677	22.00	*7
26.53	.2116	4.726	23.00	7
26.80	.2095	4.773	24.00	*7
27.34	.2054	4.869	26.00	7
27.91	.2012	4.971	28.00	*7
28.19	.1991	5.022	29.00	7
28.48	.1971	5.073	30.00	*7
29.07	.1931	5.178	32.00	7
29.62	.1895	5.276	34.00	*7
30.00	.1872	5.342	35.00	7
30.90	.1817	5.503	38.00	7
31.84	.1763	5.671	40.00	*7
20.99	.2675	3.739	20.00	*7½
21.62	.2597	3.850	24.00	7½
21.98	.2555	3.915	26.40	7½
22.61	.2484	4.026	29.70	7½
23.38	.2402	4.164	33.70	7½
24.42	.2300	4.349	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.315"**
TWO STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4½	9.50	4.090	.5414	1.8471	.0129
4½	10.50	4.052	.5288	1.8912	.0126
4½	11.60	4.000	.5117	1.9543	.0122
4½	13.50	3.920	.4858	2.0583	.0116
*4½	15.10	3.826	.4561	2.1923	.0109
*4¾	16.00	4.082	.5387	1.8562	.0128
5	11.50	4.560	.7073	1.4139	.0168
5	13.00	4.494	.6829	1.4644	.0163
5	15.00	4.408	.6517	1.5346	.0155
5	18.00	4.276	.6049	1.6532	.0144
*5	21.00	4.154	.5629	1.7764	.0134
*5½	13.00	5.044	.8969	1.1149	.0214
5½	14.00	5.012	.8838	1.1315	.0210
*5½	15.00	4.974	.8683	1.1517	.0207
5½	15.50	4.950	.8586	1.1647	.0204
5½	17.00	4.892	.8353	1.1972	.0199
5½	20.00	4.778	.7903	1.2653	.0188
5½	23.00	4.670	.7487	1.3357	.0178
*5¾	14.00	5.290	1.0006	.9994	.0238
*5¾	17.00	5.190	.9579	1.0440	.0228
*5¾	19.50	5.090	.9159	1.0918	.0218
*5¾	22.50	4.990	.8748	1.1431	.0208
*6	15.00	5.524	1.1039	.9059	.0263
*6	16.00	5.500	1.0931	.9148	.0260
*6	17.00	5.450	1.0708	.9339	.0255
*6	18.00	5.424	1.0592	.9441	.0252
*6	20.00	5.352	1.0276	.9732	.0245
*6	23.00	5.240	.9792	1.0213	.0233
*6	26.00	5.132	.9335	1.0713	.0222
*6½	17.00	6.135	1.3945	.7171	.0332
6½	20.00	6.049	1.3518	.7398	.0322
*6½	22.00	5.989	1.3223	.7563	.0315
6½	24.00	5.921	1.2893	.7756	.0307
*6½	26.00	5.855	1.2576	.7952	.0299
6½	28.00	5.791	1.2271	.8149	.0292
*6½	29.00	5.761	1.2130	.8244	.0289
6½	32.00	5.675	1.1729	.8526	.0279
7	17.00	6.538	1.6029	.6239	.0382
7	20.00	6.456	1.5594	.6413	.0371
*7	22.00	6.398	1.5290	.6540	.0364
7	23.00	6.366	1.5124	.6612	.0360
*7	24.00	6.336	1.4968	.6681	.0356
7	26.00	6.276	1.4659	.6822	.0349
*7	28.00	6.214	1.4343	.6972	.0342
7	29.00	6.184	1.4192	.7046	.0338
*7	30.00	6.154	1.4041	.7122	.0334
7	32.00	6.094	1.3741	.7278	.0327
*7	34.00	6.040	1.3473	.7422	.0321
7	35.00	6.004	1.3297	.7521	.0317
7	38.00	5.920	1.2888	.7759	.0307
*7	40.00	5.836	1.2485	.8010	.0297
*7½	20.00	7.125	1.9301	.5181	.0460
7½	24.00	7.025	1.8724	.5341	.0446
7½	26.40	6.969	1.8404	.5434	.0438
7½	29.70	6.875	1.7873	.5595	.0426
7½	33.70	6.765	1.7261	.5793	.0411
7½	39.00	6.625	1.6496	.6062	.0393

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.315"**
TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
77.58	.0724	13.817	9.50	4½
79.43	.0707	14.147	10.50	4½
82.08	.0684	14.619	11.60	4½
86.45	.0649	15.397	13.50	4½
92.08	.0610	16.400	15.10	*4½
77.96	.0720	13.885	16.00	*4¾
59.38	.0945	10.577	11.50	5
61.50	.0913	10.954	13.00	5
64.45	.0871	11.479	15.00	5
69.43	.0809	12.367	18.00	5
74.61	.0753	13.289	21.00	*5
46.83	.1199	8.340	13.00	*5½
47.52	.1181	8.464	14.00	5½
48.37	.1161	8.615	15.00	*5½
48.92	.1148	8.713	15.50	5½
50.28	.1117	8.955	17.00	5½
53.14	.1057	9.465	20.00	5½
56.10	.1001	9.991	23.00	5½
41.97	.1338	7.476	14.00	*5¾
43.85	.1281	7.809	17.00	*5¾
45.85	.1224	8.167	19.50	*5¾
48.01	.1169	8.551	22.50	*5¾
38.05	.1476	6.777	15.00	*6
38.42	.1461	6.843	16.00	*6
39.22	.1431	6.986	17.00	*6
39.65	.1416	7.062	18.00	*6
40.87	.1374	7.280	20.00	*6
42.89	.1309	7.640	23.00	*6
44.99	.1248	8.014	26.00	*6
30.12	.1864	5.364	17.00	*6½
31.07	.1807	5.534	20.00	6½
31.76	.1768	5.657	22.00	*6½
32.58	.1724	5.802	24.00	6½
33.40	.1681	5.948	26.00	*6½
34.23	.1640	6.096	28.00	6½
34.62	.1622	6.167	29.00	*6½
35.81	.1568	6.378	32.00	6½
26.20	.2143	4.667	17.00	7
26.93	.2085	4.797	20.00	7
27.47	.2044	4.892	22.00	*7
27.77	.2022	4.946	23.00	7
28.06	.2001	4.998	24.00	*7
28.65	.1960	5.103	26.00	7
29.28	.1917	5.215	28.00	*7
29.60	.1897	5.271	29.00	7
29.91	.1877	5.328	30.00	*7
30.57	.1837	5.444	32.00	7
31.17	.1801	5.552	34.00	*7
31.59	.1777	5.626	35.00	7
32.59	.1723	5.804	38.00	7
33.64	.1669	5.992	40.00	*7
21.76	.2580	3.876	20.00	*7½
22.43	.2503	3.995	24.00	7½
22.82	.2460	4.065	26.40	7½
23.50	.2389	4.185	29.70	7½
24.33	.2307	4.334	33.70	7½
25.46	.2205	4.535	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.315"**
THREE STRINGS
TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 1/2	9.50	4.090	.4708	2.1238	.0112
4 1/2	10.50	4.052	.4582	2.1823	.0109
4 1/2	11.60	4.000	.4411	2.2668	.0105
4 1/2	13.50	3.920	.4153	2.4080	.0099
*4 1/2	15.10	3.826	.3856	2.5935	.0092
*4 3/4	16.00	4.082	.4682	2.1359	.0111
5	11.50	4.560	.6367	1.5705	.0152
5	13.00	4.494	.6123	1.6331	.0146
5	15.00	4.408	.5811	1.7209	.0138
5	18.00	4.276	.5343	1.8715	.0127
*5	21.00	4.154	.4924	2.0310	.0117
*5 1/2	13.00	5.044	.8264	1.2101	.0197
5 1/2	14.00	5.012	.8132	1.2296	.0194
*5 1/2	15.00	4.974	.7978	1.2535	.0190
5 1/2	15.50	4.950	.7880	1.2690	.0188
5 1/2	17.00	4.892	.7648	1.3076	.0182
5 1/2	20.00	4.778	.7198	1.3893	.0171
5 1/2	23.00	4.670	.6781	1.4746	.0161
*5 3/4	14.00	5.290	.9301	1.0752	.0221
*5 3/4	17.00	5.190	.8873	1.1270	.0211
*5 3/4	19.50	5.090	.8454	1.1829	.0201
*5 3/4	22.50	4.990	.8043	1.2434	.0191
*6	15.00	5.524	1.0333	.9677	.0246
*6	16.00	5.500	1.0225	.9780	.0243
*6	17.00	5.450	1.0002	.9998	.0238
*6	18.00	5.424	.9887	1.0115	.0235
*6	20.00	5.352	.9570	1.0449	.0228
*6	23.00	5.240	.9086	1.1006	.0216
*6	26.00	5.132	.8629	1.1589	.0205
*6 5/8	17.00	6.135	1.3240	.7553	.0315
6 5/8	20.00	6.049	1.2812	.7805	.0305
*6 5/8	22.00	5.989	1.2518	.7989	.0298
6 5/8	24.00	5.921	1.2187	.8205	.0290
*6 5/8	26.00	5.855	1.1870	.8425	.0283
6 5/8	28.00	5.791	1.1566	.8646	.0275
*6 5/8	29.00	5.761	1.1425	.8753	.0272
6 5/8	32.00	5.675	1.1023	.9072	.0262
7	17.00	6.538	1.5324	.6526	.0365
7	20.00	6.456	1.4889	.6716	.0354
*7	22.00	6.398	1.4585	.6857	.0347
7	23.00	6.366	1.4418	.6936	.0343
*7	24.00	6.336	1.4263	.7011	.0340
7	26.00	6.276	1.3954	.7167	.0332
*7	28.00	6.214	1.3638	.7333	.0325
7	29.00	6.184	1.3486	.7415	.0321
*7	30.00	6.154	1.3335	.7499	.0318
7	32.00	6.094	1.3035	.7672	.0310
*7	34.00	6.040	1.2768	.7832	.0304
7	35.00	6.004	1.2591	.7942	.0300
7	38.00	5.920	1.2182	.8209	.0290
*7	40.00	5.836	1.1779	.8489	.0280
*7 5/8	20.00	7.125	1.8596	.5378	.0443
7 5/8	24.00	7.025	1.8018	.5550	.0429
7 5/8	26.40	6.969	1.7699	.5650	.0421
7 5/8	29.70	6.875	1.7168	.5825	.0409
7 5/8	33.70	6.765	1.6556	.6040	.0394
7 5/8	39.00	6.625	1.5791	.6333	.0376

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.315"**
THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
89.20	.0629	15.887	9.50	4½
91.66	.0613	16.325	10.50	4½
95.21	.0590	16.957	11.60	4½
101.13	.0555	18.013	13.50	4½
108.93	.0515	19.401	15.10	*4½
89.71	.0626	15.978	16.00	*4¾
65.96	.0851	11.749	11.50	5
68.59	.0819	12.216	13.00	5
72.28	.0777	12.873	15.00	5
78.60	.0714	14.000	18.00	5
85.30	.0658	15.193	21.00	*5
50.82	.1105	9.052	13.00	*5½
51.65	.1087	9.198	14.00	5½
52.65	.1066	9.377	15.00	*5½
53.30	.1053	9.493	15.50	5½
54.92	.1022	9.782	17.00	5½
58.35	.0962	10.393	20.00	5½
61.93	.0907	11.031	23.00	5½
45.16	.1243	8.043	14.00	*5¾
47.33	.1186	8.430	17.00	*5¾
49.68	.1130	8.849	19.50	*5¾
52.22	.1075	9.301	22.50	*5¾
40.65	.1381	7.239	15.00	*6
41.07	.1367	7.316	16.00	*6
41.99	.1337	7.479	17.00	*6
42.48	.1322	7.566	18.00	*6
43.89	.1279	7.817	20.00	*6
46.22	.1215	8.233	23.00	*6
48.67	.1154	8.669	26.00	*6
31.72	.1770	5.650	17.00	*6½
32.78	.1713	5.839	20.00	6½
33.55	.1673	5.976	22.00	*6½
34.46	.1629	6.138	24.00	6½
35.38	.1587	6.302	26.00	*6½
36.31	.1546	6.468	28.00	6½
36.76	.1527	6.548	29.00	*6½
38.10	.1474	6.786	32.00	6½
27.41	.2048	4.882	17.00	7
28.21	.1990	5.024	20.00	7
28.80	.1950	5.129	22.00	*7
29.13	.1927	5.188	23.00	7
29.45	.1907	5.245	24.00	*7
30.10	.1865	5.361	26.00	7
30.80	.1823	5.485	28.00	*7
31.14	.1803	5.547	29.00	7
31.50	.1783	5.610	30.00	*7
32.22	.1743	5.739	32.00	7
32.90	.1707	5.859	34.00	*7
33.36	.1683	5.941	35.00	7
34.48	.1629	6.141	38.00	7
35.66	.1575	6.351	40.00	*7
22.59	.2486	4.023	20.00	*7½
23.31	.2409	4.152	24.00	7½
23.73	.2366	4.227	26.40	7½
24.46	.2295	4.357	29.70	7½
25.37	.2213	4.518	33.70	7½
26.60	.2111	4.737	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.315"**
FOUR STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4½	9.50	4.090	.4003	2.4982	.0095
4½	10.50	4.052	.3877	2.5795	.0092
4½	11.60	4.000	.3706	2.6984	.0088
4½	13.50	3.920	.3447	2.9007	.0082
*4½	15.10	3.826	.3150	3.1743	.0075
*4¾	16.00	4.082	.3976	2.5149	.0095
5	11.50	4.560	.5662	1.7663	.0135
5	13.00	4.494	.5418	1.8457	.0129
5	15.00	4.408	.5106	1.9587	.0122
5	18.00	4.276	.4638	2.1562	.0110
*5	21.00	4.154	.4218	2.3707	.0100
*5½	13.00	5.044	.7558	1.3231	.0180
5½	14.00	5.012	.7427	1.3465	.0177
*5½	15.00	4.974	.7272	1.3751	.0173
5½	15.50	4.950	.7175	1.3937	.0171
5½	17.00	4.892	.6942	1.4405	.0165
5½	20.00	4.778	.6492	1.5403	.0155
5½	23.00	4.670	.6076	1.6458	.0145
*5¾	14.00	5.290	.8595	1.1634	.0205
*5¾	17.00	5.190	.8168	1.2243	.0194
*5¾	19.50	5.090	.7748	1.2906	.0184
*5¾	22.50	4.990	.7337	1.3629	.0175
*6	15.00	5.524	.9628	1.0387	.0229
*6	16.00	5.500	.9520	1.0504	.0227
*6	17.00	5.450	.9297	1.0757	.0221
*6	18.00	5.424	.9181	1.0892	.0219
*6	20.00	5.352	.8865	1.1281	.0211
*6	23.00	5.240	.8381	1.1932	.0200
*6	26.00	5.132	.7924	1.2621	.0189
*6½	17.00	6.135	1.2534	.7978	.0298
6½	20.00	6.049	1.2107	.8260	.0288
*6½	22.00	5.989	1.1812	.8466	.0281
6½	24.00	5.921	1.1482	.8710	.0273
*6½	26.00	5.855	1.1165	.8957	.0266
6½	28.00	5.791	1.0860	.9208	.0259
*6½	29.00	5.761	1.0719	.9329	.0255
6½	32.00	5.675	1.0318	.9692	.0246
7	17.00	6.538	1.4618	.6841	.0348
7	20.00	6.456	1.4183	.7051	.0338
*7	22.00	6.398	1.3879	.7205	.0330
7	23.00	6.366	1.3712	.7293	.0326
*7	24.00	6.336	1.3557	.7376	.0323
7	26.00	6.276	1.3248	.7548	.0315
*7	28.00	6.214	1.2932	.7733	.0308
7	29.00	6.184	1.2781	.7824	.0304
*7	30.00	6.154	1.2630	.7918	.0301
7	32.00	6.094	1.2330	.8110	.0294
*7	34.00	6.040	1.2062	.8290	.0287
7	35.00	6.004	1.1885	.8414	.0283
7	38.00	5.920	1.1477	.8713	.0273
*7	40.00	5.836	1.1074	.9030	.0264
*7½	20.00	7.125	1.7890	.5590	.0426
7½	24.00	7.025	1.7313	.5776	.0412
7½	26.40	6.969	1.6993	.5885	.0405
7½	29.70	6.875	1.6462	.6075	.0392
7½	33.70	6.765	1.5850	.6309	.0377
7½	39.00	6.625	1.5085	.6629	.0359

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.315"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
104.92	.0535	18.688	9.50	4½
108.34	.0518	19.296	10.50	4½
113.33	.0495	20.186	11.60	4½
121.83	.0461	21.699	13.50	4½
133.32	.0421	23.745	15.10	*4½
105.63	.0532	18.813	16.00	*4¾
74.18	.0757	13.213	11.50	5
77.52	.0724	13.807	13.00	5
82.26	.0683	14.652	15.00	5
90.56	.0620	16.129	18.00	5
99.57	.0564	17.734	21.00	*5
55.57	.1010	9.897	13.00	*5½
56.55	.0993	10.072	14.00	5½
57.76	.0972	10.287	15.00	*5½
58.54	.0959	10.426	15.50	5½
60.50	.0928	10.776	17.00	5½
64.69	.0868	11.522	20.00	5½
69.13	.0812	12.312	23.00	5½
48.86	.1149	8.703	14.00	*5¾
51.42	.1092	9.159	17.00	*5¾
54.20	.1036	9.654	19.50	*5¾
57.24	.0981	10.195	22.50	*5¾
43.62	.1287	7.770	15.00	*6
44.12	.1273	7.858	16.00	*6
45.18	.1243	8.047	17.00	*6
45.75	.1227	8.148	18.00	*6
47.38	.1185	8.439	20.00	*6
50.12	.1120	8.926	23.00	*6
53.01	.1059	9.441	26.00	*6
33.51	.1676	5.968	17.00	*6½
34.69	.1618	6.179	20.00	6½
35.56	.1579	6.333	22.00	*6½
36.58	.1535	6.515	24.00	6½
37.62	.1492	6.700	26.00	*6½
38.67	.1452	6.888	28.00	6½
39.18	.1433	6.979	29.00	*6½
40.71	.1379	7.250	32.00	6½
28.73	.1954	5.117	17.00	7
29.61	.1896	5.274	20.00	7
30.26	.1855	5.390	22.00	*7
30.63	.1833	5.455	23.00	7
30.98	.1812	5.518	24.00	*7
31.70	.1771	5.646	26.00	7
32.48	.1729	5.784	28.00	*7
32.86	.1709	5.853	29.00	7
33.26	.1688	5.923	30.00	*7
34.06	.1648	6.067	32.00	7
34.82	.1613	6.202	34.00	*7
35.34	.1589	6.294	35.00	7
36.60	.1534	6.518	38.00	7
37.93	.1480	6.755	40.00	*7
23.48	.2392	4.181	20.00	*7½
24.26	.2314	4.321	24.00	7½
24.72	.2272	4.402	26.40	7½
25.51	.2201	4.544	29.70	7½
26.50	.2119	4.720	33.70	7½
27.84	.2017	4.959	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.660"**
ONE STRING

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4½	9.50	4.090	.5701	1.7542	.0136
4½	10.50	4.052	.5575	1.7939	.0133
4½	11.60	4.000	.5404	1.8506	.0129
4½	13.50	3.920	.5145	1.9436	.0123
*4½	15.10	3.826	.4848	2.0627	.0115
*4¾	16.00	4.082	.5674	1.7624	.0135
5	11.50	4.560	.7359	1.3588	.0175
5	13.00	4.494	.7116	1.4053	.0169
5	15.00	4.408	.6803	1.4699	.0162
5	18.00	4.276	.6336	1.5784	.0151
*5	21.00	4.154	.5916	1.6903	.0141
*5½	13.00	5.044	.9256	1.0804	.0220
5½	14.00	5.012	.9125	1.0959	.0217
*5½	15.00	4.974	.8970	1.1148	.0214
5½	15.50	4.950	.8873	1.1271	.0211
5½	17.00	4.892	.8640	1.1574	.0206
5½	20.00	4.778	.8190	1.2210	.0195
5½	23.00	4.670	.7774	1.2864	.0185
*5¾	14.00	5.290	1.0293	.9715	.0245
*5¾	17.00	5.190	.9866	1.0136	.0235
*5¾	19.50	5.090	.9446	1.0586	.0225
*5¾	22.50	4.990	.9035	1.1068	.0215
*6	15.00	5.524	1.1326	.8830	.0270
*6	16.00	5.500	1.1218	.8914	.0267
*6	17.00	5.450	1.0994	.9096	.0262
*6	18.00	5.424	1.0879	.9192	.0259
*6	20.00	5.352	1.0562	.9468	.0251
*6	23.00	5.240	1.0078	.9922	.0240
*6	26.00	5.132	.9621	1.0394	.0229
*6½	17.00	6.135	1.4232	.7026	.0339
6½	20.00	6.049	1.3805	.7244	.0329
*6½	22.00	5.989	1.3510	.7402	.0322
6½	24.00	5.921	1.3179	.7588	.0314
*6½	26.00	5.855	1.2862	.7775	.0306
6½	28.00	5.791	1.2558	.7963	.0299
*6½	29.00	5.761	1.2417	.8054	.0296
6½	32.00	5.675	1.2016	.8323	.0286
7	17.00	6.538	1.6316	.6129	.0388
7	20.00	6.456	1.5881	.6297	.0378
*7	22.00	6.398	1.5577	.6420	.0371
7	23.00	6.366	1.5410	.6489	.0367
*7	24.00	6.336	1.5255	.6555	.0363
7	26.00	6.276	1.4946	.6691	.0356
*7	28.00	6.214	1.4630	.6835	.0348
7	29.00	6.184	1.4478	.6907	.0345
*7	30.00	6.154	1.4327	.6980	.0341
7	32.00	6.094	1.4028	.7129	.0334
*7	34.00	6.040	1.3760	.7267	.0328
7	35.00	6.004	1.3583	.7362	.0323
7	38.00	5.920	1.3175	.7590	.0314
*7	40.00	5.836	1.2772	.7830	.0304
*7½	20.00	7.125	1.9588	.5105	.0466
7½	24.00	7.025	1.9011	.5260	.0453
7½	26.40	6.969	1.8691	.5350	.0445
7½	29.70	6.875	1.8160	.5507	.0432
7½	33.70	6.765	1.7548	.5699	.0418
7½	39.00	6.625	1.6783	.5958	.0400

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
O.D. 1.660"**
ONE STRING

BETWEEN TUBING & CASING**

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
73.67	.0762	13.122	9.50	4½
75.34	.0745	13.419	10.50	4½
77.72	.0722	13.843	11.60	4½
81.63	.0688	14.539	13.50	4½
86.63	.0648	15.430	15.10	*4½
74.02	.0759	13.184	16.00	*4¾
57.07	.0984	10.164	11.50	5
59.02	.0951	10.513	13.00	5
61.73	.0909	10.995	15.00	5
66.29	.0847	11.807	18.00	5
70.99	.0791	12.644	21.00	*5
45.38	.1237	8.082	13.00	*5½
46.03	.1220	8.198	14.00	5½
46.82	.1199	8.340	15.00	*5½
47.34	.1186	8.431	15.50	5½
48.61	.1155	8.658	17.00	5½
51.28	.1095	9.134	20.00	5½
54.03	.1039	9.623	23.00	5½
40.80	.1376	7.267	14.00	*5¾
42.57	.1319	7.582	17.00	*5¾
44.46	.1263	7.919	19.50	*5¾
46.49	.1208	8.280	22.50	*5¾
37.08	.1514	6.605	15.00	*6
37.44	.1500	6.669	16.00	*6
38.20	.1470	6.804	17.00	*6
38.61	.1454	6.876	18.00	*6
39.76	.1412	7.082	20.00	*6
41.67	.1347	7.422	23.00	*6
43.65	.1286	7.775	26.00	*6
29.51	.1903	5.256	17.00	*6½
30.42	.1845	5.419	20.00	6½
31.09	.1806	5.537	22.00	*6½
31.87	.1762	5.676	24.00	6½
32.65	.1719	5.816	26.00	*6½
33.44	.1679	5.957	28.00	6½
33.83	.1660	6.024	29.00	*6½
34.95	.1606	6.226	32.00	6½
25.74	.2181	4.585	17.00	7
26.45	.2123	4.710	20.00	7
26.96	.2082	4.802	22.00	*7
27.25	.2060	4.854	23.00	7
27.53	.2039	4.904	24.00	*7
28.10	.1998	5.005	26.00	7
28.71	.1956	5.113	28.00	*7
29.01	.1935	5.167	29.00	7
29.31	.1915	5.221	30.00	*7
29.94	.1875	5.333	32.00	7
30.52	.1839	5.436	34.00	*7
30.92	.1816	5.507	35.00	7
31.88	.1761	5.678	38.00	7
32.89	.1707	5.857	40.00	*7
21.44	.2619	3.819	20.00	*7½
22.09	.2541	3.935	24.00	7½
22.47	.2499	4.002	26.40	7½
23.13	.2428	4.119	29.70	7½
23.93	.2346	4.263	33.70	7½
25.03	.2244	4.457	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.660"**
TWO STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4½	9.50	4.090	.4576	2.1851	.0109
4½	10.50	4.052	.4450	2.2471	.0106
4½	11.60	4.000	.4279	2.3368	.0102
4½	13.50	3.920	.4021	2.4870	.0096
*4½	15.10	3.826	.3724	2.6854	.0089
*4¾	16.00	4.082	.4550	2.1979	.0108
5	11.50	4.560	.6235	1.6038	.0148
5	13.00	4.494	.5991	1.6691	.0143
5	15.00	4.408	.5679	1.7609	.0135
5	18.00	4.276	.5211	1.9189	.0124
*5	21.00	4.154	.4792	2.0869	.0114
*5½	13.00	5.044	.8132	1.2298	.0194
5½	14.00	5.012	.8000	1.2499	.0190
*5½	15.00	4.974	.7846	1.2746	.0187
5½	15.50	4.950	.7748	1.2906	.0184
5½	17.00	4.892	.7516	1.3306	.0179
5½	20.00	4.778	.7066	1.4153	.0168
5½	23.00	4.670	.6649	1.5039	.0158
*5¾	14.00	5.290	.9169	1.0906	.0218
*5¾	17.00	5.190	.8741	1.1440	.0208
*5¾	19.50	5.090	.8322	1.2016	.0198
*5¾	22.50	4.990	.7911	1.2641	.0188
*6	15.00	5.524	1.0201	.9803	.0243
*6	16.00	5.500	1.0093	.9907	.0240
*6	17.00	5.450	.9870	1.0132	.0235
*6	18.00	5.424	.9755	1.0251	.0232
*6	20.00	5.352	.9438	1.0595	.0225
*6	23.00	5.240	.8954	1.1168	.0213
*6	26.00	5.132	.8497	1.1769	.0202
*6½	17.00	6.135	1.3108	.7629	.0312
6½	20.00	6.049	1.2680	.7886	.0302
*6½	22.00	5.989	1.2386	.8074	.0295
6½	24.00	5.921	1.2055	.8295	.0287
*6½	26.00	5.855	1.1738	.8519	.0279
6½	28.00	5.791	1.1434	.8746	.0272
*6½	29.00	5.761	1.1293	.8855	.0269
6½	32.00	5.675	1.0891	.9182	.0259
7	17.00	6.538	1.5192	.6583	.0362
7	20.00	6.456	1.4757	.6777	.0351
*7	22.00	6.398	1.4453	.6919	.0344
7	23.00	6.366	1.4286	.7000	.0340
*7	24.00	6.336	1.4131	.7077	.0336
7	26.00	6.276	1.3822	.7235	.0329
*7	28.00	6.214	1.3506	.7404	.0322
7	29.00	6.184	1.3354	.7488	.0318
*7	30.00	6.154	1.3203	.7574	.0314
7	32.00	6.094	1.2903	.7750	.0307
*7	34.00	6.040	1.2636	.7914	.0301
7	35.00	6.004	1.2459	.8026	.0297
7	38.00	5.920	1.2050	.8299	.0287
*7	40.00	5.836	1.1647	.8586	.0277
*7½	20.00	7.125	1.8464	.5416	.0440
7½	24.00	7.025	1.7886	.5591	.0426
7½	26.40	6.969	1.7567	.5693	.0418
7½	29.70	6.875	1.7036	.5870	.0406
7½	33.70	6.765	1.6424	.6089	.0391
7½	39.00	6.625	1.5659	.6386	.0373

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.660"**
TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
91.77	.0612	16.346	9.50	4½
94.38	.0595	16.809	10.50	4½
98.14	.0572	17.480	11.60	4½
104.45	.0538	18.604	13.50	4½
112.79	.0498	20.088	15.10	*4½
92.31	.0608	16.441	16.00	*4¾
67.36	.0834	11.997	11.50	5
70.10	.0801	12.485	13.00	5
73.96	.0759	13.172	15.00	5
80.59	.0697	14.354	18.00	5
87.65	.0641	15.611	21.00	*5
51.65	.1087	9.199	13.00	*5½
52.50	.1070	9.350	14.00	5½
53.53	.1049	9.535	15.00	*5½
54.20	.1036	9.654	15.50	5½
55.88	.1005	9.953	17.00	5½
59.44	.0945	10.587	20.00	5½
63.16	.0889	11.250	23.00	5½
45.81	.1226	8.159	14.00	*5¾
48.05	.1169	8.558	17.00	*5¾
50.47	.1112	8.989	19.50	*5¾
53.09	.1058	9.456	22.50	*5¾
41.17	.1364	7.333	15.00	*6
41.61	.1349	7.411	16.00	*6
42.55	.1319	7.579	17.00	*6
43.06	.1304	7.669	18.00	*6
44.50	.1262	7.926	20.00	*6
46.91	.1197	8.354	23.00	*6
49.43	.1136	8.804	26.00	*6
32.04	.1752	5.707	17.00	*6½
33.12	.1695	5.899	20.00	6½
33.91	.1656	6.040	22.00	*6½
34.84	.1612	6.205	24.00	6½
35.78	.1569	6.373	26.00	*6½
36.73	.1528	6.542	28.00	6½
37.19	.1510	6.624	29.00	*6½
38.56	.1456	6.868	32.00	6½
27.65	.2031	4.924	17.00	7
28.46	.1973	5.069	20.00	7
29.06	.1932	5.176	22.00	*7
29.40	.1910	5.236	23.00	7
29.72	.1889	5.294	24.00	*7
30.39	.1848	5.412	26.00	7
31.10	.1805	5.539	28.00	*7
31.45	.1785	5.602	29.00	7
31.81	.1765	5.666	30.00	*7
32.55	.1725	5.797	32.00	7
33.24	.1689	5.920	34.00	*7
33.71	.1666	6.004	35.00	7
34.85	.1611	6.208	38.00	7
36.06	.1557	6.423	40.00	*7
22.75	.2468	4.052	20.00	*7½
23.48	.2391	4.182	24.00	7½
23.91	.2348	4.258	26.40	7½
24.65	.2277	4.391	29.70	7½
25.57	.2196	4.555	33.70	7½
26.82	.2093	4.777	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.660"**
THREE STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5	11.50	4.560	.5111	1.9566	.0122
5	13.00	4.494	.4867	2.0546	.0116
5	15.00	4.408	.4555	2.1955	.0108
5	18.00	4.276	.4087	2.4467	.0097
*5	21.00	4.154	.3667	2.7267	.0087
*5½	13.00	5.044	.7007	1.4271	.0167
5½	14.00	5.012	.6876	1.4543	.0164
*5½	15.00	4.974	.6721	1.4878	.0160
5½	15.50	4.950	.6624	1.5096	.0158
5½	17.00	4.892	.6391	1.5646	.0152
5½	20.00	4.778	.5941	1.6831	.0141
5½	23.00	4.670	.5525	1.8099	.0132
*5¾	14.00	5.290	.8045	1.2431	.0192
*5¾	17.00	5.190	.7617	1.3128	.0181
*5¾	19.50	5.090	.7198	1.3893	.0171
*5¾	22.50	4.990	.6786	1.4735	.0162
*6	15.00	5.524	.9077	1.1017	.0216
*6	16.00	5.500	.8969	1.1149	.0214
*6	17.00	5.450	.8746	1.1434	.0208
*6	18.00	5.424	.8630	1.1587	.0205
*6	20.00	5.352	.8314	1.2028	.0198
*6	23.00	5.240	.7830	1.2772	.0186
*6	26.00	5.132	.7373	1.3563	.0176
*6½	17.00	6.135	1.1984	.8345	.0285
6½	20.00	6.049	1.1556	.8654	.0275
*6½	22.00	5.989	1.1261	.8880	.0268
6½	24.00	5.921	1.0931	.9148	.0260
*6½	26.00	5.855	1.0614	.9422	.0253
6½	28.00	5.791	1.0310	.9700	.0245
*6½	29.00	5.761	1.0168	.9835	.0242
6½	32.00	5.675	.9767	1.0239	.0233
7	17.00	6.538	1.4067	.7109	.0335
7	20.00	6.456	1.3633	.7335	.0325
*7	22.00	6.398	1.3328	.7503	.0317
7	23.00	6.366	1.3162	.7598	.0313
*7	24.00	6.336	1.3006	.7689	.0310
7	26.00	6.276	1.2697	.7876	.0302
*7	28.00	6.214	1.2382	.8077	.0295
7	29.00	6.184	1.2230	.8177	.0291
*7	30.00	6.154	1.2079	.8279	.0288
7	32.00	6.094	1.1779	.8490	.0280
*7	34.00	6.040	1.1512	.8687	.0274
7	35.00	6.004	1.1335	.8822	.0270
7	38.00	5.920	1.0926	.9152	.0260
*7	40.00	5.836	1.0523	.9503	.0251
*7½	20.00	7.125	1.7339	.5767	.0413
7½	24.00	7.025	1.6762	.5966	.0399
7½	26.40	6.969	1.6442	.6082	.0391
7½	29.70	6.875	1.5911	.6285	.0379
7½	33.70	6.765	1.5299	.6536	.0364
7½	39.00	6.625	1.4534	.6880	.0346
*8	26.00	7.386	1.8885	.5295	.0450
*8½	28.00	7.485	1.9485	.5132	.0464
*8½	32.00	7.385	1.8879	.5297	.0449
*8½	35.50	7.285	1.8280	.5470	.0435
*8½	39.50	7.185	1.7690	.5653	.0421

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.660"**
THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
82.18	.0683	14.636	11.50	5
86.29	.0651	15.370	13.00	5
92.21	.0609	16.424	15.00	5
102.76	.0546	18.303	18.00	5
114.52	.0490	20.397	21.00	*5
59.94	.0937	10.675	13.00	*5½
61.08	.0919	10.879	14.00	5½
62.49	.0899	11.130	15.00	*5½
63.40	.0886	11.293	15.50	5½
65.71	.0854	11.704	17.00	5½
70.69	.0794	12.590	20.00	5½
76.02	.0739	13.539	23.00	5½
52.21	.1075	9.299	14.00	*5¾
55.14	.1018	9.821	17.00	*5¾
58.35	.0962	10.393	19.50	*5¾
61.89	.0907	11.023	22.50	*5¾
46.27	.1213	8.241	15.00	*6
46.83	.1199	8.340	16.00	*6
48.02	.1169	8.553	17.00	*6
48.67	.1154	8.668	18.00	*6
50.52	.1111	8.998	20.00	*6
53.64	.1047	9.554	23.00	*6
56.97	.0986	10.146	26.00	*6
35.05	.1602	6.242	17.00	*6½
36.34	.1545	6.473	20.00	6½
37.30	.1505	6.643	22.00	*6½
38.42	.1461	6.844	24.00	6½
39.57	.1419	7.048	26.00	*6½
40.74	.1378	7.256	28.00	6½
41.30	.1359	7.357	29.00	*6½
43.00	.1306	7.659	32.00	6½
29.86	.1881	5.318	17.00	7
30.81	.1822	5.487	20.00	7
31.51	.1782	5.613	22.00	*7
31.91	.1759	5.684	23.00	7
32.29	.1739	5.752	24.00	*7
33.08	.1697	5.891	26.00	7
33.92	.1655	6.042	28.00	*7
34.34	.1635	6.117	29.00	7
34.77	.1615	6.193	30.00	*7
35.66	.1575	6.351	32.00	7
36.48	.1539	6.498	34.00	*7
37.05	.1515	6.600	35.00	7
38.44	.1461	6.847	38.00	7
39.91	.1407	7.109	40.00	*7
24.22	.2318	4.314	20.00	*7½
25.06	.2241	4.463	24.00	7½
25.54	.2198	4.550	26.40	7½
26.40	.2127	4.701	29.70	7½
27.45	.2045	4.889	33.70	7½
28.90	.1943	5.147	39.00	7½
22.24	.2525	3.961	26.00	*8
21.55	.2605	3.839	28.00	*8½
22.25	.2524	3.962	32.00	*8½
22.98	.2444	4.092	35.50	*8½
23.74	.2365	4.229	39.50	*8½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.660"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*5½	13.00	5.044	.5883	1.6998	.0140
5½	14.00	5.012	.5752	1.7386	.0137
*5½	15.00	4.974	.5597	1.7867	.0133
5½	15.50	4.950	.5500	1.8182	.0131
5½	17.00	4.892	.5267	1.8986	.0125
5½	20.00	4.778	.4817	2.0759	.0115
5½	23.00	4.670	.4401	2.2723	.0105
*5¾	14.00	5.290	.6920	1.4450	.0165
*5¾	17.00	5.190	.6493	1.5402	.0155
*5¾	19.50	5.090	.6073	1.6465	.0145
*5¾	22.50	4.990	.5662	1.7661	.0135
*6	15.00	5.524	.7953	1.2574	.0189
*6	16.00	5.500	.7845	1.2747	.0187
*6	17.00	5.450	.7621	1.3121	.0181
*6	18.00	5.424	.7506	1.3322	.0179
*6	20.00	5.352	.7190	1.3909	.0171
*6	23.00	5.240	.6706	1.4913	.0160
*6	26.00	5.132	.6249	1.6004	.0149
*6½	17.00	6.135	1.0859	.9209	.0259
6½	20.00	6.049	1.0432	.9586	.0248
*6½	22.00	5.989	1.0137	.9865	.0241
6½	24.00	5.921	.9807	1.0197	.0233
*6½	26.00	5.855	.9489	1.0538	.0226
6½	28.00	5.791	.9185	1.0887	.0219
*6½	29.00	5.761	.9044	1.1057	.0215
6½	32.00	5.675	.8643	1.1570	.0206
7	17.00	6.538	1.2943	.7726	.0308
7	20.00	6.456	1.2508	.7995	.0298
*7	22.00	6.398	1.2204	.8194	.0291
7	23.00	6.366	1.2037	.8307	.0287
*7	24.00	6.336	1.1882	.8416	.0283
7	26.00	6.276	1.1573	.8641	.0276
*7	28.00	6.214	1.1257	.8883	.0268
7	29.00	6.184	1.1106	.9005	.0264
*7	30.00	6.154	1.0954	.9129	.0261
7	32.00	6.094	1.0655	.9386	.0254
*7	34.00	6.040	1.0387	.9627	.0247
7	35.00	6.004	1.0210	.9794	.0243
7	38.00	5.920	.9802	1.0202	.0233
*7	40.00	5.836	.9399	1.0640	.0224
*7½	20.00	7.125	1.6215	.6167	.0386
7½	24.00	7.025	1.5638	.6395	.0372
7½	26.40	6.969	1.5318	.6528	.0365
7½	29.70	6.875	1.4787	.6763	.0352
7½	33.70	6.765	1.4175	.7055	.0338
7½	39.00	6.625	1.3410	.7457	.0319
*8	26.00	7.386	1.7760	.5630	.0423
*8½	28.00	7.485	1.8361	.5446	.0437
*8½	32.00	7.385	1.7754	.5632	.0423
*8½	35.50	7.285	1.7156	.5829	.0408
*8½	39.50	7.185	1.6566	.6037	.0394

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.660"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
71.39	.0786	12.715	13.00	*5 1/2
73.02	.0769	13.005	14.00	5 1/2
75.04	.0748	13.365	15.00	*5 1/2
76.37	.0735	13.601	15.50	5 1/2
79.74	.0704	14.203	17.00	5 1/2
87.19	.0644	15.529	20.00	5 1/2
95.44	.0588	16.998	23.00	5 1/2
60.69	.0925	10.809	14.00	*5 3/4
64.69	.0868	11.521	17.00	*5 3/4
69.15	.0812	12.317	19.50	*5 3/4
74.18	.0757	13.212	22.50	*5 3/4
52.81	.1063	9.406	15.00	*6
53.54	.1049	9.536	16.00	*6
55.11	.1019	9.815	17.00	*6
55.95	.1003	9.966	18.00	*6
58.42	.0961	10.405	20.00	*6
62.63	.0896	11.156	23.00	*6
67.22	.0835	11.972	26.00	*6
38.68	.1452	6.889	17.00	*6 5/8
40.26	.1395	7.171	20.00	6 5/8
41.43	.1355	7.379	22.00	*6 5/8
42.83	.1311	7.628	24.00	6 5/8
44.26	.1269	7.883	26.00	*6 5/8
45.72	.1228	8.144	28.00	6 5/8
46.44	.1209	8.271	29.00	*6 5/8
48.60	.1155	8.655	32.00	6 5/8
32.45	.1730	5.780	17.00	7
33.58	.1672	5.981	20.00	
34.41	.1631	6.130	22.00	*7
34.89	.1609	6.214	23.00	7
35.35	.1588	6.296	24.00	*7
36.29	.1547	6.464	26.00	7
37.31	.1505	6.645	28.00	*7
37.82	.1485	6.736	29.00	7
38.34	.1464	6.829	30.00	*7
39.42	.1424	7.021	32.00	7
40.43	.1389	7.202	34.00	*7
41.13	.1365	7.326	35.00	7
42.85	.1310	7.632	38.00	7
44.69	.1256	7.959	40.00	*7
25.90	.2168	4.613	20.00	*7 5/8
26.86	.2090	4.784	24.00	7 5/8
27.42	.2048	4.883	26.40	7 5/8
28.40	.1977	5.059	29.70	7 5/8
29.63	.1895	5.227	33.70	7 5/8
31.32	.1793	5.578	39.00	7 5/8
23.65	.2374	4.212	26.00	*8
22.87	.2455	4.074	28.00	*8 1/8
23.66	.2373	4.213	32.00	*8 1/8
24.48	.2293	4.360	35.50	*8 1/8
25.35	.2214	4.516	39.50	*8 1/8

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.660"**
FOUR STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8 ⁵ / ₈	24.00	8.097	2.2252	.4494	.0530
8 ⁵ / ₈	28.00	8.017	2.1726	.4603	.0517
8 ⁵ / ₈	32.00	7.921	2.1102	.4739	.0502
8 ⁵ / ₈	36.00	7.825	2.0485	.4882	.0488
8 ⁵ / ₈	38.00	7.775	2.0167	.4959	.0480
8 ⁵ / ₈	40.00	7.725	1.9850	.5038	.0473
8 ⁵ / ₈	43.00	7.651	1.9386	.5158	.0462
8 ⁵ / ₈	44.00	7.625	1.9224	.5202	.0458
8 ⁵ / ₈	49.00	7.511	1.8520	.5400	.0441
*9	34.00	8.290	2.3542	.4248	.0561
*9	38.00	8.196	2.2910	.4365	.0545
*9	40.00	8.150	2.2603	.4424	.0538
*9	45.00	8.032	2.1824	.4582	.0520
*9	55.00	7.812	2.0402	.4901	.0486
*9 ⁵ / ₈	29.30	9.063	2.9015	.3446	.0691
9 ⁵ / ₈	32.30	9.001	2.8558	.3502	.0680
9 ⁵ / ₈	36.00	8.921	2.7973	.3575	.0666
*9 ⁵ / ₈	38.00	8.877	2.7654	.3616	.0658
9 ⁵ / ₈	40.00	8.835	2.7350	.3656	.0651
9 ⁵ / ₈	43.50	8.755	2.6776	.3735	.0638
9 ⁵ / ₈	47.00	8.681	2.6250	.3810	.0625
9 ⁵ / ₈	53.50	8.535	2.5224	.3964	.0601
*10	33.00	9.384	3.1431	.3182	.0748
10 ³ / ₄	32.75	10.192	3.7885	.2640	.0902
*10 ³ / ₄	35.75	10.136	3.7420	.2672	.0891
10 ³ / ₄	40.50	10.050	3.6712	.2724	.0874
10 ³ / ₄	45.50	9.950	3.5896	.2786	.0855
10 ³ / ₄	51.00	9.850	3.5088	.2850	.0835
*10 ³ / ₄	54.00	9.784	3.4559	.2894	.0823
10 ³ / ₄	55.50	9.760	3.4368	.2910	.0818
*10 ³ / ₄	60.70	9.660	3.3576	.2978	.0799
*10 ³ / ₄	65.70	9.560	3.2791	.3050	.0781
*11 ³ / ₄	38.00	11.150	4.6226	.2163	.1101
11 ³ / ₄	42.00	11.084	4.5628	.2192	.1086
11 ³ / ₄	47.00	11.000	4.4871	.2229	.1068
11 ³ / ₄	54.00	10.880	4.3800	.2283	.1043
11 ³ / ₄	60.00	10.772	4.2845	.2334	.1020
*12	40.00	11.384	4.8378	.2067	.1152
*13	40.00	12.438	5.8622	.1706	.1396
*13	45.00	12.360	5.7833	.1729	.1377
*13	50.00	12.282	5.7049	.1753	.1358
*13	54.00	12.220	5.6429	.1772	.1344
13 ³ / ₈	48.00	12.715	6.1465	.1627	.1463
13 ³ / ₈	54.50	12.615	6.0431	.1655	.1439
13 ³ / ₈	61.00	12.515	5.9406	.1683	.1414
13 ³ / ₈	68.00	12.415	5.8389	.1713	.1390
13 ³ / ₈	72.00	12.347	5.7702	.1733	.1374
*13 ³ / ₈	83.00	12.175	5.5981	.1786	.1333

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.660"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
18.87	.2975	3.362	24.00	8 $\frac{5}{8}$
19.33	.2904	3.443	28.00	8 $\frac{5}{8}$
19.90	.2821	3.545	32.00	8 $\frac{5}{8}$
20.50	.2738	3.652	36.00	8 $\frac{5}{8}$
20.83	.2696	3.709	38.00	8 $\frac{5}{8}$
21.16	.2654	3.768	40.00	8 $\frac{5}{8}$
21.66	.2592	3.859	43.00	8 $\frac{5}{8}$
21.85	.2570	3.891	44.00	8 $\frac{5}{8}$
22.68	.2476	4.039	49.00	8 $\frac{5}{8}$
17.84	.3147	3.178	34.00	*9
18.33	.3063	3.265	38.00	*9
18.58	.3022	3.310	40.00	*9
19.24	.2917	3.428	45.00	*9
20.59	.2727	3.667	55.00	*9
14.48	.3879	2.578	29.30	*9 $\frac{5}{8}$
14.71	.3818	2.619	32.30	9 $\frac{5}{8}$
15.01	.3739	2.674	36.00	9 $\frac{5}{8}$
15.19	.3697	2.705	38.00	*9 $\frac{5}{8}$
15.36	.3656	2.735	40.00	9 $\frac{5}{8}$
15.69	.3579	2.794	43.50	9 $\frac{5}{8}$
16.00	.3509	2.850	47.00	9 $\frac{5}{8}$
16.65	.3372	2.966	53.50	9 $\frac{5}{8}$
13.36	.4202	2.380	33.00	*10
11.09	.5064	1.975	32.75	10 $\frac{3}{4}$
11.22	.5002	1.999	35.75	*10 $\frac{3}{4}$
11.44	.4908	2.038	40.50	10 $\frac{3}{4}$
11.70	.4799	2.084	45.50	10 $\frac{3}{4}$
11.97	.4691	2.132	51.00	10 $\frac{3}{4}$
12.15	.4620	2.165	54.00	*10 $\frac{3}{4}$
12.22	.4594	2.177	55.50	10 $\frac{3}{4}$
12.51	.4488	2.228	60.70	*10 $\frac{3}{4}$
12.81	.4384	2.281	65.70	*10 $\frac{3}{4}$
9.81	.6180	1.618	38.00	*11 $\frac{3}{4}$
9.21	.6100	1.640	42.00	11 $\frac{3}{4}$
9.36	.5998	1.667	47.00	11 $\frac{3}{4}$
9.59	.5855	1.708	54.00	11 $\frac{3}{4}$
9.80	.5728	1.746	60.00	11 $\frac{3}{4}$
8.68	.6467	1.546	40.00	*12
7.16	.7837	1.276	40.00	*13
7.26	.7731	1.294	45.00	*13
7.36	.7626	1.311	50.00	*13
7.44	.7543	1.326	54.00	*13
6.83	.8217	1.217	48.00	13 $\frac{3}{8}$
6.95	.8078	1.238	54.50	13 $\frac{3}{8}$
7.07	.7941	1.259	61.00	13 $\frac{3}{8}$
7.19	.7805	1.281	68.00	13 $\frac{3}{8}$
7.28	.7714	1.296	72.00	13 $\frac{3}{8}$
7.50	.7484	1.336	83.00	*13 $\frac{3}{8}$

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.900"**
ONE STRING

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 1/2	9.50	4.090	.5352	1.8684	.0127
4 1/2	10.50	4.052	.5226	1.9135	.0124
4 1/2	11.60	4.000	.5055	1.9782	.0120
4 1/2	13.50	3.920	.4797	2.0848	.0114
*4 1/2	15.10	3.826	.4500	2.2225	.0107
*4 3/4	16.00	4.082	.5325	1.8778	.0127
5	11.50	4.560	.7011	1.4264	.0167
5	13.00	4.494	.6767	1.4777	.0161
5	15.00	4.408	.6455	1.5493	.0154
5	18.00	4.276	.5987	1.6703	.0143
*5	21.00	4.154	.5567	1.7962	.0133
*5 1/2	13.00	5.044	.8907	1.1227	.0212
5 1/2	14.00	5.012	.8776	1.1395	.0209
*5 1/2	15.00	4.974	.8621	1.1599	.0205
5 1/2	15.50	4.950	.8524	1.1731	.0203
5 1/2	17.00	4.892	.8291	1.2061	.0197
5 1/2	20.00	4.778	.7841	1.2753	.0187
5 1/2	23.00	4.670	.7425	1.3468	.0177
*5 3/4	14.00	5.290	.9945	1.0056	.0237
*5 3/4	17.00	5.190	.9517	1.0507	.0227
*5 3/4	19.50	5.090	.9098	1.0992	.0217
*5 3/4	22.50	4.990	.8686	1.1512	.0207
*6	15.00	5.524	1.0977	.9110	.0261
*6	16.00	5.500	1.0869	.9200	.0259
*6	17.00	5.450	1.0646	.9393	.0253
*6	18.00	5.424	1.0530	.9496	.0251
*6	20.00	5.352	1.0214	.9791	.0243
*6	23.00	5.240	.9730	1.0278	.0232
*6	26.00	5.132	.9273	1.0784	.0221
*6 5/8	17.00	6.135	1.3883	.7203	.0331
6 5/8	20.00	6.049	1.3456	.7432	.0320
*6 5/8	22.00	5.989	1.3161	.7598	.0313
6 5/8	24.00	5.921	1.2831	.7794	.0305
*6 5/8	26.00	5.855	1.2514	.7991	.0298
6 5/8	28.00	5.791	1.2210	.8190	.0291
*6 5/8	29.00	5.761	1.2068	.8286	.0287
6 5/8	32.00	5.675	1.1667	.8571	.0278
7	17.00	6.538	1.5967	.6263	.0380
7	20.00	6.456	1.5532	.6438	.0370
*7	22.00	6.398	1.5228	.6567	.0363
7	23.00	6.366	1.5062	.6639	.0359
*7	24.00	6.336	1.4906	.6709	.0355
7	26.00	6.276	1.4597	.6851	.0348
*7	28.00	6.214	1.4282	.7002	.0340
7	29.00	6.184	1.4130	.7077	.0336
*7	30.00	6.154	1.3979	.7154	.0333
7	32.00	6.094	1.3679	.7311	.0326
*7	34.00	6.040	1.3412	.7456	.0319
7	35.00	6.004	1.3235	.7556	.0315
7	38.00	5.920	1.2826	.7797	.0305
*7	40.00	5.836	1.2423	.8050	.0296
*7 5/8	20.00	7.125	1.9239	.5198	.0458
7 5/8	24.00	7.025	1.8662	.5358	.0444
7 5/8	26.40	6.969	1.8342	.5452	.0437
7 5/8	29.70	6.875	1.7811	.5614	.0424
7 5/8	33.70	6.765	1.7199	.5814	.0410
7 5/8	39.00	6.625	1.6434	.6085	.0391

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
O.D. 1.900"**
ONE STRING

BETWEEN TUBING & CASING**

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
78.47	.0715	13.977	9.50	4½
80.37	.0699	14.314	10.50	4½
83.08	.0676	14.798	11.60	4½
87.56	.0641	15.595	13.50	4½
93.34	.0601	16.625	15.10	*4½
78.87	.0712	14.047	16.00	*4¾
59.91	.0937	10.670	11.50	5
62.07	.0905	11.054	13.00	5
65.07	.0863	11.589	15.00	5
70.15	.0800	12.495	18.00	5
75.44	.0744	13.436	21.00	*5
47.15	.1191	8.398	13.00	*5½
47.86	.1173	8.524	14.00	5½
48.72	.1152	8.677	15.00	*5½
49.27	.1140	8.776	15.50	5½
50.66	.1108	9.022	17.00	5½
53.56	.1048	9.540	20.00	5½
56.56	.0993	10.075	23.00	5½
42.23	.1329	7.522	14.00	*5¾
44.13	.1272	7.860	17.00	*5¾
46.17	.1216	8.223	19.50	*5¾
48.35	.1161	8.612	22.50	*5¾
38.26	.1467	6.815	15.00	*6
38.64	.1453	6.882	16.00	*6
39.45	.1423	7.027	17.00	*6
39.88	.1408	7.104	18.00	*6
41.12	.1365	7.324	20.00	*6
43.17	.1301	7.688	23.00	*6
45.29	.1240	8.067	26.00	*6
30.25	.1856	5.388	17.00	*6½
31.21	.1799	5.559	20.00	6½
31.91	.1759	5.684	22.00	*6½
32.73	.1715	5.830	24.00	6½
33.56	.1673	5.978	26.00	*6½
34.40	.1632	6.127	28.00	6½
34.80	.1613	6.199	29.00	*6½
36.00	.1560	6.412	32.00	6½
26.30	.2135	4.685	17.00	7
27.04	.2076	4.816	20.00	7
27.58	.2036	4.912	22.00	*7
27.89	.2013	4.967	23.00	7
28.18	.1993	5.018	24.00	*7
28.77	.1951	5.125	26.00	7
29.41	.1909	5.238	28.00	*7
29.72	.1889	5.294	29.00	7
30.05	.1869	5.351	30.00	*7
30.70	.1829	5.469	32.00	7
31.32	.1793	5.578	34.00	*7
31.73	.1769	5.652	35.00	7
32.75	.1715	5.832	38.00	7
33.81	.1661	6.021	40.00	*7
21.83	.2572	3.888	20.00	*7½
22.51	.2495	4.008	24.00	7½
22.90	.2452	4.078	26.40	7½
23.58	.2381	4.200	29.70	7½
24.42	.2299	4.349	33.70	7½
25.56	.2197	4.552	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.900"**
TWO STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
5	11.50	4.560	.5538	1.8057	.0132
5	13.00	4.494	.5294	1.8889	.0126
5	15.00	4.408	.4982	2.0073	.0119
5	18.00	4.276	.4514	2.2152	.0107
*5	21.00	4.154	.4095	2.4423	.0097
*5½	13.00	5.044	.7435	1.3451	.0177
5½	14.00	5.012	.7303	1.3693	.0174
*5½	15.00	4.974	.7148	1.3989	.0170
5½	15.50	4.950	.7051	1.4182	.0168
5½	17.00	4.892	.6818	1.4666	.0162
5½	20.00	4.778	.6369	1.5702	.0152
5½	23.00	4.670	.5952	1.6800	.0142
*5¾	14.00	5.290	.8472	1.1804	.0202
*5¾	17.00	5.190	.8044	1.2431	.0192
*5¾	19.50	5.090	.7625	1.3115	.0182
*5¾	22.50	4.990	.7213	1.3863	.0172
*6	15.00	5.524	.9504	1.0522	.0226
*6	16.00	5.500	.9396	1.0643	.0224
*6	17.00	5.450	.9173	1.0902	.0218
*6	18.00	5.424	.9057	1.1041	.0216
*6	20.00	5.352	.8741	1.1440	.0208
*6	23.00	5.240	.8257	1.2111	.0197
*6	26.00	5.132	.7800	1.2821	.0186
*6½	17.00	6.135	1.2411	.8058	.0295
6½	20.00	6.049	1.1983	.8345	.0285
6½	22.00	5.989	1.1688	.8555	.0278
6½	24.00	5.921	1.1358	.8804	.0270
6½	26.00	5.855	1.1041	.9057	.0263
6½	28.00	5.791	1.0737	.9314	.0256
6½	29.00	5.761	1.0595	.9438	.0252
6½	32.00	5.675	1.0194	.9810	.0243
7	17.00	6.538	1.4494	.6899	.0345
7	20.00	6.456	1.4060	.7113	.0335
*7	22.00	6.398	1.3755	.7270	.0328
7	23.00	6.366	1.3589	.7359	.0324
*7	24.00	6.336	1.3433	.7444	.0320
7	26.00	6.276	1.3125	.7619	.0312
*7	28.00	6.214	1.2809	.7807	.0305
7	29.00	6.184	1.2657	.7901	.0301
*7	30.00	6.154	1.2506	.7996	.0298
7	32.00	6.094	1.2206	.8193	.0291
*7	34.00	6.040	1.1939	.8376	.0284
7	35.00	6.004	1.1762	.8502	.0280
7	38.00	5.920	1.1353	.8808	.0270
*7	40.00	5.836	1.0950	.9132	.0261
*7½	20.00	7.125	1.7767	.5629	.0423
7½	24.00	7.025	1.7189	.5818	.0409
7½	26.40	6.969	1.6870	.5928	.0402
7½	29.70	6.875	1.6339	.6120	.0389
7½	33.70	6.765	1.5726	.6359	.0374
7½	39.00	6.625	1.4962	.6684	.0356
*8	26.00	7.386	1.9312	.5178	.0460
*8½	28.00	7.485	1.9912	.5022	.0474
*8½	32.00	7.385	1.9306	.5180	.0460
*8½	35.50	7.285	1.8707	.5346	.0445
*8½	39.50	7.185	1.8117	.5520	.0431

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.900"**
TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
75.84	.0740	13.508	11.50	5
79.33	.0708	14.130	13.00	5
84.31	.0666	15.016	15.00	5
93.04	.0603	16.571	18.00	5
102.58	.0547	18.269	21.00	*5
56.49	.0994	10.062	13.00	*5½
57.51	.0976	10.243	14.00	5½
58.75	.0956	10.465	15.00	*5½
59.56	.0943	10.609	15.50	5½
61.60	.0911	10.971	17.00	5½
65.95	.0851	11.746	20.00	5½
70.56	.0796	12.568	23.00	5½
49.58	.1133	8.830	14.00	*5¾
52.21	.1075	9.299	17.00	*5¾
55.08	.1019	9.811	19.50	*5¾
58.22	.0964	10.370	22.50	*5¾
44.19	.1271	7.871	15.00	*6
44.70	.1256	7.961	16.00	*6
45.79	.1226	8.155	17.00	*6
46.37	.1211	8.259	18.00	*6
48.05	.1168	8.558	20.00	*6
50.87	.1104	9.060	23.00	*6
53.85	.1043	9.591	26.00	*6
33.84	.1659	6.028	17.00	*6½
35.05	.1602	6.243	20.00	6½
35.93	.1563	6.400	22.00	*6½
36.98	.1518	6.586	24.00	6½
38.04	.1476	6.775	26.00	*6½
39.12	.1435	6.967	28.00	6½
39.64	.1416	7.060	29.00	*6½
41.20	.1363	7.338	32.00	6½
28.98	.1938	5.161	17.00	7
29.87	.1879	5.321	20.00	7
30.53	.1839	5.438	22.00	*7
30.91	.1817	5.505	23.00	7
31.27	.1796	5.569	24.00	*7
32.00	.1755	5.700	26.00	7
32.79	.1712	5.840	28.00	*7
33.18	.1692	5.910	29.00	7
33.58	.1672	5.982	30.00	*7
34.41	.1632	6.129	32.00	7
35.18	.1596	6.266	34.00	*7
35.71	.1572	6.360	35.00	7
36.99	.1518	6.589	38.00	7
38.36	.1464	6.831	40.00	*7
23.64	.2375	4.210	20.00	*7½
24.43	.2298	4.352	24.00	7½
24.90	.2255	4.434	26.40	7½
25.71	.2184	4.578	29.70	7½
26.71	.2102	4.757	33.70	7½
28.07	.2000	5.000	39.00	7½
21.75	.2582	3.874	26.00	*8
21.09	.2662	3.757	28.00	*8½
21.76	.2581	3.875	32.00	*8½
22.45	.2501	3.999	35.50	*8½
23.18	.2422	4.129	39.50	*8½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.900"**
THREE STRINGS
TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*5½	13.00	5.044	.5953	1.6797	.0142
5½	14.00	5.012	.5822	1.7176	.0139
*5½	15.00	4.974	.5667	1.7645	.0135
5½	15.50	4.950	.5570	1.7953	.0133
5½	17.00	4.892	.5337	1.8736	.0127
5½	20.00	4.778	.4888	2.0460	.0116
5½	23.00	4.670	.4471	2.2365	.0106
*5¾	14.00	5.290	.6991	1.4305	.0166
*5¾	17.00	5.190	.6563	1.5237	.0156
*5¾	19.50	5.090	.6144	1.6277	.0146
*5¾	22.50	4.990	.5732	1.7445	.0136
*6	15.00	5.524	.8023	1.2464	.0191
*6	16.00	5.500	.7915	1.2634	.0188
*6	17.00	5.450	.7692	1.3001	.0183
*6	18.00	5.424	.7576	1.3199	.0180
*6	20.00	5.352	.7260	1.3774	.0173
*6	23.00	5.240	.6776	1.4758	.0161
*6	26.00	5.132	.6319	1.5826	.0150
*6½	17.00	6.135	1.0930	.9149	.0260
6½	20.00	6.049	1.0502	.9522	.0250
*6½	22.00	5.989	1.0207	.9797	.0243
6½	24.00	5.921	.9877	1.0125	.0235
*6½	26.00	5.855	.9560	1.0460	.0228
6½	28.00	5.791	.9256	1.0804	.0220
*6½	29.00	5.761	.9114	1.0972	.0217
6½	32.00	5.675	.8713	1.1477	.0207
7	17.00	6.538	1.3013	.7684	.0310
7	20.00	6.456	1.2579	.7950	.0299
*7	22.00	6.398	1.2274	.8147	.0292
7	23.00	6.366	1.2108	.8259	.0288
*7	24.00	6.336	1.1952	.8367	.0285
7	26.00	6.276	1.1644	.8588	.0277
*7	28.00	6.214	1.1328	.8828	.0270
7	29.00	6.184	1.1176	.8948	.0266
*7	30.00	6.154	1.1025	.9070	.0262
7	32.00	6.094	1.0725	.9324	.0255
*7	34.00	6.040	1.0458	.9562	.0249
7	35.00	6.004	1.0281	.9727	.0245
7	38.00	5.920	.9872	1.0130	.0235
*7	40.00	5.836	.9469	1.0561	.0225
*7½	20.00	7.125	1.6286	.6140	.0388
7½	24.00	7.025	1.5708	.6366	.0374
7½	26.40	6.969	1.5388	.6498	.0366
7½	29.70	6.875	1.4858	.6731	.0354
7½	33.70	6.765	1.4245	.7020	.0339
7½	39.00	6.625	1.3481	.7418	.0321
*8	26.00	7.386	1.7831	.5608	.0425
*8½	28.00	7.485	1.8431	.5426	.0439
*8½	32.00	7.385	1.7825	.5610	.0424
*8½	35.50	7.285	1.7226	.5805	.0410
*8½	39.50	7.185	1.6636	.6011	.0396

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.900"**
THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
70.55	.0796	12.565	13.00	*5½
72.14	.0778	12.848	14.00	5½
74.11	.0758	13.199	15.00	*5½
75.40	.0745	13.430	15.50	5½
78.69	.0713	14.016	17.00	5½
85.93	.0653	15.305	20.00	5½
93.93	.0598	16.730	23.00	5½
60.08	.0935	10.701	14.00	*5¾
63.99	.0877	11.398	17.00	*5¾
68.36	.0821	12.176	19.50	*5¾
73.27	.0766	13.050	22.50	*5¾
52.35	.1073	9.324	15.00	*6
53.06	.1058	9.451	16.00	*6
54.60	.1028	9.725	17.00	*6
55.43	.1013	9.873	18.00	*6
57.85	.0971	10.304	20.00	*6
61.98	.0906	11.040	23.00	*6
66.47	.0845	11.838	26.00	*6
38.43	.1461	6.844	17.00	*6½
39.99	.1404	7.123	20.00	6½
41.15	.1365	7.329	22.00	*6½
42.52	.1320	7.574	24.00	6½
43.93	.1278	7.825	26.00	*6½
45.38	.1237	8.082	28.00	6½
46.08	.1218	8.207	29.00	*6½
48.20	.1165	8.585	32.00	6½
32.27	.1740	5.748	17.00	7
33.39	.1682	5.947	20.00	7
34.22	.1641	6.094	22.00	*7
34.69	.1619	6.178	23.00	7
35.14	.1598	6.259	24.00	*7
36.07	.1557	6.425	26.00	7
37.08	.1514	6.604	28.00	*7
37.58	.1494	6.694	29.00	7
38.10	.1474	6.785	30.00	*7
39.16	.1434	6.975	32.00	7
40.16	.1398	7.153	34.00	*7
40.85	.1374	7.276	35.00	7
42.54	.1320	7.577	38.00	7
44.35	.1266	7.900	40.00	*7
25.79	.2177	4.593	20.00	*7½
26.74	.2100	4.762	24.00	7½
27.29	.2057	4.861	26.40	7½
28.27	.1986	5.035	29.70	7½
29.48	.1904	5.251	33.70	7½
31.16	.1802	5.549	39.00	7½
23.55	.2384	4.195	26.00	*8
22.79	.2464	4.059	28.00	*8½
23.56	.2383	4.197	32.00	*8½
24.38	.2303	4.343	35.50	*8½
25.25	.2224	4.497	39.50	*8½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.900"**
THREE STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8 ⁵ / ₈	24.00	8.097	2.2322	.4480	.0531
8 ⁵ / ₈	28.00	8.017	2.1796	.4588	.0519
8 ⁵ / ₈	32.00	7.921	2.1172	.4723	.0504
8 ⁵ / ₈	36.00	7.825	2.0555	.4865	.0489
8 ⁵ / ₈	38.00	7.775	2.0237	.4941	.0482
8 ⁵ / ₈	40.00	7.725	1.9921	.5020	.0474
8 ⁵ / ₈	43.00	7.651	1.9457	.5140	.0463
8 ⁵ / ₈	44.00	7.625	1.9295	.5183	.0459
8 ⁵ / ₈	49.00	7.511	1.8591	.5379	.0443
*9	34.00	8.290	2.3613	.4235	.0562
*9	38.00	8.196	2.2980	.4352	.0547
*9	40.00	8.150	2.2674	.4410	.0540
*9	45.00	8.032	2.1894	.4567	.0521
*9	55.00	7.812	2.0472	.4885	.0487
*9 ⁵ / ₈	29.30	9.063	2.9085	.3438	.0693
9 ⁵ / ₈	32.30	9.001	2.8628	.3493	.0682
9 ⁵ / ₈	36.00	8.921	2.8044	.3566	.0668
*9 ⁵ / ₈	38.00	8.877	2.7724	.3607	.0660
9 ⁵ / ₈	40.00	8.835	2.7420	.3647	.0653
9 ⁵ / ₈	43.50	8.755	2.6846	.3725	.0639
9 ⁵ / ₈	47.00	8.681	2.6320	.3799	.0627
9 ⁵ / ₈	53.50	8.535	2.5294	.3953	.0602
*10	33.00	9.384	3.1501	.3174	.0750
10 ³ / ₄	32.75	10.192	3.7955	.2635	.0904
*10 ³ / ₄	35.75	10.136	3.7490	.2667	.0893
10 ³ / ₄	40.50	10.050	3.6782	.2719	.0876
10 ³ / ₄	45.50	9.950	3.5966	.2780	.0856
10 ³ / ₄	51.00	9.850	3.5158	.2844	.0837
*10 ³ / ₄	54.00	9.784	3.4630	.2888	.0825
10 ³ / ₄	55.50	9.760	3.4438	.2904	.0820
*10 ³ / ₄	60.70	9.660	3.3646	.2972	.0801
*10 ³ / ₄	65.70	9.560	3.2862	.3043	.0782
*11 ³ / ₄	38.00	11.150	4.6297	.2160	.1102
11 ³ / ₄	42.00	11.084	4.5698	.2188	.1088
11 ³ / ₄	47.00	11.000	4.4941	.2225	.1070
11 ³ / ₄	54.00	10.880	4.3870	.2279	.1045
11 ³ / ₄	60.00	10.772	4.2916	.2330	.1022
*12	40.00	11.384	4.8448	.2064	.1154
*13	40.00	12.438	5.8692	.1704	.1397
*13	45.00	12.360	5.7903	.1727	.1379
*13	50.00	12.282	5.7119	.1751	.1360
*13	54.00	12.220	5.6499	.1770	.1345
13 ³ / ₈	48.00	12.715	6.1535	.1625	.1465
13 ³ / ₈	54.50	12.615	6.0501	.1653	.1441
13 ³ / ₈	61.00	12.515	5.9476	.1681	.1416
13 ³ / ₈	68.00	12.415	5.8459	.1711	.1392
13 ³ / ₈	72.00	12.347	5.7772	.1731	.1376
*13 ³ / ₈	83.00	12.175	5.6051	.1784	.1335

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.900"**
THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
18.82	.2984	3.351	24.00	8 $\frac{5}{8}$
19.27	.2914	3.432	28.00	8 $\frac{5}{8}$
19.84	.2830	3.533	32.00	8 $\frac{5}{8}$
20.43	.2748	3.639	36.00	8 $\frac{5}{8}$
20.75	.2705	3.697	38.00	8 $\frac{5}{8}$
21.08	.2663	3.755	40.00	8 $\frac{5}{8}$
21.59	.2601	3.845	43.00	8 $\frac{5}{8}$
21.77	.2579	3.877	44.00	8 $\frac{5}{8}$
22.59	.2485	4.024	49.00	8 $\frac{5}{8}$
17.79	.3157	3.168	34.00	*9
18.28	.3072	3.255	38.00	*9
18.52	.3031	3.299	40.00	*9
19.18	.2927	3.417	45.00	*9
20.52	.2737	3.654	55.00	*9
14.44	.3888	2.572	29.30	*9 $\frac{5}{8}$
14.67	.3827	2.613	32.30	9 $\frac{5}{8}$
14.98	.3749	2.668	36.00	9 $\frac{5}{8}$
15.15	.3706	2.698	38.00	*9 $\frac{5}{8}$
15.32	.3666	2.728	40.00	9 $\frac{5}{8}$
15.64	.3589	2.786	43.50	9 $\frac{5}{8}$
15.96	.3518	2.842	47.00	9 $\frac{5}{8}$
16.60	.3381	2.957	53.50	9 $\frac{5}{8}$
13.33	.4211	2.375	33.00	*10
11.07	.5074	1.971	32.75	10 $\frac{3}{4}$
11.20	.5012	1.995	35.75	*10 $\frac{3}{4}$
11.42	.4917	2.034	40.50	10 $\frac{3}{4}$
11.68	.4808	2.080	45.50	10 $\frac{3}{4}$
11.95	.4700	2.128	51.00	10 $\frac{3}{4}$
12.13	.4629	2.160	54.00	*10 $\frac{3}{4}$
12.20	.4604	2.172	55.50	10 $\frac{3}{4}$
12.48	.4498	2.223	60.70	*10 $\frac{3}{4}$
12.78	.4393	2.276	65.70	*10 $\frac{3}{4}$
9.07	.6189	1.616	38.00	*11 $\frac{3}{4}$
9.19	.6109	1.637	42.00	11 $\frac{3}{4}$
9.35	.6008	1.665	47.00	11 $\frac{3}{4}$
9.57	.5865	1.705	54.00	11 $\frac{3}{4}$
9.79	.5737	1.743	60.00	11 $\frac{3}{4}$
8.67	.6477	1.544	40.00	*12
7.16	.7846	1.275	40.00	*13
7.25	.7741	1.292	45.00	*13
7.35	.7636	1.310	50.00	*13
7.43	.7553	1.324	54.00	*13
6.83	.8226	1.216	48.00	13 $\frac{3}{8}$
6.94	.8088	1.236	54.50	13 $\frac{3}{8}$
7.06	.7951	1.258	61.00	13 $\frac{3}{8}$
7.18	.7815	1.280	68.00	13 $\frac{3}{8}$
7.27	.7723	1.295	72.00	13 $\frac{3}{8}$
7.49	.7493	1.335	83.00	*13 $\frac{3}{8}$

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.900"**
FOUR STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*6	15.00	5.524	.6558	1.5248	.0156
*6	16.00	5.500	.6450	1.5503	.0154
*6	17.00	5.450	.6227	1.6059	.0148
*6	18.00	5.424	.6112	1.6362	.0146
*6	20.00	5.352	.5795	1.7256	.0138
*6	23.00	5.240	.5311	1.8828	.0126
*6	26.00	5.132	.4854	2.0601	.0116
*6½	17.00	6.135	.9465	1.0565	.0225
6½	20.00	6.049	.9037	1.1065	.0215
*6½	22.00	5.989	.8743	1.1438	.0208
6½	24.00	5.921	.8412	1.1887	.0200
*6½	26.00	5.855	.8095	1.2353	.0193
6½	28.00	5.791	.7791	1.2835	.0186
*6½	29.00	5.761	.7650	1.3073	.0182
6½	32.00	5.675	.7248	1.3796	.0173
7	17.00	6.538	1.1549	.8659	.0275
7	20.00	6.456	1.1114	.8998	.0265
*7	22.00	6.398	1.0810	.9251	.0257
7	23.00	6.366	1.0643	.9396	.0253
*7	24.00	6.336	1.0488	.9535	.0250
7	26.00	6.276	1.0179	.9824	.0242
*7	28.00	6.214	.9863	1.0139	.0235
7	29.00	6.184	.9711	1.0297	.0231
*7	30.00	6.154	.9560	1.0460	.0228
7	32.00	6.094	.9260	1.0799	.0220
*7	34.00	6.040	.8993	1.1120	.0214
7	35.00	6.004	.8816	1.1343	.0210
7	38.00	5.920	.8407	1.1894	.0200
*7	40.00	5.836	.8004	1.2493	.0191
*7½	20.00	7.125	1.4821	.6747	.0353
7½	24.00	7.025	1.4244	.7021	.0339
7½	26.40	6.969	1.3924	.7182	.0332
7½	29.70	6.875	1.3393	.7467	.0319
7½	33.70	6.765	1.2781	.7824	.0304
7½	39.00	6.625	1.2016	.8322	.0286
*8	26.00	7.386	1.6366	.6110	.0390
*8½	28.00	7.485	1.6967	.5894	.0404
*8½	32.00	7.385	1.6360	.6112	.0390
*8½	35.50	7.285	1.5762	.6345	.0375
*8½	39.50	7.185	1.5171	.6591	.0361
8½	24.00	8.097	2.0857	.4794	.0497
8½	28.00	8.017	2.0332	.4918	.0484
8½	32.00	7.921	1.9707	.5074	.0469
8½	36.00	7.825	1.9091	.5238	.0455
*8½	38.00	7.775	1.8772	.5327	.0447
8½	40.00	7.725	1.8456	.5418	.0439
*8½	43.00	7.651	1.7992	.5558	.0428
8½	44.00	7.625	1.7830	.5609	.0425
8½	49.00	7.511	1.7126	.5839	.0408

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.900"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
64.04	.0877	11.406	15.00	*6
65.11	.0862	11.597	16.00	*6
67.45	.0832	12.013	17.00	*6
68.72	.0817	12.240	18.00	*6
72.47	.0775	12.908	20.00	*6
79.08	.0710	14.085	23.00	*6
86.52	.0649	15.411	26.00	*6
44.37	.1265	7.904	17.00	*6½
46.47	.1208	8.277	20.00	6½
48.04	.1169	8.556	22.00	*6½
49.93	.1125	8.892	24.00	6½
51.88	.1082	9.241	26.00	*6½
53.91	.1042	9.602	28.00	6½
54.90	.1023	9.779	29.00	*6½
57.94	.0969	10.320	32.00	6½
36.37	.1544	6.477	17.00	7
37.79	.1486	6.731	20.00	7
38.85	.1445	6.920	22.00	*7
39.46	.1423	7.029	23.00	7
40.05	.1402	7.133	24.00	*7
41.26	.1361	7.349	26.00	7
42.58	.1318	7.585	28.00	*7
43.25	.1298	7.703	29.00	7
43.93	.1278	7.825	30.00	*7
45.36	.1238	8.078	32.00	7
46.70	.1202	8.318	34.00	*7
47.64	.1179	8.485	35.00	7
49.96	.1124	8.898	38.00	7
52.47	.1070	9.345	40.00	*7
28.34	.1981	5.047	20.00	*7½
29.49	.1904	5.252	24.00	7½
30.16	.1861	5.373	26.40	7½
31.36	.1790	5.586	29.70	7½
32.86	.1709	5.853	33.70	7½
34.95	.1606	6.226	39.00	7½
25.66	.2188	4.571	26.00	*8
24.75	.2268	4.409	28.00	*8½
25.67	.2187	4.572	32.00	*8½
26.65	.2107	4.746	35.50	*8½
27.68	.2028	4.931	39.50	*8½
20.14	.2788	3.587	24.00	8½
20.66	.2718	3.679	28.00	8½
21.31	.2634	3.796	32.00	8½
22.00	.2552	3.918	36.00	8½
22.37	.2509	3.985	38.00	*8½
22.76	.2467	4.053	40.00	8½
23.34	.2405	4.158	43.00	*8½
23.56	.2383	4.196	44.00	8½
24.52	.2289	4.368	49.00	8½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 1.900"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*9	34.00	8.290	2.2148	.4515	.0527
*9	38.00	8.196	2.1516	.4648	.0512
*9	40.00	8.150	2.1209	.4715	.0505
*9	45.00	8.032	2.0430	.4895	.0486
*9	55.00	7.812	1.9008	.5261	.0453
*9½	29.30	9.063	2.7621	.3620	.0658
9½	32.30	9.001	2.7164	.3681	.0647
9½	36.00	8.921	2.6579	.3762	.0633
*9½	38.00	8.877	2.6259	.3808	.0625
9½	40.00	8.835	2.5956	.3853	.0618
9½	43.50	8.755	2.5382	.3940	.0604
9½	47.00	8.681	2.4855	.4023	.0592
9½	53.50	8.535	2.3830	.4196	.0567
*10	33.00	9.384	3.0037	.3329	.0715
10¾	32.75	10.192	3.6490	.2740	.0869
*10¾	35.75	10.136	3.6026	.2776	.0858
10¾	40.50	10.050	3.5317	.2831	.0841
10¾	45.50	9.950	3.4501	.2898	.0821
10¾	51.00	9.850	3.3694	.2968	.0802
*10¾	54.00	9.784	3.3165	.3015	.0790
10¾	55.50	9.760	3.2974	.3033	.0785
*10¾	60.70	9.660	3.2181	.3107	.0766
*10¾	65.70	9.560	3.1397	.3185	.0748
*11¾	38.00	11.150	4.4832	.2231	.1067
11¾	42.00	11.084	4.4233	.2261	.1053
11¾	47.00	11.000	4.3476	.2300	.1035
11¾	54.00	10.880	4.2405	.2358	.1010
11¾	60.00	10.772	4.1451	.2412	.0987
*12	40.00	11.384	4.6983	.2128	.1119
*13	40.00	12.438	5.7228	.1747	.1363
*13	45.00	12.360	5.6438	.1772	.1344
*13	50.00	12.282	5.5654	.1797	.1325
*13	54.00	12.220	5.5034	.1817	.1310
13¾	48.00	12.715	6.0070	.1665	.1430
13¾	54.50	12.615	5.9037	.1694	.1406
13¾	61.00	12.515	5.8011	.1724	.1381
13¾	68.00	12.415	5.6994	.1755	.1357
13¾	72.00	12.347	5.6307	.1776	.1341
*13¾	83.00	12.175	5.4586	.1832	.1300
*16	55.00	15.376	9.0568	.1104	.2156
16	65.00	15.250	8.8994	.1124	.2119
16	75.00	15.124	8.7432	.1144	.2082
16	84.00	15.010	8.6031	.1162	.2048
20	94.00	19.124	14.3325	.0698	.3412

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 1.900"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
18.96	.2961	3.378	34.00	*9
19.52	.2876	3.477	38.00	*9
19.80	.2835	3.527	40.00	*9
20.56	.2731	3.662	45.00	*9
22.10	.2541	3.936	55.00	*9
15.21	.3692	2.708	29.30	*9 1/8
15.46	.3631	2.754	32.30	9 5/8
15.80	.3553	2.815	36.00	9 5/8
15.99	.3510	2.849	38.00	*9 5/8
16.18	.3470	2.882	40.00	9 5/8
16.55	.3393	2.947	43.50	9 5/8
16.90	.3323	3.010	47.00	9 5/8
17.63	.3186	3.139	53.50	9 5/8
13.98	.4015	2.491	33.00	*10
11.51	.4878	2.050	32.75	10 3/4
11.66	.4816	2.076	35.75	*10 3/4
11.89	.4721	2.118	40.50	10 3/4
12.17	.4612	2.168	45.50	10 3/4
12.47	.4504	2.220	51.00	10 3/4
12.66	.4433	2.256	54.00	*10 3/4
12.74	.4408	2.269	55.50	10 3/4
13.05	.4302	2.325	60.70	*10 3/4
13.38	.4197	2.383	65.70	*10 3/4
9.37	.5993	1.669	38.00	*11 1/4
9.50	.5913	1.691	42.00	11 1/4
9.66	.5812	1.721	47.00	11 1/4
9.90	.5669	1.764	54.00	11 1/4
10.13	.5541	1.805	60.00	11 1/4
8.94	.6281	1.592	40.00	*12
7.34	.7650	1.307	40.00	*13
7.44	.7545	1.325	45.00	*13
7.55	.7440	1.344	50.00	*13
7.63	.7357	1.359	54.00	*13
6.99	.8030	1.245	48.00	13 3/8
7.11	.7892	1.267	54.50	13 3/8
7.24	.7755	1.290	61.00	13 3/8
7.37	.7619	1.313	68.00	13 3/8
7.46	.7527	1.329	72.00	13 3/8
7.69	.7297	1.370	83.00	*13 3/8
4.64	1.2107	.826	55.00	*16
4.72	1.1897	.841	65.00	16
4.80	1.1688	.856	75.00	16
4.88	1.1501	.870	84.00	16
2.93	1.9160	.522	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
*O.D. 2.063"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4 1/2	9.50	4.090	.5089	1.9652	.0121
4 1/2	10.50	4.052	.4962	2.0152	.0118
4 1/2	11.60	4.000	.4792	2.0870	.0114
4 1/2	13.50	3.920	.4533	2.2060	.0108
*4 1/2	15.10	3.826	.4236	2.3607	.0101
*4 3/4	16.00	4.082	.5062	1.9755	.0121
5	11.50	4.560	.6747	1.4821	.0161
5	13.00	4.494	.6504	1.5376	.0155
5	15.00	4.408	.6191	1.6152	.0147
5	18.00	4.276	.5724	1.7472	.0136
*5	21.00	4.154	.5304	1.8854	.0126
*5 1/2	13.00	5.044	.8644	1.1569	.0206
5 1/2	14.00	5.012	.8513	1.1747	.0203
*5 1/2	15.00	4.974	.8358	1.1965	.0199
5 1/2	15.50	4.950	.8261	1.2106	.0197
5 1/2	17.00	4.892	.8028	1.2457	.0191
5 1/2	20.00	4.778	.7578	1.3196	.0180
5 1/2	23.00	4.670	.7162	1.3963	.0171
*5 3/4	14.00	5.290	.9681	1.0329	.0231
*5 3/4	17.00	5.190	.9254	1.0807	.0220
*5 3/4	19.50	5.090	.8834	1.1320	.0210
*5 3/4	22.50	4.990	.8423	1.1873	.0201
*6	15.00	5.524	1.0714	.9334	.0255
*6	16.00	5.500	1.0606	.9429	.0253
*6	17.00	5.450	1.0382	.9632	.0247
*6	18.00	5.424	1.0267	.9740	.0244
*6	20.00	5.352	.9950	1.0050	.0237
*6	23.00	5.240	.9466	1.0564	.0225
*6	26.00	5.132	.9009	1.1100	.0215
*6 5/8	17.00	6.135	1.3620	.7342	.0324
6 5/8	20.00	6.049	1.3192	.7580	.0314
*6 5/8	22.00	5.989	1.2898	.7753	.0307
6 5/8	24.00	5.921	1.2567	.7957	.0299
*6 5/8	26.00	5.855	1.2250	.8163	.0292
6 5/8	28.00	5.791	1.1946	.8371	.0284
*6 5/8	29.00	5.761	1.1805	.8471	.0281
6 5/8	32.00	5.675	1.1403	.8769	.0272
7	17.00	6.538	1.5704	.6368	.0374
7	20.00	6.456	1.5269	.6549	.0364
*7	22.00	6.398	1.4965	.6682	.0356
7	23.00	6.366	1.4798	.6758	.0352
*7	24.00	6.336	1.4643	.6829	.0349
7	26.00	6.276	1.4334	.6976	.0341
*7	28.00	6.214	1.4018	.7134	.0334
7	29.00	6.184	1.3866	.7212	.0330
*7	30.00	6.154	1.3715	.7291	.0327
7	32.00	6.094	1.3415	.7454	.0319
*7	34.00	6.040	1.3148	.7606	.0313
7	35.00	6.004	1.2971	.7709	.0309
7	38.00	5.920	1.2562	.7960	.0299
*7	40.00	5.836	1.2160	.8224	.0290
*7 5/8	20.00	7.125	1.8976	.5270	.0452
7 5/8	24.00	7.025	1.8399	.5435	.0438
7 5/8	26.40	6.969	1.8079	.5531	.0430
7 5/8	29.70	6.875	1.7548	.5699	.0418
7 5/8	33.70	6.765	1.6936	.5905	.0403
7 5/8	39.00	6.625	1.6171	.6184	.0385

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
*O.D. 2.063"**
BETWEEN TUBING & CASING****ONE STRING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
82.54	.0680	14.700	9.50	4½
84.64	.0663	15.074	10.50	4½
87.65	.0641	15.612	11.60	4½
92.65	.0606	16.502	13.50	4½
99.15	.0566	17.659	15.10	*4½
82.97	.0677	14.778	16.00	*4¾
62.25	.0902	11.087	11.50	5
64.58	.0869	11.502	13.00	5
67.84	.0828	12.083	15.00	5
73.38	.0765	13.070	18.00	5
79.19	.0709	14.104	21.00	*5
48.59	.1156	8.654	13.00	*5½
49.34	.1138	8.788	14.00	5½
50.25	.1117	8.950	15.00	*5½
50.84	.1104	9.056	15.50	5½
52.32	.1073	9.318	17.00	5½
55.42	.1013	9.872	20.00	5½
58.65	.0957	10.445	23.00	5½
43.38	.1294	7.727	14.00	*5¾
45.39	.1237	8.084	17.00	*5¾
47.54	.1181	8.468	19.50	*5¾
49.86	.1126	8.881	22.50	*5¾
39.20	.1432	6.982	15.00	*6
39.60	.1418	7.053	16.00	*6
40.45	.1388	7.205	17.00	*6
40.91	.1372	7.286	18.00	*6
42.21	.1330	7.518	20.00	*6
44.37	.1265	7.902	23.00	*6
46.62	.1204	8.303	26.00	*6
30.84	.1821	5.492	17.00	*6½
31.84	.1764	5.670	20.00	6½
32.56	.1724	5.800	22.00	*6½
33.42	.1680	5.952	24.00	6½
34.29	.1638	6.106	26.00	*6½
35.16	.1597	6.262	28.00	6½
35.58	.1578	6.337	29.00	*6½
36.83	.1524	6.560	32.00	6½
26.75	.2099	4.764	17.00	7
27.51	.2041	4.899	20.00	7
28.07	.2001	4.999	22.00	*7
28.38	.1978	5.055	23.00	7
28.68	.1957	5.109	24.00	*7
29.30	.1916	5.219	26.00	7
29.96	.1874	5.336	28.00	*7
30.29	.1854	5.395	29.00	7
30.62	.1833	5.454	30.00	*7
31.31	.1793	5.576	32.00	7
31.94	.1758	5.689	34.00	*7
32.38	.1734	5.767	35.00	7
33.43	.1679	5.955	38.00	7
34.54	.1626	6.152	40.00	*7
22.13	.2537	3.942	20.00	*7½
22.83	.2460	4.066	24.00	7½
23.23	.2417	4.138	26.40	7½
23.93	.2346	4.263	29.70	7½
24.80	.2264	4.417	33.70	7½
25.97	.2162	4.626	39.00	7½

**Note: No allowance made for couplings.

**Inside Tubing
*O.D. 2.063"**

**TABLE
VOLUME & HEIGHT**

TWO STRINGS

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*5½	13.00	5.044	.6907	1.4477	.0164
5½	14.00	5.012	.6776	1.4758	.0161
*5½	15.00	4.974	.6621	1.5103	.0158
5½	15.50	4.950	.6524	1.5328	.0155
5½	17.00	4.892	.6291	1.5895	.0150
5½	20.00	4.778	.5841	1.7119	.0139
5½	23.00	4.670	.5425	1.8433	.0129
*5¾	14.00	5.290	.7945	1.2587	.0189
*5¾	17.00	5.190	.7517	1.3303	.0179
*5¾	19.50	5.090	.7098	1.4089	.0169
*5¾	22.50	4.990	.6686	1.4956	.0159
*6	15.00	5.524	.8977	1.1139	.0214
*6	16.00	5.500	.8869	1.1275	.0211
*6	17.00	5.450	.8646	1.1566	.0206
*6	18.00	5.424	.8530	1.1723	.0203
*6	20.00	5.352	.8214	1.2175	.0196
*6	23.00	5.240	.7730	1.2937	.0184
*6	26.00	5.132	.7273	1.3750	.0173
*6½	17.00	6.135	1.1884	.8415	.0283
6½	20.00	6.049	1.1456	.8729	.0273
*6½	22.00	5.989	1.1161	.8960	.0266
6½	24.00	5.921	1.0831	.9233	.0258
*6½	26.00	5.855	1.0514	.9511	.0250
6½	28.00	5.791	1.0210	.9795	.0243
*6½	29.00	5.761	1.0068	.9932	.0240
6½	32.00	5.675	.9667	1.0344	.0230
7	17.00	6.538	1.3967	.7160	.0333
7	20.00	6.456	1.3533	.7390	.0322
*7	22.00	6.398	1.3228	.7560	.0315
7	23.00	6.366	1.3062	.7656	.0311
*7	24.00	6.336	1.2906	.7748	.0307
7	26.00	6.276	1.2597	.7938	.0300
*7	28.00	6.214	1.2282	.8142	.0292
7	29.00	6.184	1.2130	.8244	.0289
*7	30.00	6.154	1.1979	.8348	.0285
7	32.00	6.094	1.1679	.8562	.0278
*7	34.00	6.040	1.1412	.8763	.0272
7	35.00	6.004	1.1235	.8901	.0267
7	38.00	5.920	1.0826	.9237	.0258
*7	40.00	5.836	1.0423	.9594	.0248
*7½	20.00	7.125	1.7239	.5801	.0410
7½	24.00	7.025	1.6662	.6002	.0397
7½	26.40	6.969	1.6342	.6119	.0389
7½	29.70	6.875	1.5811	.6325	.0376
7½	33.70	6.765	1.5199	.6579	.0362
7½	39.00	6.625	1.4434	.6928	.0344
*8	26.00	7.386	1.8785	.5323	.0447
*8½	28.00	7.485	1.9385	.5159	.0462
*8½	32.00	7.385	1.8779	.5325	.0447
*8½	35.50	7.285	1.8180	.5501	.0433
*8½	39.50	7.185	1.7590	.5685	.0419

*Not API Standard. Shown for information only.

NO. 221-B

Inside Tubing
*O.D. 2.063"**BETWEEN TUBING & CASING****

TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
60.80	.0923	10.830	13.00	*5 1/2
61.98	.0906	11.040	14.00	5 1/2
63.43	.0885	11.298	15.00	*5 1/2
64.38	.0872	11.466	15.50	5 1/2
66.76	.0841	11.890	17.00	5 1/2
71.90	.0781	12.806	20.00	5 1/2
77.42	.0725	13.789	23.00	5 1/2
52.87	.1062	9.416	14.00	*5 3/4
55.87	.1005	9.951	17.00	*5 3/4
59.17	.0949	10.540	19.50	*5 3/4
62.81	.0894	11.188	22.50	*5 3/4
46.79	.1200	8.333	15.00	*6
47.36	.1186	8.434	16.00	*6
48.58	.1156	8.652	17.00	*6
49.24	.1140	8.769	18.00	*6
51.13	.1098	9.107	20.00	*6
54.34	.1033	9.678	23.00	*6
57.75	.0972	10.286	26.00	*6
35.34	.1589	6.295	17.00	*6 5/8
36.66	.1531	6.530	20.00	6 5/8
37.63	.1492	6.702	22.00	*6 5/8
38.78	.1448	6.907	24.00	6 5/8
39.95	.1405	7.115	26.00	*6 5/8
41.14	.1365	7.327	28.00	6 5/8
41.72	.1346	7.430	29.00	*6 5/8
43.45	.1292	7.738	32.00	6 5/8
30.07	.1867	5.356	17.00	7
31.04	.1809	5.528	20.00	7
31.75	.1768	5.655	22.00	*7
32.16	.1746	5.727	23.00	7
32.54	.1725	5.796	24.00	*7
33.34	.1684	5.938	26.00	7
34.20	.1642	6.091	28.00	*7
34.63	.1622	6.167	29.00	7
35.06	.1601	6.245	30.00	*7
35.96	.1561	6.405	32.00	7
36.80	.1526	6.555	34.00	*7
37.38	.1502	6.658	35.00	7
38.80	.1447	6.910	38.00	7
40.29	.1393	7.177	40.00	*7
24.36	.2305	4.339	20.00	*7 5/8
25.21	.2227	4.490	24.00	7 5/8
25.70	.2185	4.577	26.40	7 5/8
26.56	.2114	4.731	29.70	7 5/8
27.63	.2032	4.922	33.70	7 5/8
29.10	.1930	5.182	39.00	7 5/8
22.36	.2511	3.982	26.00	*8
21.67	.2591	3.859	28.00	*8 1/8
22.37	.2510	3.984	32.00	*8 1/8
23.10	.2430	4.115	35.50	*8 1/8
23.88	.2351	4.253	39.50	*8 1/8

**Note: No allowance made for couplings.

**Inside Tubing
*O.D. 2.063"**
**TABLE
VOLUME & HEIGHT**
TWO STRINGS

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8 ⁵ / ₈	24.00	8.097	2.3276	.4296	.0554
8 ⁵ / ₈	28.00	8.017	2.2750	.4396	.0542
8 ⁵ / ₈	32.00	7.921	2.2126	.4520	.0527
8 ⁵ / ₈	36.00	7.825	2.1509	.4649	.0512
8 ⁵ / ₈	38.00	7.775	2.1191	.4719	.0505
8 ⁵ / ₈	40.00	7.725	2.0875	.4790	.0497
8 ⁵ / ₈	43.00	7.651	2.0411	.4899	.0486
8 ⁵ / ₈	44.00	7.625	2.0248	.4939	.0482
8 ⁵ / ₈	49.00	7.511	1.9544	.5117	.0465
*9	34.00	8.290	2.4567	.4071	.0585
*9	38.00	8.196	2.3934	.4178	.0570
*9	40.00	8.150	2.3627	.4232	.0563
*9	45.00	8.032	2.2848	.4377	.0544
*9	55.00	7.812	2.1426	.4667	.0510
*9 ⁵ / ₈	29.30	9.063	3.0039	.3329	.0715
9 ⁵ / ₈	32.30	9.001	2.9582	.3380	.0704
9 ⁵ / ₈	36.00	8.921	2.8997	.3449	.0690
*9 ⁵ / ₈	38.00	8.877	2.8678	.3487	.0683
9 ⁵ / ₈	40.00	8.835	2.8374	.3524	.0676
9 ⁵ / ₈	43.50	8.755	2.7800	.3597	.0662
9 ⁵ / ₈	47.00	8.681	2.7274	.3667	.0649
9 ⁵ / ₈	53.50	8.535	2.6248	.3810	.0625
*10	33.00	9.384	3.2455	.3081	.0773
10 ³ / ₄	32.75	10.192	3.8909	.2570	.0926
*10 ³ / ₄	35.75	10.136	3.8444	.2601	.0915
10 ³ / ₄	40.50	10.050	3.7736	.2650	.0898
10 ³ / ₄	45.50	9.950	3.6920	.2709	.0879
10 ³ / ₄	51.00	9.850	3.6112	.2769	.0860
*10 ³ / ₄	54.00	9.784	3.5584	.2810	.0847
10 ³ / ₄	55.50	9.760	3.5392	.2825	.0843
*10 ³ / ₄	60.70	9.660	3.4600	.2890	.0824
*10 ³ / ₄	65.70	9.560	3.3816	.2957	.0805
*11 ³ / ₄	38.00	11.150	4.7251	.2116	.1125
11 ³ / ₄	42.00	11.084	4.6652	.2144	.1111
11 ³ / ₄	47.00	11.000	4.5895	.2179	.1093
11 ³ / ₄	54.00	10.880	4.4824	.2231	.1067
11 ³ / ₄	60.00	10.772	4.3870	.2279	.1045
*12	40.00	11.384	4.9402	.2024	.1176
*13	40.00	12.438	5.9646	.1677	.1420
*13	45.00	12.360	5.8857	.1699	.1401
*13	50.00	12.282	5.8073	.1722	.1383
*13	54.00	12.220	5.7453	.1741	.1368
13 ³ / ₈	48.00	12.715	6.2489	.1600	.1488
13 ³ / ₈	54.50	12.615	6.1455	.1627	.1463
13 ³ / ₈	61.00	12.515	6.0430	.1655	.1439
13 ³ / ₈	68.00	12.415	5.9413	.1683	.1415
13 ³ / ₈	72.00	12.347	5.8726	.1703	.1398
*13 ³ / ₈	83.00	12.175	5.7005	.1754	.1357

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**
**Inside Tubing
*O.D. 2.063"**
TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
18.04	.3112	3.214	24.00	8 $\frac{5}{8}$
18.46	.3041	3.288	28.00	8 $\frac{5}{8}$
18.98	.2958	3.381	32.00	8 $\frac{5}{8}$
19.53	.2875	3.478	36.00	8 $\frac{5}{8}$
19.82	.2833	3.530	38.00	8 $\frac{5}{8}$
20.12	.2791	3.584	40.00	8 $\frac{5}{8}$
20.58	.2728	3.665	43.00	8 $\frac{5}{8}$
20.74	.2707	3.694	44.00	8 $\frac{5}{8}$
21.49	.2613	3.827	49.00	8 $\frac{5}{8}$
17.10	.3284	3.045	34.00	*9
17.55	.3200	3.125	38.00	*9
17.78	.3159	3.166	40.00	*9
18.38	.3054	3.274	45.00	*9
19.60	.2864	3.491	55.00	*9
13.98	.4016	2.490	29.30	*9 $\frac{5}{8}$
14.20	.3955	2.529	32.30	9 $\frac{5}{8}$
14.48	.3876	2.580	36.00	9 $\frac{5}{8}$
14.65	.3834	2.609	38.00	*9 $\frac{5}{8}$
14.80	.3793	2.636	40.00	9 $\frac{5}{8}$
15.11	.3716	2.691	43.50	9 $\frac{5}{8}$
15.40	.3646	2.743	47.00	9 $\frac{5}{8}$
16.00	.3509	2.850	53.50	9 $\frac{5}{8}$
12.94	.4339	2.305	33.00	*10
10.79	.5201	1.923	32.75	10 $\frac{3}{4}$
10.92	.5139	1.946	35.75	*10 $\frac{3}{4}$
11.13	.5045	1.982	40.50	10 $\frac{3}{4}$
11.38	.4935	2.026	45.50	10 $\frac{3}{4}$
11.63	.4828	2.072	51.00	10 $\frac{3}{4}$
11.80	.4757	2.102	54.00	*10 $\frac{3}{4}$
11.87	.4731	2.114	55.50	10 $\frac{3}{4}$
12.14	.4625	2.162	60.70	*10 $\frac{3}{4}$
12.42	.4520	2.212	65.70	*10 $\frac{3}{4}$
8.89	.6316	1.583	38.00	*11 $\frac{3}{4}$
9.00	.6236	1.604	42.00	11 $\frac{3}{4}$
9.15	.6135	1.630	47.00	11 $\frac{3}{4}$
9.37	.5992	1.669	54.00	11 $\frac{3}{4}$
9.57	.5865	1.705	60.00	11 $\frac{3}{4}$
8.50	.6604	1.514	40.00	*12
7.04	.7974	1.254	40.00	*13
7.14	.7868	1.271	45.00	*13
7.23	.7763	1.288	50.00	*13
7.31	.7680	1.302	54.00	*13
6.72	.8354	1.197	48.00	13 $\frac{3}{8}$
6.83	.8215	1.217	54.50	13 $\frac{3}{8}$
6.95	.8078	1.238	61.00	13 $\frac{3}{8}$
7.07	.7942	1.259	68.00	13 $\frac{3}{8}$
7.15	.7851	1.274	72.00	13 $\frac{3}{8}$
7.37	.7620	1.312	83.00	*13 $\frac{3}{8}$

**Note: No allowance made for couplings.

**Inside Tubing
*O.D. 2.063"**
THREE STRINGS
TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*5½	13.00	5.044	.5171	1.9339	.0123
5½	14.00	5.012	.5040	1.9842	.0120
*5½	15.00	4.974	.4885	2.0471	.0116
5½	15.50	4.950	.4788	2.0887	.0114
5½	17.00	4.892	.4555	2.1955	.0108
5½	20.00	4.778	.4105	2.4360	.0098
5½	23.00	4.670	.3689	2.7110	.0088
*5¾	14.00	5.290	.6208	1.6108	.0148
*5¾	17.00	5.190	.5781	1.7299	.0138
*5¾	19.50	5.090	.5361	1.8653	.0128
*5¾	22.50	4.990	.4950	2.0202	.0118
*6	15.00	5.524	.7241	1.3811	.0172
*6	16.00	5.500	.7133	1.4020	.0170
*6	17.00	5.450	.6909	1.4473	.0165
*6	18.00	5.424	.6794	1.4719	.0162
*6	20.00	5.352	.6477	1.5438	.0154
*6	23.00	5.240	.5993	1.6685	.0143
*6	26.00	5.132	.5536	1.8062	.0132
*6½	17.00	6.135	1.0147	.9855	.0242
6½	20.00	6.049	.9720	1.0289	.0231
*6½	22.00	5.989	.9425	1.0610	.0224
6½	24.00	5.921	.9094	1.0996	.0217
*6½	26.00	5.855	.8777	1.1393	.0209
6½	28.00	5.791	.8473	1.1802	.0202
*6½	29.00	5.761	.8332	1.2002	.0198
6½	32.00	5.675	.7931	1.2609	.0189
7	17.00	6.538	1.2231	.8176	.0291
7	20.00	6.456	1.1796	.8477	.0281
*7	22.00	6.398	1.1492	.8702	.0274
7	23.00	6.366	1.1325	.8830	.0270
*7	24.00	6.336	1.1170	.8953	.0266
7	26.00	6.276	1.0861	.9207	.0259
*7	28.00	6.214	1.0545	.9483	.0251
7	29.00	6.184	1.0393	.9622	.0247
*7	30.00	6.154	1.0242	.9763	.0244
7	32.00	6.094	.9942	1.0058	.0237
*7	34.00	6.040	.9675	1.0336	.0230
7	35.00	6.004	.9498	1.0528	.0226
7	38.00	5.920	.9090	1.1002	.0216
*7	40.00	5.836	.8687	1.1512	.0207
*7½	20.00	7.125	1.5503	.6450	.0369
7½	24.00	7.025	1.4926	.6700	.0355
7½	26.40	6.969	1.4606	.6847	.0348
7½	29.70	6.875	1.4075	.7105	.0335
7½	33.70	6.765	1.3463	.7428	.0321
7½	39.00	6.625	1.2698	.7875	.0302
*8	26.00	7.386	1.7048	.5866	.0406
*8½	28.00	7.485	1.7649	.5666	.0420
*8½	32.00	7.385	1.7042	.5868	.0406
*8½	35.50	7.285	1.6444	.6081	.0392
*8½	39.50	7.185	1.5853	.6308	.0377

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
*O.D. 2.063"**
THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
81.22	.0691	14.466	13.00	*5½
83.34	.0674	14.843	14.00	5½
85.98	.0653	15.314	15.00	*5½
87.72	.0640	15.624	15.50	5½
92.21	.0609	16.423	17.00	5½
102.31	.0549	18.223	20.00	5½
113.86	.0493	20.280	23.00	5½
67.65	.0830	12.049	14.00	*5¾
72.66	.0773	12.941	17.00	*5¾
78.34	.0717	13.953	19.50	*5¾
84.85	.0662	15.112	22.50	*5¾
58.01	.0968	10.331	15.00	*6
58.88	.0954	10.488	16.00	*6
60.79	.0924	10.827	17.00	*6
61.82	.0908	11.011	18.00	*6
64.84	.0866	11.549	20.00	*6
70.08	.0801	12.481	23.00	*6
75.86	.0740	13.512	26.00	*6
41.39	.1356	7.372	17.00	*6½
43.21	.1299	7.696	20.00	6½
44.56	.1260	7.937	22.00	*6½
46.18	.1216	8.225	24.00	6½
47.85	.1173	8.523	26.00	*6½
49.57	.1133	8.828	28.00	6½
50.41	.1114	8.978	29.00	*6½
52.96	.1060	9.433	32.00	6½
34.34	.1635	6.116	17.00	7
35.61	.1577	6.342	20.00	7
36.55	.1536	6.509	22.00	*7
37.09	.1514	6.605	23.00	7
37.60	.1493	6.697	24.00	*7
38.67	.1452	6.888	26.00	7
39.83	.1410	7.094	28.00	*7
40.41	.1389	7.197	29.00	7
41.01	.1369	7.304	30.00	*7
42.24	.1329	7.524	32.00	7
43.41	.1293	7.732	34.00	*7
44.22	.1270	7.876	35.00	7
46.21	.1215	8.230	38.00	7
48.35	.1161	8.612	40.00	*7
27.09	.2072	4.825	20.00	*7½
28.14	.1995	5.012	24.00	7½
28.76	.1953	5.122	26.40	7½
29.84	.1882	5.315	29.70	7½
31.20	.1800	5.556	33.70	7½
33.08	.1697	5.891	39.00	7½
24.64	.2279	4.388	26.00	*8
23.80	.2359	4.239	28.00	*8½
24.64	.2278	4.389	32.00	*8½
25.54	.2198	4.549	35.50	*8½
26.49	.2119	4.719	39.50	*8½

**Note: No allowance made for couplings.

**Inside Tubing
*O.D. 2.063"**

THREE STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8 ⁵ / ₈	24.00	8.097	2.1540	.4643	.0513
8 ⁵ / ₈	28.00	8.017	2.1014	.4759	.0500
8 ⁵ / ₈	32.00	7.921	2.0389	.4904	.0485
8 ⁵ / ₈	36.00	7.825	1.9773	.5057	.0471
8 ⁵ / ₈	38.00	7.775	1.9455	.5140	.0463
8 ⁵ / ₈	40.00	7.725	1.9138	.5225	.0456
8 ⁵ / ₈	43.00	7.651	1.8674	.5355	.0445
8 ⁵ / ₈	44.00	7.625	1.8512	.5402	.0441
8 ⁵ / ₈	49.00	7.511	1.7808	.5615	.0424
*9	34.00	8.290	2.2830	.4380	.0544
*9	38.00	8.196	2.2198	.4505	.0529
*9	40.00	8.150	2.1891	.4568	.0521
*9	45.00	8.032	2.1112	.4737	.0503
*9	55.00	7.812	1.9690	.5079	.0469
*9 ⁵ / ₈	29.30	9.063	2.8303	.3533	.0674
9 ⁵ / ₈	32.30	9.001	2.7846	.3591	.0663
9 ⁵ / ₈	36.00	8.921	2.7261	.3668	.0649
*9 ⁵ / ₈	38.00	8.877	2.6941	.3712	.0641
9 ⁵ / ₈	40.00	8.835	2.6638	.3754	.0634
9 ⁵ / ₈	43.50	8.755	2.6064	.3837	.0621
9 ⁵ / ₈	47.00	8.681	2.5537	.3916	.0608
9 ⁵ / ₈	53.50	8.535	2.4512	.4080	.0584
*10	33.00	9.384	3.0719	.3255	.0731
10 ³ / ₄	32.75	10.192	3.7172	.2690	.0885
*10 ³ / ₄	35.75	10.136	3.6708	.2724	.0874
10 ³ / ₄	40.50	10.050	3.6000	.2778	.0857
10 ³ / ₄	45.50	9.950	3.5184	.2842	.0838
10 ³ / ₄	51.00	9.850	3.4376	.2909	.0818
*10 ³ / ₄	54.00	9.784	3.3847	.2954	.0806
10 ³ / ₄	55.50	9.760	3.3656	.2971	.0801
*10 ³ / ₄	60.70	9.660	3.2863	.3043	.0782
*10 ³ / ₄	65.70	9.560	3.2079	.3117	.0764
*11 ³ / ₄	38.00	11.150	4.5514	.2197	.1084
11 ³ / ₄	42.00	11.084	4.4915	.2226	.1069
11 ³ / ₄	47.00	11.000	4.4159	.2265	.1051
11 ³ / ₄	54.00	10.880	4.3087	.2321	.1026
11 ³ / ₄	60.00	10.772	4.2133	.2373	.1003
*12	40.00	11.384	4.7666	.2098	.1135
*13	40.00	12.438	5.7910	.1727	.1379
*13	45.00	12.360	5.7121	.1751	.1360
*13	50.00	12.282	5.6336	.1775	.1341
*13	54.00	12.220	5.5717	.1795	.1327
13 ³ / ₈	48.00	12.715	6.0752	.1646	.1446
13 ³ / ₈	54.50	12.615	5.9719	.1675	.1422
13 ³ / ₈	61.00	12.515	5.8694	.1704	.1397
13 ³ / ₈	68.00	12.415	5.7677	.1734	.1373
13 ³ / ₈	72.00	12.347	5.6990	.1755	.1357
*13 ³ / ₈	83.00	12.175	5.5269	.1809	.1316

*Not API Standard. Shown for information only.

NO. 221-B

Inside Tubing
*O.D. 2.063"**BETWEEN TUBING & CASING****

THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
19.50	.2879	3.473	24.00	8 $\frac{5}{8}$
19.99	.2809	3.560	28.00	8 $\frac{5}{8}$
20.60	.2726	3.669	32.00	8 $\frac{5}{8}$
21.24	.2643	3.783	36.00	8 $\frac{5}{8}$
21.59	.2601	3.845	38.00	8 $\frac{5}{8}$
21.95	.2558	3.909	40.00	8 $\frac{5}{8}$
22.49	.2496	4.006	43.00	8 $\frac{5}{8}$
22.69	.2475	4.041	44.00	8 $\frac{5}{8}$
23.58	.2381	4.201	49.00	8 $\frac{5}{8}$
18.40	.3052	3.277	34.00	*9
18.92	.2967	3.370	38.00	*9
19.19	.2926	3.417	40.00	*9
19.89	.2822	3.543	45.00	*9
21.33	.2632	3.799	55.00	*9
14.84	.3784	2.643	29.30	*9 $\frac{5}{8}$
15.08	.3722	2.686	32.30	9 $\frac{5}{8}$
15.41	.3644	2.744	36.00	9 $\frac{5}{8}$
15.59	.3602	2.777	38.00	*9 $\frac{5}{8}$
15.77	.3561	2.808	40.00	9 $\frac{5}{8}$
16.11	.3484	2.870	43.50	9 $\frac{5}{8}$
16.45	.3414	2.929	47.00	9 $\frac{5}{8}$
17.13	.3277	3.052	53.50	9 $\frac{5}{8}$
13.67	.4107	2.435	33.00	*10
11.30	.4969	2.012	32.75	10 $\frac{3}{4}$
11.44	.4907	2.038	35.75	*10 $\frac{3}{4}$
11.67	.4812	2.078	40.50	10 $\frac{3}{4}$
11.94	.4703	2.126	45.50	10 $\frac{3}{4}$
12.22	.4595	2.176	51.00	10 $\frac{3}{4}$
12.41	.4525	2.210	54.00	*10 $\frac{3}{4}$
12.48	.4499	2.223	55.50	10 $\frac{3}{4}$
12.78	.4393	2.276	60.70	*10 $\frac{3}{4}$
13.09	.4288	2.332	65.70	*10 $\frac{3}{4}$
9.23	.6084	1.644	38.00	*11 $\frac{3}{4}$
9.35	.6004	1.666	42.00	11 $\frac{3}{4}$
9.51	.5903	1.694	47.00	11 $\frac{3}{4}$
9.75	.5760	1.736	54.00	11 $\frac{3}{4}$
9.97	.5632	1.775	60.00	11 $\frac{3}{4}$
8.81	.6372	1.569	40.00	*12
7.25	.7741	1.292	40.00	*13
7.35	.7636	1.310	45.00	*13
7.46	.7531	1.328	50.00	*13
7.54	.7448	1.343	54.00	*13
6.91	.8121	1.231	48.00	13 $\frac{5}{8}$
7.03	.7983	1.253	54.50	13 $\frac{5}{8}$
7.16	.7846	1.275	61.00	13 $\frac{5}{8}$
7.28	.7710	1.297	68.00	13 $\frac{5}{8}$
7.37	.7618	1.313	72.00	13 $\frac{5}{8}$
7.60	.7388	1.354	83.00	*13 $\frac{5}{8}$

**Note: No allowance made for couplings.

**Inside Tubing
*O.D. 2.063"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*6 ⁵ / ₈	17.00	6.135	.8411	1.1890	.0200
6 ⁵ / ₈	20.00	6.049	.7983	1.2526	.0190
*6 ⁵ / ₈	22.00	5.989	.7688	1.3007	.0183
6 ⁵ / ₈	24.00	5.921	.7358	1.3591	.0175
*6 ⁵ / ₈	26.00	5.855	.7041	1.4203	.0168
6 ⁵ / ₈	28.00	5.791	.6737	1.4844	.0160
*6 ⁵ / ₈	29.00	5.761	.6595	1.5162	.0157
6 ⁵ / ₈	32.00	5.675	.6194	1.6144	.0147
7	17.00	6.538	1.0494	.9529	.0250
7	20.00	6.456	1.0060	.9941	.0240
*7	22.00	6.398	.9755	1.0251	.0232
7	23.00	6.366	.9589	1.0429	.0228
*7	24.00	6.336	.9433	1.0601	.0225
7	26.00	6.276	.9125	1.0959	.0217
*7	28.00	6.214	.8809	1.1352	.0210
7	29.00	6.184	.8657	1.1551	.0206
*7	30.00	6.154	.8506	1.1757	.0203
7	32.00	6.094	.8206	1.2186	.0195
*7	34.00	6.040	.7939	1.2596	.0189
7	35.00	6.004	.7762	1.2884	.0185
7	38.00	5.920	.7353	1.3600	.0175
*7	40.00	5.836	.6950	1.4388	.0165
*7 ⁵ / ₈	20.00	7.125	1.3767	.7264	.0328
7 ⁵ / ₈	24.00	7.025	1.3189	.7582	.0314
7 ⁵ / ₈	26.40	6.969	1.2870	.7770	.0306
7 ⁵ / ₈	29.70	6.875	1.2339	.8105	.0294
7 ⁵ / ₈	33.70	6.765	1.1726	.8528	.0279
7 ⁵ / ₈	39.00	6.625	1.0962	.9123	.0261
*8	26.00	7.386	1.5312	.6531	.0365
*8 ¹ / ₈	28.00	7.485	1.5913	.6284	.0379
*8 ¹ / ₈	32.00	7.385	1.5306	.6533	.0364
*8 ¹ / ₈	35.50	7.285	1.4707	.6799	.0350
*8 ¹ / ₈	39.50	7.185	1.4117	.7084	.0336
8 ⁵ / ₈	24.00	8.097	1.9803	.5050	.0472
8 ⁵ / ₈	28.00	8.017	1.9277	.5187	.0459
8 ⁵ / ₈	32.00	7.921	1.8653	.5361	.0444
8 ⁵ / ₈	36.00	7.825	1.8036	.5544	.0429
*8 ⁵ / ₈	38.00	7.775	1.7718	.5644	.0422
8 ⁵ / ₈	40.00	7.725	1.7402	.5747	.0414
*8 ⁵ / ₈	43.00	7.651	1.6938	.5904	.0403
8 ⁵ / ₈	44.00	7.625	1.6776	.5961	.0399
8 ⁵ / ₈	49.00	7.511	1.6072	.6222	.0383

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
*O.D. 2.063"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
49.94	.1124	8.894	17.00	*6 5/8
52.61	.1067	9.370	20.00	6 5/8
54.63	.1028	9.730	22.00	*6 5/8
57.08	.0984	10.167	24.00	6 5/8
59.65	.0941	10.624	26.00	*6 5/8
62.34	.0901	11.104	28.00	6 5/8
63.68	.0882	11.342	29.00	*6 5/8
67.81	.0828	12.077	32.00	6 5/8
40.02	.1403	7.128	17.00	7
41.75	.1345	7.436	20.00	7
43.05	.1304	7.668	22.00	*7
43.80	.1282	7.801	23.00	7
44.52	.1261	7.930	24.00	*7
46.03	.1220	8.198	26.00	7
47.68	.1178	8.492	28.00	*7
48.52	.1157	8.641	29.00	7
49.38	.1137	8.795	30.00	*7
51.18	.1097	9.156	32.00	7
52.91	.1061	9.423	34.00	*7
54.11	.1038	9.638	35.00	7
57.12	.0983	10.173	38.00	7
60.43	.0929	10.763	40.00	*7
30.51	.1840	5.434	20.00	*7 5/8
31.84	.1763	5.672	24.00	7 5/8
32.64	.1720	5.813	26.40	7 5/8
34.04	.1649	6.063	29.70	7 5/8
35.82	.1568	6.379	33.70	7 5/8
38.32	.1465	6.824	39.00	7 5/8
27.43	.2047	4.885	26.00	*8
26.39	.2127	4.701	28.00	*8 1/8
27.44	.2046	4.887	32.00	*8 1/8
28.56	.1966	5.086	35.50	*8 1/8
29.75	.1887	5.299	39.50	*8 1/8
21.21	.2647	3.777	24.00	8 5/8
21.79	.2577	3.881	28.00	8 5/8
22.52	.2494	4.010	32.00	8 5/8
23.29	.2411	4.148	36.00	8 5/8
23.70	.2369	4.222	38.00	*8 5/8
24.14	.2326	4.299	40.00	8 5/8
24.80	.2264	4.417	43.00	*8 5/8
25.04	.2243	4.459	44.00	8 5/8
26.13	.2148	4.655	49.00	8 5/8

**Note: No allowance made for couplings.

**Inside Tubing
*O.D. 2.063"**
FOUR STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*9	34.00	8.290	2.1094	.4741	.0502
*9	38.00	8.196	2.0461	.4887	.0487
*9	40.00	8.150	2.0155	.4962	.0480
*9	45.00	8.032	1.9376	.5161	.0461
*9	55.00	7.812	1.7953	.5570	.0427
*9½	29.30	9.063	2.6566	.3764	.0633
9½	32.30	9.001	2.6110	.3830	.0622
9½	36.00	8.921	2.5525	.3918	.0608
*9½	38.00	8.877	2.5205	.3967	.0600
9½	40.00	8.835	2.4902	.4016	.0593
9½	43.50	8.755	2.4327	.4111	.0579
9½	47.00	8.681	2.3801	.4202	.0567
9½	53.50	8.535	2.2775	.4391	.0542
*10	33.00	9.384	2.8982	.3450	.0690
10¾	32.75	10.192	3.5436	.2822	.0844
*10¾	35.75	10.136	3.4971	.2859	.0833
10¾	40.50	10.050	3.4263	.2919	.0816
10¾	45.50	9.950	3.3447	.2990	.0796
10¾	51.00	9.850	3.2639	.3064	.0777
*10¾	54.00	9.784	3.2111	.3114	.0765
10¾	55.50	9.760	3.1919	.3133	.0760
*10¾	60.70	9.660	3.1127	.3213	.0741
*10¾	65.70	9.560	3.0343	.3296	.0722
*11¾	38.00	11.150	4.3778	.2284	.1042
11¾	42.00	11.084	4.3179	.2316	.1028
11¾	47.00	11.000	4.2422	.2357	.1010
11¾	54.00	10.880	4.1351	.2418	.0985
11¾	60.00	10.772	4.0397	.2475	.0962
*12	40.00	11.384	4.5929	.2177	.1094
*13	40.00	12.438	5.6173	.1780	.1337
*13	45.00	12.360	5.5384	.1806	.1319
*13	50.00	12.282	5.4600	.1832	.1300
*13	54.00	12.220	5.3980	.1853	.1285
13½	48.00	12.715	5.9016	.1694	.1405
13½	54.50	12.615	5.7983	.1725	.1381
13½	61.00	12.515	5.6957	.1756	.1356
13½	68.00	12.415	5.5940	.1788	.1332
13½	72.00	12.347	5.5253	.1810	.1316
*13½	83.00	12.175	5.3532	.1868	.1275
*16	55.00	15.376	8.9514	.1117	.2131
16	65.00	15.250	8.7940	.1137	.2094
16	75.00	15.124	8.6378	.1158	.2057
16	84.00	15.010	8.4977	.1177	.2023
20	94.00	19.124	14.2271	.0703	.3387

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
*O.D. 2.063"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
19.91	.2820	3.546	34.00	*9
20.53	.2735	3.656	38.00	*9
20.84	.2694	3.712	40.00	*9
21.68	.2590	3.861	45.00	*9
23.39	.2400	4.167	55.00	*9
15.81	.3551	2.816	29.30	*9 1/8
16.09	.3490	2.865	32.30	9 1/8
16.45	.3412	2.931	36.00	9 1/8
16.66	.3369	2.968	38.00	*9 1/8
16.87	.3329	3.004	40.00	9 1/8
17.26	.3252	3.075	43.50	9 1/8
17.65	.3182	3.143	47.00	9 1/8
18.44	.3045	3.285	53.50	9 1/8
14.49	.3874	2.581	33.00	*10
11.85	.4737	2.111	32.75	10 3/4
12.01	.4675	2.139	35.75	*10 3/4
12.26	.4580	2.183	40.50	10 3/4
12.56	.4471	2.237	45.50	10 3/4
12.87	.4363	2.292	51.00	10 3/4
13.08	.4293	2.330	54.00	*10 3/4
13.16	.4267	2.344	55.50	10 3/4
13.49	.4161	2.403	60.70	*10 3/4
13.84	.4056	2.465	65.70	*10 3/4
9.59	.5852	1.709	38.00	*11 1/4
9.73	.5772	1.732	42.00	11 1/4
9.90	.5671	1.763	47.00	11 1/4
10.16	.5528	1.809	54.00	11 1/4
10.40	.5400	1.852	60.00	11 1/4
9.14	.6140	1.629	40.00	*12
7.48	.7509	1.332	40.00	*13
7.58	.7404	1.351	45.00	*13
7.69	.7299	1.370	50.00	*13
7.78	.7216	1.386	54.00	*13
7.12	.7889	1.268	48.00	13 3/8
7.24	.7751	1.290	54.50	13 3/8
7.37	.7614	1.313	61.00	13 3/8
7.51	.7478	1.337	68.00	13 3/8
7.60	.7386	1.354	72.00	13 3/8
7.85	.7156	1.397	83.00	*13 3/8
4.69	1.1966	.836	55.00	*16
4.78	1.1756	.851	65.00	16
4.86	1.1547	.866	75.00	16
4.94	1.1360	.880	84.00	16
2.95	1.9019	.526	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.375"**
ONE STRING

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4½	9.50	4.090	.4524	2.2106	.0108
4½	10.50	4.052	.4397	2.2740	.0105
4½	11.60	4.000	.4227	2.3660	.0101
4½	13.50	3.920	.3968	2.5201	.0094
*4½	15.10	3.826	.3671	2.7240	.0087
*4¾	16.00	4.082	.4497	2.2237	.0107
5	11.50	4.560	.6182	1.6175	.0147
5	13.00	4.494	.5939	1.6839	.0141
5	15.00	4.408	.5626	1.7774	.0134
5	18.00	4.276	.5159	1.9385	.0123
*5	21.00	4.154	.4739	2.1102	.0113
*5	23.20	4.044	.4371	2.2878	.0104
*5½	13.00	5.044	.8079	1.2378	.0192
5½	14.00	5.012	.7948	1.2582	.0189
*5½	15.00	4.974	.7793	1.2832	.0186
5½	15.50	4.950	.7696	1.2994	.0183
5½	17.00	4.892	.7463	1.3400	.0178
5½	20.00	4.778	.7013	1.4259	.0167
5½	23.00	4.670	.6597	1.5159	.0157
*5¾	14.00	5.290	.9116	1.0970	.0217
*5¾	17.00	5.190	.8689	1.1509	.0207
*5¾	19.50	5.090	.8269	1.2093	.0197
*5¾	22.50	4.990	.7858	1.2726	.0187
*6	15.00	5.524	1.0149	.9854	.0242
*6	16.00	5.500	1.0041	.9960	.0239
*6	17.00	5.450	.9817	1.0186	.0234
*6	18.00	5.424	.9702	1.0307	.0231
*6	20.00	5.352	.9385	1.0655	.0223
*6	23.00	5.240	.8901	1.1234	.0212
*6	26.00	5.132	.8444	1.1842	.0201
*6½	17.00	6.135	1.3055	.7660	.0311
6½	20.00	6.049	1.2627	.7919	.0301
*6½	22.00	5.989	1.2333	.8108	.0294
6½	24.00	5.921	1.2002	.8332	.0286
*6½	26.00	5.855	1.1685	.8558	.0278
6½	28.00	5.791	1.1381	.8786	.0271
*6½	29.00	5.761	1.1240	.8897	.0268
6½	32.00	5.675	1.0838	.9226	.0258
7	17.00	6.538	1.5139	.6606	.0360
7	20.00	6.456	1.4704	.6801	.0350
*7	22.00	6.398	1.4400	.6945	.0343
7	23.00	6.366	1.4233	.7026	.0339
*7	24.00	6.336	1.4078	.7103	.0335
7	26.00	6.276	1.3769	.7263	.0328
*7	28.00	6.214	1.3453	.7433	.0320
7	29.00	6.184	1.3301	.7518	.0317
*7	30.00	6.154	1.3150	.7604	.0313
7	32.00	6.094	1.2850	.7782	.0306
*7	34.00	6.040	1.2583	.7947	.0300
7	35.00	6.004	1.2406	.8060	.0295
7	38.00	5.920	1.1998	.8335	.0286
*7	40.00	5.836	1.1595	.8625	.0276

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.375"**
ONE STRING

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
92.84	.0605	16.536	9.50	4½
95.51	.0588	17.011	10.50	4½
99.37	.0565	17.699	11.60	4½
105.84	.0530	18.852	13.50	4½
114.41	.0491	20.377	15.10	*4½
93.40	.0601	16.634	16.00	*4¾
67.93	.0826	12.100	11.50	5
70.72	.0794	12.596	13.00	5
74.65	.0752	13.296	15.00	5
81.42	.0690	14.501	18.00	5
88.63	.0634	15.785	21.00	*5
96.09	.0584	17.114	23.20	*5
51.99	.1080	9.259	13.00	*5½
52.85	.1062	9.412	14.00	5½
53.90	.1042	9.599	15.00	*5½
54.58	.1029	9.720	15.50	5½
56.28	.0998	10.024	17.00	5½
59.89	.0937	10.667	20.00	5½
63.67	.0882	11.340	23.00	5½
46.07	.1219	8.206	14.00	*5¾
48.34	.1161	8.610	17.00	*5¾
50.79	.1105	9.046	19.50	*5¾
53.45	.1050	9.520	22.50	*5¾
41.39	.1357	7.371	15.00	*6
41.83	.1342	7.450	16.00	*6
42.78	.1312	7.620	17.00	*6
43.29	.1297	7.710	18.00	*6
44.75	.1255	7.970	20.00	*6
47.18	.1190	8.404	23.00	*6
49.74	.1129	8.859	26.00	*6
32.17	.1745	5.730	17.00	*6½
33.26	.1688	5.924	20.00	6½
34.06	.1649	6.066	22.00	*6½
34.99	.1604	6.203	24.00	6½
35.94	.1562	6.402	26.00	*6½
36.90	.1521	6.573	28.00	6½
37.37	.1503	6.655	29.00	*6½
38.75	.1449	6.902	32.00	6½
27.74	.2024	4.941	17.00	7
28.56	.1966	5.087	20.00	7
29.17	.1925	5.195	22.00	*7
29.51	.1903	5.256	23.00	7
29.83	.1882	5.314	24.00	*7
30.50	.1841	5.433	26.00	7
31.22	.1798	5.560	28.00	*7
31.58	.1778	5.624	29.00	7
31.94	.1758	5.688	30.00	*7
32.68	.1718	5.821	32.00	7
33.38	.1682	5.945	34.00	*7
33.85	.1658	6.030	35.00	7
35.01	.1604	6.235	38.00	7
36.22	.1550	6.452	40.00	*7

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.375"**
ONE STRING

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*7 ⁵ / ₈	20.00	7.125	1.8411	.5432	.0438
7 ⁵ / ₈	24.00	7.025	1.7834	.5607	.0425
7 ⁵ / ₈	26.40	6.969	1.7514	.5710	.0417
7 ⁵ / ₈	29.70	6.875	1.6983	.5888	.0404
7 ⁵ / ₈	33.70	6.765	1.6371	.6108	.0390
7 ⁵ / ₈	39.00	6.625	1.5606	.6408	.0372
7 ³ / ₄	45.30	6.560	1.5256	.6555	.0363
*8	26.00	7.386	1.9956	.5011	.0475
*8 ¹ / ₈	28.00	7.485	2.0557	.4865	.0489
*8 ¹ / ₈	32.00	7.385	1.9950	.5012	.0475
*8 ¹ / ₈	35.50	7.285	1.9352	.5168	.0461
*8 ¹ / ₈	39.50	7.185	1.8761	.5330	.0447
8 ⁵ / ₈	24.00	8.097	2.4448	.4090	.0582
8 ⁵ / ₈	28.00	8.017	2.3922	.4180	.0570
8 ⁵ / ₈	32.00	7.921	2.3297	.4292	.0555
8 ⁵ / ₈	36.00	7.825	2.2681	.4409	.0540
*8 ⁵ / ₈	38.00	7.775	2.2362	.4472	.0532
8 ⁵ / ₈	40.00	7.725	2.2046	.4536	.0525
*8 ⁵ / ₈	43.00	7.651	2.1582	.4633	.0514
8 ⁵ / ₈	44.00	7.625	2.1420	.4669	.0510
8 ⁵ / ₈	49.00	7.511	2.0716	.4827	.0493
*9	34.00	8.290	2.5738	.3885	.0613
*9	38.00	8.196	2.5106	.3983	.0598
*9	40.00	8.150	2.4799	.4032	.0590
*9	45.00	8.032	2.4020	.4163	.0572
*9	55.00	7.812	2.2598	.4425	.0538
*9 ⁵ / ₈	29.30	9.063	3.1211	.3204	.0743
9 ⁵ / ₈	32.30	9.001	3.0754	.3252	.0732
9 ⁵ / ₈	36.00	8.921	3.0169	.3315	.0718
*9 ⁵ / ₈	38.00	8.877	2.9849	.3350	.0711
9 ⁵ / ₈	40.00	8.835	2.9546	.3385	.0703
9 ⁵ / ₈	43.50	8.755	2.8972	.3452	.0690
9 ⁵ / ₈	47.00	8.681	2.8445	.3516	.0677
9 ⁵ / ₈	53.50	8.535	2.7420	.3647	.0653
*10	33.00	9.384	3.3627	.2974	.0801
10 ³ / ₄	32.75	10.192	4.0080	.2495	.0954
*10 ³ / ₄	35.75	10.136	3.9616	.2524	.0943
10 ³ / ₄	40.50	10.050	3.8908	.2570	.0926
10 ³ / ₄	45.50	9.950	3.8092	.2625	.0907
*10 ³ / ₄	51.00	9.850	3.7284	.2682	.0888
10 ³ / ₄	54.00	9.784	3.6755	.2721	.0875
*10 ³ / ₄	55.50	9.760	3.6564	.2735	.0871
*10 ³ / ₄	60.70	9.660	3.5771	.2796	.0852
*10 ³ / ₄	65.70	9.560	3.4987	.2858	.0833

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
O.D. 2.375"**
ONE STRING

BETWEEN TUBING & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
22.81	.2461	4.063	20.00	*7 $\frac{7}{8}$
23.55	.2384	4.195	24.00	7 $\frac{7}{8}$
23.98	.2341	4.271	26.40	7 $\frac{7}{8}$
24.73	.2270	4.405	29.70	7 $\frac{7}{8}$
25.66	.2188	4.569	33.70	7 $\frac{7}{8}$
26.91	.2086	4.793	39.00	7 $\frac{7}{8}$
27.53	.2039	4.903	45.30	7 $\frac{3}{4}$
21.05	.2668	3.748	26.00	*8
20.43	.2748	3.639	28.00	*8 $\frac{1}{8}$
21.05	.2667	3.750	32.00	*8 $\frac{1}{8}$
21.70	.2587	3.866	35.50	*8 $\frac{1}{8}$
22.39	.2508	3.987	39.50	*8 $\frac{1}{8}$
17.18	.3268	3.060	24.00	8 $\frac{5}{8}$
17.56	.3198	3.127	28.00	8 $\frac{5}{8}$
18.03	.3114	3.211	32.00	8 $\frac{5}{8}$
18.52	.3032	3.298	36.00	8 $\frac{5}{8}$
18.78	.2989	3.345	38.00	*8 $\frac{5}{8}$
19.05	.2947	3.393	40.00	8 $\frac{5}{8}$
19.46	.2885	3.466	43.00	*8 $\frac{5}{8}$
19.61	.2863	3.492	44.00	8 $\frac{5}{8}$
20.27	.2769	3.611	49.00	8 $\frac{5}{8}$
16.32	.3441	2.906	34.00	*9
16.73	.3356	2.980	38.00	*9
16.94	.3315	3.016	40.00	*9
17.49	.3211	3.114	45.00	*9
18.59	.3021	3.310	55.00	*9
13.46	.4172	2.397	29.30	*9 $\frac{5}{8}$
13.66	.4111	2.432	32.30	9 $\frac{5}{8}$
13.92	.4033	2.480	36.00	9 $\frac{5}{8}$
14.07	.3990	2.506	38.00	*9 $\frac{5}{8}$
14.22	.3950	2.532	40.00	9 $\frac{5}{8}$
14.50	.3873	2.582	43.50	9 $\frac{5}{8}$
14.77	.3803	2.630	47.00	9 $\frac{5}{8}$
15.32	.3665	2.728	53.50	9 $\frac{5}{8}$
12.49	.4495	2.225	33.00	*10
10.48	.5358	1.866	32.75	10 $\frac{3}{4}$
10.60	.5296	1.888	35.75	*10 $\frac{3}{4}$
10.79	.5201	1.923	40.50	10 $\frac{3}{4}$
11.03	.5092	1.964	45.50	10 $\frac{3}{4}$
11.26	.4984	2.006	51.00	*10 $\frac{3}{4}$
11.43	.4913	2.035	54.00	10 $\frac{3}{4}$
11.49	.4888	2.046	55.50	*10 $\frac{3}{4}$
11.74	.4782	2.091	60.70	*10 $\frac{3}{4}$
12.00	.4677	2.138	65.70	*10 $\frac{3}{4}$

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.375"**
TWO STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*6	15.00	5.524	.7847	1.2743	.0187
*6	16.00	5.500	.7739	1.2921	.0184
*6	17.00	5.450	.7516	1.3305	.0179
*6	18.00	5.424	.7401	1.3513	.0176
*6	20.00	5.352	.7084	1.4116	.0169
*6	23.00	5.240	.6600	1.5152	.0157
*6	26.00	5.132	.6143	1.6279	.0146
*6½	17.00	6.135	1.0754	.9299	.0256
6½	20.00	6.049	1.0326	.9684	.0246
*6½	22.00	5.989	1.0031	.9969	.0239
6½	24.00	5.921	.9701	1.0308	.0231
*6½	26.00	5.855	.9384	1.0657	.0223
6½	28.00	5.791	.9080	1.1013	.0216
*6½	29.00	5.761	.8938	1.1188	.0213
6½	32.00	5.675	.8537	1.1714	.0203
7	17.00	6.538	1.2837	.7790	.0306
7	20.00	6.456	1.2403	.8063	.0295
*7	22.00	6.398	1.2098	.8266	.0288
7	23.00	6.366	1.1932	.8381	.0284
*7	24.00	6.336	1.1776	.8492	.0280
7	26.00	6.276	1.1468	.8720	.0273
*7	28.00	6.214	1.1152	.8967	.0266
7	29.00	6.184	1.1000	.9091	.0262
*7	30.00	6.154	1.0849	.9218	.0258
7	32.00	6.094	1.0549	.9480	.0251
*7	34.00	6.040	1.0282	.9726	.0245
7	35.00	6.004	1.0105	.9896	.0241
7	38.00	5.920	.9696	1.0313	.0231
*7	40.00	5.836	.9293	1.0760	.0221
*7½	20.00	7.125	1.6110	.6207	.0384
7½	24.00	7.025	1.5532	.6438	.0370
7½	26.40	6.969	1.5213	.6574	.0362
7½	29.70	6.875	1.4682	.6811	.0350
7½	33.70	6.765	1.4069	.7108	.0335
7½	39.00	6.625	1.3305	.7516	.0317
7¾	45.30	6.560	1.2955	.7719	.0308
*8	26.00	7.386	1.7655	.5664	.0420
*8½	28.00	7.485	1.8255	.5478	.0435
*8½	32.00	7.385	1.7649	.5666	.0420
*8½	35.50	7.285	1.7050	.5865	.0406
*8½	39.50	7.185	1.6460	.6075	.0392
8½	24.00	8.097	2.2146	.4515	.0527
8½	28.00	8.017	2.1620	.4625	.0515
8½	32.00	7.921	2.0996	.4763	.0500
8½	36.00	7.825	2.0379	.4907	.0485
*8½	38.00	7.775	2.0061	.4985	.0478
8½	40.00	7.725	1.9745	.5065	.0470
*8½	43.00	7.651	1.9281	.5187	.0459
8½	44.00	7.625	1.9119	.5231	.0455
8½	49.00	7.511	1.8415	.5430	.0438

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.375"**
TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
53.52	.1049	9.533	15.00	*6
54.27	.1035	9.666	16.00	*6
55.88	.1005	9.953	17.00	*6
56.75	.0989	10.108	18.00	*6
59.29	.0947	10.560	20.00	*6
63.64	.0882	11.334	23.00	*6
68.37	.0821	12.178	26.00	*6
39.06	.1438	6.956	17.00	*6 1/8
40.67	.1380	7.244	20.00	6 5/8
41.87	.1341	7.457	22.00	*6 5/8
43.29	.1297	7.711	24.00	6 5/8
44.76	.1254	7.972	26.00	*6 5/8
46.26	.1214	8.239	28.00	6 5/8
46.99	.1195	8.369	29.00	*6 5/8
49.20	.1141	8.762	32.00	6 5/8
32.72	.1716	5.827	17.00	7
33.86	.1658	6.031	20.00	7
34.72	.1617	6.183	22.00	*7
35.20	.1595	6.269	23.00	7
35.66	.1574	6.352	24.00	*7
36.62	.1533	6.523	26.00	7
37.66	.1491	6.708	28.00	*7
38.18	.1470	6.801	29.00	7
38.71	.1450	6.895	30.00	*7
39.81	.1410	7.091	32.00	7
40.85	.1374	7.276	34.00	*7
41.56	.1351	7.403	35.00	7
43.32	.1296	7.715	38.00	7
45.19	.1242	8.049	40.00	*7
26.07	.2154	4.644	20.00	*7 1/8
27.04	.2076	4.816	24.00	7 1/8
27.61	.2034	4.917	26.40	7 1/8
28.61	.1963	5.095	29.70	7 1/8
29.85	.1881	5.317	33.70	7 1/8
31.57	.1779	5.623	39.00	7 1/8
32.42	.1732	5.774	45.30	7 3/4
23.79	.2360	4.237	26.00	*8
23.01	.2440	4.098	28.00	*8 1/8
23.80	.2359	4.239	32.00	*8 1/8
24.63	.2279	4.387	35.50	*8 1/8
25.52	.2200	4.545	39.50	*8 1/8
18.96	.2961	3.378	24.00	8 1/8
19.43	.2890	3.460	28.00	8 5/8
20.00	.2807	3.563	32.00	8 5/8
20.61	.2724	3.671	36.00	8 5/8
20.94	.2682	3.729	38.00	*8 5/8
21.27	.2640	3.789	40.00	8 5/8
21.78	.2577	3.880	43.00	*8 5/8
21.97	.2556	3.913	44.00	8 5/8
22.81	.2462	4.062	49.00	8 5/8

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.375"**
TWO STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*9	34.00	8.290	2.3437	.4267	.0558
*9	38.00	8.196	2.2804	.4385	.0543
*9	40.00	8.150	2.2498	.4445	.0536
*9	45.00	8.032	2.1719	.4604	.0517
*9	55.00	7.812	2.0296	.4927	.0483
*9 ^{5/8}	29.30	9.063	2.8909	.3459	.0688
9 ^{5/8}	32.30	9.001	2.8453	.3515	.0677
9 ^{5/8}	36.00	8.921	2.7868	.3588	.0664
*9 ^{5/8}	38.00	8.877	2.7548	.3630	.0656
9 ^{5/8}	40.00	8.835	2.7245	.3670	.0649
9 ^{5/8}	43.50	8.755	2.6670	.3749	.0635
9 ^{5/8}	47.00	6.681	2.6144	.3825	.0622
9 ^{5/8}	53.50	6.535	2.5118	.3981	.0598
*10	33.00	9.384	3.1325	.3192	.0746
10 ^{3/4}	32.75	10.192	3.7779	.2647	.0899
*10 ^{3/4}	35.75	10.136	3.7314	.2680	.0888
10 ^{3/4}	40.50	10.050	3.6606	.2732	.0872
10 ^{3/4}	45.50	9.950	3.5790	.2794	.0852
10 ^{3/4}	51.00	9.850	3.4982	.2859	.0833
*10 ^{3/4}	54.00	9.784	3.4454	.2902	.0820
10 ^{3/4}	55.50	9.760	3.4262	.2919	.0816
*10 ^{3/4}	60.70	9.660	3.3470	.2988	.0797
*10 ^{3/4}	65.70	9.560	3.2686	.3059	.0778
*11 ^{3/4}	38.00	11.150	4.6121	.2168	.1098
11 ^{3/4}	42.00	11.084	4.5522	.2197	.1084
11 ^{3/4}	47.00	11.000	4.4765	.2234	.1066
11 ^{3/4}	54.00	10.880	4.3694	.2289	.1040
11 ^{3/4}	60.00	10.772	4.2740	.2340	.1018
*12	40.00	11.384	4.8272	.2072	.1149
*13	40.00	12.438	5.8516	.1709	.1393
*13	45.00	12.360	5.7727	.1732	.1374
*13	50.00	12.282	5.6943	.1756	.1356
*13	54.00	12.220	5.6323	.1775	.1341
13 ^{3/8}	48.00	12.715	6.1359	.1630	.1461
13 ^{3/8}	54.50	12.615	6.0326	.1658	.1436
13 ^{3/8}	61.00	12.515	5.9300	.1686	.1412
13 ^{3/8}	68.00	12.415	5.8283	.1716	.1388
13 ^{3/8}	72.00	12.347	5.7596	.1736	.1371
*13 ^{3/8}	83.00	12.175	5.5875	.1790	.1330
*16	55.00	15.376	9.1857	.1089	.2187
16	65.00	15.250	9.0283	.1108	.2150
16	75.00	15.124	8.8721	.1127	.2112
16	84.00	15.010	8.7319	.1145	.2079
20	94.00	19.124	14.4614	.0691	.3443

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.375"**
TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
17.92	.3133	3.192	34.00	*9
18.42	.3048	3.280	38.00	*9
18.67	.3007	3.325	40.00	*9
19.34	.2903	3.444	45.00	*9
20.69	.2713	3.686	55.00	*9
14.53	.3865	2.588	29.30	*9 5/8
14.76	.3804	2.629	32.30	9 5/8
15.07	.3725	2.684	36.00	9 5/8
15.25	.3683	2.715	38.00	*9 5/8
15.42	.3642	2.746	40.00	9 5/8
15.75	.3565	2.805	43.50	9 5/8
16.06	.3495	2.861	47.00	9 5/8
16.72	.3358	2.978	53.50	9 5/8
13.41	.4188	2.388	33.00	*10
11.12	.5050	1.980	32.75	10 3/4
11.26	.4988	2.005	35.75	*10 3/4
11.47	.4894	2.044	40.50	10 3/4
11.74	.4784	2.090	45.50	10 3/4
12.01	.4676	2.138	51.00	10 3/4
12.19	.4606	2.171	54.00	*10 3/4
12.26	.4580	2.183	55.50	10 3/4
12.55	.4474	2.235	60.70	*10 3/4
12.85	.4369	2.289	65.70	*10 3/4
9.11	.6165	1.622	38.00	*11 3/4
9.23	.6085	1.643	42.00	11 3/4
9.38	.5984	1.671	47.00	11 3/4
9.61	.5841	1.712	54.00	11 3/4
9.83	.5713	1.750	60.00	11 3/4
8.70	.6453	1.550	40.00	*12
7.18	.7822	1.278	40.00	*13
7.28	.7717	1.296	45.00	*13
7.38	.7612	1.314	50.00	*13
7.46	.7529	1.328	54.00	*13
6.85	.8203	1.219	48.00	13 3/8
6.96	.8064	1.240	54.50	13 3/8
7.08	.7927	1.262	61.00	13 3/8
7.21	.7791	1.284	68.00	13 3/8
7.29	.7699	1.299	72.00	13 3/8
7.52	.7469	1.339	83.00	*13 3/8
4.57	1.2279	.814	55.00	*16
4.65	1.2069	.829	65.00	16
4.73	1.1860	.843	75.00	16
4.81	1.1673	.857	84.00	16
2.90	1.9332	.517	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.375"**
THREE STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*6 ⁵ / ₈	17.00	6.135	.8452	1.1831	.0201
6 ⁵ / ₈	20.00	6.049	.8025	1.2461	.0191
*6 ⁵ / ₈	22.00	5.989	.7730	1.2937	.0184
6 ⁵ / ₈	24.00	5.921	.7400	1.3514	.0176
*6 ⁵ / ₈	26.00	5.855	.7083	1.4119	.0169
6 ⁵ / ₈	28.00	5.791	.6778	1.4753	.0161
*6 ⁵ / ₈	29.00	5.761	.6637	1.5067	.0158
6 ⁵ / ₈	32.00	5.675	.6236	1.6037	.0148
7	17.00	6.538	1.0536	.9491	.0251
7	20.00	6.456	1.0101	.9900	.0241
*7	22.00	6.398	.9797	1.0207	.0233
7	23.00	6.366	.9630	1.0384	.0229
*7	24.00	6.336	.9475	1.0554	.0226
7	26.00	6.276	.9166	1.0910	.0218
*7	28.00	6.214	.8850	1.1299	.0211
7	29.00	6.184	.8699	1.1496	.0207
*7	30.00	6.154	.8548	1.1699	.0204
7	32.00	6.094	.8248	1.2125	.0196
*7	34.00	6.040	.7980	1.2531	.0190
7	35.00	6.004	.7803	1.2815	.0186
7	38.00	5.920	.7395	1.3523	.0176
*7	40.00	5.836	.6992	1.4302	.0166
*7 ⁵ / ₈	20.00	7.125	1.3808	.7242	.0329
7 ⁵ / ₈	24.00	7.025	1.3231	.7558	.0315
7 ⁵ / ₈	26.40	6.969	1.2911	.7745	.0307
7 ⁵ / ₈	29.70	6.875	1.2380	.8077	.0295
7 ⁵ / ₈	33.70	6.765	1.1768	.8498	.0280
7 ⁵ / ₈	39.00	6.625	1.1003	.9088	.0262
*8	26.00	7.386	1.5353	.6513	.0366
*8 ¹ / ₈	28.00	7.485	1.5954	.6268	.0380
*8 ¹ / ₈	32.00	7.385	1.5347	.6516	.0365
*8 ¹ / ₈	35.50	7.285	1.4749	.6780	.0351
*8 ¹ / ₈	39.50	7.185	1.4159	.7063	.0337
8 ⁵ / ₈	24.00	8.097	1.9845	.5039	.0472
8 ⁵ / ₈	28.00	8.017	1.9319	.5176	.0460
8 ⁵ / ₈	32.00	7.921	1.8695	.5349	.0445
8 ⁵ / ₈	36.00	7.825	1.8078	.5532	.0430
*8 ⁵ / ₈	38.00	7.775	1.7760	.5631	.0423
8 ⁵ / ₈	40.00	7.725	1.7443	.5733	.0415
*8 ⁵ / ₈	43.00	7.651	1.6979	.5890	.0404
8 ⁵ / ₈	44.00	7.625	1.6817	.5946	.0400
8 ⁵ / ₈	49.00	7.511	1.6113	.6206	.0384
*9	34.00	8.290	2.1135	.4731	.0503
*9	38.00	8.196	2.0503	.4877	.0488
*9	40.00	8.150	2.0196	.4951	.0481
*9	45.00	8.032	1.9417	.5150	.0462
*9	55.00	7.812	1.7995	.5557	.0428

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.375"**
THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
49.69	.1130	8.850	17.00	*6 5/8
52.34	.1073	9.322	20.00	6 5/8
54.33	.1033	9.677	22.00	*6 5/8
56.76	.0989	10.109	24.00	6 5/8
59.30	.0947	10.562	26.00	*6 5/8
61.96	.0906	11.036	28.00	6 5/8
63.28	.0887	11.271	29.00	*6 5/8
67.35	.0834	11.996	32.00	6 5/8
39.86	.1408	7.100	17.00	7
41.58	.1350	7.406	20.00	7
42.87	.1310	7.636	22.00	*7
43.61	.1287	7.768	23.00	7
44.33	.1267	7.895	24.00	*7
45.82	.1225	8.161	26.00	7
47.46	.1183	8.452	28.00	*7
48.28	.1163	8.600	29.00	7
49.14	.1143	8.752	30.00	*7
50.92	.1103	9.070	32.00	7
52.63	.1067	9.374	34.00	*7
53.82	.1043	9.586	35.00	7
56.80	.0989	10.116	38.00	7
60.07	.0935	10.699	40.00	*7
30.42	.1846	5.417	20.00	*7 5/8
31.74	.1769	5.654	24.00	7 5/8
32.53	.1726	5.794	26.40	7 5/8
33.93	.1655	6.042	29.70	7 5/8
35.69	.1573	6.357	33.70	7 5/8
38.17	.1471	6.799	39.00	7 5/8
27.36	.2052	4.872	26.00	*8
26.33	.2133	4.689	28.00	*8 1/8
27.37	.2052	4.874	32.00	*8 1/8
28.48	.1972	5.072	35.50	*8 1/8
29.66	.1893	5.283	39.50	*8 1/8
21.16	.2653	3.770	24.00	8 5/8
21.74	.2583	3.872	28.00	8 5/8
22.47	.2499	4.001	32.00	8 5/8
23.23	.2417	4.138	36.00	8 5/8
23.65	.2374	4.212	38.00	*8 5/8
24.08	.2332	4.288	40.00	8 5/8
24.74	.2270	4.406	43.00	*8 5/8
24.97	.2248	4.448	44.00	8 5/8
26.07	.2154	4.643	49.00	8 5/8
19.87	.2825	3.539	34.00	*9
20.48	.2741	3.649	38.00	*9
20.80	.2700	3.704	40.00	*9
21.63	.2596	3.853	45.00	*9
23.34	.2406	4.157	55.00	*9

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.375"**
THREE STRINGS
TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*9 ⁵ / ₈	29.30	9.063	2.6608	.3758	.0634
9 ⁵ / ₈	32.30	9.001	2.6151	.3824	.0623
9 ⁵ / ₈	36.00	8.921	2.5566	.3911	.0609
*9 ⁵ / ₈	38.00	8.877	2.5247	.3961	.0601
9 ⁵ / ₈	40.00	8.835	2.4943	.4009	.0594
9 ⁵ / ₈	43.50	8.755	2.4369	.4104	.0580
9 ⁵ / ₈	47.00	8.681	2.3843	.4194	.0568
9 ⁵ / ₈	53.50	8.535	2.2817	.4383	.0543
*10	33.00	9.384	2.9024	.3445	.0691
10 ³ / ₄	32.75	10.192	3.5478	.2819	.0845
*10 ³ / ₄	35.75	10.136	3.5013	.2856	.0834
10 ³ / ₄	40.50	10.050	3.4305	.2915	.0817
10 ³ / ₄	45.50	9.950	3.3489	.2986	.0797
10 ³ / ₄	51.00	9.850	3.2681	.3060	.0778
*10 ³ / ₄	54.00	9.784	3.2152	.3110	.0766
10 ³ / ₄	55.50	9.760	3.1961	.3129	.0761
*10 ³ / ₄	60.70	9.660	3.1169	.3208	.0742
*10 ³ / ₄	65.70	9.560	3.0384	.3291	.0723
*11 ³ / ₄	38.00	11.150	4.3819	.2282	.1043
11 ³ / ₄	42.00	11.084	4.3221	.2314	.1029
11 ³ / ₄	47.00	11.000	4.2464	.2355	.1011
11 ³ / ₄	54.00	10.880	4.1393	.2416	.0986
11 ³ / ₄	60.00	10.772	4.0438	.2473	.0963
*12	40.00	11.384	4.5971	.2175	.1095
*13	40.00	12.438	5.6215	.1779	.1338
*13	45.00	12.360	5.5426	.1804	.1320
*13	50.00	12.282	5.4642	.1830	.1301
*13	54.00	12.220	5.4022	.1851	.1286
13 ³ / ₈	48.00	12.715	5.9058	.1693	.1406
13 ³ / ₈	54.50	12.615	5.8024	.1723	.1382
13 ³ / ₈	61.00	12.515	5.6999	.1754	.1357
13 ³ / ₈	68.00	12.415	5.5982	.1786	.1333
13 ³ / ₈	72.00	12.347	5.5295	.1808	.1317
*13 ³ / ₈	83.00	12.175	5.3574	.1867	.1276
*16	55.00	15.376	8.9556	.1117	.2132
16	65.00	15.250	8.7981	.1137	.2095
16	75.00	15.124	8.6420	.1157	.2058
16	84.00	15.010	8.5018	.1176	.2024
20	94.00	19.124	14.2312	.0703	.3388

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.375"**
THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
15.78	.3557	2.811	29.30	*9 $\frac{1}{8}$
16.06	.3496	2.861	32.30	9 $\frac{1}{8}$
16.43	.3418	2.926	36.00	9 $\frac{1}{8}$
16.64	.3375	2.963	38.00	*9 $\frac{1}{8}$
16.84	.3334	2.999	40.00	9 $\frac{1}{8}$
17.24	.3258	3.070	43.50	9 $\frac{1}{8}$
17.62	.3187	3.138	47.00	9 $\frac{1}{8}$
18.41	.3050	3.279	53.50	9 $\frac{1}{8}$
14.47	.3880	2.577	33.00	*10
11.84	.4743	2.109	32.75	10 $\frac{3}{4}$
12.00	.4681	2.137	35.75	*10 $\frac{3}{4}$
12.24	.4586	2.181	40.50	10 $\frac{3}{4}$
12.54	.4477	2.234	45.50	10 $\frac{3}{4}$
12.85	.4369	2.289	51.00	10 $\frac{3}{4}$
13.06	.4298	2.327	54.00	*10 $\frac{3}{4}$
13.14	.4273	2.341	55.50	10 $\frac{3}{4}$
13.48	.4167	2.400	60.70	*10 $\frac{3}{4}$
13.82	.4062	2.462	65.70	*10 $\frac{3}{4}$
9.58	.5858	1.707	38.00	*11 $\frac{1}{4}$
9.72	.5778	1.731	42.00	11 $\frac{1}{4}$
9.89	.5677	1.762	47.00	11 $\frac{1}{4}$
10.15	.5533	1.807	54.00	11 $\frac{1}{4}$
10.39	.5406	1.850	60.00	11 $\frac{1}{4}$
9.14	.6145	1.627	40.00	*12
7.47	.7515	1.331	40.00	*13
7.58	.7409	1.350	45.00	*13
7.69	.7305	1.369	50.00	*13
7.77	.7222	1.385	54.00	*13
7.11	.7895	1.267	48.00	13 $\frac{3}{8}$
7.24	.7757	1.289	54.50	13 $\frac{3}{8}$
7.37	.7620	1.312	61.00	13 $\frac{3}{8}$
7.50	.7484	1.336	68.00	13 $\frac{3}{8}$
7.60	.7392	1.353	72.00	13 $\frac{3}{8}$
7.84	.7162	1.396	83.00	*13 $\frac{3}{8}$
4.69	1.1972	.835	55.00	*16
4.77	1.1761	.850	65.00	16
4.86	1.1553	.866	75.00	16
4.94	1.1365	.880	84.00	16
2.95	1.9024	.526	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.735"**
FOUR STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	17.00	6.538	.8235	1.2144	.0196
7	20.00	6.456	.7800	1.2821	.0186
*7	22.00	6.398	.7496	1.3341	.0178
7	23.00	6.366	.7329	1.3644	.0175
*7	24.00	6.336	.7174	1.3940	.0171
7	26.00	6.276	.6865	1.4567	.0163
*7	28.00	6.214	.6549	1.5270	.0156
7	29.00	6.184	.6397	1.5632	.0152
*7	30.00	6.154	.6246	1.6010	.0149
7	32.00	6.094	.5946	1.6817	.0142
*7	34.00	6.040	.5679	1.7609	.0135
7	35.00	6.004	.5502	1.8175	.0131
7	38.00	5.920	.5093	1.9633	.0121
*7	40.00	5.836	.4691	2.1320	.0112
*7½	20.00	7.125	1.1507	.8690	.0274
7½	24.00	7.025	1.0930	.9150	.0260
7½	26.40	6.969	1.0610	.9425	.0253
7½	29.70	6.875	1.0079	.9922	.0240
7½	33.70	6.765	.9467	1.0563	.0225
7½	39.00	6.625	.8702	1.1492	.0207
*8	26.00	7.386	1.3052	.7662	.0311
*8½	28.00	7.485	1.3653	.7325	.0325
*8½	32.00	7.385	1.3046	.7665	.0311
*8½	35.50	7.285	1.2448	.8034	.0296
*8½	39.50	7.185	1.1857	.8434	.0282
8½	24.00	8.097	1.7544	.5700	.0418
8½	28.00	8.017	1.7018	.5876	.0405
8½	32.00	7.921	1.6393	.6100	.0390
8½	36.00	7.825	1.5777	.6339	.0376
*8½	38.00	7.775	1.5458	.6469	.0368
8½	40.00	7.725	1.5142	.6604	.0361
*8½	43.00	7.651	1.4678	.6813	.0349
8½	44.00	7.625	1.4516	.6889	.0346
8½	49.00	7.511	1.3812	.7240	.0329
*9	34.00	8.290	1.8834	.5310	.0448
*9	38.00	8.196	1.8202	.5494	.0433
*9	40.00	8.150	1.7895	.5588	.0426
*9	45.00	8.032	1.7116	.5843	.0408
*9	55.00	7.812	1.5694	.6372	.0374
*9½	29.30	9.063	2.4307	.4114	.0579
9½	32.30	9.001	2.3850	.4193	.0568
9½	36.00	8.921	2.3265	.4298	.0554
*9½	38.00	8.877	2.2945	.4358	.0546
9½	40.00	8.835	2.2642	.4417	.0539
9½	43.50	8.755	2.2068	.4532	.0525
9½	47.00	8.681	2.1541	.4642	.0513
9½	53.50	8.535	2.0516	.4874	.0488

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
O.D. 2.375"**
FOUR STRINGS

BETWEEN TUBING & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
51.00	.1101	9.084	17.00	7
53.85	.1043	9.591	20.00	7
56.03	.1002	9.980	22.00	*7
57.31	.0980	10.207	23.00	7
58.55	.0959	10.428	24.00	*7
61.18	.0918	10.897	26.00	7
64.13	.0875	11.423	28.00	*7
65.65	.0855	11.694	29.00	7
67.24	.0835	11.976	30.00	*7
70.63	.0795	12.580	32.00	7
73.96	.0759	13.172	34.00	*7
76.33	.0736	13.596	35.00	7
82.46	.0681	14.687	38.00	7
89.54	.0627	15.948	40.00	*7
36.50	.1538	6.501	20.00	*7½
38.43	.1461	6.844	24.00	7½
39.59	.1418	7.051	26.40	7½
41.67	.1347	7.422	29.70	7½
44.37	.1266	7.902	33.70	7½
48.27	.1163	8.597	39.00	7½
32.18	.1745	5.731	26.00	*8
30.76	.1825	5.479	28.00	*8½
32.19	.1744	5.734	32.00	*8½
33.74	.1664	6.010	35.50	*8½
35.42	.1585	6.309	39.50	*8½
23.94	.2345	4.264	24.00	8½
24.68	.2275	4.396	28.00	8½
25.62	.2191	4.563	32.00	8½
26.62	.2109	4.742	36.00	8½
27.17	.2066	4.839	38.00	*8½
27.74	.2024	4.940	40.00	8½
28.61	.1962	5.097	43.00	*8½
28.93	.1940	5.153	44.00	8½
30.41	.1846	5.416	49.00	8½
22.30	.2518	3.972	34.00	*9
23.07	.2433	4.110	38.00	*9
23.47	.2392	4.180	40.00	*9
24.54	.2288	4.371	45.00	*9
26.76	.2098	4.767	55.00	*9
17.28	.3249	3.078	29.30	*9½
17.61	.3188	3.137	32.30	9½
18.05	.3110	3.215	36.00	9½
18.30	.3067	3.260	38.00	*9½
18.55	.3027	3.304	40.00	9½
19.03	.2950	3.390	43.50	9½
19.50	.2880	3.473	47.00	9½
20.47	.2743	3.646	53.50	9½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.375"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*10	33.00	9.384	2.6723	.3742	.0636
10 ³ / ₄	32.75	10.192	3.3176	.3014	.0790
*10 ³ / ₄	35.75	10.136	3.2712	.3057	.0779
10 ³ / ₄	40.50	10.050	3.2003	.3125	.0762
10 ³ / ₄	45.50	9.950	3.1187	.3206	.0743
10 ³ / ₄	51.00	9.850	3.0380	.3292	.0723
*10 ³ / ₄	54.00	9.784	2.9851	.3350	.0711
10 ³ / ₄	55.50	9.760	2.9660	.3372	.0706
*10 ³ / ₄	60.70	9.660	2.8867	.3464	.0687
*10 ³ / ₄	65.70	9.560	2.8083	.3561	.0669
*11 ³ / ₄	38.00	11.150	4.1518	.2409	.0989
11 ³ / ₄	42.00	11.084	4.0919	.2444	.0974
11 ³ / ₄	47.00	11.000	4.0162	.2490	.0956
11 ³ / ₄	54.00	10.880	3.9091	.2558	.0931
11 ³ / ₄	60.00	10.772	3.8137	.2622	.0908
*12	40.00	11.384	4.3669	.2290	.1040
*13	40.00	12.438	5.3914	.1855	.1284
*13	45.00	12.360	5.3124	.1882	.1265
*13	50.00	12.282	5.2340	.1911	.1246
*13	54.00	12.220	5.1720	.1933	.1231
13 ³ / ₈	48.00	12.715	5.6756	.1762	.1351
13 ³ / ₈	54.50	12.615	5.5723	.1795	.1327
13 ³ / ₈	61.00	12.515	5.4697	.1828	.1302
13 ³ / ₈	68.00	12.415	5.3680	.1863	.1278
13 ³ / ₈	72.00	12.347	5.2993	.1887	.1262
*13 ³ / ₈	83.00	12.175	5.1272	.1950	.1221
*16	55.00	15.376	8.7254	.1146	.2077
16	65.00	15.250	8.5680	.1167	.2040
16	75.00	15.124	8.4118	.1189	.2003
16	84.00	15.010	8.2717	.1209	.1969
20	94.00	19.124	14.0011	.0714	.3334

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.375"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
15.72	.3572	2.799	33.00	*10
12.66	.4435	2.255	32.75	10 ³ / ₄
12.84	.4373	2.287	35.75	*10 ³ / ₄
13.12	.4278	2.337	40.50	10 ³ / ₄
13.47	.4169	2.399	45.50	10 ³ / ₄
13.83	.4061	2.462	51.00	10 ³ / ₄
14.07	.3990	2.506	54.00	*10 ³ / ₄
14.16	.3965	2.522	55.50	10 ³ / ₄
14.55	.3859	2.591	60.70	*10 ³ / ₄
14.96	.3754	2.664	65.70	*10 ³ / ₄
10.12	.5550	1.802	38.00	*11 ³ / ₄
10.26	.5470	1.828	42.00	11 ³ / ₄
10.46	.5369	1.863	47.00	11 ³ / ₄
10.74	.5226	1.914	54.00	11 ³ / ₄
11.01	.5098	1.962	60.00	11 ³ / ₄
9.62	.5838	1.713	40.00	*12
7.79	.7207	1.388	40.00	*13
7.91	.7102	1.408	45.00	*13
8.02	.6997	1.429	50.00	*13
8.12	.6914	1.446	54.00	*13
7.40	.7587	1.318	48.00	13 ³ / ₈
7.54	.7449	1.343	54.50	13 ³ / ₈
7.68	.7312	1.368	61.00	13 ³ / ₈
7.82	.7176	1.394	68.00	13 ³ / ₈
7.93	.7084	1.412	72.00	13 ³ / ₈
8.19	.6854	1.459	83.00	*13 ³ / ₈
4.81	1.1664	.857	55.00	*16
4.90	1.1454	.873	65.00	16
4.99	1.1245	.889	75.00	16
5.08	1.1058	.904	84.00	16
3.00	1.8717	.534	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.875"**
ONE STRING

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4½	9.50	4.090	.3453	2.8963	.0082
4½	10.50	4.052	.3326	3.0062	.0079
4½	11.60	4.000	.3156	3.1690	.0075
4½	13.50	3.920	.2897	3.4517	.0069
*4½	15.10	3.826	.2600	3.8461	.0062
*4¾	16.00	4.082	.3426	2.9188	.0082
5	11.50	4.560	.5111	1.9564	.0122
5	13.00	4.494	.4868	2.0544	.0116
5	15.00	4.408	.4555	2.1953	.0108
5	18.00	4.276	.4088	2.4464	.0097
*5	21.00	4.154	.3668	2.7263	.0087
*5	23.20	4.044	.3300	3.0303	.0079
*5½	13.00	5.044	.7008	1.4270	.0167
5½	14.00	5.012	.6877	1.4542	.0164
*5½	15.00	4.974	.6722	1.4877	.0160
5½	15.50	4.950	.6625	1.5095	.0158
5½	17.00	4.892	.6392	1.5645	.0152
5½	20.00	4.778	.5942	1.6829	.0141
5½	23.00	4.670	.5526	1.8097	.0132
*5¾	14.00	5.290	.8045	1.2430	.0192
*5¾	17.00	5.190	.7618	1.3128	.0181
*5¾	19.50	5.090	.7198	1.3893	.0171
*5¾	22.50	4.990	.6787	1.4734	.0162
*6	15.00	5.524	.9078	1.1016	.0216
*6	16.00	5.500	.8970	1.1149	.0214
*6	17.00	5.450	.8746	1.1434	.0208
*6	18.00	5.424	.8631	1.1586	.0205
*6	20.00	5.352	.8314	1.2027	.0198
*6	23.00	5.240	.7830	1.2771	.0186
*6	26.00	5.132	.7373	1.3562	.0176
*6½	17.00	6.135	1.1984	.8344	.0285
6½	20.00	6.049	1.1556	.8653	.0275
*6½	22.00	5.989	1.1262	.8880	.0268
6½	24.00	5.921	1.0931	.9148	.0260
*6½	26.00	5.855	1.0614	.9421	.0253
6½	28.00	5.791	1.0310	.9699	.0245
*6½	29.00	5.761	1.0169	.9834	.0242
6½	32.00	5.675	.9767	1.0238	.0233
7	17.00	6.538	1.4068	.7108	.0335
7	20.00	6.456	1.3633	.7335	.0325
*7	22.00	6.398	1.3329	.7503	.0317
7	23.00	6.366	1.3162	.7598	.0313
*7	24.00	6.336	1.3007	.7688	.0310
7	26.00	6.276	1.2698	.7875	.0302
*7	28.00	6.214	1.2382	.8076	.0295
7	29.00	6.184	1.2230	.8176	.0291
*7	30.00	6.154	1.2079	.8279	.0288
7	32.00	6.094	1.1779	.8489	.0280
*7	34.00	6.040	1.1512	.8687	.0274
7	35.00	6.004	1.1335	.8822	.0270
7	38.00	5.920	1.0927	.9152	.0260
*7	40.00	5.836	1.0524	.9502	.0251

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.875"**
ONE STRING

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
121.64	.0462	21.666	9.50	4½
126.26	.0445	22.488	10.50	4½
133.10	.0422	23.705	11.60	4½
144.97	.0387	25.821	13.50	4½
161.54	.0348	28.771	15.10	*4½
122.59	.0458	21.835	16.00	*4¾
82.17	.0683	14.635	11.50	5
86.28	.0651	15.368	13.00	5
92.20	.0609	16.422	15.00	5
102.75	.0546	18.301	18.00	5
114.51	.0490	20.394	21.00	*5
127.27	.0441	22.668	23.20	*5
59.93	.0937	10.674	13.00	*5½
61.08	.0919	10.878	14.00	5½
62.48	.0899	11.129	15.00	*5½
63.40	.0886	11.292	15.50	5½
65.71	.0854	11.703	17.00	5½
70.68	.0794	12.589	20.00	5½
76.01	.0739	13.538	23.00	5½
52.21	.1075	9.298	14.00	*5¾
55.14	.1018	9.820	17.00	*5¾
58.35	.0962	10.392	19.50	*5¾
61.88	.0907	11.022	22.50	*5¾
46.27	.1213	8.241	15.00	*6
46.82	.1199	8.340	16.00	*6
48.02	.1169	8.553	17.00	*6
48.66	.1154	8.667	18.00	*6
50.52	.1111	8.997	20.00	*6
53.64	.1047	9.553	23.00	*6
56.96	.0986	10.145	26.00	*6
35.05	.1602	6.242	17.00	*6½
36.34	.1545	6.473	20.00	6½
37.29	.1505	6.642	22.00	*6½
38.42	.1461	6.843	24.00	6½
39.57	.1419	7.048	26.00	*6½
40.74	.1378	7.255	28.00	6½
41.30	.1359	7.356	29.00	*6½
43.00	.1306	7.659	32.00	6½
29.86	.1881	5.318	17.00	7
30.81	.1822	5.487	20.00	7
31.51	.1782	5.612	22.00	*7
31.91	.1760	5.683	23.00	7
32.29	.1739	5.751	24.00	*7
33.08	.1697	5.891	26.00	7
33.92	.1655	6.041	28.00	*7
34.34	.1635	6.116	29.00	7
34.77	.1615	6.193	30.00	*7
35.66	.1575	6.350	32.00	7
36.48	.1539	6.498	34.00	*7
37.05	.1515	6.599	35.00	7
38.44	.1461	6.846	38.00	7
39.91	.1407	7.108	40.00	*7

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.875"**
ONE STRING

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*7 5/8	20.00	7.125	1.7340	.5767	.0413
7 5/8	24.00	7.025	1.6763	.5966	.0399
7 5/8	26.40	6.969	1.6443	.6082	.0391
7 5/8	29.70	6.875	1.5912	.6285	.0379
7 5/8	33.70	6.765	1.5300	.6536	.0364
7 5/8	39.00	6.625	1.4535	.6880	.0346
7 3/4	45.30	6.560	1.4185	.7050	.0338
*8	26.00	7.386	1.8885	.5295	.0450
*8 1/8	28.00	7.485	1.9486	.5132	.0464
*8 1/8	32.00	7.385	1.8879	.5297	.0450
*8 1/8	35.50	7.285	1.8281	.5470	.0435
8 1/8	39.50	7.185	1.7690	.5653	.0421
8 5/8	24.00	8.097	2.3377	.4278	.0557
8 5/8	28.00	8.017	2.2851	.4376	.0544
8 5/8	32.00	7.921	2.2226	.4499	.0529
8 5/8	36.00	7.825	2.1610	.4628	.0515
*8 5/8	38.00	7.775	2.1291	.4697	.0507
8 5/8	40.00	7.725	2.0975	.4768	.0499
*8 5/8	43.00	7.651	2.0511	.4875	.0488
8 5/8	44.00	7.625	2.0349	.4914	.0484
8 5/8	49.00	7.511	1.9645	.5090	.0468
*9	34.00	8.290	2.4667	.4054	.0587
*9	38.00	8.196	2.4035	.4161	.0572
*9	40.00	8.150	2.3728	.4214	.0565
*9	45.00	8.032	2.2949	.4358	.0546
*9	55.00	7.812	2.1527	.4645	.0513
9 5/8	29.30	9.063	3.0140	.3318	.0718
9 5/8	32.30	9.001	2.9683	.3369	.0707
*9 5/8	36.00	8.921	2.9098	.3437	.0693
9 5/8	38.00	8.877	2.8778	.3475	.0685
9 5/8	40.00	8.835	2.8475	.3512	.0678
9 5/8	43.50	8.755	2.7901	.3584	.0664
9 5/8	47.00	8.681	2.7374	.3653	.0652
9 5/8	53.50	8.535	2.6349	.3795	.0627
*10	33.00	9.384	3.2556	.3072	.0775
*10 3/4	32.75	10.192	3.9009	.2563	.0929
10 3/4	35.75	10.136	3.8545	.2594	.0918
10 3/4	40.50	10.050	3.7837	.2643	.0901
10 3/4	45.50	9.950	3.7021	.2701	.0881
*10 3/4	51.00	9.850	3.6213	.2761	.0862
10 3/4	54.00	9.784	3.5684	.2802	.0850
*10 3/4	55.50	9.760	3.5493	.2817	.0845
*10 3/4	60.70	9.660	3.4700	.2882	.0826
*10 3/4	65.70	9.560	3.3916	.2948	.0808

*Not API Standard. Shown for information only.

NO. 221-B

Inside Tubing
O.D. 2.875"**BETWEEN TUBING & CASING****

ONE STRING

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
24.22	.2318	4.314	20.00	*7 $\frac{1}{8}$
25.06	.2241	4.463	24.00	7 $\frac{1}{8}$
25.54	.2198	4.549	26.40	7 $\frac{1}{8}$
26.40	.2127	4.701	29.70	7 $\frac{1}{8}$
27.45	.2045	4.889	33.70	7 $\frac{1}{8}$
28.90	.1943	5.147	39.00	7 $\frac{1}{8}$
29.61	.1896	5.273	45.30	7 $\frac{3}{4}$
22.24	.2525	3.961	26.00	*8
21.55	.2605	3.839	28.00	*8 $\frac{1}{8}$
22.25	.2524	3.962	32.00	*8 $\frac{1}{8}$
22.98	.2444	4.092	35.50	*8 $\frac{1}{8}$
23.74	.2365	4.229	39.50	*8 $\frac{1}{8}$
17.97	.3125	3.200	24.00	8 $\frac{5}{8}$
18.38	.3055	3.274	28.00	8 $\frac{5}{8}$
18.90	.2971	3.366	32.00	8 $\frac{5}{8}$
19.44	.2889	3.462	36.00	8 $\frac{5}{8}$
19.73	.2846	3.513	38.00	*8 $\frac{5}{8}$
20.02	.2804	3.566	40.00	8 $\frac{5}{8}$
20.48	.2742	3.647	43.00	*8 $\frac{5}{8}$
20.64	.2720	3.676	44.00	8 $\frac{5}{8}$
21.38	.2626	3.808	49.00	8 $\frac{5}{8}$
17.03	.3297	3.033	34.00	*9
17.47	.3213	3.112	38.00	*9
17.70	.3172	3.153	40.00	*9
18.30	.3068	3.260	45.00	*9
19.51	.2878	3.475	55.00	*9
13.94	.4029	2.482	29.30	*9 $\frac{5}{8}$
14.15	.3968	2.520	32.30	9 $\frac{5}{8}$
14.43	.3890	2.571	36.00	9 $\frac{5}{8}$
14.59	.3847	2.599	38.00	*9 $\frac{5}{8}$
14.75	.3807	2.627	40.00	9 $\frac{5}{8}$
15.05	.3730	2.681	43.50	9 $\frac{5}{8}$
15.34	.3659	2.733	47.00	9 $\frac{5}{8}$
15.94	.3522	2.839	53.50	9 $\frac{5}{8}$
12.90	.4352	2.298	33.00	*10
10.77	.5215	1.918	32.75	*10 $\frac{3}{4}$
10.90	.5153	1.941	35.75	10 $\frac{3}{4}$
11.10	.5058	1.977	40.50	10 $\frac{3}{4}$
11.35	.4949	2.021	45.50	10 $\frac{3}{4}$
11.60	.4841	2.066	51.00	*10 $\frac{3}{4}$
11.77	.4770	2.096	54.00	10 $\frac{3}{4}$
11.83	.4745	2.108	55.50	*10 $\frac{3}{4}$
12.10	.4639	2.156	60.70	*10 $\frac{3}{4}$
12.38	.4534	2.206	65.70	*10 $\frac{3}{4}$

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.875"**
TWO STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	17.00	6.538	1.0695	.9350	.0255
7	20.00	6.456	1.0261	.9746	.0244
*7	22.00	6.398	.9956	1.0044	.0237
7	23.00	6.366	.9790	1.0215	.0233
*7	24.00	6.336	.9634	1.0380	.0229
7	26.00	6.276	.9326	1.0723	.0222
*7	28.00	6.214	.9010	1.1099	.0215
7	29.00	6.184	.8858	1.1289	.0211
*7	30.00	6.154	.8707	1.1485	.0207
7	32.00	6.094	.8407	1.1895	.0200
*7	34.00	6.040	.8140	1.2285	.0194
7	35.00	6.004	.7963	1.2558	.0190
7	38.00	5.920	.7554	1.3238	.0180
*7	40.00	5.836	.7151	1.3984	.0170
*7½	20.00	7.125	1.3968	.7159	.0333
7½	24.00	7.025	1.3390	.7468	.0319
7½	26.40	6.969	1.3071	.7651	.0311
7½	29.70	6.875	1.2540	.7975	.0299
7½	33.70	6.765	1.1927	.8384	.0284
7½	39.00	6.625	1.1163	.8958	.0266
7¾	45.30	6.560	1.0813	.9248	.0257
*8	26.00	7.386	1.5513	.6446	.0369
*8⅓	28.00	7.485	1.6114	.6206	.0384
*8⅓	32.00	7.385	1.5507	.6449	.0369
*8⅓	35.50	7.285	1.4908	.6708	.0355
*8⅓	39.50	7.185	1.4318	.6984	.0341
8½	24.00	8.097	2.0004	.4999	.0476
8½	28.00	8.017	1.9478	.5134	.0464
8½	32.00	7.921	1.8854	.5304	.0449
8½	36.00	7.825	1.8237	.5483	.0434
*8½	38.00	7.775	1.7919	.5581	.0427
8½	40.00	7.725	1.7603	.5681	.0419
*8½	43.00	7.651	1.7139	.5835	.0408
8½	44.00	7.625	1.6977	.5890	.0404
8½	49.00	7.511	1.6273	.6145	.0387
*9	34.00	8.290	2.1295	.4696	.0507
*9	38.00	8.196	2.0662	.4840	.0492
*9	40.00	8.150	2.0356	.4913	.0485
*9	45.00	8.032	1.9577	.5108	.0466
*9	55.00	7.812	1.8154	.5508	.0432
*9½	29.30	9.063	2.6767	.3736	.0637
9½	32.30	9.001	2.6311	.3801	.0626
9½	36.00	8.921	2.5726	.3887	.0613
*9½	38.00	8.877	2.5406	.3936	.0605
9½	40.00	8.835	2.5103	.3984	.0598
9½	43.50	8.755	2.4528	.4077	.0584
9½	47.00	8.681	2.4002	.4166	.0571
9½	53.50	8.535	2.2976	.4352	.0547

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.875"**
TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
39.27	.1430	6.994	17.00	7
40.93	.1372	7.291	20.00	7
42.18	.1331	7.513	22.00	*7
42.90	.1309	7.641	23.00	7
43.59	.1288	7.764	24.00	*7
45.04	.1247	8.022	26.00	7
46.62	.1204	8.303	28.00	*7
47.42	.1184	8.445	29.00	7
48.24	.1164	8.592	30.00	*7
49.96	.1124	6.898	32.00	7
51.60	.1088	9.190	34.00	*7
52.75	.1064	9.394	35.00	7
55.60	.1010	9.903	38.00	7
58.73	.0956	10.460	40.00	*7
30.07	.1867	5.356	20.00	*7½
31.37	.1790	5.587	24.00	7½
32.13	.1747	5.723	26.40	7½
33.49	.1676	5.966	29.70	7½
35.21	.1594	6.272	33.70	7½
37.63	.1492	6.701	39.00	7½
38.84	.1445	6.918	45.30	7¾
27.07	.2074	4.822	26.00	*8
26.07	.2154	4.642	28.00	*8⅓
27.08	.2073	4.824	32.00	*8⅓
28.17	.1993	5.018	35.50	*8⅓
29.33	.1914	5.225	39.50	*8⅓
21.00	.2674	3.740	24.00	8½
21.56	.2604	3.840	28.00	8½
22.28	.2520	3.968	32.00	8½
23.03	.2438	4.102	36.00	8½
23.44	.2395	4.175	38.00	*8½
23.86	.2353	4.250	40.00	8½
24.51	.2291	4.365	43.00	*8½
24.74	.2269	4.406	44.00	8½
25.81	.2175	4.597	49.00	8½
19.72	.2847	3.513	34.00	*9
20.33	.2762	3.620	38.00	*9
20.63	.2721	3.675	40.00	*9
21.45	.2617	3.821	45.00	*9
23.13	.2427	4.121	55.00	*9
15.69	.3578	2.795	29.30	*9½
15.96	.3517	2.843	32.30	9½
16.33	.3439	2.908	36.00	9½
16.53	.3396	2.944	38.00	*9½
16.73	.3356	2.980	40.00	9½
17.12	.3279	3.050	43.50	9½
17.50	.3209	3.117	47.00	9½
18.28	.3072	3.256	53.50	9½

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.875"**
TWO STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*10	33.00	9.384	2.9183	.3427	.0695
10 ³ / ₄	32.75	10.192	3.5637	.2806	.0848
*10 ³ / ₄	35.75	10.136	3.5172	.2843	.0837
10 ³ / ₄	40.50	10.050	3.4464	.2902	.0821
10 ³ / ₄	45.50	9.950	3.3648	.2972	.0801
10 ³ / ₄	51.00	9.850	3.2840	.3045	.0782
*10 ³ / ₄	54.00	9.784	3.2312	.3095	.0769
10 ³ / ₄	55.50	9.760	3.2120	.3113	.0765
*10 ³ / ₄	60.70	9.660	3.1328	.3192	.0746
*10 ³ / ₄	65.70	9.560	3.0544	.3274	.0727
*11 ³ / ₄	38.00	11.150	4.3979	.2274	.1047
11 ³ / ₄	42.00	11.084	4.3380	.2305	.1033
11 ³ / ₄	47.00	11.000	4.2623	.2346	.1015
11 ³ / ₄	54.00	10.880	4.1552	.2407	.0989
11 ³ / ₄	60.00	10.772	4.0598	.2463	.0967
*12	40.00	11.384	4.6130	.2168	.1098
*13	40.00	12.438	5.6374	.1774	.1342
*13	45.00	12.360	5.5585	.1799	.1323
*13	50.00	12.282	5.4801	.1825	.1305
*13	54.00	12.220	5.4181	.1846	.1290
13 ³ / ₈	48.00	12.715	5.9217	.1689	.1410
13 ³ / ₈	54.50	12.615	5.8184	.1719	.1385
13 ³ / ₈	61.00	12.515	5.7158	.1750	.1361
13 ³ / ₈	68.00	12.415	5.6141	.1781	.1337
13 ³ / ₈	72.00	12.347	5.5454	.1803	.1320
*13 ³ / ₈	83.00	12.175	5.3733	.1861	.1279
*16	55.00	15.376	8.9715	.1115	.2136
16	65.00	15.250	8.8141	.1135	.2099
16	75.00	15.124	8.6579	.1155	.2061
16	84.00	15.010	8.5177	.1174	.2028
20	94.00	19.124	14.2472	.0702	.3392

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.875"**
TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
14.39	.3901	2.563	33.00	*10
11.79	.4764	2.099	32.75	10 ³ / ₄
11.94	.4702	2.127	35.75	*10 ³ / ₄
12.19	.4607	2.171	40.50	10 ³ / ₄
12.48	.4498	2.223	45.50	10 ³ / ₄
12.79	.4390	2.278	51.00	10 ³ / ₄
13.00	.4319	2.315	54.00	*10 ³ / ₄
13.08	.4294	2.329	55.50	10 ³ / ₄
13.41	.4188	2.388	60.70	*10 ³ / ₄
13.75	.4083	2.449	65.70	*10 ³ / ₄
9.55	.5879	1.701	38.00	*11 ³ / ₄
9.68	.5799	1.724	42.00	11 ³ / ₄
9.85	.5698	1.755	47.00	11 ³ / ₄
10.11	.5555	1.800	54.00	11 ³ / ₄
10.35	.5427	1.843	60.00	11 ³ / ₄
9.10	.6167	1.622	40.00	*12
7.45	.7536	1.327	40.00	*13
7.56	.7431	1.346	45.00	*13
7.66	.7326	1.365	50.00	*13
7.75	.7243	1.381	54.00	*13
7.09	.7916	1.263	48.00	13 ³ / ₈
7.22	.7778	1.286	54.50	13 ³ / ₈
7.35	.7641	1.309	61.00	13 ³ / ₈
7.48	.7505	1.333	68.00	13 ³ / ₈
7.57	.7413	1.349	72.00	13 ³ / ₈
7.82	.7183	1.392	83.00	*13 ³ / ₈
4.68	1.1993	.834	55.00	*16
4.77	1.1783	.849	65.00	16
4.85	1.1574	.864	75.00	16
4.93	1.1387	.878	84.00	16
2.95	1.9046	.525	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.875"**
THREE STRINGS
TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*8	26.00	7.386	1.2140	.8237	.0289
*8½	28.00	7.485	1.2741	.7849	.0303
*8½	32.00	7.385	1.2134	.8241	.0289
*8½	35.50	7.285	1.1536	.8669	.0275
*8½	39.50	7.185	1.0946	.9136	.0261
8½	24.00	8.097	1.6632	.6013	.0396
8½	28.00	8.017	1.6106	.6209	.0383
8½	32.00	7.921	1.5482	.6459	.0369
8½	36.00	7.825	1.4865	.6727	.0354
*8½	38.00	7.775	1.4547	.6874	.0346
8½	40.00	7.725	1.4230	.7027	.0339
*8½	43.00	7.651	1.3766	.7264	.0328
8½	44.00	7.625	1.3604	.7351	.0324
8½	49.00	7.511	1.2900	.7752	.0307
*9	34.00	8.290	1.7922	.5580	.0427
*9	38.00	8.196	1.7290	.5784	.0412
*9	40.00	8.150	1.6983	.5888	.0404
*9	45.00	8.032	1.6204	.6171	.0386
*9	55.00	7.812	1.4782	.6765	.0352
*9½	29.30	9.063	2.3395	.4274	.0557
9½	32.30	9.001	2.2938	.4360	.0546
9½	36.00	8.921	2.2353	.4474	.0532
*9½	38.00	8.877	2.2034	.4539	.0525
9½	40.00	8.835	2.1730	.4602	.0517
9½	43.50	8.755	2.1156	.4727	.0504
9½	47.00	8.681	2.0630	.4847	.0491
9½	53.50	8.535	1.9604	.5101	.0467
*10	33.00	9.384	2.5811	.3874	.0615
10¾	32.75	10.192	3.2265	.3099	.0768
*10¾	35.75	10.136	3.1800	.3145	.0757
10¾	40.50	10.050	3.1092	.3216	.0740
10¾	45.50	9.950	3.0276	.3303	.0721
10¾	51.00	9.850	2.9468	.3394	.0702
*10¾	54.00	9.784	2.8939	.3456	.0689
10¾	55.50	9.760	2.8748	.3479	.0684
*10¾	60.70	9.660	2.7956	.3577	.0666
*10¾	65.70	9.560	2.7171	.3680	.0647
*11¾	38.00	11.150	4.0606	.2463	.0967
11¾	42.00	11.084	4.0008	.2500	.0953
11¾	47.00	11.000	3.9251	.2548	.0935
11¾	54.00	10.880	3.8180	.2619	.0909
11¾	60.00	10.772	3.7225	.2686	.0886
*12	40.00	11.384	4.2758	.2339	.1018
*13	40.00	12.438	5.3002	.1887	.1262
*13	45.00	12.360	5.2213	.1915	.1243
*13	50.00	12.282	5.1429	.1944	.1224
*13	54.00	12.220	5.0809	.1968	.1210
13½	48.00	12.715	5.5845	.1791	.1330
13½	54.50	12.615	5.4811	.1824	.1305
13½	61.00	12.515	5.3786	.1859	.1281
13½	68.00	12.415	5.2769	.1895	.1256
13½	72.00	12.347	5.2082	.1920	.1240
*13½	83.00	12.175	5.0361	.1986	.1199
*16	55.00	15.376	8.6343	.1158	.2056
16	65.00	15.250	8.4768	.1180	.2018
16	75.00	15.124	8.3207	.1202	.1981
16	84.00	15.010	8.1805	.1222	.1948
20	94.00	19.124	13.9099	.0719	.3312

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.875"**
THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
34.60	.1623	6.162	26.00	*8
32.96	.1703	5.871	28.00	*8 1/8
34.61	.1622	6.165	32.00	*8 1/8
36.41	.1542	6.485	35.50	*8 1/8
38.37	.1463	6.834	39.50	*8 1/8
25.25	.2223	4.498	24.00	8 5/8
26.08	.2153	4.645	28.00	8 5/8
27.13	.2070	4.832	32.00	8 5/8
28.25	.1987	5.032	36.00	8 5/8
28.87	.1945	5.142	38.00	*8 7/8
29.51	.1902	5.257	40.00	8 7/8
30.51	.1840	5.434	43.00	*8 7/8
30.87	.1819	5.499	44.00	8 7/8
32.56	.1725	5.799	49.00	8 7/8
23.43	.2396	4.174	34.00	*9
24.29	.2311	4.327	38.00	*9
24.73	.2270	4.405	40.00	*9
25.92	.2166	4.616	45.00	*9
28.41	.1976	5.061	55.00	*9
17.95	.3127	3.198	29.30	*9 5/8
18.31	.3066	3.261	32.30	9 5/8
18.79	.2988	3.347	36.00	9 5/8
19.06	.2945	3.395	38.00	*9 5/8
19.33	.2905	3.443	40.00	9 5/8
19.85	.2828	3.536	43.50	9 5/8
20.36	.2758	3.626	47.00	9 5/8
21.42	.2621	3.816	53.50	9 5/8
16.27	.3450	2.898	33.00	*10
13.02	.4313	2.319	32.75	10 3/4
13.21	.4251	2.352	35.75	*10 3/4
13.51	.4156	2.406	40.50	10 3/4
13.87	.4047	2.471	45.50	10 3/4
14.25	.3939	2.539	51.00	10 3/4
14.51	.3869	2.585	54.00	*10 3/4
14.61	.3843	2.602	55.50	10 3/4
15.02	.3737	2.676	60.70	*10 3/4
15.46	.3632	2.753	65.70	*10 3/4
10.34	.5428	1.842	38.00	*11 3/4
10.50	.5348	1.870	42.00	11 3/4
10.70	.5247	1.906	47.00	11 3/4
11.00	.5104	1.959	54.00	11 3/4
11.28	.4976	2.010	60.00	11 3/4
9.82	.5716	1.750	40.00	*12
7.92	.7085	1.411	40.00	*13
8.04	.6980	1.433	45.00	*13
8.17	.6875	1.455	50.00	*13
8.27	.6792	1.472	54.00	*13
7.52	.7465	1.340	48.00	13 3/8
7.66	.7327	1.365	54.50	13 3/8
7.81	.7190	1.391	61.00	13 3/8
7.96	.7054	1.418	68.00	13 3/8
8.06	.6962	1.436	72.00	13 3/8
8.34	.6732	1.485	83.00	*13 3/8
4.86	1.1542	.866	55.00	*16
4.95	1.1332	.883	65.00	16
5.05	1.1123	.899	75.00	16
5.13	1.0936	.914	84.00	16
3.02	1.8595	.538	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 2.875"**
FOUR STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*8 ⁵ / ₈	43.00	7.651	1.0394	.9621	.0247
8 ⁵ / ₈	44.00	7.625	1.0232	.9773	.0244
8 ⁵ / ₈	49.00	7.511	.9528	1.0496	.0227
*9	34.00	8.290	1.4550	.6873	.0346
*9	38.00	8.196	1.3918	.7185	.0331
*9	40.00	8.150	1.3611	.7347	.0324
*9	45.00	8.032	1.2832	.7793	.0306
*9	55.00	7.812	1.1410	.8765	.0272
*9 ⁵ / ₈	29.30	9.063	2.0023	.4994	.0477
9 ⁵ / ₈	32.30	9.001	1.9566	.5111	.0466
9 ⁵ / ₈	36.00	8.921	1.8981	.5268	.0452
*9 ⁵ / ₈	38.00	8.877	1.8661	.5359	.0444
9 ⁵ / ₈	40.00	8.835	1.8358	.5447	.0437
9 ⁵ / ₈	43.50	8.755	1.7784	.5623	.0423
9 ⁵ / ₈	47.00	8.681	1.7257	.5795	.0411
9 ⁵ / ₈	53.50	8.535	1.6232	.6161	.0386
*10	33.00	9.384	2.2439	.4457	.0534
10 ³ / ₄	32.75	10.192	2.8892	.3461	.0688
*10 ³ / ₄	35.75	10.136	2.8428	.3518	.0677
10 ³ / ₄	40.50	10.050	2.7719	.3608	.0660
10 ³ / ₄	45.50	9.950	2.6903	.3717	.0641
10 ³ / ₄	51.00	9.850	2.6096	.3832	.0621
*10 ³ / ₄	54.00	9.784	2.5567	.3911	.0609
10 ³ / ₄	55.50	9.760	2.5376	.3941	.0604
*10 ³ / ₄	60.70	9.660	2.4583	.4068	.0585
*10 ³ / ₄	65.70	9.560	2.3799	.4202	.0567
*11 ³ / ₄	38.00	11.150	3.7234	.2686	.0887
11 ³ / ₄	42.00	11.084	3.6635	.2730	.0872
11 ³ / ₄	47.00	11.000	3.5878	.2787	.0854
11 ³ / ₄	54.00	10.880	3.4807	.2873	.0829
11 ³ / ₄	60.00	10.772	3.3853	.2954	.0806
*12	40.00	11.384	3.9385	.2539	.0938
*13	40.00	12.438	4.9630	.2015	.1182
*13	45.00	12.360	4.8840	.2047	.1163
*13	50.00	12.282	4.8056	.2081	.1144
*13	54.00	12.220	4.7436	.2108	.1129
13 ³ / ₈	48.00	12.715	5.2472	.1906	.1249
13 ³ / ₈	54.50	12.615	5.1439	.1944	.1225
13 ³ / ₈	61.00	12.515	5.0413	.1984	.1200
13 ³ / ₈	68.00	12.415	4.9396	.2024	.1176
13 ³ / ₈	72.00	12.347	4.8709	.2053	.1160
*13 ³ / ₈	83.00	12.175	4.6988	.2128	.1119
*16	55.00	15.376	8.2970	.1205	.1975
16	65.00	15.250	8.1396	.1229	.1938
16	75.00	15.124	7.9834	.1253	.1901
16	84.00	15.010	7.8433	.1275	.1867
20	94.00	19.124	13.5727	.0737	.3232

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 2.875"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
40.41	.1389	7.197	43.00	*8 $\frac{5}{8}$
41.05	.1368	7.311	44.00	8 $\frac{5}{8}$
44.08	.1274	7.851	49.00	8 $\frac{5}{8}$
28.87	.1945	5.141	34.00	*9
30.18	.1861	5.375	38.00	*9
30.86	.1820	5.496	40.00	*9
32.73	.1715	5.830	45.00	*9
36.81	.1525	6.556	55.00	*9
20.98	.2677	3.736	29.30	*9 $\frac{5}{8}$
21.47	.2616	3.823	32.30	9 $\frac{5}{8}$
22.13	.2537	3.941	36.00	9 $\frac{5}{8}$
22.51	.2495	4.009	38.00	*9 $\frac{5}{8}$
22.88	.2454	4.075	40.00	9 $\frac{5}{8}$
23.62	.2377	4.206	43.50	9 $\frac{5}{8}$
24.34	.2307	4.335	47.00	9 $\frac{5}{8}$
25.88	.2170	4.609	53.50	9 $\frac{5}{8}$
18.72	.3000	3.334	33.00	*10
14.54	.3862	2.589	32.75	10 $\frac{3}{4}$
14.77	.3800	2.631	35.75	*10 $\frac{3}{4}$
15.15	.3706	2.699	40.50	10 $\frac{3}{4}$
15.61	.3596	2.781	45.50	10 $\frac{3}{4}$
16.09	.3488	2.867	51.00	10 $\frac{3}{4}$
16.43	.3418	2.926	54.00	*10 $\frac{3}{4}$
16.55	.3392	2.948	55.50	10 $\frac{3}{4}$
17.08	.3286	3.043	60.70	*10 $\frac{3}{4}$
17.65	.3181	3.143	65.70	*10 $\frac{3}{4}$
11.28	.4977	2.009	38.00	*11 $\frac{3}{4}$
11.46	.4897	2.042	42.00	11 $\frac{3}{4}$
11.71	.4796	2.085	47.00	11 $\frac{3}{4}$
12.07	.4653	2.149	54.00	11 $\frac{3}{4}$
12.41	.4526	2.210	60.00	11 $\frac{3}{4}$
10.66	.5265	1.899	40.00	*12
8.46	.6635	1.507	40.00	*13
8.60	.6529	1.532	45.00	*13
8.74	.6424	1.557	50.00	*13
8.85	.6341	1.577	54.00	*13
8.00	.7015	1.426	48.00	13 $\frac{3}{8}$
8.17	.6876	1.454	54.50	13 $\frac{3}{8}$
8.33	.6739	1.484	61.00	13 $\frac{3}{8}$
8.50	.6603	1.514	68.00	13 $\frac{3}{8}$
8.62	.6511	1.536	72.00	13 $\frac{3}{8}$
8.94	.6281	1.592	83.00	*13 $\frac{3}{8}$
5.06	1.1092	.902	55.00	*16
5.16	1.0881	.919	65.00	16
5.26	1.0672	.937	75.00	16
5.35	1.0485	.954	84.00	16
3.09	1.8144	.551	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 3.500"**
ONE STRING

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*5½	13.00	5.044	.5382	1.8579	.0128
5½	14.00	5.012	.5251	1.9044	.0125
*5½	15.00	4.974	.5096	1.9623	.0121
5½	15.50	4.950	.4999	2.0004	.0119
5½	17.00	4.892	.4766	2.0981	.0113
5½	20.00	4.778	.4316	2.3168	.0103
5½	23.00	4.670	.3900	2.5641	.0093
*5¾	14.00	5.290	.6419	1.5578	.0153
*5¾	17.00	5.190	.5992	1.6689	.0143
*5¾	19.50	5.090	.5572	1.7945	.0133
*5¾	22.50	4.990	.5161	1.9375	.0123
*6	15.00	5.524	.7452	1.3419	.0177
*6	16.00	5.500	.7344	1.3617	.0175
*6	17.00	5.450	.7121	1.4044	.0170
*6	18.00	5.424	.7005	1.4275	.0167
*6	20.00	5.352	.6689	1.4951	.0159
*6	23.00	5.240	.6205	1.6117	.0148
*6	26.00	5.132	.5748	1.7398	.0137
*6½	17.00	6.135	1.0358	.9654	.0247
6½	20.00	6.049	.9931	1.0070	.0236
*6½	22.00	5.989	.9636	1.0378	.0229
6½	24.00	5.921	.9306	1.0746	.0222
*6½	26.00	5.855	.8989	1.1125	.0214
6½	28.00	5.791	.8685	1.1515	.0207
*6½	29.00	5.761	.8543	1.1705	.0203
6½	32.00	5.675	.8142	1.2282	.0194
7	17.00	6.538	1.2442	.8037	.0296
7	20.00	6.456	1.2007	.8328	.0286
*7	22.00	6.398	1.1703	.8545	.0279
7	23.00	6.366	1.1537	.8668	.0275
*7	24.00	6.336	1.1381	.8787	.0271
7	26.00	6.276	1.1072	.9032	.0264
*7	28.00	6.214	1.0756	.9297	.0256
7	29.00	6.184	1.0605	.9430	.0252
*7	30.00	6.154	1.0454	.9566	.0249
7	32.00	6.094	1.0154	.9849	.0242
*7	34.00	6.040	.9886	1.0115	.0235
7	35.00	6.004	.9710	1.0299	.0231
7	38.00	5.920	.9301	1.0752	.0221
*7	40.00	5.836	.8898	1.1238	.0212
*7½	20.00	7.125	1.5714	.6364	.0374
7½	24.00	7.025	1.5137	.6606	.0360
7½	26.40	6.969	1.4817	.6749	.0353
7½	29.70	6.875	1.4286	.7000	.0340
7½	33.70	6.765	1.3674	.7313	.0326
7½	39.00	6.625	1.2909	.7746	.0307
7¾	45.30	6.560	1.256	.7962	.0299

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
O.D. 3.500"**
ONE STRING

BETWEEN TUBING & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
78.03	.0720	13.898	13.00	*5½
79.98	.0702	14.246	14.00	5½
82.41	.0681	14.679	15.00	*5½
84.02	.0668	14.964	15.50	5½
88.12	.0637	15.695	17.00	5½
97.30	.0577	17.331	20.00	5½
107.69	.0521	19.181	23.00	5½
65.43	.0858	11.653	14.00	*5¾
70.09	.0801	12.484	17.00	*5¾
75.37	.0745	13.424	19.50	*5¾
81.38	.0690	14.494	22.50	*5¾
56.36	.0996	10.038	15.00	*6
57.19	.0982	10.186	16.00	*6
58.98	.0952	10.505	17.00	*6
59.96	.0936	10.678	18.00	*6
62.79	.0894	11.184	20.00	*6
67.69	.0829	12.056	23.00	*6
73.07	.0768	13.015	26.00	*6
40.55	.1385	7.222	17.00	*6½
42.29	.1328	7.533	20.00	6½
43.59	.1288	7.763	22.00	*6½
45.13	.1244	8.039	24.00	6½
46.73	.1202	8.322	26.00	*6½
48.36	.1161	8.614	28.00	6½
49.16	.1142	8.756	29.00	*6½
51.59	.1088	9.188	32.00	6½
33.76	.1663	6.012	17.00	7
34.98	.1605	6.230	20.00	7
35.89	.1564	6.392	22.00	*7
36.41	.1542	6.484	23.00	7
36.90	.1521	6.573	24.00	*7
37.93	.1480	6.756	26.00	7
39.05	.1438	6.954	28.00	*7
39.61	.1418	7.054	29.00	7
40.18	.1397	7.156	30.00	*7
41.36	.1357	7.367	32.00	7
42.48	.1322	7.566	34.00	*7
43.26	.1298	7.704	35.00	7
45.16	.1243	8.043	38.00	7
47.20	.1189	8.407	40.00	*7
26.73	.2101	4.760	20.00	*7½
27.75	.2024	4.942	24.00	7½
28.35	.1981	5.049	26.40	7½
29.40	.1910	5.236	29.70	7½
30.71	.1828	5.471	33.70	7½
32.53	.1726	5.795	39.00	7½
33.44	.1679	5.956	45.30	7¾

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 3.500"
ONE STRING**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*8	26.00	7.386	1.7260	.5794	.0411
*8½	28.00	7.485	1.7860	.5599	.0425
*8⅓	32.00	7.385	1.7254	.5796	.0411
*8⅔	35.50	7.285	1.6655	.6004	.0397
*8⅓	39.50	7.185	1.6065	.6225	.0382
8½	24.00	8.097	2.1751	.4597	.0518
8⅓	28.00	8.017	2.1225	.4711	.0505
8⅔	32.00	7.921	2.0601	.4854	.0490
8⅔	36.00	7.825	1.9984	.5004	.0476
*8⅔	38.00	7.775	1.9666	.5085	.0468
8½	40.00	7.725	1.9350	.5168	.0461
*8⅔	43.00	7.651	1.8885	.5295	.0450
8½	44.00	7.625	1.8723	.5341	.0446
8½	49.00	7.511	1.8019	.5550	.0429
*9	34.00	8.290	2.3041	.4340	.0549
*9	38.00	8.196	2.2409	.4462	.0534
*9	40.00	8.150	2.2102	.4524	.0526
*9	45.00	8.032	2.1323	.4690	.0508
*9	55.00	7.812	1.9901	.5025	.0474
9½	29.30	9.063	2.8514	.3507	.0679
9½	32.30	9.001	2.8057	.3564	.0668
9½	36.00	8.921	2.7472	.3640	.0654
*9½	38.00	8.877	2.7153	.3683	.0646
9½	40.00	8.835	2.6849	.3724	.0639
9½	43.50	8.755	2.6275	.3806	.0626
9½	47.00	8.681	2.5749	.3884	.0613
9½	53.50	8.535	2.4723	.4045	.0589
*10	33.00	9.384	3.0930	.3233	.0736
10¾	32.75	10.192	3.7384	.2675	.0890
*10¾	35.75	10.136	3.6919	.2709	.0879
10¾	40.50	10.050	3.6211	.2762	.0862
10¾	45.50	9.950	3.5395	.2825	.0843
10¾	51.00	9.850	3.4587	.2891	.0824
*10¾	54.00	9.784	3.4058	.2936	.0811
10¾	55.50	9.760	3.3867	.2953	.0806
*10¾	60.70	9.660	3.3075	.3023	.0787
*10¾	65.70	9.560	3.2291	.3097	.0769
*11¾	38.00	11.150	4.5725	.2187	.1089
11¾	42.00	11.084	4.5127	.2216	.1074
11¾	47.00	11.000	4.4370	.2254	.1056
11¾	54.00	10.880	4.3299	.2310	.1031
11¾	60.00	10.772	4.2345	.2362	.1008

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
O.D. 3.500"**
ONE STRING

BETWEEN TUBING & CASING**

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
24.33	.2307	4.334	26.00	*8
23.52	.2388	4.188	28.00	*8 1/8
24.34	.2306	4.336	32.00	*8 1/8
25.22	.2226	4.491	35.50	*8 1/8
26.14	.2148	4.657	39.50	*8 1/8
19.31	.2908	3.439	24.00	8 5/8
19.79	.2837	3.524	28.00	8 5/8
20.39	.2754	3.631	32.00	8 5/8
21.02	.2671	3.743	36.00	8 5/8
21.36	.2629	3.804	38.00	*8 5/8
21.71	.2587	3.866	40.00	8 5/8
22.24	.2525	3.961	43.00	*8 5/8
22.43	.2503	3.995	44.00	8 5/8
23.31	.2409	4.151	49.00	8 5/8
18.23	.3080	3.247	34.00	*9
18.74	.2996	3.338	38.00	*9
19.00	.2955	3.384	40.00	*9
19.70	.2851	3.508	45.00	*9
21.10	.2660	3.759	55.00	*9
14.73	.3812	2.623	29.30	*9 5/8
14.97	.3751	2.666	32.30	9 5/8
15.29	.3673	2.723	36.00	9 5/8
15.47	.3630	2.755	38.00	*9 5/8
15.64	.3589	2.786	40.00	9 5/8
15.98	.3512	2.847	43.50	9 5/8
16.31	.3442	2.905	47.00	9 5/8
16.99	.3305	3.026	53.50	9 5/8
13.58	.4135	2.419	33.00	*10
11.23	.4997	2.001	32.75	10 3/4
11.38	.4935	2.026	35.75	*10 3/4
11.60	.4841	2.066	40.50	10 3/4
11.87	.4732	2.113	45.50	10 3/4
12.14	.4624	2.163	51.00	10 3/4
12.33	.4553	2.196	54.00	*10 3/4
12.40	.4527	2.209	55.50	10 3/4
12.70	.4421	2.262	60.70	*10 3/4
13.01	.4317	2.317	65.70	*10 3/4
9.19	.6113	1.636	38.00	*11 3/4
9.31	.6033	1.658	42.00	11 3/4
9.47	.5931	1.686	47.00	11 3/4
9.70	.5788	1.728	54.00	11 3/4
9.92	.5661	1.767	60.00	11 3/4

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 3.500"**
TWO STRINGS

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*8 ⁵ / ₈	43.00	7.651	1.3887	.7201	.0331
8 ⁵ / ₈	44.00	7.625	1.3725	.7286	.0327
8 ⁵ / ₈	49.00	7.511	1.3021	.7680	.0310
*9	34.00	8.290	1.8043	.5542	.0430
*9	38.00	8.196	1.7411	.5743	.0415
*9	40.00	8.150	1.7104	.5846	.0407
*9	45.00	8.032	1.6325	.6125	.0389
*9	55.00	7.812	1.4903	.6710	.0355
*9 ⁵ / ₈	29.30	9.063	2.3516	.4252	.0560
9 ⁵ / ₈	32.30	9.001	2.3059	.4337	.0549
9 ⁵ / ₈	36.00	8.921	2.2474	.4450	.0535
*9 ⁵ / ₈	38.00	8.877	2.2155	.4514	.0527
9 ⁵ / ₈	40.00	8.835	2.1851	.4576	.0520
9 ⁵ / ₈	43.50	8.755	2.1277	.4700	.0507
9 ⁵ / ₈	47.00	8.681	2.0751	.4819	.0494
9 ⁵ / ₈	53.50	8.535	1.9725	.5070	.0470
*10	33.00	9.384	2.5932	.3856	.0617
10 ³ / ₄	32.75	10.192	3.2386	.3088	.0771
*10 ³ / ₄	35.75	10.136	3.1921	.3133	.0760
10 ³ / ₄	40.50	10.050	3.1213	.3204	.0743
10 ³ / ₄	45.50	9.950	3.0397	.3290	.0724
10 ³ / ₄	51.00	9.850	2.9589	.3380	.0705
*10 ³ / ₄	54.00	9.784	2.9060	.3441	.0692
10 ³ / ₄	55.50	9.760	2.8869	.3464	.0687
*10 ³ / ₄	60.70	9.660	2.8077	.3562	.0668
*10 ³ / ₄	65.70	9.560	2.7293	.3664	.0650
*11 ³ / ₄	38.00	11.150	4.0727	.2455	.0970
11 ³ / ₄	42.00	11.084	4.0129	.2492	.0955
11 ³ / ₄	47.00	11.000	3.9372	.2540	.0937
11 ³ / ₄	54.00	10.880	3.8301	.2611	.0912
11 ³ / ₄	60.00	10.772	3.7347	.2678	.0889
*12	40.00	11.384	4.2879	.2332	.1021
*13	40.00	12.438	5.3123	.1882	.1265
*13	45.00	12.360	5.2334	.1911	.1246
*13	50.00	12.282	5.1550	.1940	.1227
*13	54.00	12.220	5.0930	.1963	.1213
13 ³ / ₈	48.00	12.715	5.5966	.1787	.1333
13 ³ / ₈	54.50	12.615	5.4932	.1820	.1308
13 ³ / ₈	61.00	12.515	5.3907	.1855	.1283
13 ³ / ₈	68.00	12.415	5.2890	.1891	.1259
13 ³ / ₈	72.00	12.347	5.2203	.1916	.1243
*13 ³ / ₈	83.00	12.175	5.0482	.1981	.1202
*16	55.00	15.376	8.6464	.1157	.2059
16	65.00	15.250	8.4889	.1178	.2021
16	75.00	15.124	8.3328	.1200	.1984
16	84.00	15.010	8.1926	.1221	.1951
20	94.00	19.124	13.9220	.0718	.3315

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 3.500"**
TWO STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
30.24	.1856	5.387	43.00	*8 $\frac{5}{8}$
30.60	.1835	5.450	44.00	8 $\frac{5}{8}$
32.25	.1741	5.745	49.00	8 $\frac{5}{8}$
23.28	.2412	4.146	34.00	*9
24.12	.2328	4.296	38.00	*9
24.56	.2287	4.374	40.00	*9
25.73	.2182	4.582	45.00	*9
28.18	.1992	5.019	55.00	*9
17.86	.3144	3.181	29.30	*9 $\frac{5}{8}$
18.21	.3083	3.244	32.30	9 $\frac{5}{8}$
18.69	.3004	3.329	36.00	9 $\frac{5}{8}$
18.96	.2962	3.377	38.00	*9 $\frac{5}{8}$
19.22	.2921	3.423	40.00	9 $\frac{5}{8}$
19.74	.2844	3.516	43.50	9 $\frac{5}{8}$
20.24	.2774	3.605	47.00	9 $\frac{5}{8}$
21.29	.2637	3.792	53.50	9 $\frac{5}{8}$
16.20	.3467	2.885	33.00	*10
12.97	.4329	2.310	32.75	10 $\frac{3}{4}$
13.13	.4267	2.343	35.75	*10 $\frac{3}{4}$
13.46	.4173	2.397	40.50	10 $\frac{3}{4}$
13.82	.4063	2.461	45.50	10 $\frac{3}{4}$
14.19	.3955	2.528	51.00	10 $\frac{3}{4}$
14.45	.3885	2.574	54.00	*10 $\frac{3}{4}$
14.55	.3859	2.591	55.50	10 $\frac{3}{4}$
14.96	.3753	2.664	60.70	*10 $\frac{3}{4}$
15.39	.3648	2.741	65.70	*10 $\frac{3}{4}$
10.31	.5444	1.837	38.00	*11 $\frac{3}{4}$
10.47	.5364	1.864	42.00	11 $\frac{3}{4}$
10.67	.5263	1.900	47.00	11 $\frac{3}{4}$
10.97	.5120	1.953	54.00	11 $\frac{3}{4}$
11.25	.4993	2.003	60.00	11 $\frac{3}{4}$
9.80	.5732	1.745	40.00	*12
7.91	.7102	1.408	40.00	*13
8.03	.6996	1.429	45.00	*13
8.15	.6891	1.451	50.00	*13
8.25	.6808	1.469	54.00	*13
7.50	.7482	1.337	48.00	13 $\frac{3}{8}$
7.65	.7343	1.362	54.50	13 $\frac{3}{8}$
7.79	.7206	1.388	61.00	13 $\frac{3}{8}$
7.94	.7070	1.414	68.00	13 $\frac{3}{8}$
8.05	.6979	1.433	72.00	13 $\frac{3}{8}$
8.32	.6748	1.482	83.00	*13 $\frac{3}{8}$
4.86	1.1559	.865	55.00	*16
4.95	1.1348	.881	65.00	16
5.04	1.1139	.898	75.00	16
5.13	1.0952	.913	84.00	16
3.02	1.8611	.537	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 3.500"**
THREE STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
9 ⁵ / ₈	32.30	9.001	1.8061	.5537	.0430
9 ⁵ / ₈	36.00	8.921	1.7476	.5722	.0416
*9 ⁵ / ₈	38.00	8.877	1.7157	.5829	.0408
9 ⁵ / ₈	40.00	8.835	1.6853	.5934	.0401
9 ⁵ / ₈	43.50	8.755	1.6279	.6143	.0388
9 ⁵ / ₈	47.00	8.681	1.5753	.6348	.0375
9 ⁵ / ₈	53.50	8.535	1.4727	.6790	.0351
*10	33.00	9.384	2.0934	.4777	.0498
10 ³ / ₄	32.75	10.192	2.7388	.3651	.0652
*10 ³ / ₄	35.75	10.136	2.6923	.3714	.0641
10 ³ / ₄	40.50	10.050	2.6215	.3815	.0624
10 ³ / ₄	45.50	9.950	2.5399	.3937	.0605
10 ³ / ₄	51.00	9.850	2.4591	.4067	.0586
*10 ³ / ₄	54.00	9.784	2.4062	.4156	.0573
10 ³ / ₄	55.50	9.760	2.3871	.4189	.0568
*10 ³ / ₄	60.70	9.660	2.3079	.4333	.0549
*10 ³ / ₄	65.70	9.560	2.2295	.4485	.0531
*11 ³ / ₄	38.00	11.150	3.5729	.2799	.0851
11 ³ / ₄	42.00	11.084	3.5131	.2847	.0836
11 ³ / ₄	47.00	11.000	3.4374	.2909	.0818
11 ³ / ₄	54.00	10.880	3.3303	.3003	.0793
11 ³ / ₄	60.00	10.772	3.2349	.3091	.0770
*12	40.00	11.384	3.7881	.2640	.0902
*13	40.00	12.438	4.8125	.2078	.1146
*13	45.00	12.360	4.7336	.2113	.1127
*13	50.00	12.282	4.6552	.2148	.1108
*13	54.00	12.220	4.5932	.2177	.1094
13 ³ / ₈	48.00	12.715	5.0968	.1962	.1214
13 ³ / ₈	54.50	12.615	4.9934	.2003	.1189
13 ³ / ₈	61.00	12.515	4.8909	.2045	.1164
13 ³ / ₈	68.00	12.415	4.7892	.2088	.1140
13 ³ / ₈	72.00	12.347	4.7205	.2118	.1124
*13 ³ / ₈	83.00	12.175	4.5484	.2199	.1083
*16	55.00	15.376	8.1466	.1228	.1940
16	65.00	15.250	7.9891	.1252	.1902
16	75.00	15.124	7.8330	.1277	.1865
16	84.00	15.010	7.6928	.1300	.1832
20	94.00	19.124	13.4222	.0745	.3196

*Not API Standard. Shown for information only.

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 3.500"**
THREE STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
23.25	.2414	4.142	32.30	9 $\frac{5}{8}$
24.03	.2336	4.280	36.00	9 $\frac{5}{8}$
24.48	.2294	4.360	38.00	*9 $\frac{5}{8}$
24.92	.2253	4.439	40.00	9 $\frac{5}{8}$
25.80	.2176	4.595	43.50	9 $\frac{5}{8}$
26.66	.2106	4.749	47.00	9 $\frac{5}{8}$
28.52	.1969	5.079	53.50	9 $\frac{5}{8}$
20.06	.2798	3.573	33.00	*10
15.34	.3661	2.731	32.75	10 $\frac{3}{4}$
15.60	.3599	2.779	35.75	*10 $\frac{3}{4}$
16.02	.3504	2.854	40.50	10 $\frac{3}{4}$
16.54	.3395	2.945	45.50	10 $\frac{3}{4}$
17.08	.3287	3.042	51.00	10 $\frac{3}{4}$
17.45	.3217	3.109	54.00	*10 $\frac{3}{4}$
17.59	.3191	3.134	55.50	10 $\frac{3}{4}$
18.20	.3085	3.241	60.70	*10 $\frac{3}{4}$
18.84	.2980	3.355	65.70	*10 $\frac{3}{4}$
11.76	.4776	2.094	38.00	*11 $\frac{3}{4}$
11.96	.4696	2.129	42.00	11 $\frac{3}{4}$
12.22	.4595	2.176	47.00	11 $\frac{3}{4}$
12.61	.4452	2.246	54.00	11 $\frac{3}{4}$
12.98	.4324	2.313	60.00	11 $\frac{3}{4}$
11.09	.5064	1.975	40.00	*12
8.73	.6433	1.554	40.00	*13
8.87	.6328	1.580	45.00	*13
9.02	.6223	1.607	50.00	*13
9.14	.6140	1.629	54.00	*13
8.24	.6813	1.468	48.00	13 $\frac{3}{8}$
8.41	.6675	1.498	54.50	13 $\frac{3}{8}$
8.59	.6538	1.530	61.00	13 $\frac{3}{8}$
8.77	.6402	1.562	68.00	13 $\frac{3}{8}$
8.90	.6310	1.585	72.00	13 $\frac{3}{8}$
9.23	.6080	1.645	83.00	*13 $\frac{3}{8}$
5.16	1.0890	.918	55.00	*16
5.26	1.0680	.936	65.00	16
5.36	1.0471	.955	75.00	16
5.46	1.0284	.972	84.00	16
3.13	1.7943	.557	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 3.500"**
FOUR STRINGS

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*10 ³ / ₄	54.00	9.784	1.9064	.5245	.0454
10 ³ / ₄	55.50	9.760	1.8873	.5299	.0449
*10 ³ / ₄	60.70	9.660	1.8081	.5531	.0430
*10 ³ / ₄	65.70	9.560	1.7297	.5782	.0412
*11 ³ / ₄	38.00	11.150	3.0732	.3254	.0732
11 ³ / ₄	42.00	11.084	3.0133	.3319	.0717
11 ³ / ₄	47.00	11.000	2.9376	.3404	.0699
11 ³ / ₄	54.00	10.880	2.8305	.3533	.0674
11 ³ / ₄	60.00	10.772	2.7351	.3656	.0651
*12	40.00	11.384	3.2883	.3041	.0783
*13	40.00	12.438	4.3127	.2319	.1027
*13	45.00	12.360	4.2338	.2362	.1008
*13	50.00	12.282	4.1554	.2407	.0989
*13	54.00	12.220	4.0934	.2443	.0975
13 ³ / ₈	48.00	12.715	4.5970	.2175	.1095
13 ³ / ₈	54.50	12.615	4.4936	.2225	.1070
13 ³ / ₈	61.00	12.515	4.3911	.2277	.1045
13 ³ / ₈	68.00	12.415	4.2894	.2331	.1021
13 ³ / ₈	72.00	12.347	4.2207	.2369	.1005
*13 ³ / ₈	83.00	12.175	4.0486	.2470	.0964
*16	55.00	15.376	7.6468	.1308	.1821
16	65.00	15.250	7.4893	.1335	.1783
16	75.00	15.124	7.3332	.1364	.1746
16	84.00	15.010	7.1930	.1390	.1713
20	94.00	19.124	12.9224	.0774	.3077

NO. 221-B

BETWEEN TUBING & CASING**

**Inside Tubing
O.D. 3.500"**
FOUR STRINGS

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
22.03	.2549	3.924	54.00	*10 ³ / ₄
22.25	.2523	3.964	55.50	10 ³ / ₄
23.23	.2417	4.137	60.70	*10 ³ / ₄
24.28	.2312	4.325	65.70	*10 ³ / ₄
13.67	.4108	2.434	38.00	*11 ³ / ₄
13.94	.4028	2.483	42.00	11 ³ / ₄
14.30	.3927	2.547	47.00	11 ³ / ₄
14.84	.3784	2.643	54.00	11 ³ / ₄
15.36	.3656	2.735	60.00	11 ³ / ₄
12.77	.4396	2.275	40.00	*12
9.74	.5765	1.735	40.00	*13
9.92	.5660	1.767	45.00	*13
10.11	.5555	1.800	50.00	*13
10.26	.5472	1.828	54.00	*13
9.14	.6145	1.627	48.00	13 ³ / ₈
9.35	.6007	1.665	54.50	13 ³ / ₈
9.56	.5870	1.704	61.00	13 ³ / ₈
9.79	.5734	1.744	68.00	13 ³ / ₈
9.95	.5642	1.772	72.00	13 ³ / ₈
10.37	.5412	1.848	83.00	*13 ³ / ₈
5.49	1.0222	.978	55.00	*16
5.61	1.0012	.999	65.00	16
5.73	.9803	1.020	75.00	16
5.84	.9616	1.040	84.00	16
3.25	1.7275	.579	94.00	20

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 4.000"**
ONE STRING

TABLE
VOLUME & HEIGHT

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*5 $\frac{1}{2}$	13.00	5.044	.3852	2.5959	.0092
5 $\frac{1}{2}$	14.00	5.012	.3721	2.6874	.0089
*5 $\frac{1}{2}$	15.00	4.974	.3566	2.8041	.0085
5 $\frac{1}{2}$	15.50	4.950	.3469	2.8827	.0083
5 $\frac{1}{2}$	17.00	4.892	.3236	3.0901	.0077
5 $\frac{1}{2}$	20.00	4.778	.2786	3.5889	.0066
5 $\frac{1}{2}$	23.00	4.670	.2370	4.2194	.0056
*5 $\frac{3}{4}$	14.00	5.290	.4890	2.0452	.0116
*5 $\frac{3}{4}$	17.00	5.190	.4462	2.2412	.0106
*5 $\frac{3}{4}$	19.50	5.090	.4042	2.4737	.0096
*5 $\frac{3}{4}$	22.50	4.990	.3631	2.7539	.0086
*6	15.00	5.524	.5922	1.6886	.0141
*6	16.00	5.500	.5814	1.7200	.0138
*6	17.00	5.450	.5591	1.7887	.0133
*6	18.00	5.424	.5475	1.8264	.0130
*6	20.00	5.352	.5159	1.9385	.0123
*6	23.00	5.240	.4675	2.1392	.0111
*6	26.00	5.132	.4218	2.3710	.0100
*6 $\frac{5}{8}$	17.00	6.135	.8828	1.1327	.0210
6 $\frac{5}{8}$	20.00	6.049	.8401	1.1904	.0200
*6 $\frac{5}{8}$	22.00	5.989	.8106	1.2336	.0193
6 $\frac{5}{8}$	24.00	5.921	.7776	1.2861	.0185
*6 $\frac{5}{8}$	26.00	5.855	.7459	1.3407	.0178
6 $\frac{5}{8}$	28.00	5.791	.7155	1.3977	.0170
*6 $\frac{5}{8}$	29.00	5.761	.7013	1.4259	.0167
6 $\frac{5}{8}$	32.00	5.675	.6612	1.5124	.0157
7	17.00	6.538	1.0912	.9164	.0260
7	20.00	6.456	1.0477	.9544	.0249
*7	22.00	6.398	1.0173	.9830	.0242
7	23.00	6.366	1.0007	.9993	.0238
*7	24.00	6.336	.9851	1.0151	.0235
7	26.00	6.276	.9542	1.0480	.0227
*7	28.00	6.214	.9226	1.0838	.0220
7	29.00	6.184	.9075	1.1020	.0216
*7	30.00	6.154	.8924	1.1206	.0212
7	32.00	6.094	.8624	1.1596	.0205
*7	34.00	6.040	.8356	1.1967	.0199
7	35.00	6.004	.8180	1.2226	.0195
7	38.00	5.920	.7771	1.2869	.0185
*7	40.00	5.836	.7368	1.3572	.0175
*7 $\frac{5}{8}$	20.00	7.125	1.4184	.7050	.0338
7 $\frac{5}{8}$	24.00	7.025	1.3607	.7349	.0324
7 $\frac{5}{8}$	26.40	6.969	1.3287	.7526	.0316
7 $\frac{5}{8}$	29.70	6.875	1.2756	.7839	.0304
7 $\frac{5}{8}$	33.70	6.765	1.2144	.8234	.0289
7 $\frac{5}{8}$	39.00	6.625	1.1379	.8788	.0271
7 $\frac{3}{4}$	45.30	6.560	1.103	.9066	.0263

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
O.D. 4.000"**
ONE STRING

BETWEEN TUBING & CASING**

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
109.03	.0515	19.418	13.00	*5 $\frac{1}{2}$
112.87	.0497	20.103	14.00	5 $\frac{1}{2}$
117.77	.0477	20.976	15.00	*5 $\frac{1}{2}$
121.07	.0464	21.564	15.50	5 $\frac{1}{2}$
129.79	.0433	23.116	17.00	5 $\frac{1}{2}$
150.74	.0372	26.847	20.00	5 $\frac{1}{2}$
177.21	.0317	31.563	23.00	5 $\frac{1}{2}$
85.90	.0654	15.299	14.00	*5 $\frac{3}{4}$
94.13	.0596	16.765	17.00	*5 $\frac{3}{4}$
103.90	.0540	18.505	19.50	*5 $\frac{3}{4}$
115.66	.0485	20.600	22.50	*5 $\frac{3}{4}$
70.92	.0792	12.632	15.00	*6
72.24	.0777	12.866	16.00	*6
75.13	.0747	13.381	17.00	*6
76.71	.0732	13.662	18.00	*6
81.42	.0690	14.501	20.00	*6
89.85	.0625	16.002	23.00	*6
99.58	.0564	17.736	26.00	*6
47.57	.1180	8.473	17.00	*6 $\frac{5}{8}$
49.99	.1123	8.904	20.00	6 $\frac{5}{8}$
51.81	.1084	9.228	22.00	*6 $\frac{5}{8}$
54.01	.1039	9.620	24.00	6 $\frac{5}{8}$
56.31	.0997	10.029	26.00	*6 $\frac{5}{8}$
58.70	.0956	10.456	28.00	6 $\frac{5}{8}$
59.89	.0938	10.666	29.00	*6 $\frac{5}{8}$
63.52	.0884	11.314	32.00	6 $\frac{5}{8}$
38.49	.1459	6.855	17.00	7
40.09	.1401	7.140	20.00	7
41.28	.1360	7.353	22.00	*7
41.97	.1338	7.476	23.00	7
42.63	.1317	7.594	24.00	*7
44.01	.1276	7.839	26.00	7
45.52	.1233	8.108	28.00	*7
46.28	.1213	8.243	29.00	7
47.07	.1193	8.383	30.00	*7
48.70	.1153	8.674	32.00	7
50.26	.1117	8.952	34.00	*7
51.35	.1093	9.145	35.00	7
54.05	.1039	9.626	38.00	7
57.00	.0985	10.153	40.00	*7
29.61	.1896	5.274	20.00	*7 $\frac{5}{8}$
30.87	.1819	5.498	24.00	7 $\frac{5}{8}$
31.61	.1776	5.630	26.40	7 $\frac{5}{8}$
32.92	.1705	5.864	29.70	7 $\frac{5}{8}$
34.58	.1623	6.160	33.70	7 $\frac{5}{8}$
36.91	.1521	6.574	39.00	7 $\frac{5}{8}$
38.08	.1474	6.782	45.30	7 $\frac{3}{4}$

**Note: No allowance made for couplings.

**Inside Tubing
O.D. 4.000"
ONE STRING**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*8	26.00	7.386	1.5730	.6357	.0375
*8½	28.00	7.485	1.6330	.6124	.0389
*8½	32.00	7.385	1.5724	.6360	.0374
*8½	35.50	7.285	1.5125	.6612	.0360
*8½	39.50	7.185	1.4535	.6880	.0346
8½	24.00	8.097	2.0221	.4945	.0481
8½	28.00	8.017	1.9695	.5077	.0469
8½	32.00	7.921	1.9071	.5244	.0454
8½	36.00	7.825	1.8454	.5419	.0439
*8½	38.00	7.775	1.8136	.5514	.0432
8½	40.00	7.725	1.7820	.5612	.0424
*8½	43.00	7.651	1.7355	.5762	.0413
8½	44.00	7.625	1.7193	.5816	.0409
8½	49.00	7.511	1.6489	.6065	.0393
*9	34.00	8.290	2.1511	.4649	.0512
*9	38.00	8.196	2.0879	.4789	.0497
*9	40.00	8.150	2.0572	.4861	.0490
*9	45.00	8.032	1.9793	.5052	.0471
*9	55.00	7.812	1.8371	.5443	.0437
*9½	29.30	9.063	2.6984	.3706	.0642
9½	32.30	9.001	2.6527	.3770	.0632
9½	36.00	8.921	2.5942	.3855	.0618
*9½	38.00	8.877	2.5623	.3903	.0610
9½	40.00	8.835	2.5319	.3950	.0603
9½	43.50	8.755	2.4745	.4041	.0589
9½	47.00	8.681	2.4219	.4129	.0577
9½	53.50	8.535	2.3193	.4312	.0552
*10	33.00	9.384	2.9400	.3401	.0700
10¾	32.75	10.192	3.5854	.2789	.0854
*10¾	35.75	10.136	3.5389	.2826	.0843
10¾	40.50	10.050	3.4681	.2883	.0826
10¾	45.50	9.950	3.3865	.2953	.0806
10¾	51.00	9.850	3.3057	.3025	.0787
*10¾	54.00	9.784	3.2528	.3074	.0774
10¾	55.50	9.760	3.2337	.3092	.0770
*10¾	60.70	9.660	3.1545	.3170	.0751
*10¾	65.70	9.560	3.0761	.3251	.0732
*11¾	38.00	11.150	4.4195	.2263	.1052
11¾	42.00	11.084	4.3597	.2294	.1038
11¾	47.00	11.000	4.2840	.2334	.1020
11¾	54.00	10.880	4.1769	.2394	.0994
11¾	60.00	10.772	4.0815	.2450	.0972

*Not API Standard. Shown for information only.

NO. 221-B

**Inside Tubing
O.D. 4.000"**
ONE STRING

BETWEEN TUBING & CASING**

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
26.70	.2103	4.756	26.00	*8
25.72	.2183	4.581	28.00	*8 1/8
26.71	.2102	4.758	32.00	*8 1/8
27.77	.2022	4.946	35.50	*8 1/8
28.90	.1943	5.147	39.50	*8 1/8
20.77	.2703	3.699	24.00	8 5/8
21.33	.2633	3.798	28.00	8 5/8
22.02	.2549	3.923	32.00	8 5/8
22.76	.2467	4.054	36.00	8 5/8
23.16	.2424	4.125	38.00	*8 5/8
23.57	.2382	4.198	40.00	8 5/8
24.20	.2320	4.310	43.00	*8 5/8
24.43	.2298	4.351	44.00	8 5/8
25.47	.2204	4.537	49.00	8 5/8
19.52	.2876	3.477	34.00	*9
20.12	.2791	3.583	38.00	*9
20.42	.2750	3.636	40.00	*9
21.22	.2646	3.779	45.00	*9
22.86	.2456	4.072	55.00	*9
15.56	.3607	2.772	29.30	*9 5/8
15.83	.3546	2.820	32.30	9 5/8
16.19	.3468	2.884	36.00	9 5/8
16.39	.3425	2.919	38.00	*9 5/8
16.59	.3385	2.954	40.00	9 5/8
16.97	.3308	3.023	43.50	9 5/8
17.34	.3238	3.089	47.00	9 5/8
18.11	.3100	3.225	53.50	9 5/8
14.29	.3930	2.544	33.00	*10
11.71	.4793	2.086	32.75	10 3/4
11.87	.4731	2.114	35.75	*10 3/4
12.11	.4636	2.157	40.50	10 3/4
12.40	.4527	2.209	45.50	10 3/4
12.71	.4419	2.263	51.00	10 3/4
12.91	.4348	2.300	54.00	*10 3/4
12.99	.4323	2.313	55.50	10 3/4
13.31	.4217	2.371	60.70	*10 3/4
13.65	.4112	2.432	65.70	*10 3/4
9.50	.5908	1.693	38.00	*11 3/4
9.63	.5828	1.716	42.00	11 3/4
9.80	.5727	1.746	47.00	11 3/4
10.06	.5584	1.791	54.00	11 3/4
10.29	.5456	1.833	60.00	11 3/4

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 4.500"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*5 $\frac{1}{2}$	13.00	5.044	.2118	4.7208	.0050
5 $\frac{1}{2}$	14.00	5.012	.1987	5.0327	.0047
*5 $\frac{1}{2}$	15.00	4.974	.1832	5.4579	.0044
5 $\frac{1}{2}$	15.50	4.950	.1735	5.7636	.0041
5 $\frac{1}{2}$	17.00	4.892	.1502	6.6573	.0036
5 $\frac{1}{2}$	20.00	4.778	.1052	9.5026	.0025
5 $\frac{1}{2}$	23.00	4.670	.0636	15.7225	.0015
*5 $\frac{3}{4}$	14.00	5.290	.3156	3.1691	.0075
*5 $\frac{3}{4}$	17.00	5.190	.2728	3.6658	.0065
*5 $\frac{3}{4}$	19.50	5.090	.2308	4.3318	.0055
*5 $\frac{3}{4}$	22.50	4.990	.1897	5.2708	.0045
*6	15.00	5.524	.4188	2.3878	.0100
*6	16.00	5.500	.4080	2.4510	.0097
*6	17.00	5.450	.3857	2.5930	.0092
*6	18.00	5.424	.3741	2.6729	.0089
*6	20.00	5.352	.3425	2.9200	.0082
*6	23.00	5.240	.2941	3.4006	.0070
*6	26.00	5.132	.2484	4.0263	.0059
*6 $\frac{5}{8}$	17.00	6.135	.7094	1.4096	.0169
6 $\frac{5}{8}$	20.00	6.049	.6667	1.5000	.0159
*6 $\frac{5}{8}$	22.00	5.989	.6372	1.5693	.0152
6 $\frac{5}{8}$	24.00	5.921	.6042	1.6552	.0144
*6 $\frac{5}{8}$	26.00	5.855	.5725	1.7468	.0136
6 $\frac{5}{8}$	28.00	5.791	.5421	1.8448	.0129
*6 $\frac{5}{8}$	29.00	5.761	.5279	1.8942	.0126
6 $\frac{5}{8}$	32.00	5.675	.4878	2.0501	.0116
7	17.00	6.538	.9178	1.0895	.0219
7	20.00	6.456	.8743	1.1437	.0208
*7	22.00	6.398	.8439	1.1849	.0201
7	23.00	6.366	.8273	1.2088	.0197
*7	24.00	6.336	.8117	1.2320	.0193
7	26.00	6.276	.7808	1.2807	.0186
*7	28.00	6.214	.7492	1.3347	.0178
7	29.00	6.184	.7341	1.3623	.0175
*7	30.00	6.154	.7190	1.3909	.0171
7	32.00	6.094	.6890	1.4514	.0164
*7	34.00	6.040	.6622	1.5100	.0158
7	35.00	6.004	.6446	1.5515	.0153
7	38.00	5.920	.6037	1.6565	.0144
*7	40.00	5.836	.5634	1.7749	.0134
*7 $\frac{5}{8}$	20.00	7.125	1.2450	.8032	.0296
7 $\frac{5}{8}$	24.00	7.025	1.1873	.8422	.0283
7 $\frac{5}{8}$	26.40	6.969	1.1553	.8656	.0275
7 $\frac{5}{8}$	29.70	6.875	1.1022	.9072	.0262
7 $\frac{5}{8}$	33.70	6.765	1.0410	.9606	.0248
7 $\frac{5}{8}$	39.00	6.625	.9645	1.0368	.0230
*8 $\frac{5}{8}$	20.00	8.191	1.9112	.5232	.0455
8 $\frac{5}{8}$	24.00	8.097	1.8487	.5409	.0440
8 $\frac{5}{8}$	28.00	8.017	1.7961	.5568	.0428
8 $\frac{5}{8}$	32.00	7.921	1.7337	.5768	.0413
8 $\frac{5}{8}$	36.00	7.825	1.6720	.5981	.0398
*8 $\frac{5}{8}$	38.00	7.775	1.6402	.6097	.0391
8 $\frac{5}{8}$	40.00	7.725	1.6086	.6217	.0383
*8 $\frac{5}{8}$	43.00	7.651	1.5621	.6401	.0372
8 $\frac{5}{8}$	44.00	7.625	1.5459	.6469	.0368
8 $\frac{5}{8}$	49.00	7.511	1.4755	.6777	.0351

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

**Size of
Inside Casing
O.D. 4.500"**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
198.27	.0283	35.314	13.00	*5½
211.37	.0266	37.647	14.00	5½
229.23	.0245	40.828	15.00	*5½
242.07	.0232	43.115	15.50	5½
279.61	.0201	49.800	17.00	5½
399.11	.0141	71.084	20.00	5½
660.35	.0085	117.613	23.00	5½
133.10	.0422	23.706	14.00	*5¾
153.96	.0365	27.422	17.00	*5¾
181.94	.0309	32.404	19.50	*5¾
221.37	.0254	39.429	22.50	*5¾
100.29	.0560	17.862	15.00	*6
102.94	.0545	18.335	16.00	*6
108.90	.0516	19.397	17.00	*6
112.26	.0500	19.995	18.00	*6
122.64	.0458	21.843	20.00	*6
142.82	.0393	25.438	23.00	*6
169.11	.0332	30.119	26.00	*6
59.20	.0948	10.544	17.00	*6½
63.00	.0891	11.220	20.00	6½
65.91	.0852	11.739	22.00	*6½
69.52	.0808	12.381	24.00	6½
73.37	.0765	13.067	26.00	*6½
77.48	.0725	13.800	28.00	6½
79.56	.0706	14.170	29.00	*6½
86.10	.0652	15.336	32.00	6½
45.76	.1227	8.150	17.00	7
48.04	.1169	8.556	20.00	7
49.77	.1128	8.864	22.00	*7
50.77	.1106	9.043	23.00	7
51.74	.1085	9.216	24.00	*7
53.79	.1044	9.580	26.00	7
56.06	.1002	9.984	28.00	*7
57.22	.0981	10.191	29.00	7
58.42	.0961	10.405	30.00	*7
60.96	.0921	10.857	32.00	7
63.42	.0885	11.296	34.00	*7
65.16	.0862	11.606	35.00	7
69.57	.0807	12.391	38.00	7
74.55	.0753	13.277	40.00	*7
33.73	.1664	6.008	20.00	*7½
35.37	.1587	6.300	24.00	7½
36.35	.1544	6.475	26.40	7½
38.10	.1473	6.787	29.70	7½
40.35	.1392	7.186	33.70	7½
43.54	.1289	7.756	39.00	7½
21.98	.2555	3.914	20.00	*8½
22.72	.2471	4.046	24.00	8½
23.38	.2401	4.165	28.00	8½
24.23	.2318	4.315	32.00	8½
25.12	.2235	4.474	36.00	8½
25.61	.2193	4.561	38.00	*8½
26.11	.2150	4.650	40.00	8½
26.89	.2088	4.789	43.00	*8½
27.17	.2067	4.839	44.00	8½
28.46	.1973	5.070	49.00	8½

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 4.750"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*6	15.00	5.524	.3244	3.0822	.0077
*6	16.00	5.500	.3136	3.1883	.0075
*6	17.00	5.450	.2913	3.4328	.0069
*6	18.00	5.424	.2798	3.5743	.0067
*6	20.00	5.352	.2481	4.0303	.0059
*6	23.00	5.240	.1997	5.0070	.0048
*6	26.00	5.132	.1540	6.4928	.0037
*6½	17.00	6.135	.6151	1.6258	.0146
6½	20.00	6.049	.5723	1.7472	.0136
*6½	22.00	5.989	.5429	1.8421	.0129
6½	24.00	5.921	.5098	1.9615	.0121
*6½	26.00	5.855	.4781	2.0915	.0114
6½	28.00	5.791	.4477	2.2336	.0107
*6½	29.00	5.761	.4336	2.3065	.0103
6½	32.00	5.675	.3934	2.5417	.0094
7	17.00	6.538	.8235	1.2144	.0196
7	20.00	6.456	.7800	1.2821	.0186
*7	22.00	6.398	.7496	1.3341	.0178
7	23.00	6.366	.7329	1.3644	.0175
*7	24.00	6.336	.7174	1.3940	.0171
7	26.00	6.276	.6865	1.4567	.0163
*7	28.00	6.214	.6549	1.5270	.0156
7	29.00	6.184	.6397	1.5632	.0152
*7	30.00	6.154	.6246	1.6010	.0149
7	32.00	6.094	.5946	1.6817	.0142
*7	34.00	6.040	.5679	1.7609	.0135
7	35.00	6.004	.5502	1.8175	.0131
7	38.00	5.920	.5093	1.9633	.0121
*7	40.00	5.836	.4691	2.1320	.0112
*7½	20.00	7.125	1.1507	.8690	.0274
7½	24.00	7.025	1.0930	.9150	.0260
7½	26.40	6.969	1.0610	.9425	.0253
7½	29.70	6.875	1.0079	.9922	.0240
7½	33.70	6.765	.9467	1.0563	.0225
7½	39.00	6.625	.8702	1.1492	.0207
*8	26.00	7.386	1.3052	.7662	.0311
*8½	28.00	7.485	1.3653	.7325	.0325
*8½	32.00	7.385	1.3046	.7665	.0311
*8½	35.50	7.285	1.2448	.8034	.0296
*8½	39.50	7.185	1.1857	.8434	.0282
*8½	20.00	8.191	1.8168	.5504	.0433
8½	24.00	8.097	1.7544	.5700	.0418
8½	28.00	8.017	1.7018	.5876	.0405
8½	32.00	7.921	1.6393	.6100	.0390
8½	36.00	7.825	1.5777	.6339	.0376
*8½	38.00	7.775	1.5458	.6469	.0368
8½	40.00	7.725	1.5142	.6604	.0361
*8½	43.00	7.651	1.4678	.6813	.0349
8½	44.00	7.625	1.4516	.6889	.0346
8½	49.00	7.511	1.3812	.7240	.0329

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 4.750"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
129.45	.0434	23.056	15.00	*6
133.91	.0419	23.850	16.00	*6
144.18	.0389	25.679	17.00	*6
150.12	.0374	26.738	18.00	*6
169.27	.0332	30.149	20.00	*6
210.29	.0267	37.455	23.00	*6
272.70	.0206	48.570	26.00	*6
68.28	.0822	12.162	17.00	*6 $\frac{5}{8}$
73.38	.0765	13.070	20.00	6 $\frac{5}{8}$
77.37	.0726	13.780	22.00	*6 $\frac{5}{8}$
82.38	.0682	14.673	24.00	6 $\frac{5}{8}$
87.85	.0639	15.646	26.00	*6 $\frac{5}{8}$
93.81	.0598	16.709	28.00	6 $\frac{5}{8}$
96.87	.0580	17.254	29.00	*6 $\frac{5}{8}$
106.75	.0526	19.013	32.00	6 $\frac{5}{8}$
51.00	.1101	9.084	17.00	7
53.85	.1043	9.591	20.00	7
56.03	.1002	9.980	22.00	*7
57.31	.0980	10.207	23.00	7
58.55	.0959	10.428	24.00	*7
61.18	.0918	10.897	26.00	7
64.13	.0875	11.423	28.00	*7
65.65	.0855	11.693	29.00	7
67.24	.0835	11.976	30.00	*7
70.63	.0795	12.580	32.00	7
73.96	.0759	13.172	34.00	*7
76.33	.0736	13.596	35.00	7
82.46	.0681	14.687	38.00	7
89.54	.0627	15.948	40.00	*7
36.50	.1538	6.501	20.00	*7 $\frac{5}{8}$
38.43	.1461	6.844	24.00	7 $\frac{5}{8}$
39.59	.1418	7.051	26.40	7 $\frac{5}{8}$
41.67	.1347	7.422	29.70	7 $\frac{5}{8}$
44.37	.1266	7.902	33.70	7 $\frac{5}{8}$
48.27	.1163	8.596	39.00	7 $\frac{5}{8}$
32.18	.1745	5.731	26.00	*8
30.76	.1825	5.479	28.00	*8 $\frac{1}{8}$
32.19	.1744	5.734	32.00	*8 $\frac{1}{8}$
33.74	.1664	6.010	35.50	*8 $\frac{1}{8}$
35.42	.1585	6.309	39.50	*8 $\frac{1}{8}$
23.12	.2429	4.117	20.00	*8 $\frac{5}{8}$
23.94	.2345	4.264	24.00	8 $\frac{5}{8}$
24.68	.2275	4.396	28.00	8 $\frac{5}{8}$
25.62	.2191	4.563	32.00	8 $\frac{5}{8}$
26.62	.2109	4.742	36.00	8 $\frac{5}{8}$
27.17	.2066	4.839	38.00	*8 $\frac{5}{8}$
27.74	.2024	4.940	40.00	8 $\frac{5}{8}$
28.61	.1962	5.096	43.00	*8 $\frac{5}{8}$
28.93	.1940	5.153	44.00	8 $\frac{5}{8}$
30.41	.1846	5.416	49.00	8 $\frac{5}{8}$

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 5.000"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	17.00	6.538	.7240	1.3812	.0172
7	20.00	6.456	.6805	1.4694	.0162
*7	22.00	6.398	.6501	1.5382	.0155
7	23.00	6.366	.6335	1.5786	.0151
*7	24.00	6.336	.6179	1.6184	.0147
7	26.00	6.276	.5870	1.7035	.0140
*7	28.00	6.214	.5554	1.8004	.0132
7	29.00	6.184	.5403	1.8509	.0129
*7	30.00	6.154	.5252	1.9042	.0125
7	32.00	6.094	.4952	2.0195	.0118
*7	34.00	6.040	.4684	2.1347	.0112
7	35.00	6.004	.4508	2.2185	.0107
7	38.00	5.920	.4099	2.4397	.0098
*7	40.00	5.836	.3696	2.7056	.0088
*7½	20.00	7.125	1.0512	.9513	.0250
7½	24.00	7.025	.9935	1.0065	.0237
7½	26.40	6.969	.9615	1.0400	.0229
7½	29.70	6.875	.9084	1.1008	.0216
7½	33.70	6.765	.8472	1.1803	.0202
7½	39.00	6.625	.7707	1.2975	.0184
*8½	20.00	8.191	1.7174	.5823	.0409
8½	24.00	8.097	1.6549	.6043	.0394
8½	28.00	8.017	1.6023	.6241	.0382
8½	32.00	7.921	1.5399	.6494	.0367
8½	36.00	7.825	1.4782	.6765	.0352
*8½	38.00	7.775	1.4464	.6914	.0344
8½	40.00	7.725	1.4148	.7068	.0337
*8½	43.00	7.651	1.3683	.7308	.0326
8½	44.00	7.625	1.3521	.7396	.0322
8½	49.00	7.511	1.2817	.7802	.0305
*9	34.00	8.290	1.7839	.5606	.0425
*9	38.00	8.196	1.7207	.5812	.0410
*9	40.00	8.150	1.6900	.5917	.0402
*9	45.00	8.032	1.6121	.6203	.0384
*9	55.00	7.812	1.4699	.6803	.0350
*9½	29.30	9.063	2.3312	.4290	.0555
9½	32.30	9.001	2.2855	.4375	.0544
9½	36.00	8.921	2.2270	.4490	.0530
*9½	38.00	8.877	2.1951	.4556	.0523
9½	40.00	8.835	2.1647	.4620	.0515
9½	43.50	8.755	2.1073	.4745	.0502
9½	47.00	8.681	2.0547	.4867	.0489
9½	53.50	8.535	1.9521	.5123	.0465
*10	33.00	9.384	2.5728	.3887	.0613
10¾	32.75	10.192	3.2182	.3107	.0766
*10¾	35.75	10.136	3.1717	.3153	.0755
10¾	40.50	10.050	3.1009	.3225	.0738
10¾	45.50	9.950	3.0193	.3312	.0719
10¾	51.00	9.850	2.9385	.3403	.0700
*10¾	54.00	9.784	2.8856	.3465	.0687
10¾	55.50	9.760	2.8665	.3489	.0683
*10¾	60.70	9.660	2.7873	.3588	.0664
*10¾	65.70	9.560	2.7089	.3692	.0645

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 5.000"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
58.01	.0968	10.332	17.00	7
61.72	.0910	10.992	20.00	7
64.60	.0869	11.506	22.00	*7
66.30	.0847	11.809	23.00	7
67.97	.0826	12.106	24.00	*7
71.55	.0785	12.743	26.00	7
75.62	.0743	13.468	28.00	*7
77.74	.0722	13.846	29.00	7
79.97	.0702	14.244	30.00	*7
84.82	.0662	15.107	32.00	7
89.66	.0626	15.969	34.00	*7
93.18	.0603	16.595	35.00	7
102.47	.0548	18.250	38.00	7
113.64	.0494	20.239	40.00	*7
39.95	.1405	7.116	20.00	*7½
42.27	.1328	7.529	24.00	7½
43.68	.1285	7.780	26.40	7½
46.23	.1214	8.235	29.70	7½
49.57	.1133	8.822	33.70	7½
54.49	.1030	9.706	39.00	7½
24.46	.2296	4.356	20.00	*8½
25.38	.2212	4.520	24.00	8½
26.21	.2142	4.669	28.00	8½
27.27	.2059	4.858	32.00	8½
28.41	.1976	5.061	36.00	8½
29.04	.1934	5.172	38.00	*8½
29.69	.1891	5.287	40.00	8½
30.69	.1829	5.467	43.00	*8½
31.06	.1808	5.532	44.00	8½
32.77	.1713	5.836	49.00	8½
23.54	.2385	4.193	34.00	*9
24.41	.2300	4.347	38.00	*9
24.85	.2259	4.426	40.00	*9
26.05	.2155	4.640	45.00	*9
28.57	.1965	5.089	55.00	*9
18.02	.3116	3.209	29.30	*9½
18.38	.3055	3.273	32.30	9½
18.86	.2977	3.359	36.00	9½
19.13	.2934	3.408	38.00	*9½
19.40	.2894	3.456	40.00	9½
19.93	.2817	3.550	43.50	9½
20.44	.2747	3.641	47.00	9½
21.52	.2610	3.832	53.50	9½
16.32	.3439	2.908	33.00	*10
13.05	.4302	2.324	32.75	10³/₄
13.24	.4240	2.359	35.75	*10³/₄
13.54	.4145	2.412	40.50	10³/₄
13.91	.4036	2.478	45.50	10³/₄
14.29	.3928	2.546	51.00	10³/₄
14.55	.3858	2.592	54.00	*10³/₄
14.65	.3832	2.610	55.50	10³/₄
15.07	.3726	2.684	60.70	*10³/₄
15.50	.3621	2.762	65.70	*10³/₄

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 5.500"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	17.00	6.538	.5098	1.9615	.0121
7	20.00	6.456	.4663	2.1444	.0111
*7	22.00	6.398	.4359	2.2940	.0104
7	23.00	6.366	.4193	2.3852	.0100
*7	24.00	6.336	.4037	2.4770	.0096
7	26.00	6.276	.3728	2.6821	.0089
*7	28.00	6.214	.3412	2.9305	.0081
7	29.00	6.184	.3261	3.0669	.0078
*7	30.00	6.154	.3110	3.2158	.0074
7	32.00	6.094	.2810	3.5589	.0067
*7	34.00	6.040	.2542	3.9332	.0061
7	35.00	6.004	.2366	4.2273	.0056
7	38.00	5.920	.1957	5.1101	.0047
*7	40.00	5.836	.1554	6.4349	.0037
*7½	20.00	7.125	.8370	1.1947	.0199
7½	24.00	7.025	.7793	1.2832	.0186
7½	26.40	6.969	.7473	1.3381	.0178
7½	29.70	6.875	.6942	1.4404	.0165
7½	33.70	6.765	.6330	1.5797	.0151
7½	39.00	6.625	.5565	1.7968	.0133
*8½	20.00	8.191	1.5032	.6653	.0358
8½	24.00	8.097	1.4407	.6941	.0343
8½	28.00	8.017	1.3881	.7204	.0331
8½	32.00	7.921	1.3257	.7543	.0316
8½	36.00	7.825	1.2640	.7911	.0301
*8½	38.00	7.775	1.2322	.8116	.0293
8½	40.00	7.725	1.2006	.8329	.0286
*8½	43.00	7.651	1.1541	.8664	.0275
8½	44.00	7.625	1.1379	.8788	.0271
8½	49.00	7.511	1.0675	.9367	.0254
*9	34.00	8.290	1.5697	.6370	.0374
*9	38.00	8.196	1.5065	.6638	.0359
*9	40.00	8.150	1.4758	.6776	.0351
*9	45.00	8.032	1.3979	.7153	.0333
*9	55.00	7.812	1.2557	.7964	.0299
*9½	29.30	9.063	2.1170	.4724	.0504
9½	32.30	9.001	2.0713	.4828	.0493
9½	36.00	8.921	2.0128	.4968	.0479
*9½	38.00	8.877	1.9809	.5048	.0472
9½	40.00	8.835	1.9505	.5127	.0464
9½	43.50	8.755	1.8931	.5282	.0451
9½	47.00	8.681	1.8405	.5433	.0438
9½	53.50	8.535	1.7379	.5754	.0414
*10	33.00	9.384	2.3586	.4240	.0562
10¾	32.75	10.192	3.0040	.3329	.0715
*10¾	35.75	10.136	2.9575	.3381	.0704
10¾	40.50	10.050	2.8867	.3464	.0687
10¾	45.50	9.950	2.8051	.3565	.0668
10¾	51.00	9.850	2.7243	.3671	.0649
*10¾	54.00	9.784	2.6714	.3743	.0636
10¾	55.50	9.760	2.6523	.3770	.0632
*10¾	60.70	9.660	2.5731	.3886	.0613
*10¾	65.70	9.560	2.4947	.4009	.0594

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 5.500"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
82.38	.0682	14.673	17.00	7
90.06	.0623	16.041	20.00	7
96.35	.0583	17.160	22.00	*7
100.18	.0560	17.842	23.00	7
104.03	.0540	18.529	24.00	*7
112.65	.0498	20.064	26.00	7
123.08	.0456	21.921	28.00	*7
128.81	.0436	22.942	29.00	7
135.06	.0416	24.056	30.00	*7
149.48	.0376	26.623	32.00	7
165.19	.0340	29.422	34.00	*7
177.55	.0316	31.622	35.00	7
214.62	.0262	38.226	38.00	7
270.27	.0208	48.136	40.00	*7
50.18	.1119	8.937	20.00	*7½
53.89	.1042	9.599	24.00	7½
56.20	.0999	10.010	26.40	7½
60.50	.0928	10.775	29.70	7½
66.35	.0846	11.817	33.70	7½
75.47	.0744	13.441	39.00	7½
27.94	.2009	4.976	20.00	*8½
29.15	.1926	5.192	24.00	8½
30.26	.1856	5.389	28.00	8½
31.68	.1772	5.643	32.00	8½
33.23	.1690	5.918	36.00	8½
34.09	.1647	6.071	38.00	*8½
34.98	.1605	6.231	40.00	8½
36.39	.1543	6.481	43.00	*8½
36.91	.1521	6.574	44.00	8½
39.34	.1427	7.007	49.00	8½
26.76	.2098	4.765	34.00	*9
27.88	.2014	4.965	38.00	*9
28.46	.1973	5.069	40.00	*9
30.04	.1869	5.351	45.00	*9
33.45	.1679	5.957	55.00	*9
19.84	.2830	3.534	29.30	*9½
20.28	.2769	3.611	32.30	9½
20.87	.2691	3.716	36.00	9½
21.20	.2648	3.776	38.00	*9½
21.53	.2607	3.835	40.00	9½
22.19	.2531	3.951	43.50	9½
22.82	.2460	4.064	47.00	9½
24.17	.2323	4.304	53.50	9½
17.81	.3153	3.172	33.00	*10
13.98	.4016	2.490	32.75	10³/₄
14.20	.3954	2.529	35.75	*10³/₄
14.55	.3859	2.591	40.50	10³/₄
14.97	.3750	2.667	45.50	10³/₄
15.42	.3642	2.746	51.00	10³/₄
15.72	.3571	2.800	54.00	*10³/₄
15.84	.3546	2.820	55.50	10³/₄
16.32	.3440	2.907	60.70	*10³/₄
16.84	.3335	2.999	65.70	*10³/₄

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 5.750"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	17.00	6.538	.3951	2.5312	.0094
7	20.00	6.456	.3516	2.8442	.0084
*7	22.00	6.398	.3212	3.1136	.0076
7	23.00	6.366	.3045	3.2840	.0073
*7	24.00	6.336	.2890	3.4607	.0069
7	26.00	6.276	.2581	3.8747	.0061
*7	28.00	6.214	.2265	4.4152	.0054
7	29.00	6.184	.2113	4.7322	.0050
*7	30.00	6.154	.1962	5.0964	.0047
7	32.00	6.094	.1662	6.0157	.0040
*7	34.00	6.040	.1395	7.1685	.0033
7	35.00	6.004	.1218	8.2096	.0029
7	38.00	5.920	.0809	12.3544	.0019
*7	40.00	5.836	.0407	24.5985	.0010
*7½	20.00	7.125	.7223	1.3845	.0172
7½	24.00	7.025	.6646	1.5048	.0158
7½	26.40	6.969	.6326	1.5808	.0151
7½	29.70	6.875	.5795	1.7257	.0138
7½	33.70	6.765	.5183	1.9295	.0123
7½	39.00	6.625	.4418	2.2635	.0105
*8	26.00	7.386	.8768	1.1405	.0209
*8¼	28.00	7.485	.9369	1.0674	.0223
*8¼	32.00	7.385	.8762	1.1413	.0209
*8¼	35.50	7.285	.8164	1.2250	.0194
*8¼	39.50	7.185	.7573	1.3205	.0180
*8½	20.00	8.191	1.3884	.7202	.0331
8½	24.00	8.097	1.3260	.7542	.0316
8½	28.00	8.017	1.2734	.7853	.0303
8½	32.00	7.921	1.2109	.8258	.0288
8½	36.00	7.825	1.1493	.8701	.0274
*8½	38.00	7.775	1.1174	.8949	.0266
8½	40.00	7.725	1.0858	.9210	.0259
*8½	43.00	7.651	1.0394	.9621	.0247
8½	44.00	7.625	1.0232	.9773	.0244
8½	49.00	7.511	.9528	1.0496	.0227
*9	34.00	8.290	1.4550	.6873	.0346
*9	38.00	8.196	1.3918	.7185	.0331
*9	40.00	8.150	1.3611	.7347	.0324
*9	45.00	8.032	1.2832	.7793	.0306
*9	55.00	7.812	1.1410	.8765	.0272
*9½	29.30	9.063	2.0023	.4994	.0477
9½	32.30	9.001	1.9566	.5111	.0466
9½	36.00	8.921	1.8981	.5268	.0452
*9½	38.00	8.877	1.8661	.5359	.0444
9½	40.00	8.835	1.8358	.5447	.0437
9½	43.50	8.755	1.7784	.5623	.0423
9½	47.00	8.681	1.7257	.5795	.0411
9½	53.50	8.535	1.6232	.6161	.0386
*10	33.00	9.384	2.2439	.4457	.0534
10¾	32.75	10.192	2.8892	.3461	.0688
*10¾	35.75	10.136	2.8428	.3518	.0677
10¾	40.50	10.050	2.7719	.3608	.0660
10¾	45.50	9.950	2.6903	.3717	.0641
10¾	51.00	9.850	2.6096	.3832	.0621
*10¾	54.00	9.784	2.5567	.3911	.0609
10¾	55.50	9.760	2.5376	.3941	.0604
*10¾	60.70	9.660	2.4583	.4068	.0585
*10¾	65.70	9.560	2.3799	.4202	.0567

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 5.750"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
106.31	.0528	18.935	17.00	7
119.46	.0470	21.276	20.00	7
130.77	.0429	23.291	22.00	*7
137.93	.0407	24.566	23.00	7
145.35	.0386	25.888	24.00	*7
162.74	.0345	28.984	26.00	7
185.44	.0303	33.028	28.00	*7
198.75	.0282	35.399	29.00	7
214.05	.0262	38.124	30.00	*7
252.66	.0222	45.000	32.00	7
301.08	.0186	53.624	34.00	*7
344.80	.0163	61.412	35.00	7
518.88	.0108	92.417	38.00	7
33.14	.0054	184.010	40.00	*7
58.15	.0966	10.357	20.00	*7½
63.20	.0888	11.256	24.00	7½
66.39	.0846	11.825	26.40	7½
72.48	.0775	12.909	29.70	7½
81.04	.0693	14.434	33.70	7½
95.07	.0591	16.932	39.00	7½
47.90	.1172	8.532	26.00	*8
44.83	.1252	7.985	28.00	*8½
47.93	.1171	8.537	32.00	*8½
51.45	.1091	9.163	35.50	*8½
55.46	.1012	9.878	39.50	*8½
30.25	.1856	5.388	20.00	*8½
31.68	.1773	5.642	24.00	8½
32.98	.1702	5.875	28.00	8½
34.68	.1619	6.177	32.00	8½
36.55	.1536	6.509	36.00	8½
37.59	.1494	6.694	38.00	*8½
38.68	.1452	6.889	40.00	8½
40.41	.1389	7.197	43.00	*8½
41.05	.1368	7.311	44.00	8½
44.08	.1274	7.851	49.00	8½
28.87	.1945	5.141	34.00	*9
30.18	.1861	5.375	38.00	*9
30.86	.1820	5.496	40.00	*9
32.73	.1715	5.830	45.00	*9
36.81	.1525	6.556	55.00	*9
20.98	.2677	3.736	29.30	*9½
21.47	.2616	3.823	32.30	9½
22.13	.2537	3.941	36.00	9½
22.51	.2495	4.009	38.00	*9½
22.88	.2454	4.075	40.00	9½
23.62	.2377	4.206	43.50	9½
24.34	.2307	4.335	47.00	9½
25.88	.2170	4.609	53.50	9½
18.72	.3000	3.334	33.00	*10
14.54	.3862	2.589	32.75	10½
14.77	.3800	2.631	35.75	*10½
15.15	.3706	2.699	40.50	10½
15.61	.3596	2.781	45.50	10½
16.09	.3488	2.867	51.00	10½
16.43	.3418	2.926	54.00	*10½
16.55	.3392	2.948	55.50	10½
17.08	.3286	3.043	60.70	*10½
17.65	.3181	3.143	65.70	*10½

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 6.000"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	17.00	6.538	.2752	3.6335	.0066
*7	20.00	6.456	.2317	4.3152	.0055
7	22.00	6.398	.2013	4.9671	.0048
*7	23.00	6.366	.1847	5.4154	.0044
7	24.00	6.336	.1691	5.9133	.0040
*7	26.00	6.276	.1382	7.2339	.0033
7	28.00	6.214	.1066	9.3771	.0025
7	29.00	6.184	.0915	10.9328	.0022
*7	30.00	6.154	.0764	13.0949	.0018
*7 ⁵ / ₈	20.00	7.125	.6024	1.6599	.0143
7 ⁵ / ₈	24.00	7.025	.5447	1.8359	.0130
7 ⁵ / ₈	26.40	6.969	.5127	1.9503	.0122
7 ⁵ / ₈	29.70	6.875	.4596	2.1756	.0109
7 ⁵ / ₈	33.70	6.765	.3984	2.5099	.0095
7 ⁵ / ₈	39.00	6.625	.3219	3.1062	.0077
*8	26.00	7.386	.7570	1.3211	.0180
*8 ¹ / ₈	28.00	7.485	.8170	1.2239	.0195
*8 ¹ / ₈	32.00	7.385	.7564	1.3221	.0180
*8 ¹ / ₈	35.50	7.285	.6965	1.4357	.0166
*8 ¹ / ₈	39.50	7.185	.6375	1.5687	.0152
*8 ⁵ / ₈	20.00	8.191	1.2686	.7883	.0302
8 ⁵ / ₈	24.00	8.097	1.2061	.8291	.0287
8 ⁵ / ₈	28.00	8.017	1.1535	.8669	.0275
8 ⁵ / ₈	32.00	7.921	1.0911	.9165	.0260
8 ⁵ / ₈	36.00	7.825	1.0294	.9714	.0245
*8 ⁵ / ₈	38.00	7.775	.9976	1.0024	.0238
8 ⁵ / ₈	40.00	7.725	.9660	1.0352	.0230
*8 ⁵ / ₈	43.00	7.651	.9195	1.0875	.0219
8 ⁵ / ₈	44.00	7.625	.9033	1.1070	.0215
8 ⁵ / ₈	49.00	7.511	.8329	1.2006	.0198
*9	34.00	8.290	1.3351	.7490	.0318
*9	38.00	8.196	1.2719	.7862	.0303
*9	40.00	8.150	1.2412	.8056	.0296
*9	45.00	8.032	1.1633	.8596	.0277
*9	55.00	7.812	1.0211	.9793	.0243
*9 ⁵ / ₈	29.30	9.063	1.8824	.5312	.0448
9 ⁵ / ₈	32.30	9.001	1.8367	.5444	.0437
9 ⁵ / ₈	36.00	8.921	1.7782	.5624	.0423
*9 ⁵ / ₈	38.00	8.877	1.7463	.5726	.0416
9 ⁵ / ₈	40.00	8.835	1.7159	.5828	.0409
9 ⁵ / ₈	43.50	8.755	1.6585	.6029	.0395
9 ⁵ / ₈	47.00	8.681	1.6059	.6227	.0382
9 ⁵ / ₈	53.50	8.535	1.5033	.6652	.0358
*10	33.00	9.384	2.1240	.4708	.0506
10 ³ / ₄	32.75	10.192	2.7694	.3611	.0659
*10 ³ / ₄	35.75	10.136	2.7229	.3673	.0648
10 ³ / ₄	40.50	10.050	2.6521	.3771	.0631
10 ³ / ₄	45.50	9.950	2.5705	.3890	.0612
10 ³ / ₄	51.00	9.850	2.4897	.4017	.0593
*10 ³ / ₄	54.00	9.784	2.4368	.4104	.0580
10 ³ / ₄	55.50	9.760	2.4177	.4136	.0576
*10 ³ / ₄	60.70	9.660	2.3385	.4276	.0557
*10 ³ / ₄	65.70	9.560	2.2601	.4425	.0538

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 6.000"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
152.61	.0368	27.181	17.00	7
181.24	.0310	32.280	20.00	*7
208.62	.0269	37.157	22.00	7
227.45	.0247	40.510	23.00	*7
248.36	.0226	44.234	24.00	7
303.83	.0185	54.114	26.00	*7
393.84	.0143	70.146	28.00	7
459.18	.0122	81.783	29.00	7
549.98	.0102	97.956	30.00	*7
69.72	.0805	12.417	20.00	*7½
77.11	.0728	13.733	24.00	7½
81.91	.0685	14.590	26.40	7½
91.38	.0614	16.275	29.70	7½
105.42	.0533	18.775	33.70	7½
130.46	.0430	23.236	39.00	7½
55.49	.1012	9.882	26.00	*8
51.41	.1092	9.156	28.00	*8⅓
55.53	.1011	9.890	32.00	*8⅓
60.30	.0931	10.740	35.50	*8⅓
65.89	.0852	11.735	39.50	*8⅓
33.11	.1696	5.897	20.00	*8½
34.82	.1612	6.202	24.00	8½
36.41	.1542	6.485	28.00	8½
38.49	.1459	6.856	32.00	8½
40.80	.1376	7.267	36.00	8½
42.10	.1334	7.499	38.00	*8½
43.48	.1291	7.744	40.00	8½
45.68	.1229	8.135	43.00	*8½
46.49	.1208	8.281	44.00	8½
50.42	.1113	8.981	49.00	8½
31.46	.1785	5.603	34.00	*9
33.02	.1700	5.881	38.00	*9
33.84	.1659	6.027	40.00	*9
36.10	.1555	6.430	45.00	*9
41.13	.1365	7.326	55.00	*9
22.31	.2516	3.974	29.30	*9½
22.87	.2455	4.073	32.30	9½
23.62	.2377	4.207	36.00	9½
24.05	.2334	4.284	38.00	*9½
24.48	.2294	4.359	40.00	9½
25.32	.2217	4.510	43.50	9½
26.15	.2147	4.656	47.00	9½
27.94	.2010	4.976	53.50	9½
19.77	.2839	3.522	33.00	*10
15.17	.3702	2.701	32.75	10³/₄
15.42	.3640	2.747	35.75	*10³/₄
15.84	.3545	2.821	40.50	10³/₄
16.34	.3436	2.910	45.50	10³/₄
16.87	.3328	3.005	51.00	10³/₄
17.24	.3258	3.070	54.00	*10³/₄
17.37	.3232	3.094	55.50	10³/₄
17.96	.3126	3.199	60.70	*10³/₄
18.58	.3021	3.310	65.70	*10³/₄

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 6.625"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7 $\frac{5}{8}$	20.00	7.125	.2805	3.5651	.0067
7 $\frac{5}{8}$	24.00	7.025	.2228	4.4890	.0053
7 $\frac{5}{8}$	26.40	6.969	.1908	5.2413	.0045
7 $\frac{5}{8}$	29.70	6.875	.1377	7.2622	.0033
7 $\frac{5}{8}$	33.70	6.765	.0765	13.0747	.0018
*8	26.00	7.386	.4350	2.2987	.0104
*8 $\frac{1}{8}$	28.00	7.485	.4951	2.0198	.0118
*8 $\frac{1}{8}$	32.00	7.385	.4344	2.3019	.0103
*8 $\frac{1}{8}$	35.50	7.285	.3746	2.6697	.0089
*8 $\frac{1}{8}$	39.50	7.185	.3155	3.1693	.0075
*8 $\frac{5}{8}$	20.00	8.191	.9466	1.0564	.0225
8 $\frac{5}{8}$	24.00	8.097	.8842	1.1310	.0211
8 $\frac{5}{8}$	28.00	8.017	.8316	1.2025	.0198
8 $\frac{5}{8}$	32.00	7.921	.7691	1.3001	.0183
8 $\frac{5}{8}$	36.00	7.825	.7075	1.4135	.0168
*8 $\frac{5}{8}$	38.00	7.775	.6756	1.4801	.0161
8 $\frac{5}{8}$	40.00	7.725	.6440	1.5527	.0153
*8 $\frac{5}{8}$	43.00	7.651	.5976	1.6734	.0142
8 $\frac{5}{8}$	44.00	7.625	.5814	1.7200	.0138
8 $\frac{5}{8}$	49.00	7.511	.5110	1.9570	.0122
*9	34.00	8.290	1.0132	.9870	.0241
*9	38.00	8.196	.9500	1.0527	.0226
*9	40.00	8.150	.9193	1.0878	.0219
*9	45.00	8.032	.8414	1.1885	.0200
*9	55.00	7.812	.6992	1.4303	.0166
*9 $\frac{5}{8}$	29.30	9.063	1.5605	.6408	.0372
9 $\frac{5}{8}$	32.30	9.001	1.5148	.6602	.0361
9 $\frac{5}{8}$	36.00	8.921	1.4563	.6867	.0347
*9 $\frac{5}{8}$	38.00	8.877	1.4243	.7021	.0339
9 $\frac{5}{8}$	40.00	8.835	1.3940	.7174	.0332
9 $\frac{5}{8}$	43.50	8.755	1.3366	.7482	.0318
9 $\frac{5}{8}$	47.00	8.681	1.2839	.7789	.0306
9 $\frac{5}{8}$	53.50	8.535	1.1814	.8465	.0281
*10	33.00	9.384	1.8021	.5549	.0429
10 $\frac{3}{4}$	32.75	10.192	2.4474	.4086	.0583
*10 $\frac{3}{4}$	35.75	10.136	2.4010	.4165	.0572
10 $\frac{3}{4}$	40.50	10.050	2.3302	.4292	.0555
10 $\frac{3}{4}$	45.50	9.950	2.2486	.4447	.0535
10 $\frac{3}{4}$	51.00	9.850	2.1678	.4613	.0516
*10 $\frac{3}{4}$	54.00	9.784	2.1149	.4728	.0504
10 $\frac{3}{4}$	55.50	9.760	2.0958	.4772	.0499
*10 $\frac{3}{4}$	60.70	9.660	2.0165	.4959	.0480
*10 $\frac{3}{4}$	65.70	9.560	1.9381	.5160	.0461

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 6.625"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
149.73	.0375	26.669	20.00	7 $\frac{1}{8}$
188.54	.0298	33.580	24.00	7 $\frac{1}{8}$
220.13	.0255	39.207	26.40	7 $\frac{1}{8}$
305.01	.0184	54.325	29.70	7 $\frac{1}{8}$
549.14	.0102	97.806	33.70	7 $\frac{1}{8}$
96.55	.0582	17.196	26.00	*8
84.83	.0662	15.109	28.00	*8 $\frac{1}{8}$
96.68	.0581	17.220	32.00	*8 $\frac{1}{8}$
112.13	.0501	19.971	35.50	*8 $\frac{1}{8}$
133.11	.0422	23.708	39.50	*8 $\frac{1}{8}$
44.37	.1265	7.902	20.00	*8 $\frac{5}{8}$
47.50	.1182	8.461	24.00	8 $\frac{5}{8}$
50.51	.1112	8.996	28.00	8 $\frac{5}{8}$
54.61	.1028	9.726	32.00	8 $\frac{5}{8}$
59.37	.0946	10.574	36.00	8 $\frac{5}{8}$
62.16	.0903	11.072	38.00	*8 $\frac{5}{8}$
65.21	.0861	11.615	40.00	8 $\frac{5}{8}$
70.28	.0799	12.518	43.00	*8 $\frac{5}{8}$
72.24	.0777	12.866	44.00	8 $\frac{5}{8}$
82.19	.0683	14.639	49.00	8 $\frac{5}{8}$
41.45	.1354	7.383	34.00	*9
44.21	.1270	7.874	38.00	*9
45.69	.1229	8.137	40.00	*9
49.92	.1125	8.891	45.00	*9
60.07	.0935	10.699	55.00	*9
26.91	.2086	4.794	29.30	*9 $\frac{5}{8}$
27.73	.2025	4.938	32.30	9 $\frac{5}{8}$
28.84	.1947	5.137	36.00	9 $\frac{5}{8}$
29.49	.1904	5.252	38.00	*9 $\frac{5}{8}$
30.13	.1863	5.366	40.00	9 $\frac{5}{8}$
31.42	.1787	5.597	43.50	9 $\frac{5}{8}$
32.71	.1716	5.826	47.00	9 $\frac{5}{8}$
35.55	.1579	6.332	53.50	9 $\frac{5}{8}$
23.31	.2409	4.151	33.00	*10
17.16	.3272	3.056	32.75	10 $\frac{3}{4}$
17.49	.3210	3.116	35.75	*10 $\frac{3}{4}$
18.02	.3115	3.210	40.50	10 $\frac{3}{4}$
18.68	.3006	3.327	45.50	10 $\frac{3}{4}$
19.37	.2898	3.451	51.00	10 $\frac{3}{4}$
19.86	.2827	3.537	54.00	*10 $\frac{3}{4}$
20.04	.2802	3.569	55.50	10 $\frac{3}{4}$
20.83	.2696	3.710	60.70	*10 $\frac{3}{4}$
21.67	.2591	3.860	65.70	*10 $\frac{3}{4}$

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 7.000"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*8 ⁵ / ₈	20.00	8.191	.7382	1.3546	.0176
8 ⁵ / ₈	24.00	8.097	.6757	1.4799	.0161
8 ⁵ / ₈	28.00	8.017	.6231	1.6049	.0148
8 ⁵ / ₈	32.00	7.921	.5607	1.7835	.0133
8 ⁵ / ₈	36.00	7.825	.4990	2.0040	.0119
*8 ⁵ / ₈	38.00	7.775	.4672	2.1405	.0111
8 ⁵ / ₈	40.00	7.725	.4356	2.2959	.0104
*8 ⁵ / ₈	43.00	7.651	.3891	2.5698	.0093
8 ⁵ / ₈	44.00	7.625	.3729	2.6814	.0089
8 ⁵ / ₈	49.00	7.511	.3025	3.3054	.0072
*9	34.00	8.290	.8047	1.2426	.0192
*9	38.00	8.196	.7415	1.3486	.0177
*9	40.00	8.150	.7108	1.4068	.0169
*9	45.00	8.032	.6329	1.5800	.0151
*9	55.00	7.812	.4907	2.0378	.0117
*9 ⁵ / ₈	29.30	9.063	1.3520	.7396	.0322
9 ⁵ / ₈	32.30	9.001	1.3063	.7655	.0311
9 ⁵ / ₈	36.00	8.921	1.2478	.8014	.0297
*9 ⁵ / ₈	38.00	8.877	1.2159	.8224	.0289
9 ⁵ / ₈	40.00	8.835	1.1855	.8435	.0282
9 ⁵ / ₈	43.50	8.755	1.1281	.8864	.0269
9 ⁵ / ₈	47.00	8.681	1.0755	.9298	.0256
9 ⁵ / ₈	53.50	8.535	.9729	1.0278	.0232
*10	33.00	9.384	1.5936	.6275	.0379
10 ³ / ₄	32.75	10.192	2.2390	.4466	.0533
*10 ³ / ₄	35.75	10.136	2.1925	.4561	.0522
10 ³ / ₄	40.50	10.050	2.1217	.4713	.0505
10 ³ / ₄	45.50	9.950	2.0401	.4902	.0486
10 ³ / ₄	51.00	9.850	1.9593	.5104	.0467
*10 ³ / ₄	54.00	9.784	1.9064	.5245	.0454
10 ³ / ₄	55.50	9.760	1.8873	.5299	.0449
*10 ³ / ₄	60.70	9.660	1.8081	.5531	.0430
*10 ³ / ₄	65.70	9.560	1.7297	.5782	.0412
*11 ³ / ₄	38.00	11.150	3.0732	.3254	.0732
11 ³ / ₄	42.00	11.084	3.0133	.3319	.0717
11 ³ / ₄	47.00	11.000	2.9376	.3404	.0699
11 ³ / ₄	54.00	10.880	2.8305	.3533	.0674
11 ³ / ₄	60.00	10.772	2.7351	.3656	.0651
*12	40.00	11.384	3.2883	.3041	.0783
*13	40.00	12.438	4.3127	.2319	.1027
*13	45.00	12.360	4.2338	.2362	.1008
*13	50.00	12.282	4.1554	.2407	.0989
*13	54.00	12.220	4.0934	.2443	.0975
13 ³ / ₈	48.00	12.715	4.5970	.2175	.1095
13 ³ / ₈	54.50	12.615	4.4936	.2225	.1070
13 ³ / ₈	61.00	12.515	4.3911	.2277	.1045
13 ³ / ₈	68.00	12.415	4.2894	.2331	.1021
13 ³ / ₈	72.00	12.347	4.2207	.2369	.1005
*13 ³ / ₈	83.00	12.175	4.0486	.2470	.0964

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 7.000"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
56.90	.0987	10.134	20.00	*8 ⁵ / ₈
62.16	.0903	11.071	24.00	8 ⁵ / ₈
67.40	.0833	12.005	28.00	8 ⁵ / ₈
74.91	.0750	13.342	32.00	8 ⁵ / ₈
84.17	.0667	14.991	36.00	8 ⁵ / ₈
89.90	.0625	16.012	38.00	*8 ⁵ / ₈
96.43	.0582	17.174	40.00	8 ⁵ / ₈
107.93	.0520	19.223	43.00	*8 ⁵ / ₈
112.62	.0499	20.058	44.00	8 ⁵ / ₈
138.83	.0404	24.726	49.00	8 ⁵ / ₈
52.19	.1076	9.296	34.00	*9
56.64	.0991	10.088	38.00	*9
59.09	.0950	10.524	40.00	*9
66.36	.0846	11.819	45.00	*9
85.59	.0656	15.244	55.00	*9
31.06	.1807	5.533	29.30	*9 ⁵ / ₈
32.15	.1746	5.726	32.30	9 ⁵ / ₈
33.66	.1668	5.995	36.00	9 ⁵ / ₈
34.54	.1625	6.152	38.00	*9 ⁵ / ₈
35.43	.1585	6.310	40.00	9 ⁵ / ₈
37.23	.1508	6.631	43.50	9 ⁵ / ₈
39.05	.1438	6.956	47.00	9 ⁵ / ₈
43.17	.1301	7.689	53.50	9 ⁵ / ₈
26.36	.2130	4.694	33.00	*10
18.76	.2993	3.341	32.75	10 ³ / ₄
19.16	.2931	3.412	35.75	*10 ³ / ₄
19.80	.2836	3.526	40.50	10 ³ / ₄
20.59	.2727	3.667	45.50	10 ³ / ₄
21.44	.2619	3.818	51.00	10 ³ / ₄
22.03	.2549	3.924	54.00	*10 ³ / ₄
22.25	.2523	3.964	55.50	10 ³ / ₄
23.23	.2417	4.137	60.70	*10 ³ / ₄
24.28	.2312	4.325	65.70	*10 ³ / ₄
13.67	.4108	2.434	38.00	*11 ³ / ₄
13.94	.4028	2.483	42.00	11 ³ / ₄
14.30	.3927	2.546	47.00	11 ³ / ₄
14.84	.3784	2.643	54.00	11 ³ / ₄
15.36	.3656	2.735	60.00	11 ³ / ₄
12.77	.4396	2.275	40.00	*12
9.74	.5765	1.735	40.00	*13
9.92	.5660	1.767	45.00	*13
10.11	.5555	1.800	50.00	*13
10.26	.5472	1.827	54.00	*13
9.14	.6145	1.627	48.00	13 ³ / ₈
9.35	.6007	1.665	54.50	13 ³ / ₈
9.56	.5870	1.704	61.00	13 ³ / ₈
9.79	.5734	1.744	68.00	13 ³ / ₈
9.95	.5642	1.772	72.00	13 ³ / ₈
10.37	.5412	1.848	83.00	*13 ³ / ₈

**Note: No allowance made for couplings.

**Size of
Inside Tubing
O.D. 7.625"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*8 ⁵ / ₈	20.00	8.191	.3652	2.7380	.0087
8 ⁵ / ₈	24.00	8.097	.3028	3.3029	.0072
8 ⁵ / ₈	28.00	8.017	.2502	3.9973	.0060
8 ⁵ / ₈	32.00	7.921	.1877	5.3264	.0045
8 ⁵ / ₈	36.00	7.825	.1261	7.9320	.0030
*8 ⁵ / ₈	38.00	7.775	.0942	10.6103	.0022
*9	34.00	8.290	.4318	2.3159	.0103
*9	38.00	8.196	.3686	2.7131	.0088
*9	40.00	8.150	.3379	2.9595	.0080
*9	45.00	8.032	.2600	3.8463	.0062
*9	55.00	7.812	.1178	8.4906	.0028
*9 ⁵ / ₈	29.30	9.063	.9791	1.0214	.0233
9 ⁵ / ₈	32.30	9.001	.9334	1.0714	.0222
9 ⁵ / ₈	36.00	8.921	.8749	1.1430	.0208
*9 ⁵ / ₈	38.00	8.877	.8429	1.1863	.0201
9 ⁵ / ₈	40.00	8.835	.8126	1.2306	.0193
9 ⁵ / ₈	43.50	8.755	.7552	1.3242	.0180
9 ⁵ / ₈	47.00	8.681	.7025	1.4234	.0167
9 ⁵ / ₈	53.50	8.535	.6000	1.6667	.0143
*10	33.00	9.384	1.2207	.8192	.0291
10 ³ / ₄	32.75	10.192	1.8660	.5359	.0444
*10 ³ / ₄	35.75	10.136	1.8196	.5496	.0433
10 ³ / ₄	40.50	10.050	1.7488	.5718	.0416
10 ³ / ₄	45.50	9.950	1.6672	.5998	.0397
10 ³ / ₄	51.00	9.850	1.5864	.6304	.0378
*10 ³ / ₄	54.00	9.784	1.5335	.6521	.0365
10 ³ / ₄	55.50	9.760	1.5144	.6603	.0361
*10 ³ / ₄	60.70	9.660	1.4351	.6968	.0342
*10 ³ / ₄	65.70	9.560	1.3567	.7371	.0323
*11 ³ / ₄	38.00	11.150	2.7002	.3703	.0643
11 ³ / ₄	42.00	11.084	2.6403	.3787	.0629
11 ³ / ₄	47.00	11.000	2.5647	.3899	.0611
11 ³ / ₄	54.00	10.880	2.4575	.4069	.0585
11 ³ / ₄	60.00	10.772	2.3621	.4233	.0562
*12	40.00	11.384	2.9154	.3430	.0694
*13	40.00	12.438	3.9398	.2538	.0938
*13	45.00	12.360	3.8609	.2590	.0919
*13	50.00	12.282	3.7824	.2644	.0901
*13	54.00	12.220	3.7205	.2688	.0886
13 ³ / ₈	48.00	12.715	4.2240	.2367	.1006
13 ³ / ₈	54.50	12.615	4.1207	.2427	.0981
13 ³ / ₈	61.00	12.515	4.0182	.2489	.0957
13 ³ / ₈	68.00	12.415	3.9164	.2553	.0932
13 ³ / ₈	72.00	12.347	3.8477	.2599	.0916
*13 ³ / ₈	83.00	12.175	3.6757	.2721	.0875

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 7.625"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
114.99	.0488	20.481	20.00	*8 $\frac{5}{8}$
138.72	.0405	24.707	24.00	8 $\frac{5}{8}$
167.88	.0334	29.902	28.00	8 $\frac{5}{8}$
223.71	.0251	39.844	32.00	8 $\frac{5}{8}$
333.14	.0169	59.335	36.00	8 $\frac{5}{8}$
445.63	.0126	79.371	38.00	*8 $\frac{5}{8}$
97.27	.0577	17.324	34.00	*9
113.95	.0493	20.296	38.00	*9
124.30	.0452	22.138	40.00	*9
161.54	.0348	28.772	45.00	*9
356.60	.0157	63.514	55.00	*9
42.90	.1309	7.640	29.30	*9 $\frac{5}{8}$
45.00	.1248	8.014	32.30	9 $\frac{5}{8}$
48.01	.1170	8.550	36.00	9 $\frac{5}{8}$
49.83	.1127	8.874	38.00	*9 $\frac{5}{8}$
51.69	.1086	9.206	40.00	9 $\frac{5}{8}$
55.62	.1010	9.906	43.50	9 $\frac{5}{8}$
59.78	.0939	10.648	47.00	9 $\frac{5}{8}$
70.00	.0802	12.468	53.50	9 $\frac{5}{8}$
34.41	.1632	6.128	33.00	*10
22.51	.2495	4.009	32.75	10 $\frac{3}{4}$
23.08	.2432	4.111	35.75	*10 $\frac{3}{4}$
24.02	.2338	4.278	40.50	10 $\frac{3}{4}$
25.19	.2229	4.487	45.50	10 $\frac{3}{4}$
26.48	.2121	4.715	51.00	10 $\frac{3}{4}$
27.39	.2050	4.878	54.00	*10 $\frac{3}{4}$
27.73	.2024	4.940	55.50	10 $\frac{3}{4}$
29.27	.1918	5.212	60.70	*10 $\frac{3}{4}$
30.96	.1814	5.514	65.70	*10 $\frac{3}{4}$
15.55	.3610	2.770	38.00	*11 $\frac{3}{4}$
15.91	.3530	2.833	42.00	11 $\frac{3}{4}$
16.38	.3428	2.917	47.00	11 $\frac{3}{4}$
17.09	.3285	3.044	54.00	11 $\frac{3}{4}$
17.78	.3158	3.167	60.00	11 $\frac{3}{4}$
14.41	.3897	2.566	40.00	*12
10.66	.5267	1.899	40.00	*13
10.88	.5161	1.938	45.00	*13
11.10	.5056	1.978	50.00	*13
11.29	.4974	2.011	54.00	*13
9.94	.5647	1.771	48.00	13 $\frac{3}{8}$
10.19	.5509	1.815	54.50	13 $\frac{3}{8}$
10.45	.5372	1.862	61.00	13 $\frac{3}{8}$
10.72	.5236	1.910	68.00	13 $\frac{3}{8}$
10.92	.5144	1.944	72.00	13 $\frac{3}{8}$
11.43	.4914	2.035	83.00	*13 $\frac{3}{8}$

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 8.000"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*9	34.00	8.290	.1927	5.1883	.0046
*9	38.00	8.196	.1295	7.7211	.0031
*9	40.00	8.150	.0988	10.1176	.0024
*9½	29.30	9.063	.7400	1.3513	.0176
9½	32.30	9.001	.6943	1.4402	.0165
9½	36.00	8.921	.6358	1.5727	.0151
*9½	38.00	8.877	.6039	1.6559	.0144
9½	40.00	8.835	.5735	1.7436	.0137
9½	43.50	8.755	.5161	1.9375	.0123
9½	47.00	8.681	.4635	2.1576	.0110
9½	53.50	8.535	.3609	2.7707	.0086
*10	33.00	9.384	.9816	1.0187	.0234
10¾	32.75	10.192	1.6270	.6146	.0387
*10¾	35.75	10.136	1.5805	.6327	.0376
10¾	40.50	10.050	1.5097	.6624	.0359
10¾	45.50	9.950	1.4281	.7002	.0340
10¾	51.00	9.850	1.3473	.7422	.0321
*10¾	54.00	9.784	1.2944	.7725	.0308
10¾	55.50	9.760	1.2753	.7841	.0304
*10¾	60.70	9.660	1.1961	.8361	.0285
*10¾	65.70	9.560	1.1177	.8947	.0266
*11¾	38.00	11.150	2.4612	.4063	.0586
11¾	42.00	11.084	2.4013	.4164	.0572
11¾	47.00	11.000	2.3256	.4300	.0554
11¾	54.00	10.880	2.2185	.4508	.0528
11¾	60.00	10.772	2.1231	.4710	.0505
*12	40.00	11.384	2.6763	.3737	.0637
*13	40.00	12.438	3.7007	.2702	.0881
*13	45.00	12.360	3.6218	.2761	.0862
*13	50.00	12.282	3.5434	.2822	.0844
*13	54.00	12.220	3.4814	.2872	.0829
13¾	48.00	12.715	3.9850	.2509	.0949
13¾	54.50	12.615	3.8816	.2576	.0924
13¾	61.00	12.515	3.7791	.2646	.0900
13¾	68.00	12.415	3.6774	.2719	.0876
13¾	72.00	12.347	3.6087	.2771	.0859
*13¾	83.00	12.175	3.4366	.2910	.0818

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 8.000"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
217.91	.0258	38.811	34.00	*9
324.28	.0173	57.758	38.00	*9
424.94	.0132	75.685	40.00	*9
56.75	.0989	10.108	29.30	*9 $\frac{5}{8}$
60.49	.0928	10.774	32.30	9 $\frac{5}{8}$
66.05	.0850	11.765	36.00	9 $\frac{5}{8}$
69.55	.0807	12.387	38.00	*9 $\frac{5}{8}$
73.23	.0767	13.043	40.00	9 $\frac{5}{8}$
81.38	.0690	14.494	43.50	9 $\frac{5}{8}$
90.62	.0620	16.140	47.00	9 $\frac{5}{8}$
116.37	.0482	20.726	53.50	9 $\frac{5}{8}$
42.79	.1312	7.621	33.00	*10
25.81	.2175	4.598	32.75	10 $\frac{3}{4}$
26.57	.2113	4.733	35.75	*10 $\frac{3}{4}$
27.82	.2018	4.955	40.50	10 $\frac{3}{4}$
29.41	.1909	5.238	45.50	10 $\frac{3}{4}$
31.17	.1801	5.552	51.00	10 $\frac{3}{4}$
32.45	.1730	5.779	54.00	*10 $\frac{3}{4}$
32.93	.1705	5.866	55.50	10 $\frac{3}{4}$
35.11	.1599	6.254	60.70	*10 $\frac{3}{4}$
37.58	.1494	6.693	65.70	*10 $\frac{3}{4}$
17.07	.3290	3.039	38.00	*11 $\frac{3}{4}$
17.49	.3210	3.115	42.00	11 $\frac{3}{4}$
18.06	.3109	3.217	47.00	11 $\frac{3}{4}$
18.93	.2966	3.372	54.00	11 $\frac{3}{4}$
19.78	.2838	3.523	60.00	11 $\frac{3}{4}$
15.69	.3578	2.795	40.00	*12
11.35	.4947	2.021	40.00	*13
11.60	.4842	2.065	45.00	*13
11.85	.4737	2.111	50.00	*13
12.06	.4654	2.149	54.00	*13
10.54	.5327	1.877	48.00	13 $\frac{3}{8}$
10.82	.5189	1.927	54.50	13 $\frac{3}{8}$
11.11	.5052	1.979	61.00	13 $\frac{3}{8}$
11.42	.4916	2.034	68.00	13 $\frac{3}{8}$
11.64	.4824	2.073	72.00	13 $\frac{3}{8}$
12.22	.4594	2.177	83.00	*13 $\frac{3}{8}$

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 8.125"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*9	34.00	8.290	.1105	9.0493	.0026
*9	38.00	8.196	.0473	21.1512	.0011
*9½	29.30	9.063	.6578	1.5202	.0157
9½	32.30	9.001	.6121	1.6337	.0146
9½	36.00	8.921	.5536	1.8064	.0132
*9½	38.00	8.877	.5216	1.9170	.0124
9½	40.00	8.835	.4913	2.0354	.0117
9½	43.50	8.755	.4339	2.3048	.0103
9½	47.00	8.681	.3812	2.6230	.0091
9½	53.50	8.535	.2787	3.5882	.0066
*10	33.00	9.384	.8994	1.1119	.0214
10¾	32.75	10.192	1.5447	.6474	.0368
*10¾	35.75	10.136	1.4983	.6674	.0357
10¾	40.50	10.050	1.4275	.7005	.0340
10¾	45.50	9.950	1.3459	.7430	.0320
10¾	51.00	9.850	1.2651	.7905	.0301
*10¾	54.00	9.784	1.2122	.8249	.0289
10¾	55.50	9.760	1.1931	.8382	.0284
*10¾	60.70	9.660	1.1138	.8978	.0265
*10¾	65.70	9.560	1.0354	.9658	.0247
*11¾	38.00	11.150	2.3789	.4204	.0566
11¾	42.00	11.084	2.3190	.4312	.0552
11¾	47.00	11.000	2.2434	.4458	.0534
11¾	54.00	10.880	2.1362	.4681	.0509
11¾	60.00	10.772	2.0408	.4900	.0486
*12	40.00	11.384	2.5941	.3855	.0618
*13	40.00	12.438	3.6185	.2764	.0862
*13	45.00	12.360	3.5396	.2825	.0843
*13	50.00	12.282	3.4611	.2889	.0824
*13	54.00	12.220	3.3992	.2942	.0809
13¾	48.00	12.715	3.9027	.2562	.0929
13¾	54.50	12.615	3.7994	.2632	.0905
13¾	61.00	12.515	3.6969	.2705	.0880
13¾	68.00	12.415	3.5951	.2782	.0856
13¾	72.00	12.347	3.5264	.2836	.0840
*13¾	83.00	12.175	3.3544	.2981	.0799

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 8.125"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
380.07	.0148	67.694	34.00	*9
888.35	.0063	158.222	38.00	*9
63.85	.0879	11.372	29.30	*9 $\frac{5}{8}$
68.62	.0818	12.221	32.30	9 $\frac{5}{8}$
75.87	.0740	13.513	36.00	9 $\frac{5}{8}$
80.51	.0697	14.340	38.00	*9 $\frac{5}{8}$
85.49	.0657	15.226	40.00	9 $\frac{5}{8}$
96.80	.0580	17.241	43.50	9 $\frac{5}{8}$
110.17	.0510	19.622	47.00	9 $\frac{5}{8}$
150.71	.0373	26.842	53.50	9 $\frac{5}{8}$
46.70	.1202	8.317	33.00	*10
27.19	.2065	4.843	32.75	10 $\frac{3}{4}$
28.03	.2003	4.993	35.75	*10 $\frac{3}{4}$
29.42	.1908	5.240	40.50	10 $\frac{3}{4}$
31.21	.1799	5.558	45.50	10 $\frac{3}{4}$
33.20	.1691	5.913	51.00	10 $\frac{3}{4}$
34.65	.1620	6.171	54.00	*10 $\frac{3}{4}$
35.20	.1595	6.270	55.50	10 $\frac{3}{4}$
37.71	.1489	6.716	60.70	*10 $\frac{3}{4}$
40.56	.1384	7.225	65.70	*10 $\frac{3}{4}$
17.66	.3180	3.145	38.00	*11 $\frac{3}{4}$
18.11	.3100	3.226	42.00	11 $\frac{3}{4}$
18.72	.2999	3.335	47.00	11 $\frac{3}{4}$
19.66	.2856	3.502	54.00	11 $\frac{3}{4}$
20.58	.2728	3.665	60.00	11 $\frac{3}{4}$
16.19	.3468	2.884	40.00	*12
11.61	.4837	2.067	40.00	*13
11.87	.4732	2.113	45.00	*13
12.13	.4627	2.161	50.00	*13
12.36	.4544	2.201	54.00	*13
10.76	.5217	1.917	48.00	13 $\frac{3}{8}$
11.05	.5079	1.969	54.50	13 $\frac{3}{8}$
11.36	.4942	2.023	61.00	13 $\frac{3}{8}$
11.68	.4806	2.081	68.00	13 $\frac{3}{8}$
11.91	.4717	2.121	72.00	13 $\frac{3}{8}$
12.52	.4484	2.230	83.00	*13 $\frac{3}{8}$

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 8.625"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*9 ⁵ / ₈	29.30	9.063	.3161	3.1636	.0075
9 ⁵ / ₈	32.30	9.001	.2704	3.6983	.0064
9 ⁵ / ₈	36.00	8.921	.2119	4.7192	.0050
*9 ⁵ / ₈	38.00	8.877	.1799	5.5572	.0043
9 ⁵ / ₈	40.00	8.835	.1496	6.6846	.0036
9 ⁵ / ₈	43.50	8.755	.0922	10.8480	.0022
*10	33.00	9.384	.5577	1.7931	.0133
10 ³ / ₄	32.75	10.192	1.2030	.8312	.0286
*10 ³ / ₄	35.75	10.136	1.1566	.8646	.0275
10 ³ / ₄	40.50	10.050	1.0858	.9210	.0259
10 ³ / ₄	45.50	9.950	1.0042	.9959	.0239
10 ³ / ₄	51.00	9.850	.9234	1.0830	.0220
*10 ³ / ₄	54.00	9.784	.8705	1.1488	.0207
10 ³ / ₄	55.50	9.760	.8514	1.1746	.0203
*10 ³ / ₄	60.70	9.660	.7721	1.2951	.0184
*10 ³ / ₄	65.70	9.560	.6937	1.4415	.0165
*11 ³ / ₄	38.00	11.150	2.0372	.4909	.0485
11 ³ / ₄	42.00	11.084	1.9773	.5057	.0471
11 ³ / ₄	47.00	11.000	1.9017	.5259	.0453
11 ³ / ₄	54.00	10.880	1.7945	.5572	.0427
11 ³ / ₄	60.00	10.772	1.6991	.5885	.0405
*12	40.00	11.384	2.2524	.4440	.0536
*13	40.00	12.438	3.2768	.3052	.0780
*13	45.00	12.360	3.1979	.3127	.0761
*13	50.00	12.282	3.1194	.3206	.0743
*13	54.00	12.220	3.0575	.3271	.0728
13 ³ / ₈	48.00	12.715	3.5610	.2808	.0848
13 ³ / ₈	54.50	12.615	3.4577	.2892	.0823
13 ³ / ₈	61.00	12.515	3.3552	.2980	.0799
13 ³ / ₈	68.00	12.415	3.2534	.3074	.0775
13 ³ / ₈	72.00	12.347	3.1848	.3140	.0758
*13 ³ / ₈	83.00	12.175	3.0127	.3319	.0717

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 8.625"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
132.87	.0423	23.666	29.30	*9 $\frac{5}{8}$
155.33	.0361	27.665	32.30	9 $\frac{5}{8}$
198.21	.0283	35.302	36.00	9 $\frac{5}{8}$
233.40	.0241	41.570	38.00	*9 $\frac{5}{8}$
280.75	.0200	50.004	40.00	9 $\frac{5}{8}$
455.61	.0123	81.148	43.50	9 $\frac{5}{8}$
75.31	.0746	13.413	33.00	*10
34.91	.1608	6.218	32.75	10 $\frac{3}{4}$
36.31	.1546	6.468	35.75	*10 $\frac{3}{4}$
38.68	.1451	6.890	40.50	10 $\frac{3}{4}$
41.83	.1342	7.450	45.50	10 $\frac{3}{4}$
45.49	.1234	8.101	51.00	10 $\frac{3}{4}$
48.25	.1164	8.593	54.00	*10 $\frac{3}{4}$
49.33	.1138	8.786	55.50	10 $\frac{3}{4}$
54.39	.1032	9.688	60.70	*10 $\frac{3}{4}$
60.54	.0927	10.783	65.70	*10 $\frac{3}{4}$
20.62	.2723	3.672	38.00	*11 $\frac{3}{4}$
21.24	.2643	3.783	42.00	11 $\frac{3}{4}$
22.09	.2542	3.934	47.00	11 $\frac{3}{4}$
23.40	.2399	4.169	54.00	11 $\frac{3}{4}$
24.72	.2271	4.403	60.00	11 $\frac{3}{4}$
18.65	.3011	3.321	40.00	*12
12.82	.4380	2.283	40.00	*13
13.13	.4275	2.339	45.00	*13
13.46	.4170	2.398	50.00	*13
13.74	.4087	2.447	54.00	*13
11.79	.4760	2.101	48.00	13 $\frac{3}{8}$
12.15	.4622	2.163	54.50	13 $\frac{3}{8}$
12.52	.4485	2.230	61.00	13 $\frac{3}{8}$
12.91	.4349	2.299	68.00	13 $\frac{3}{8}$
13.19	.4257	2.349	72.00	13 $\frac{3}{8}$
13.94	.4027	2.483	83.00	*13 $\frac{3}{8}$

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 9.000"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*10	33.00	9.384	.2880	3.4719	.0069
10 ³ / ₄	32.75	10.192	.9334	1.0714	.0222
*10 ³ / ₄	35.75	10.136	.8869	1.1275	.0211
10 ³ / ₄	40.50	10.050	.8161	1.2253	.0194
10 ³ / ₄	45.50	9.950	.7345	1.3615	.0175
10 ³ / ₄	51.00	9.850	.6537	1.5297	.0156
*10 ³ / ₄	54.00	9.784	.6008	1.6643	.0143
10 ³ / ₄	55.50	9.760	.5817	1.7191	.0139
*10 ³ / ₄	60.70	9.660	.5025	1.9901	.0120
*10 ³ / ₄	65.70	9.560	.4241	2.3582	.0101
*11 ³ / ₄	38.00	11.150	1.7676	.5658	.0421
11 ³ / ₄	42.00	11.084	1.7077	.5856	.0407
11 ³ / ₄	47.00	11.000	1.6320	.6127	.0389
11 ³ / ₄	54.00	10.880	1.5249	.6558	.0363
11 ³ / ₄	60.00	10.772	1.4295	.6996	.0340
*12	40.00	11.384	1.9827	.5044	.0472
*13	40.00	12.438	3.0071	.3325	.0716
*13	45.00	12.360	2.9282	.3415	.0697
*13	50.00	12.282	2.8498	.3509	.0679
*13	54.00	12.220	2.7878	.3587	.0664
13 ³ / ₈	48.00	12.715	3.2914	.3038	.0784
13 ³ / ₈	54.50	12.615	3.1880	.3137	.0759
13 ³ / ₈	61.00	12.515	3.0855	.3241	.0735
13 ³ / ₈	68.00	12.415	2.9838	.3351	.0710
13 ³ / ₈	72.00	12.347	2.9151	.3430	.0694
*13 ³ / ₈	83.00	12.175	2.7430	.3646	.0653
*14	50.00	13.344	3.9601	.2525	.0943
*16	55.00	15.376	6.3412	.1577	.1510
16	65.00	15.250	6.1837	.1617	.1472
*16	70.00	15.198	6.1191	.1634	.1457
16	75.00	15.124	6.0276	.1659	.1435
16	84.00	15.010	5.8874	.1699	.1402

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
 Inside Casing
 O.D. 9.000"

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
145.82	.0385	25.972	33.00	*10
45.00	.1248	8.014	32.75	10 ³ / ₄
47.35	.1186	8.434	35.75	*10 ³ / ₄
51.46	.1091	9.166	40.50	10 ³ / ₄
57.18	.0982	10.185	45.50	10 ³ / ₄
64.25	.0874	11.443	51.00	10 ³ / ₄
69.90	.0803	12.450	54.00	*10 ³ / ₄
72.20	.0778	12.860	55.50	10 ³ / ₄
83.59	.0672	14.887	60.70	*10 ³ / ₄
99.04	.0567	17.640	65.70	*10 ³ / ₄
23.76	.2363	4.232	38.00	*11 ³ / ₄
24.59	.2283	4.381	42.00	11 ³ / ₄
25.74	.2182	4.584	47.00	11 ³ / ₄
27.54	.2038	4.906	54.00	11 ³ / ₄
29.38	.1911	5.233	60.00	11 ³ / ₄
21.18	.2650	3.773	40.00	*12
13.97	.4020	2.488	40.00	*13
14.34	.3914	2.555	45.00	*13
14.74	.3810	2.625	50.00	*13
15.07	.3727	2.683	54.00	*13
12.76	.4400	2.273	48.00	13 ³ / ₈
13.17	.4262	2.346	54.50	13 ³ / ₈
13.61	.4125	2.424	61.00	13 ³ / ₈
14.08	.3989	2.507	68.00	13 ³ / ₈
14.41	.3897	2.566	72.00	13 ³ / ₈
15.31	.3667	2.727	83.00	*13 ³ / ₈
10.61	.5294	1.889	50.00	*14
6.62	.8477	1.180	55.00	*16
6.79	.8266	1.210	65.00	16
6.86	.8180	1.222	70.00	*16
6.97	.8058	1.241	75.00	16
7.13	.7870	1.271	84.00	16

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 9.625"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
10 ³ / ₄	32.75	10.192	.4584	2.1813	.0109
*10 ³ / ₄	35.75	10.136	.4120	2.4272	.0098
10 ³ / ₄	40.50	10.050	.3412	2.9311	.0081
10 ³ / ₄	45.50	9.950	.2596	3.8526	.0062
10 ³ / ₄	51.00	9.850	.1788	5.5935	.0043
*10 ³ / ₄	54.00	9.784	.1259	7.9422	.0030
10 ³ / ₄	55.50	9.760	.1068	9.3657	.0025
*11 ³ / ₄	38.00	11.150	1.2926	.7736	.0308
11 ³ / ₄	42.00	11.084	1.2327	.8112	.0294
11 ³ / ₄	47.00	11.000	1.1571	.8643	.0275
11 ³ / ₄	54.00	10.880	1.0499	.9524	.0250
11 ³ / ₄	60.00	10.772	.9545	1.0476	.0227
*12	40.00	11.384	1.5078	.6632	.0359
*13	40.00	12.438	2.5322	.3949	.0603
*13	45.00	12.360	2.4533	.4076	.0584
*13	50.00	12.282	2.3748	.4211	.0565
*13	54.00	12.220	2.3129	.4324	.0551
13 ³ / ₈	48.00	12.715	2.8164	.3551	.0671
13 ³ / ₈	54.50	12.615	2.7131	.3686	.0646
13 ³ / ₈	61.00	12.515	2.6106	.3831	.0622
13 ³ / ₈	68.00	12.415	2.5089	.3986	.0597
13 ³ / ₈	72.00	12.347	2.4402	.4098	.0581
*13 ³ / ₈	83.00	12.175	2.2681	.4409	.0540
*14	50.00	13.344	3.4852	.2869	.0830
*16	55.00	15.376	5.8662	.1705	.1397
16	65.00	15.250	5.7088	.1752	.1359
*16	70.00	15.198	5.6442	.1772	.1344
16	75.00	15.124	5.5527	.1801	.1322
16	84.00	15.010	5.4125	.1848	.1289
*18	78.00	17.194	8.2821	.1207	.1972
*18	87.50	17.088	8.1338	.1229	.1937
*18	96.50	16.986	7.9920	.1251	.1903
*18 ⁵ / ₈	78.00	17.855	9.2273	.1084	.2197
18 ⁵ / ₈	87.50	17.755	9.0820	.1101	.2162
*18 ⁵ / ₈	96.50	17.655	8.9376	.1119	.2128
20	94.00	19.124	11.1419	.0898	.2653

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 9.625"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
91.62	.0613	16.317	32.75	10 ³ / ₄
101.94	.0551	18.157	35.75	*10 ³ / ₄
123.11	.0456	21.926	40.50	10 ³ / ₄
161.81	.0347	28.820	45.50	10 ³ / ₄
234.93	.0239	41.842	51.00	10 ³ / ₄
333.57	.0168	59.412	54.00	*10 ³ / ₄
393.36	.0143	70.060	55.50	10 ³ / ₄
32.49	.1728	5.787	38.00	*11 ³ / ₄
34.07	.1648	6.068	42.00	11 ³ / ₄
36.30	.1547	6.465	47.00	11 ³ / ₄
40.00	.1404	7.125	54.00	11 ³ / ₄
44.00	.1276	7.837	60.00	11 ³ / ₄
27.86	.2016	4.961	40.00	*12
16.59	.3385	2.954	40.00	*13
17.12	.3280	3.049	45.00	*13
17.69	.3175	3.150	50.00	*13
18.16	.3092	3.234	54.00	*13
14.91	.3765	2.656	48.00	13 ³ / ₈
15.48	.3627	2.757	54.50	13 ³ / ₈
16.09	.3490	2.865	61.00	13 ³ / ₈
16.74	.3354	2.982	68.00	13 ³ / ₈
17.21	.3262	3.066	72.00	13 ³ / ₈
18.52	.3032	3.298	83.00	*13 ³ / ₈
12.05	.4659	2.146	50.00	*14
7.16	.7842	1.275	55.00	*16
7.36	.7632	1.310	65.00	16
7.44	.7545	1.325	70.00	*16
7.56	.7423	1.347	75.00	16
7.76	.7235	1.382	84.00	16
5.07	1.1072	.903	78.00	*18
5.16	1.0873	.920	87.50	*18
5.26	1.0684	.936	96.50	*18
4.55	1.2335	.811	78.00	*18 ⁵ / ₈
4.62	1.2141	.824	87.50	18 ⁵ / ₈
4.70	1.1948	.837	96.50	*18 ⁵ / ₈
3.77	1.4895	.671	94.00	20

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 10.000"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*11 $\frac{3}{4}$	38.00	11.150	.9924	1.0077	.0236
11 $\frac{3}{4}$	42.00	11.084	.9325	1.0724	.0222
11 $\frac{3}{4}$	47.00	11.000	.8568	1.1671	.0204
11 $\frac{3}{4}$	54.00	10.880	.7497	1.3339	.0178
11 $\frac{3}{4}$	60.00	10.772	.6543	1.5284	.0156
*12	40.00	11.384	1.2075	.8282	.0287
*13	40.00	12.438	2.2319	.4480	.0531
*13	45.00	12.360	2.1530	.4645	.0513
*13	50.00	12.282	2.0746	.4820	.0494
*13	54.00	12.220	2.0126	.4969	.0479
13 $\frac{3}{8}$	48.00	12.715	2.5162	.3974	.0599
13 $\frac{3}{8}$	54.50	12.615	2.4128	.4145	.0574
13 $\frac{3}{8}$	61.00	12.515	2.3103	.4328	.0550
13 $\frac{3}{8}$	68.00	12.415	2.2086	.4528	.0526
13 $\frac{3}{8}$	72.00	12.347	2.1399	.4673	.0509
*13 $\frac{3}{8}$	83.00	12.175	1.9678	.5082	.0469
*14	50.00	13.344	3.1849	.3140	.0758
*16	55.00	15.376	5.5660	.1797	.1325
16	65.00	15.250	5.4085	.1849	.1288
*16	70.00	15.198	5.3439	.1871	.1272
16	75.00	15.124	5.2524	.1904	.1251
16	84.00	15.010	5.1122	.1956	.1217
*18	78.00	17.194	7.9818	.1253	.1900
*18	87.50	17.088	7.8336	.1277	.1865
*18	96.50	16.986	7.6918	.1300	.1831
*18 $\frac{5}{8}$	78.00	17.855	8.9271	.1120	.2125
18 $\frac{5}{8}$	87.50	17.755	8.7818	.1139	.2091
*18 $\frac{5}{8}$	96.50	17.655	8.6373	.1158	.2057
20	94.00	19.124	10.8417	.0922	.2581

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 10.000"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
42.32	.1327	7.538	38.00	*11 ³ / ₄
45.04	.1247	8.022	42.00	11 ³ / ₄
49.02	.1145	8.731	47.00	11 ³ / ₄
56.02	.1002	9.978	54.00	11 ³ / ₄
64.19	.0875	11.433	60.00	11 ³ / ₄
34.78	.1614	6.195	40.00	*12
18.82	.2984	3.352	40.00	*13
19.51	.2878	3.474	45.00	*13
20.25	.2773	3.606	50.00	*13
20.87	.2690	3.717	54.00	*13
16.69	.3364	2.973	48.00	13 ³ / ₈
17.41	.3225	3.100	54.50	13 ³ / ₈
18.18	.3088	3.238	61.00	13 ³ / ₈
19.02	.2952	3.387	68.00	13 ³ / ₈
19.63	.2861	3.496	72.00	13 ³ / ₈
21.34	.2631	3.801	83.00	*13 ³ / ₈
13.19	.4258	2.349	50.00	*14
7.55	.7441	1.344	55.00	*16
7.77	.7230	1.383	65.00	16
7.86	.7144	1.400	70.00	*16
8.00	.7021	1.424	75.00	16
8.22	.6834	1.463	84.00	16
5.26	1.0670	.937	78.00	*18
5.36	1.0472	.955	87.50	*18
5.46	1.0282	.973	96.50	*18
4.70	1.1934	.838	78.00	*18 ⁵ / ₈
4.78	1.1740	.852	87.50	18 ⁵ / ₈
4.86	1.1546	.866	96.50	*18 ⁵ / ₈
3.87	1.4493	.690	94.00	20

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 10.750"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*11 $\frac{3}{4}$	38.00	11.150	.3574	2.7979	.0085
11 $\frac{3}{4}$	42.00	11.084	.2975	3.3609	.0071
11 $\frac{3}{4}$	47.00	11.000	.2218	4.5076	.0053
11 $\frac{3}{4}$	54.00	10.880	.1147	8.7165	.0027
*12	40.00	11.384	.5725	1.7466	.0136
*13	40.00	12.438	1.5970	.6262	.0380
*13	45.00	12.360	1.5180	.6587	.0361
*13	50.00	12.282	1.4396	.6946	.0343
*13	54.00	12.220	1.3776	.7259	.0328
13 $\frac{3}{8}$	48.00	12.715	1.8812	.5316	.0448
13 $\frac{3}{8}$	54.50	12.615	1.7779	.5625	.0423
13 $\frac{3}{8}$	61.00	12.515	1.6754	.5969	.0399
13 $\frac{3}{8}$	68.00	12.415	1.5736	.6355	.0375
13 $\frac{3}{8}$	72.00	12.347	1.5049	.6645	.0358
*13 $\frac{3}{8}$	83.00	12.175	1.3329	.7503	.0317
*14	50.00	13.344	2.5500	.3922	.0607
*16	55.00	15.376	4.9310	.2028	.1174
16	65.00	15.250	4.7736	.2095	.1137
*16	70.00	15.198	4.7090	.2124	.1121
16	75.00	15.124	4.6174	.2166	.1099
16	84.00	15.010	4.4773	.2233	.1066
*18	78.00	17.194	7.3469	.1361	.1749
*18	87.50	17.088	7.1986	.1389	.1714
*18	96.50	16.986	7.0568	.1417	.1680
*18 $\frac{5}{8}$	78.00	17.855	8.2921	.1206	.1974
18 $\frac{5}{8}$	87.50	17.755	8.1468	.1227	.1940
*18 $\frac{5}{8}$	96.50	17.655	8.0024	.1250	.1905
20	94.00	19.124	10.2067	.0980	.2430
*21 $\frac{1}{2}$	92.50	20.710	12.7843	.0782	.3044
*21 $\frac{1}{2}$	103.00	20.610	12.6157	.0793	.3004
*21 $\frac{1}{2}$	114.00	20.510	12.4480	.0803	.2964
*22	92.50	21.222	13.6602	.0732	.3252
*22	103.00	21.128	13.4978	.0741	.3214
*22	114.00	21.028	13.3258	.0750	.3173
*24	100.50	23.226	17.2945	.0578	.4118
*24	113.00	23.124	17.1016	.0585	.4072
*24 $\frac{1}{2}$	88.00	23.850	18.4930	.0541	.4403
*24 $\frac{1}{2}$	100.50	23.750	18.2988	.0546	.4357
*24 $\frac{1}{2}$	113.00	23.650	18.1054	.0552	.4311

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 10.750"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
117.51	.0478	20.930	38.00	*11 ³ / ₄
141.16	.0398	25.142	42.00	11 ³ / ₄
189.32	.0297	33.719	47.00	11 ³ / ₄
366.09	.0153	65.204	54.00	11 ³ / ₄
73.36	.0765	13.065	40.00	*12
26.30	.2135	4.684	40.00	*13
27.67	.2029	4.928	45.00	*13
29.17	.1924	5.196	50.00	*13
30.49	.1842	5.430	54.00	*13
22.33	.2515	3.976	48.00	13 ³ / ₈
23.62	.2377	4.208	54.50	13 ³ / ₈
25.07	.2240	4.465	61.00	13 ³ / ₈
26.69	.2104	4.754	68.00	13 ³ / ₈
27.91	.2012	4.971	72.00	13 ³ / ₈
31.51	.1782	5.612	83.00	*13 ³ / ₈
16.47	.3409	2.934	50.00	*14
8.52	.6592	1.517	55.00	*16
8.80	.6381	1.567	65.00	16
8.92	.6295	1.589	70.00	*16
9.10	.6173	1.620	75.00	16
9.38	.5985	1.671	84.00	16
5.72	.9821	1.018	78.00	*18
5.83	.9623	1.039	87.50	*18
5.95	.9434	1.060	96.50	*18
5.07	1.1085	.902	78.00	*18 ⁵ / ₈
5.16	1.0891	.918	87.50	18 ⁵ / ₈
5.25	1.0698	.935	96.50	*18 ⁵ / ₈
4.11	1.3644	.733	94.00	20
3.29	1.7090	.585	92.50	*21 ¹ / ₂
3.33	1.6865	.593	103.00	*21 ¹ / ₂
3.37	1.6640	.601	114.00	*21 ¹ / ₂
3.07	1.8261	.548	92.50	*22
3.11	1.8044	.554	103.00	*22
3.15	1.7814	.561	114.00	*22
2.43	2.3119	.433	100.50	*24
2.46	2.2861	.437	113.00	*24
2.27	2.4721	.405	88.00	*24 ¹ / ₂
2.30	2.4462	.409	100.50	*24 ¹ / ₂
2.32	2.4203	.413	113.00	*24 ¹ / ₂

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 11.750"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
13 $\frac{3}{8}$	48.00	12.715	.9632	1.0382	.0229
13 $\frac{3}{8}$	54.50	12.615	.8599	1.1629	.0205
13 $\frac{3}{8}$	61.00	12.515	.7574	1.3204	.0180
13 $\frac{3}{8}$	68.00	12.415	.6556	1.5252	.0156
13 $\frac{3}{8}$	72.00	12.347	.5869	1.7037	.0140
*13 $\frac{3}{8}$	83.00	12.175	.4149	2.4105	.0099
*14	50.00	13.344	1.6320	.6127	.0389
*16	55.00	15.376	4.0130	.2492	.0955
16	65.00	15.250	3.8556	.2594	.0918
*16	70.00	15.198	3.7910	.2638	.0903
16	75.00	15.124	3.6994	.2703	.0881
16	84.00	15.010	3.5593	.2810	.0847
*18	78.00	17.194	6.4289	.1555	.1531
*18	87.50	17.088	6.2806	.1592	.1495
*18	96.50	16.986	6.1388	.1629	.1462
*18 $\frac{5}{8}$	78.00	17.855	7.3741	.1356	.1756
18 $\frac{5}{8}$	87.50	17.755	7.2288	.1383	.1721
*18 $\frac{5}{8}$	96.50	17.655	7.0844	.1412	.1687
20	94.00	19.124	9.2887	.1077	.2212
*21 $\frac{1}{2}$	92.50	20.710	11.8663	.0843	.2825
*21 $\frac{1}{2}$	103.00	20.610	11.6977	.0855	.2785
*21 $\frac{1}{2}$	114.00	20.510	11.5300	.0867	.2745
*22	92.50	21.222	12.7423	.0785	.3034
*22	103.00	21.128	12.5798	.0795	.2995
*22	114.00	21.028	12.4078	.0806	.2954
*24	100.50	23.226	16.3765	.0611	.3899
*24	113.00	23.124	16.1836	.0618	.3853
*24 $\frac{1}{2}$	88.00	23.850	17.5750	.0569	.4185
*24 $\frac{1}{2}$	100.50	23.750	17.3808	.0575	.4138
*24 $\frac{1}{2}$	113.00	23.650	17.1874	.0582	.4092

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
 Inside Casing
O.D. 11.750"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
43.60	.1288	7.766	48.00	13 ³ / ₈
48.84	.1150	8.699	54.50	13 ³ / ₈
55.46	.1012	9.877	61.00	13 ³ / ₈
64.06	.0876	11.409	68.00	13 ³ / ₈
71.56	.0785	12.745	72.00	13 ³ / ₈
101.24	.0555	18.031	83.00	*13 ³ / ₈
25.74	.2182	4.584	50.00	*14
10.47	.5365	1.864	55.00	*16
10.89	.5154	1.940	65.00	16
11.08	.5068	1.973	70.00	*16
11.35	.4945	2.022	75.00	16
11.80	.4758	2.102	84.00	16
6.53	.8594	1.164	78.00	*18
6.69	.8396	1.191	87.50	*18
6.84	.8206	1.219	96.50	*18
5.70	.9858	1.014	78.00	*18 ⁵ / ₈
5.81	.9664	1.035	87.50	18 ⁵ / ₈
5.93	.9470	1.056	96.50	*18 ⁵ / ₈
4.52	1.2417	.805	94.00	20
3.54	1.5863	.630	92.50	*21 ¹ / ₂
3.59	1.5638	.639	103.00	*21 ¹ / ₂
3.64	1.5413	.649	114.00	*21 ¹ / ₂
3.30	1.7034	.587	92.50	*22
3.34	1.6817	.595	103.00	*22
3.38	1.6587	.603	114.00	*22
2.56	2.1892	.457	100.50	*24
2.60	2.1634	.462	113.00	*24
2.39	2.3494	.426	88.00	*24 ¹ / ₂
2.42	2.3235	.430	100.50	*24 ¹ / ₂
2.44	2.2976	.435	113.00	*24 ¹ / ₂

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 12.000"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
13 $\frac{3}{8}$	48.00	12.715	.7210	1.3870	.0172
13 $\frac{3}{8}$	54.50	12.615	.6176	1.6191	.0147
13 $\frac{3}{8}$	61.00	12.515	.5151	1.9413	.0123
13 $\frac{3}{8}$	68.00	12.415	.4134	2.4190	.0098
13 $\frac{3}{8}$	72.00	12.347	.3447	2.9011	.0082
*13 $\frac{3}{8}$	83.00	12.175	.1726	5.7934	.0041
*14	50.00	13.344	1.3897	.7196	.0331
*16	55.00	15.376	3.7708	.2652	.0898
16	65.00	15.250	3.6133	.2768	.0860
*16	70.00	15.198	3.5487	.2818	.0845
16	75.00	15.124	3.4572	.2893	.0823
16	84.00	15.010	3.3170	.3015	.0790
*18	78.00	17.194	6.1866	.1616	.1473
*18	87.50	17.088	6.0384	.1656	.1438
*18	96.50	16.986	5.8966	.1696	.1404
*18 $\frac{5}{8}$	78.00	17.855	7.1319	.1402	.1698
18 $\frac{5}{8}$	87.50	17.755	6.9866	.1431	.1663
*18 $\frac{5}{8}$	96.50	17.655	6.8421	.1462	.1629
20	94.00	19.124	9.0465	.1105	.2154
*21 $\frac{1}{2}$	92.50	20.710	11.6241	.0860	.2768
*21 $\frac{1}{2}$	103.00	20.610	11.4555	.0873	.2727
*21 $\frac{1}{2}$	114.00	20.510	11.2877	.0886	.2688
*22	92.50	21.222	12.5000	.0800	.2976
*22	103.00	21.128	12.3376	.0811	.2938
*22	114.00	21.028	12.1656	.0822	.2897
*24	100.50	23.226	16.1342	.0620	.3841
*24	113.00	23.124	15.9413	.0627	.3796
*24 $\frac{1}{2}$	88.00	23.850	17.3327	.0577	.4127
*24 $\frac{1}{2}$	100.50	23.750	17.1385	.0583	.4081
*24 $\frac{1}{2}$	113.00	23.650	16.9451	.0590	.4035

*Not API Standard. Shown for information only.

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 12.000"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
58.25	.0964	10.375	48.00	13 ³ / ₈
68.00	.0826	12.111	54.50	13 ³ / ₈
81.54	.0689	14.522	61.00	13 ³ / ₈
101.60	.0553	18.095	68.00	13 ³ / ₈
121.85	.0461	21.702	72.00	13 ³ / ₈
243.32	.0231	43.338	83.00	*13 ³ / ₈
30.22	.1858	5.383	50.00	*14
11.14	.5041	1.984	55.00	*16
11.62	.4830	2.070	65.00	16
11.84	.4744	2.108	70.00	*16
12.15	.4622	2.164	75.00	16
12.66	.4434	2.255	84.00	16
6.79	.8270	1.209	78.00	*18
6.96	.8072	1.239	87.50	*18
7.12	.7883	1.269	96.50	*18
5.89	.9534	1.049	78.00	*18 ⁵ / ₈
6.01	.9340	1.071	87.50	18 ⁵ / ₈
6.14	.9147	1.093	96.50	*18 ⁵ / ₈
4.64	1.2093	.827	94.00	20
3.61	1.5539	.644	92.50	*21 ¹ / ₂
3.67	1.5314	.653	103.00	*21 ¹ / ₂
3.72	1.5089	.663	114.00	*21 ¹ / ₂
3.36	1.6710	.598	92.50	*22
3.40	1.6493	.606	103.00	*22
3.45	1.6263	.615	114.00	*22
2.60	2.1568	.464	100.50	*24
2.63	2.1310	.469	113.00	*24
2.42	2.3170	.432	88.00	*24 ¹ / ₂
2.45	2.2911	.436	100.50	*24 ¹ / ₂
2.48	2.2652	.441	113.00	*24 ¹ / ₂

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 13.000"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*16	55.00	15.376	2.7508	.3635	.0655
16	65.00	15.250	2.5933	.3856	.0617
*16	70.00	15.198	2.5287	.3955	.0602
16	75.00	15.124	2.4372	.4103	.0580
16	84.00	15.010	2.2970	.4353	.0547
*18	78.00	17.194	5.1666	.1935	.1230
*18	87.50	17.088	5.0184	.1993	.1195
*18	96.50	16.986	4.8766	.2051	.1161
*18½	78.00	17.855	6.1119	.1636	.1455
18½	87.50	17.755	5.9666	.1676	.1421
*18½	96.50	17.655	5.8221	.1718	.1386
20	94.00	19.124	8.0265	.1246	.1911
*21½	92.50	20.710	10.6041	.0943	.2525
*21½	103.00	20.610	10.4355	.0958	.2485
*21½	114.00	20.510	10.2677	.0974	.2445
*22	92.50	21.222	11.4800	.0871	.2733
*22	103.00	21.128	11.3176	.0884	.2695
*22	114.00	21.028	11.1456	.0897	.2654
*24	100.50	23.226	15.1142	.0662	.3599
*24	113.00	23.124	14.9213	.0670	.3553
*24½	88.00	23.850	16.3127	.0613	.3884
*24½	100.50	23.750	16.1185	.0620	.3838
*24½	113.00	23.650	15.9251	.0628	.3792

NO. 221-C

BETWEEN CASINGS**

Size of
 Inside Casing
O.D. 13.000"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
15.27	.3677	2.719	55.00	*16
16.20	.3467	2.885	65.00	16
16.61	.3380	2.958	70.00	*16
17.23	.3258	3.069	75.00	16
18.28	.3071	3.257	84.00	16
8.13	.6907	1.448	78.00	*18
8.37	.6709	1.491	87.50	*18
8.61	.6519	1.534	96.50	*18
6.87	.8170	1.224	78.00	*18 ^{5/8}
7.04	.7976	1.254	87.50	18 ^{5/8}
7.21	.7783	1.285	96.50	*18 ^{5/8}
5.23	1.0730	.932	94.00	20
3.96	1.4176	.705	92.50	*21 ^{1/2}
4.02	1.3950	.717	103.00	*21 ^{1/2}
4.09	1.3726	.729	114.00	*21 ^{1/2}
3.66	1.5347	.652	92.50	*22
3.71	1.5129	.661	103.00	*22
3.77	1.4899	.671	114.00	*22
2.78	2.0205	.495	100.50	*24
2.81	1.9947	.501	113.00	*24
2.57	2.1807	.459	88.00	*24 ^{1/2}
2.61	2.1547	.464	100.50	*24 ^{1/2}
2.64	2.1289	.470	113.00	*24 ^{1/2}

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 13.375"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*16	55.00	15.376	2.3472	.4260	.0559
16	65.00	15.250	2.1898	.4567	.0521
*16	70.00	15.198	2.1252	.4705	.0506
16	75.00	15.124	2.0337	.4917	.0484
16	84.00	15.010	1.8935	.5281	.0451
*18	78.00	17.194	4.7631	.2099	.1134
*18	87.50	17.088	4.6148	.2167	.1099
*18	96.50	16.986	4.4730	.2236	.1065
*18½	78.00	17.855	5.7083	.1752	.1359
18½	87.50	17.755	5.5630	.1798	.1325
*18½	96.50	17.655	5.4186	.1846	.1290
20	94.00	19.124	7.6229	.1312	.1815
*21½	92.50	20.710	10.2005	.0980	.2429
*21½	103.00	20.610	10.0319	.0997	.2389
*21½	114.00	20.510	9.8642	.1014	.2349
*22	92.50	21.222	11.0765	.0903	.2637
*22	103.00	21.128	10.9140	.0916	.2599
*22	114.00	21.028	10.7421	.0931	.2558
*24	100.50	23.226	14.7107	.0680	.3503
*24	113.00	23.124	14.5178	.0689	.3457
*24½	88.00	23.850	15.9092	.0629	.3788
*24½	100.50	23.750	15.7150	.0636	.3742
*24½	113.00	23.650	15.5216	.0644	.3696

NO. 221-C

BETWEEN CASINGS**

Size of
 Inside Casing
O.D. 13.375"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
17.89	.3138	3.187	55.00	*16
19.18	.2927	3.416	65.00	16
19.76	.2841	3.520	70.00	*16
20.65	.2719	3.678	75.00	16
22.18	.2531	3.951	84.00	16
8.82	.6367	1.571	78.00	*18
9.10	.6169	1.621	87.50	*18
9.39	.5980	1.672	96.50	*18
7.36	.7631	1.310	78.00	*18 ^{5/8}
7.55	.7437	1.345	87.50	18 ^{5/8}
7.75	.7244	1.381	96.50	*18 ^{5/8}
5.51	1.0190	.981	94.00	20
4.12	1.3636	.733	92.50	*21 ^{1/2}
4.19	1.3411	.746	103.00	*21 ^{1/2}
4.26	1.3186	.758	114.00'	*21 ^{1/2}
3.79	1.4807	.675	92.50	*22
3.85	1.4590	.685	103.00	*22
3.91	1.4360	.696	114.00	*22
2.86	1.9665	.509	100.50	*24
2.89	1.9407	.515	113.00	*24
2.64	2.1267	.470	88.00	*24 ^{1/2}
2.67	2.1008	.476	100.50	*24 ^{1/2}
2.71	2.0749	.482	113.00	*24 ^{1/2}

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 14.00"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*16	55.00	15.376	1.6492	.6064	.0393
16	65.00	15.250	1.4917	.6704	.0355
*16	70.00	15.198	1.4271	.7007	.0340
16	75.00	15.124	1.3356	.7487	.0318
16	84.00	15.010	1.1954	.8365	.0285
*18	78.00	17.194	4.0650	.2460	.0968
*18	87.50	17.088	3.9168	.2553	.0933
*18	96.50	16.986	3.7750	.2649	.0899
*18½	78.00	17.855	5.0103	.1996	.1193
18½	87.50	17.755	4.8650	.2056	.1158
*18½	96.50	17.655	4.7205	.2118	.1124
20	94.00	19.124	6.9249	.1444	.1649
*21½	92.50	20.710	9.5025	.1052	.2262
*21½	103.00	20.610	9.3339	.1071	.2222
*21½	114.00	20.510	9.1661	.1091	.2182
*22	92.50	21.222	10.3784	.0964	.2471
*22	103.00	21.128	10.2160	.0979	.2432
*22	114.00	21.028	10.0440	.0996	.2391
*24	100.50	23.226	14.0126	.0714	.3336
*24	113.00	23.124	13.8197	.0724	.3290
*24½	88.00	23.850	15.2111	.0657	.3622
*24½	100.50	23.750	15.0169	.0666	.3575
*24½	113.00	23.650	14.8235	.0675	.3529

**Size of
Inside Casing
O.D. 16.000"**

*18½	78.00	17.855	2.5623	.3903	.0610
18½	87.50	17.755	2.4170	.4137	.0575
*18½	96.50	17.655	2.2725	.4400	.0541
20	94.00	19.124	4.4769	.2234	.1066
*21½	92.50	20.710	7.0545	.1418	.1680
*21½	103.00	20.610	6.8859	.1452	.1639
*21½	114.00	20.510	6.7181	.1489	.1600
*22	92.50	21.222	7.9304	.1261	.1888
*22	103.00	21.128	7.7680	.1287	.1850
*22	114.00	21.028	7.5960	.1316	.1809
*24	100.50	23.226	11.5646	.0865	.2753
*24	113.00	23.124	11.3717	.0879	.2708
*24½	88.00	23.850	12.7631	.0784	.3039
*24½	100.50	23.750	12.5689	.0796	.2993
*24½	113.00	23.650	12.3755	.0808	.2947

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 14.000"

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
25.47	.2205	4.536	55.00	*16
28.15	.1994	5.015	65.00	16
29.43	.1908	5.242	70.00	*16
31.45	.1785	5.601	75.00	16
35.13	.1598	6.258	84.00	16
10.33	.5434	1.840	78.00	*18
10.72	.5236	1.910	87.50	*18
11.13	.5046	1.982	96.50	*18
8.38	.6698	1.493	78.00	*18 ⁵ / ₈
8.63	.6504	1.538	87.50	18 ⁵ / ₈
8.90	.6310	1.585	96.50	*18 ⁵ / ₈
6.07	.9257	1.080	94.00	20
4.42	1.2703	.787	92.50	*21 ¹ / ₂
4.50	1.2475	.801	103.00	*21 ¹ / ₂
4.58	1.2253	.816	114.00	*21 ¹ / ₂
4.05	1.3874	.721	92.50	*22
4.11	1.3657	.732	103.00	*22
4.18	1.3427	.745	114.00	*22
3.00	1.8732	.534	100.50	*24
3.04	1.8474	.541	113.00	*24
2.76	2.0334	.492	88.00	*24 ¹ / ₂
2.80	2.0075	.498	100.50	*24 ¹ / ₂
2.83	1.9816	.505	113.00	*24 ¹ / ₂

Size of
Inside Casing
O.D. 16.00"

16.39	.3425	2.919	78.00	*18 ⁵ / ₈
17.38	.3231	3.095	87.50	18 ⁵ / ₈
18.48	.3038	3.292	96.50	*18 ⁵ / ₈
9.38	.5985	1.671	94.00	20
5.95	.9430	1.060	92.50	*21 ¹ / ₂
6.10	.9205	1.086	103.00	*21 ¹ / ₂
6.25	.8981	1.113	114.00	*21 ¹ / ₂
5.30	1.0601	.943	92.50	*22
5.41	1.0384	.963	103.00	*22
5.53	1.0154	.985	114.00	*22
3.63	1.5460	.647	100.50	*24
3.69	1.5202	.658	113.00	*24
3.29	1.7062	.586	88.00	*24 ¹ / ₂
3.34	1.6802	.595	100.50	*24 ¹ / ₂
3.39	1.6544	.604	113.00	*24 ¹ / ₂

**Note: No allowance made for couplings.

**Size of
Inside Casing
O.D. 18.000"**

**TABLE
VOLUME & HEIGHT**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*21½	92.50	20.710	4.2801	.2336	.1019
*21½	103.00	20.610	4.1115	.2432	.0979
*21½	114.00	20.510	3.9437	.2536	.0939
*22	92.50	21.222	5.1560	.1939	.1228
*22	103.00	21.128	4.9936	.2003	.1189
*22	114.00	21.028	4.8216	.2074	.1148
*24	100.50	23.226	8.7902	.1138	.2093
*24	113.00	23.124	8.5973	.1163	.2047
*24½	88.00	23.850	9.9887	.1001	.2378
*24½	100.50	23.750	9.7945	.1021	.2332
*24½	113.00	23.650	9.6011	.1042	.2286

**Size of
Inside Casing
O.D. 18.625"**

*21½	92.50	20.710	3.3461	.2989	.0797
*21½	103.00	20.610	3.1776	.3147	.0757
*21½	114.00	20.510	3.0098	.3322	.0717
*22	92.50	21.222	4.2221	.2368	.1005
*22	103.00	21.128	4.0597	.2463	.0967
*22	114.00	21.028	3.8877	.2572	.0926
*24	100.50	23.226	7.8563	.1273	.1871
*24	113.00	23.124	7.6634	.1305	.1825
*24½	88.00	23.850	9.0548	.1104	.2156
*24½	100.50	23.750	8.8606	.1129	.2110
*24½	113.00	23.650	8.6672	.1154	.2064

NO. 221-C

BETWEEN CASINGS**

Size of
Inside Casing
O.D. 18.000"

		OUTSIDE CASING		
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
9.81	.5722	1.748	92.50	*21 $\frac{1}{2}$
10.22	.5496	1.819	103.00	*21 $\frac{1}{2}$
10.65	.5272	1.897	114.00	*21 $\frac{1}{2}$
8.15	.6893	1.451	92.50	*22
8.41	.6675	1.498	103.00	*22
8.71	.6446	1.551	114.00	*22
4.78	1.1751	.851	100.50	*24
4.89	1.1493	.870	113.00	*24
4.20	1.3353	.749	88.00	*24 $\frac{1}{2}$
4.29	1.3093	.764	100.50	*24 $\frac{1}{2}$
4.37	1.2835	.779	113.00	*24 $\frac{1}{2}$

Size of
Inside Casing
O.D. 18.625"

12.55	.4473	2.236	92.50	*21 $\frac{1}{2}$
13.22	.4248	2.354	103.00	*21 $\frac{1}{2}$
13.95	.4024	2.485	114.00	*21 $\frac{1}{2}$
9.95	.5644	1.772	92.50	*22
10.35	.5427	1.843	103.00	*22
10.80	.5197	1.924	114.00	*22
5.35	1.0502	.952	100.50	*24
5.48	1.0244	.976	113.00	*24
4.64	1.2105	.826	88.00	*24 $\frac{1}{2}$
4.74	1.1845	.844	100.50	*24 $\frac{1}{2}$
4.85	1.1586	.863	113.00	*24 $\frac{1}{2}$

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 2.375"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*7 ⁵ / ₈	20.00	7.125	1.8411	.5432	.0438
7 ⁵ / ₈	24.00	7.025	1.7834	.5607	.0425
7 ⁵ / ₈	26.40	6.969	1.7514	.5710	.0417
7 ⁵ / ₈	29.70	6.875	1.6983	.5888	.0404
7 ⁵ / ₈	33.70	6.765	1.6371	.6108	.0390
7 ⁵ / ₈	39.00	6.625	1.5606	.6408	.0372
7 ³ / ₄	45.30	6.560	1.5256	.6555	.0363
*8	26.00	7.386	1.9956	.5011	.0475
*8 ¹ / ₈	28.00	7.485	2.0557	.4865	.0489
*8 ¹ / ₈	32.00	7.385	1.9950	.5012	.0475
*8 ¹ / ₈	35.50	7.285	1.9352	.5168	.0461
*8 ¹ / ₈	39.50	7.185	1.8761	.5330	.0447
8 ⁵ / ₈	24.00	8.097	2.4448	.4090	.0582
8 ⁵ / ₈	28.00	8.017	2.3922	.4180	.0570
8 ⁵ / ₈	32.00	7.921	2.3297	.4292	.0555
8 ⁵ / ₈	36.00	7.825	2.2681	.4409	.0540
*8 ⁵ / ₈	38.00	7.775	2.2362	.4472	.0532
8 ⁵ / ₈	40.00	7.725	2.2046	.4536	.0525
*8 ⁵ / ₈	43.00	7.651	2.1582	.4633	.0514
8 ⁵ / ₈	44.00	7.625	2.1420	.4669	.0510
8 ⁵ / ₈	49.00	7.511	2.0716	.4827	.0493
*9	34.00	8.290	2.5738	.3885	.0613
*9	38.00	8.196	2.5106	.3983	.0598
*9	40.00	8.150	2.4799	.4032	.0590
*9	45.00	8.032	2.4020	.4163	.0572
*9	55.00	7.812	2.2598	.4425	.0538
*9 ⁵ / ₈	29.30	9.063	3.1211	.3204	.0743
9 ⁵ / ₈	32.30	9.001	3.0754	.3252	.0732
9 ⁵ / ₈	36.00	8.921	3.0169	.3315	.0718
*9 ⁵ / ₈	38.00	8.877	2.9849	.3350	.0711
9 ⁵ / ₈	40.00	8.835	2.9546	.3385	.0703
9 ⁵ / ₈	43.50	8.755	2.8972	.3452	.0690
9 ⁵ / ₈	47.00	8.681	2.8445	.3516	.0677
9 ⁵ / ₈	53.50	8.535	2.7420	.3647	.0653
*10	33.00	9.384	3.3627	.2974	.0801
*10 ³ / ₄	32.75	10.192	4.0080	.2495	.0954
10 ³ / ₄	35.75	10.136	3.9616	.2524	.0943
10 ³ / ₄	40.50	10.050	3.8908	.2570	.0926
10 ³ / ₄	45.50	9.950	3.8092	.2625	.0907
*10 ³ / ₄	51.00	9.850	3.7284	.2682	.0888
10 ³ / ₄	54.00	9.784	3.6755	.2721	.0875
*10 ³ / ₄	55.50	9.760	3.6564	.2735	.0871
*10 ³ / ₄	60.70	9.660	3.5771	.2796	.0852
*10 ³ / ₄	65.70	9.560	3.4987	.2858	.0833

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 2.375"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
22.81	.2461	4.063	20.00	*7 $\frac{5}{8}$
23.55	.2384	4.195	24.00	7 $\frac{5}{8}$
23.98	.2341	4.271	26.40	7 $\frac{5}{8}$
24.73	.2270	4.405	29.70	7 $\frac{5}{8}$
25.66	.2188	4.569	33.70	7 $\frac{5}{8}$
26.91	.2086	4.793	39.00	7 $\frac{5}{8}$
27.53	.2039	4.903	45.30	7 $\frac{3}{4}$
21.05	.2668	3.748	26.00	*8
20.43	.2748	3.639	28.00	*8 $\frac{1}{8}$
21.05	.2667	3.750	32.00	*8 $\frac{1}{8}$
21.70	.2587	3.866	35.50	*8 $\frac{1}{8}$
22.39	.2508	3.987	39.50	*8 $\frac{1}{8}$
17.18	.3268	3.060	24.00	8 $\frac{5}{8}$
17.56	.3198	3.127	28.00	8 $\frac{5}{8}$
18.03	.3114	3.211	32.00	8 $\frac{5}{8}$
18.52	.3032	3.298	36.00	8 $\frac{5}{8}$
18.78	.2989	3.345	38.00	*8 $\frac{5}{8}$
19.05	.2947	3.393	40.00	8 $\frac{5}{8}$
19.46	.2885	3.466	43.00	*8 $\frac{5}{8}$
19.61	.2863	3.492	44.00	8 $\frac{5}{8}$
20.27	.2769	3.611	49.00	8 $\frac{5}{8}$
16.32	.3441	2.906	34.00	*9
16.73	.3356	2.980	38.00	*9
16.94	.3315	2.506	38.00	*9
17.49	.3211	3.114	45.00	*9
18.59	.3021	3.310	55.00	*9
13.46	.4172	2.397	29.30	*9 $\frac{5}{8}$
13.66	.4111	2.432	32.30	9 $\frac{5}{8}$
13.92	.4033	2.480	36.00	9 $\frac{5}{8}$
14.07	.3990	2.506	38.00	*9 $\frac{5}{8}$
14.22	.3950	2.532	40.00	9 $\frac{5}{8}$
14.50	.3873	2.582	43.50	9 $\frac{5}{8}$
14.77	.3803	2.630	47.00	9 $\frac{5}{8}$
15.32	.3665	2.728	53.50	9 $\frac{5}{8}$
12.49	.4495	2.225	33.00	*10
10.48	.5358	1.866	32.75	*10 $\frac{3}{4}$
10.60	.5296	1.888	35.75	10 $\frac{3}{4}$
10.79	.5201	1.923	40.50	10 $\frac{3}{4}$
11.03	.5092	1.964	45.50	10 $\frac{3}{4}$
11.26	.4984	2.006	51.00	*10 $\frac{3}{4}$
11.43	.4913	2.035	54.00	10 $\frac{3}{4}$
11.49	.4888	2.046	55.50	*10 $\frac{3}{4}$
11.74	.4782	2.091	60.70	*10 $\frac{3}{4}$
12.00	.4677	2.138	65.70	*10 $\frac{3}{4}$

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 2.875"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
4½	9.50	4.090	.3453	2.8963	.0082
4½	10.50	4.052	.3326	3.0062	.0079
4½	11.60	4.000	.3156	3.1690	.0075
4½	13.50	3.920	.2897	3.4517	.0069
*4½	15.10	3.826	.2600	3.8461	.0062
*4¾	16.00	4.082	.3426	2.9188	.0082
5	11.50	4.560	.5111	1.9564	.0122
5	13.00	4.494	.4868	2.0544	.0116
5	15.00	4.408	.4555	2.1953	.0108
5	18.00	4.276	.4088	2.4464	.0097
*5	21.00	4.154	.3668	2.7263	.0087
*5	23.20	4.044	.3300	3.0303	.0079
*5½	13.00	5.044	.7008	1.4270	.0167
5½	14.00	5.012	.6877	1.4542	.0164
*5½	15.00	4.974	.6722	1.4877	.0160
5½	15.50	4.950	.6625	1.5095	.0158
5½	17.00	4.892	.6392	1.5645	.0152
5½	20.00	4.778	.5942	1.6829	.0141
5½	23.00	4.670	.5526	1.8097	.0132
*5¾	14.00	5.290	.8045	1.2430	.0192
*5¾	17.00	5.190	.7618	1.3128	.0181
*5¾	19.50	5.090	.7198	1.3893	.0171
*5¾	22.50	4.990	.6787	1.4734	.0162
*6	15.00	5.524	.9078	1.1016	.0216
*6	16.00	5.500	.8970	1.1149	.0214
*6	17.00	5.450	.8746	1.1434	.0208
*6	18.00	5.424	.8631	1.1586	.0205
*6	20.00	5.352	.8314	1.2027	.0198
*6	23.00	5.240	.7830	1.2771	.0186
*6	26.00	5.132	.7373	1.3562	.0176
*6½	17.00	6.135	1.1984	.8344	.0285
6½	20.00	6.049	1.1556	.8653	.0275
*6½	22.00	5.989	1.1262	.8880	.0268
6½	24.00	5.921	1.0931	.9148	.0260
*6½	26.00	5.855	1.0614	.9421	.0253
6½	28.00	5.791	1.0310	.9699	.0245
*6½	29.00	5.761	1.0169	.9834	.0242
6½	32.00	5.675	.9767	1.0238	.0233
7	17.00	6.538	1.4068	.7108	.0335
7	20.00	6.456	1.3633	.7335	.0325
*7	22.00	6.398	1.3329	.7503	.0317
7	23.00	6.366	1.3162	.7598	.0313
*7	24.00	6.336	1.3007	.7688	.0310
7	26.00	6.276	1.2698	.7875	.0302
*7	28.00	6.214	1.2382	.8076	.0295
7	29.00	6.184	1.2230	.8176	.0291
*7	30.00	6.154	1.2079	.8279	.0288
7	32.00	6.094	1.1779	.8489	.0280
*7	34.00	6.040	1.1512	.8687	.0274
7	35.00	6.004	1.1335	.8822	.0270
7	38.00	5.920	1.0927	.9152	.0260
*7	40.00	5.836	1.0524	.9502	.0251

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 2.875"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
121.64	.0462	21.666	9.50	4½
126.26	.0445	22.488	10.50	4½
133.10	.0422	23.705	11.60	4½
144.97	.0387	25.821	13.50	4½
161.54	.0348	28.771	15.10	*4½
122.59	.0458	21.835	16.00	*4¾
82.17	.0683	14.635	11.50	5
86.28	.0651	15.368	13.00	5
92.20	.0609	16.422	15.00	5
102.75	.0546	18.301	18.00	5
114.51	.0490	20.394	21.00	*5
127.27	.0441	22.668	23.20	*5
59.93	.0937	10.674	13.00	*5½
61.08	.0919	10.878	14.00	5½
62.48	.0899	11.129	15.00	*5½
63.40	.0886	11.292	15.50	5½
65.71	.0854	11.703	17.00	5½
70.68	.0794	12.589	20.00	5½
76.01	.0739	13.538	23.00	5½
52.21	.1075	9.298	14.00	*5¾
55.14	.1018	9.820	17.00	*5¾
58.35	.0962	10.392	19.50	*5¾
61.88	.0907	11.022	22.50	*5¾
46.27	.1213	8.241	15.00	*6
46.82	.1199	8.340	16.00	*6
48.02	.1169	8.553	17.00	*6
48.66	.1154	8.667	18.00	*6
50.52	.1111	8.997	20.00	*6
53.64	.1047	9.553	23.00	*6
56.96	.0986	10.145	26.00	*6
35.05	.1602	6.242	17.00	*6½
36.34	.1545	6.473	20.00	6½
37.29	.1505	6.642	22.00	*6½
38.42	.1461	6.843	24.00	6½
39.57	.1419	7.048	26.00	*6½
40.74	.1378	7.255	28.00	6½
41.30	.1359	7.356	29.00	*6½
43.00	.1306	7.659	32.00	6½
29.86	.1881	5.318	17.00	7
30.81	.1822	5.487	20.00	7
31.51	.1782	5.612	22.00	*7
31.91	.1760	5.683	23.00	7
32.29	.1739	5.751	24.00	*7
33.08	.1697	5.891	26.00	7
33.92	.1655	6.041	28.00	*7
34.34	.1635	6.116	29.00	7
34.77	.1615	6.193	30.00	*7
35.66	.1575	6.350	32.00	7
36.48	.1539	6.498	34.00	*7
37.05	.1515	6.599	35.00	7
38.44	.1461	6.846	38.00	7
39.91	.1407	7.108	40.00	*7

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 3.500"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*5½	13.00	5.044	.5382	1.8579	.0128
5½	14.00	5.012	.5251	1.9044	.0125
*5½	15.00	4.974	.5096	1.9623	.0121
5½	15.50	4.950	.4999	2.0004	.0119
5½	17.00	4.892	.4766	2.0981	.0113
5½	20.00	4.778	.4316	2.3168	.0103
5½	23.00	4.670	.3900	2.5641	.0093
*5¾	14.00	5.290	.6419	1.5578	.0153
*5¾	17.00	5.190	.5992	1.6689	.0143
*5¾	19.50	5.090	.5572	1.7945	.0133
*5¾	22.50	4.990	.5161	1.9375	.0123
*6	15.00	5.524	.7452	1.3419	.0177
*6	16.00	5.500	.7344	1.3617	.0175
*6	17.00	5.450	.7121	1.4044	.0170
*6	18.00	5.424	.7005	1.4275	.0167
*6	20.00	5.352	.6689	1.4951	.0159
*6	23.00	5.240	.6205	1.6117	.0148
*6	26.00	5.132	.5748	1.7398	.0137
*6½	17.00	6.135	1.0358	.9654	.0247
6½	20.00	6.049	.9931	1.0070	.0236
*6½	22.00	5.989	.9636	1.0378	.0229
6½	24.00	5.921	.9306	1.0746	.0222
*6½	26.00	5.855	.8989	1.1125	.0214
6½	28.00	5.791	.8685	1.1515	.0207
*6½	29.00	5.761	.8543	1.1705	.0203
6½	32.00	5.675	.8142	1.2282	.0194
7	17.00	6.538	1.2442	.8037	.0296
7	20.00	6.456	1.2007	.8328	.0286
*7	22.00	6.398	1.1703	.8545	.0279
7	23.00	6.366	1.1537	.8668	.0275
*7	24.00	6.336	1.1381	.8787	.0271
7	26.00	6.276	1.1072	.9032	.0264
*7	28.00	6.214	1.0756	.9297	.0256
7	29.00	6.184	1.0605	.9430	.0252
*7	30.00	6.154	1.0454	.9566	.0249
7	32.00	6.094	1.0154	.9849	.0242
*7	34.00	6.040	.9886	1.0115	.0235
7	35.00	6.004	.9710	1.0299	.0231
7	38.00	5.920	.9301	1.0752	.0221
*7	40.00	5.836	.8898	1.1238	.0212
*7½	20.00	7.125	1.5714	.6364	.0374
7½	24.00	7.025	1.5137	.6606	.0360
7½	26.40	6.969	1.4817	.6749	.0353
7½	29.70	6.875	1.4286	.7000	.0340
7½	33.70	6.765	1.3674	.7313	.0326
7½	39.00	6.625	1.2909	.7746	.0307
*7¾	45.30	6.560	1.256	.7962	.0299

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 3.500"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
78.03	.0720	13.898	13.00	*5½
79.98	.0702	14.246	14.00	5½
82.41	.0681	14.679	15.00	*5½
84.02	.0668	14.964	15.50	5½
88.12	.0637	15.695	17.00	5½
97.30	.0577	17.331	20.00	5½
107.69	.0521	19.181	23.00	5½
65.43	.0858	11.653	14.00	*5¾
70.09	.0801	12.484	17.00	*5¾
75.37	.0745	13.424	19.50	*5¾
81.38	.0690	14.494	22.50	*5¾
56.36	.0996	10.038	15.00	*6
57.19	.0982	10.186	16.00	*6
58.98	.0952	10.505	17.00	*6
59.96	.0936	10.678	18.00	*6
62.79	.0894	11.184	20.00	*6
67.69	.0829	12.056	23.00	*6
73.07	.0768	13.015	26.00	*6
40.55	.1385	7.222	17.00	*6½
42.29	.1328	7.533	20.00	6½
43.59	.1288	7.763	22.00	*6½
45.13	.1244	8.039	24.00	6½
46.73	.1202	8.322	26.00	*6½
48.36	.1161	8.614	28.00	6½
49.16	.1142	8.756	29.00	*6½
51.59	.1088	9.188	32.00	6½
33.76	.1663	6.012	17.00	7
34.98	.1605	6.230	20.00	7
35.89	.1564	6.392	22.00	*7
36.41	.1542	6.484	23.00	7
36.90	.1521	6.573	24.00	*7
37.93	.1480	6.756	26.00	7
39.05	.1438	6.954	28.00	*7
39.61	.1418	7.054	29.00	7
40.18	.1397	7.156	30.00	*7
41.36	.1357	7.367	32.00	7
42.48	.1322	7.566	34.00	*7
43.26	.1298	7.704	35.00	7
45.16	.1243	8.043	38.00	7
47.20	.1189	8.407	40.00	*7
26.73	.2101	4.760	20.00	*7½
27.75	.2024	4.942	24.00	7½
28.35	.1981	5.049	26.40	7½
29.40	.1910	5.236	29.70	7½
30.71	.1828	5.471	33.70	7½
32.53	.1726	5.795	39.00	7½
33.44	.1679	5.956	45.30	*7¾

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 4.000"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*5½	13.00	5.044	.3852	2.5959	.0092
5½	14.00	5.012	.3721	2.6874	.0089
*5½	15.00	4.974	.3566	2.8041	.0085
5½	15.50	4.950	.3469	2.8827	.0083
5½	17.00	4.892	.3236	3.0901	.0077
5½	20.00	4.778	.2786	3.5889	.0066
5½	23.00	4.670	.2370	4.2194	.0056
*5¾	14.00	5.290	.4890	2.0452	.0116
*5¾	17.00	5.190	.4462	2.2412	.0106
*5¾	19.50	5.090	.4042	2.4737	.0096
*5¾	22.50	4.990	.3631	2.7539	.0086
*6	15.00	5.524	.5922	1.6886	.0141
*6	16.00	5.500	.5814	1.7200	.0138
*6	17.00	5.450	.5591	1.7887	.0133
*6	18.00	5.424	.5475	1.8264	.0130
*6	20.00	5.352	.5159	1.9385	.0123
*6	23.00	5.240	.4675	2.1392	.0111
*6	26.00	5.132	.4218	2.3710	.0100
*6½	17.00	6.135	.8828	1.1327	.0210
6½	20.00	6.049	.8401	1.1904	.0200
*6½	22.00	5.989	.8106	1.2336	.0193
6½	24.00	5.921	.7776	1.2861	.0185
*6½	26.00	5.855	.7459	1.3407	.0178
6½	28.00	5.791	.7155	1.3977	.0170
*6½	29.00	5.761	.7013	1.4259	.0167
6½	32.00	5.675	.6612	1.5124	.0157
7	17.00	6.538	1.0912	.9164	.0260
7	20.00	6.456	1.0477	.9544	.0249
*7	22.00	6.398	1.0173	.9830	.0242
7	23.00	6.366	1.0007	.9993	.0238
*7	24.00	6.336	.9851	1.0151	.0235
7	26.00	6.276	.9542	1.0480	.0227
*7	28.00	6.214	.9226	1.0838	.0220
7	29.00	6.184	.9075	1.1020	.0216
*7	30.00	6.154	.8924	1.1206	.0212
7	32.00	6.094	.8624	1.1596	.0205
*7	34.00	6.040	.8356	1.1967	.0199
7	35.00	6.004	.8180	1.2226	.0195
7	38.00	5.920	.7771	1.2869	.0185
*7	40.00	5.836	.7368	1.3572	.0175
*7½	20.00	7.125	1.4184	.7050	.0338
7½	24.00	7.025	1.3607	.7349	.0324
7½	26.40	6.969	1.3287	.7526	.0316
7½	29.70	6.875	1.2756	.7839	.0304
7½	33.70	6.765	1.2144	.8234	.0289
7½	39.00	6.625	1.1379	.8788	.0271
*7¾	45.30	6.560	1.103	.9066	.0263

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 4.000"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
109.03	.0515	19.418	13.00	*5½
112.87	.0497	20.103	14.00	5½
117.77	.0477	20.976	15.00	*5½
121.07	.0464	21.564	15.50	5½
129.79	.0433	23.116	17.00	5½
150.74	.0372	26.847	20.00	5½
177.21	.0317	31.563	23.00	5½
85.90	.0654	15.299	14.00	*5¾
94.13	.0596	16.765	17.00	*5¾
103.90	.0540	18.505	19.50	*5¾
115.66	.0485	20.600	22.50	*5¾
70.92	.0792	12.632	15.00	*6
72.24	.0777	12.866	16.00	*6
75.13	.0747	13.381	17.00	*6
76.71	.0732	13.662	18.00	*6
81.42	.0690	14.501	20.00	*6
89.85	.0625	16.002	23.00	*6
99.58	.0564	17.736	26.00	*6
47.57	.1180	8.473	17.00	*6½
49.99	.1123	8.904	20.00	6½
51.81	.1084	9.228	22.00	*6½
54.01	.1039	9.620	24.00	6½
56.31	.0997	10.029	26.00	*6½
58.70	.0956	10.456	28.00	6½
59.89	.0938	10.666	29.00	*6½
63.52	.0884	11.314	32.00	6½
38.49	.1459	6.855	17.00	7
40.09	.1401	7.140	20.00	7
41.28	.1360	7.353	22.00	*7
41.97	.1338	7.476	23.00	7
42.63	.1317	7.594	24.00	*7
44.01	.1276	7.839	26.00	7
45.52	.1233	8.108	28.00	*7
46.28	.1213	8.243	29.00	7
47.07	.1193	8.383	30.00	*7
48.70	.1153	8.674	32.00	7
50.26	.1117	8.952	34.00	*7
51.35	.1093	9.145	35.00	7
54.05	.1039	9.626	38.00	7
57.00	.0985	10.153	40.00	*7
29.61	.1896	5.274	20.00	*7½
30.87	.1819	5.498	24.00	7½
31.61	.1776	5.630	26.40	7½
32.92	.1705	5.864	29.70	7½
34.58	.1623	6.160	33.70	7½
36.91	.1521	6.574	39.00	7½
38.08	.1474	6.782	45.30	*7¾

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 4.500"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*5½	13.00	5.044	.2118	4.7208	.0050
5½	14.00	5.012	.1987	5.0327	.0047
*5½	15.00	4.974	.1832	5.4579	.0044
5½	15.50	4.950	.1735	5.7636	.0041
5½	17.00	4.892	.1502	6.6573	.0036
5½	20.00	4.778	.1052	9.5026	.0025
5½	23.00	4.670	.0636	15.7225	.0015
*5¾	14.00	5.290	.3156	3.1691	.0075
*5¾	17.00	5.190	.2728	3.6658	.0065
*5¾	19.50	5.090	.2308	4.3318	.0055
*5¾	22.50	4.990	.1897	5.2708	.0045
*6	15.00	5.524	.4188	2.3878	.0100
*6	16.00	5.500	.4080	2.4510	.0097
*6	17.00	5.450	.3857	2.5930	.0092
*6	18.00	5.424	.3741	2.6729	.0089
*6	20.00	5.352	.3425	2.9200	.0082
*6	23.00	5.240	.2941	3.4006	.0070
*6	26.00	5.132	.2484	4.0263	.0059
*6½	17.00	6.135	.7094	1.4096	.0169
6½	20.00	6.049	.6667	1.5000	.0159
*6½	22.00	5.989	.6372	1.5693	.0152
6½	24.00	5.921	.6042	1.6552	.0144
*6½	26.00	5.855	.5725	1.7468	.0136
6½	28.00	5.791	.5421	1.8448	.0129
*6½	29.00	5.761	.5279	1.8942	.0126
6½	32.00	5.675	.4878	2.0501	.0116
7	17.00	6.538	.9178	1.0895	.0219
7	20.00	6.456	.8743	1.1437	.0208
*7	22.00	6.398	.8439	1.1849	.0201
7	23.00	6.366	.8273	1.2088	.0197
*7	24.00	6.336	.8117	1.2320	.0193
7	26.00	6.276	.7808	1.2807	.0186
*7	28.00	6.214	.7492	1.3347	.0178
7	29.00	6.184	.7341	1.3623	.0175
*7	30.00	6.154	.7190	1.3909	.0171
7	32.00	6.094	.6890	1.4514	.0164
*7	34.00	6.040	.6622	1.5100	.0158
7	35.00	6.004	.6446	1.5515	.0153
7	38.00	5.920	.6037	1.6565	.0144
*7	40.00	5.836	.5634	1.7749	.0134
*7½	20.00	7.125	1.2450	.8032	.0296
7½	24.00	7.025	1.1873	.8422	.0283
7½	26.40	6.969	1.1553	.8656	.0275
7½	29.70	6.875	1.1022	.9072	.0262
7½	33.70	6.765	1.0410	.9606	.0248
7½	39.00	6.625	.9645	1.0368	.0230
*8½	20.00	8.191	1.9112	.5232	.0455
8½	24.00	8.097	1.8487	.5409	.0440
8½	28.00	8.017	1.7961	.5568	.0428
8½	32.00	7.921	1.7337	.5768	.0413
8½	36.00	7.825	1.6720	.5981	.0398
*8½	38.00	7.775	1.6402	.6097	.0391
8½	40.00	7.725	1.6086	.6217	.0383
*8½	43.00	7.651	1.5621	.6401	.0372
8½	44.00	7.625	1.5459	.6469	.0368
8½	49.00	7.511	1.4755	.6777	.0351

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 4.500"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
198.27	.0283	35.314	13.00	*5½
211.37	.0266	37.647	14.00	5½
229.23	.0245	40.828	15.00	*5½
242.07	.0232	43.115	15.50	5½
279.61	.0201	49.800	17.00	5½
399.11	.0141	71.084	20.00	5½
660.35	.0085	117.613	23.00	5½
133.10	.0422	23.706	14.00	*5¾
153.96	.0365	27.422	17.00	*5¾
181.94	.0309	32.404	19.50	*5¾
221.37	.0254	39.429	22.50	*5¾
100.29	.0560	17.862	15.00	*6
102.94	.0545	18.335	16.00	*6
108.90	.0516	19.397	17.00	*6
112.26	.0500	19.995	18.00	*6
122.64	.0458	21.843	20.00	*6
142.82	.0393	25.438	23.00	*6
169.11	.0332	30.119	26.00	*6
59.20	.0948	10.544	17.00	*6½
63.00	.0891	11.220	20.00	6½
65.91	.0852	11.739	22.00	*6½
69.52	.0808	12.381	24.00	6½
73.37	.0765	13.067	26.00	*6½
77.48	.0725	13.800	28.00	6½
79.56	.0706	14.170	29.00	*6½
86.10	.0652	15.336	32.00	6½
45.76	.1227	8.150	17.00	7
48.04	.1169	8.556	20.00	7
49.77	.1128	8.864	22.00	*7
50.77	.1106	9.043	23.00	7
51.74	.1085	9.216	24.00	*7
53.79	.1044	9.580	26.00	7
56.06	.1002	9.984	28.00	*7
57.22	.0981	10.191	29.00	7
58.42	.0961	10.405	30.00	*7
60.96	.0921	10.857	32.00	7
63.42	.0885	11.296	34.00	*7
65.16	.0862	11.606	35.00	7
69.57	.0807	12.391	38.00	7
74.55	.0753	13.271	40.00	*7
33.73	.1664	6.008	20.00	*7½
35.37	.1587	6.300	24.00	7½
36.35	.1544	6.475	26.40	7½
38.10	.1473	6.787	29.70	7½
40.35	.1392	7.186	33.70	7½
43.54	.1289	7.756	39.00	7½
21.98	.2555	3.914	20.00	*8½
22.72	.2471	4.046	24.00	8½
23.38	.2401	4.165	28.00	8½
24.23	.2318	4.315	32.00	8½
25.12	.2235	4.474	36.00	8½
25.61	.2193	4.561	38.00	*8½
26.11	.2150	4.650	40.00	8½
26.89	.2088	4.789	43.00	*8½
27.17	.2067	4.839	44.00	8½
28.46	.1973	5.070	49.00	8½

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 5.000"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	17.00	6.538	.7240	1.3812	.0172
7	20.00	6.456	.6805	1.4694	.0162
*7	22.00	6.398	.6501	1.5382	.0155
7	23.00	6.366	.6335	1.5786	.0151
*7	24.00	6.336	.6179	1.6184	.0147
7	26.00	6.276	.5870	1.7035	.0140
*7	28.00	6.214	.5554	1.8004	.0132
7	29.00	6.184	.5403	1.8509	.0129
*7	30.00	6.154	.5252	1.9042	.0125
7	32.00	6.094	.4952	2.0195	.0118
*7	34.00	6.040	.4684	2.1347	.0112
7	35.00	6.004	.4508	2.2185	.0107
7	38.00	5.920	.4099	2.4397	.0098
*7	40.00	5.836	.3696	2.7056	.0088
*7½	20.00	7.125	1.0512	.9513	.0250
7½	24.00	7.025	.9935	1.0065	.0237
7½	26.40	6.969	.9615	1.0400	.0229
7½	29.70	6.875	.9084	1.1008	.0216
7½	33.70	6.765	.8472	1.1803	.0202
7½	39.00	6.625	.7707	1.2975	.0184
8½	20.00	8.191	1.7174	.5823	.0409
8½	24.00	8.097	1.6549	.6043	.0394
8½	28.00	8.017	1.6023	.6241	.0382
8½	32.00	7.921	1.5399	.6494	.0367
8½	36.00	7.825	1.4782	.6765	.0352
8½	38.00	7.775	1.4464	.6914	.0344
8½	40.00	7.725	1.4148	.7068	.0337
8½	43.00	7.651	1.3683	.7308	.0326
8½	44.00	7.625	1.3521	.7396	.0322
8½	49.00	7.511	1.2817	.7802	.0305
*9	34.00	8.290	1.7839	.5606	.0425
*9	38.00	8.196	1.7207	.5812	.0410
*9	40.00	8.150	1.6900	.5917	.0402
*9	45.00	8.032	1.6121	.6203	.0384
*9	55.00	7.812	1.4699	.6803	.0350
*9½	29.30	9.063	2.3312	.4290	.0555
9½	32.30	9.001	2.2855	.4375	.0544
9½	36.00	8.921	2.2270	.4490	.0530
*9½	38.00	8.877	2.1951	.4556	.0523
9½	40.00	8.835	2.1647	.4620	.0515
9½	43.50	8.755	2.1073	.4745	.0502
9½	47.00	8.681	2.0547	.4867	.0489
9½	53.50	8.535	1.9521	.5123	.0465
*10	33.00	9.384	2.5728	.3887	.0613
10¾	32.75	10.192	3.2182	.3107	.0766
*10¾	35.75	10.136	3.1717	.3153	.0755
10¾	40.50	10.050	3.1009	.3225	.0738
10¾	45.50	9.950	3.0193	.3312	.0719
10¾	51.00	9.850	2.9385	.3403	.0700
*10¾	54.00	9.784	2.8856	.3465	.0687
10¾	55.50	9.760	2.8665	.3489	.0683
*10¾	60.70	9.660	2.7873	.3588	.0664
*10¾	65.70	9.560	2.7089	.3692	.0645

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 5.000"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
58.01	.0968	10.332	17.00	7
61.72	.0910	10.992	20.00	7
64.60	.0869	11.506	22.00	*7
66.30	.0847	11.809	23.00	7
67.97	.0826	12.106	24.00	*7
71.55	.0785	12.743	26.00	7
75.62	.0743	13.468	28.00	*7
77.74	.0722	13.846	29.00	7
79.97	.0702	14.244	30.00	*7
84.82	.0662	15.107	32.00	7
89.66	.0626	15.969	34.00	*7
93.18	.0603	16.595	35.00	7
102.47	.0548	18.250	38.00	7
113.64	.0494	20.239	40.00	*7
39.95	.1405	7.116	20.00	*7½
42.27	.1328	7.529	24.00	7½
43.68	.1285	7.780	26.40	7½
46.23	.1214	8.235	29.70	7½
49.57	.1133	8.822	33.70	7½
54.49	.1030	9.706	39.00	7½
24.46	.2296	4.356	20.00	8½
25.38	.2212	4.520	24.00	8½
26.21	.2142	4.669	28.00	8½
27.27	.2059	4.858	32.00	8½
28.41	.1976	5.061	36.00	8½
29.04	.1934	5.172	38.00	8½
29.69	.1891	5.287	40.00	8½
30.69	.1829	5.467	43.00	8½
31.06	.1808	5.532	44.00	8½
32.77	.1713	5.836	49.00	8½
23.54	.2385	4.193	34.00	*9
24.41	.2300	4.347	38.00	*9
24.85	.2259	4.426	40.00	*9
26.05	.2155	4.640	45.00	*9
28.57	.1965	5.089	55.00	*9
18.02	.3116	3.209	29.30	*9½
18.38	.3055	3.273	32.30	9½
18.86	.2977	3.359	36.00	9½
19.13	.2934	3.408	38.00	*9½
19.40	.2894	3.456	40.00	9½
19.93	.2817	3.550	43.50	9½
20.44	.2747	3.641	47.00	9½
21.52	.2610	3.832	53.50	9½
16.32	.3439	2.908	33.00	*10
13.05	.4302	2.324	32.75	10³/₄
13.24	.4240	2.359	35.75	*10³/₄
13.54	.4145	2.412	40.50	10³/₄
13.91	.4036	2.478	45.50	10³/₄
14.29	.3928	2.546	51.00	10³/₄
14.55	.3858	2.592	54.00	*10³/₄
14.65	.3832	2.610	55.50	10³/₄
15.07	.3726	2.684	60.70	*10³/₄
15.50	.3621	2.762	65.70	*10³/₄

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 5.500"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	17.00	6.538	.5098	1.9615	.0121
7	20.00	6.456	.4663	2.1444	.0111
*7	22.00	6.398	.4359	2.2940	.0104
7	23.00	6.366	.4193	2.3852	.0100
*7	24.00	6.336	.4037	2.4770	.0096
7	26.00	6.276	.3728	2.6821	.0089
*7	28.00	6.214	.3412	2.9305	.0081
7	29.00	6.184	.3261	3.0669	.0078
*7	30.00	6.154	.3110	3.2158	.0074
7	32.00	6.094	.2810	3.5589	.0067
*7	34.00	6.040	.2542	3.9332	.0061
7	35.00	6.004	.2366	4.2273	.0056
7	38.00	5.920	.1957	5.1101	.0047
*7	40.00	5.836	.1554	6.4349	.0037
*7½	20.00	7.125	.8370	1.1947	.0199
7½	24.00	7.025	.7793	1.2832	.0186
7½	26.40	6.969	.7473	1.3381	.0178
7½	29.70	6.875	.6942	1.4404	.0165
7½	33.70	6.765	.6330	1.5797	.0151
7½	39.00	6.625	.5565	1.7968	.0133
*8½	20.00	8.191	1.5032	.6653	.0358
8½	24.00	8.097	1.4407	.6941	.0343
8½	28.00	8.017	1.3881	.7204	.0331
8½	32.00	7.921	1.3257	.7543	.0316
8½	36.00	7.825	1.2640	.7911	.0301
*8½	38.00	7.775	1.2322	.8116	.0293
8½	40.00	7.725	1.2006	.8329	.0286
*8½	43.00	7.651	1.1541	.8664	.0275
8½	44.00	7.625	1.1379	.8788	.0271
8½	49.00	7.511	1.0675	.9367	.0254
*9	34.00	8.290	1.5697	.6370	.0374
*9	38.00	8.196	1.5065	.6638	.0359
*9	40.00	8.150	1.4758	.6776	.0351
*9	45.00	8.032	1.3979	.7153	.0333
*9	55.00	7.812	1.2557	.7964	.0299
*9½	29.30	9.063	2.1170	.4724	.0504
9½	32.30	9.001	2.0713	.4828	.0493
9½	36.00	8.921	2.0128	.4968	.0479
*9½	38.00	8.877	1.9809	.5048	.0472
9½	40.00	8.835	1.9505	.5127	.0464
9½	43.50	8.755	1.8931	.5282	.0451
9½	47.00	8.681	1.8405	.5433	.0438
9½	53.50	8.535	1.7379	.5754	.0414
*10	33.00	9.384	2.3586	.4240	.0562
10¾	32.75	10.192	3.0040	.3329	.0715
*10¾	35.75	10.136	2.9575	.3381	.0704
10¾	40.50	10.050	2.8867	.3464	.0687
10¾	45.50	9.950	2.8051	.3565	.0668
10¾	51.00	9.850	2.7243	.3671	.0649
*10¾	54.00	9.784	2.6714	.3743	.0636
10¾	55.50	9.760	2.6523	.3770	.0632
*10¾	60.70	9.660	2.5731	.3886	.0613
*10¾	65.70	9.560	2.4947	.4009	.0594

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 5.500"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
82.36	.0682	14.673	17.00	7
90.06	.0623	16.041	20.00	7
96.35	.0583	17.160	22.00	*7
100.18	.0560	17.842	23.00	7
104.03	.0540	18.529	24.00	*7
112.65	.0498	20.064	26.00	7
123.08	.0456	21.921	28.00	*7
128.81	.0436	22.942	29.00	7
135.06	.0416	24.056	30.00	*7
149.48	.0376	26.623	32.00	7
165.19	.0340	29.422	34.00	*7
177.55	.0316	31.622	35.00	7
214.62	.0262	38.226	38.00	7
270.27	.0208	48.136	40.00	*7
50.18	.1119	8.937	20.00	*7½
53.89	.1042	9.599	24.00	7½
56.20	.0999	10.010	26.40	7½
60.50	.0928	10.775	29.70	7½
66.35	.0846	11.817	33.70	7½
75.47	.0744	13.441	39.00	7½
27.94	.2009	4.976	20.00	*8½
29.15	.1926	5.192	24.00	8½
30.26	.1856	5.389	28.00	8½
31.68	.1772	5.643	32.00	8½
33.23	.1690	5.918	36.00	8½
34.09	.1647	6.071	38.00	*8½
34.98	.1605	6.231	40.00	8½
36.39	.1543	6.481	43.00	*8½
36.91	.1521	6.574	44.00	8½
39.34	.1427	7.007	49.00	8½
26.76	.2098	4.765	34.00	*9
27.88	.2014	4.965	38.00	*9
28.46	.1973	5.069	40.00	*9
30.04	.1869	5.351	45.00	*9
33.45	.1679	5.957	55.00	*9
19.84	.2830	3.534	29.30	*9½
20.28	.2769	3.611	32.30	9½
20.87	.2691	3.716	36.00	9½
21.20	.2648	3.776	38.00	*9½
21.53	.2607	3.835	40.00	9½
22.19	.2531	3.951	43.50	9½
22.82	.2460	4.064	47.00	9½
24.17	.2323	4.304	53.50	9½
17.81	.3153	3.172	33.00	*10
13.98	.4016	2.490	32.75	10³/₄
14.20	.3954	2.529	35.75	*10³/₄
14.55	.3859	2.591	40.50	10³/₄
14.97	.3750	2.667	45.50	10³/₄
15.42	.3642	2.746	51.00	10³/₄
15.72	.3571	2.800	54.00	*10³/₄
15.84	.3546	2.820	55.50	10³/₄
16.32	.3440	2.907	60.70	*10³/₄
16.84	.3335	2.999	65.70	*10³/₄

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 5.562"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	17.00	6.538	.4818	2.0754	.0115
7	20.00	6.456	.4384	2.2812	.0104
*7	22.00	6.398	.4079	2.4513	.0097
7	23.00	6.366	.3913	2.5557	.0093
*7	24.00	6.336	.3757	2.6615	.0089
7	26.00	6.276	.3449	2.8998	.0082
*7	28.00	6.214	.3133	3.1922	.0075
7	29.00	6.184	.2981	3.3548	.0071
*7	30.00	6.154	.2830	3.5338	.0067
7	32.00	6.094	.2530	3.9526	.0060
*7	34.00	6.040	.2263	4.4196	.0054
7	35.00	6.004	.2086	4.7944	.0050
7	38.00	5.920	.1677	5.9627	.0040
*7	40.00	5.836	.1274	7.8481	.0030
<hr/>					
*7½	20.00	7.125	.8091	1.2360	.0193
7½	24.00	7.025	.7513	1.3310	.0179
7½	26.40	6.969	.7193	1.3901	.0171
7½	29.70	6.875	.6663	1.5009	.0159
7½	33.70	6.765	.6050	1.6528	.0144
7½	39.00	6.625	.5286	1.8920	.0126
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*8½	20.00	8.191	1.4752	.6779	.0351
8½	24.00	8.097	1.4127	.7079	.0336
8½	28.00	8.017	1.3601	.7352	.0324
8½	32.00	7.921	1.2977	.7706	.0309
8½	36.00	7.825	1.2360	.8090	.0294
*8½	38.00	7.775	1.2042	.8304	.0287
8½	40.00	7.725	1.1726	.8528	.0279
*8½	43.00	7.651	1.1262	.8880	.0268
8½	44.00	7.625	1.1100	.9009	.0264
8½	49.00	7.511	1.0396	.9620	.0248
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*9	34.00	8.290	1.5418	.6486	.0367
*9	38.00	8.196	1.4785	.6763	.0352
*9	40.00	8.150	1.4479	.6907	.0345
*9	45.00	8.032	1.3699	.7300	.0326
*9	55.00	7.812	1.2277	.8145	.0292
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*9½	29.30	9.063	2.0890	.4787	.0497
9½	32.30	9.001	2.0429	.4895	.0486
9½	36.00	8.921	1.9848	.5038	.0473
*9½	38.00	8.877	1.9529	.5121	.0465
9½	40.00	8.835	1.9225	.5201	.0458
9½	43.50	8.755	1.8651	.5362	.0444
9½	47.00	8.681	1.8125	.5517	.0432
9½	53.50	8.535	1.7099	.5848	.0407
<hr/>					
*10	33.00	9.384	2.3306	.4291	.0555
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10¾	32.75	10.192	2.9760	.3360	.0709
*10¾	35.75	10.136	2.9295	.3414	.0698
10¾	40.50	10.050	2.8587	.3498	.0681
10¾	45.50	9.950	2.7771	.3601	.0661
10¾	51.00	9.850	2.6963	.3709	.0642
*10¾	54.00	9.784	2.6435	.3783	.0629
10¾	55.50	9.760	2.6243	.3811	.0625
*10¾	60.70	9.660	2.5451	.3929	.0606
*10¾	65.70	9.560	2.4667	.4054	.0587

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 5.562"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
87.17	.0644	15.525	17.00	7
95.81	.0586	17.065	20.00	7
102.96	.0545	18.337	22.00	*7
107.34	.0523	19.118	23.00	7
111.78	.0502	19.909	24.00	*7
121.79	.0461	21.692	26.00	7
134.07	.0419	23.880	28.00	*7
140.90	.0398	25.095	29.00	7
148.42	.0378	26.435	30.00	*7
166.01	.0338	29.567	32.00	7
185.62	.0302	33.061	34.00	*7
201.37	.0279	35.865	35.00	7
250.43	.0224	44.604	38.00	7
329.62	.0170	58.708	40.00	*7
51.91	.1082	9.246	20.00	*7½
55.90	.1004	9.956	24.00	7½
58.39	.0962	10.399	26.40	7½
63.04	.0891	11.228	29.70	7½
69.42	.0809	12.364	33.70	7½
79.46	.0707	14.153	39.00	7½
28.47	.1972	5.071	20.00	*8½
29.73	.1889	5.295	24.00	8½
30.88	.1818	5.500	28.00	8½
32.37	.1735	5.764	32.00	8½
33.98	.1652	6.052	36.00	8½
34.88	.1610	6.212	38.00	*8½
35.82	.1568	6.380	40.00	8½
37.30	.1505	6.643	43.00	*8½
37.84	.1484	6.739	44.00	8½
40.40	.1390	7.196	49.00	8½
27.24	.2061	4.852	34.00	*9
28.41	.1977	5.059	38.00	*9
29.01	.1935	5.167	40.00	*9
30.66	.1831	5.460	45.00	*9
34.21	.1641	6.093	55.00	*9
20.10	.2793	3.581	29.30	*9½
20.56	.2731	3.662	32.30	9½
21.16	.2653	3.769	36.00	9½
21.51	.2611	3.830	38.00	*9½
21.85	.2570	3.891	40.00	9½
22.52	.2493	4.011	43.50	9½
23.17	.2423	4.127	47.00	9½
24.56	.2286	4.375	53.50	9½
18.02	.3116	3.210	33.00	*10
14.11	.3978	2.514	32.75	10³/₄
14.34	.3916	2.553	35.75	*10³/₄
14.69	.3822	2.617	40.50	10³/₄
15.12	.3712	2.694	45.50	10³/₄
15.58	.3604	2.774	51.00	10³/₄
15.89	.3534	2.830	54.00	*10³/₄
16.00	.3508	2.850	55.50	10³/₄
16.50	.3402	2.939	60.70	*10³/₄
17.03	.3297	3.033	65.70	*10³/₄

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 6.625"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7 ⁵ / ₈	20.00	7.125	.2805	3.5651	.0067
7 ⁵ / ₈	24.00	7.025	.2228	4.4890	.0053
7 ⁵ / ₈	26.40	6.969	.1908	5.2413	.0045
7 ⁵ / ₈	29.70	6.875	.1377	7.2622	.0033
7 ⁵ / ₈	33.70	6.765	.0765	13.0747	.0018
*8	26.00	7.386	.4350	2.2987	.0104
*8 ¹ / ₈	28.00	7.485	.4951	2.0198	.0118
*8 ¹ / ₈	32.00	7.385	.4344	2.3019	.0103
*8 ¹ / ₈	35.50	7.285	.3746	2.6697	.0089
*8 ¹ / ₈	39.50	7.185	.3155	3.1693	.0075
*8 ⁵ / ₈	20.00	8.191	.9466	1.0564	.0225
8 ⁵ / ₈	24.00	8.097	.8842	1.1310	.0211
8 ⁵ / ₈	28.00	8.017	.8316	1.2025	.0198
8 ⁵ / ₈	32.00	7.921	.7691	1.3001	.0183
8 ⁵ / ₈	36.00	7.825	.7075	1.4135	.0168
*8 ⁵ / ₈	38.00	7.775	.6756	1.4801	.0161
8 ⁵ / ₈	40.00	7.725	.6440	1.5527	.0153
*8 ⁵ / ₈	43.00	7.651	.5976	1.6734	.0142
8 ⁵ / ₈	44.00	7.625	.5814	1.7200	.0138
8 ⁵ / ₈	49.00	7.511	.5110	1.9570	.0122
*9	34.00	8.290	1.0132	.9870	.0241
*9	38.00	8.196	.9500	1.0527	.0226
*9	40.00	8.150	.9193	1.0878	.0219
*9	45.00	8.032	.8414	1.1885	.0200
*9	55.00	7.812	.6992	1.4303	.0166
*9 ⁵ / ₈	29.30	9.063	1.5605	.6408	.0372
9 ⁵ / ₈	32.30	9.001	1.5148	.6602	.0361
9 ⁵ / ₈	36.00	8.921	1.4563	.6867	.0347
*9 ⁵ / ₈	38.00	8.877	1.4243	.7021	.0339
9 ⁵ / ₈	40.00	8.835	1.3940	.7174	.0332
9 ⁵ / ₈	43.50	8.755	1.3366	.7482	.0318
9 ⁵ / ₈	47.00	8.681	1.2839	.7789	.0306
9 ⁵ / ₈	53.50	8.535	1.1814	.8465	.0281
*10	33.00	9.384	1.8021	.5549	.0429
10 ³ / ₄	32.75	10.192	2.4474	.4086	.0583
*10 ³ / ₄	35.75	10.136	2.4010	.4165	.0572
10 ³ / ₄	40.50	10.050	2.3302	.4292	.0555
10 ³ / ₄	45.50	9.950	2.2486	.4447	.0535
10 ³ / ₄	51.00	9.850	2.1678	.4613	.0516
*10 ³ / ₄	54.00	9.784	2.1149	.4728	.0504
10 ³ / ₄	55.50	9.760	2.0958	.4772	.0499
*10 ³ / ₄	60.70	9.660	2.0165	.4959	.0480
*10 ³ / ₄	65.70	9.560	1.9381	.5160	.0461

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 6.625"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
149.73	.0375	26.669	20.00	7 $\frac{1}{8}$
188.54	.0298	33.580	24.00	7 $\frac{1}{8}$
220.13	.0255	39.207	26.40	7 $\frac{1}{8}$
305.01	.0184	54.325	29.70	7 $\frac{1}{8}$
549.14	.0102	97.806	33.70	7 $\frac{1}{8}$
96.55	.0582	17.196	26.00	*8
84.83	.0662	15.109	28.00	*8 $\frac{1}{8}$
96.68	.0581	17.220	32.00	*8 $\frac{1}{8}$
112.13	.0501	19.971	35.50	*8 $\frac{1}{8}$
133.11	.0422	23.708	39.50	*8 $\frac{1}{8}$
44.37	.1265	7.902	20.00	*8 $\frac{5}{8}$
47.50	.1182	8.461	24.00	8 $\frac{5}{8}$
50.51	.1112	8.996	28.00	8 $\frac{5}{8}$
54.61	.1028	9.726	32.00	8 $\frac{5}{8}$
59.37	.0946	10.574	36.00	8 $\frac{5}{8}$
62.16	.0903	11.072	38.00	*8 $\frac{5}{8}$
65.21	.0861	11.615	40.00	8 $\frac{5}{8}$
70.28	.0799	12.518	43.00	*8 $\frac{5}{8}$
72.24	.0777	12.866	44.00	8 $\frac{5}{8}$
82.19	.0683	14.639	49.00	8 $\frac{5}{8}$
41.45	.1354	7.383	34.00	*9
44.21	.1270	7.874	38.00	*9
45.69	.1229	8.137	40.00	*9
49.92	.1125	8.891	45.00	*9
60.07	.0935	10.699	55.00	*9
26.91	.2086	4.794	29.30	*9 $\frac{5}{8}$
27.73	.2025	4.938	32.30	9 $\frac{5}{8}$
28.84	.1947	5.137	36.00	9 $\frac{5}{8}$
29.49	.1904	5.252	38.00	*9 $\frac{5}{8}$
30.13	.1863	5.366	40.00	9 $\frac{5}{8}$
31.42	.1787	5.597	43.50	9 $\frac{5}{8}$
32.71	.1716	5.826	47.00	9 $\frac{5}{8}$
35.55	.1579	6.332	53.50	9 $\frac{5}{8}$
23.31	.2409	4.151	33.00	*10
17.16	.3272	3.056	32.75	10 $\frac{3}{4}$
17.49	.3210	3.116	35.75	*10 $\frac{3}{4}$
18.02	.3115	3.210	40.50	10 $\frac{3}{4}$
18.68	.3006	3.327	45.50	10 $\frac{3}{4}$
19.37	.2898	3.451	51.00	10 $\frac{3}{4}$
19.86	.2827	3.537	54.00	*10 $\frac{3}{4}$
20.04	.2802	3.569	55.50	10 $\frac{3}{4}$
20.83	.2696	3.710	60.70	*10 $\frac{3}{4}$
21.67	.2591	3.860	65.70	*10 $\frac{3}{4}$

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 7.625"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
8 ⁵ / ₈	20.00	8.191	.3652	2.7380	.0087
8 ⁵ / ₈	24.00	8.097	.3028	3.3029	.0072
8 ⁵ / ₈	28.00	8.017	.2502	3.9973	.0060
8 ⁵ / ₈	32.00	7.921	.1877	5.3264	.0045
8 ⁵ / ₈	36.00	7.825	.1261	7.9320	.0030
8 ⁵ / ₈	38.00	7.775	.0942	10.6103	.0022
*9	34.00	8.290	.4318	2.3159	.0103
*9	38.00	8.196	.3686	2.7131	.0088
*9	40.00	8.150	.3379	2.9595	.0080
*9	45.00	8.032	.2600	3.8463	.0062
*9	55.00	7.812	.1178	8.4906	.0028
*9 ⁵ / ₈	29.30	9.063	.9791	1.0214	.0233
9 ⁵ / ₈	32.30	9.001	.9334	1.0714	.0222
9 ⁵ / ₈	36.00	8.921	.8749	1.1430	.0208
*9 ⁵ / ₈	38.00	8.877	.8429	1.1863	.0201
9 ⁵ / ₈	40.00	8.835	.8126	1.2306	.0193
9 ⁵ / ₈	43.50	8.755	.7552	1.3242	.0180
9 ⁵ / ₈	47.00	8.681	.7025	1.4234	.0167
9 ⁵ / ₈	53.50	8.535	.6000	1.6667	.0143
*10	33.00	9.384	1.2207	.8192	.0291
10 ³ / ₄	32.75	10.192	1.8660	.5359	.0444
*10 ³ / ₄	35.75	10.136	1.8196	.5496	.0433
10 ³ / ₄	40.50	10.050	1.7488	.5718	.0416
10 ³ / ₄	45.50	9.950	1.6672	.5998	.0397
10 ³ / ₄	51.00	9.850	1.5864	.6304	.0378
*10 ³ / ₄	54.00	9.784	1.5335	.6521	.0365
10 ³ / ₄	55.50	9.760	1.5144	.6603	.0361
*10 ³ / ₄	60.70	9.660	1.4351	.6968	.0342
*10 ³ / ₄	65.70	9.560	1.3567	.7371	.0323
*11 ³ / ₄	38.00	11.150	2.7002	.3703	.0643
11 ³ / ₄	42.00	11.084	2.6403	.3787	.0629
11 ³ / ₄	47.00	11.000	2.5647	.3899	.0611
11 ³ / ₄	54.00	10.880	2.4575	.4069	.0585
11 ³ / ₄	60.00	10.772	2.3621	.4233	.0562
*12	40.00	11.384	2.9154	.3430	.0694
*13	40.00	12.438	3.9398	.2538	.0938
*13	45.00	12.360	3.8609	.2590	.0919
*13	50.00	12.282	3.7824	.2644	.0901
*13	54.00	12.220	3.7205	.2688	.0886
13 ³ / ₈	48.00	12.715	4.2240	.2367	.1006
13 ³ / ₈	54.50	12.615	4.1207	.2427	.0981
13 ³ / ₈	61.00	12.515	4.0182	.2489	.0957
13 ³ / ₈	68.00	12.415	3.9164	.2553	.0932
13 ³ / ₈	72.00	12.347	3.8477	.2599	.0916
*13 ³ / ₈	83.00	12.175	3.6757	.2721	.0875

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 7.625"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
114.99	.0488	20.481	20.00	8 $\frac{5}{8}$
138.72	.0405	24.707	24.00	8 $\frac{5}{8}$
167.88	.0334	29.902	28.00	8 $\frac{5}{8}$
223.71	.0251	39.844	32.00	8 $\frac{5}{8}$
333.14	.0169	59.335	36.00	8 $\frac{5}{8}$
445.63	.0126	79.371	38.00	8 $\frac{5}{8}$
97.27	.0577	17.324	34.00	*9
113.95	.0493	20.296	38.00	*9
124.30	.0452	22.138	40.00	*9
161.54	.0348	28.772	45.00	*9
356.60	.0157	63.514	55.00	*9
42.90	.1309	7.640	29.30	*9 $\frac{5}{8}$
45.00	.1248	8.014	32.30	9 $\frac{5}{8}$
48.01	.1170	8.550	36.00	9 $\frac{5}{8}$
49.83	.1127	8.874	38.00	*9 $\frac{5}{8}$
51.69	.1086	9.206	40.00	9 $\frac{5}{8}$
55.62	.1010	9.906	43.50	9 $\frac{5}{8}$
59.78	.0939	10.648	47.00	9 $\frac{5}{8}$
70.00	.0802	12.468	53.50	9 $\frac{5}{8}$
34.41	.1632	6.128	33.00	*10
22.51	.2495	4.009	32.75	10 $\frac{3}{4}$
23.08	.2432	4.111	35.75	*10 $\frac{3}{4}$
24.02	.2338	4.278	40.50	10 $\frac{3}{4}$
25.19	.2229	4.487	45.50	10 $\frac{3}{4}$
26.48	.2121	4.715	51.00	10 $\frac{3}{4}$
27.39	.2050	4.878	54.00	*10 $\frac{3}{4}$
27.73	.2024	4.940	55.50	10 $\frac{3}{4}$
29.27	.1918	5.212	60.70	*10 $\frac{3}{4}$
30.96	.1814	5.514	65.70	*10 $\frac{3}{4}$
15.55	.3610	2.770	38.00	*11 $\frac{3}{4}$
15.91	.3530	2.833	42.00	11 $\frac{3}{4}$
16.38	.3428	2.917	47.00	11 $\frac{3}{4}$
17.09	.3285	3.044	54.00	11 $\frac{3}{4}$
17.78	.3158	3.167	60.00	11 $\frac{3}{4}$
14.41	.3897	2.566	40.00	*12
10.66	.5267	1.899	40.00	*13
10.88	.5161	1.938	45.00	*13
11.10	.5056	1.978	50.00	*13
11.29	.4974	2.011	54.00	*13
9.94	.5647	1.771	48.00	13 $\frac{3}{8}$
10.19	.5509	1.815	54.50	13 $\frac{3}{8}$
10.45	.5372	1.862	61.00	13 $\frac{3}{8}$
10.72	.5236	1.910	68.00	13 $\frac{3}{8}$
10.92	.5144	1.944	72.00	13 $\frac{3}{8}$
11.43	.4914	2.035	83.00	*13 $\frac{3}{8}$

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 8.625"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
*9 ⁵ / ₈	29.30	9.063	.3161	3.1636	.0075
9 ⁵ / ₈	32.30	9.001	.2704	3.6983	.0064
9 ⁵ / ₈	36.00	8.921	.2119	4.7192	.0050
*9 ⁵ / ₈	38.00	8.877	.1799	5.5572	.0043
9 ⁵ / ₈	40.00	8.835	.1496	6.6846	.0036
9 ⁵ / ₈	43.50	8.755	.0922	10.8480	.0022
*10	33.00	9.384	.5577	1.7931	.0133
10 ³ / ₄	32.75	10.192	1.2030	.8312	.0286
*10 ³ / ₄	35.75	10.136	1.1566	.8646	.0275
10 ³ / ₄	40.50	10.050	1.0858	.9210	.0259
10 ³ / ₄	45.50	9.950	1.0042	.9959	.0239
10 ³ / ₄	51.00	9.850	.9234	1.0830	.0220
*10 ³ / ₄	54.00	9.784	.8705	1.1488	.0207
10 ³ / ₄	55.50	9.760	.8514	1.1746	.0203
*10 ³ / ₄	60.70	9.660	.7721	1.2951	.0184
*10 ³ / ₄	65.70	9.560	.6937	1.4415	.0165
*11 ³ / ₄	38.00	11.150	2.0372	.4909	.0485
11 ³ / ₄	42.00	11.084	1.9773	.5057	.0471
11 ³ / ₄	47.00	11.000	1.9017	.5259	.0453
11 ³ / ₄	54.00	10.880	1.7945	.5572	.0427
11 ³ / ₄	60.00	10.772	1.6991	.5885	.0405
*12	40.00	11.384	2.2524	.4440	.0536
*13	40.00	12.438	3.2768	.3052	.0780
*13	45.00	12.360	3.1979	.3127	.0761
*13	50.00	12.282	3.1194	.3206	.0743
*13	54.00	12.220	3.0575	.3271	.0728
13 ³ / ₈	48.00	12.715	3.5610	.2808	.0848
13 ³ / ₈	54.50	12.615	3.4577	.2892	.0823
13 ³ / ₈	61.00	12.515	3.3552	.2980	.0799
13 ³ / ₈	68.00	12.415	3.2534	.3074	.0775
13 ³ / ₈	72.00	12.347	3.1848	.3140	.0758
*13 ³ / ₈	83.00	12.175	3.0127	.3319	.0717

*Not API Standard. Shown for information only.

NO. 221-D

Drill Pipe
O.D. 8.625"**DRILL PIPE & CASING**

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
132.87	.0423	23.666	29.30	*9 $\frac{5}{8}$
155.33	.0361	27.665	32.30	9 $\frac{5}{8}$
198.21	.0283	35.302	36.00	9 $\frac{5}{8}$
233.40	.0241	41.570	38.00	*9 $\frac{5}{8}$
280.75	.0200	50.004	40.00	9 $\frac{5}{8}$
455.61	.0123	81.148	43.50	9 $\frac{5}{8}$
75.31	.0746	13.413	33.00	*10
34.91	.1608	6.218	32.75	10 $\frac{3}{4}$
36.31	.1546	6.468	35.75	*10 $\frac{3}{4}$
38.68	.1451	6.890	40.50	10 $\frac{3}{4}$
41.83	.1342	7.450	45.50	10 $\frac{3}{4}$
45.49	.1234	8.101	51.00	10 $\frac{3}{4}$
48.25	.1164	8.593	54.00	*10 $\frac{3}{4}$
49.33	.1138	8.786	55.50	10 $\frac{3}{4}$
54.39	.1032	9.688	60.70	*10 $\frac{3}{4}$
60.54	.0927	10.783	65.70	*10 $\frac{3}{4}$
20.62	.2723	3.672	38.00	*11 $\frac{3}{4}$
21.24	.2643	3.783	42.00	11 $\frac{3}{4}$
22.09	.2542	3.934	47.00	11 $\frac{3}{4}$
23.40	.2399	4.169	54.00	11 $\frac{3}{4}$
24.72	.2271	4.403	60.00	11 $\frac{3}{4}$
18.65	.3011	3.321	40.00	*12
12.82	.4380	2.283	40.00	*13
13.13	.4275	2.339	45.00	*13
13.46	.4170	2.398	50.00	*13
13.74	.4087	2.447	54.00	*13
11.79	.4760	2.101	48.00	13 $\frac{3}{8}$
12.15	.4622	2.163	54.50	13 $\frac{3}{8}$
12.52	.4485	2.230	61.00	13 $\frac{3}{8}$
12.91	.4349	2.299	68.00	13 $\frac{3}{8}$
13.19	.4257	2.349	72.00	13 $\frac{3}{8}$
13.94	.4027	2.483	83.00	*13 $\frac{3}{8}$

**Note: No allowance made for couplings.

**Drill Pipe
O.D. 5.562"**

**TABLE
VOLUME & HEIGHT BETWEEN**

OUTSIDE CASING					
Size O.D. In.	Wt/Ft. With Couplings Lb.	I.D. In.	Gal. Per Lin. Ft.	Lin. Ft. Per Gallon	Barrels Per Lin. Ft.
7	17.00	6.538	.4818	2.0754	.0115
7	20.00	6.456	.4384	2.2812	.0104
*7	22.00	6.398	.4079	2.4513	.0097
7	23.00	6.366	.3913	2.5557	.0093
*7	24.00	6.336	.3757	2.6615	.0089
7	26.00	6.276	.3449	2.8998	.0082
*7	28.00	6.214	.3133	3.1922	.0075
7	29.00	6.184	.2981	3.3548	.0071
*7	30.00	6.154	.2830	3.5338	.0067
7	32.00	6.094	.2530	3.9526	.0060
*7	34.00	6.040	.2263	4.4196	.0054
7	35.00	6.004	.2086	4.7944	.0050
7	38.00	5.920	.1677	5.9627	.0040
*7	40.00	5.836	.1274	7.8481	.0030
<hr/>					
*7½	20.00	7.125	.8091	1.2360	.0193
7½	24.00	7.025	.7513	1.3310	.0179
7½	26.40	6.969	.7193	1.3901	.0171
7½	29.70	6.875	.6663	1.5009	.0159
7½	33.70	6.765	.6050	1.6528	.0144
7½	39.00	6.625	.5286	1.8920	.0126
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*8½	20.00	8.191	1.4752	.6779	.0351
8½	24.00	8.097	1.4127	.7079	.0336
8½	28.00	8.017	1.3601	.7352	.0324
8½	32.00	7.921	1.2977	.7706	.0309
8½	36.00	7.825	1.2360	.8090	.0294
*8½	38.00	7.775	1.2042	.8304	.0287
8½	40.00	7.725	1.1726	.8528	.0279
*8½	43.00	7.651	1.1262	.8880	.0268
8½	44.00	7.625	1.1100	.9009	.0264
8½	49.00	7.511	1.0396	.9620	.0248
<hr/>					
*9	34.00	8.290	1.5418	.6486	.0367
*9	38.00	8.196	1.4785	.6763	.0352
*9	40.00	8.150	1.4479	.6907	.0345
*9	45.00	8.032	1.3699	.7300	.0326
*9	55.00	7.812	1.2277	.8145	.0292
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*9½	29.30	9.063	2.0890	.4787	.0497
9½	32.30	9.001	2.0429	.4895	.0486
9½	36.00	8.921	1.9848	.5038	.0473
*9½	38.00	8.877	1.9529	.5121	.0465
9½	40.00	8.835	1.9225	.5201	.0458
9½	43.50	8.755	1.8651	.5362	.0444
9½	47.00	8.681	1.8125	.5517	.0432
9½	53.50	8.535	1.7099	.5848	.0407
<hr/>					
*10	33.00	9.384	2.3306	.4291	.0555
<hr/>					
10¾	32.75	10.192	2.9760	.3360	.0709
*10¾	35.75	10.136	2.9295	.3414	.0698
10¾	40.50	10.050	2.8587	.3498	.0681
10¾	45.50	9.950	2.7771	.3601	.0661
10¾	51.00	9.850	2.6963	.3709	.0642
*10¾	54.00	9.784	2.6435	.3783	.0629
10¾	55.50	9.760	2.6243	.3811	.0625
*10¾	60.70	9.660	2.5451	.3929	.0606
*10¾	65.70	9.560	2.4667	.4054	.0587

*Not API Standard. Shown for information only.

NO. 221-D

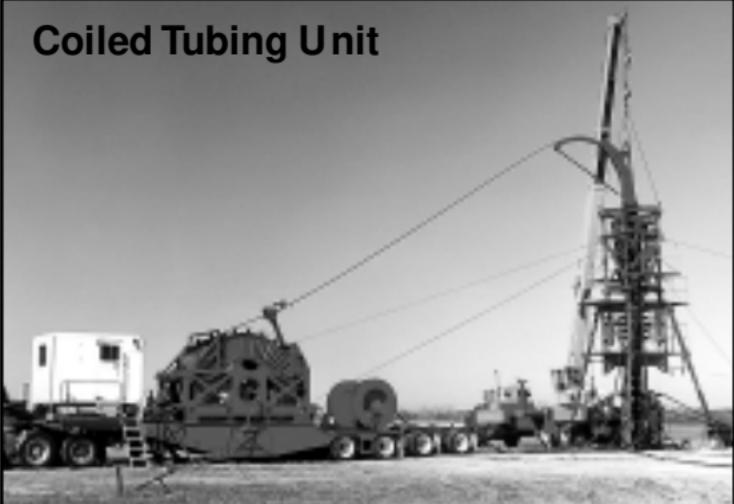
Drill Pipe
O.D. 5.562"

DRILL PIPE & CASING

			OUTSIDE CASING	
Lin. Ft. Per Barrel	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Wt/Ft With Couplings Lb.	Size O.D. In.
87.17	.0644	15.525	17.00	7
95.81	.0586	17.065	20.00	7
102.96	.0545	18.337	22.00	*7
107.34	.0523	19.118	23.00	7
111.78	.0502	19.909	24.00	*7
121.79	.0461	21.692	26.00	7
134.07	.0419	23.880	28.00	*7
140.90	.0398	25.095	29.00	7
148.42	.0378	26.435	30.00	*7
166.01	.0338	29.567	32.00	7
185.62	.0302	33.061	34.00	*7
201.37	.0279	35.865	35.00	7
250.43	.0224	44.604	38.00	7
329.62	.0170	58.708	40.00	*7
51.91	.1082	9.246	20.00	*7½
55.90	.1004	9.956	24.00	7½
58.39	.0962	10.399	26.40	7½
63.04	.0891	11.228	29.70	7½
69.42	.0809	12.364	33.70	7½
79.46	.0707	14.153	39.00	7½
28.47	.1972	5.071	20.00	*8½
29.73	.1889	5.295	24.00	8½
30.88	.1818	5.500	28.00	8½
32.37	.1735	5.764	32.00	8½
33.98	.1652	6.052	36.00	8½
34.88	.1610	6.212	38.00	*8½
35.82	.1568	6.380	40.00	8½
37.30	.1505	6.643	43.00	*8½
37.84	.1484	6.739	44.00	8½
40.40	.1390	7.196	49.00	8½
27.24	.2061	4.852	34.00	*9
28.41	.1977	5.059	38.00	*9
29.01	.1935	5.167	40.00	*9
30.66	.1831	5.460	45.00	*9
34.21	.1641	6.093	55.00	*9
20.10	.2793	3.581	29.30	*9½
20.56	.2731	3.662	32.30	9½
21.16	.2653	3.769	36.00	9½
21.51	.2611	3.830	38.00	*9½
21.85	.2570	3.891	40.00	9½
22.52	.2493	4.011	43.50	9½
23.17	.2423	4.127	47.00	9½
24.56	.2286	4.375	53.50	9½
18.02	.3116	3.210	33.00	*10
14.11	.3978	2.514	32.75	10³/₄
14.34	.3916	2.553	35.75	*10³/₄
14.69	.3822	2.617	40.50	10³/₄
15.12	.3712	2.694	45.50	10³/₄
15.58	.3604	2.774	51.00	10³/₄
15.89	.3534	2.830	54.00	*10³/₄
16.00	.3508	2.850	55.50	10³/₄
16.50	.3402	2.939	60.70	*10³/₄
17.03	.3297	3.033	65.70	*10³/₄

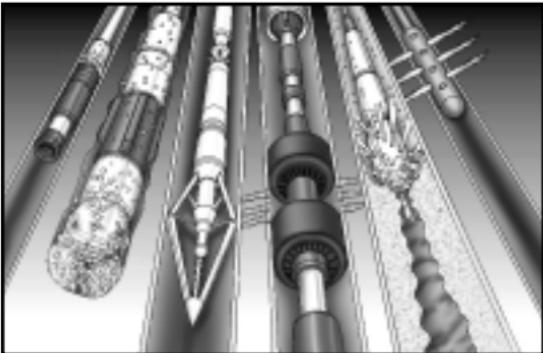
**Note: No allowance made for couplings.

Coiled Tubing Unit



Applications

Halliburton provides coiled tubing services for many applications—everything to help you reduce oil and gas well expenses from start to finish including



- Drilling
- Horizontal well services/logging and perforating
- Stimulation
- Fluid displacement
- Sand Control
- Coiled-tubing-conveyed perforating
- Wellbore cleanout
- Remedial cementing
- Setting and retrieving bridge plugs
- Flowline cleanup and repair
- Flow control of horizontal and deviated completions
- Fishing
- Nitrogen jetting
- Scale removal with Hydrablast® services

Products

Halliburton has more than 130 coiled tubing units worldwide with capacities ranging from $\frac{3}{4}$ -in. to $3\frac{1}{2}$ -in. coiled tubing pipe sizes.

DEPTH PRO™ WIRELESS COILED TUBING COLLAR LOCATOR

The DepthPro™ CT collar locator allows operators to accurately determine the location of various equipment and points in the wellbore without utilizing electric line inside of the coil. This patented technology expands the cost-effective capabilities of coiled tubing and is now being introduced by Halliburton. Proven applications include:

- spot perforating guns
- locate nipple profiles, ends of tubing and other equipment
- spot production packers, bridge plugs, squeeze packers, and inflatables
- spot chemical or jet cutters
- place sand-control fluids and chemicals
- place cement
- provide better depth correlation during CT fishing operations

The DepthPro CT collar locator provides the depth accuracy of a wireline collar locator and works on any coiled tubing. Other features include:

- Decreases the need for cumbersome depth-prediction calculations
- This battery-operated tool sends a pressure pulse signal to the surface to indicate the location of collars.
- Flow capabilities include acid or cement.
- An API log is generated for correlation purposes.



QT-700®

Coiled Tubing Manufactured Product

QT-700® is a 70,000 psi minimum yield strength continuously milled tubing produced by Quality Tubing, Inc. to meet Halliburton Energy Services material specification 70.99985. The coiled tubing is milled, to the length required, from flat strip that is joined end-to-end using a patented high quality 45 degree bias-weld process. When milled, the strip bias-weld is distributed along a helix in the finished tube. The bias-weld process eliminates tube-to-tube butt welds which significantly enhances reliability and service life of the coiled tubing.

The coiled tubing contains a longitudinal seam weld that is full annealed to achieve a uniform metallurgical structure. The tubing is eddy current tested to be defect-free and full body stress relieved. Other tests, such as hardness, tensile strength, tensile elongation, flattening, flare, drift and hydrostatic pressure tests are performed on the finished tubing to insure that it meets Halliburton specifications.

The material used to manufacture QT-700® is a modification of ASTM A-606 Type 4 steel that provides enhanced atmospheric corrosion resistance. Chemical composition of this high strength, low alloy (HSLA) steel is given on the following page along with mechanical properties of the coiled tubing.

QT-700® coiled tubing is manufactured to be suitable for sour (H_2S) service.

Note: For the appropriate sizes, QT-700® can be routinely ordered as a Tapered string, Flash-Free™, or as a string with an electric wireline installed.

QT-700

Material Specifications

Alloy: ASTM A-606, Type 4 Modified

Typical Chemistry:

C	Mn	P	S	Si	Cr	Cu	Ni
0.10-0.14	0.70-0.90	0.025 max	0.005 max	0.30-0.50	0.50-070	0.25 max	0.20 max

Mechanical Properties:

Minimum Yield Strength	70,000 psi (552 N/mm ²)
Minimum Ultimate Tensile Strength	80,000 psi (621 N/mm ²)

QT-800®**Coiled Tubing Manufactured Product**

QT-800® is a 80,000 psi minimum yield strength tube developed to fill the need for a higher strength coiled tubing product and that would still be suitable for use in sour (H_2S) service. As coiled tubing applications extend to higher pressure wells, QT-800® offers increased cycle life and reduced ovality growth required for these demanding applications. The higher strength allows QT-800® to work under the higher stress loads imposed by drilling and fishing tools.

Like the QT-700® product, QT-800® is a continuously milled tubing produced by Quality Tubing, Inc. and is manufactured to meet Halliburton Energy Services material specification 70.99986. QT-800® coiled tubing is also milled from strip that has been joined end-to-end using a patented high quality 45 degree bias-weld, eliminating the need for butt welds.

The coiled tubing contains a longitudinal seam weld that is full annealed to achieve a uniform metallurgical structure. The tubing is eddy current tested to be defect-free and full body stress relieved. Other tests, such as hardness, tensile strength, tensile elongation, flattening, flare, drift and hydrostatic pressure tests are performed on the finished tubing to insure that it meets Halliburton specifications.

The material used to manufacture QT-800® is a modification of ASTM A-606 Type 4 steel that provides enhanced atmospheric corrosion resistance. Chemical composition of this high strength, low alloy (HSLA) steel is given on the following page along with mechanical properties of the coiled tubing.

Note: For the appropriate sizes, QT-800® can be routinely ordered as a Tapered or Tru-Taper® string, Flash-Free™, or as a string with an electric wireline installed.

**QT-800
Material Specifications**

Alloy: ASTM A-606, Type 4 Modified

Typical Chemistry:

C	Mn	P	S	Si	Cr	Cu	Ni	Mo
0.10-0.16	0.70-0.90	0.025 max	0.006 max	0.30-0.50	0.50-070	0.25 max	0.20 max	0.21 max

Mechanical Properties:

Minimum Yield Strength	80,000 psi (552 N/mm ²)
Minimum Ultimate Tensile Strength	90,000 psi (621 N/mm ²)

QT-1000™**Coiled Tubing Manufactured Product**

In response to further increased demands, Quality Tubing, Inc. has developed QT-1000™ which has significantly higher strength than QT-700® or QT-800®. The higher strength of QT-1000™ (100,000 psi minimum yield strength) allows it to be used in highly demanding applications where higher maximum stresses, allowable pull, internal or collapse pressure ratings may be needed.

QT-1000™ is made to the same exacting demands as the other coiled tubing products made by Quality Tubing, Inc. QT-1000™ is a continuously milled tubing and is manufactured to meet Halliburton Energy Services material specification 70.99434. QT-1000™ coiled tubing contains a longitudinal seam weld that is full annealed to achieve a uniform metallurgical structure. The tubing is eddy current tested to be defect-free and full body stress relieved. Other tests, such as hardness, tensile strength, tensile elongation, flattening, flare, drift and hydrostatic pressure tests are performed on the finished tubing to insure that it meets Halliburton specifications.

QT-1000™ is a product that is sour gas (H_2S) limited as its hardness may be above 22 HRC (Rockwell C). The limits of usage in H_2S containing environments are still being defined. Contact Duncan Technology Coiled Tubing group or Quality Tubing for specific recommendations.

The material used to manufacture QT-1000™ is a modification of ASTM A-607 Type 4 steel that provides enhanced atmospheric corrosion resistance. Typical chemical composition of this high strength, low alloy (HSLA) steel is given below along with mechanical properties of the coiled tubing.

Note: For the appropriate sizes, QT-1000™ can be routinely ordered as a True-Tapered string, Flash-Free™, or as a string with an electric wireline installed.

QT-1000™**Material Specifications
(Ref: HES spec 70.99434)**

Alloy: ASTM A-607, Type 4 Modified

Typical Chemistry:

C	Mn	P	S	Si	Cr	Cu	V
0.12	1.48	0.010	0.003	0.38	0.62	0.27	0.07

Mechanical Properties:

Minimum Yield Strength:	100,000 psi (690 N/mm ²)
Minimum Ultimate Tensile Strength	110,000 psi (759 N/mm ²)

Coiled Tubing Material Properties

Young's Modulus	30×10^6 psi or $(21.55 \times 10^3$ kg/mm ²)
Shear Modulus	11.7×10^6 psi or $(8.2 \times 10^3$ kg/mm ²)
Poisson's Ratio	0.30
Coefficient of Thermal Expansion	6.51×10^{-6} /°F or $(11.7 \times 10^{-6}$ /°C)
Steel Density	0.283 lbs/in ³ or $(7.86$ g/cm ³)

COILED TUBING TECHNICAL DATA

Specified Outside Diameter	Wall Thickness*	Inside Diameter	Wall Cross- Section Area At sq. in.	Weight W lb/ft	Volume Internal Capacity Vi bbl/1000 ft	External Capacity Vo bbl/1000 ft
D in.	t in.	d in.				
1.000	0.080	0.8400	0.2312	0.7861	0.6854	0.9714
1.000	0.087	0.8260	0.2495	0.8483	0.6628	0.9714
1.000	0.095	0.8100	0.2701	0.9182	0.6373	0.9714
1.000	0.102	0.7960	0.2878	0.9783	0.6155	0.9714
1.000	0.109	0.7820	0.3051	1.037	0.5940	0.9714
1.250	0.080	1.090	0.2941	1.000	1.154	1.518
1.250	0.087	1.076	0.3179	1.081	1.125	1.518
1.250	0.095	1.060	0.3447	1.172	1.091	1.518
1.250	0.102	1.046	0.3679	1.251	1.063	1.518
1.250	0.109	1.032	0.3907	1.328	1.035	1.518
1.250	0.125	1.000	0.4418	1.502	0.9714	1.518
1.250	0.134	0.9820	0.4698	1.597	0.9367	1.518
1.250	0.156	0.9380	0.5362	1.823	0.8547	1.518
1.500	0.095	1.310	0.4193	1.426	1.667	2.186
1.500	0.102	1.296	0.4480	1.523	1.632	2.186
1.500	0.109	1.282	0.4763	1.619	1.597	2.186
1.500	0.125	1.250	0.5400	1.836	1.518	2.186
1.500	0.134	1.232	0.5750	1.955	1.474	2.186
1.500	0.156	1.188	0.6587	2.239	1.371	2.186
1.500	0.175	1.150	0.7285	2.476	1.285	2.186
1.750	0.109	1.532	0.5619	1.910	2.280	2.975
1.750	0.125	1.500	0.6381	2.169	2.186	2.975
1.750	0.134	1.482	0.6803	2.313	2.134	2.975
1.750	0.156	1.438	0.7812	2.666	2.009	2.975
1.750	0.175	1.400	0.8659	2.944	1.904	2.975
1.750	0.188	1.374	0.9225	3.136	1.834	2.975
2.000	0.109	1.782	0.6475	2.201	3.085	3.886
2.000	0.125	1.750	0.7363	2.503	2.975	3.886
2.000	0.134	1.732	0.7855	2.671	2.914	3.886
2.000	0.156	1.688	0.9037	3.072	2.768	3.886
2.000	0.175	1.650	1.0033	3.411	2.645	3.886
2.000	0.188	1.624	1.0702	3.638	2.562	3.886
2.000	0.203	1.594	1.1460	3.896	2.468	3.886
2.375	0.109	2.157	0.7760	2.638	4.520	5.479
2.375	0.125	2.125	0.8836	3.004	4.386	5.479
2.375	0.134	2.107	0.9434	3.207	4.312	5.479
2.375	0.156	2.063	1.0875	3.697	4.134	5.479
2.375	0.175	2.025	1.2095	4.112	3.983	5.479
2.375	0.188	1.999	1.2917	4.391	3.882	5.479
2.375	0.203	1.969	1.3852	4.709	3.766	5.479
2.875	0.125	2.625	1.0799	3.671	6.694	8.029
2.875	0.134	2.607	1.1539	3.923	6.602	8.029
2.875	0.156	2.563	1.3326	4.530	6.381	8.029
2.875	0.175	2.525	1.4844	5.046	6.193	8.029
2.875	0.188	2.499	1.5870	5.395	6.066	8.029
2.875	0.203	2.469	1.7041	5.793	5.922	8.029
3.500	0.134	3.232	1.4170	4.817	10.150	11.900
3.500	0.156	3.188	1.6389	5.571	9.873	11.900
3.500	0.175	3.150	1.8280	6.215	9.639	11.900
3.500	0.188	3.124	1.9561	6.650	9.480	11.900
3.500	0.203	3.094	2.1026	7.148	9.299	11.900

COILED TUBING TECHNICAL DATA

Tubing Capacity @ 70 kpsi yield strength			Tubing Capacity @ 80 kpsi yield strength			Tubing Capacity @ 100 kpsi yield strength		
Internal Pressure	Tensile Load	Torque	Internal Pressure	Tensile Load	Torque	Internal Pressure	Tensile Load	Torque
P _y psi	Q _y lb	T _y lb-ft	P _y psi	Q _y lb	T _y lb-ft	P _y psi	Q _y lb	T _y lb-ft
10250	15420	323	11720	17620	369	14640	22030	462
11180	16730	346	12770	19130	395	15970	23910	494
12230	18210	371	13970	20810	424	17460	26010	529
13130	19480	391	15010	22260	447	18760	27820	559
14030	20720	410	16040	23680	469	20040	29600	586
8259	19540	526	9438	22340	601	11798	27920	752
9013	21240	566	10300	24280	646	12876	30350	808
9870	23160	609	11280	26460	696	14100	33080	870
10620	24810	645	12130	28350	737	15170	35440	922
11360	26440	680	12980	30220	777	16220	37770	971
13030	30080	755	14890	34380	863	18610	42980	1078
13960	32080	794	15950	36670	907	19940	45840	1134
16170	36830	881	18490	42090	1007	23110	52610	1258
8269	28100	907	9451	32120	1036	11813	40150	1295
8899	30140	963	10170	34450	1101	12714	43060	1376
9530	32160	1018	10890	36750	1164	13610	45940	1455
10950	36680	1137	12510	41920	1300	15640	52400	1625
11740	39180	1201	13420	44770	1372	16770	55970	1715
13650	45130	1344	15600	51570	1536	19500	64470	1920
15260	50100	1456	17440	57250	1664	21800	71570	2080
8200	37870	1425	9371	43280	1329	11714	54110	2036
9433	43280	1600	10780	49460	1828	13476	61830	2285
10120	46270	1693	11570	52880	1935	14460	66100	2418
11790	53430	1907	13470	61060	2180	16840	76330	2725
13200	59440	2077	15090	67930	2374	18860	84920	2968
14160	63460	2186	16180	72530	2499	20230	90660	3123
7195	43590	1901	8223	49820	2173	10278	62270	2716
8283	49880	2141	9466	57000	2447	11833	71250	3058
8891	53360	2270	10160	60980	2595	12702	76230	3243
10370	61730	2570	11850	70550	2937	14810	88190	3672
11630	68790	2811	13290	78650	3213	16610	98270	4016
12480	73530	2967	14260	84030	3391	17830	105000	4238
13450	78900	3137	15380	90170	3586	19220	112700	4482
6075	52170	2743	6943	59620	3135	8679	74530	3919
6999	59770	3102	7999	68310	3545	9998	85390	4431
7516	64000	3296	8590	73140	3767	10740	91430	4709
8774	74180	3751	10030	84780	4287	12530	106000	5359
9850	82810	4122	11260	94640	4711	14070	118300	5889
10580	88620	4364	12090	101300	4987	15120	126600	6234
11420	95230	4632	13050	108800	5293	16310	136000	6617
5798	72970	4660	6626	83390	5326	8283	104200	6658
6228	78180	4963	7118	89350	5672	8898	111700	7089
7277	90790	5676	8316	103800	6487	10400	129700	8108
8177	101500	6263	9345	116000	7158	11680	145000	8947
8790	108700	6650	10050	124300	7600	12560	155300	9500
9494	117000	7082	10850	133700	8094	13560	167100	10120
5128	95910	7525	5860	109600	8600	7325	137000	10750
5995	111500	8643	6851	127500	9877	8564	159300	12350
6740	124900	9572	7703	142700	10940	9629	178400	13670
7249	133900	10190	8285	153000	11640	10360	191300	14550
7834	144200	10880	8953	164800	12440	11190	206000	15540

GENERAL ENGINEERING INFORMATION

DEFINITIONS

Pipe Body Yield Load

The Pipe Body Yield Load is defined as the axial tension load (in the absence of pressures or torque) which produces a stress in the tube equal to the specified minimum yield strength (SMYS) in tension;

$$L_y = p \times (D - t) \times t \times \text{SMYS}$$

Where:

L_y	=	Pipe Body Yield Load (lbs)
SMYS	=	Specified Minimum Yield Strength (psi)
D	=	Specified Outside Diameter (inches)
t	=	Specified Wall Thickness (inches)

Inside Diameter is equal to the CT OD, minus twice the specified WT:

$$d = D - 2t$$

Wall Cross-Section Area is defined by specified OD and specified WT

$$At = \pi (D - t) t$$

The **Weight** per foot of CT length is calculated by specified OD, specified WT, and applying steel densing of 0.2833 lb/in^3

$$W = 10.68 (D - t) t \quad \text{lb/ft}$$

Internal Volume Capacity of 1000 ft long non-tapered CT string (at constant WT and OD) is defined as

$$V_i = 0.971426 d^2 = 0.971426 (1 - 2/\alpha)^2 D^2 \text{ bbl/1000 ft}$$

Internal Volume Capacity of 1000 ft long tru-tapered CT segment is defined as the volume of a frustum cone

$$V_i = \frac{0.971426^2}{3} (d_1 + d_1 d_2 + d_2^2) \text{ bbl/1000 ft}$$

External Volume Capacity of 1000 ft long CT string is defined as a volume for 1000 ft long a solid cylinder with diameter D

$$V_o = 5.45415 D^2 \quad \text{ft}^3/1000 \text{ ft}$$

$$V_o = 40.7999 D^2 \quad \text{gal/1000 ft}$$

$$V_o = 0.971426 D^2 \quad \text{bbl/1000 ft}$$

where D - CT OD in in.

Displacement is the material (metallic) volume occupied by 1000 ft long CT string

$$V = V_o - V_i$$

where Vo and Vi are volumes in consistent units.

Yield Pressure, Load, and Torque Capacities and CP are defined using:

- CT inner surface stress state,
- distortion energy failure theory (von Mises),
- production maximum OD ($DD = D + 0.01$),
- production minimum WT ($tt = t - 0.005$), and
- ratio $\alpha = \frac{DD}{tt} = \frac{\text{Production Maximum OD}}{\text{Production Minimum WT}}$

Yield Internal Pressure Capacity is a pressure, P_y , which induces combined stress on inner surface of the CT equal to the specified minimum yield strength, σ_y . It is assumed that the pressure does not produce axial tensile load ("open end" tubing),

$$P_y = \frac{\sigma_y}{\sqrt{4M^2 - 2M + 1}}$$

Yield Load Capacity is an axial force, Q_y , which induces a stress in the CT cross-section equal to the specified minimum yield strength, σ_y

$$Q_y = \sigma_y \pi (DD-tt) tt$$

Yield Torque Capacity is the torque, T_y , which produces shear stress on the CT outer surface equal to the specified minimum yield strength in shear, $T_y = \sigma_y / \sqrt{3}$

$$T_y = \frac{\sigma_y \pi}{192 \sqrt{3}} DD^3 [1 - (1-2/\alpha)^4] \text{ lb-ft}$$

CP is a function of CT ovality ($O_v = (D_{max} - D_{min})/D$), applied internal pressure, P_i , applied axial force, Q , and D/t -ratio. The condition of the CT in service cannot be considered as "perfectly round". Therefore, CT should always be considered as oval, with minimum ovality of 0.02 (2%).

CP for CT with ovality $O_v=0$ (round tubing), $=0.02$, and $=0.05$ is in the Coiled Tubing Collapse Pressures Table (pages 16 & 17) for various CT sizes and material grades. For ovality 2% and 5% CP is tabulated at zero axial force ($Q=0$) and at axial force equal to one half of yield load capacity ($Q=Q_y/2$).

In general, if external pressure is combined with internal pressure, P_i , and/or with axial force, Q , and CT ovality is other than in the Coiled Tubing Collapse Pressures Table (pages 16 & 17), then CP should be calculated using formulas

$$P_{co} = g - \sqrt{g^2 - f}$$

where

$$g = \frac{\sigma_y K_y}{4M} + (2 + 3 \cdot \alpha \cdot O_v) \frac{P_{ce}}{4}$$

$$f = \frac{\sigma_y K_y P_{ce}}{2M}$$

US CUSTOMARY UNITS: CONVERSION TO METRIC UNITS

In Accordance with Guidelines Given in API Spec 5CT

Outside Diameter

$$D_M = 25.4 \times D$$

Where:

D_M = Outside Diameter, mm
rounded to nearest 0.01 mm.

D = Specified Outside Diameter, inches

Wall Thickness

$$t_m = 25.4 \times t$$

Where:

t_m = Wall Thickness, mm
rounded to nearest 0.01 mm

t = Specified Wall Thickness, inches

Inside Diameter

$$d_m = 25.4 \times d$$

Where:

d_m = Inside Diameter, mm
rounded to nearest 0.01 mm.

d = Calculated Inside Diameter, inches

Plain End Weight

$$P_1 = 0.0246615 (D_m - t_m) t_m$$

Where:

P_1 = Metric Plain End Mass/Meter, kg/m
rounded to nearest 0.01 kg/m.

D_m = Metric Outside Diameter, mm

t_m = Metric Wall Thickness, mm

Specified Minimum Yield Strength

$$SMYS_m = 0.00689476 \times SMYS$$

Where:

$SMYS_m$ = Specified Min. Yield Strength, N/mm²
rounded to nearest 1 N/mm².

$SMYS$ = Specified Minimum Yield Strength, psi

Torsional Strength

1 lb-ft = 1.35582 Newton-meters (N-m),
Values in tables are rounded to the
nearest 10 N-m.

Pipe Body Yield Load

$$L_{yM} = 4.448222 \times L_y$$

Where:

L_{yM} = Pipe Body Yield Load, N
rounded to nearest 100 N (0.1kN)
 L_y = Pipe Body Yield Load, lbs

Internal Yield Pressure

$$P_{rM} = 0.00689476 \times P_r$$

Where:

P_{rM} = Metric Internal Yield Pressure, MPa
rounded to nearest 0.1 MPa
 P_r = Internal Yield Pressure, psi

Collapse Pressure

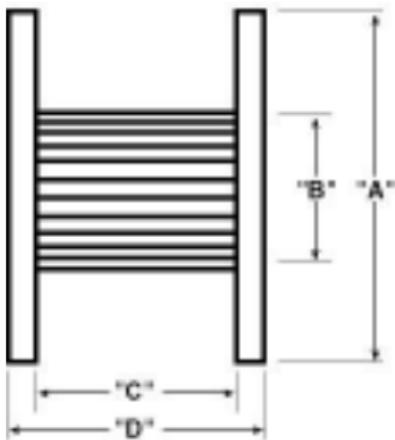
$$P_{cM} = 0.00689476 \times P_t$$

Where:

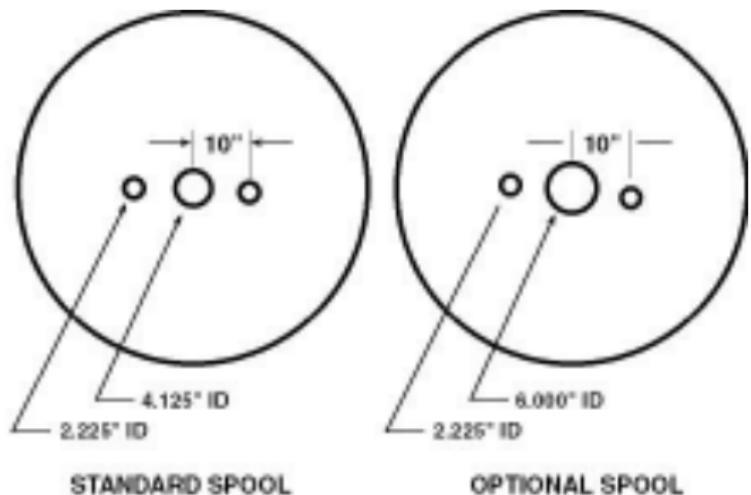
P_{cM} = Metric Collapse Pressure, MPa
rounded to nearest 0.1 MPa
 P_c = Collapse Pressure, psi

SHIPPING SPOOL CAPACITY

The following catalog spools are available on request. Wood or metal custom-designed spools can be ordered for special requirements.



Spool Capacity in Feet (by pipe O.D.)



Flange Height "A"	Core Diameter "B"	Inside Width "C"	Outside Width "D"	Spool Weight Empty lbs	Spool Weight (Crated) lbs
90"	48"	48"	58"	1,750	2,250
112"	72"	60"	70"	3,150	4,100
120"	72"	60"	70"	3,460	4,510
124"	72"	60"	70"	3,625	4,800
128"	72"	65"	75"	3,840	4,760
135"	82"	60"	70"	4,400	5,370
135"	82"	65"	75"	4,400	5,400
154"	92"	65"	75"	6,100	7,400
154"	98"	65"	75"	6,100	7,400
180"	112"	88.75"	96"	9,000	
180"	130"	88.75"	96"	9,000	
165"	130"	88.75"	96"	8,000	

REEL CAPACITY CALCULATION

The pipe capacity of any reel can be found by following equations. Wrapping efficiency factors are used to account for nesting and spool width effects.

$$p := .96$$

Radial pitch factor: radial distance between adjacent layers divided by tubing OD

$$k := 0.96$$

Drum width utilization factor: number of coils per drum width divided by theoretical capacity, w/d

$$C := 82$$

Drum (core) diameter, *in.*

$$W := 65$$

Drum length (width), *in.*

$$F := 135$$

Flange Diameter, *in.*

$$DD := 2.01$$

Maximum production CT OD, *in.*

$$m := \frac{W \cdot k}{DD} \quad m = 31$$

Number of coils per drum length

$$n := \text{floor}\left(\frac{F - C}{2 \cdot DD \cdot p}\right)$$

$$n = 13$$

Total number of layers; floor means that an integer portion of an expression should be used

$$j := 1..n$$

Layer serial number

$$d_j := C + DD + 2 \cdot DD \cdot p \cdot (j - 1)$$

The *j*th layer diameter, defined by CT centerline, *in.*

$$d_1 = 84.01$$

The 1st layer diameter, *in.*

$$d_n = 130.32$$

The last layer diameter, *in.*

$$d_{o_j} := d_j + DD$$

The *j*th layer OD, defined by layer outermost cylinder (outer surface)

$$d_{o_1} = 86.02$$

The 1st layer OD, *in.*

$$d_{o_n} = 132.33$$

The last layer OD, *in.*

$$H_j := \frac{1}{12} \cdot \pi \cdot (C + DD + DD \cdot j \cdot p - DD \cdot p) \cdot W \cdot \frac{k}{DD} \cdot j \quad \begin{matrix} \text{CT length at } j \\ \text{layers, starting} \\ \text{from bedlayer, ft} \end{matrix}$$

$$H1 = 683$$

Capacity of the 1st layer, *ft*

$$Hn = 11323$$

Reel capacity, CT length at all *n* layers, *ft*

Coiled Tubing, Drill Pipe and Casing Stretch Data

The stretch or elongation of oil well tubular material resulting from an applied pulling force is a commonly required determination. Robert Hooke (1635-1702) discovered the law (Hooke's law) that strain or distortion is proportional to stress or force if the elastic limit of the material is not exceeded. (The elastic limit of the material is the maximum stress that can be developed within it without causing permanent deformation or permanent stretch in oil field terms.)

The amount of stretch that will occur when a pull force is applied varies with the amount of pull, the length of the material being stretched, the elasticity of the material and its cross-sectional area, provided the elastic limit is not exceeded.

General Stretch Formula:

$$S = \frac{F \times L \times 12}{A_w \times E}$$

Where:

S = stretch, in inches

F = pull force, in pounds

L = length, in feet

E = modulus of elasticity, in pounds per square inch.
(for steel, $E = 30,000,000$ psi)

A_w = pipe metal cross-section in square inches.

Note:

It is a common misconception that the amount of stretch for oil field tubular material is affected by the grade of steel (J-55, N-80, etc.). This is not true, because the modulus of elasticity remains the same.

Higher grades of steel have greater elastic limits and can therefore be stretched farther before reaching their elastic limits than can the lower grades. The only factors that affect the amount of stretch are those shown in the preceding general stretch formula.

Formula for stretch in Tubular Steel Products:

$$S = \frac{F \times L}{A_w \times E}$$

Where:

S = Stretch in inches

F = Force in pounds

L = Length in inches

A_w = Pipe Metal Cross-section in sq. in.

E = Elasticity Modulus of steel

= 30,000,000 psi

Example:

15,000 ft of 1.50" x .095" Coiled Tubing with 20,000 lb pull would stretch how many inches?

$$S = \frac{20,000 \text{ lb} \times 180,000 \text{ in.}}{0.419 \text{ sq in} \times 30,000,000 \text{ psi}}$$

$$= 286 \text{ inches}$$

COLLAPSE PRESSURE

The collapse pressure in the absence of axial stress, P, for new, as-manufactured coiled tubing is calculated using the appropriate formula of API Bul 5C3 for Yield Strength, Plastic or Transition Collapse pressure, but using the specified wall thickness (t).

For coiled tubing in service, the condition of the tube cannot be considered "perfectly round". Coiled tubing should always be considered as oval, with a minimum ovality of 0.2 (2%). For standard coiled tubing sizes and material grades, collapse pressures at ovalities of 0.02 and 0.05 are calculated and listed in the following tables. When actual ovality is other than 0.02 or 0.05, these equations should be used.

Collapse Pressure of Coiled Tubing: Example

Input:

QT-800, 1.50 in. OD x 0.109 in. WT, as the CT identification

D = 1.5	Specified CT OD, in.
t = 0.109	Specified CT WT, in.
DD = D + 0.01	CT OD, production maximum, in
tt = t - 0.005	Wall thickness, production minimum, in
Dmax = 1.57	Section major diameter, measured, in
Dmin = 1.45	Section minor diameter, measured, in
y = 80000	CT Yield Strength, psi
E = 30000000	Modulus of Elasticity, psi
u = 0.3	Poisson's Ratio
Qy = 36750	Tensile Load Capacity, from Table of CT Technical Data, lb
Q = 20000	Applied axial force in design section, lb
P = 2000	Applied Internal Pressure, psi
UF = 0.5	CT Utilization Factor, UF=0 for new CT, UF=1 for fully worn CT

EVALUATION:

$$C := \frac{2 \cdot E}{1 - \mu^2} \quad C = 65934066 \quad \text{Material Constant, psi}$$

$$SF := 0.8 \cdot 0.8 \left(\frac{UF}{UF - 1} \right)^{1.5} \quad SF = 0.739 \quad \text{Safety Factor}$$

$$\alpha := \frac{DD}{tt} \quad \alpha = 14.519 \quad \text{Ratio}$$

$$M := \frac{\alpha^2}{4 \cdot (\alpha - 1)} \quad M = 3.898 \quad \text{CT constant}$$

$$Ov := \frac{D_{max} - D_{min}}{D} \quad Ov = 0.08 \quad \text{Ovality index}$$

$$K_y := \frac{2 \cdot M \cdot P_i}{\sigma_y} - \frac{1}{2} \cdot \left(\frac{Q}{Q_y} + \frac{P_i}{\sigma_y} \right) + \sqrt{1 - \frac{3}{4} \cdot \left(\frac{Q}{Q_y} + \frac{P_i}{\sigma_y} \right)^2}$$

Ky = 0.78

Yield correction factor

$$P_{ce} := .7125 \cdot \left[\frac{C}{\alpha \cdot (\alpha - 1)^2} + P_i \right]$$

P_{ce} = 19128Elastic collapse pressure for round CT
when internal pressure is applied, psi

$$P_{yo} := \frac{\sigma_y \cdot K_y}{2 \cdot M}$$

P_{yo} = 8007

Yield External Pressure Capacity, psi

$$P_c := \left(P_{yo}^{-2} + P_{ce}^{-2} \right)^{-\frac{1}{2}}$$

P_c = 7386Collapse Pressure for Round CT with
internal pressure & axial load, psi

$$g := \frac{\sigma_y \cdot K_y}{4 \cdot M} + (2 + 3 \cdot Ov \cdot \alpha) \cdot \frac{P_{ce}}{4}$$

g = 30231

Factor

$$f := \frac{\sigma_y \cdot K_y \cdot P_{ce}}{2 \cdot M}$$

f = 153161456

Factor

$$P_{co} = g - \sqrt{g^2 - f}$$

P_{co} = 2649Collapse pressure of oval CT with
internal pressure and axial force, psi

$$PA_{co} := P_{co} \cdot SF$$

PA_{co} = 1959

Allowable collapse pressure, psi

COILED TUBING COLLAPSE PRESSURES

Outside Diameter	Wall Thickness	Weight	D / t Ratio	Specified Minimum Yield				
				70		0		
				0	0.02	Ovality, 0.05		
D in	t in	W lb/ft	DD/tt	Q=0	Q=0	Qy/2	Q=0	Tensile Qy/2
Collapse Pressure at Production Maximum OD								
1.000	0.080	0.7861	13.47	9624	6179	4189	4281	2902
1.000	0.087	0.8483	12.32	10440	7038	4727	4954	3334
1.000	0.095	0.9182	11.22	11360	7999	5332	5733	3834
1.000	0.102	0.9783	10.41	12150	8821	5852	6419	4274
1.000	0.109	1.037	9.712	12930	9627	6364	7106	4715
1.000	0.125	1.168	8.417	14660	11410	7502	8672	5721
1.250	0.080	1.000	16.80	6682	4308	3021	2902	2013
1.250	0.087	1.081	15.37	7863	5019	3464	3411	2342
1.250	0.095	1.172	14.00	9213	5824	3967	4010	2728
1.250	0.102	1.251	12.99	9948	6519	4401	4545	3072
1.250	0.109	1.328	12.12	10600	7204	4831	5086	3419
1.250	0.125	1.502	10.50	12060	8727	5792	6339	4223
1.250	0.134	1.597	9.767	12870	9560	6321	7048	4677
1.250	0.156	1.823	8.344	14770	11520	7575	8773	5786
1.500	0.095	1.426	16.78	6699	4319	3027	2909	2018
1.500	0.102	1.523	15.57	7685	4912	3397	3333	2292
1.500	0.109	1.619	14.52	8670	5501	3765	3767	2572
1.500	0.125	1.836	12.58	10240	6827	4594	4786	3227
1.500	0.134	1.955	11.71	10940	7555	5052	5370	3601
1.500	0.156	2.239	10.00	12600	9284	6145	6812	4526
1.500	0.175	2.476	8.882	13990	10719	7060	8058	5326
1.750	0.109	1.910	16.92	6590	4253	2986	2863	1988
1.750	0.125	2.169	14.67	8523	5414	3710	3702	2530
1.750	0.134	2.313	13.64	9509	6059	4113	4189	2843
1.750	0.156	2.656	11.66	10980	7600	5080	5406	3624
1.750	0.175	2.944	10.35	12220	8886	5893	6473	4309
1.750	0.188	3.136	9.617	13040	9743	6437	7206	4779
2.000	0.109	2.201	19.33	5028	3317	2397	2222	1569
2.000	0.125	2.503	16.75	6720	4331	3035	2918	2023
2.000	0.134	2.671	15.58	7672	4904	3393	3328	2288
2.000	0.156	3.072	13.31	9727	6288	4256	4365	2956
2.000	0.175	3.411	11.82	10840	7452	4987	5286	3547
2.000	0.188	3.638	10.98	11590	8230	5478	5924	3957
2.000	0.203	3.896	10.15	12430	9110	6035	6663	4431
2.375	0.109	2.638	22.93	3298	2323	1753	1568	1137
2.375	0.125	3.004	19.88	4724	3138	2283	2102	1491
2.375	0.134	3.207	18.49	5527	3614	2585	2422	1701
2.375	0.156	3.697	15.79	7488	4793	3323	3247	2237
2.375	0.175	4.112	14.03	9181	5805	3955	3996	2719
2.375	0.188	4.391	13.03	9918	6487	4381	4520	3056
2.375	0.203	4.709	12.05	10660	7262	4867	5133	3449
2.875	0.125	3.671	24.04	2958	2091	1598	1419	1036
2.875	0.134	3.923	22.36	3534	2454	1839	1653	1193
2.875	0.156	4.530	19.11	5155	3393	2445	2272	1603
2.875	0.175	5.046	16.97	6555	4232	2973	2848	1978
2.875	0.188	5.395	15.77	7513	4809	3333	3258	2244
2.875	0.203	5.793	14.57	8618	5471	3746	3744	2557
3.500	0.134	4.817	27.21	2285	1566	1238	1082	806
3.500	0.156	5.571	23.25	3174	2254	1708	1524	1107
3.500	0.175	6.215	20.65	4325	2905	2133	1948	1389
3.500	0.188	6.650	19.18	5112	3367	2428	2255	1591
3.500	0.203	7.148	17.73	6020	3910	2771	2625	1833

NOTES: 1. Collapse pressure for round CT (ovality $(D_{max}-D_{min})/D=0$) is the yield strength, plastic, transition, or elastic collapse pressure by API Bull 5C3.
 2. Collapse pressure due to ovality is in the solution by S. Timoshenko, *Strength of Materials, Part 2*, Van Nostrand, 1954. See also: *Computing Collapse Pressure*

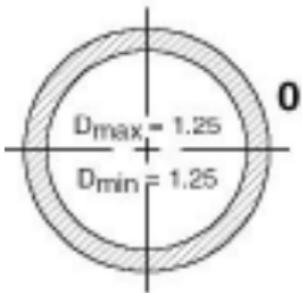
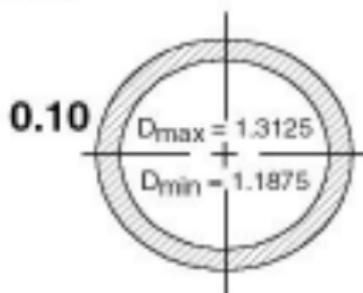
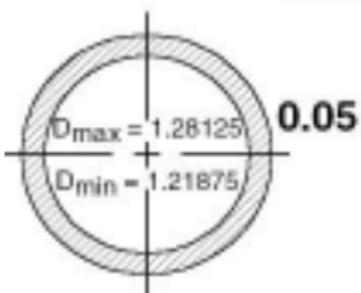
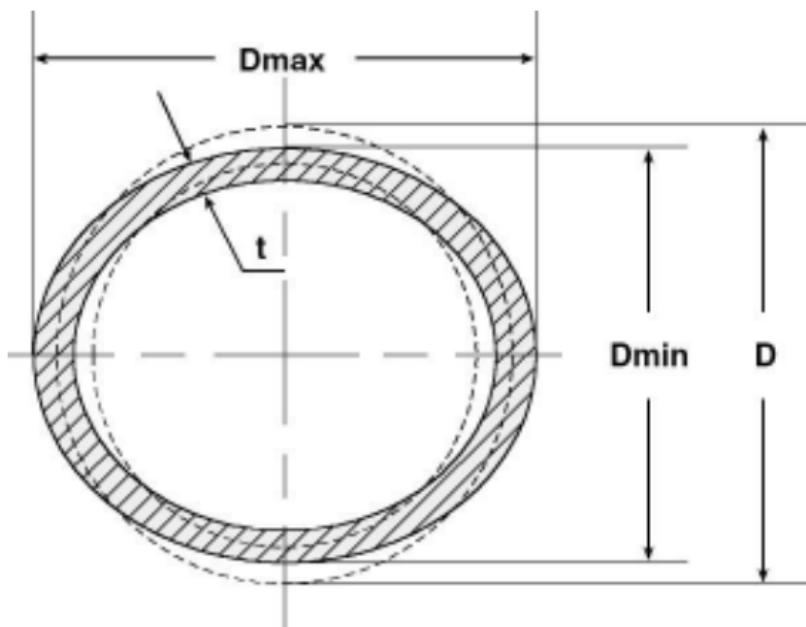
COILED TUBING COLLAPSE PRESSURES

Strength, <i>kpsi</i>	1 080					100				
	<i>0</i>	<i>0.02</i>	<i>0.05</i>	<i>0</i>	<i>0.02</i>	<i>0.05</i>	<i>0</i>	<i>0.02</i>	<i>0.05</i>	
(Dmax - Dmin)/D	<i>Q</i>	<i>Q</i>	<i>Qy/2</i>	<i>Q=0</i>	<i>Qy/2</i>	<i>Q=0</i>	<i>Q=0</i>	<i>Qy/2</i>	<i>Q=0</i>	<i>Qy/2</i>
(DD=D+0.01) and Minimum Wall (tt=t=t-0.005), <i>psi</i>										
10950	6940	4738	4812	3282	13100	8363	5798	5817	4016	
11940	7937	5360	5585	3778	14920	9647	6591	6792	4640	
12990	9051	6057	6480	4351	16230	11080	7479	7922	5363	
13890	10000	6656	7269	4856	17360	12300	8240	8919	5999	
14780	10930	7245	8059	5362	18470	13490	8986	9918	6637	
16750	12990	8550	9860	6520	20940	16110	10640	12190	8090	
7330	4770	3387	3232	2262	8470	5584	4070	3838	2735	
8695	5593	3901	3814	2640	10220	6633	4727	4565	3208	
10250	6528	4482	4501	3082	12210	7832	5470	5426	3764	
11370	7335	4984	5115	3476	13960	8871	6111	6198	4260	
12120	8129	5480	5737	3875	15150	9894	6744	6984	4763	
13790	9893	6588	7178	4798	17230	12160	8152	8804	5926	
14700	10860	7195	7992	5319	18380	13390	8923	9833	6583	
16880	13120	8640	9970	6590	21100	16270	10740	12340	8180	
7349	4782	3395	3240	2268	8495	5599	4080	3848	2741	
8488	5468	3823	3725	2582	9952	6473	4628	4453	3135	
9627	6153	4249	4222	2903	11410	7351	5172	5076	3539	
11700	7692	5206	5392	3654	14630	9331	6396	6548	4485	
12500	8537	5735	6063	4084	15630	10420	7069	7395	5026	
14400	10540	6994	7720	5145	18000	12980	8668	9490	6364	
15990	12190	8045	9153	6063	19980	15090	9997	11301	7520	
7223	4706	3347	3188	2233	8334	5503	4019	3783	2698	
9457	6051	4185	4148	2855	11190	7220	5091	4982	3478	
10710	6800	4651	4706	3214	12800	8183	5686	5684	3930	
12550	8588	5767	6105	4111	15690	10480	7110	7448	5060	
13960	10080	6703	7332	4896	17450	12390	8299	8999	6050	
14910	11070	7330	8174	5436	18630	13660	9093	10063	6730	
5418	3629	2666	2457	1755	6024	4155	3153	2880	2101	
7373	4796	3404	3251	2274	8526	5617	4091	3861	2749	
8473	5460	3818	3719	2578	9934	6462	4621	4445	3130	
11120	7066	4816	4908	3344	13370	8525	5898	5938	4093	
12390	8417	5660	5967	4022	15480	10260	6973	7274	4949	
13240	9319	6225	6700	4492	16550	11420	7693	8200	5540	
14210	10340	6867	7550	5036	17760	12730	8507	9275	6226	
3496	2501	1926	1718	1262	3909	2788	2226	1979	1490	
5067	3425	2535	2322	1665	5576	3903	2986	2713	1989	
5994	3970	2883	2685	1905	6762	4578	3428	3160	2288	
8260	5331	3738	3627	2519	9661	6298	4518	4331	3056	
10220	6506	4468	4484	3071	12160	7804	5452	5405	3751	
11330	7298	4961	5086	3458	13880	8824	6082	6163	4237	
12180	8197	5522	5791	3910	15230	9981	6798	7052	4807	
3175	2242	1750	1550	1148	3498	2481	2008	1777	1350	
3692	2648	2025	1814	1326	4135	2963	2348	2085	1570	
5565	3716	2721	2515	1793	6213	4262	3223	2950	2148	
7183	4681	3332	3171	2222	8282	5472	4000	3762	2685	
8290	5349	3749	3640	2527	9699	6321	4532	4346	3066	
9567	6117	4226	4196	2886	11330	7305	5144	5043	3517	
2401	1662	1341	1173	888	2510	1809	1512	1329	1033	
3403	2425	1874	1669	1228	3789	2697	2161	1920	1449	
4605	3159	2362	2146	1549	4985	3578	2769	2499	1845	
5515	3686	2703	2495	1780	6149	4226	3199	2926	2132	
6565	4310	3098	2916	2056	7492	5004	3702	3445	2476	

for CT, Proceedings of the 1st N. American Roundtable, SPE/CoTA, Montgomery, TX, February 25-28, 1996

3. Collapse Pressure data above is defined at S.F. = 1 & in absence of internal pressure.

$$(D_{\max} - D_{\min})/D$$



MAXIMUM ALLOWABLE SAFETY FACTOR SF
(Do not exceed chosen SF)

Tubing Utilization Factor <i>UF, percent</i>		Maximum Allowable SF
<i>Over</i>	<i>To</i>	
New CT	15	0.80
15	30	0.78
30	40	0.76
40	50	0.74
50	60	0.72
60	70	0.70
70	80	0.68
80	90	0.66
90 (Totally Worn CT)	100	0.64

NOMENCLATURE

C - elastic constant, *psi*

$$C := \frac{2E}{1 - \mu^2}$$

D - specified outside diameter (OD) of coiled tubing (CT), *in.*

DD - production maximum OD, *in.*

$$DD = D + 0.01 \text{ in.}$$

D_{\max}, D_{\min} - major and minor CT section diameters, *in.*

d - inside diameter, *in.*

$$d = D - 2t$$

d_1 & d_2 - inside diameter at opposite ends of the tru-tapered segment, *in.*

$$d_1 = D - 2t_1$$

$$d_2 = D - 2t_2$$

E - modulus of elasticity, $E=30 \cdot 10^6$ for steel CT

f - factor in collapse pressure calculations

$$f := \frac{\sigma_y K_y P_{ce}}{2M}$$

g - factor in collapse pressure calculations

$$g := \frac{\sigma_y K_y}{4M} + (2 + 3 \cdot \alpha \cdot Ov) \cdot \frac{P_{ce}}{4}$$

K_y - yield strength correction factor

$$K_y := 2M \frac{P_i}{\sigma_y} + \sqrt{SF^2 - \frac{3}{4} \left(\frac{Q}{Q_y} + \frac{P_i}{\sigma_y} \right)^2} - \frac{1}{2} \left(\frac{Q}{Q_y} + \frac{P_i}{\sigma_y} \right)$$

M - CT factor, defined as

$$M := \frac{\alpha^2}{4(\alpha-1)}$$

Ov - CT ovality,

$$Ov = (D_{\max} - D_{\min}) / D$$

P_c - collapse pressure for round tubing, is calculated using the appropriate of API Bul 5C3 [1]

$$P_c := \left(P_{yo}^{-2} + P_{ce}^{-2} \right)^{\frac{1}{2}}$$

P_{ce} - elastic collapse pressure for round CT, psi

$$P_{ce} := .7125 \left[\frac{C}{\alpha(\alpha - 1)^2} \right] + P_i$$

P_{co} - collapse pressure for oval CT, psi

$$P_{co} = g - \sqrt{g^2 - f}$$

P_i - applied internal pressure, psi

P_y - CT yield internal pressure capacity, psi

$$P_y = \frac{\sigma_y}{\sqrt{4M^2 - 2M + 1}}$$

P_{yo} - CT yield external pressure capacity, psi

$$P_{yo} := \frac{\sigma_y K_y}{2M}$$

Q - applied axial force, lb

Q_y - CT yield load capacity, lb

$$Q_y = \sigma_y \pi (DD - tt)tt$$

SF - safety factor against failure. It is a utilized portion of the CT yield or collapse capacity when pressure, load, and/or torque are acting alone or simultaneously. It varies in the range 0-SF-1. Maximum of the factor, $SF=S/S_y=1$, means that design load or stress reached ultimate capacity, and therefore tubing can fail. The actual SF should never exceed allowable safety factor (see page 19):

$$SF = 0.8 \cdot 0.8 UF^{1.5}$$

T_y - CT yield torque capacity, lb-ft

$$T_y = \frac{\sigma_y \pi}{192 \sqrt{3}} DD^3 [1 - (1-2/\alpha)^4] \text{ lb-ft}$$

t - specified wall thickness, in.

tt - production minimum wall thickness, in.

$$tt = t - 0.005 \text{ in.}$$

t_1, t_2 - specified wall thickness at opposite ends of the tru-tapered segment, in.

V - displacement, material (metallic) volume occupied by 1000 ft long CT string, $V=V_o-V_i$

V_i - internal volume capacity of 1000 ft long CT string

V_o - external volume capacity of 1000 ft long CT string

W - CT weight, lb/ft

$$W = 10.68 (D - t)t \text{ lb/ft}$$

- α - D/t-ratio; for CT yield pressure, load, torque capacities, and CP evaluation

$$\alpha = \frac{DD}{tt} = \frac{\text{Production Maximum OD}}{\text{Production Minimum WT}}$$

- σ_y - specified minimum yield strength in tension of CT, psi
- τ_y - specified minimum yield strength in shear of CT, $\tau_y = \sigma_y / \beta$, psi
- μ - Poisson's ratio, $\mu = 0.30$ for steel

ABBREVIATIONS

- CT - coiled tubing
- CP - collapse pressure
- ID - inside diameter
- OD - outside diameter
- WT - wall thickness
- UF - utilization factor, it is the ratio of the life already utilized, I , to the expected total CT life, L , that $UF=I/L$, where I and L are expressed in consistent units: calendar time, running feet, strokes over the gooseneck, etc. It may be estimated by experienced operator

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DRILL BIT CLASSIFIER



SAO SUPPLIES DBS
Drill Bit Supplier

DRILL BIT CLASSIFIER



Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/ usage*
Soft and Soft Sticky					
Steel tooth roller cone bits					
S3SJ	111	12 1/4, 13 1/2, 13 3/4, 14 3/4, 16, 17, 17 1/2, 18 1/2, 20, 21, 22, 23, 24, 26, 28	1,000-5,000	200-80	S
SS33SG	115	10 5/8, 12 1/4, 13 1/2, 14 3/4, 16, 17 1/2, 18 1/2, 23, 24, 26	1,000-4,000	350-80	MB
SSD33SG	115	17 1/2	1,000-4,000	350-80	W
S33SF	116	9 1/2, 11	2,000-5,000	200-80	
PSF	116	6 1/8, 6 1/4, 6 1/2, 7 7/8, 8 1/2, 8 3/4, 9 7/8, 12 1/4	2,000-5,000	200-80	G
ERA MPSF	117	7 7/8, 8 1/2, 8 3/4, 9 7/8, 12 1/4	2,000-5,000	200-80	G
ERA 1RD	115	12 1/4	2,000-5,000	350-80	BCGLMR
MPSF	117	7 7/8, 8 1/2, 8 3/4, 9 7/8, 12 1/4	1,500-4,000	240-80	MG
MPSF2	127	10 5/8	2,000-5,000	200-80	MG
S33SGF	117	12 1/4	2,000-5,000	180-80	G
S33G	125	17 1/2	2,000-5,000	350-80	G
S33GF	127	12 1/4	2,000-5,000	180-80	G
S44G	135	8 1/2, 11 5/8	2,000-4,500	300-80	G
S33F	126	5 7/8, 6, 6 1/4, 6 3/4	2,000-5,000	180-80	S
S33TGF	127	9 7/8	2,000-5,000	180-80	G
S4TJ	131	17 1/2, 22, 26, 28	2,000-5,500	160-60	S

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/usage*
S4J	131	6, 121/4	2,000-5,500	160-60	S
SS44G	135	81/2, 121/4, 16, 17, 171/2, 24	2,000-4,500	300-80	MBG
S44GF	137	81/2, 83/4, 121/4	2,000-6,000	150-60	G
S44F	137	43/4, 6	2,000-6,000	150-60	
Insert roller cone bits					
SS80	415	16, 171/2, 20, 22, 24, 26	1,000-4,000	350-80	MB
S80F	417	81/2	1,000-5,000	160-70	BX
SS81	425	171/2	1,000-4,000	350-80	MBX
S81F	427	77/8, 83/4, 121/4	1,500-5,000	160-70	BX
SS82	435	121/4, 143/4, 16, 17, 171/2, 28	1,000-4,000	350-80	MBX
SS82 FD	437	121/4	1,000-5,000	250-80	MBX
SS83 FD	447	121/4	1,000-5,000	280-80	MBXGW
S82F	437	61/2, 81/2, 83/4, 97/8, 105/8, 115/8, 121/4	2,000-5,000	160-70	BX
ERA 03	417	121/4	1,000-4,000	250-80	BCGLMRX
ERA 03D	417	121/4	1,000-4,000	250-80	BCGLMRXW
ERA 07	427	77/8, 81/2	1,500-5,000	160-70	GLRX
ERA 07C	427	77/8	1,500-5,000	160-70	GLRY
ERA 07D	427	121/4	1,500-5,000	160-70	GLRX
ERA 07RD	425	121/4	1,500-5,000	160-70	GLRX
ERA 13	437	77/8, 81/2, 121/4	1,000-5,000	250-70	BCGLMRX
ERA 13C	437	77/8	2,000-5,000	160-70	GLRY

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/ usage*
ERA 13D	437	121/4	1,000-5,000	160-70	GLRX
ERA 13RD	435	121/4	1,000-5,000	160-70	GLRX
ERA 14C	437	77/8	2,000-5,000	160-70	GLRY
ERA 17	447	77/8, 81/2, 83/4, 97/8, 121/4	1,000-5,500	250-70	BCGLMRX
ERA 17RD	445	121/4, 123/8	1,000-5,500	350-80	BCGLMRX
SS82F	437	81/2, 121/4	1,000-5,000	250-80	MBX
S82CF	437	81/2, 83/4	2,000-5,000	160-70	BY
HZS82F	437	61/8, 61/2	2,000-5,000	140-70	HGBX
HZSD82F	437	6 1/8	2,000-5,000	140-70	HGBW
SS80F	417	97/8	1,000-5,000	160-70	GBM
ERA D17D	447	121/4	1,000-5,500	250-70	BCGLMRXW
ERA D17R	445	121/4	1,000-5,500	350-80	BCGLMRXW
ERA 17D	447	121/4	1,000-5,000	250-80	MWBXGC
S83F	447	77/8, 81/2, 83/4, 121/4	2,000-5,500	140-60	BX
SS83F	447	81/2, 121/4	1,000-5,000	250-80	MBXGW

PDC drill bits

FM2446	M131	121/4	500-2,000	60-400	MVV
FM2466	M111	121/4	500-2,000	60-400	MVV
FM2643	M331	57/8, 6, 61/8, 61/4, 61/2, 63/4, 97/8	500-2,000	60-400	MVV
FM2862	M121	143/4, 171/2	500-2,000	60-400	MVV
FM2365	M421	81/2	350-2,000	60-400	MVV
FM2563	M121	181/2	500-2,000	60-400	MVV

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/usage*
FM2648	M231	12, 121/4	500-2,000	60-400	MVV
FM2566	M323	121/4	500-2,000	60-400	MVV
B10-25	M434	81/2, 97/8	500-2,000	250-1400	MN
FM2565	M223	77/8, 97/8, 83/4, 81/2, 83/8	500-2,000	60-400	MVV
FM2465	M323	6, 61/4, 81/2, 97/8, 121/4	200-3,500	60-400	MVV
PD-5	S422	83/8, 81/2, 121/4, 16, 171/2	200-3400	60-400	M
FM2565	M423	77/8, 83/8, 81/2, 83/4, 97/8	500-2,000	60-400	MVV
PD-4HS	S423	83/8, 81/2, 121/4, 16, 171/2	200-4,000	60-400	M
FM2365	M224	97/8	350-2,000	60-400	MVV
FM2365	M124	121/4	350-2,000	60-400	MVV
FM2662	M122	171/2	500-2,000	60-400	MVV
FM2664	M423	83/4	500-2,000	60-400	MVV
FM2545	M333	97/8	500-2,000	60-400	MVV
FM2662	M323	121/4	500-2,000	60-400	MVV
FS2441	S432	6, 61/8, 61/2, 63/4, 81/2	500-2,000	60-400	MVV
FS2461	S322	81/2, 97/8, 121/4	500-2,000	60-400	MVV
FS2463	S323	81/2, 97/8, 121/4, 143/4	500-2,000	60-400	MVV
FS2465	S424	81/2	500-2,000	60-400	MVV
FS2545	S334	81/2	500-2,000	60-400	MVV
FS2565	S424	81/2, 97/8, 121/4	500-2,000	60-400	MVV
FS2645	S434	81/2, 97/8	500-2,000	60-400	MVV
FS2563	S323	97/8, 121/4, 141/2, 143/4, 16, 171/2	500-2,000	60-400	MVV
FS2543	S133	121/4	500-2,000	60-400	MVV

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/ usage*
FS2663	S323	12, 12 1/4, 13 1/2, 16, 17, 17 1/2	500-2,000	60-400	MVV
FS2467	S424	6 1/8	500-2,000	60-400	MVV
FS2665	S124	20, 22	500-2,000	60-200	MVV
FS2661	S122	26	500-2,000	60-200	MVV
SE3442	M432	6, 6 1/8	200-2,000	60-400	DVW
SE3461	M422	6-12 1/4	200-3,000	60-400	DVW
PDC coring bits					
CD 502	M132	6-12 1/4	250-3,500	50-150	
CD 73	M233	6-12 1/4	250-3,500	50-150	F
FC264	M233	6-12 1/4	250-3,500	50-150	F
CSP 107	S234	6-12 1/4	250-3,500	50-150	F
CS93	S132	4-8 1/2, 5 1/4-12 1/4	250-3,500	50-150	F
FC244LI	M243	8 1/2-12 1/4	250-3,500	50-150	F
Surface set diamond coring bits					
CSD120	S134	6-12 1/4	250-3,500	50-150	F

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/ usage*
Soft-Medium					
Insert roller cone bits					
SS84	515	8 1/2, 12, 12 1/4, 16, 17 1/2, 23, 24, 26	1,000-5,000	300-80	MB
S84F	517	4 3/4, 5 7/8, 6, 6 1/8, 6 1/4, 6 3/4, 7 7/8, 7 7/8, 8 1/2, 8 3/4, 9 7/8, 10 5/8, 12 1/4, 14 3/4, 17 1/2	2,000-6,000	140-50	BX
S84FD	517	6 1/8, 6 1/2, 14 3/4	2,000-6,000	140-50	BW
SS84D	517	17 1/2, 23	1,000-5,000	300-80	MBW
SS84F	517	8 1/2, 9 7/8, 12 1/4	1,000-6,000	250-80	MBXG
SS84FD	517	8 1/2, 9 7/8	1,000-6,000	250-80	MBXG
SS85F	527	9 7/8	2,000-6,000	120-50	MBXG
ERA 22D	517	8 1/2, 12 1/4	1,000-6,000	250-80	WMBXC
HZS84F	517	4 3/4, 6 1/8, 6 1/4	2,000-6,000	120-50	HGBX
S85F	527	8 1/2, 8 3/4, 12 1/4	2,000-6,000	120-50	BX
S85CF	527	12 1/4	2,000-6,000	120-50	BY
SS85	525	12	1,000-5,000	300-80	MB
SS86	535	8 1/2, 15 1/2, 17 1/2, 22	2,000-6,000	220-80	MB
S86F	537	5 7/8, 6, 6 1/8, 6 1/4, 6 1/2, 7 7/8, 8 3/8, 8 1/2, 8 3/4, 9 7/8, 12 1/4, 17 1/2	3,000-6,000	100-40	BX
SS86F	537	8 1/2, 9 7/8, 12 1/4	2,000-6,000	200-80	MBXG
SS86FD	537	8 1/2, 9 7/8, 12 1/4	2,000-6,000	200-80	MBXGW
S86CF	537	6 3/4, 7 7/8, 8 3/4, 12 1/4	3,000-6,000	100-40	BYG

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/ usage*
S86FD	537	6, 6 1/2, 9 1/2, 97/8	3,000-6,000	100-40	BXW
ERA 33C	537	97/8, 11	3,000-6,000	100-40	BYG
SS88C	545	81/2, 12 1/4	2,000-6,000	220-80	MBPG
S88F	547	77/8	3,000-7,000	80-40	BX
S88CF	547	43/4, 6 1/4, 77/8	3,000-7,000	80-40	BY
S88CFH	547	77/8	3,000-7,000	80-40	YB
S88FA	547	77/8	3,000-7,000	80-40	AB
ERA 22C	517	77/8	2,000-6,000	140-50	GLRY
ERA22R	517	12 1/4	1,000-5,000	300-80	MBXC
ERA 25	527	77/8	2,000-6,000	120-50	GLRX
ERA 25C	527	77/8, 11	2,000-6,000	120-50	BGLRY
ERA 33	537	77/8, 8 1/2, 8 3/4, 97/8	2,000-6,000	200-40	BGLRX
ERA 33CD	537	81/2	2,000-6,000	200-80	BXGW
ERA 33D	537	81/2	2,000-6,000	200-80	BXGW
ERA 18C	517	77/8	2,000-6,000	140-50	GLRY
ERA 22	517	77/8, 8 1/2, 8 3/4, 97/8, 12 1/4	1,000-6,000	200-50	BCGLMRX
ERA 22R	515	12 1/4	1,000-5,000	300-80	BCGLMRX
ERA D22D	517	81/2	2,000-6,000	140-50	BGLMRXW
ERA D25D	527	81/2	2,000-6,000	120-50	BGLMRXW
ERA D33D	537	81/2, 12 1/4	2,000-6,000	200-80	BCGLMRXW

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/ usage*
Fish tail bits					
FM2443	M431	61/8, 63/4	500-2,000	60-400	MVV
FM2445	M121	61/4	500-2,000	60-400	MVV
FM2445	M331	81/2	500-2,000	60-400	MVV
FM2445	M131	97/8, 121/4	500-2,000	60-400	MVV
FM2461	M221	97/8	500-2,000	60-400	MVV
FM2463	M421	61/8	500-2,000	60-400	MVV
PDC drill bits					
HZ23-2	M232	53/4, 6, 61/8, 61/2, 63/4, 81/2	500-2,500	80-450	HM
TD19H	M223	77/8, 83/8, 83/4, 97/8, 12, 141/2	200-3,500	60-400	M
HZ23-1	M342	31/2, 37/8, 41/8, 41/2, 43/4	500-2,500	80-450	HM
FM2943	M333	97/8, 12, 121/4, 143/4	500-2,500	60-400	MVV
FM2865	M423	121/4	500-2,500	60-400	MVV
FM2745	M433	77/8, 83/8, 81/2, 83/4, 91/2, 97/8, 101/2, 105/8	500-2,500	60-400	MVV
FM2846	M433	81/2, 83/4	500-2,500	60-400	MVV
FM2841	M433	83/8, 81/2	500-2,500	60-400	MVV
FM2943	M333	12, 121/4, 143/4	500-2,500	60-400	MVV
B35+2	M432	57/8, 6, 61/4, 63/4, 77/8, 83/8, 81/2, 121/4	1,500-3,000	80-350	MW
HZ35+2	M432	57/8, 6, 61/8, 81/2, 121/4	1200-2700	80-450	HMW
FM2443	M333	6, 61/2	500-2,500	60-400	MVV
FM2445	M334	6	500-2,000	60-400	MVV

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/ usage*
FM2461	M222	121/4	500-2,000	60-400	MVV
FM2545	M433	77/8	500-2,500	60-400	MVV
FM2545	M333	83/4, 97/8	500-2,500	60-400	MVV
FM2546	M433	81/2	500-2,500	60-400	MVV
FM2641	M232	6, 61/8	500-2,500	60-400	MVV
FM2641	M432	63/4	500-2,500	60-400	MVV
FM2641	M332	61/2	500-2,500	60-400	MVV
FM2645	M333	77/8, 83/4	500-2,500	60-400	MVV
FM2665	M423	77/8, 81/2, 83/4	500-2,500	60-400	MVV
FM2665	M323	97/8	500-2,500	60-400	MVV
FM2743	M333	121/4	500-2,500	60-400	MVV
FM2633	M443	61/8, 61/4, 61/2, 63/4	500-2,000	60-400	MVV
FM2631	M442	6	500-2,000	60-400	MVV
FS2743	S243	121/4	500-2,000	60-400	MVV
FS2863	S223	16, 171/2	500-2,000	60-400	MVV
FS2963	S223	16	500-2,000	60-400	MVV
FM2765	M424	97/8	500-2,500	60-400	MVV
FM2765	M324	121/4	500-2,500	60-400	MVV
SE3641	M332	6	500-2,500	60-400	DVV
PDC coring bits					
CD 93	M233	6-121/4	250-3,500	80-140	F
FC264LI	M343	81/2-121/4	250-3,500	50-150	F

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/usage*
Surface set diamond coring bits					
CB17	M613	6-121/4	250-3,500	80-140	F
Medium					
Insert roller cone bits					
M84	615	11 5/8, 17, 171/2	3,000-7,000	300-80	X
M84F	617	43/4, 51/2, 61/4, 61/2, 63/4, 77/8, 83/8, 81/2, 83/4, 91/2, 97/8, 105/8, 12, 121/4	3,000-7,000	80-40	BX
M84FD	617	83/8, 81/2, 8 3/4, 121/4	3,000-7,000	80-40	BXW
MAF	617	77/8	3,000-7,000	80-40	AB
MM88	625	121/4	2,500-7,000	150-80	MB
M84CF	627	77/8, 83/4, 11	3,000-7,000	80-40	BY
M84CFD	627	81/2, 83/4	3,000-7,000	14824	BYW
M85F	627	61/2, 63/4, 77/8, 83/4	3,500-7,000	80-40	BX
M86CF	627	77/8	3,000-7,000	80-40	BY
M89T	627	171/2	2,500-7,000	150-80	MB
M89TF	627	57/8, 6, 61/8, 61/4, 61/2, 63/4, 77/8,	3,500-7,000	80-40	BX
M89TFD	627	81/2, 83/4, 91/2	3,500-7,000	80-40	BXW
M89F	637	77/8, 121/4	4,000-7,000	70-40	BY
M89FD	637	97/8	4,000-7,000	70-40	BYW

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/ usage*
HZM89F	637	61/8, 61/4	4,000-7,000	70-40	BY
HZMD89F	637	61/8, 61/4	4,000-7,000	70-40	BWY
ERA D44D	617	121/4	3,000-7,000	80-40	BCGLMRXW
Fish tail bits					
FM2563	M221	63/4	,500-2,500	60-400	MVV
PDC drill bits					
FM2844	M433	97/8	500-2,500	60-400	MVV
FM2844	M332	121/4	500-2,500	60-400	MVV
FM2845	M433	81/2	500-2,500	60-400	MVV
FM2863	M323	143/4	500-2,500	60-400	MVV
FM2865	M324	121/4	500-2,500	60-400	MVV
PDC coring bits					
FC284	M233	6-121/4	250-3,500	90-160	F
CD 104	M334	6-121/4	250-3,500	90-160	
CD 202	M232	6-121/4	250-3,500	90-160	
CMP ZI	M333	6-121/4	250-3,500	90-160	F
FC274LI	M343	81/2-121/4	250-3,500	50-150	F

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/usage*
Surface set diamond bits					
TT521	M622	57/8, 83/8, 81/2, 121/4	300-3,000	80-1000	IMN
TT561	M624	41/8, 43/4, 55/8, 53/4, 57/8,	300-3,000	80-1000	IMN
TBT17	M634	57/8, 81/2	300-3,000	80-1000	IMN
TB16	M713	61/2, 121/2	300-3,000	80-1000	MN
TT593	M724	31/2, 33/4	300-3,000	80-1000	IMN
TBT703	M734	57/8, 6, 81/2	300-3,000	80-1000	IMN
Medium-Hard					
Steel tooth roller cone bits					
M44NG	215	77/8, 83/4, 81/2	2,000-6,000	120-40	G
MM44NG	215	81/2, 121/4, 16, 171/2, 26	2,000-4,500	250-80	MGB
M44NF	216	43/4, 57/8, 6, 61/8, 61/4, 61/2	3,000-6,500	110-40	S
M44NGF	217	81/2, 121/4	3,000-6,500	110-40	G
M4N	211	6, 61/8, 61/4, 81/2, 121/4			

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/ usage*
PDC drill bits					
FM2643i	M343	5 1/2-6	500-3,000	100-400	VWM
FM2762i	M322	12 1/4	500-3,500	100-400	VWM
FM2843i	M343	12 1/4	500-3,500	100-400	VWM
SE3641i	M342	5 3/4-8 1/2	500-3,000	100-400	DVWM
PDC coring bits					
FC284LI	M343	8 1/2-12 1/4	250-3,500	50-150	F
FCi264LI	M343	8 1/2-12 1/4	250-3,500	50-150	F
Surface set diamond coring bits					
CT 303	M623	6-12 1/4	250-3,500	110-150	I
CT 313	M623	6-12 1/4	250-3,500	110-150	W
CT 103	M623	6-12 1/4	250-3,500	110-150	I
CT 403	M624	6-12 1/4	250-3,500	110-150	I
CT 93	M623	6-12 1/4	250-3,500	110-150	I

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/usage*
Hard					
Steel tooth roller cone bits					
H77SG	335	8 1/2, 12 1/4	3,000-6,500	80-40	G
H77SGF	337	5 7/8	3,000-6,500	80-40	G
H7	331	6, 17 1/2	3,000-6,500	80-40	G
Insert roller cone bits					
H83F	717	7 7/8, 8 3/4, 9 7/8	4,000-7,500	65-35	Y
H87F	737	7 7/8, 8 1/2, 8 3/4, 9, 9 7/8, 11	4,000-7,500	65-35	B
PDC drill bits					
FM2821	M442	5 7/8, 6, 6 1/8, 6 1/2	500-2,500	60-450	MVV
FM2821	M442	7 7/8	500-2,500	60-450	MVV
FM2921	M443	5 6/8, 5 7/8, 6, 6 1/8, 6 1/2, 6 3/4, 8 1/2, 12 1/4	300-3,000	60-400	MVV
FM2941	M432	8 1/2	500-2,500	60-450	MVV
FM2831	M442	6, 6 1/8, 6 1/2, 6 3/4, 12 1/4	500-2,000	60-400	MVV
FM2933	M443	8 1/2	500-2,000	60-400	MVV
FM2931	M442	9 7/8	500-2,000	60-400	MVV
FM2841i	M342	8 3/8-8 1/2	500-3,000	100-400	MVV
FM2843i	M343	8 3/8-8 1/2	500-3,000	100-400	MVV

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/ usage*
FM2845i	M344	83/8-81/2	500-3,000	100-400	MVV
FM2941i	M442	83/8-81/2	500-3,000	100-400	MVV
FM2943i	M443	83/8-81/2	500-3,000	100-400	MVV
FM2945i	M444	121/4-171/2	500-3,500	100-400	MVV
SE3841i	M342	83/8-81/2	500-3,000	100-400	DMVV
PDC coring bits					
FCi274LI	M343	81/2-121/4	250-3,500	50-150	F
FCi284LI	M343	81/2-121/4	250-3,500	50-150	F
Surface set diamond bits					
TBT26	M831	57/8, 61/8, 83/8	300-3,000	80-1000	IMN
TB26	M811	61/8, 83/8, 81/2, 121/4	300-3,000	80-1000	MN
Surface set diamond coring bits					
CB 303	M613	6-121/4	250-3,500	100-130	
CB 401	M613	6-121/4	250-3,500	100-130	

Security DBS

Bit Name	IADC code	Size range, in.	Recommended WOB, lb/in. diameter	Recommended rotary speed, rpm	Special features/usage*
Extremely Hard					
Insert roller cone bits					
H89F	817	77/8, 97/8	4,000-7,500	55-40	B
H100F	837	57/8, 81/2, 83/4, 9, 97/8, 11, 121/4, 133/4	4,500-7,500	50-30	BY
H100	835	171/2	4,000-7,000	55-40	Y
Surface set diamond bits					
TI2352	M843	41/8, 51/2, 57/8, 6, 61/8, 61/2, 83/8, 81/2, 121/4	300-3,000	80-1000	IMN
Fi2241	M841	57/8-81/2	300-3,000	80-1200	VMT
Fi2641	M841	57/8-121/4	300-3,500	80-1200	VMT
Fi2841	M841	57/8-81/2	300-3,000	80-1200	VMT
Surface set diamond coring bits					
CI352	M843	6-121/4	250-3,500	50-70	G

***Special Feature Nomenclature:**

(Boldface indicates IADC convention)

A- Air drilling application**B- Special bearing seal****C- Center jet****D- Deviation control****E- Extended jet (full length)****F- Face discharge ports****G- Gage/body protection (additional)****H- Horizontal steering application****I- Thermally stable synthetic diamond (TSP)****J- Jet deflection****K- Cross flow hydraulics****L- Lug pads****M- Mud motor application****N- Turbine drilling****O- Milling applications****P- Percussion drilling****Q- Lateral nozzles****R- Radial flow hydraulics****S- Standard steel tooth model****T- Two cone bit****U- Cutter density; light (l), medium (m), heavy (h); Example: Ul, Um, Uh****V- Anti-whirl characteristics****W- Enhanced cutting structure****X- Chisel tooth insert****Y- Conical tooth insert****Z- Other shape insert**

Bit Classifications:

1. Steel tooth roller cone bit
2. Insert roller cone drill bit
3. Roller cone coring bit
4. Fishtail drill bit
5. PDC drill bit
6. PDC coring bit
7. Surface set diamond (natural, TSP, natural/TSP) drill bit
8. Surface set diamond (natural, TSP, natural/TSP) coring bit

SOFT (incl. soft sticky): Formation types with low compressive strength and high drillability like clay, shale, marl, salt and sand, including very soft, sticky gumbo and unconsolidated sand

SOFT-TO-MEDIUM: Formation types with low compressive strength, interbedded with hard layers like sand, shale, chalk and anhydrite

MEDIUM: Hard formation types with moderate compressive strength, like shale, chalk, anhydrite and sand

MEDIUM-TO-HARD: Dense formation types with high and increasing compressive strength, but non- or semi-abrasive layers like shale, siltstone, mudstone, sandstone, limestone, dolomite and anhydrite

HARD: Hard and dense formation types with very high compressive strength and some abrasive layer like siltstone, sandstone and mudstone

EXTREMELY HARD: Very hard and abrasive formation types like quartzite and volcanics

ING FLUIDS

Glutaraldehyde solution

FLUIDS, CLEAR FLUID, BONES

ING FLUIDS

FOAM

Nitroso- β -methylimid

Water soluble, high scale in

bound



Research and technical services laboratories

Since Baroid's inception, a commitment to research and development has played a key role in supporting the field specialist. Research and product development efforts have yielded innovative products which respond to industry needs and often set performance standards.

With Baroid's extensive network of domestic and international field laboratories, no wellsite representative is far from an extensively equipped laboratory with technologists on call twenty-four hours. Extended-service laboratories support the field laboratories with sophisticated analysis capabilities such as tests for lubricity, shale erosion, and particle size distribution.

Drilling fluid products

Baroid provides drilling fluid systems and specialty products which reflect the latest advancements in drilling fluids technology. Baroid's quality processes follow formal, documented procedures to ensure consistency. Whether formulated at the wellsite or at a field mixing facility, all products have been proven — in the laboratory and in field applications. During the drilling operation, each fluid system can be adapted to varying drilling situations by adding specialized product additives.

Completion Fluid Services

Baroid's Completion Fluid Services team was formed to answer the industry's need to produce from deep, delicately structured reservoirs. The team is trained to meet the special challenges of well completion and workover with the support of a dedicated laboratory staff. Each Baroid completion fluid product is designed to handle a specialized function while preventing formation damage. By using computer-aided blending techniques, our personnel can tailor a fluid for a specific use. Baroid completion fluid services also offers a complete line of filtration systems and services.

Bariod Fluids Listing

Tradename	Description	Recommended for these systems								Product Function		
		Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary
AK-70	Asphaltic blend	X	X	X	X	X	X	X	X	SH	FR	
AKTAFLO-E	Wetting agent	X	X	X	X	X	X			E		
AKTAFLO-S	Non-ionic surfactant		X	X	X	X	X			TE	SU	SH
ALDACIDE-G	Glutaraldehyde Solution	X	X	X	X	X	X			B		
AQUAGEL	Wyoming bentonite	X	X	X	X	X	X			V	FR	
AQUAGEL GOLD SEAL	Untreated Wyoming bentonite	X	X	X	X	X	X			V	FR	
BARABLOK	Powdered hydrocarbon resin	X	X	X	X	X	X	X	X	FR	SH	LU
BARABLOK 400	Hi-temp powdered hydrocarbon resin	X	X	X	X	X	X	X	X	FR	SH	LU
BARABRINE DEFOAM	Brine defoamer	X	X	X	X	X	X			D		
BARABRINE SI	Scale inhibitor for clear brines									CO		
BARABUF	pH buffer	X			X	X	X			A	FR	
BARACARB 5	Sized calcium carbonate	X	X	X	X	X	X	X	X	LO	W	FR
BARACARB 25	Sized calcium carbonate	X	X	X	X	X	X	X	X	LO	W	FR
BARACARB 50	Sized calcium carbonate	X	X	X	X	X	X	X	X	LO	W	FR
BARACARB 150	Sized calcium carbonate	X	X	X	X	X	X	X	X	LO	W	FR
BARACARB 600	Sized calcium carbonate	X	X	X	X	X	X	X	X	LO	W	FR

Bariod Fluids Listing

Tradename	Description	Recommended for these systems Water-based Fluids								Product Function		
		Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary
BARACARB 2300	Sized calcium carbonate	X	X	X	X	X	X	X	X	LO	W	FR
BARACAT	Cationic polymer solution	X		X	X	X	X			SH	FL	
BARACHEK HV	Cellulose derivative	X		X	X	X	X			V	FR	
BARACHEK LV	Cellulose derivative	X		X	X	X	X			FR	V	
BARACOR 44	Sulfide scavenger	X	X	X	X	X	X	X	X	CO		
BARACOR 95	Corrosion inhibitor	X			X	X	X			CO	A	
BARACOR 100	Corrosion inhibitor									CO		
BARACOR 129	Powdered corrosion inhibitor	X	X		X	X	X			CO		
BARACOR 450	High temp. corr. inh. for hi-density brines									CO		TE
BARACOR 700	Corrosion/scale inhibitor	X		X					X	CO		
BARACOR 1635	Powdered oxygen corr. inhibitor								X	CO		
BARACTIVE	Polar Activator							X	X	V	FR	
BARA-DEFOAM 1	Defoamer	X	X	X	X	X				D	SU	
BARA-DEFOAM HP	Defoamer	X	X	X	X	X	X			D		
BARA-DEFOAM W 300	Defoamer	X	X	X	X	X	X			D		
BARAFILM	Filming amine	X	X	X	X	X	X		X	CO		

Bariod Fluids Listing

Tradename	Description	Recommended for these systems								Product Function		
		Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary
BARAFLOC	Flocculant	X				X					FL	
BARAFOAM	Foaming agent								X		FO	
BARAFOS	Sodium polyphosphate compound	X			X	X					TH	CA
BARAKLEAN	Water soluble detergent										SU	
BARAKLEAN FL	Surfactant blend										FL	SU
BARAKLEAN NS	Surfactant blend							X	X		FL	SU
BARANEX	Modified lignin polymer	X	X	X	X	X					FR	TE
BARAPAK	Oil soluble polymer							X	X		V	
BARAPLUG 20, 50, 6/300	Sized salt						X				LO	W
BARARESIN	Sized oil-soluble bridging agent, F,M,C, G	X	X	X	X	X	X				LO	
BARARESIN-VIS	Oil mud viscosifier							X	X		V	
BARASCAV-D	Powdered oxygen scavenger	X	X	X	X	X	X				CO	
BARASCAV-L	Liquid oxygen scavenger	X	X	X	X	X	X				CO	
BARASCRUB	Terpene derived surfactant for well-bore clean-up							X	X		SU	
BARASIL-S	Sodium silicate solution						X				SH	

Bariod Fluids Listing

Tradename	Description	Recommended for these systems							Product Function			
		Water-based Fluids	Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary
BARAVIS	Modified cellulose	X	X	X	X	X	X	X		X	V	FR
BARAWEIGHT	Iron carbonate powder								X	X	W	
BARAZAN	Xanthan gum	X	X	X	X	X	X	X			V	
BARAZAN D F/COMPL'NS	Dispersion enhanced xanthan gum	X	X	X	X	X	X	X			V	
BARAZAN D F/DRILLING	Prem. Dispersion enhanced xanthan susp.	X	X	X	X	X	X	X			V	
BARAZAN D PLUS F/DRILLING	Prem. Dispersion enhanced xanthan susp.	X	X	X	X	X	X	X			V	
BARAZAN D PLUS F/COMPL'NS	Prem. Dispersion enhanced xanthan susp.	X	X	X	X	X	X	X			V	
BARAZAN-L	Xanthan suspension	X	X	X	X	X	X	X			V	
BARAZAN PLUS F/DRILLING	Premium xanthan	X	X	X	X	X	X	X			V	
BARAZAN PLUS F/COMPL'NS	Premium xanthan	X	X	X	X	X	X	X			V	
BARODENSE	Hematite	X	X	X	X	X	X	X	X	X	W	
BAROFIBRE	Seepage-loss additive, regular & coarse	X	X	X	X	X	X	X	X	X	LO	
BAROID	Barite	X	X	X	X	X	X	X	X	X	W	
BAROID Oil Absorbent	Granular attapulgite											
BAROID RIG WASH	Degreaser										SU	
BARO-LUBE	Surfactant blend	X	X	X	X	X	X	X			LU	

Bariod Fluids Listing

Tradename	Description	Recommended for these systems								Product Function		
		Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary
BARO-LUBE GOLD SEAL	Surfactant/lubricant blend	X	X	X	X	X	X				LU	
BARO-SEAL	Sized LCM blend	X	X	X	X	X	X				LO	
BARO-SPOT	Surfactant blend	X	X	X	X	X	X				P	
BARO-TROL	Shale stabilizer	X	X	X	X	X	X				SH	FL
BARO-TROL PLUS	Enhanced shale stabilizer	X	X	X	X	X	X				SH	FL
BROMIMUL	Brine-in-oil emulsifier							X	X		E	
BROMI-VIS	Pre-dispersed polymer suspension						X				V	
BXR	Borehole stabilizer	X	X	X	X	X	X				SH	LU
BXR-L	Borehole stabilizer suspension	X	X	X	X	X	X				SH	FR
CARBONOX	Lignite material		X	X	X	X	X				TH	FR
CAT-300	Modified organic polymer	X		X	X	X	X				FR	
CAT-GEL	Sized kaolinite	X		X	X	X	X				FR	
CAT-HI	Non-ionic modified cellulose	X	X	X	X	X	X				FR	V
CAT-LO	Non-ionic modified cellulose	X	X	X	X	X	X				FR	
CAT-VIS	Welan gum	X	X	X	X	X	X				V	
CC-16	Causticized lignite		X	X	X	X	X				TH	FR

Bariod Fluids Listing

Tradename	Description	Recommended for these systems								Product Function		
		Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary
CELLEX REGULAR	Sodium CMC	X	X	X	X	X				X	FR	V
CELLEX HV	Sodium CMC	X	X	X	X	X	X				FR	V
CLAYSEAL	Amphoteric compound	X	X	X	X	X	X				SH	SU
CLAYSEAL PLUS	Amphoteric compound	X	X	X	X	X	X				SH	SU
CON DET	Mud detergent					X					SU	E
DEEP-TREAT	Wetting agent							X	X		SU	TH
DEXTRID	Modified starch with biocide	X	X	X	X	X	X				FR	SH
DEXTRID E	Modified starch	X	X	X	X	X	X				FR	SH
DEXTRID LT	Modified starch with biocide	X	X	X	X	X	X				FR	SH
DEXTRID LTE	Modified starch with biocide	X	X	X	X	X	X				FR	SH
DRILFOAM	Foaming agent								X		FO	LU
DRIL-N-SLIDE	ROP enhancer	X	X		X	X	X				LU	SU
DRILTREAT	Oil wetting agent							X	X		SU	E
DURATONE E	Oil mud filtration control additive							X			FR	
DURATONE HT	Oil mud filtration control additive							X	X		FR	
DURENEX PLUS	Hi-temp filtration control additive							X	X		FR	

Bariod Fluids Listing

Tradename	Description	Recommended for these systems								Product Function		
		Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary
ENVIRO-SPOT	Spotting fluid concentrate	X	X	X	X	X	X				P	LU
ENVIRO-THIN	Chrome-free lignosulfonate		X	X		X	X				TH	FL
ENVIRO-TORQ	Broad-spectrum lubricant	X	X	X	X	X	X				LU	
EP MUDLUBE	Extreme pressure lubricant	X	X		X	X	X				LU	
EXTENSOL	Salt crystal growth inhibitor						X				TE	
EZ-CORE	Fatty acid emulsifier							X	X		E	
EZ-MUD	Shale stabilizing polymer solution	X	X		X	X	X			X	V	SH
EZ-MUD DP	Powdered shale stabilizing polymer	X	X		X	X	X				SH	V
EZ MUL	Oil mud emulsifier							X	X		E	SU
EZ MUL 2F	Synthetic mud emulsifier							X	X		E	SU
EZ MUL NT	Oil mud emulsifier							X	X		E	SU
EZ MUL NTE	Synthetic mud emulsifier							X	X		E	SU
FIBERTEX	Shredded cane fibers	X	X	X	X	X	X				LO	
FILTER-CHEK	Fermentation-resistant modified starch	X	X	X	X	X	X				FR	V
FLC	Cellulosic blend	X		X	X						FR	
FLO-CLEAN MD	Flocculant for calcium brines										FL	

Bariod Fluids Listing

Tradename	Description	Recommended for these systems								Product Function			
		Water-based Fluids	Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary
FLO-CLEAN Z	Flocculant for zinc brines											FL	
GELTONE	Oil mud viscosifier								X	X		V	
GELTONE II	Oil mud viscosifier								X	X		V	
GELTONE III	Oil mud viscosifier								X	X		V	
GELTONE IV	Oil mud viscosifier								X	X		V	
GELTONE V	Oil mud viscosifier								X	X		V	
GEM 2000	Polyglycerol		X	X	X	X	X	X				SH	
GEM CP	Polyglycol		X	X	X	X	X	X				SH	
GEM GP	Polyglycol		X	X	X	X	X	X				SH	
GEM SP	Polyglycol							X				SH	
HY-SEAL	Shredded organic fibers		X	X	X	X	X	X				LO	
IMPERMEX	Pre-gelatinized starch		X	X	X	X	X	X				FR	
INVERMUL	Oil-mud emulsifier								X	X	E	SU	
INVERMUL NT	Oil-mud emulsifier								X	X	E	SU	
K-LIG	Potassium lignite				X	X	X				TH	FR	E
LE BASE	Olefin base fluid									X			

Bariod Fluids Listing

Tradename	Description	Recommended for these systems								Product Function		
		Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary
LE MUL	Emulsifier for synthetic fluids								X	E	FR	SU
LE SUPERMUL	Emulsifier for synthetic fluids								X	M	SU	
LE THIN	Dispersant for synthetic fluids								X	TH		
LIGNO-THIN	Ferrochrome lignosulfonate		X	X	X	X	X			TH	FR	
LIGNOX	Lime mud thinner		X	X						TH	SH	
LIQUI-DRIL	ROP enhancer	X	X		X	X	X			LU		
LIQUI-VIS EP	Non-ionic polymer dispersion							X		V		
LIQUI-VIS NT	Non-ionic polymer dispersion						X		X			
LUBRA-BEADS	Co-polymer bead lubricant	X	X	X	X	X	X	X		LU		
MICATEX	Sized mica flakes	X	X	X	X	X	X	X		LO		
N-DRIL	Modified starch	X	X	X	X	X	X			FR		
N-DRIL HI	High M.W. HEC	X	X	X	X	X	X			V	FR	
N-DRIL HT PLUS	Modified starch	X		X	X	X	X			FR		
N-DRIL LO	Low M.W. HEC	X	X	X	X	X	X			FR	V	
N-PLEX	Activator for N-Squeeze	X	X	X	X	X	X			V		
NO BLOK C	Emulsion preventor for calcium brines									SU		

Bariod Fluids Listing

Tradename	Description	Recommended for these systems								Product Function			
		Water-based Fluids	Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary
NO BLOK Z	Emulsion preventor for zinc based brines										SU		
NO-SULF	Zinc compound for sulfide scavenging	X	X	X	X	X	X	X	X		CO		
N-SEAL	Inorganic LCM	X	X	X	X	X	X	X	X		LO		
N-SQUEEZE	Lost Circulation material	X	X	X	X	X	X	X	X		LO		
N-VIS	Biopolymer	X	X	X	X	X	X	X	X		V		
N-VIS HB	Cellulosic biopolymer dispersion	X		X	X	X	X	X			V		
N-VIS HI	Mixed metal silicates	X			X						V		
N-VIS L	Liquid xanthan gum	X		X	X	X	X	X			V		
N-VIS O	Organophilic clay								X	X	V		FR
N-VIS P PLUS	Blend of polymers	X	X	X	X	X	X		X	X	V		FR
OMC	Oil mud conditioner								X	X	TH		
OMC 2	Oil mud conditioner								X	X	TH		
OMC 42	Oil mud conditioner								X	X	TH		
OMC 2000	Oil mud conditioner								X	X	TH		
OXYGON	Oxygen scavenger	X	X	X	X	X	X				CO		
PAC-L	Low visc. polyanionic cellulose	X	X	X	X	X	X			X	FR	SH	E

Bariod Fluids Listing

Tradename	Description	Recommended for these systems										Product Function		
		Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary	Secondary	
PAC-R	Regular polyanionic cellulose	X	X	X	X	X	X			X	FR	SH	V	
PETROFREE ESTER	Ester based fluid								X					
PHASE ONE	Treated brine	X	X	X	X	X	X				P			
PHASE TWO	Water based spotting fluid	X	X	X	X	X	X				P			
PLUG-GIT	Processed cedar fiber	X	X	X	X	X	X				LO			
POLYAC	Polyacrylate	X	X		X	X	X				FR	FL	TH	
Q-BROXIN	Ferrochrome lignosulfonate		X	X	X	X	X				TH	FR	E	
QUIK-FOAM	Foaming agent								X	X	X	FO		
RM-63	Polymeric rheology modifier										V			
RV-310	Mixed metal silicates	X			X	X			X	X	V			
SDI	Silicone defoamer		X	X	X	X	X				D	SU		
STABILITE	Organic phosphate thinner					X					TH	SU		
STEELSEAL	Dual composition carbon compound	X	X	X	X	X	X	X	X		LO			
STICK-LESS 20	Sized glass spheres	X	X	X	X	X	X	X	X		LU			
SUSPENTONE	Organophilic clay							X	X		V			
THERMA-CHEK	High temp. filtrate reducer	X	X	X	X	X	X				FR			

Bariod Fluids Listing

Tradename	Description	Recommended for these systems								Product Function			
		Water-based Fluids	Non-dispersed	Dispersed	Calcium-treated	Polymer	Low Solids	Saturated Salt	Oil-base	Synthetic-base	Air, mist, foam, gas	Primary	Secondary
THERMA-CHEK LV	High temp., low visc. filtrate reducer	X	X	X	X	X	X				FR		
THERMA-THIN	High temperature deflocculant	X	X	X	X	X	X				TH		
THERMA-VIS	Synthetic inorganic viscosifier	X	X	X	X	X				X	V		FR
THERMO MUL	Hi-temp emulsifier								X	X	E		
THERMO PLUS	Hi-temp emulsifier								X	X	M		
THERMO TONE	Hi-temp filtration reducer								X	X	FR		
TORQ-TRIM 22	Lubricant	X	X	X	X	X	X				LU		
TORQ-TRIM II	Lubricant	X	X	X	X	X	X				LU		
TORQUE-LESS DI 170	Sized glass spheres	X	X	X	X	X	X	X	X	X	LU		
TRIMULSO	Oil-in-water emulsifier	X	X	X	X	X	X	X			P	TE	LU
WALL-NUT	Ground walnut shells	X	X	X	X	X	X	X	X	X	LO		
XP-07	Linear alkane based fluid									X			
X-TEND II	Bentonite extender	X			X	X					FL	V	
X-VIS	Polymerized fatty acid								X		V		FR
ZEOGEL	Attapulgite	X		X		X		X			V		
VIS-PLUS	Organic viscosifier								X	X	V		

LIGHTWEIGHT SOLUTIONS

MicroMatrix™ Cement

- Designed for use in both remedial and primary cementing operations.
- Particle sizes are approximately 10 times smaller than standard cement.
- Able to penetrate openings as narrow as 0.05 mm, or sands as fine as 100 mesh.
- Low density with high compressive strengths, especially at temperatures lower than 110°F (43°C).
- Ideal for subsea completions.

Foam Cement

- Lightweight slurries— 6 to 11 lb/gal (0.72 to 1.32 kg/liter)—for well cementing.
- Ultra-lightweight slurries—3 to 4 lb/gal (0.36 to .48 kg/liter)—for specialty applications.
- Especially useful for cementing wells that pass through zones having very sensitive fracture gradients.
- Economical - can increase the yield of a sack of cement by as much as four times.
- Acts as a lost circulation aid, reducing the amount of other additives required.
- Halliburton's FMCEM computer program can provide the proper mixing rates and volumes for the desired final slurry weight.

Spherelite™ Additive

- Hollow, inorganic spheres which are competent at high pressure.
- Allows preparation of slurries from 9 to 12 lb/gal (1 078 to 1 438 kg/m³).
- Provides improved early compressive strength development.
- Results in a set cement that has improved heat insulation properties.
- Functions as a lost-circulation aid.
- Excellent choice for low-density cements when cementing offshore conductor and casing pipe in weak, unconsolidated formations, and for low-density, thermal cements for steam injection wells.

Econolite® Additive

- Provides slurry weights to as low as 11.4 lb/gal (1.37 kg/liter).
- Economical—can be used as a water-increasing mechanism, resulting in increased slurry volumes.
- Useful where an economical filler slurry is desired.
- Can be added directly into the mixing water, making it convenient where bulk blending facilities are not available.

Gilsonite

- A particulated non-cellular lightweight additive that also provides superior lost circulation control.
- Neither accelerates nor retards setting times.
- Provides very good fill-up above incompetent zones.
- Useful in various operations including full-column cementing, multiple stage cementing, and plugback operations to obtain circulation while drilling.

LIGHTWEIGHT SOLUTIONS

Halliburton Gel

- Because of its colloidal properties, Halliburton Gel absorbs and holds several times its own weight of water.
- The greater the percentage of Halliburton gel used, the greater the water requirement and the lighter the slurry weight.
- Actual slurry and set volume of cement is increased, resulting in an appreciable reduction in fill-up cost.

Silicalite™ Additive

- Imparts an early pozzolanic-type reaction that extends lightweight cement.
- Provides compressive strength enhancement for low-temperature, lightweight cements
- Provides the thixotropic properties necessary for squeeze cementing, lost circulation, and gas migration control.
- Acts as a low temperature accelerator for saturated salt slurries.

Pozmix A

- Economical slurry with premium properties.
- Increases resistance of cement to chemical attack.
- Compatible with all classes of cement and all cementing additives.

Halliburton Light Cement (HLC)

- Economical filler type cement.
- Variable density.
- Compatible with most cementing additives.

ENGLISH / METRIC UNITS

SECTION No. 230

TECHNICAL DATA OIL WELL CEMENTS AND CEMENT ADDITIVES

NOTICE

The compressive strengths, thickening times, and other properties set forth in these materials are averages based on the testing of numerous samples and are provided to serve only as general guidelines for slurry design and well cementing.



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SECTION I

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HALLIBURTON BULK CEMENT ADDITIVES

LIGHT WEIGHT ADDITIVES

Pozmix A
Gilsonite
Halliburton Gel
Econolite
Halliburton Light Cement
SPHERELITE
Micro-Flyash
FWCA
MicroBlock
SilicaLite
VersaSet L

DENSITY INCREASING OR WEIGHTING ADDITIVES

Hi-Dense No. 3
Hi-Dense No. 4
Barite
Sand
Microsand
MicroMax

LOW WATER LOSS ADDITIVES

Halad-9 LXP
Halad-22A LXP
Halad-100A & -100AL
Halad-322 & -322 LXP
Halad-344 & -344 LXP
Halad-413 & -413 Liquid
Halad-447 & -447 Liquid
Halad-567 & -567L
Halad-600LE+
LA-2
LAP-1
Latex 2000

LOST CIRCULATION PREVENTION ADDITIVES

Gilsonite
Tuf Additive 2
Flocele
Walnut Shells
Cotton Seed Hulls
Cal-Seal Cement
Halliburton Gel
Flo-Chek Process
Foamed Cement
Flex-Plug
Diesel Oil Cement
MOC-ONE

CEMENT RETARDERS

HR-5
HR-6L
HR-7
HR-12 & HR-12L
HR-13L
HR-25 & HR-25L
SCR-100 & SCR-100 Liquid
SCR-500 & SCR-500L
Sodium Citrate
Micro-Matrix Cement Retarder
ZoneSeal Retarder

CEMENT ACCELERATORS & SALTS

Ammonium Chloride
Calcium Chloride
Cal-Seal
Diacel A
Econolite
HA-5
Potassium Chloride
Sodium Chloride

HALLIBURTON BULK CEMENT ADDITIVES CONTINUED

FREE-WATER AND SOLIDS SUSPENDING AGENTS	ANTI-FOAM AND DEFOAMING AGENTS
Diacel A	D-AIR-1, D-AIR-2, & D-AIR-3
Econolite	NF-1, NF-3, & NF-4
FWCA	
GasCom 4690	
Halliburton Gel	SPECIAL CEMENTS OR ADDITIVES
MicroBlock	Acid Soluble Cement
SA-541	DWFS 4000
SilicaLite	EpSeal
Suspend HT	Foamed Cement
VersaSet	Hydromite
	Micro-Matrix Cement
DISPERSANTS	Micro-Fly Ash
CFR-2, CFR-2L, CFR-3,	MicroSand
CFR-3L	PERMA-FROST
	PozMix 140
BOND IMPROVING AND EXPANDING ADDITIVES	Radioactive Tracers
Latex 2000	SSA-1 (Silica Flour)
SilicaLite	SSA-2 (Coarse Silica)
MicroBlock	StrataLock
MicroBond	ThermaLock
MicroBond M	VersaSet
MicroBond HT	
Super CBL	CEMENT SPACER SYSTEMS
Foamed Cement	Alpha Spacer
	Dual Purpose Spacer
ANTI-GAS MIGRATION AGENTS	Dual Spacer E
ThixSet 31	Mud Flush
VersaSet	N-Ver-Sperse O
GasStop & GasStop LXP	Spacer 500
GasStop HT	SuperFlush
Super CBL	Tuned Spacer
Foamed Cement	

Many of these additives serve more than one purpose when used in a cement slurry. Technical information for specific additives is available upon request.

(SEE CATALOG FOR ADDITIONAL INFORMATION)

ENGLISH/METRIC UNITS**BASIC CEMENTING MATERIALS**

A basic cementing material is classified as one that, without special additives for weight control or setting properties, when mixed with the proper amount of water, will have cementitious properties. This may be a single ingredient or a combination of two or more ingredients, but they are always used in this combination even when special additives are used with them. The following are of this class:

Portland Cement	Pozmix Cement
High Early Cement	Pozmix 140
Retarded Cement	

API CLASSIFICATION FOR OIL WELL CEMENTS*

Class A: Intended for use from surface to 6,000 ft. (1830 m) depth,* when special properties are not required. Available only in ordinary type (similar to ASTM C 150, Type I).**

Class B: Intended for use from surface to 6,000 ft. (1830 m) depth, when conditions require moderate to high sulfate-resistance. Available in both moderate (similar to ASTM C 150, Type II) and high sulfate-resistant types.

Class C: Intended for use from surface to 6,000 ft. (1830 m) depth, when conditions require high early strength. Available in ordinary and moderate (similar to ASTM C 150, Type III) and high sulfate-resistant types.

Class D: Intended for use from 6,000 ft. to 10,000 ft. (1830 m to 3050 m) depth, under conditions of moderately high temperatures and pressures. Available in both moderate and high sulfate-resistant types.

Class E: Intended for use from 10,000 ft. to 14,000 ft. (3050 m to 4270 m) depth, under conditions of high temperatures and pressures. Available in both moderate and high sulfate-resistant types.

Class F: Intended for use from 10,000 ft. to 16,000 ft. (3050 m to 4880 m) depth, under conditions of extremely high temperatures and pressures. Available in both moderate and high sulfate-resistant types.

Class G

and H: Intended for use as a basic well cement from surface to 8,000 ft. (2440 m) depth as manufactured, or can be used with accelerators and retarders to cover a wide range of well depths and temperatures. No additions other than calcium sulfate or water, or both, shall be interground or blended with the clinker during manufacture of Class G or H well cement. Available in moderate and high sulfate-resistant types.

*Reproduced by permission from API Spec. 10, "API Specification for Materials and Testing for Well Cements." Depth limits are based on the conditions imposed by the casing-cement specification tests (Schedules 1, 4, 5, 6, 8, 9), and should be considered as approximate values.

**ASTM C 150: Standard Specification for Portland Cement. Copies of this specification are available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103.

ENGLISH/METRIC UNITS

THE MANUFACTURE AND COMPOSITION OF CEMENT

Manufacture—Cements are made of limestone (or other materials high in calcium carbonate content), clay or shale, some iron and aluminum oxides if they are not present in sufficient quantity in the clay or shale. These dry materials are finely ground and mixed thoroughly in the correct proportions either in the dry condition (dry process) or mixed with water (wet process). This raw mixture is then fed into the upper end of a sloping, rotary kiln at a uniform rate, and slowly travels to the lower end. The kiln is fired with powdered coal, fuel oil, or gas to temperatures of 2,600 to 2,800°F. (1427°C. to 1530°C) These temperatures cause certain chemical reactions to occur between the ingredients of the raw mixture with the resulting material called clinker. The clinker is ground with a controlled amount of gypsum to form the product we know as Portland cement.

Composition—The following are the principal compounds formed in the burning process and their functions:

Tricalcium Aluminate (C_3A) is the compound that promotes rapid hydration and is the constituent which controls the initial set and thickening time of the cement. It is also responsible for the susceptibility of cement to sulfate attack and to be classified as a high-sulfate resistant cement, it must have three percent or less C_3A .

Tetracalcium Aluminoferrite (C_4AF) is the low-heat-of-hydration compound in cement. The addition of an excess of iron oxide will increase the amount of C_4AF and decrease the amount of C_3A in the cement.

Tri-Calcium Silicate (C_3S) is the prevalent compound in most cement and the principal strength producing material. It is responsible for the early strength (1 to 28 days). High early cements generally have higher percentages of this compound than do Portland or Retarded cements.

Dicalcium Silicate (C_2S) is the slow hydrating compound and accounts for the small, gradual gain in strength which occurs over an extended period of time.

All cements are manufactured in essentially the same way and are composed of the same ingredients, only in different proportions. The water requirement of each type of cement varies with the fineness of grind or surface area. High early strength cements have a high surface area (fine grind), the retarded cements have a low surface area, and the Portland cements have a surface area slightly higher than the retarded cements. The chemical retarder used in retarded cements may be added to the clinker during the secondary grinding stage to provide uniform distribution, or to the finished product.

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API CLASS A & B CEMENT (Common Portland Cement)

This cement is intended for use in oil wells from surface to 6,000 ft. depth (1830 m) when no special properties are required. The recommended water-cement ratio, according to API, is 0.46 by weight (5.2 gals./sk.) (19.7 L/sk.). It is more economical than premium cements and should be used when no special properties are desired and well conditions permit.

API CLASS C CEMENT (High Early Cement)

This cement is intended for use in oil wells from surface to 6,000 ft. depth (1830 m). It is ground finer than Portland and has a high C₃S content, both of which contribute to the higher strength. The API water requirement for this cement is 0.56 (6.3 gals./sk.) (24 L/sk.)

The compressive strength of this cement is greater than Portland cement at curing times up to 30 hours; and the pumping time slightly less under the same test conditions. This cement is more expensive than Portland and, unless its special properties are needed, should not be used. Generally, Portland with calcium chloride will give better strengths than this type of cement without accelerators.

API CLASSES G OR H CEMENT (Basic Cement)

This cement is intended for use as manufactured from surface to 8,000 ft (2440 m) or can be modified with accelerators or retarders to meet a wide range of temperature conditions. It is chemically similar to API Class B cement but is manufactured to more rigorous chemical and physical specifications which result in a more uniform product. As manufactured it contains no accelerators, retarders or viscosity control agents other than gypsum normally ground with cement clinker. All necessary additives are blended by the service Company. The API water requirement for Class G is 0.44 (5.0 gals/sk.) (18.9 L/sk.) and for Class H is 0.38 (4.3 gals/sk.) (16.3 L/sk.).

API CLASS D, E, AND F CEMENTS (Retarded Cement)

Most of these cements are retarded with an organic compound while some are retarded by chemical composition and grind. The most common retarders are of the lignin type, the most widely used being calcium lignosulfonates similar to HR-5. These cements are more expensive than Portland cement and, unless their special properties are needed, should not be used.

ENGLISH/METRIC UNITS

POZMIX® CEMENT*

This basic cementing composition consists of portland cement, a pozzolanic material (Pozmix), and 2 per cent bentonite based on the total weight of cement and Pozmix. By definition a pozzolan is a siliceous material which reacts with lime and water to form calcium silicates having cementitious properties. Advantages of this reaction are utilized with Pozmix Cement since portland cements release approximately 15 per cent free lime when they react with water, and the lime will subsequently react with the Pozmix to yield a more durable mass of calcium silicates. Because this type of composition is less expensive than the other basic materials and performs well with most additives, it has almost universal application in well cementing.

POZMIX® 140*

Further utilization of the pozzolan-lime reaction occurs with Pozmix 140, which is a blend of Pozmix and hydrated lime (calcium hydroxide) containing no portland cement. Because calcium silicates form more slowly from this reaction than from cement, this composition is not normally used at temperatures lower than 140°F. (60°C.). However, its compatibility with retarders as well as its properties of thickening time and compressive strength provide excellent performance in the range from 140°F. (60°C.) to over 400°F. (204°C.).

HALLIBURTON "LIGHT" CEMENT*

This is a filler cementing composition that is both versatile and economical for those applications requiring a low or variable slurry density. It fills a need for a high yield, low cost slurry providing a permanent cement for those zones that do not present critical cement slurry design factors. "HLC" can be used without changing formulation to achieve slurry densities of 12.4 to 13.6 lbs per gallon (1.48 kg/L to 1.63 kg/L) with API Class A or B Cements. Still lower slurry densities of 12.0 to 12.8 lbs. per gallon (1.44 kg/L to 1.53 kg/L) can be achieved with Special Class C Cements.

*—for further information refer to the following section on Pozmix Cements.

ENGLISH/METRIC UNITS

LABORATORY PROCEDURE AND METHODS OF REPORTING

Standard procedures for testing oil well cements and additives are given in API Spec. 10, "API Specifications for Materials and Testing for Well Cements" and API RP 10B, "API Recommended Practice for Testing Well Cements."

SLURRY PROPERTIES

Water ratios, viscosities, densities and volumes are given for each of the various slurries tested. Water ratios are expressed in gallons and cubic feet per sack of cement (94 pounds) (42.6 kg). These water contents are in all cases greater than Minimum Water but such that the Free Water Content is never greater than API specification. Densities are given in pounds per gallon, pounds per cubic foot and (kg/L). Slurry yields are reported in cubic feet per sack of cement. For Pozmix®, water ratios and slurry yields are reported per sack of blend.

THICKENING TIMES

The thickening time test determines the length of time a slurry will remain pumpable under simulated well conditions. The thickening time test can simulate temperature, pressure and time. Other factors that can affect the slurry's pumpability during a job cannot be simulated exactly during a laboratory thickening time test (fluid contamination, fluid loss to formation, unforeseen temperature variations, unplanned shutdowns in pumping, etc.). Because these factors cannot be accounted for, simulating known well conditions as precisely as possible is very important when determining the thickening time of a slurry to be pumped into a well.

COMPRESSIVE STRENGTHS

The compressive strength test determines the strength of a cement composition under temperature conditions simulating well conditions. The maximum pressure used for curing is normally 3,000 psi (API), unless otherwise specified.

CRUSH STRENGTH TESTING

The crush strength test indicates the strength of a cement slurry after it has been pumped into the well and allowed to set static. The slurry is subjected to temperature (and normally, pressure) for various lengths of time. The strength test may be performed at bottomhole conditions or the conditions at a specific point of interest (at the top of a long cement column, at the top of a liner, across a producing zone, etc.).

SONIC STRENGTH TESTING

The sonic strength (UCA analyzer) test is a non-destructive test performed on a slurry to estimate its strength. Correlations have been developed to approximate the compressive strength of a cementing composition based on the time required for the ultrasonic signal to pass through the cement as it sets. Sonic strength and crush strength indications can vary considerably, depending on the temperature of the test, slurry composition, etc., and in most cases, the sonic strength may be as little as 50% of the crush strength. The sonic strength test is performed according to the procedures outlined in the **API RP 10B**. The temperature and pressure schedule and the preconditioning options are the same as for the crush strength test.

ENGLISH/METRIC UNITS

RHEOLOGICAL TESTING

The rheology test determines the apparent flow properties (plastic viscosity, yield point, frictional properties, gel strength, etc.) of a cement slurry, using a rotational viscometer such as the Fann (6- or 12-speed), Chandler 12-speed or OFI 10-speed instruments.

FLUID LOSS TESTING

A fluid-loss test determines the effectiveness of a cement slurry composition in preventing the loss of water from the slurry to a formation in the wellbore. Two types of fluid-loss tests are commonly performed on cement slurries: the stirred fluid-loss test and the static fluid-loss test. In most cases, circumstances prevent you from obtaining a sample of the formation or simulating wellbore conditions exactly. Consequently, these tests utilize a standard sieve size to simulate an average formation permeability (usually a 325-mesh stainless steel sieve assembly).

FREE FLUID CEMENT SPECIFICATION TEST

The free fluid test for testing cement slurries used to cement a well helps determine a slurry's capacity to prevent fluid separation in static conditions, both during placement and after it has been placed into the wellbore. Excessive free fluid in a slurry can cause problems with water pockets, channeling, sedimentation, zonal isolation, etc. The maximum free fluid allowed by the API specification test for API class G or H is 3.5 mL (1.4%). The Texas Railroad Commission sets the maximum allowable free fluid content at 6 mL (2.4%) for "critical zone" slurries.

SLURRY SEDIMENTATION TEST

This test, which helps to determine if a cement slurry experiences particle sedimentation, is used in conjunction with the free fluid test to help determine the static stability of a cement slurry under downhole conditions. Excessive free fluid and settling can indicate stability problems in a cement sample.

STATIC GEL STRENGTH TESTING

The static gel strength (SGS) test determines the gel strength development characteristics of a static fluid under temperature and pressure conditions.

"Zero Gel" Time – the length of time from the point at which the fluid goes static until the SGS reaches 100 lb/100 ft² is referred to as the "zero gel" time. When the SGS value reaches 500 lb/100 ft², the fluid no longer transfers hydrostatic pressure from the fluid (or the fluid above it).

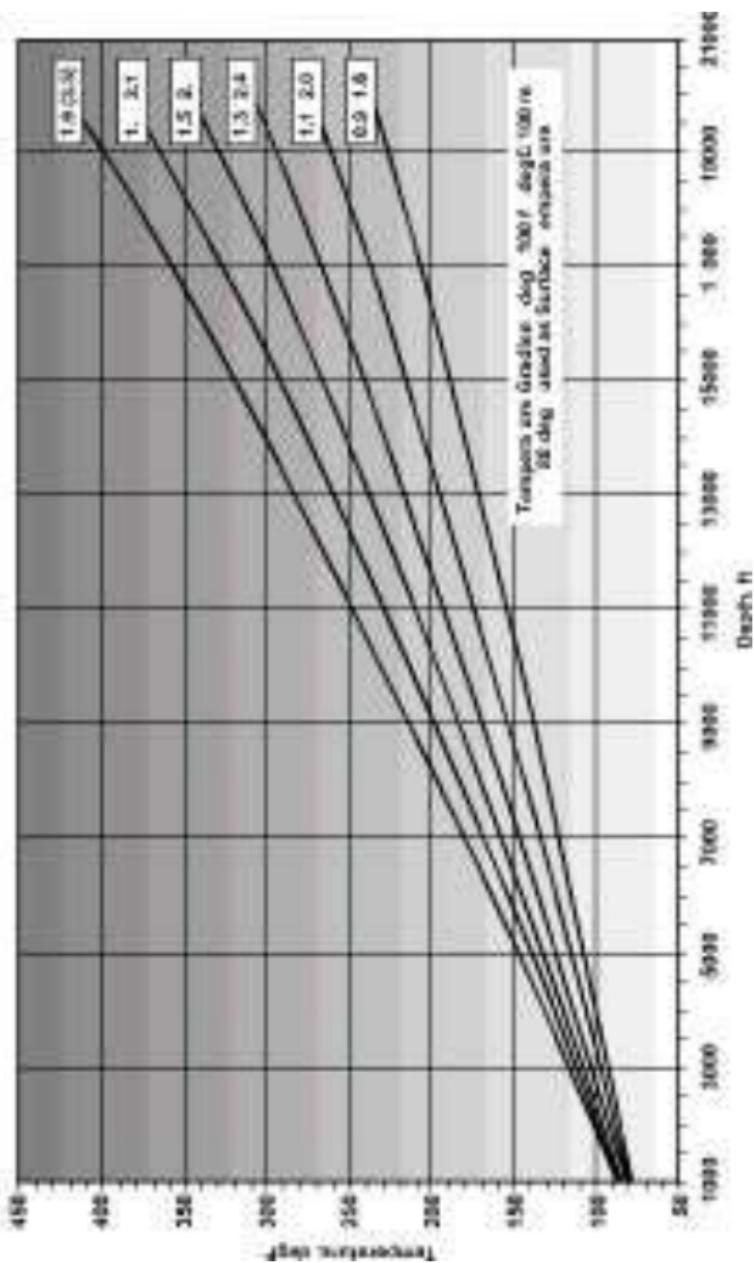
"Transition" Time – The time required for the fluid's SGS value to increase from 100 lb/100 ft² to 500 lb/100 ft² is referred to as the "transition" time. To control gas migration, the "zero gel" time can be long, but the "transition" time must be as short as possible (preferably, less than 20 to 30 minutes).

COMPRESSIBILITY TESTING

Certain materials such as GAS-CHEK® additive and SUPER CBL® additive generate a gas after they have been mixed into a slurry. The reaction that generates the gas should occur while the cement is still fluid and before it sets. By performing a modified thickening time test with the MACS analyzer, the time of this reaction can be determined.

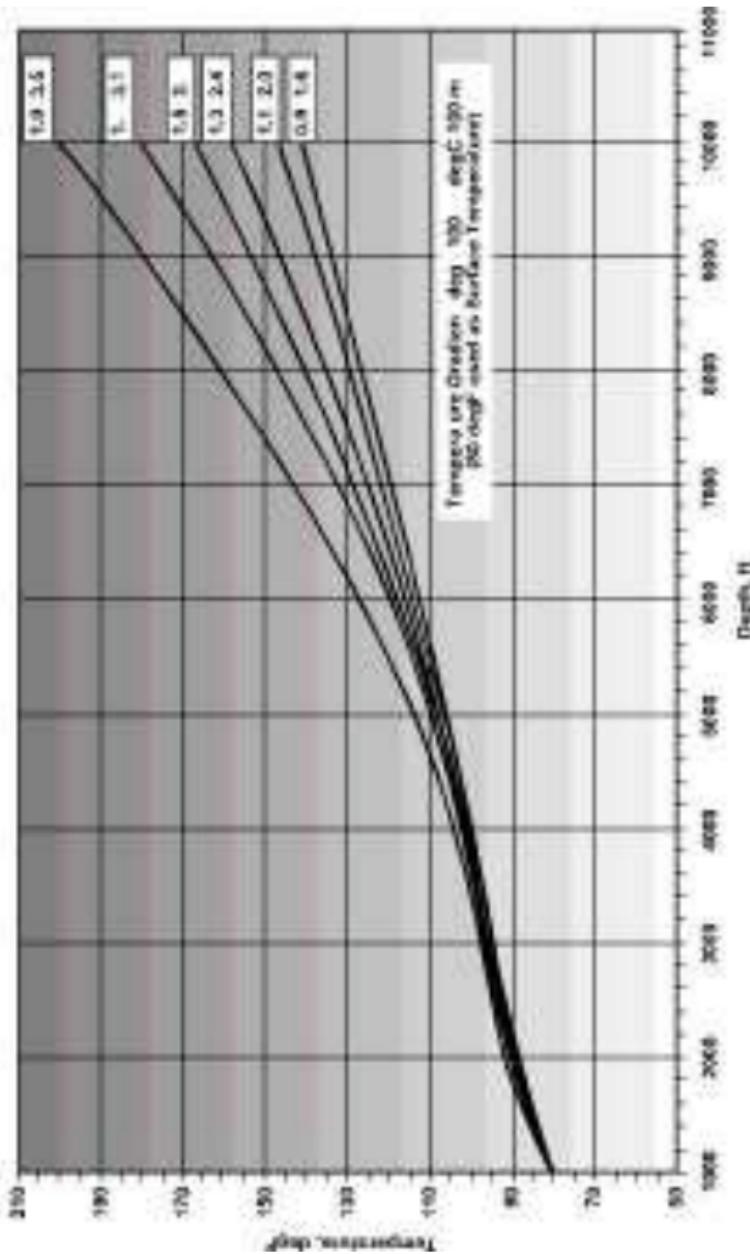
ENGLISH/METRIC UNITS

Squeezing Capacity BHTC = API RP 58B (1997) - Figure 10 under 9.5.1



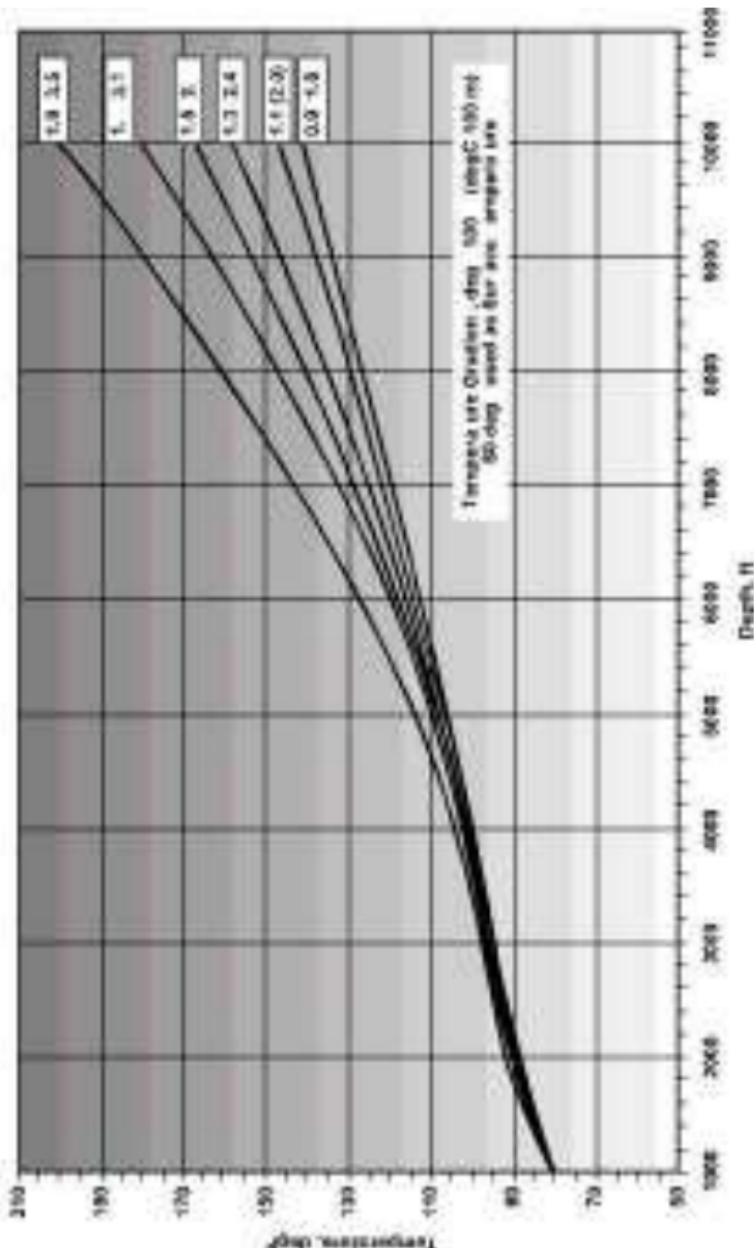
ENGLISH/METRIC UNITS

Casing Centering (HIC) -- API Table 4 -- From API RP 11B 1997



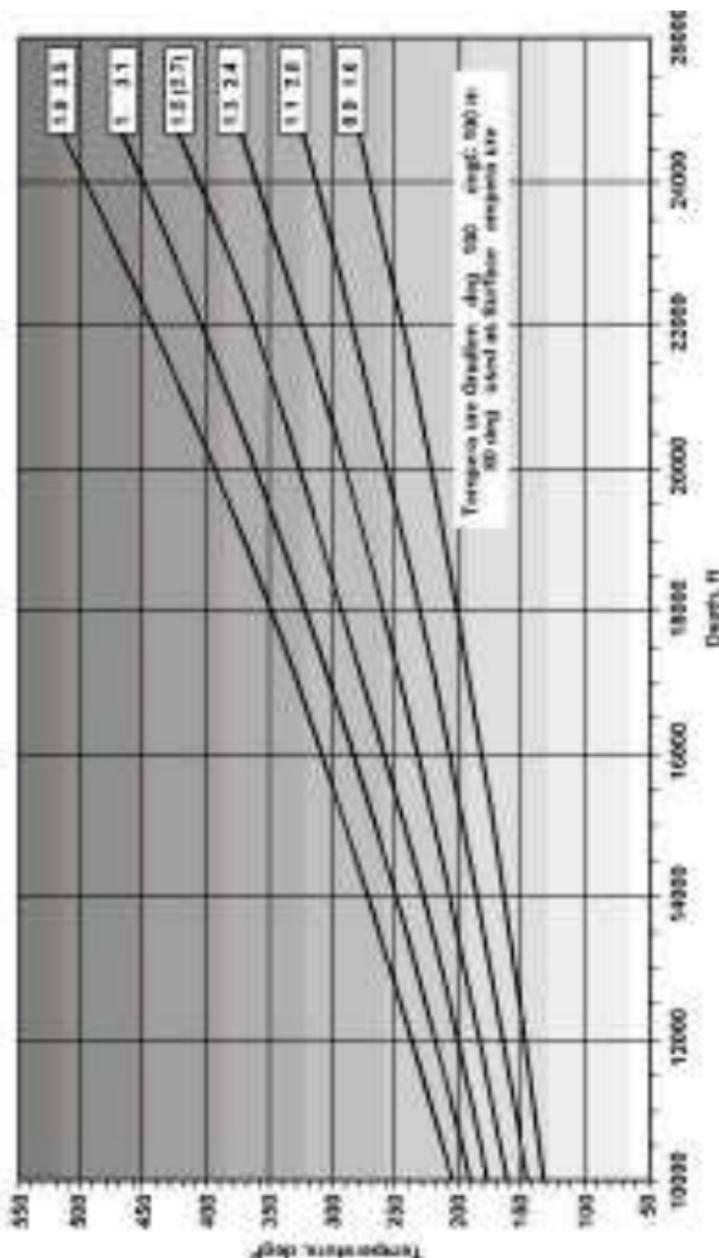
ENGLISH/METRIC UNITS

Linear Generating BNCT - API Table 4 - From API RP 13D 1997

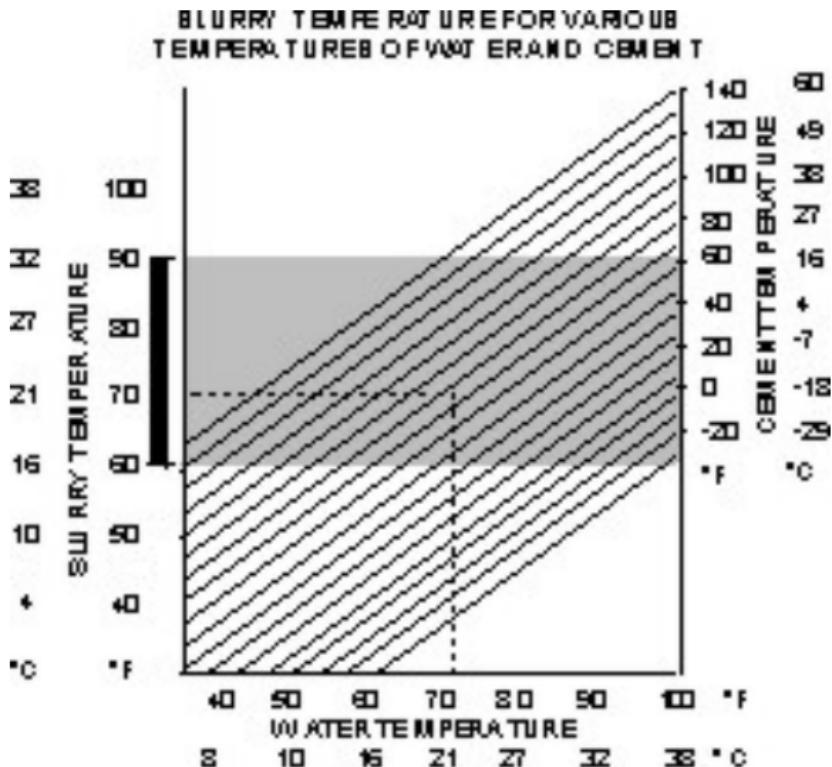


ENGLISH/METRIC UNITS

Casing & Liner Cementing BHCT - API RP-10D (8887) - Option 3 under 9.5.1.1
For Jobs at Depths Deeper Than 10,000 ft 3300m



ENGLISH/METRIC UNITS



CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight	Specific Gravity	Absolute Volume			Activity %	Dry/ Liquid	Liquid Base	Water Requirements
	lbs/cuft		gals/lb	cu ft/lb	gals/lb				gals/lb
API Cements	94	3.14	0.0382	0.0051	100	100	Dry		0.045 to 0.055
Trinity Lite-Wate	75	2.8	0.0429	0.0057	100	100	Dry		0.080 to 0.103
Micro-Matrix	50	3	0.0400	0.0053	100	100	Dry		0.120 to 0.180
Micro-Fly Ash	65	2.54	0.0473	0.0063	100	100	Dry		0.120 to 0.180
Micro-Matrix Cmt Ret		1.15	0.1044	0.0140	100	100	Liquid	Water	
PozMix A	74	2.46	0.0488	0.0065	100	100	Dry		0.049 to 0.053
SilicaLite	18	2.52	0.0476	0.0064	100	100	Dry		0.4
Attapulgite	40	2.58	0.0465	0.0062	100	100	Dry		0.69
Barite	135	4.23	0.0284	0.0038	100	100	Dry		0.0264
Bentonite	60	2.65	0.0453	0.0061	100	100	Dry		0.69
Calcium Carbonate	22.3	2.71	0.0443	0.0059	100	100	Dry		none
Calcium Chloride	50.5	1.96	0.0612	0.0082	100	100	Dry		none
CAHT-1	45	1.75	0.0686	0.0092	100	100	Dry		none
CFA-S		1.05	0.1143	0.0153	100	100	Liquid	Water	
Cal-Seal	75	2.7	0.0445	0.0059	100	100	Dry		0.048

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight		Absolute Volume			Activity %	Dry/Liquid	Liquid Base	Water Requirements gals/lb
	Ibs/cuft	Specific Gravity	gals/lb	cu ft/lb					
CFR-2	43	1.3	0.0923	0.0123	100	Dry			none
CFR-2L		1.18	0.1017	0.0136	33	Liquid	Water		
CFR-3	38	1.28	0.0938	0.0125	100	Dry			none
CFR-3L		1.17	0.1026	0.0137	33	Liquid	Water		
D-Air-1	25.2	1.35	0.0889	0.0119	100	Dry			none
D-Air-2		1.01	0.1189	0.0159	100	Liquid	Suspension		
D-Air-3		1	0.1200	0.0160	100	Liquid			
Diacel A	60.3	2.62	0.0458	0.0061	100	Dry			none
Diesel Oil		0.85	0.1412	0.0189	100	Liquid			
DSMA		1.006	0.1193	0.0160	40	Liquid	Water		
Econolite	75	2.4	0.0500	0.0067	100	Dry			Varies
Econolite Liquid		1.4	0.0857	0.0115	40	Liquid	Water		
EX-1		2.4	0.0500	0.0067	100	Dry			Varies
Flocele	15	1.42	0.0845	0.0113	100	Dry			none
FWCA	32	1.4	0.0857	0.0115	100	Dry			none

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight	Absolute Volume			Activity %	Dry/ Liquid	Liquid Base	Water Requirements
	lbs/cuft	Specific Gravity	gals/lb	cu ft/lb				gals/lb
GasCon 469		1.1	0.1091	0.0146	15	Liquid	Water	
GasStop	19	1.19	0.1009	0.0135	100	Dry		none
GasStop HT	19	1.43	0.0839	0.0112	100	Dry		none
GasStop LXP		0.994	0.1208	0.0161	42.3	Liquid	Suspension	
Gilsonite	50	1.07	0.1122	0.0150	100	Dry		0.04
Halad-9	37.2	1.22	0.0984	0.0132	100	Dry		none < 0.5%
Halad-9 LXP		0.987	0.1216	0.0163	42.6	Liquid	Suspension	
Halad-14	39.5	1.31	0.0916	0.0123	100	Dry		none
Halad-22A	23.5	1.32	0.0909	0.0122	100	Dry		none < 0.5%
Halad-22A LXP		1.003	0.1197	0.0160	41.9	Liquid	Suspension	
Halad-100A	15.62	1.36	0.0883	0.0118	100	Dry		none
Halad-100AL		1.034	0.1161	0.0155	10	Liquid	Water	
Halad-322	35.2	1.28	0.0938	0.0125	100	Dry		none
Halad-322 LXP		0.984	0.1220	0.0163	50	Liquid	Suspension	
Halad-344	19	1.19	0.1009	0.0135	100	Dry		none
Halad-344 LXP		1.01	0.1189	0.0159	42.3	Liquid	Suspension	

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk		Absolute Volume		Activity %	Dry/Liquid	Liquid Base	Water Requirements gals/lb
	Weight lbs/cuft	Specific Gravity	gals/lb	cu ft/lb				
Halad-413	42	1.48	0.0811	0.0108	100	Dry		none
Halad-413 Liquid		1.11	0.1082	0.0145	25	Liquid	Water	
Halad-447	55.8	1.64	0.0732	0.0098	100	Dry		none
Halad-361A		1.07	0.1122	0.0150	20	Liquid	Water	
Halad-600LE+		1.097	0.1094	0.0146	20	Liquid	Water	
Hi-Dense #4	165	5.2	0.0231	0.0031	100	Dry		varies
HR-5	38.4	1.6	0.0750	0.0100	100	Dry		none
HR-6L		1.21	0.0992	0.0133	40	Liquid	Water	
HR-7	30	1.28	0.0938	0.0125	100	Dry		none
HR-12	23.2	1.14	0.1053	0.0141	100	Dry		none
HR-12L		1.2	0.1000	0.0134	40	Liquid	Water	
HR-13L		1.24	0.0968	0.0129	40	Liquid	Water	
HR-25	45	1.76	0.0682	0.0091	100	Dry		none
HR-25L		1.2	0.1000	0.0134	40	Liquid	Water	
SCR-100	45	1.42	0.0845	0.0113	100	Dry		none
SCR-100 Liquid		1.16	0.1035	0.0138	40	Liquid	Water	

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk	Absolute Volume			Activity %	Dry/ Liquid	Liquid Base	Water
	Weight lbs/cuft	Specific Gravity	gals/lb	cu ft/lb				Requirements gals/lb
Hydrated Lime	31	2.34	0.0513	0.0069	100	Dry		0.153
Hydromite	68	2.15	0.0558	0.0075	100	Dry		0.03
Iron Carbonate	114.5	3.7	0.0324	0.0043	100	Dry		none
KCl (in solution)								
3%		1.019	0.0443	0.0059	100	Dry		
5%		1.031	0.0450	0.0060	100	Dry		
Sat.		1.178	0.1019	0.0136	26.5	Liquid	Water	
LAP-1	50	1.33	0.0903	0.0121	100	Dry		none
LA-2		1.1	0.1091	0.0146	54	Liquid	Water	
Latex-2000		0.996	0.1205	0.0161	50	Liquid	Water	
Microbond	61	2.4	0.0500	0.0067	100	Dry		0.048
Microbond E		3	0.0400	0.0053	100	Dry		
Microbond HT	112	3.57	0.0336	0.0045	100	Dry		0.048
Microbond M	65	3.61	0.0333	0.0044	100	Dry		0.088
MicroBlock		1.4	0.0857	0.0115	50	Liquid	Water	
MicroMax	84	4.9	0.0245	0.0033	100	Dry		0.05

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk		Absolute Volume		Activity %	Dry/ Liquid	Liquid Base	Water Requirements gals/lb
	Weight lbs/cuft	Specific Gravity	gals/lb	cu ft/lb				
MicroSand	38	2.65	0.0453	0.0061	100	Dry		0.05
Perlite (0 psi)	8	0.67	0.1792	0.0240	100	Dry		0.5
Perlite (3000 psi)		2.2	0.0546	0.0073	100	Dry		
Perlite Six (0 psi)	38	1.575	0.0762	0.0102	100	Dry		0.158
Perlite Six (3000 psi)		2.4	0.0500	0.0067	100	Dry		
NF-3		0.981	0.1224	0.0164	100	Liquid	Water	
NF-4		1.01	0.1189	0.0159	100	Liquid	Water	
NF-4E		0.998	0.1203	0.0161	100	Liquid	Water	
NF-5		0.94	0.1277	0.0171	100	Liquid	Water	
SA-541	47	1.4	0.0857	0.0115	100	Dry		none
Spherelite (0 psi)	25	0.685	0.1753	0.0234	100	Dry		0.95
Spherelite (500 psi)		0.759	0.1582	0.0211	100	Dry		
Spherelite (1000 psi)		0.785	0.1529	0.0204	100	Dry		
Spherelite (2000 psi)		0.828	0.1450	0.0194	100	Dry		
Spherelite (3000 psi)		0.864	0.1389	0.0186	100	Dry		
Spherelite (4000 psi)		0.902	0.1331	0.0178	100	Dry		

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight	Specific Gravity	Absolute Volume		Activity %	Dry/ Liquid	Liquid Base	Water Requirements
	Ibs/cuft		gals/lb	cu ft/lb				gals/lb
Spherelite (5000 psi)		0.943	0.1273	0.0170	100	Dry		
Spherelite (6000 psi)		0.98	0.1225	0.0164	100	Dry		
SSA-1 (Silica Flour)	70	2.65	0.0453	0.0061	100	Dry		0.049
SSA-2 (Coarse Silica)	100	2.65	0.0453	0.0061	100	Dry		none
Sea Water		1.025	0.1171	0.0157		Liquid		
Salt (dry)	71	2.17	0.0553	0.0074	100	Dry		
Salt (in Solution)								
6% - 0.5 lb/gal		1.041	0.0372	0.0050	6	Dry		
12% - 1.0 lb/gal		1.078	0.0391	0.0052	12	Dry		
18% - 1.5 lb/gal		1.112	0.0405	0.0054	18	Dry		
24% - 2.0 lb/gal		1.145	0.0417	0.0056	24	Dry		
Sat.- 3.1 lb/gal		1.2	0.0458	0.0061	37.2	Dry		
Sand								none
35% porosity	106.6	2.63	0.0456	0.0061	100	Wet		
39% porosity	100	2.63	0.0456	0.0061	100	Dry		
Super CBL	56.9	2.6	0.0462	0.0062	100	Dry		none

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight	Specific Gravity	Absolute Volume		Activity %	Dry/ Liquid	Liquid Base	Water Requirements
	lbs/cuft		gals/lb	cu ft/lb				gals/lb
Suspend HT	55	1.53	0.0785	0.0105	100	Dry		varies
Tuf Plug	48	1.28	0.0938	0.0125	100	Dry		none
VersaSet	50	2.32	0.0517	0.0069	100	Dry		none
Water		1	0.1200	0.0160		Liquid		
ZoneSeal Retarder	29	1.36	0.0883	0.0118	100	Dry		none

CEMENTING MATERIALS AND ADMIXTURES

PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight Kg/m3	Specific Gravity	Absolute Volume L/Kg	Activity %	Dry/Liquid	Liquid Base	Water Requirements L/Kg
API Cements	1506	3.14	0.3190	100	Dry		0.376 to 0.459
Trinity Lite-Wate	1201	2.8	0.3578	100	Dry		0.668 to 0.859
Micro-Matrix	801	3	0.3339	100	Dry		1.001 to 1.502
Micro-Fly Ash	1041	2.54	0.3944	100	Dry		1.001 to 1.502
Micro-Matrix Cmt Ret		1.15	0.8711	100	Liquid	Water	
PozMix A	1185	2.46	0.4072	100	Dry		0.409 to 0.442
SilicaLite	288	2.52	0.3975	100	Dry		3.338
Attapulgite	641	2.58	0.3883	100	Dry		5.758
Barite	2162	4.23	0.2368	100	Dry		0.22
Bentonite	961	2.65	0.3780	100	Dry		5.758
Calcium Carbonate	357	2.71	0.3697	100	Dry		none
Calcium Chloride	809	1.96	0.5111	100	Dry		none
CAHT-1	721	1.75	0.5725	100	Dry		none
CFA-S		1.05	0.9541	100	Liquid	Water	
Cal-Seal	1201	2.7	0.3710	100	Dry		0.401
CFR-2	689	1.3	0.7706	100	Dry		none
CFR-2L		1.18	0.8490	33	Liquid	Water	

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight Kg/m ³	Specific Gravity	Absolute Volume L/Kg	Activity %	Dry/Liquid	Liquid Base	Water Requirements L/Kg
CFR-3	609	1.28	0.7827	100	Dry		none
CFR-3L		1.17	0.8562	33	Liquid	Water	
D-Air-1	404	1.35	0.7421	100	Dry		none
D-Air-2		1.01	0.9919	100	Liquid	Suspension	
D-Air-3		1	1.0018	100	Liquid		
Diacel A	966	2.62	0.3824	100	Dry		none
Diesel Oil		0.85	1.1786	100	Liquid		
DSMA		1.006	0.9958	40	Liquid	Water	
Econolite	1201	2.4	0.4174	100	Dry		Varies
Econolite Liquid		1.4	0.7156	40	Liquid	Water	
EX-1		2.4	0.4174	100	Dry		Varies
Flocele	240	1.42	0.7055	100	Dry		none
FWCA	513	1.4	0.7156	100	Dry		none
GasCon 469		1.1	0.9107	15	Liquid	Water	
GasStop	304	1.19	0.8418	100	Dry		none
GasStop HT	304	1.43	0.7006	100	Dry		none
GasStop LXP		0.994	1.0078	42.3	Liquid	Suspension	

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight Kg/m3	Specific Gravity	Absolute Volume L/Kg	Activity %	Dry/Liquid	Liquid Base	Water Requirements L/Kg
Gilsonite	801	1.07	0.9363	100	Dry		0.334
Halad-9	596	1.22	0.8211	100	Dry		none < 0.5%
Halad-9LXP		0.987	1.0150	42.6	Liquid	Suspension	
Halad-14	633	1.31	0.7647	100	Dry		none
Halad-22A	376	1.32	0.7589	100	Dry		none < 0.5%
Halad-22ALXP		1.003	0.9988	41.9	Liquid	Suspension	
Halad-100A	250	1.36	0.7366	100	Dry		none
Halad-100AL		1.034	0.9689	10	Liquid	Water	
Halad-322	564	1.28	0.7827	100	Dry		none
Halad-322LXP		0.984	1.0181	50	Liquid	Suspension	
Halad-344	304	1.19	0.8418	100	Dry		none
Halad-344LXP		1.01	0.9919	42.3	Liquid	Suspension	
Halad-413	673	1.48	0.6769	100	Dry		none
Halad-413 Liquid		1.11	0.9025	25	Liquid	Water	
Halad-447	894	1.64	0.6109	100	Dry		none
Halad-361A		1.07	0.9363	20	Liquid	Water	
Halad-600LE+		1.097	0.9132	20	Liquid	Water	

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight Kg/m ³	Specific Gravity	Absolute Volume L/Kg	Activity %	Dry/Liquid	Liquid Base	Water Requirements L/Kg
Hi-Dense #4	2643	5.2	0.1927	100	Dry		varies
HR-5	615	1.6	0.6261	100	Dry		none
HR-6L		1.21	0.8279	40	Liquid	Water	
HR-7	481	1.28	0.7827	100	Dry		none
HR-12	372	1.14	0.8788	100	Dry		none
HR-12L		1.2	0.8348	40	Liquid	Water	
HR-13L		1.24	0.8079	40	Liquid	Water	
HR-25	721	1.76	0.5692	100	Dry		none
HR-25L		1.2	0.8348	40	Liquid	Water	
SCR-100	721	1.42	0.7055	100	Dry		none
SCR-100 Liquid		1.16	0.8636	40	Liquid	Water	
Hydrated Lime	497	2.34	0.4281	100	Dry		1.277
Hydromite	1089	2.15	0.4660	100	Dry		0.25
Iron Carbonate	1834	3.7	0.2708	100	Dry		none
KCl (in solution)							
3%		1.019	0.9831	100	Dry		
5%		1.031	0.9717	100	Dry		
Sat.		1.178	0.8504	26.5	Liquid	Water	

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight Kg/m3	Specific Gravity	Absolute Volume L/Kg	Activity %	Dry/Liquid	Liquid Base	Water Requirements L/Kg
LAP-1	801	1.33	0.7532	100	Dry		none
LA-2		1.1	0.9107	54	Liquid	Water	
Latex-2000		0.996	1.0058	50	Liquid	Water	
Microbond	977	2.4	0.4174	100	Dry		0.401
Microbond E		3	0.3339	100	Dry		
Microbond HT	1794	3.57	0.2806	100	Dry		0.401
Microbond M	1041	3.61	0.2775	100	Dry		0.734
MicroBlock		1.4	0.7156	50	Liquid	Water	
MicroMax	1346	4.9	0.2044	100	Dry		0.417
MicroSand	609	2.65	0.3780	100	Dry		0.417
Perlite (0 psi)	128	0.67	1.4952	100	Dry		4.172
Perlite (3000 psi)		2.2	0.4554	100	Dry		
Perlite Six (0 psi)	609	1.575	0.6361	100	Dry		1.318
Perlite Six (3000 psi)		2.4	0.4174	100	Dry		
NF-3		0.981	1.0212	100	Liquid	Water	
NF-4		1.01	0.9919	100	Liquid	Water	
NF-4E		0.998	1.0038	100	Liquid	Water	

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight Kg/m3	Specific Gravity	Absolute Volume L/Kg	Activity %	Dry/Liquid	Liquid Base	Water Requirements L/Kg
NF-5		0.94	1.0657	100	Liquid	Water	
SA-541	753	1.4	0.7156	100	Dry		none
Spherelite (0 psi)	400	0.685	1.4625	100	Dry		7.927
Spherelite (500 psi)		0.759	1.3199	100	Dry		
Spherelite (1000 psi)		0.785	1.2762	100	Dry		
Spherelite (2000 psi)		0.828	1.2099	100	Dry		
Spherelite (3000 psi)		0.864	1.1595	100	Dry		
Spherelite (4000 psi)		0.902	1.1106	100	Dry		
Spherelite (5000 psi)		0.943	1.0624	100	Dry		
Spherelite (6000 psi)		0.98	1.0222	100	Dry		
SSA-1 (Silica Flour)	1121	2.65	0.3780	100	Dry		0.409
SSA-2 (Coarse Silica)	1602	2.65	0.3780	100	Dry		none
Sea Water		1.025	0.9774		Liquid		
Salt (dry)	1137	2.17	0.4617	100	Dry		

CEMENTING MATERIALS AND ADMIXTURES
PHYSICAL PROPERTIES AND WATER REQUIREMENTS

Material	Bulk Weight Kg/m ³	Specific Gravity	Absolute Volume L/Kg	Activity %	Dry/Liquid	Liquid Base	Water Requirements L/Kg
Salt (in Solution)							
6% - 0.5 lb/gal		1.041	0.9623	6	Dry		
12% - 1.0 lb/gal		1.078	0.9293	12	Dry		
18% - 1.5 lb/gal		1.112	0.9009	18	Dry		
24% - 2.0 lb/gal		1.145	0.8749	24	Dry		
Sat.- 3.1 lb/gal		1.2	0.8348	37.2	Dry		
Sand							none
35% porosity	1708	2.63	0.3809	100	Wet		
39% porosity	1602	2.63	0.3809	100	Dry		
Super CBL	911	2.6	0.3853	100	Dry		none
Suspend HT	881	1.53	0.6548	100	Dry		varies
Tuf Plug	769	1.28	0.7827	100	Dry		none
VersaSet	801	2.32	0.4318	100	Dry		none
Water		1	1.0018		Liquid		
ZoneSeal Retarder	465	1.36	0.7366	100	Dry		none

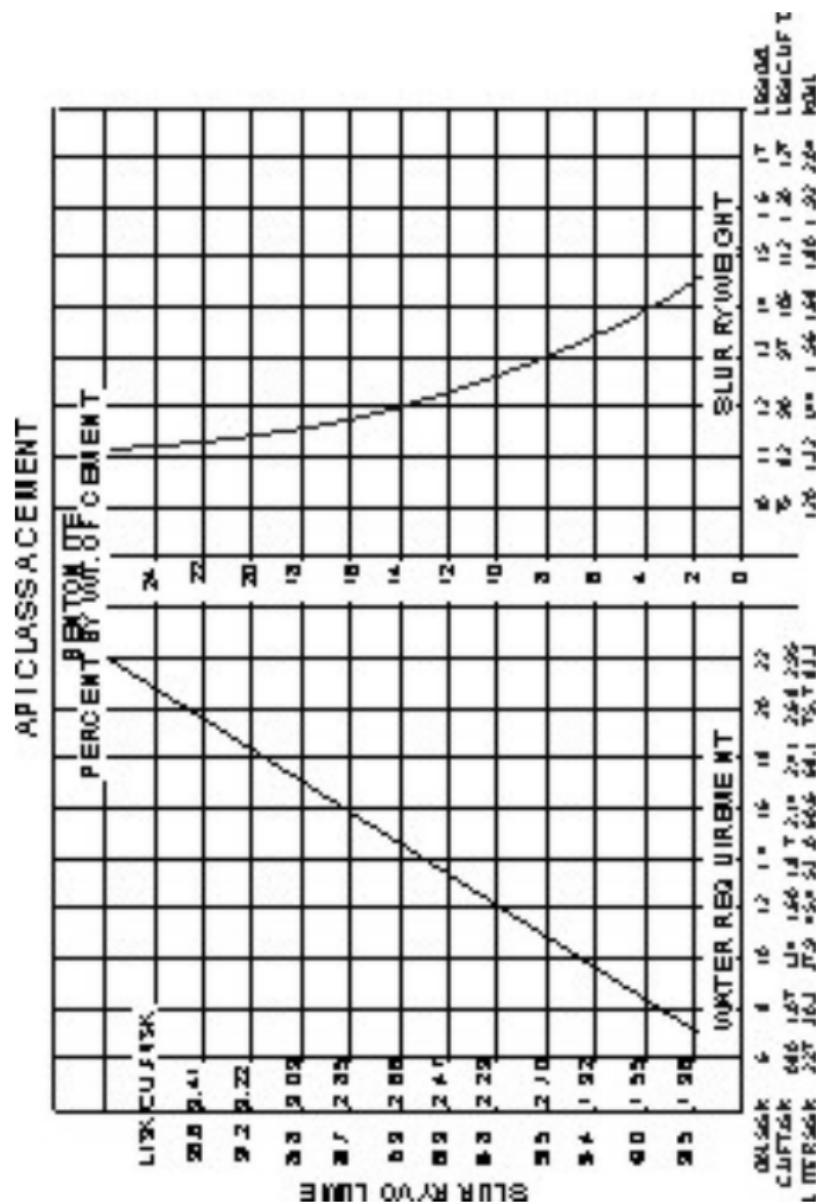
SECTION II

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ENGLISH/METRIC UNITS



ENGLISH UNITS**PORTLAND CEMENT — CLASS A OR B
WITH BENTONITE****SLURRY PROPERTIES**

Per Cent Bentonite	Maximum		Slurry Weight Lbs./Gal.	Slurry Volume Lbs./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
	Water Requirements Gal./Sk.	Cu. Ft./Sk.			
0	5.2	0.70	15.6	117	1.18
2	6.5	0.87	14.7	110	1.36
4	7.8	1.04	14.1	105	1.55
6	9.1	1.22	13.5	101	1.73
8	10.4	1.39	13.1	98	1.92

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Per Cent Bentonite	API CASING TESTS			API SQUEEZE TESTS		
	4,000'	6,000'	8,000'	2,000'	4,000'	6,000'
0	3:00+	2:25	1:40	2:14	1:32	1:01
2	2:25	1:48	1:34	2:25	1:29	0:56
4	2:34	1:57	1:32	2:26	1:18	0:58
6	2:35	1:45	1:22	2:16	1:26	0:56
8	2:44	1:50	1:24	2:31	1:28	0:58

COMPRESSIVE STRENGTHS — PSI

Atmospheric Pressure

Percent Bentonite	60°F	80°F	100°F	120°F
12 HOURS				
0	80	580	1035	1905
2	55	455	635	1280
4	20	220	375	780
6	15	85	245	500
8	15	50	155	310
24 HOURS				
0	615	1905	2610	3595
2	365	1090	1520	2040
4	225	750	1015	1380
6	85	360	730	925
8	60	265	510	610
72 HOURS				
0	2050	4125	6150	6650
2	1185	2840	3350	4110
4	960	1775	2430	2800
6	615	1170	1610	1710
8	425	720	1045	1215

METRIC UNITS
PORLAND CEMENT — CLASS A OR B
WITH BENTONITE

SLURRY PROPERTIES

Per Cent Bentonite	Maximum		Slurry Weight Kg/Liters	Slurry Volume L / Sk.
	Water Requirements	L/Sk.		
0	19.7		1.87	33.41
2	24.6		1.76	38.50
4	29.5		1.69	43.88
6	34.4		1.62	48.98
8	39.4		1.57	54.36

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Per Cent Bentonite	API CASING TESTS			API SQUEEZE TESTS		
	1 220m	1 830m	2 440m	610m	1 220m	1 830m
0	3:00+	2:25	1:40	2:14	1:32	1:01
2	2:25	1:48	1:34	2:25	1:29	0:56
4	2:34	1:57	1:32	2:26	1:18	0:58
6	2:35	1:45	1:22	2:16	1:26	0:56
8	2:44	1:50	1:24	2:31	1:28	0:58

COMPRESSIVE STRENGTHS — MEGAPASCALS

Atmospheric Pressure

Per cent Bentonite	16°C		27°C		38°C		49°C	
	12 HOURS							
0	0.55		3.99		7.13		13.13	
2	0.37		3.13		4.37		8.82	
4	0.13		1.51		2.58		5.37	
6	0.10		0.58		1.68		3.44	
8	0.10		0.34		1.06		2.13	
24 HOURS								
0	4.24		13.13		17.99		24.78	
2	2.51		7.51		10.48		14.06	
4	1.41		5.17		6.99		9.51	
6	0.58		2.48		5.03		6.37	
8	0.41		1.82		3.51		4.20	
72 HOURS								
0	14.13		28.44		42.40		45.85	
2	8.17		19.58		23.09		28.33	
4	6.61		11.23		16.75		19.85	
6	4.24		8.06		11.10		11.79	
8	2.93		4.96		7.20		8.37	

ENGLISH UNITS**CLASS A CEMENT**

COMPRESSIVE STRENGTH — psi

2 PER CENT BENTONITE — 14.7 lbs/gal

Percent Calcium Chloride	CURING TEMPERATURE AND PRESSURE				
	60°F 0 psi	80°F 0 psi	95°C 800 psi	110°F 1,600 psi	140°F 3,000 psi
6 HOURS					
0	Not Set	70	180	415	1330
2	85	350	515	695	1730
4	185	535	700	1040	1650
8 HOURS					
0	15	200	310	660	1905
2	135	620	770	905	2185
4	240	730	930	1260	1830
12 HOURS					
0	55	455	630	1150	2350
2	255	1150	1310	1610	2850
4	450	1100	1340	2000	2440
18 HOURS					
0	260	885	1065	1740	2890
2	520	1805	1925	2290	3340
4	660	1610	1915	2450	2900
24 HOURS					
0	365	1090	1340	1540	3380
2	765	1820	2025	2390	3520
4	1040	2020	2200	2610	3490

4 PER CENT BENTONITE — 14.1 lbs/gal

Percent Calcium Chloride	CURING TEMPERATURE AND PRESSURE				
	60°F 0 psi	80°F 0 psi	95°C 800 psi	110°F 1,600 psi	140°F 3,000 psi
6 HOURS					
0	Not Set	45	120	270	890
2	30	170	285	395	1065
4	80	265	405	525	1345
8 HOURS					
0	10	115	195	320	1160
2	75	240	380	445	1295
4	95	335	465	575	1400
12 HOURS					
0	20	220	285	410	1400
2	135	500	600	750	1475
4	170	355	605	980	1425
18 HOURS					
0	125	440	610	975	1950
2	305	785	990	1400	2135
4	410	865	1150	1640	2100
24 HOURS					
0	225	750	900	1410	2225
2	395	1085	1225	1440	2275
4	510	1195	1350	1690	2145

METRIC UNITS

CLASS A CEMENT

COMPRESSIVE STRENGTH — MEGAPASCALS

2 PER CENT BENTONITE — 1.76 Kg/L

Percent Calcium Chloride	CURING TEMPERATURE AND PRESSURE				
	16°C 0 MPa	27°C 0 MPa	35°C 5.51 MPa	43°C 11.03 MPa	60°C 20.68 MPa
6 HOURS					
0	Not Set	0.48	1.24	2.86	9.17
2	0.58	2.41	3.55	4.79	11.92
4	1.27	3.68	4.82	7.17	11.37
8 HOURS					
0	0.10	1.37	2.13	4.55	13.13
2	0.93	4.27	5.30	6.24	15.06
4	1.65	5.03	6.41	8.68	12.61
12 HOURS					
0	0.37	3.13	4.34	7.92	16.20
2	1.75	7.92	9.03	11.10	19.65
4	3.10	7.58	9.23	13.78	16.82
18 HOURS					
0	1.79	6.10	7.34	11.99	19.92
2	3.58	12.44	13.27	15.78	23.02
4	4.55	11.10	13.20	16.89	19.99
24 HOURS					
0	2.51	7.51	9.23	10.61	23.30
2	5.27	12.54	13.96	16.47	24.26
4	7.17	13.92	15.16	17.99	24.06

4 PER CENT BENTONITE — 7.69 Kg/L

Percent Calcium Chloride	CURING TEMPERATURE AND PRESSURE				
	16°C 0 MPa	27°C 0 MPa	35°C 5.51 MPa	43°C 11.03 MPa	60°C 20.68 MPa
6 HOURS					
0	Not Set	0.31	0.82	1.86	6.13
2	0.20	1.17	1.96	2.72	7.34
4	0.55	1.82	2.79	3.62	9.27
8 HOURS					
0	0.06	0.79	1.34	2.20	7.99
2	0.51	1.65	2.62	3.06	8.92
4	0.65	2.31	3.20	3.96	9.65
12 HOURS					
0	0.13	1.51	1.96	2.82	9.65
2	0.93	3.44	4.13	5.17	10.17
4	1.17	2.44	4.17	6.75	9.82
18 HOURS					
0	0.86	3.03	4.20	6.72	13.44
2	2.10	5.41	6.82	9.65	14.72
4	2.82	5.96	7.92	11.30	14.47
24 HOURS					
0	1.41	5.17	6.20	9.72	15.34
2	2.72	7.48	8.44	9.92	15.75
4	3.51	8.44	9.30	11.58	14.78

ENGLISH UNITS

CLASS A CEMENT WITH SALT

Salt Cement slurries are recommended for use in cementing through salt sections, shale formations, bentonitic sands as well as other types of formations that are susceptible to fresh water contamination. When salt is preferentially dry blended with cement, $\frac{1}{4}$ lb. of D-AIR 1™ per sack is recommended to reduce foaming of the slurry. Where blending facilities are not available and the salt must be placed in the mixing water, 1 gallon of D-AIR-2 per 1,000 gallons of water will aid in reducing foaming during mixing.

SLURRY PROPERTIES

Water Requirements Gals./Sk.	Cu. Ft./Sk.	Per Cent Salt by Weight of Water	Weight of Dry Salt Lbs./Sk. Cement	Slurry Weight Lbs./Gal.	Slurry Volume Lbs./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
5.2	0.70	0	0	15.6	117	1.18
		5	2.17	15.7	117	1.19
		10	4.33	15.8	118	1.20
		15	6.50	15.9	119	1.21
		20	8.66	16.0	120	1.22
Sat. (140°F)		16.12		16.1	120	1.27

THICKENING TIME AND COMPRESSIVE STRENGTH

Per Cent Salt	Per Cent Calcium Chloride	Thickening Time		Compressive Strength - PSI			
		Hrs:Mins. 2,000'	Csg. Test	8 Hours		24 Hours	
				95°F 800 psi	110°F 1600 psi	95°F 800 psi	110°F 1600 psi
0	0	4:15		305	925	2240	3230
0	2	1:40		1365	2000	3920	4815
5	0	2:30		1050	2060	3990	4350
5	2	1:49		1630	2515	4530	5465
10	0	2:30		965	1925	4150	4730
10	2	1:48		1235	2200	3775	4650
15	0	3:01		700	1735	4015	4480
15	2	2:31		945	1605	3075	3820
20	0	3:00		380	1140	3175	3495
20	2	3:13		490	1065	2390	3155
Sat.	0	7:15+		Not Set	15	930	1955
Sat.	2	5:00+		50	290	1570	2450

CLASS A CEMENT WITH RETARDER

Water - 5.2 Gals./Sk.

THICKENING TIME—HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

Per Cent Retarder	API Casing Cementing				API Squeeze Cementing		
	4,000'	6,000'	8,000'	10,000'	4,000'	6,000'	8,000'
% SALT							
0.0	3:36	2:25	1:59	1:14	1:32	1:01	0:44
	10% SALT WATER						
0.0	1:53	1:30	1:10	0:50	1:08	1:00	0:30
0.2	2:29	2:05	1:33	1:18	1:43	1:15	0:34
0.4	3:00+	3:00+	3:08	3:14	2:59	2:45	—
	15% SALT WATER						
0.0	2:05	1:33	1:25	1:10	1:35	0:55	0:21
0.2	3:00+	2:17	2:02	1:48	2:19	2:07	0:22
0.4	3:00+	3:00+	3:00+	3:00	—	—	0:15
	20% SALT WATER						
0.0	2:00+	2:00	1:50	1:13	1:47	1:23	0:42
0.2	3:00+	3:00+	2:36	1:36	3:00+	2:12	—
	SATURATED SALT WATER						
0.0	3:00+	3:00+	3:25	2:25	3:00+	3:05	1:29
0.4	—	—	—	—	3:00+	3:00+	2:04

METRIC UNITS

CLASS A CEMENT WITH SALT

Salt Cement slurries are recommended for use in cementing through salt sections, shale formations, bentonitic sands as well as other types of formations that are susceptible to fresh water contamination. When salt is preferentially dry blended with cement, 114 grams of D-AIR 1™ per sack is recommended to reduce foaming of the slurry. Where blending facilities are not available and the salt must be placed in the mixing water, 1 L of D-AIR-2 per 1000L of water will aid in reducing foaming during mixing.

SLURRY PROPERTIES

Water Requirements L/Sk.	Per Cent Salt by Weight of Water	Weight of Dry Salt Kg/Sk. Cement	Slurry Weight Kg/L	Slurry Volume L/Sk.
19.7	0	0	1.87	33.41
	5	1.00	1.88	33.69
	10	1.96	1.89	33.97
	15	2.95	1.90	34.26
	20	3.93	1.92	34.54
Sat. (60°C)	7.31	1.93	35.96	

THICKENING TIME AND COMPRESSIVE STRENGTH

Per Cent Salt	Per Cent Calcium Chloride	Thickening Time		Compressive Strength - mPa			
		Hrs:Mins.	610 m Csg. Test	8 Hours		24 Hours	
				35°C	43°C	35°C	43°C
0	0	4:15		2.10	6.37	15.44	22.27
0	2	1:40		9.41	13.78	27.02	33.19
5	0	2:30		7.23	14.20	27.51	29.99
5	2	1:49		11.23	17.34	31.28	37.68
10	0	2:30		6.65	13.27	28.61	32.61
10	2	1:48		8.51	15.16	26.02	32.06
15	0	3:01		4.82	11.96	27.68	30.88
15	2	2:31		6.51	11.06	21.20	26.33
20	0	3:00		2.62	7.86	21.89	24.09
20	2	3:13		3.37	7.34	16.47	21.75
Sat.	0	7:15+		Not Set	0.10	6.41	13.47
Sat.	2	5:00+		3.45	1.99	10.82	16.89

CLASS A CEMENT WITH RETARDER

Water - 19.7 L/Sk.

THICKENING TIME—HOURS:MINUTES (Pressure-Temperature Thickening-Time Tests)

Per Cent Retarder	API Casing Cementing				API Squeeze Cementing		
	1 220m	1 830m	2 440m	3 050m	1 220m	1 830m	2 440m
% SALT							
0.0	3:36	2:25	1:59	1:14	1:32	1:01	0:44
10% SALT WATER							
0.0	1:53	1:30	1:10	0:50	1:08	1:00	0:30
0.2	2:29	2:05	1:33	1:18	1:43	1:15	0:34
0.4	3:00+	3:00+	3:08	3:14	2:59	2:45	—
15% SALT WATER							
0.0	2:05	1:33	1:25	1:10	1:35	0:55	0:21
0.2	3:00+	2:17	2:02	1:48	2:19	2:07	0:22
0.4	3:00+	3:00+	3:00+	3:00	—	—	0:15
20% SALT WATER							
0.0	2:00+	2:00	1:50	1:13	1:47	1:23	0:42
0.2	3:00+	3:00+	2:36	1:36	3:00+	2:12	—
SATURATED SALT WATER							
0.0	3:00+	3:00+	3:25	2:25	3:00+	3:05	1:29
0.4	—	—	—	—	3:00+	3:00+	2:04

*Curing Pressure

ENGLISH UNITS

SAND FOR PLUG BACK JOBS

Fracturing sand (20-40 grade) can be used to increase the strength of portland or retarded cement for "plug back jobs to whipstock" in order to provide a tougher plug having greater compressive strengths. When used in cement it requires very little water for wetting and does not seem to affect the pumpability.

PORTLAND CEMENT — CLASS A

SLURRY PROPERTIES

Cement Lbs.	Sand Lbs.	Water Gals./Sk.	Slurry Weight Lbs./Gal.	Slurry Volume Cu. Ft./Sk.
94	—	5.2	15.60	1.18
94	5	5.2	15.76	1.21
94	10	5.2	15.91	1.24
94	15	5.2	16.07	1.27
94	20	5.2	16.20	1.30
94	32	5.2	16.50	1.37
94	56	5.2	17.00	1.52
94	85	5.2	17.50	1.70
94	123	5.2	18.00	1.93

24 HOUR COMPRESSIVE STRENGTH — PSI

Typical Data With Class A Cement
5.2 Gallons Water Per Sack

Cement Pounds	Sand Pounds	95°F 800 psi	110°F 1,600 psi
94	0	2085	2925
94	10	1795	3125
94	20	2125	3100
94	30	2250	3325
94	40	2285	3375
94	50	2036	3385
94	60	2065	3525

METRIC UNITS

SAND FOR PLUG BACK JOBS

Fracturing sand (20-40 grade) can be used to increase the strength of portland or retarded cement for "plug back jobs to whipstock" in order to provide a tougher plug having greater compressive strengths. When used in cement it requires very little water for wetting and does not seem to affect the pumpability.

PORTLAND CEMENT — CLASS A

SLURRY PROPERTIES

Cement Kg	Sand Kg	Water L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
42.6	—	19.7	1.87	33.41
42.6	2.3	19.7	1.89	34.26
42.6	4.5	19.7	1.91	35.11
42.6	6.8	19.7	1.93	35.96
42.6	9.1	19.7	1.94	36.81
42.6	14.5	19.7	1.98	38.79
42.6	25.4	19.7	2.04	43.03
42.6	38.6	19.7	2.10	48.13
42.6	55.8	19.7	2.16	54.64

24 HOUR COMPRESSIVE STRENGTH — MEGAPASCALS

Typical Data With Class A Cement
19.7 Liters Water Per Sack

Cement Kg	Sand Kg	35°C 5.51 MPa*	43°C 11.03 MPa*
42.6	0.0	14.37	20.16
42.6	4.5	12.37	21.54
42.6	9.1	14.65	21.37
42.6	13.6	15.51	22.92
42.6	18.1	15.75	23.27
42.6	22.7	14.03	23.33
42.6	27.2	14.23	24.30

*Cureing Pressure

ENGLISH UNITS

GILSONITE CEMENT

Gilsonite is a special type of solid hydrocarbon (asphaltite) used with cements to reduce slurry weight and minimize lost circulation. It is a black granular material having a specific gravity of 1.07 and a relatively low water requirement (2 Gals. per Cu. Ft.). It has a bulk density of 50 Lbs. per Cu. Ft., and is supplied in 100 pound paper bags.

The following recommendations should be noted:

1. Bottom plugs should not be used ahead of Gilsonite cement.
2. A viscous slurry should precede the Gilsonite cement to help prevent separation of the light material.
3. The use of centralizers and scratchers should be minimal with this material.
4. Twenty-five pounds of Gilsonite per sack of cement should be the normally recommended amount although higher concentrations may be used for extremely severe lost circulation.

SLURRY PROPERTIES

Portland Cement

Class A Cement

Gilsonite Lbs./Sk.	Per Cent Bentonite	Water Gals.	Per Sk. Cu. Ft.	Slurry Weight Lbs./Gal.	Slurry Volume Lbs./Cu. Ft.	Cu. Ft./sk.
0	0	5.20	0.70	15.6	117	1.18
	4	7.80	1.04	14.1	105	1.55
12.5	0	5.60	0.75	14.4	108	1.42
	4	8.30	1.11	13.3	99	1.80
25	0	6.00	0.80	13.6	102	1.66
	4	8.80	1.18	12.7	95	2.05
50	0	7.00	0.94	12.5	94	2.17
	4	9.80	1.31	11.9	89	2.56

THICKENING TIME — HOURS:MINUTES

Gilsonite Lbs./Sk.	Per Cent Bentonite	API CASING TESTS		Compressive Strength—PSI			
		6,000'	8,000'	80°F	100°F	120°F	140°F
0	0	2:30+	1:44	2135	2740	4935	6285
	4	1:57	1:32	750	1015	1380	2025
25	0	2:30+	1:46	1250	1660	2560	2725
	4	2:30+	1:42	365	605	965	1210
50	0	2:30+	1:48	740	960	1485	1675
	4	2:30+	1:40	275	485	715	890

COMPRESSIVE STRENGTH — PSI

Gilsonite Lbs./Sk.	Per Cent Bentonite	24 HOURS				28 DAYS	
		170°F*	200°F*	230°F**	260°F**	230°F**	260°F**
0	0	4065	4850	4500	4440	4390	3540
	4	1960	1575	1610	1615	1535	775
12.5	0	2715	2800	2875	2675	2160	2130
	4	1215	1140	1165	1245	980	540
25	0	2725	2200	1965	1995	1430	1760
	4	1150	890	790	1015	765	360
50	0	1010	1000	1170	1130	1005	1020
	4	1075	700	660	775	595	335

*Slurries cured @ 3,000 psi @ 170°F and 200°F contained 0.3% Retarder.

**Slurries cured @ 3,000 psi @ 230°F and 260°F contained 0.5% Retarder.

METRIC UNITS

GILSONITE CEMENT

Gilsonite is a special type of solid hydrocarbon (asphaltite) used with cements to reduce slurry weight and minimize lost circulation. It is a black granular material having a specific gravity of 1.07 and a relatively low water requirement (7.6 Liters). It has a bulk density of 801 Kg/m³, and is supplied in 45.4 Kg paper bags.

The following recommendations should be noted:

1. Bottom plugs should not be used ahead of Gilsonite cement.
2. A viscous slurry should precede the Gilsonite cement to help prevent separation of the light material.
3. The use of centralizers and scratchers should be minimal with this material.
4. 11.3 Kg of Gilsonite per sack of cement should be the normally recommended amount although higher concentrations may be used for extremely severe lost circulation.

SLURRY PROPERTIES

Portland Cement

Class A Cement

Gilsonite Lbs./Sk.	Per Cent Bentonite	Water L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
0	0	19.68	1.87	33.41
	4	29.53	1.69	43.88
5.7	0	21.20	1.73	40.20
	4	31.42	1.59	50.96
11.3	0	22.71	1.63	47.00
	4	33.31	1.52	50.04
22.7	0	26.50	1.50	61.44
	4	37.10	1.43	72.48

THICKENING TIME — HOURS:MINUTES

Gilsonite Kg./Sk.	Per Cent Bentonite	API CASING TESTS		Compressive Strength—MPa			
		1830m	2440m	24 Hours — Atm. Pressure	27°C	38°C	49°C
0	0	2:30+	1:44	14.72	18.89	34.02	43.33
	4	1:57	1:32	5.17	6.99	9.51	13.96
11.3	0	2:30+	1:46	8.61	11.44	17.65	18.78
	4	2:30+	1:42	2.51	4.17	6.65	8.34
22.7	0	2:30+	1:48	5.10	6.61	10.23	11.54
	4	2:30+	1:40	1.89	3.34	4.93	6.13

COMPRESSIVE STRENGTH — MEGAPASCALS

Gilsonite Kg./Sk.	Per Cent Bentonite	24 HOURS				28 DAYS	
		77°C*	93°C*	110°C**	127°C**	110°C**	127°C**
0	0	28.02	33.34	31.02	30.54	30.26	24.40
	4	13.51	10.85	11.11	11.13	10.58	5.34
5.7	0	18.71	19.30	19.82	18.44	14.89	14.68
	4	8.37	7.86	8.03	8.58	6.75	3.72
11.3	0	18.78	15.16	13.54	13.75	9.86	12.13
	4	7.92	6.13	5.44	6.99	5.27	2.48
22.7	0	6.96	6.89	8.06	7.79	6.92	7.03
	4	7.41	4.82	4.55	5.34	4.10	2.31

*Slurries cured @ 20.68 mPa @ 77°C and 93°C contained 0.3% Retarder.

**Slurries cured @ 20.68 mPa @ 110°C and 127°C contained 0.5% Retarder.

ENGLISH UNITS

HALLIBURTON LATEX CEMENT

Latex cement is a blend of water, latex and portland cement. This type of slurry has two major advantages.

1. Low Filtration rates.
2. Good bonding qualities.

SLURRY PROPERTIES

Class A Cement

Latex (LA-2) Additive Gal./Sk.	Water Gal./Sk.	Fluid Loss Paper - 100 psi cc/30 Min.	Slurry Weight Lbs./Gal.	Slurry Volume Cu. Ft./Sk.
0.0	5.2	Dehydrated*	15.60	1.18
0.9	6.0	24	14.50	1.40

*Less than one minute required for dehydration

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Latex (LA-2) Additive Gal./Sk.	Water Gal./Sk.	API CASING TESTS		
		4,000'	6,000'	8,000'
0.0	5.2	3:36	2:41	1:59
0.9	6.0	4:00+	4:00+	3:03

COMPRESSIVE STRENGTH — PSI

Latex (LA-2) Additive Gal./Sk.	Water Gal./Sk.	Per Cent Calcium Chloride	CURING TEMPERATURE**			
			80°F	100°F	120°F	140°F
24 HOURS						
0.9	6.00	0	510	1320	1690	1920
0.9	6.00	2	750	1490	1860	2165
72 HOURS						
0.9	6.00	0	1335	2085	2440	2865
0.9	6.00	2	1625	2355	2965	3435

**Atmospheric Pressure.

METRIC UNITS

HALLIBURTON LATEX CEMENT

Latex cement is a blend of water, latex and portland cement. This type of slurry has two major advantages.

1. Low Filtration rates.
2. Good bonding qualities.

SLURRY PROPERTIES

Class A Cement

Latex (LA-2) Additive L/Sk.	Water L/Sk.	Fluid Loss Paper - 6.89 MPa cc/30 Min.	Slurry Weight Kg./L	Slurry Volume L/Sk.
0.0	19.7	Dehydrated*	1.87	33.41
3.4	22.7	24	1.74	39.64

*Less than one minute required for dehydration

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Latex (LA-2) Additive L/Sk.	Water L/Sk.	1220m	API CASING TESTS		
			1830m	2440m	
0.0	19.7	3:36	2:41	1:59	
3.4	22.7	4:00+	4:00+	3:03	

COMPRESSIVE STRENGTH — MEGAPASCALS

Latex (LA-2) Additive L/Sk.	Water L/Sk.	Per Cent Calcium Chloride	CURING TEMPERATURE**			
			27°C	38°C	49°C	60°C
24 HOURS						
3.4	22.7	0	3.51	9.10	11.65	13.23
3.4	22.7	2	5.17	10.27	12.82	14.92
72 HOURS						
3.4	22.7	0	9.20	14.37	16.82	19.75
3.4	22.7	2	11.20	16.23	20.44	23.68

**Atmospheric Pressure.

ENGLISH UNITS

CLASS A CEMENT WITH ECONOLITE

SLURRY PROPERTIES

ECONOLITE		Slurry		Free Water Percent	Slurry Density Lb./Gal.	Yield Lb./Cu. Ft.	Yield Cu.Ft./Sk.
Additive Percent	Water Gal./Sk.	Cu.Ft./Sk.	Viscosity-BC Initial	20 Min.			
0	5.2	0.70	4	9	2.30	15.6	117
2	9.0	1.20	7	8	0.00	13.4	100
2	11.8	1.58	6	6	0.52	12.5	94
2	14.7	1.96	3	2	0.68	11.8	88
2	17.5	2.34	2	2	1.50	11.4	86
3	17.5	2.34	3	3	1.00	11.4	86
							282

PRESSURE-TEMPERATURE THICKENING TIME TESTS

API CASING-CEMENTING SCHEDULES

ECONOLITE		Thickening Time-Hours:Minutes		
Additive Percent	Slurry Density Lb./Ga.	Lb./Cu.Ft.	4,000' 103°F	8,000' 125°F
0	15.6	117	3:47	1:30
2	13.4	100	1:08	0:58
2	12.5	94	2:15	1:42
2	11.8	88	2:38	2:14
2	11.4	86	4:00+	4:00+
3	11.4	86	4:40	2:12

COMPRESSIVE STRENGTH — PSI

ECONOLITE		100°F 24 Hrs.			140°F - 3000 PSI	
Additive Percent	Slurry Density Lb./Gal.	Lb./Cu. Ft.	100°F 24 Hrs.	12 Hrs.	24 Hrs.	
0	15.6	117	3260	3245	5010	
2	13.4	100	1095	480	975	
2	12.5	94	555	385	675	
2	11.8	88	300	310	410	
2	11.4	86	195	170	255	
3	11.4	86	225	245	405	

METRIC UNITS

CLASS A CEMENT WITH ECONOLITE

SLURRY PROPERTIES

ECONOLITE Additive Percent	Water Gal./Sk.	Slurry Viscosity-BC Initial	Slurry Viscosity-BC 20 Min.	Free Water Percent	Slurry Density Kg./L.	Yield L/Sk.
0	19.7	4	9	2.30	1.87	33.41
2	34.1	7	8	0.00	1.61	47.57
2	44.7	6	6	0.52	1.50	58.33
2	55.6	3	2	0.68	1.41	69.38
2	66.2	2	2	1.50	1.37	79.85
3	66.2	3	3	1.00	1.37	79.85

PRESSURE-TEMPERATURE THICKENING TIME TESTS

API CASING-CEMENTING SCHEDULES

ECONOLITE Additive Percent	Slurry Density Kg./L.	Thickening Time-Hours:Minutes 1220m 39°C	Thickening Time-Hours:Minutes 2440m 52°C
0	1.87	3:47	1:30
2	1.61	1:08	0:58
2	1.50	2:15	1:42
2	1.41	2:38	2:14
2	1.37	4:00+	4:00+
3	1.37	4:40	2:12

COMPRESSIVE STRENGTH — MPa

ECONOLITE Additive Percent	Slurry Density Kg/L	38°C 24 Hrs.	60°F -20.68 MPa 12 Hrs.	60°F -20.68 MPa 24 Hrs.
0	1.87	22.48	22.37	34.45
2	1.61	7.55	3.31	6.72
2	1.50	3.83	2.65	4.65
2	1.41	2.07	2.14	2.83
2	1.37	1.34	1.17	1.76
3	1.37	1.55	1.69	2.79

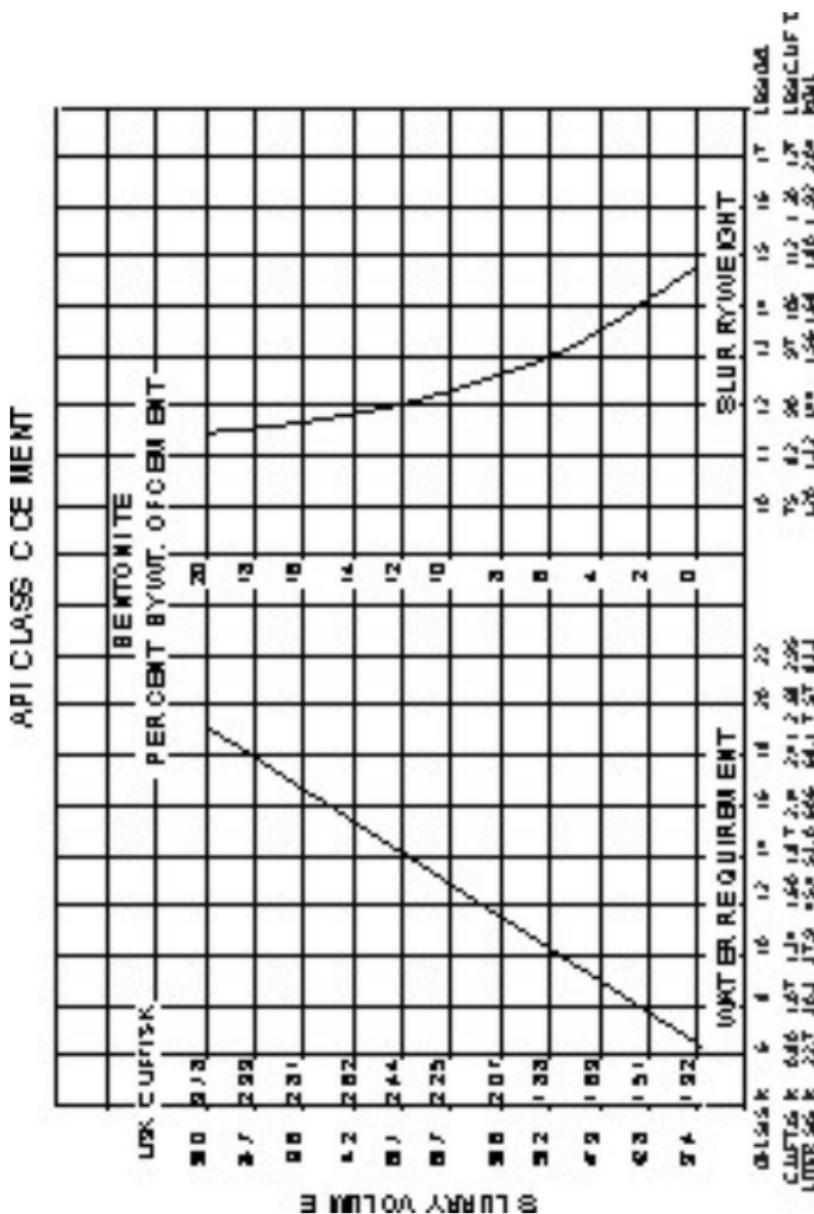
SECTION III

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CLASS C CEMENT

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ENGLISH/METRIC UNITS



ENGLISH UNITS**HIGH EARLY CEMENT — CLASS C
WITH BENTONITE****SLURRY PROPERTIES**

Per Cent Bentonite	Maximum		Slurry Weight Lbs./Gal.	Slurry Volume Lbs./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
	Water Requirements Gal./Sk.	Cu. Ft./Sk.			
0	6.3	0.84	14.8	110.7	1.32
2	7.6	1.02	14.1	105.5	1.51
4	8.9	1.19	13.5	101.0	1.69
6	10.2	1.36	13.1	98.0	1.88

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Per Cent Bentonite	API CASING TESTS			API SQUEEZE TESTS		
	4,000'	6,000'	8,000'	2,000'	4,000'	6,000'
0	3:05	2:35	1:50	3:25	2:10	1:25
2	2:30	2:14	1:25	2:58	2:06	1:05
4	2:19	2:15	1:25	3:00	1:50	1:20
6	2:21	1:50	1:20	2:18	1:31	1:10

COMPRESSIVE STRENGTHS — PSI

Atmospheric Pressure

Percent Bentonite	60°F	80°F	95°F	110°F
	0 psi*	0 psi*	800 psi*	1,600 psi*
12 HOURS				
0	130	750	975	1285
2	125	520	855	1195
4	105	470	615	935
6	85	370	460	690
24 HOURS				
0	780	1870	2015	2705
2	650	1790	1910	2310
4	430	1055	1255	1665
6	200	755	750	1185
72 HOURS				
0	2535	3935	4105	4780
2	1895	3045	3300	4020
4	1425	2070	2400	2955
6	930	1335	1555	1800

*Curing Pressure

METRIC UNITS

HIGH EARLY CEMENT — CLASS C WITH BENTONITE

SLURRY PROPERTIES

Per Cent Bentonite	Maximum		Slurry Weight Kg/Liters	Slurry Volume L / Sk.
	Water Requirements	L/Sk.		
0	23.8		1.77	37.37
2	28.8		1.69	42.75
4	33.7		1.62	47.85
6	38.6		1.57	53.23

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Per Cent Bentonite	API CASING TESTS			API SQUEEZE TESTS		
	1220m	1830m	2440m	610m	1220m	1830m
0	3:05	2:35	1:50	3:25	2:10	1:25
2	2:30	2:14	1:25	2:58	2:06	1:05
4	2:19	2:15	1:25	3:00	1:50	1:20
6	2:21	1:50	1:20	2:18	1:31	1:10

COMPRESSIVE STRENGTHS — MEGAPASCALS

Atmospheric Pressure

Percent Bentonite	16°C 0 MPa*	27°C 0 MPa*	35°C 5.51 MPa*	43°C 11.03 MPa*
12 HOURS				
0	0.89	5.17	6.72	8.86
2	0.86	3.58	5.89	8.23
4	0.72	3.24	4.24	6.44
6	0.58	2.55	3.17	4.75
24 HOURS				
0	5.37	12.89	13.89	18.65
2	4.48	12.34	13.16	15.92
4	2.96	7.27	8.65	11.48
6	1.37	5.20	5.17	8.17
72 HOURS				
0	17.47	27.13	28.30	32.95
2	13.06	20.99	22.75	27.71
4	9.82	14.27	16.54	20.37
6	6.41	9.20	10.72	12.41

*Curing Pressure

ENGLISH UNITS

CLASS C CEMENT WITH ECONOLITE

SLURRY PROPERTIES

ECONOLITE		Slurry		Free Water		Slurry Density		Yield	
Additive Percent	Water Gal./Sk.	Cu.Ft./Sk.	Viscosity-BC Initial	20 Min.	Percent	Lb./Gal.	Lb./Cu. Ft.	Cu.Ft./Sk.	
0	6.3	0.84	2	3	1.2	14.8	111	1.32	
0	7.6	0.98	1	2	2.9	14.0	105	1.50	
2	9.6	1.28	7	8	0.3	13.2	99	1.77	
2	11.6	1.55	5	4	0.8	12.4	93	2.03	
2	13.6	1.82	2	2	1.6	12.0	90	2.30	
3	13.6	1.82	2	2	1.6	12.0	90	2.30	
3	15.6	2.08	4	4	1.1	11.7	87	2.57	
3	17.6	2.35	3	3	1.1	11.3	84	2.83	

PRESSURE-TEMPERATURE THICKENING TIME TESTS

API CASING-CEMENTING SCHEDULES

ECONOLITE		Slurry Density		Thickening Time-Hours:Minutes	
Additive Percent		Lb./Gal.	Lb./Cu.Ft.	4,000'	8,000'
				103°F	125°F
0		14.8	111	3:31	1:46
0		14.0	105	4:45	2:36
2		13.2	99	2:40	1:20
2		12.4	93	3:25	1:32
2		12.0	90	4:00+	2:18
3		12.0	90	4:17	2:22
3		11.7	87	4:00+	2:30
3		11.3	84	4:00+	3:24

COMPRESSIVE STRENGTH — PSI

ECONOLITE		Slurry Density		100°F	140°F - 3000 PSI	
Additive Percent		Lb./Gal.	Lb./Cu. Ft.	24 Hrs.	12 Hrs.	24 Hrs.
0		14.8	111	2850	2525	3300
0		14.0	105	1800	1680	1930
2		13.2	99	1000	1000	1075
2		12.4	93	900	815	1025
2		12.0	90	570	540	640
3		12.0	90	580	530	655
3		11.7	87	420	330	470
3		11.3	84	255	290	310

METRIC UNITS

CLASS C CEMENT WITH ECONOLITE

SLURRY PROPERTIES

ECONOLITE Additive Percent	Water Gal./Sk.	Slurry Viscosity-BC Initial	Slurry Viscosity-BC 20 Min.	Free Water Percent	Slurry Density Kg./L.	Yield L/Sk.
0	23.8	2	3	1.2	1.77	37.38
0	28.8	1	2	2.9	1.68	42.48
2	36.3	7	8	0.3	1.58	50.12
2	43.9	5	4	0.8	1.49	57.48
2	51.5	2	2	1.6	1.44	65.13
3	51.5	2	2	1.6	1.44	65.12
3	59.1	4	4	1.1	1.40	72.77
3	66.6	3	3	1.1	1.35	80.14

PRESSURE-TEMPERATURE THICKENING TIME TESTS

API CASING-CEMENTING SCHEDULES

ECONOLITE Additive Percent	Slurry Density Kg./L.	Thickening Time-Hours:Minutes	
		1220m 39°C	2440m 52°C
0	1.77	3:31	1:46
0	1.68	4:45	2:36
2	1.58	2:40	1:20
2	1.49	3:25	1:32
2	1.44	4:00+	2:18
3	1.44	4:17	2:22
3	1.40	4:00+	2:30
3	1.35	4:00+	3:24

COMPRESSIVE STRENGTH — MPa

ECONOLITE Additive Percent	Slurry Density Kg/L	38°C	60°F -20.68 MPa	
		24 Hrs.	12 Hrs.	24 Hrs.
0	1.77	19.65	17.41	22.75
0	1.68	12.41	11.58	13.31
2	1.58	6.89	6.89	7.41
2	1.49	6.21	5.62	7.07
2	1.44	3.93	3.72	4.41
3	1.44	4.00	3.65	4.52
3	1.40	2.90	2.28	3.24
3	1.35	1.76	2.00	2.14

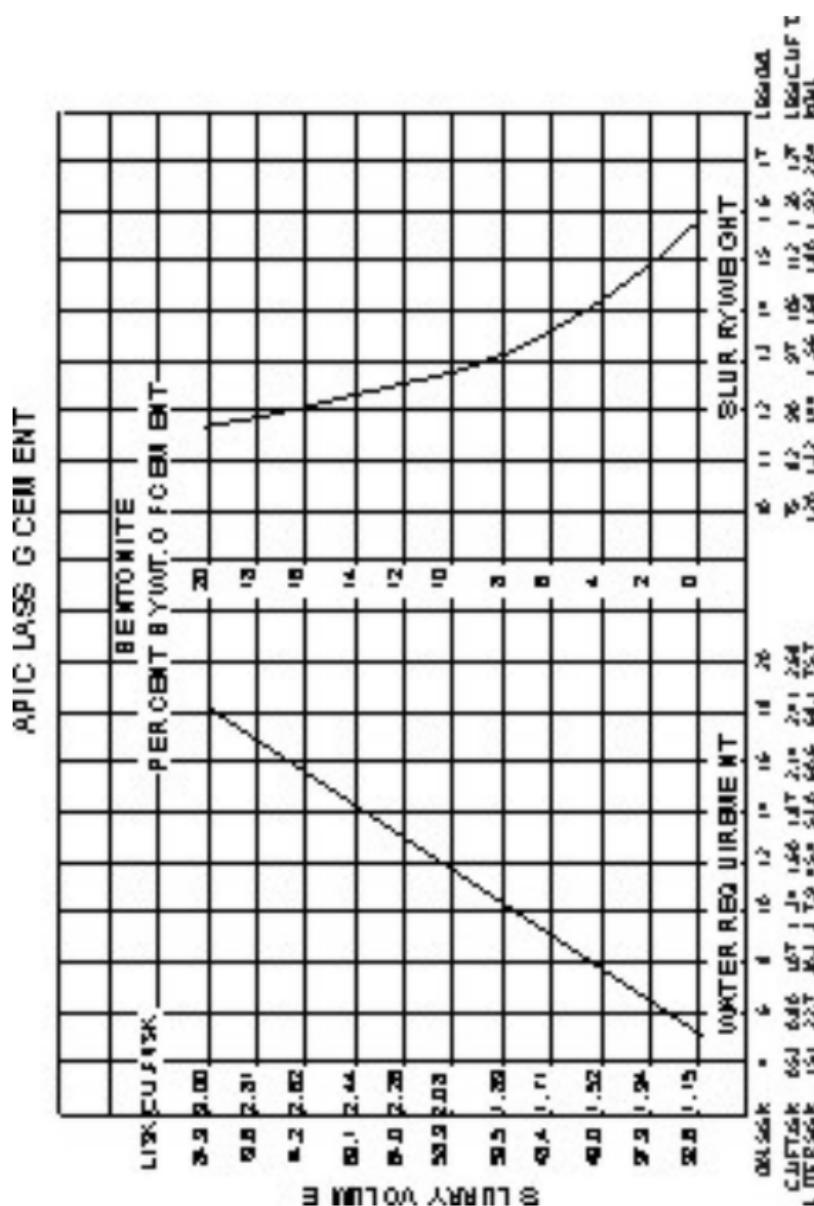
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ENGLISH / METRIC UNITS



ENGLISH UNITS**API CLASS G CEMENT
SLURRY PROPERTIES**

Per Cent Bentonite	Water Requirement	Slurry Weight	Slurry Volume		
	Gal./Sk.	Cu. Ft./Sk.	Lbs./Cu. Ft.	Cu. Ft./Sk.	
0	5.0	0.67	15.8	118	1.15
2	6.3	0.84	14.8	111	1.34
4	7.6	1.02	14.2	106	1.52
6	8.9	1.19	13.6	102	1.71
8	10.2	1.37	13.2	99	1.89
10	11.5	1.54	12.8	96	2.08
12	12.8	1.71	12.6	94	2.26

Gilsonite Lbs./Sk.	Per Cent Bentonite	Water Requirement		Slurry Weight		Slurry Volume
		Gal./Sk.	Cu. Ft./Sk.	Lbs./Gal.	Lbs./Cu. Ft.	
10	0	5.4	0.72	14.7	110	1.36
15	0	5.6	0.75	14.3	107	1.46
25	0	6.0	0.80	13.6	102	1.66
50	0	7.0	0.94	12.4	93	2.17
10	2	6.7	0.90	14.0	105	1.54
15	2	6.9	0.92	13.8	103	1.64
25	2	7.3	0.98	13.2	99	1.85
50	2	8.3	1.11	12.3	92	2.36
10	4	8.0	1.07	13.5	101	1.73
15	4	8.2	1.10	13.2	99	1.83
25	4	8.6	1.15	12.8	96	2.03
50	4	9.6	1.29	12.0	90	2.54

Per Cent Silica Flour	Water Requirement	Slurry Weight	Slurry Volume		
	Gal./Sk.	Cu. Ft./Sk.	Lbs./Gal.	Lbs./Cu. Ft.	Cu. Ft./Sk.
30	6.4	0.85	15.6	117	1.50
40	6.8	0.91	15.5	116	1.62
50	7.3	0.97	15.5	116	1.74

Sand Lbs./Sk.	Water Requirement	Slurry Weight	Slurry Volume		
	Gal./Sk.	Cu. Ft./Sk.	Lbs./Gal.	Lbs./Cu. Ft.	Cu. Ft./Sk.
20	5.0	0.67	16.3	122	1.27
25	5.0	0.67	16.4	123	1.30
30	5.0	0.67	16.6	124	1.33
35	5.0	0.67	16.7	125	1.36
40	5.0	0.67	16.8	126	1.39
50	5.0	0.67	17.1	128	1.46

METRIC UNITS

API CLASS G CEMENT SLURRY PROPERTIES

Per Cent Bentonite	Water Requirement L/Sk	Slurry Weight Kg/L	Slurry Volume L/Sk	
0	18.9	1.89	32.56	
2	23.8	1.77	37.94	
4	28.8	1.70	43.03	
6	33.7	1.63	48.41	
8	38.6	1.58	53.51	
10	43.5	1.53	58.89	
12	48.4	1.51	63.99	
Gilsonite Kg/Sk	Per Cent Bentonite	Water Requirement L/Sk	Slurry Weight Kg/L	Slurry Volume L/Sk
4.5	0	20.4	1.76	38.50
6.8	0	21.2	1.71	41.43
11.3	0	22.7	1.63	47.00
22.7	0	26.5	1.49	61.44
4.5	2	25.4	1.68	43.60
6.8	2	26.1	1.65	46.43
11.3	2	27.6	1.58	52.38
22.7	2	31.4	1.47	68.81
4.5	4	30.3	1.62	48.98
6.8	4	31.0	1.58	51.81
11.3	4	32.5	1.53	57.47
22.7	4	36.3	1.44	71.91
Per Cent Silica Flour	Water Requirement L/Sk	Slurry Weight Kg/L	Slurry Volume L/Sk	
30	24.2	1.87	42.47	
40	25.7	1.86	45.87	
50	27.6	1.86	49.26	
Sand Kg/Sk	Water Requirement L/Sk	Slurry Weight Kg/L	Slurry Volume L/Sk	
9.1	18.9	1.95	35.96	
11.3	18.9	1.96	36.81	
13.6	18.9	1.99	37.65	
15.9	18.9	2.00	38.50	
18.1	18.9	2.01	39.35	
22.7	18.9	2.05	41.34	

ENGLISH UNITS**API CLASS G CEM
WITH SALT**

Salt		Per Cent Silica Flour	Water Requirement		Slurry Weight Lbs./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
Per Cent*	Lbs./Sk.		Gal./Sk.	Cu. Ft./Sk.		
10	4.18	0	5.0	0.67	15.9	119
18	7.52	0	5.0	0.67	16.0	120
Sat.	15.54	0	5.0	0.67	16.3	122
10	5.30	30	6.4	0.85	15.8	118
18	9.55	30	6.4	0.85	15.8	118
Sat.	19.72	30	6.4	0.85	16.0	120
10	5.68	40	6.8	0.91	15.6	117
18	10.12	40	6.8	0.91	15.8	118
Sat.	21.10	40	6.8	0.91	16.0	120
						1.75

*By weight of water.

THICKENING TIME - HOURS : MINUTES

(Pressure - Temperature Thickening - Time Test)

Salt Per Cent	API CASING TESTS	
	6,000'	12,000'
0	1:45	3:33 (0.4)*
18	1:42	1:10 (0.4)*
Sat.	6:03	2:45 (0.4)*

*Percent Retarder.

COMPRESSIVE STRENGTH - PSI

(API Curing Pressures)

Salt Per Cent	24 Hours			72 Hours	
	110° F	140° F	170° F	170° F	170° F
0	2,915	3,425	3,735	5,685	
18	2,960	3,225	3,375	4,000	
Sat.	1,465	2,550	2,660	3,200	

Salt Per Cent	24 Hours			72 Hours		
	170° F	230° F	260° F	170° F	230° F	260° F
0	4,250	5,700	6,350	5,450	6,275	6,850
18	3,100	4,710	5,100	4,650	3,860	4,710
Sat.	2,410	2,860	3,050	2,750	3,100	3,885

METRIC UNITS

API CLASS G CEMENT WITH SALT

Salt Per Cent*	Per Cent Kg/Sk	Water Requirement l/Sk	Slurry Weight Kg/L	Slurry Volume l/Sk
10	1.90	0	18.9	1.90
18	3.41	0	18.9	1.92
Sat**	7.05	0	18.9	1.95
10	2.40	30	24.2	1.89
18	4.33	30	24.2	1.89
Sat.	8.94	30	24.2	1.92
10	2.58	40	25.7	1.87
18	4.59	40	25.7	1.89
Sat**	9.57	40	25.7	1.92

*By weight of water.

THICKENING TIME - HOURS : MINUTES

(Pressure - Temperature Thickening - Time Test)

Salt Per Cent	API CASING TESTS	
	1830m	3660m
0	1:45	3:33 (0.4)*
18	1:42	1:10 (0.4)*
Sat**	6:03	2:45 (0.4)*

*Percent Retarder.

COMPRESSIVE STRENGTH - MEGAPASCALS

(API Curing Pressures)

Salt Per Cent	24 Hours				72 Hours	
	43° C 11.03 MPa***	60° C 20.68 MPa***	77° C 20.68 MPa***	77° C 20.68 MPa***	77° C 20.68 MPa***	77° C 20.68 MPa***
0	20.09	23.61	25.75			39.19
18	20.40	22.23	23.27			27.57
Sat**	10.10	17.58	18.34			22.06

Salt Per Cent	24 Hours				72 Hours	
	77° C MPa***	110° C MPa***	127° C MPa***	77° C MPa***	110° C MPa***	127° C MPa***
0	29.30	39.30	43.78	37.57	43.26	47.22
18	21.37	32.47	35.16	32.06	26.61	32.47
Sat**	16.61	19.71	20.71	18.96	21.37	26.78

** At 60° C

*** Curing Pressure

ENGLISH UNITS

On all salt water slurries, the amount of salt to use per sack of cement can be calculated by using the following figures per Cu. Ft. of water:

SALT Per Cent by Wt. of Water	SALT Lbs./Cu. Ft. of Water
10	6.24
14	8.74
18	11.23
24	15.00
Sat.	23.20

Salt should be dry blended with the cement, where possible.

API CLASS G CEMENT With Dispersant (Densified)

Per Cent Dispersant	Water Requirement Gal./Sk.	Slurry Weight Lbs./Gal.	Slurry Weight Lbs./Cu. Ft.	Slurry Volume C. Ft./Sk.
0.75	4.00	0.54	16.7	125
0.75	3.78	0.51	17.0	127
0.75	3.38	0.45	17.5	131

COMPRESSIVE STRENGTH - PSI Atmospheric Pressure

Per Cent Dispersant	Per Cent Salt	Slurry Weight Lbs./Cu. Ft.	8 Hours		24 Hours	
			80° F	100° F	80° F	100° F
0.75	0	125	470	.990	3.225	4.225
0.75	3	125	805	1.350	4.390	5.785

METRIC UNITS

On all salt water slurries, the amount of salt to use per sack of cement can be calculated by using the following figures per Litre of water:

SALT Per Cent by Wt. of Water	SALT Kg/m ³ of Water
10	99.96
14	140.01
18	179.90
24	240.03
Sat. (60° C)	371.66

Salt should be dry blended with the cement, where possible.

API CLASS G CEMENT With Dispersant (Densified)

Per Cent Dispersant	Water Requirement L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
0.75	15.14	2.00	28.88
0.75	14.31	2.04	28.03
0.75	12.79	2.10	26.33

COMPRESSIVE STRENGTH - MEGAPASCALS Atmospheric Pressure

Per Cent Dispersant	Per Cent Salt	Slurry Weight KG/L	8 Hours		24 Hours	
			27° C	38° C	27° C	38° C
0.75	0	2.00	3.24	6.82	22.23	29.13
0.75	3	2.00	5.55	9.30	30.26	39.88

ENGLISH UNITS**API CLASS G CEMENT****1:1 PERLITE CEMENT***

(PERLITE 8-10 Lbs./Cu. Ft.)

Per Cent Bentonite	Per Cent Silica Flour	Water Requirement			Slurry Weight**		Slurry Volume Cu. Ft./Sk.**
		Gal./ Sk.	Cu. Ft./Sk.	Lbs./Gal.	Lbs./Cu. Ft.		
0	0	7.9	1.05	12.4 (13.9)	92.7 (104.0)	1.83 (1.63)	
2	0	9.1	1.22	12.1 (13.4)	90.6 (100.4)	2.01 (1.81)	
4	0	10.4	1.40	11.9 (13.0)	88.8 (97.6)	2.20 (2.00)	
0	30	10.4	1.39	12.5 (13.6)	93.6 (102.0)	2.34 (2.14)	
0	40	10.8	1.45	12.6 (13.7)	94.3 (102.5)	2.46 (2.26)	
2	30	11.7	1.56	12.1 (13.2)	90.8 (99.0)	2.55 (2.35)	
2	40	12.1	1.62	12.3 (13.4)	92.3 (100.0)	2.65 (2.45)	
0	30	9.7†	1.30	12.8 (14.0)	95.7 (105.0)	2.31 (2.10)	
2	30	11.0†	1.47	12.5 (13.4)	93.5 (100.0)	2.51 (2.31)	

2:1 PERLITE CEMENT*

0	30	14.4	1.93	11.1 (12.6)	82.7 (94.5)	3.18 (2.78)
0	40	14.9	1.99	11.2 (12.7)	83.5 (95.0)	3.30 (2.90)
2	30	15.8	2.11	10.9 (12.4)	81.8 (93.0)	3.37 (2.97)
2	40	16.2	2.16	11.0 (12.5)	82.6 (93.5)	3.49 (3.09)

* – California.

** – Values in parentheses are for 3,000 psi pressure.

† – 10 per cent salt water.

METRIC UNITS**API CLASS G CEMENT****1:1 PERLITE CEMENT***

Per Cent Bentonite	Per Cent Silica Flour	Water Requirement L/Sk	Slurry Weight** Kg/L	Slurry Volume L/Sk**
0	0	29.9	1.49 (1.67)	51.8 (46.1)
2	0	34.4	1.45 (1.61)	56.9 (51.2)
4	0	39.4	1.43 (1.56)	62.3 (56.6)
0	30	39.4	1.50 (1.63)	66.2 (60.6)
0	40	40.9	1.51 (1.64)	66.3 (64.0)
2	30	44.3	1.45 (1.58)	72.2 (66.5)
2	40	45.8	1.47 (1.61)	75.0 (69.4)
0	30	36.7†	1.53 (1.68)	65.4 (59.5)
2	30	41.6†	1.50 (1.61)	71.1 (65.4)

2:1 PERLITE CEMENT*

0	30	54.5	1.33 (1.51)	90.0 (78.7)
0	40	56.4	1.34 (1.52)	93.4 (82.1)
2	30	59.8	1.31 (1.49)	95.4 (84.1)
2	40	61.3	1.32 (1.50)	98.8 (87.5)

* – California.

** – Values in parentheses are for 20.68 MPa pressure.

† – 10 per cent salt water.

SECTION V

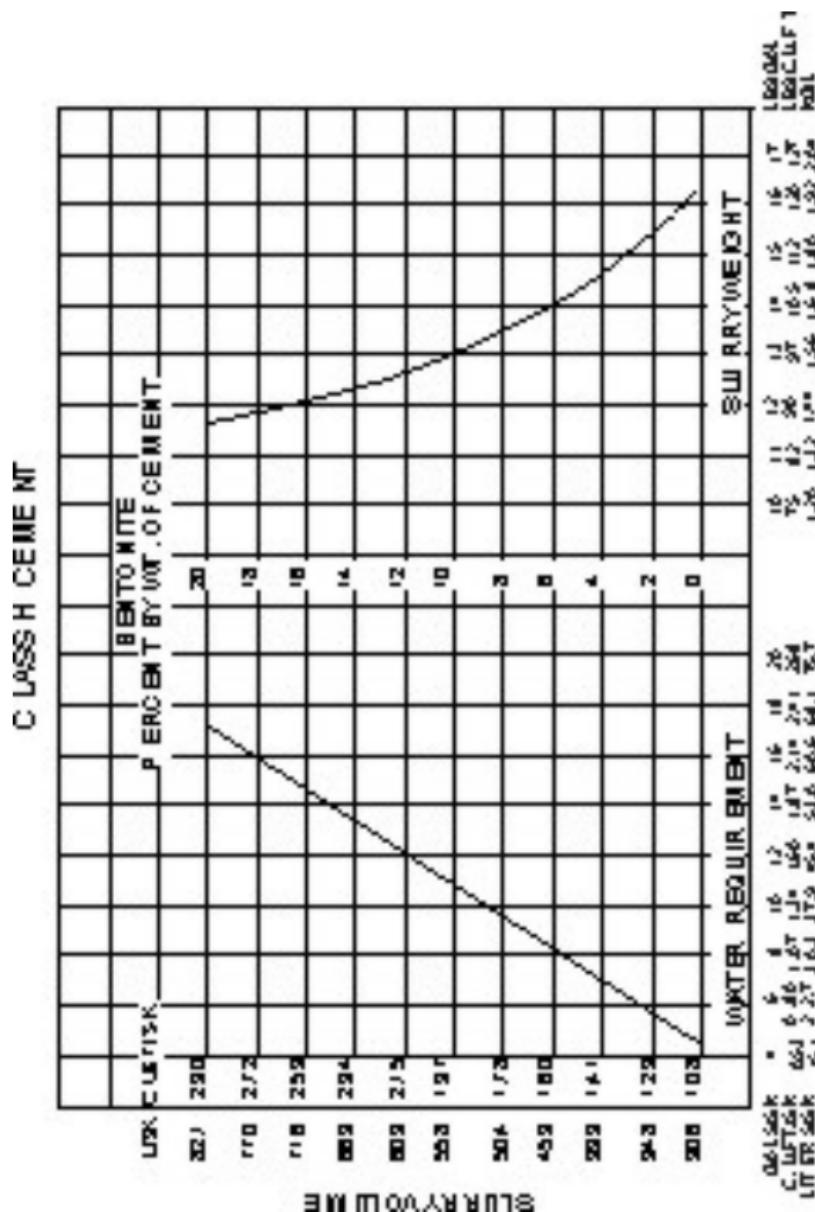
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Note: All Class H Cement Data is shown with water requirements of 4.3 (API) and 5.2 gallons (16.28 and 19.68 liters) per sack.

ENGLISH / METRIC UNITS



ENGLISH UNITS

CLASS H CEMENT

SLURRY PROPERTIES

Bentonite Per Cent	API		Slurry Weight		Slurry Volume Cu. Ft./Sk.
	Water Requirements Gal./Sk.	Cu. Ft./Sk.	Lbs./Gal.	Lbs./Cu. Ft.	
0	4.30	0.58	16.4	123	1.06
2	5.49	0.73	15.5	115	1.22
4	6.69	0.89	14.7	110	1.38
6	7.88	1.05	14.1	105	1.55
8	9.07	1.21	13.6	101	1.73
10	10.27	1.37	13.2	99	1.90
12	11.46	1.53	12.9	96	2.07
14	12.66	1.69	12.6	94	2.24
16	13.86	1.85	12.4	93	2.41

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Bentonite Per Cent	API CEMENTING SCHEDULES				
	2,000'	4,000'	6,000'	8,000'	10,000'
Squeeze-Cementing Schedules (Plug-Back)					
0	3:20	1:58	1:15	0:50	0:40
Casing-Cementing Schedules					
0	4:10	3:04	2:14	1:35	1:02
2	3:45	2:50	2:00	1:20	0:55
4	3:55	3:05	2:10	1:25	0:55
6	4:00	3:05	2:15	1:25	1:00
8	4:05	3:10	2:15	1:30	1:00
10	4:15	3:20	2:20	1:30	1:05
12	4:25	3:25	2:20	1:35	1:00
14	4:20	3:25	2:20	1:30	1:05
16	4:35	3:30	2:25	1:40	1:10

METRIC UNITS

CLASS H CEMENT

SLURRY PROPERTIES

Bentonite Per Cent	API Water Requirements L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
0	16.28	1.96	30.01
2	20.78	1.86	34.54
4	25.32	1.76	39.07
6	29.83	1.69	43.88
8	34.33	1.63	48.98
10	38.88	1.58	53.79
12	43.38	1.55	58.61
14	47.92	1.51	63.42
16	52.47	1.49	68.23

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Bentonite Per Cent	API CEMENTING SCHEDULES				
	610m	1 220m	1 830m	2 440m	3 050m
Squeeze-Cementing Schedules (Plug-Back)					
0	3:20	1:58	1:15	0:50	0:40
Casing-Cementing Schedules					
0	4:10	3:04	2:14	1:35	1:02
2	3:45	2:50	2:00	1:20	0:55
4	3:55	3:05	2:10	1:25	0:55
6	4:00	3:05	2:15	1:25	1:00
8	4:05	3:10	2:15	1:30	1:00
10	4:15	3:20	2:20	1:30	1:05
12	4:25	3:25	2:20	1:35	1:00
14	4:20	3:25	2:20	1:30	1:05
16	4:35	3:30	2:25	1:40	1:10

ENGLISH UNITS

CLASS H CEMENT

COMPRESSIVE STRENGTH — PSI

Bentonite Per Cent	Curing Time Hours	95°F 800 psi	110°F 1,600 psi	140°F 3,000 psi	170°F 3,000 psi	200°F 3,000 psi
0	8	500	1200	2500	4000	5450
	24	3000	4050	5500	6700	8400
2	8	250	720	1400	2000	2500
	24	1550	2350	3250	3630	3800
4	8	130	450	830	1200	1550
	24	980	1490	2000	2250	2400
6	8	90	380	560	800	1050
	24	650	1000	1400	1650	1800
8	8	75	200	380	560	750
	24	430	700	1025	1150	1250
10	8	74	150	260	380	500
	24	325	500	700	825	900
12	8	70	120	200	280	360
	24	225	355	500	600	675
14	8	60	95	150	200	250
	24	160	270	400	490	550
16	8	50	80	110	170	220
	24	130	245	350	400	475

CLASS H CEMENT

SLURRY PROPERTIES

Bentonite Per Cent	Water Requirements		Slurry Weight	Slurry Volume
	Gal./Sk.	Cu. Ft./Sk.	Lbs./Gal.	Cu. Ft./Sk.
0	5.2	0.70	15.6	117
2	6.5	0.87	14.7	110
4	7.8	1.04	14.1	105
8	10.4	1.39	13.1	98
12	13.0	1.74	12.5	93

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

Bentonite Per Cent	CASING-CEMENTING SCHEDULES				
	2,000'	4,000'	6,000'	8,000'	10,000'
0	7:05	4:20	3:15	2:25	1:30
2	5:30	3:55	2:55	2:05	1:25
4	5:05	3:40	2:45	2:00	1:20
8	4:40	4:00	2:40	1:55	1:15
12	4:00	3:25	2:05	1:50	1:10

COMPRESSIVE STRENGTH — PSI

Bentonite Per Cent	Curing Time Hours	95°F 800 psi	110°F 1,600 psi	140°F 3,000 psi	170°F 3,000 psi	200°F 3,000 psi
0	8	400	900	1800	3100	3950
	24	1300	2100	4450	5100	5850
2	8	300	600	1200	1600	1900
	24	1250	1750	2600	3250	3600
4	8	180	400	780	1100	1350
	24	830	1200	1850	230	2450
8	8	90	160	300	450	600
	24	400	600	900	1150	1250
12	8	50	95	180	270	350
	24	250	400	550	650	800

METRIC UNITS

CLASS H CEMENT

COMPRESSIVE STRENGTH — MEGAPASCALS

Bentonite Per Cent	Curing Time Hours	35°C 5.51 MPa*	43°C 11.03 MPa*	60°C 20.68 MPa*	77°C 20.68 MPa*	93°C 20.68 MPa*
0	8	3.44	8.27	17.23	27.57	37.57
	24	20.68	27.92	37.92	46.19	57.91
2	8	1.72	4.96	9.65	13.78	17.23
	24	10.68	16.20	22.40	25.02	26.20
4	8	0.89	3.10	5.72	8.27	10.68
	24	6.75	10.27	13.78	15.51	16.54
6	8	0.62	2.62	3.86	5.51	7.23
	24	4.48	6.89	9.65	11.37	12.41
8	8	0.51	1.37	2.62	3.86	5.17
	24	2.96	4.82	7.06	7.92	8.61
10	8	0.51	1.03	1.79	2.62	3.44
	24	2.24	3.44	4.82	5.68	6.20
12	8	0.48	0.82	1.37	1.93	2.48
	24	1.41	2.44	3.44	4.13	4.65
14	8	0.41	0.65	1.03	1.37	1.72
	24	1.10	1.86	2.75	3.37	3.79
16	8	0.34	0.55	0.75	1.17	1.51
	24	0.89	1.68	2.41	2.75	3.27

CLASS H CEMENT

SLURRY PROPERTIES

Bentonite Per Cent	Water Requirements L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
0	19.7	1.87	33.41
2	24.6	1.76	38.50
4	29.5	1.69	43.88
8	39.4	1.57	54.36
12	49.2	1.50	64.83

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

Bentonite Per Cent	CASING-CEMENTING SCHEDULES				
	610m	1 220m	1 830m	2 440m	3 050m
0	7:05	4:20	3:15	2:25	1:30
2	5:30	3:55	2:55	2:05	1:25
4	5:05	3:40	2:45	2:00	1:20
8	4:40	4:00	2:40	1:55	1:15
12	4:00	3:25	2:05	1:50	1:10

COMPRESSIVE STRENGTH — MEGAPASALS

Bentonite Per Cent	Curing Time Hours	35°C 5.51 MPa*	43°C 11.03 MPa*	60°C 20.68 MPa*	77°C 20.68 MPa*	93°C 20.68 MPa*
0	8	2.75	6.20	12.41	21.37	27.23
	24	8.96	14.47	30.68	35.16	40.33
2	8	2.06	4.13	8.27	11.03	13.10
	24	8.61	12.06	17.92	22.40	24.82
4	8	1.24	2.75	5.37	7.58	9.30
	24	5.72	8.27	12.75	15.37	16.89
8	8	0.62	1.10	2.06	3.10	4.13
	24	2.75	4.13	6.20	7.92	8.61
12	8	0.34	0.65	1.24	1.86	2.41
	24	1.72	2.75	3.79	4.48	5.51

ENGLISH UNITS

CLASS H CEMENT WITH ECONOLITE

SLURRY PROPERTIES

ECONOLITE Additive Percent	Water Gal./Sk.	Cu. Ft./Sk.	Slurry Viscosity—Bc Initial	20 Min.	Free Water Percent	Slurry Density Lb./Gal.	Density Lb./Cu. Ft.	Yield Cu. Ft./Sk.
0	4.3	0.58	6	8	2.5	16.4	123	1.06
0	5.2	.070	3	4	8.0	15.6	117	1.18
2	9.0	1.20	10	8	0.36	13.4	100	1.68
2	11.8	1.58	8	8	0.96	12.5	94	2.06
2	14.7	1.96	7	7	1.36	11.8	88	2.45
2	17.5	2.34	6	6	1.76	11.4	85	2.82
3	17.5	2.34	3	3	0.68	11.4	85	2.82

PRESSURE-TEMPERATURE THICKENING TIME TESTS

API CASING-CEMENTING SCHEDULES

ECONOLITE Additive Percent	Slurry Density		Thickening Time—Hours:Minutes		
	Lb./Gal.	Lb./cu. Ft.	4,000' 103°F	6,000' 113°F	8,000' 125°F
0	16.4	123	4:10	—	2:02
0	15.6	117	4:00	3:50	3:20
0	13.4	100	1:41	1:26	1:11
2	12.5	94	3:55	4:12	1:28
2	11.8	88	4:00+	4:00+	4:00+
2	11.4	85	4:00+	4:00+	4:00+
3	11.4	85	4:00+	—	4:00+

COMPRESSIVE STRENGTH — PSI

ECONOLITE Percent	Slurry Density		Curing Time Hours	Curing Temperature — °F			
	Lb./Gal.	Lb./cu. Ft.		100	140	170	200
0	16.4	123	12	—	2340	3960	4200
			24	2530	3540	5260	5850
0	15.6	117	12	—	1540	3130	3130
			24	1500	2250	3130	3930
2	13.4	100	12	—	380	600	680
			24	705	790	810	1030
2	12.5	94	12	—	210	260	310
			24	285	320	400	510
2	11.8	88	12	—	130	120	150
			24	105	180	200	210
2	11.4	85	12	—	80	80	90
			24	50	110	120	130
3	11.4	85	12	—	90	80	100
			24	60	130	120	130

METRIC UNITS

CLASS H CEMENT WITH ECONOLITE

SLURRY PROPERTIES

ECONOLITE Additive Percent	Water L./Sk.	Slurry Viscosity—Bc Initial	Slurry Viscosity—Bc 20 Min.	Free Water Percent	Slurry Density Kg/L.	Yield Cu. Ft./Sk.
0	16.3	6	8	2.5	1.97	30.02
0	19.7	3	4	8.0	1.87	33.41
2	34.1	10	8	0.36	1.61	47.57
2	44.7	8	8	0.96	1.50	58.33
2	55.6	7	7	1.36	1.41	69.38
2	66.2	6	6	1.76	1.37	79.85
3	66.2	3	3	0.68	1.37	79.85

PRESSURE-TEMPERATURE THICKENING TIME TESTS API CASING-CEMENTING SCHEDULES

ECONOLITE Additive Percent	Slurry Density Kg/L.	Thickening Time—Hours:Minutes		
		1220m 39°C	1830m 45°C	2440m 52°C
0	1.97	4:10	—	2:02
0	1.87	4:00	3:50	3:20
2	1.61	1:41	1:26	1:11
2	1.50	3:55	4:12	1:28
2	1.41	4:00+	4:00+	4:00+
2	1.37	4:00+	4:00+	4:00+
3	1.37	4:00+	—	4:00+

COMPRESSIVE STRENGTH — MPa

ECONOLITE Percent	Slurry Density Kg/L	Curing Time Hours	Curing Temperature — °C			
			38	60	77	93
0	1.97	12	—	16.13	27.30	28.96
		24	17.44	24.41	36.27	40.33
0	1.87	12	—	10.62	21.58	21.58
		24	10.34	15.51	21.58	27.10
2	1.61	12	—	2.62	4.14	4.69
		24	4.86	5.45	5.58	7.10
2	1.50	12	—	1.45	1.79	2.14
		24	1.96	2.21	2.76	3.52
2	1.41	12	—	0.90	0.83	1.03
		24	0.72	1.24	1.38	1.45
2	1.37	12	—	0.55	0.55	0.62
		24	0.34	0.76	0.83	0.90
3	1.37	12	—	0.62	0.55	0.69
		24	0.41	0.90	0.69	0.90

ENGLISH UNITS

CLASS H CEMENT WITH SPHERELITE

SLURRY PROPERTIES

SPHERELITE Lb./Sk.	Water Gal./Sk.	Surface Density Lbs./Gal.	Density @ 3000 PSI Lb./Gal.	Density @ 3000 PSI Cu. Ft./Sk.
21.5	6.45	12.3	13.0	1.74
54.3	9.74	10.0	11.0	2.79
177.0	26.7	8.0	9.0	7.33

COMPRESSIVE STRENGTH — PSI

Density @ 3000 PSI Lb./Gal.	Curing Time Hours	110°F	Cured Under 3000 PSI at Temp.	230°F
			170°F	
13	12	490*	1480	1900
	24	990*	1500	1910
	36	1690*	2800	2060
11	12	210*	500	950
	24	310*	840	1140
	36	690*	1670	1000
9	12	10*	80	160
	24	20*	160	180
	36	60*	280	340

*Contained 2% calcium chloride

THERMAL CONDUCTIVITY OF CLASS H CEMENT WITH SPHERELITE

SPHERELITE Lbs./Sk.	Water Gal./Sk.	Density @ 2000 PSI Lb./Gal.	Yield @ 2000 PSI Wet*	Thermal Conductivity, k (BTU/Hr. Ft. °F) Dry**
0	4.3	16.4	1.06	0.75
15	5.0	14.0	1.43	0.47
35	6.8	12.0	2.06	0.40
53	8.9	11.0	2.68	0.38
82	13.5	10.0	3.86	0.31
104	17.5	9.5	4.83	0.24
145	25.8	9.0	6.73	0.23

*Samples cured 7 days at 90°F in water.

**Wet samples subsequently dried 3 days at 230°F

SPHERELITE — CLASS H CEMENT

LIGHTWEIGHT ADMIXTURE

Basic Composition: Class H cement, 30 Lb./Sk.; Diacel D, 1.5 Lb./Sk.
CFR-2, 3 Lb./Sk. ECONOLITE, 6 Lb./Sk. CaCl₂.

SPHERELITE Lbs./Sk.	Water Gal./Sk.	Density @ 1000 PSI Lb./Gal.	Yield @ 1000 PSI Cu.Ft./Sk.	24 Hr. Comp. Strength at 140°F, 1000 PSI (PSI)
0	14.4	12.5	2.71	1380
10	15.0	12.0	2.99	1130
25	17.4	11.2	3.62	730
50	19.2	10.5	4.37	420
75	21.6	10.0	5.20	340
100	24.0	9.6	6.03	270
200	32.4	8.8	9.20	130

NOTE — This data is presented only to demonstrate the performance of SPHERELITE. These compositions are not necessarily recommended as optimal compositions for field use. Generally, combinations of lightweight cement additives are used together to give optimal slurry performance (i.e., pumpability, strength and cost) for specific applications.

It is also important to note that the physical properties of SPHERELITE cement slurries are pressure dependent. SPHERELITE compositions are, therefore, designed on the basis of maximum downhole pressure.

EFFECTIVE DENSITY OF SPHERELITE IN CEMENT SLURRY AT VARIOUS PRESURES

Pressure (PSI)	SPHERELITE		SPHERELITE	
	Density g./ml.	Abs. Vol. Gal./Lb.	Pressure (PSI)	Density g./ml.
Atm	0.685	0.1753	5000	0.947
200	0.741	0.1620	6000	0.986
500	0.761	0.1578	8000	1.072
1000	0.786	0.1527	10,000	1.154
2000	0.830	0.1447	12,000	1.235
3000	0.866	0.1386	14,000	1.316
4000	0.906	0.1325	15,000	1.355

METRIC UNITS

CLASS H CEMENT WITH SPHERELITE

SLURRY PROPERTIES

SPHERELITE Kg./Sk.	Water L/Sk.	Surface Density Kg/L	Density @ 20.68 MPa Kg/L	Density @ 20.68 MPa L/Sk.
9.8	24.4	1.47	1.56	49.27
24.6	36.9	1.20	1.32	79.00
80.3	101.1	0.96	1.08	207.56
COMPRESSIVE STRENGTH — PSI				
Density @ 20.68 MPa Kg/L	Curing Time Hours	43°C	Cured Under 20.68 MPa at Temp. 77°C	110°C
1.56	12	3.38*	10.20	13.10
	24	6.83*	10.34	13.18
	36	11.65*	19.31	14.20
1.32	12	1.45*	3.45	6.55
	24	2.14*	5.79	7.86
	36	4.76*	11.52	6.89
1.08	12	0.07*	0.55	1.10
	24	0.14*	1.10	1.24
	36	0.41*	1.93	2.34

*Contained 2% calcium chloride

THERMAL CONDUCTIVITY OF CLASS H CEMENT WITH SPHERELITE

SPHERELITE Kg./Sk.	Water L/Sk.	Density @ 13.79 MPa Kg/L	Yield @ 13.79 MPa Wet*	Thermal Conductivity, k (w/m °C) Dry**
0	16.3	1.97	30.02	—
6.8	18.9	1.68	40.49	0.33
15.9	25.7	1.44	58.33	0.28
24.0	33.7	1.32	75.89	0.22
37.2	51.1	1.20	109.30	0.22
47.2	66.2	1.14	136.77	0.21
65.8	97.7	1.08	190.57	0.14

* Samples cured 7 days at 33°C in water.

** Wet samples subsequently dried 3 days at 110°C

SPHERELITE — CLASS H CEMENT

LIGHTWEIGHT ADMIXTURE

Basic Composition: Class H cement, 13.6 Kg./Sk.; Diacel D, 0.7 Kg./Sk.; CFR-2, 1.4 Kg./Sk. ECONOLITE, 2.7 Kg./Sk. CaCl₂.

SPHERELITE Kg./Sk.	Water L/Sk.	Density @ 6.89 MPa Kg/L.	Yield @ 6.89 MPa L/Sk.	24 Hr. Comp. Strength at 60°C, 6.89 MPa (MPa)
0	54.5	1.50	76.74	9.51
4.5	56.8	1.44	84.67	7.79
11.3	65.9	1.34	102.51	5.03
22.7	72.7	1.26	123.74	2.90
34.0	81.8	1.20	147.25	2.34
45.4	90.8	1.15	170.75	1.86
90.7	122.6	1.05	260.51	0.90

NOTE — This data is presented only to demonstrate the performance of SPHERELITE. These compositions are not necessarily recommended as optimal compositions for field use. Generally, combinations of lightweight cement additives are used together to give optimal slurry performance (i.e., pumpability, strength and cost) for specific applications.

It is also important to note that the physical properties of SPHERELITE cement slurries are pressure dependent. SPHERELITE compositions are, therefore, designed on the basis of maximum downhole pressure.

EFFECTIVE DENSITY OF SPHERELITE IN CEMENT SLURRY AT VARIOUS PRESURES

Pressure (MPa)	SPHERELITE		Pressure (MPa)	SPHERELITE	
	Density Kg./L	Abs. Vol. L/Kg.		Density Kg./L	Abs. Vol. L/Kg.
Atm	0.685	1.460	34.5	0.947	1.056
1.4	0.741	1.350	41.4	0.986	1.014
3.4	0.761	1.314	55.2	1.072	0.933
6.9	0.786	1.272	68.9	1.154	0.867
13.8	0.830	1.205	82.7	1.235	0.810
20.7	0.866	1.155	96.5	1.316	0.760
27.6	0.906	1.104	103.4	1.355	0.738

ENGLISH UNITS
CLASS H CEMENT
WITH SALT
SLURRY PROPERTIES

Water — 4.3 Gals./Sk.

Salt Per Cent*	Lbs./Sk.	Slurry Weight Lbs./Gal.	Lbs./Cu.Ft.	Slurry Volume Cu.Ft./Sk.
0	0	16.4	123.0	1.06
5	1.8	16.5	123.5	1.07
10	3.6	16.6	124.1	1.08
18	6.5	16.7	124.8	1.09
Saturated	13.3	16.8	125.8	1.14

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

Salt Per Cent*	2,000'	4,000'	6,000'	8,000'	10,000'
0	4:10	3:04	2:14	1:35	1:02
5	2:45	2:05	1:30	1:00	0:35
10	3:10	2:25	1:40	1:10	0:40
18	5:00	3:30	2:25	1:35	1:05
Saturated	8:00+	8:00+	5:08	3:50	2:00

COMPRESSIVE STRENGTH — PSI

Salt Per Cent*	Curing Time Hours	95°F 800 psi	110°F 1,600 psi	140°F 3,000 psi	170°F 3,000 psi	200°F 3,000 psi
0	8	500	1200	2500	4000	5450
	24	3000	4050	5500	6700	8400
5	8	1350	2400	4000	5000	6100
	24	5000	5300	5900	6200	6550
10	8	1600	2850	4700	5950	6600
	24	5500	5650	6000	6650	7100
18	8	1000	2000	3800	5200	5900
	24	4350	4650	5150	6000	6500
Sat.	8	100	300	1500	2700	4200
	24	2650	3550	4700	4900	5700

*Per Cent by weight of water.

METRIC UNITS
CLASS H CEMENT
WITH SALT
SLURRY PROPERTIES

Water—16.3 L/Sk.

Salt Per Cent*	Slurry Weight Kg./Sk.	Slurry Volume Kg/L	L/Sk.
0	0.00	1.96	30.01
5	0.81	1.98	30.29
10	1.63	1.99	30.58
18	2.95	2.00	30.86
Saturated (60°C)	6.03	2.01	32.28

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

Salt Per Cent*	610m	API CASING-CEMENTING SCHEDULES	1 220m	1 830m	2 440m	3 050m
0	4:10	3:04	2:14	1:35		1:02
5	2:45	2:05	1:30	1:00		0:35
10	3:10	2:25	1:40	1:10		0:40
18	5:00	3:30	2:25	1:35		1:05
Saturated (60°C)	8:00+	8:00+	5:08	3:50		2:00

COMPRESSIVE STRENGTH — MEGAPASCALS

Salt Per Cent*	Curing Time Hours	35°C 5.51 MPa**	43°C 11.03 MPa**	60°C 20.68 MPa**	77°C 20.68 MPa**	93°C 20.68 MPa
0	8	3.44	8.27	17.23	27.57	37.57
	24	20.68	27.92	37.92	46.19	57.91
5	8	9.30	16.54	27.57	34.47	42.05
	24	34.47	36.54	40.67	42.74	45.16
10	8	11.03	19.65	32.40	41.02	45.50
	24	37.92	38.95	41.36	45.85	48.95
18	8	6.89	13.78	26.20	35.85	40.67
	24	29.99	32.06	35.50	41.36	44.81
Sat. (60°C)	8	0.68	2.06	10.34	18.61	28.95
	24	18.27	24.47	32.40	33.78	39.30

*Per Cent by weight of water.

**Curing Pressure

ENGLISH UNITS
CLASS H CEMENT
WITH SALT
SLURRY PROPERTIES

Water — 5.2 Gals./Sk.

Salt Per Cent*	Lbs./Sk.	Slurry Weight Lbs./Gal.	Lbs./Cu.Ft.	Slurry Volume Cu.Ft./Sk.
0	0	15.6	117.0	1.18
5	2.2	15.7	117.5	1.19
10	4.3	15.8	118.0	1.20
18	7.8	15.9	119.0	1.22
Sat.	16.1	16.1	120.3	1.28

THICKENING TIME — HOURS:MINUTES
 (Pressure-Temperature Thickening-Time Tests)
API Cementing Schedules

Salt Per Cent*	2,000'	4,000'	6,000'	8,000'	10,000'
Casing-Cementing Schedules					
0	7:05	4:20	3:15	2:25	1:30
5	3:44	2:33	1:45	1:17	0:48
10	3:46	2:44	1:56	1:18	1:02
18	6:35	4:11	3:06	1:25	1:23
Sat.	8:00+	8:00+	6:01	4:33	2:36
Squeeze Cementing Schedules					
0	5:10	3:00	1:50	1:10	0:50
5	2:50	1:25	1:05	0:42	—
10	2:43	1:56	0:57	0:51	—
18	3:57	2:35	1:43	1:05	—
Sat.	7:40	5:05	2:23	2:00	—

COMPRESSIVE STRENGTH — PSI

Salt Per Cent*	Curing Time Hours	95°F 800 psi	110°F 1,600 psi	140°F 3,000 psi	170°F 3,000 psi	200°F 3,000 psi	230°F 3,000 psi
0	8	400	900	1800	3100	3950	4200
	24	1300	2100	4450	5100	5850	6250
5	8	860	1500	2310	3400	3950	4425
	24	3100	3500	3700	4300	5900	6000
10	8	890	1700	3225	3725	4175	4600
	24	3100	3950	4400	4650	5925	6050
18	8	540	1325	3070	3800	3900	4100
	24	2650	3100	3450	4025	4625	5185
Sat.	8	Not Set	175	1075	1800	2025	2275
	24	1075	1825	2150	2575	2850	3050

*Per Cent by weight of water.

METRIC UNITS
CLASS H CEMENT
WITH SALT
SLURRY PROPERTIES

Water—19.7 L/Sk.

Salt Per Cent*	Slurry Weight Kg./Sk.	Slurry Volume Kg/L	L/Sk.
0	0.00	1.87	33.41
5	1.00	1.88	33.69
10	1.95	1.89	33.97
18	3.54	1.90	34.54
Sat. (60°C)	7.30	1.93	36.24

THICKENING TIME — HOURS:MINUTES
 (Pressure-Temperature Thickening-Time Tests)

Salt Per Cent*	610m	API CASING-CEMENTING SCHEDULES			3 050m
		1 220m	1 830m	2 440m	
Casing-Cementing Schedules					
0	7:05	4:20	3:15	2:25	1:30
5	3:44	2:33	1:45	1:17	0:48
10	3:46	2:44	1:56	1:18	1:02
18	6:35	4:11	3:06	1:25	1:23
Sat. (60°C)	8:00+	8:00+	6:01	4:33	2:36
Squeeze Cementing Schedules					
0	5:10	3:00	1:50	1:10	0:50
5	2:50	1:25	1:05	0:42	—
10	2:43	1:56	0:57	0:51	—
18	3:57	2:35	1:43	1:05	—
Sat. (60°C)	7:40	5:05	2:23	2:00	—

COMPRESSIVE STRENGTH — MEGAPASCALS

Salt Per Cent*	Curing Time Hours	35°C	43°C	60°C	77°C	93°C	110°C
		5.51	11.03	20.68	20.68	20.68	20.68
		MPa†	MPa†	MPa†	MPa†	MPa†	MPa†
0	8	2.75	6.20	12.41	21.37	27.23	28.95
	24	8.96	14.47	30.68	35.16	40.33	43.09
5	8	5.92	10.34	15.92	23.44	27.23	30.50
	24	21.37	24.13	25.51	29.64	40.67	41.36
10	8	6.13	11.72	22.23	25.68	28.78	31.71
	24	21.37	27.23	30.33	32.06	40.85	41.71
18	8	3.72	9.13	21.16	26.20	26.88	28.26
	24	18.27	21.37	23.78	27.75	31.88	35.74
Sat.(60°C)	8	Not Set	1.20	7.41	12.44	13.96	15.68
	24	7.41	12.58	14.82	17.75	19.65	21.02

*Per Cent by weight of water.

ENGLISH UNITS

CLASS H CEMENT

Silica flour — 35 Per Cent

Hi-Dense No. 3 — 47 Lbs./Sk.

Water — 6.4 Gal./Sk. (0.86 cu. Ft./Sk.)

Slurry Density — 18.0 Lbs./Gal. (134.6 Lbs./Cu. Ft.)

Slurry Volume — 1.69 Cu. Ft./sk.

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

API CEMENTING SCHEDULES

Per Cent Retarder in ()

12,000'	14,000'	16,000	18,000'
CASING SCHEDULES			
1:40 (0.10)	2:54 (0.20)	2:50 (0.80)	3:12 (2.00)
3:23 (0.20)	3:26 (0.25)	5:10 (1.00)	3:52 (2.20)
SQUEEZE SCHEDULES			
2:42 (0.30)	3:21 (0.65)	2:50 (1.00)	2:33 (2.00)
4:10 (0.40)	4:28 (0.80)	3:38 (1.20)	2:48 (2.40)
LINER SCHEDULES			
2:17 (0.15)	2:20 (0.30)	2:37 (1.00)	2:05 (2.00)
3:36 (0.20)	3:05 (0.35)	3:12 (1.20)	3:32 (2.40)

24-HOUR COMPRESSIVE STRENGTH — PSI

Per Cent Retarder in ()

260	CURING TEMPERATURE — °F (3,000 psi)		
	290	320	350
4100 (0.10)	9375 (0.20)	10,000 (0.80)	12,225 (1.60)
3775 (0.20)	9550 (0.30)	9700 (1.00)	11,825 (2.00)
3675 (0.30)	9500 (0.80)	9025 (1.20)	11,100 (2.20)
3475 (0.40)	9150 (1.00)	—	10,250 (2.40)

METRIC UNITS

CLASS H CEMENT

Silica flour — 35 Per Cent

Hi-Dense No. 3 — 21.3 Kg/Sk.

Water — 24.2 L/Sk.

Slurry Density — 21.6 Kg/L

Slurry Volume — 47.85 L/Sk.

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

API CEMENTING SCHEDULES

Per Cent Retarder in ()

3 660 m	4 270m	4 880m	5 490m
CASING SCHEDULES			
1:40 (0.10)	2:54 (0.20)	2:50 (0.80)	3:12 (2.00)
3:23 (0.20)	3:26 (0.25)	5:10 (1.00)	3:52 (2.20)
SQUEEZE SCHEDULES			
2:42 (0.30)	3:21 (0.65)	2:50 (1.00)	2:33 (2.00)
4:10 (0.40)	4:28 (0.80)	3:38 (1.20)	2:48 (2.40)
LINER SCHEDULES			
2:17 (0.15)	2:20 (0.30)	2:37 (1.00)	2:05 (2.00)
3:36 (0.20)	3:05 (0.35)	3:12 (1.20)	3:32 (2.40)

24-HOUR COMPRESSIVE STRENGTH — MEGAPASCALS

Per Cent Retarder in ()

127	CURING TEMPERATURE — °C (20.68 MPa)		
	143	160	177
28.26(0.10)	64.63 (0.20)	68.94 (0.80)	84.28 (1.60)
26.02(0.20)	65.84 (0.30)	66.87 (1.00)	81.53 (2.00)
25.33(0.30)	65.50 (0.80)	62.22 (1.20)	76.53 (2.20)
23.95(0.40)	63.08 (1.00)	—	70.67 (2.40)

ENGLISH UNITS

CLASS H CEMENT

Silica Flour — 35 Per Cent
 Hi-Dense No. 3 — 33.5 Lbs./Sk.
 Dispersant — 0.75 Per Cent
 Water — 5.60 Gal./Sk. (0.75 cu. Ft./Sk.)
 Slurry Density — 18.0 Lbs./Gal. (134.6 Lbs./Cu. Ft.)
 Slurry Volume — 1.54 Cu. Ft./sk.

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

API CEMENTING SCHEDULES

12,000'	14,000'	16,000'	18,000'
CASING SCHEDULES			
2:28 (0.03)	3:24 (0.10)	2:38 (0.30)	2:28 (1.20)
3:30 (0.05)	4:46 (0.13)	3:59 (0.40)	2:57 (1.40)
SQUEEZE SCHEDULES			
2:29 (0.10)	2:59 (0.30)	2:48 (0.70)	2:59 (1.20)
4:29 (0.15)	4:14 (0.35)	4:48 (0.80)	3:31 (1.40)
LINER SCHEDULES			
2:57 (0.07)	2:49 (0.20)	2:27 (0.60)	2:32 (1.80)
4:30 (0.10)	4:50 (0.30)	3:19 (0.70)	3:47 (2.00)

24-HOUR COMPRESSIVE STRENGTH — PSI

Per Cent Retarder in ()

260	CURING TEMPERATURE — °F (3,000 psi)		
	290	320	350
4950 (0.05)	10,350 (0.10)	11,500 (0.30)	12,000 (1.20)
4900 (0.07)	10,325 (0.20)	11,150 (0.40)	12,175 (1.40)
4875 (0.10)	9950 (0.30)	10,800 (0.60)	12,275 (1.80)
4675 (0.15)	9625 (0.35)	10,000 (0.80)	11,550 (2.00)

METRIC UNITS

CLASS H CEMENT

Silica Flour — 35 Per Cent

Hi-Dense No. 3 — 15.2 Kg/Sk.

Dispersant — 0.75 Per Cent

Water — 21.20 L/Sk.

Slurry Density — 2.16 Kg/L

Slurry Volume — 43.60 L/Sk.

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

API CEMENTING SCHEDULES

3 660 m	4 270m	4 880m	5 490m
CASING SCHEDULES			
2:28 (0.03)	3:24 (0.10)	2:38 (0.30)	2:28 (1.20)
3:30 (0.05)	4:46 (0.13)	3:59 (0.40)	2:57 (1.40)
SQUEEZE SCHEDULES			
2:29 (0.10)	2:59 (0.30)	2:48 (0.70)	2:59 (1.20)
4:29 (0.15)	4:14 (0.35)	4:48 (0.80)	3:31 (1.40)
LINER SCHEDULES			
2:57 (0.07)	2:49 (0.20)	2:27 (0.60)	2:32 (1.80)
4:30 (0.10)	4:50 (0.30)	3:19 (0.70)	3:47 (2.00)

24-HOUR COMPRESSIVE STRENGTH — MEGAPASCALS

Per Cent Retarder in ()

127°C	CURING TEMPERATURE — °C (20.68 MPa)		
	143°C	160°C	177°C
34.12 (0.05)	71.36 (0.10)	79.29 (0.30)	82.73 (1.20)
33.78 (0.07)	71.18 (0.20)	76.87 (0.40)	83.94 (1.40)
33.61 (0.10)	68.60 (0.30)	74.46 (0.60)	84.63 (1.80)
32.23 (0.15)	66.36 (0.35)	68.94 (0.80)	79.63 (2.00)

ENGLISH UNITS

THIX-SET CEMENT

Halliburton's THIX-SET cement is a thixotropic cementing composition which has been developed to aid in the prevention of several common drilling and cementing problems. A slurry is defined as thixotropic when it will exhibit a low viscosity during pumping, but develops a high viscosity when pumping is stopped. If pumping is resumed the slurry will revert to its initial low viscosity. This characteristic of low-high-low viscosity is repeatable until the cement begins to hydrate.

THIX-SET cement is designed to gel when allowed to set static for a period of less than 5 minutes. The gel can be broken if the slurry is moved again. This stop and start pumping operation can be repeated up to the time the cement starts to hydrate. The longer the slurry is quiescent, the more the slurry will thicken.

The thixotropic properties of THIX-SET cement make it particularly applicable for combating lost circulation problems during drilling. THIX-SET cement can be spotted across a thief zone. While the hydrostatic head balances with the formation pressure the cement will begin to gel into a rigid state that will resist additional fluid movement into the zone of loss. After some set strength has developed, the hole can be loaded and the zone re-drilled.

THIX-SET cement is also designed to provide better primary cement jobs in wells having unconsolidated, highly permeable, fractured, vugular or cavernous formations. In a sense, THIX-SET cement improves fill-up by reducing fall-back or loss of the slurry to the formation.

CLASS H, THIX-SET CEMENT

Class H cement with

1.0% THIX-SET Component A and 0.25% THIX-SET Component B

SLURRY PROPERTIES

Water Gal./Sk.	Cu. Ft./Sk.	Slurry Density Lb./Gal.	Slurry Volume Lb./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
5.2	0.70	15.6	117	1.18
7.7	1.03	14.0	105	1.51
10.1	1.35	13.0	97	1.83
13.8	1.84	12.0	90	2.33

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

Water — 5.2 Gal./Sk.

Additive	Well Simulation	BHCT (°F)	BHST (°F)	Thickening Time (Hours:Minutes)
0.2% CaCl_2	2,000' Casing	91	110	1:12
None	2,000' Squeeze	100	110	2:56
None	4,000' Squeeze	116	140	2:35
None	8,000' Casing	125	200	2:41
0.2% Retarder	8,000' Casing	125	200	2:59
None	8,000' Squeeze	159	200	1:22
0.3% Retarder	8,000' Squeeze	159	200	2:20
0.4% Retarder	8,000' Squeeze	159	200	3:30+
0.5% Retarder	12,000' Casing	172	260	2:52
0.4% Retarder	14,000' Liner	206	290	2:57
0.6% Retarder	14,000' Liner	206	290	4:12

COMPRESSIVE STRENGTH — PSI

Curing

Slurry Weight Lb./Gal.	Temp. Lb./cu.Ft.	8	24	72
15.6	117	60	Set*	70
15.6	117	70	Set	300
15.6	117	80	Set	430
15.6	117	90	40	790
15.6	117	100	90 (1080)**	152 (2130)**
14.0	105	100	Set (160)	580 (730)
13.0	97	100	Set (150)	410 (360)
12.0	90	100	Set (60)	305 (330)
15.6	117	200***	2240	3650
14.0	105	200	380 (680)***	770 (1030)**
13.0	97	200	280 (490)	560 (570)
12.0	90	200	20 (340)	540 (560)

API FLUID LOSS

(325 mesh screen — 1000 PSI — 100°F)

Slurry Weight — 15.6 lb/gal

Additive	Gal./Sk.	Cu.Ft./Sk.	Slurry Volume Cu.Ft./Sk.	Fluid Loss cc/30 Min.
None	5.2	0.70	1.18	115
2.0% CaCl_2	5.2	0.70	1.18	150
0.3% Retarder	5.2	0.70	1.18	180
0.4% Retarder	5.2	0.70	1.18	170
6% Salt	5.36	0.72	1.21	120
12% Salt	5.49	0.73	1.24	110
18% Salt	5.62	0.75	1.27	140
sat. Salt	5.99	0.80	1.39	200

*Set but no measurable strength.

**Strengths in () contained 2% CaCl_2 .

***Slurries cured at 200°F were cured under 3,000 psi pressure.

METRIC UNITS

THIX-SET CEMENT

Halliburton's THIX-SET cement is a thixotropic cementing composition which has been developed to aid in the prevention of several common drilling and cementing problems. A slurry is defined as thixotropic when it will exhibit a low viscosity during pumping, but develops a high viscosity when pumping is stopped. If pumping is resumed the slurry will revert to its initial low viscosity. This characteristic of low-high-low viscosity is repeatable until the cement begins to hydrate.

THIX-SET cement is designed to gel when allowed to set static for a period of less than 5 minutes. The gel can be broken if the slurry is moved again. This stop and start pumping operation can be repeated up to the time the cement starts to hydrate. The longer the slurry is quiescent, the more the slurry will thicken.

The thixotropic properties of THIX-SET cement make it particularly applicable for combating lost circulation problems during drilling. THIX-SET cement can be spotted across a thief zone. While the hydrostatic head balances with the formation pressure the cement will begin to gel into a rigid state that will resist additional fluid movement into the zone of loss. After some set strength has developed, the hole can be loaded and the zone re-drilled.

THIX-SET cement is also designed to provide better primary cement jobs in wells having unconsolidated, highly permeable, fractured, vugular or cavernous formations. In a sense, THIX-SET cement improves fill-up by reducing fall-back or loss of the slurry to the formation.

CLASS H, THIX-SET CEMENT

Class H cement with

1.0% THIX-SET Component A and 0.25% THIX-SET Component B

SLURRY PROPERTIES

Water L/Sk.	Slurry Density Kg./L	Slurry Volume L/Sk
19.7	1.87	33.41
29.1	1.68	42.76
38.2	1.56	51.82
52.2	1.44	65.98

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

Water — 19.7 L/Sk.

Additive	Well Simulation	BHCT (°C)	BHST (°C.)	Thickening Time (Hours:Minutes)
0.2% CaCl ₂	610m Casing	33	43	1:12
None	610m Squeeze	38	43	2:56
None	1 220m Squeeze	47	60	2:35
None	2 440m Casing	52	93	2:41
0.2% Retarder	2 440m Casing	52	93	2:59
None	2 440m Squeeze	71	93	1:22
0.3% Retarder	2 440m Squeeze	71	93	2:20
0.4% Retarder	2 440m Squeeze	71	93	3:30+
0.5% Retarder	3 660m Casing	78	127	2:52
0.4% Retarder	4 270m Liner	97	143	2:57
0.6% Retarder	4 270m Liner	97	143	4:12

COMPRESSIVE STRENGTH — PSI

Slurry Weight Kg./L	Curing Temp. (°C)	Curing Time — Hours		
		8	24	72
1.87	16	Set*	0.48	6.41
1.87	21	Set	2.07	10.89
1.87	27	Set	2.96	13.79
1.87	32	0.28	5.45	15.72
1.87	38	0.62 (7.45)**	10.48 (14.69)**	—
1.68	38	Set (1.10)	4.00 (5.03)	—
1.56	38	Set (1.03)	2.83 (2.48)	—
1.44	38	Set (0.41)	2.10 (2.28)	—
1.87	93***	15.4	25.17	—
1.68	93	2.62 (4.69)**	5.31 (7.10)**	—
1.56	93	1.93 (3.38)	3.86 (3.93)	—
1.44	93	0.14 (2.34)	3.72 (3.86)	—

API FLUID LOSS

(45 micrometer screen — 6.89 MPa — 38°C)

Slurry Weight — 1.87 Kg/L

Additive	Water L/Sk.	Slurry Volume L/Sk.	Fluid Loss cc/30 Min.
None	19.7	33.41	115
2.0% CaCl ₂	19.7	33.41	150
0.3% Retarder	19.7	33.41	180
0.4% Retarder	19.7	33.41	170
6% Salt	20.3	34.26	120
12% Salt	20.8	35.11	110
18% Salt	21.3	35.96	140
sat. Salt	22.7	39.36	200

*Set but no measurable strength.

**Strengths in () contained 2% CaCl₂.

***Slurries cured at 93°C were cured under 20.68 mPa pressure.

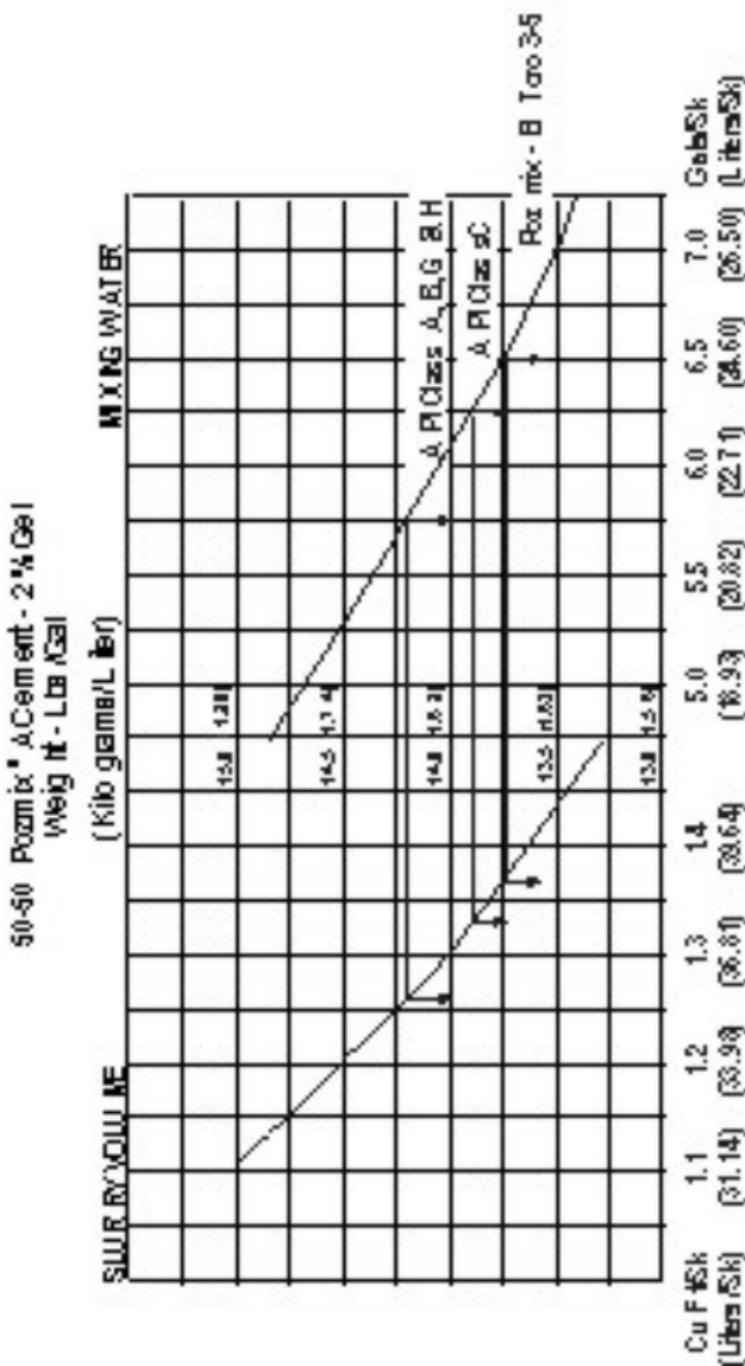
SECTION VI

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ENGLISH/METRIC UNITS



ENGLISH UNITS**POZMIX® A CEMENT (CLASS A)**

2 Per Cent Bentonite

SLURRY PROPERTIES

Per Cent Mixture Pozmix A	Portland Cement*	Weight Lbs./Sk.	Water Requirements Gals./Sk. of Mix	Ft./Sk. of Mix	Slurry Weight Lbs./Gal.	Slurry Weight Lbs./Cu.Ft.	Slurry Volume Cu. Ft./Sk.
25	75	89	5.98	0.80	14.55	109	1.29
50	50	84	5.75	0.77	14.15	106	1.26
60	40	82	5.71	0.76	14.00	105	1.25
75	25	79	5.97	0.80	13.55	101	1.29

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Per Cent Mixture Pozmix A	Portland Cement	2,000'	API CASING TESTS		
			4,000'	6,000'	8,000'
25	75	4:01	3:01	2:04	1:51
50	50	4:17	3:19	2:21	1:56
60	40	4:00+	2:43	2:20	1:57
75	25	4:00+	3:00+	3:00+	2:41

COMPRESSIVE STRENGTHS — PSI

Slurry Weight — 14.15 Lbs./Gal. (106 Lbs./cu. Ft.)

Water — 5.75 Gals./Sk. (0.77 Cu. Ft./sk.)

Slurry Volume — 1.26 cu. Ft./Sk.

Curing Time Hours	CURING TEMPERATURE †				
	60°F	80°F	100°F	120°F	140°F
6	**	**	110	235	380
12	25	120	295	490	685
18	60	195	445	660	880
24	100	350	600	815	1125
48	215	610	965	1180	1685
72	375	880	1210	1460	2145
7 Days	1335	1620	2305	3565	4075

* API Class A

** Not Set

† Atmospheric Pressure

METRIC UNITS

POZMIX® A CEMENT (CLASS A)

2 Per Cent Bentonite

SLURRY PROPERTIES

Per Cent Mixture Pozmix A	Portland Cement*	Weight Kg/Sk.	Water Requirements L/Sk. of Mix	Slurry Weight Kg/L	Slurry Volume L/Sk.
25	75	40.4	22.64	1.74	36.52
50	50	38.1	21.77	1.70	35.67
60	40	37.2	21.61	1.68	35.39
75	25	35.8	22.60	1.62	36.67

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Per Cent Mixture Pozmix A	Portland Cement	610m	API CASING TESTS		
			1220m	1830m	2440m
25	75	4:01	3:01	2:04	1:51
50	50	4:17	3:19	2:21	1:56
60	40	4:00+	2:43	2:20	1:57
75	25	4:00+	3:00+	3:00+	2:41

COMPRESSIVE STRENGTHS — MEGAPASCALS

Slurry Weight — 1.70 Kg/L

Water — 21.77 L/Sk.

Slurry Volume — 35.67 L/Sk.

Curing Time Hours	CURING TEMPERATURE***				
	16°C	27°C	38°C	49°C	60°C
6	**	**	0.75	1.62	2.62
12	0.17	0.82	2.03	3.37	4.72
18	0.41	1.34	3.06	4.55	6.06
24	0.68	2.41	4.13	5.61	7.75
48	1.48	4.20	6.65	8.13	11.61
72	2.58	6.06	8.34	10.06	14.78
7 Days	9.20	11.16	15.89	24.58	28.09

* API Class A

** Not Set

*** Atmospheric Pressure

ENGLISH UNITS

POZMIX® FOR LOW TEMPERATURE

(SURFACE PIPE, ETC.)

50-50 POZMIX® A CEMENT (CLASS A) BLEND

0 Per Cent Bentonite

Slurry Weight — 15.1 Lbs./Gal. (113 Lbs./Cu. Ft.)

Water — 4.40 Gal./Sk. (0.59 cu. Ft./Sk.)

Slurry Volume — 1.07 Cu. Ft./Sk.

Curing Time Hours	Per Cent Calcium Chloride	CURING TEMPERATURE †			
		60°F	80°F	100°F	120°F
6	0	**	**	180	455
12	0	25	235	515	1050
24	0	270	690	1200	1470
6	2	35	240	560	935
12	2	320	750	1285	1740
24	2	885	1420	2210	2800
36	2	1590	1940	2740	3310

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

API CASING TESTS — 2,000'

BLEND	Water Gal./Sk.	Slurry Weight Lbs./Gal.	Per Cent HA-5		
			0	2	3
Pozmix A Cement	4.40	15.1	4:17	1:58	1:43
Pozmix A Cement	3.60	15.8	2:00+	0:48	0:44

COMPRESSIVE STRENGTHS — PSI

Curing Time Hours	Slurry Weight Lbs./Gal.	CURING TEMPERATURE †					
		80°F			100°F		
		0	2	3	0	2	3
4	15.1	**	125	150	20	270	305
8	15.1	65	345	375	280	655	630
24	15.1	690	1030	1015	1200	1580	1510
4	15.8	**	250	280	55	515	570
8	15.8	125	660	725	490	1170	1195
24	15.8	1195	1980	1930	2050	2780	2615

† Atmospheric Pressure

** Not Set

METRIC UNITS

POZMIX® FOR LOW TEMPERATURE

(SURFACE PIPE, ETC.)

50-50 POZMIX® A CEMENT (CLASS A) BLEND

0 Per Cent Bentonite

Slurry Weight—1.81 Kg/L

Water—16.66 L/Sk.

Slurry Volume—30.29 L/Sk.

Curing Time Hours	Per Cent Calcium Chloride	CURING TEMPERATURE †			
		16°C	27°C	38°C	49°C
6	0	**	**	1.24	3.13
12	0	0.17	1.62	3.55	7.23
24	0	1.88	4.75	8.27	10.13
6	2	0.24	1.65	3.86	6.44
12	2	2.20	5.17	8.86	11.99
24	2	6.10	9.79	15.23	19.30
36	2	10.96	13.37	18.89	22.82

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

API CASING TESTS — 610m

BLEND	Water L/Sk.	Slurry Weight kG/l	Per Cent HA-5		
			0	2	3
Pozmix A Cement	16.66	1.81	4:17	1:58	1:43
Pozmix A Cement	13.63	1.89	2:00+	0:48	0:44

COMPRESSIVE STRENGTHS — MEGAPASCALS

Curing Time Hours	Slurry Weight Kg/L	CURING TEMPERATURE †					
		27°C			38°C		
		0	2	3	0	2	3
4	1.81	**	0.86	1.03	0.13	1.86	2.10
8	1.81	0.44	2.37	2.58	1.93	4.51	4.34
24	1.81	4.75	7.10	6.99	8.27	10.89	10.41
4	1.89	**	1.72	1.93	0.37	3.55	3.93
8	1.89	0.86	4.55	4.99	3.37	8.06	8.23
24	1.89	8.23	13.65	13.30	14.13	19.16	18.03

† Atmospheric Pressure

** Not Set

ENGLISH UNITS

**50-50 POZMIX® A CEMENT (CLASS A)
BLEND WITH SALT**

2% Bentonite

Water — 5.75 Gals./Sk. (0.77 Cu. Ft./Sk.)

Per Cent Salt By Wt. of Water	Dry Salt Lbs./Sk.	Slurry Weight		Slurry Volume Cu.Ft./Sk.
		Lbs./Gal	Lbs./Cu.Ft.	
0	0.00	14.15	106	1.26
5	2.40	14.28	107	1.27
10	4.79	14.38	108	1.29
18	8.62	14.52	109	1.31
Saturated*	17.11	14.78	111	1.37

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Per Cent Salt	API CASING TESTS	
	4,000'	8,000'
0	4:10	1:56
5	3:51	1:48
10	4:20	2:05
18	4:00+	2:56
Saturated	4:00+	4:00+

COMPRESSIVE STRENGTHS — PSI

Per Cent Salt	CURING TEMPERATURE**			
	80°F	100°F	120°F	140°F
24 HOURS				
0	350	600	815	1125
5	615	1025	1230	1620
10	545	910	1115	1605
18	275	465	635	1170
Saturated	135	355	430	755
72 HOURS				
0	880	1210	1460	2145
5	1260	1550	2020	2450
10	1220	1550	2110	3000
18	990	1230	1710	2405
Saturated	675	845	1235	1700

* All saturated solutions at 140°F.

** Atmospheric Pressure

METRIC UNITS**50-50 POZMIX® A CEMENT (CLASS A)
BLEND WITH SALT**

2% Bentonite

Water—21.77 L/Sk.

SLURRY PROPERTIES

Per Cent Salt By Wt. of Water	Dry Salt Kg/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
0	0.0	1.70	35.67
5	1.1	1.71	35.96
10	2.2	1.72	36.52
18	3.9	1.74	37.09
Sat. (60°C)	8.1	1.77	38.79

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Per Cent Salt	API CASING TESTS	
	1220m	2440m
0	4:10	1:56
5	3:51	1:48
10	4:20	2:05
18	4:00+	2:56
Saturated (60°C)	4:00+	4:00+

COMPRESSIVE STRENGTHS — MEGAPASCALS

Per Cent Salt	CURING TEMPERATURE**			
	27°C	38°C	49°C	60°C
24 HOURS				
0	2.41	4.13	5.61	7.75
5	4.24	7.06	8.48	11.16
10	3.75	6.27	7.68	11.06
18	1.89	3.20	4.37	8.06
Saturated (60°C)	.93	2.44	2.96	5.20
72 HOURS				
0	6.06	8.34	10.06	14.78
5	8.68	10.68	13.92	16.89
10	8.41	10.68	14.54	20.68
18	6.82	8.48	11.79	16.58
Saturated (60°C)	4.65	5.82	8.51	11.72

** Atmospheric Pressure

ENGLISH UNITS

POZMIX® A CEMENT (CLASS H)

Since field reports generally indicate that Class H cement is mixed at the same water ratio and slurry weight as Class A cement, except in the deep, high temperature, high pressure wells, these data on this cement in Pozmix Cement blends have been obtained for the same slurry properties as reported in the Pozmix Manual (C-1025) for Class A cement. Potentially the Pozmix with Class H cement could be mixed, when desired, to a higher slurry weight (14.5 Lbs./Gal) than shown, in which case the slurry would have a somewhat shorter pumping time and higher compressive strength than indicated herein.

The following data represent the average performance of two brands of Class H cement with a single source (2 batches) of Pozmix A. Slightly different performance could be expected with other brands and batches of cement, but on the whole Class H cement is more uniform than different brands and batches of Class A cement.

POZMIX® A CEMENT (CLASS H)

FOR LOW TEMPERATURES

50-50 Blend with 0 Per Cent Bentonite

Water Ratio — 4.4 Gals./Sk. (0.59 Cu. Ft./Sk.)

Slurry Weight — 15.1 Lbs./Gal. (113 Lbs./Cu. Ft.)

Slurry Volume — 1.07 Cu. Ft./Sk.

COMPRESSIVE STRENGTHS — PSI

Curing Time Hours	CaCl ₂ Per Cent	API CURING CONDITIONS: TEMPERATURE & PRESSURE			
		60°F 0 psi	80°F 0 psi	95°F 800 psi	110°F 1,600 psi
6	0	N.S.	5	35	160
12	0	N.S.	125	155	580
24	0	55	490	750	1160
6	2	N.S.	130	155	485
12	2	90	385	625	825
24	2	320	685	715	1610
36	2	570	1225	1445	1680

N.S. - Not Set

ENGLISH UNITS

POZMIX® A CEMENT (CLASS H)

Since field reports generally indicate that Class H cement is mixed at the same water ratio and slurry weight as Class A cement, except in the deep, high temperature, high pressure wells, these data on this cement in Pozmix Cement blends have been obtained for the same slurry properties as reported in the Pozmix Manual (C-1025) for Class A cement. Potentially the Pozmix with Class H cement could be mixed, when desired, to a higher slurry weight (1.74 Kg/L) than shown, in which case the slurry would have a somewhat shorter pumping time and higher compressive strength than indicated herein.

The following data represent the average performance of two brands of Class H cement with a single source (2 batches) of Pozmix A. Slightly different performance could be expected with other brands and batches of cement, but on the whole Class H cement is more uniform than different brands and batches of Class A cement.

POZMIX® A CEMENT (CLASS H) FOR LOW TEMPERATURES

50-50 Blend with 0 Per Cent Bentonite

Water Ratio — 16.7 L/Sk.

Slurry Weight — 1.81 Kg/L

Slurry Volume — 30.29 L/Sk.

COMPRESSIVE STRENGTHS — MEGAPASCALS

Curing Time Hours	CaCl ₂ Per Cent	API CURING CONDITIONS: TEMPERATURE & PRESSURE			
		16°C 0 MPa	27°C 0 MPa	35°C 5.51 MPa	43°C 11.03 MPa
6	0	N.S.	0.03	0.24	1.10
12	0	N.S.	0.86	1.06	3.99
24	0	0.37	3.37	5.17	7.99
6	2	N.S.	0.89	1.06	3.34
12	2	0.62	2.65	4.30	5.68
24	2	2.20	4.72	4.93	11.10
36	2	3.93	8.44	9.96	11.58

N.S. - Not Set

ENGLISH UNITS

POZMIX® A CEMENT (CLASS H)**50-50 BLEND WITH 2% BENTONITE**

Water Ratio — 5.75 Gals./Sk. (0.77 Cu. Ft./Sk.)

Slurry Weight — 14.15 Lbs./Gal. (106 Lbs./Cu. Ft.)

Slurry Volume — 1.26 Cu. Ft./Sk.

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

API CASING TESTS			
2,000'	4,000'	6,000'	8,000'
4:00+	4:16	3:18	2:16

COMPRESSIVE STRENGTHS — PSI

Curing Time Hours	API CURING CONDITIONS: TEMPERATURE & PRESSURE				
	60°F 0 psi	80°F 0 psi	95°F 800 psi	110°F 1,600 psi	140°F 3,000 psi
6	N.S.	N.S.	10	55	185
12	N.S.	70	160	275	475
18	10	165	250	420	645
24	45	265	360	475	800
48	190	445	570	805	2430
72	210	680	815	1135	3110
7 days	430	1030	1600	1815	3510

† Atmospheric Pressure

** Not Set

**POZMIX® A CEMENT (CLASS H)
WITH RETARDER****THICKENING TIME — HOURS:MINUTES**

Retarder Per Cent	API CASING TESTS			
	8,000'	10,000'	12,000'	14,000'
0.0	2:16	1:35	1:12	0:52
0.2	2:41	2:17	1:53	1:50
0.3	4:23	4:00+*	3:55	2:45
0.4	4:00+	4:00+*	4:00+*	3:33
0.5	4:00+	4:00+*	4:00+*	4:00+*

COMPRESSIVE STRENGTHS — PSI

Curing Time Hours	Retarder Per Cent	Curing Temperature @ 3,000 psi Pressure		
		140°F	170°F	200°F
24	0.0	800	2295	2995
	0.2	460	2200	2760
	0.3	380	1325	2700
	0.4	90	1200	2600
	0.5	N.S.	N.S.	N.S.
48	0.0	2430	2870	3745
	0.2	2350	2760	3410
	0.3	1765	2550	3480
	0.4	1290	2155	2825
	0.5	N.S.	N.S.	N.S.
72	0.0	3110	3385	4005
	0.2	2825	2950	3450
	0.3	2490	2935	3880
	0.4	2455	2600	3150
	0.5	N.S.	N.S.	350

† Atmospheric Pressure

** Not Set

METRIC UNITS

POZMIX® A CEMENT (CLASS H)

50-50 BLEND WITH 2% BENTONITE

Water Ratio — 21.77 L/Sk.

Slurry Weight — 1.70 Kg

Slurry Volume — 35.67 L/Sk.

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Tests)

API CASING TESTS				
610m	1220	1830m	2440m	
4:00+	4:16	3:18	2:16	

COMPRESSIVE STRENGTHS — MEGAPASCALS

Curing Time Hours	API CURING CONDITIONS: TEMPERATURE & PRESSURE				
	16°C 0 MPa	27°C 0 MPa	35°C 5.51 MPa	43°C 11.03 MPa	60°C 20.63 MPa
6	N.S.	N.S.	0.06	0.37	1.27
12	N.S.	0.48	1.10	1.89	3.72
18	0.06	1.13	1.72	2.89	4.44
24	0.31	1.82	2.48	3.72	5.51
48	1.31	3.06	3.93	5.55	16.75
72	1.44	4.68	5.61	7.82	21.44
7 days	3.96	7.10	11.03	12.51	24.20

† Atmospheric Pressure

** Not Set

POZMIX® A CEMENT (CLASS H)

WITH RETARDER

THICKENING TIME — HOURS:MINUTES

Retarder Per Cent	API CASING TESTS			
	2440m	3050m	3660m	4270m
0.0	2:16	1:35	1:12	0:52
0.2	2:41	2:17	1:53	1:50
0.3	4:23	4:00+*	3:55	2:45
0.4	4:00+	4:00+*	4:00+*	3:33
0.5	4:00+	4:00+*	4:00+*	4:00+*

COMPRESSIVE STRENGTHS — MEGAPASCALS

Curing Time Hours	Retarder Per Cent	Curing Temperature @ 20.63 MPa Pressure		
		60°C	77°C	93°C
24	0.0	5.51	15.82	20.65
	0.2	3.17	15.16	19.02
	0.3	2.62	9.13	18.61
	0.4	0.62	8.27	17.92
	0.5	N.S.	N.S.	N.S.
48	0.0	16.75	19.78	25.82
	0.2	16.20	19.02	23.51
	0.3	12.16	17.58	23.99
	0.4	8.89	14.85	19.47
	0.5	N.S.	N.S.	N.S.
72	0.0	21.44	23.33	27.61
	0.2	19.47	20.33	23.78
	0.3	17.16	20.33	26.75
	0.4	16.92	17.92	21.71
	0.5	N.S.	N.S.	2.41

† Atmospheric Pressure

** Not Set

ENGLISH UNITS

POZMIX® A CEMENT (CLASS H)
(50-50 BLEND — 2% BENTONITE)
WITH GILSONITE

SLURRY PROPERTIES

Gilsonite Lbs./Sk.	Water Ratio Gals./Sk.	Cu. Ft./Sk.	Slurry Weight Lbs./Gal.	Lbs./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
0	5.75	0.77	14.15	106	1.26
6	6.1	0.82	13.6	102	1.40
10	6.3	0.84	13.3	99½	1.48
12.5	6.4	0.86	13.2	99	1.53
25	7.0	0.94	12.5	93½	1.80

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Gilsonite Kg/Sk.	API CASING TESTS		
	4,000'	6,000'	8,000'
0	4:16	3:18	2:16
6	3:53	3:20	2:26
10	4:00+	3:18	2:43
12.5	4:00+	4:02	3:49
25	4:00+	3:21	2:37

COMPRESSIVE STRENGTHS — PSI @ 24 HOURS

Gilsonite Lbs./Sk.	API CURING CONDITIONS: TEMPERATURE & PRESSURE					
	95°F 800 psi	110°F 1,600 psi	140°F 3,000 psi	170°F 3,000 psi	200°F 3,000 psi	230°F 3,000 psi
						260°F 3,000 psi
0	360	475	800	2295	2995	2840
6	270	400	640	2100	2355	2520
10	220	375	610	1960	2075	2185
12.5	200	380	580	1810	1960	2135
25	190	300	420	1320	1455	1725
						1610

POZMIX® A CEMENT (CLASS H)
(50-50 BLEND WITH BENTONITE)

SLURRY PROPERTIES

Bentonite Per Cent	Water Ratio Gals./Sk.	Cu.Ft./Sk.	Slurry Weight Lbs./Gal.	Lbs./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
0	4.4	0.59	15.1	113	1.07
2	5.75	0.77	14.15	106	1.26
4	7.0	0.94	13.5	101	1.44
6	7.7	1.03	13.3	99½	1.54
8	8.4	1.12	13.1	98	1.64
10	9.0	1.20	12.9	96½	1.74

Bentonite Per Cent	Thickening Time Hrs:Min. 4,000 Ft. Casing	COMPRESSIVE STRENGTH — PSI					
		API Curing Conditions : Temperature & Pressure					
		95°F 800 psi	110°F - 1,600 psi	24 Hours	72 Hours	24 Hours	72 Hours
2	4:16	360	815	475	1135		
6	3:57	250	305	375	510		
10	3:43	120	150	185	275		

METRIC UNITS
POZMIX® A CEMENT (CLASS H)
(50-50 BLEND — 2% BENTONITE)
WITH GILSONITE

SLURRY PROPERTIES

Gilsonite Kg./Sk.	Water Ratio L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
0.0	21.8	1.70	35.67
2.7	23.1	1.63	39.64
4.5	23.8	1.59	41.90
5.7	24.2	1.58	43.32
11.3	26.5	1.50	50.96

THICKENING TIME — HOURS:MINUTES
(Pressure-Temperature Thickening-Time Test)

Gilsonite Kg./Sk.	API CASING TESTS		
	1 220m	1 830m	2 440m
0	4:16	3:18	2:16
2.7	3:53	3:20	2:26
4.5	4:00+	3:18	2:43
5.7	4:00+	4:02	3:49
11.3	4:00+	3:21	2:37

COMPRESSIVE STRENGTHS — MPa @ 24 HOURS

Gilsonite Kg./Sk.	API CURING CONDITIONS: TEMPERATURE & PRESSURE						
	35°C 5.51 MPa	43°C 11.03 MPa	60°C 20.68 MPa	77°C 20.68 MPa	93°C 20.68 MPa	110°C 20.68 MPa	127°C 20.68 MPa
0.0	2.48	3.72	5.51	15.82	20.65	19.58	16.54
2.7	1.86	2.75	4.41	14.47	16.23	17.37	15.85
4.5	1.51	2.58	4.20	13.51	14.30	15.06	14.54
5.7	1.37	2.62	3.99	12.47	13.51	14.72	14.41
11.3	1.31	2.06	2.89	9.10	10.03	11.89	11.10

POZMIX® A CEMENT (CLASS H)
(50-50 BLEND WITH BENTONITE)

SLURRY PROPERTIES

Bentonite Per Cent	Water Ratio L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
0	16.7	1.81	30.29
2	21.8	1.70	35.67
4	26.5	1.62	40.77
6	29.1	1.59	43.60
8	31.8	1.57	46.43
10	34.1	1.55	49.26

Bentonite Per Cent	Thickening Time Hrs:Min. 1 220m Casing	COMPRESSIVE STRENGTH — MPa			
		API Curing Conditions : Temperature & Pressure			
		35°C - 5.51 MPa	43°C - 11.03 MPa	24 Hours	72 Hours
2	4:16	2.48	5.61	3.72	7.82
6	3:57	1.72	2.10	2.58	3.51
10	3:43	0.82	1.03	1.27	1.89

ENGLISH UNITS

POZMIX® A CEMENT (CLASS H)
(50-50 BLEND — 2% BENTONITE)
WITH SALT (NaCl)

SLURRY PROPERTIES

Water Ratio — 5.75 Gals./Sk. (0.77 Cu. Ft./Sk.)

Salt (NaCl) % by Weight of Water	Dry Salt Lbs./Sk.	Slurry Weight Lbs./Gal.	Lbs./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
0	0	14.15	106	1.26
5	24	14.3	107	1.27
6	29	14.3	107	1.27
10	4.8	14.4	108	1.28
12	5.8	14.4	108	1.29
18	8.6	14.5	108.5	1.31
Saturated*	17.8	14.8	111	1.37

**—at 140°F.

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Salt Per Cent	API CASING TESTS		
	4,000'	6,000'	8,000'
0	4:16	3:18	2:16
5	4:13	3:04	2:28
6	3:56	2:59	2:30
10	4:00+	3:00	2:36
12	4:00+	3:36	3:08
18	4:00+	4:00+	4:21
Saturated	4:00+	4:00+	4:00+

COMPRESSIVE STRENGTHS — PSI

API CURING CONDITIONS: TEMPERATURE & PRESSURE

Salt Per Cent	80°F	95°F	110°F	140°F
	0 psi	800 psi	1,600 psi	3,000 psi
24 HOURS				
0	265	360	475	800
5	270	695	725	1635
6	385	740	840	1940
10	350	655	750	2075
12	375	630	675	1930
18	255	460	585	1675
Saturated	25	175	275	1320
72 HOURS				
0	680	815	1135	3110
5	805	1480	1885	3300
6	775	1425	1875	2860
10	750	1340	1790	2775
12	725	1400	1785	2710
18	535	1175	1615	2795
Saturated	250	630	1280	3140

METRIC UNITS

POZMIX® A CEMENT (CLASS H)

(50-50 BLEND — 2% BENTONITE)

WITH SALT (NaCl)

SLURRY PROPERTIES

Water Ratio — 21.77 L/Sk.

Salt (NaCl) % by Weight of Water	Dry Salt Kg/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
0	0.0	1.70	35.67
5	1.1	1.71	35.96
6	1.3	1.71	35.96
10	2.2	1.73	36.24
12	2.6	1.73	36.52
18	3.9	1.74	37.09
Saturated**	8.1	1.77	38.79

**—at 60°C.

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Salt Per Cent	API CASING TESTS		
	1220m	1830m	2440m
0	4:16	3:18	2:16
5	4:13	3:04	2:28
6	3:56	2:59	2:30
10	4:00+	3:00	2:36
12	4:00+	3:36	3:08
18	4:00+	4:00+	4:21
Saturated	4:00+	4:00+	4:00+

COMPRESSIVE STRENGTHS — MPa

Salt Per Cent	API CURING CONDITIONS: TEMPERATURE & PRESSURE			
	27°C 0 MPa	35°C 5.51 MPa	43°C 11.03 MPa	60°C 20.68 MPa
24 HOURS				
0	1.82	2.48	3.72	5.51
5	1.86	4.79	4.99	11.27
6	2.65	5.10	5.79	13.37
10	2.41	4.51	5.17	14.30
12	2.58	4.34	4.65	13.30
18	1.75	3.17	4.03	11.54
Saturated	0.17	1.20	1.89	9.10
72 HOURS				
0	4.68	5.61	7.82	21.44
5	5.55	10.20	12.99	22.75
6	5.34	9.82	10.85	19.71
10	5.17	9.23	12.34	19.13
12	4.99	9.65	12.30	18.68
18	3.68	8.10	11.13	19.27
Saturated	1.72	4.34	8.82	21.64

ENGLISH UNITS

POZMIX® A CEMENT (CLASS C)
(SOUTHWESTERN EL TORO 35)
(LONE STAR SPECIAL INCOR®)

SLURRY PROPERTIES

Bentonite Per Cent	Water Gals./Sk.	Slurry Weight Lbs./Gal.	Slurry Volume Cu. Ft./Sk.
0	5.50	14.2	1.22
2	6.50	13.7	1.36
4	7.60	13.2	1.52

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Bentonite Per Cent	API CASING TESTS			API SQUEEZE TESTS		
	4,000'	6,000'	8,000'	4,000'	6,000'	8,000'
0	3:00+	3:00+	2:54	2:35	1:58	1:45
2	3:00+	3:00+	3:05	2:00	1:44	1:23

COMPRESSIVE STRENGTHS — PSI

Bentonite Per Cent	CURING TEMPERATURE			
	80°F	100°F	120°F	140°F
24 HOURS				
0	625	1170	1385	1870
2	475	885	1045	1265
72 HOURS				
0	1565	1830	2500	4210
2	1160	1390	1800	3085

POZMIX® A CEMENT (CLASS C)
WITH FLUID LOSS AGENT (2% BENTONITE)

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Fluid Loss Agent Per Cent	API CASING TESTS				API SQUEEZE TESTS			
	2,000'	4,000'	6,000'	8,000'	2,000'	4,000'	6,000'	8,000'
0.80	4:00+	4:00+	4:00+	4:00+	4:00+	4:00+	2:10	1:35
1.00	4:00+	4:00+	4:00+	4:00+	4:00+	4:00+	3:50	2:40
1.20	4:00+	4:00+	4:00+	4:00+	4:00+	4:00+	4:00+	3:26

FLUID LOSS TESTS

325 Mesh Screen @ 1,000 psi

cc Per 30 Minutes

Fluid Loss Agent Per Cent	PER CENT SALT			NO BENTONITE			
	0.0	10	18	Sat.	Neat	2% CaCl2	3% HA-5
0.60	334	225	462	486	—	—	—
0.80	195	192	329	402	62	170	160
1.00	125	128	278	345	30	94	116
1.20	64	84	170	247	22	44	82

COMPRESSIVE STRENGTHS — PSI

Curing Time — 24 Hours

Fluid Loss Agent Per Cent	95°F - 800 PSI		110°F - 1,600 PSI		140°F
	0% CaCl2	2% CaCl2	0% CaCl2	2% CaCl2	3,000 psi
0.80	335	—	630	—	1010
1.00	285	465	445	765	915
1.20	270	460	400	710	890

METRIC UNITS

POZMIX® A CEMENT (CLASS C) (SOUTHWESTERN EL TORO 35) (LONE STAR SPECIAL INCOR®)

SLURRY PROPERTIES

Bentonite Per Cent	Water L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
0	20.82	1.70	34.54
2	24.60	1.64	38.50
4	28.77	1.58	43.03

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Bentonite Per Cent	API CASING TESTS			API SQUEEZE TESTS		
	1 220m	1 830m	2 440m	1 220m	1 830m	2 440m
0	3:00+	3:00+	2:54	2:35	1:58	1:45
2	3:00+	3:00+	3:05	2:00	1:44	1:23

COMPRESSIVE STRENGTHS — MEGAPASCALS @ 24 HOURS

Bentonite Per Cent	CURING TEMPERATURE			
	27°C	38°C	49°C	60°C
24 HOURS				
0	4.30	8.06	9.54	12.89
2	3.72	6.10	7.20	8.72
72 HOURS				
0	10.79	12.61	17.23	29.02
2	7.99	9.58	12.41	21.27

POZMIX® A CEMENT (CLASS C) WITH FLUID LOSS AGENT (2% BENTONITE)

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Fluid Loss Agent Per Cent	API CASING TESTS				API SQUEEZE TESTS			
	610m	1 220m	1 830m	2 440m	610m	1 220m	1 830m	2 440m
0.80	4:00+	4:00+	4:00+	4:00+	4:00+	4:00+	2:10	1:35
1.00	4:00+	4:00+	4:00+	4:00+	4:00+	4:00+	3:50	2:40
1.20	4:00+	4:00+	4:00+	4:00+	4:00+	4:00+	4:00+	3:26

FLUID LOSS TESTS

325 Mesh Screen @ 6.89 MEGAPASCALS
cc Per 30 Minutes

Fluid Loss Agent Per Cent	PER CENT SALT			Sat. (60°C)	NO BENTONITE		
	0.0	10	18		Neat	2% CaCl2	3% HA-5
0.60	2.30	1.55	3.18	3.35	—	—	—
0.80	1.34	1.32	2.26	2.77	0.42	1.1	1.10
1.00	0.86	0.88	1.91	2.37	0.20	6.4	0.80
1.20	0.44	0.57	1.17	1.70	0.15	3.0	0.56

COMPRESSIVE STRENGTHS — MEGAPASCALS

Curing Time — 24 Hours

Fluid Loss Agent Per Cent	35°C - 5.51 MPa		43°C - 11.03 MPa*		20.68 MPa*
	0% CaCl2	2% CaCl2	0% CaCl2	2% CaCl2	
	0.80	2.31	—	4.34	
1.00	1.96	3.20	3.06	5.27	6.30
1.20	1.86	3.17	2.75	4.89	6.13

*Curing Pressure

ENGLISH UNITS

HALLIBURTON "LIGHT" CEMENT

This product has a wide range water requirement and can be mixed for either maximum strength or at maximum yield without experiencing excessive free water separation. For lost circulation application a formulation of 10 pounds of Halliburton's high sealing Gilsonite is recommended. Values shown in parenthesis below are for 10 Lbs./Sack.

SLURRY PROPERTIES

Water Gals./Sack	Slurry Weight	Slurry Volume	Thickening Time - Hrs:Mins.	
	Lbs./Gal.	Cu. Ft./Sk.	API Casing 4,000 Feet	Schedules 6,000 Feet
7.7	13.6 (13.1)	1.54 (1.70)	4:00+	3:00
8.8	13.1 (12.7)	1.69 (1.84)	4:00+	3:40
9.9	12.7 (12.4)	1.84 (1.99)	4:00+	4:00+
10.9	12.4 (12.1)	1.97 (2.12)	4:00+	4:00+

() 10 Lbs. Gilsonite/Sack

COMPRESSIVE STRENGTH — PSI

Slurry Weight Lbs./Gal.	CURING TIME - HOURS			
	95°F - 800 PSI		110°F - 1,600 PSI	
	24	72	24	72
13.6	495-720*	1050	645-825*	1340
13.1	320-520*	745	435-700*	820
12.7	235-405*	485	330-490*	570
12.4	165-245*	315	225-315*	485

SLURRY PROPERTIES

WITH SALT

Water Gals./Sk.	Salt Per Cent	Slurry Weight Lbs./Gal.	Slurry Volume Cu. Ft./Sk.
9.9	—	12.7	1.84
9.9	18	13.2	1.92

API PRESSURE-TEMPERATURE THICKENING-TIME

& COMPRESSIVE STRENGTH TESTS

Slurry Weight Lbs./Gal.	Salt Per Cent	HR-4 Per Cent	Thickening Time Hours:Minutes	24 Hour Comp. Stg. PSI
8,000 Ft. Casing Schedule				

BHST -200°F
3,000 PSI

12.7	—	0.30	3:00	1,185
13.2	18	0.30	3:30+	1,005

10,000 Ft. Casing Schedule

BHST -230°F
3,000 PSI

12.7	—	0.50	3:08	1,490
13.2	18	0.40	4:15	1,460

METRIC UNITS

HALLIBURTON "LIGHT" CEMENT

This product has a wide range water requirement and can be mixed for either maximum strength or at maximum yield without experiencing excessive free water separation. For lost circulation application a formulation of 4.5 Kg of Halliburton's high sealing Gilsonite is recommended. Values shown in parenthesis below are for 4.5 Kg/Sack.

SLURRY PROPERTIES

Water L/Sack	Slurry Weight Kg/L	Slurry Volume L/Sk.	Thickening Time - Hrs:Mins.	
			API Casing 1 220m	Schedules 1 830m
29.1	1.63 (1.57)	43.60 (48.13)	4:00+	3:00
33.3	1.57 (1.52)	47.85 (52.10)	4:00+	3:40
37.5	1.52 (1.49)	52.10 (56.34)	4:00+	4:00+
41.3	1.49 (1.45)	55.77 (60.02)	4:00+	4:00+

() 4.5 Kg Gilsonite/Sack

COMPRESSIVE STRENGTH — MEGAPASCALS

Slurry Weight Lbs./Gal.	CURING TIME - HOURS			
	35°C - 5.51 MPa**		43°C - 11.03 MPa**	
	24	72	24	72
1.63	3.41-4.96*	7.23	4.44-5.68*	9.23
1.57	2.20-3.58*	5.13	2.99-4.82*	5.65
1.52	1.62-2.79*	3.34	2.27-3.37*	3.93
1.49	1.13-1.16*	2.17	1.55-2.17*	3.34

*Sea Water (Density - 1.02 Kg/L)

SLURRY PROPERTIES

WITH SALT

Water L/Sk.	Salt Per Cent	Slurry Weight Kg./L	Slurry Volume L/Sk.
37.5	—	1.52	52.10
37.5	18	1.58	54.36

API PRESSURE-TEMPERATURE THICKENING-TIME & COMPRESSIVE STRENGTH TESTS

Slurry Weight Kg/L	Salt Per Cent	HR-4 Per Cent	Thickening Time Hours:Minutes	24 Hour Comp. Stg. MPa
2 440m Casing Schedule				

1.52	—	0.30	3:00	8.17
1.58	18	0.30	3:30+	6.92

3 050m Casing Schedule

1.52	—	0.50	3:08	10.27
1.58	18	0.40	4:15	10.06

**Curing Pressure

ENGLISH UNITS

HALLIBURTON LIGHT CEMENT WITH ECONOLITE SLURRY PROPERTIES

ECONOLITE Additive Percent	Water Gal./Sk.	Cu. Ft./Sk.	Slurry Viscosity—Bc Initial	20 Min.	Free Water Percent	Slurry Density Lb./Gal.	Slurry Density Lb./Cu. Ft.	Yield Ft.Cu. Ft./Sk.
0	7.7	1.03	7	14	0.60	13.6	102	1.54
0	8.8	1.17	5	9	0.60	13.1	98	1.69
0	9.9	1.32	4	6	1.30	12.7	95	1.84
0	10.9	1.45	5	7	1.30	12.4	93	1.97
1	10.9	1.45	11	12	0.40	12.4	93	1.97
1	12.9	1.72	8	8	0.56	11.8	88	2.21
1	14.9	1.99	5	5	0.72	11.4	85	2.46
1	16.9	2.25	3	4	2.10	11.1	83	2.74
2	16.9	2.25	7	8	0.24	11.1	83	2.74

PRESSURE-TEMPERATURE THICKENING TIME TESTS

API CASING-CEMENTING SCHEDULES

ECONOLITE Additive Percent	Slurry Density Lb./Gal.	Slurry Density Lb./Cu.Ft.	Thickening Time—Hours:Minutes		
			4,000' 103°F	8,000' 125°F	
0	13.6	102	4:00+	2:02	
0	13.1	98	4:00+	2:00	
0	12.7	95	4:00+	2:25	
0	12.4	93	4:00+	3:30	
1	12.4	93	2:15	1:12	
1	11.8	88	4:00+	1:55	
1	11.4	86	4:00+	4:00+	
1	11.1	83	4:00+	4:00+	
2	11.1	83	4:00+	4:00+	

COMPRESSIVE STRENGTH — PSI

ECONOLITE Additive Percent	Slurry Density Lb./Gal.	Slurry Density Lb./Cu. Ft.	100°F	140°F — 3000 PSI	
			24 Hours	12 Hrs.	24 Hrs.
0	13.6	102	240	285	550
0	13.1	98	160	195	400
0	12.7	95	110	130	240
0	12.4	93	60	90	170
1	12.4	93	120	135	295
1	11.8	88	60	80	180
1	11.4	86	50	50	110
1	11.1	83	45	25	70
2	11.1	83	105	45	95

METRIC UNITS

HALLIBURTON LIGHT CEMENT WITH ECONOLITE SLURRY PROPERTIES

ECONOLITE Additive Percent	Water L/Sk.	Slurry Viscosity—Bc Initial	Slurry Viscosity—Bc 20 Min.	Free Water Percent	Slurry Density Kg/L	Yield L/Sk.
0	29.1	7	14	0.60	1.63	43.61
0	33.3	5	9	0.60	1.57	47.86
0	37.5	4	6	1.30	1.52	52.10
0	41.3	5	7	1.30	1.49	55.78
1	41.3	11	12	0.40	1.49	55.78
1	48.8	8	8	0.56	1.41	62.58
1	56.4	5	5	0.72	1.37	69.66
1	64.0	3	4	2.10	1.33	77.59
2	64.0	7	8	0.24	1.33	77.59

PRESSURE-TEMPERATURE THICKENING TIME TESTS

API CASING-CEMENTING SCHEDULES

ECONOLITE Additive Percent	Slurry Density Kg/L	Thickening Time—Hours:Minutes		
		1 220m 39°C	2 440m 52°C	
0	1.63	4:00+	2:02	
0	1.57	4:00+	2:00	
0	1.52	4:00+	2:25	
0	1.49	4:00+	3:30	
1	1.49	2:15	1:12	
1	1.41	4:00+	1:55	
1	1.37	4:00+	4:00+	
1	1.33	4:00+	4:00+	
2	1.33	4:00+	4:00+	

COMPRESSIVE STRENGTH—MPa

ECONOLITE Additive Percent	Slurry Density Kg/L	38°C	60°C — 20.68 MPa	
		24 Hours	12 Hrs.	24 Hrs.
0	1.63	1.65	1.97	3.79
0	1.57	1.10	1.34	2.76
0	1.52	0.76	0.90	1.65
0	1.49	0.41	0.62	1.17
1	1.49	0.83	0.93	2.03
1	1.41	0.41	0.55	1.24
1	1.37	0.34	0.34	0.76
1	1.33	0.31	0.17	0.48
2	1.33	0.72	0.31	0.66

ENGLISH UNITS**POZMIX® A CEMENT (CLASS G)****50-50 BLEND WITH 2% BENTONITE****SLURRY PROPERTIES**

Salt Per Cent**	Lbs./Sk.	Water Requirement Gal./Sk.	Cu.Ft./Sk.	Slurry Weight Lbs./Gal	Slurry Weight Lbs./cu.Ft.	Slurry Volume Cu.Ft./Sk.
0	0	5.75	0.77	14.15	106	1.26
18	8.62	5.75	0.77	14.52	109	1.31
Sat.	17.77	5.75	0.77	14.78	111	1.37

**Per Cent by Weight of Water.

COMPRESSIVE STRENGTH — PSIT†

Per Cent Salt	110°F	24 HOURS			72 HOURS	
		140°F	170°F	170°F	170°F	170°F
0	500	840	1,685		2,960	
18	575	825	2,010		2,925	
Sat.	160	660	1,785		2,250	

Per Cent Salt	Per Cent HR-4	24 HOURS			72 HOURS		
		170°F	230°F	260°F	170°F	230°F	260°F
0	0.40	1,485	2,935	2,960	2,375	2,725	2,825
18	0.40	1,810	1,875	2,110	2,150	2,550	1,885
Sat.	0.40	Not Set	1,185	1,600	1,935	2,235	1,475

† API Curing Pressures

On all salt water slurries, the amount of salt to use per sack of cement can be calculated by using the following figures per Cu. Ft. of water:

SALT % by Wt. of Water	SALT Lbs./Cu. Ft. of Water
10	6.24
14	8.74
18	11.23
24	15.00
Sat.	23.20

Salt should be dry blended with the cement, where possible.

METRIC UNITS
POZMIX® A CEMENT (CLASS G)
50-50 BLEND WITH 2% BENTONITE

SLURRY PROPERTIES

Per Cent**	Salt Kg/Sk.	Water Requirement L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
0	0.0	21.77	1.70	35.67
18	3.9	21.77	1.74	37.09
Sat. (60°C)	8.1	21.77	1.77	38.79

**Per Cent by Weight of Water.

COMPRESSIVE STRENGTH—MEGAPASCALS

Per Cent Salt	43°C**	24 HOURS			72 HOURS		
		60°C***	77°C***	77°C**	77°C***	110°C***	127°C***
0	3.44	5.79	11.61			20.40	
18	3.96	5.68	13.85			20.16	
Sat.	1.10	4.55	12.30			15.51	

Per Cent Salt	Per Cent HR-4	24 HOURS			72 HOURS		
		77°C***	110°C***	127°C***	77°C***	110°C***	127°C***
0	0.40	10.23	20.23	20.40	16.37	18.78	19.47
18	0.40	12.47	10.85	13.85	14.82	17.58	12.99
Sat.	0.40	Not Set	81.70	11.03	13.34	15.41	10.17

On all salt water slurries, the amount of salt to use per sack of cement can be calculated by using the following figures per Liter of water:

SALT % by Wt. of Water	SALT Kg/m ³ of Water
10	99.69
14	140.00
18	179.90
24	240.30
Sat. (60°C)	371.66

Salt should be dry blended with the cement, where possible.

**11.03 MPa Curing Pressure

***20.68 MPa Curing Pressure

ENGLISH UNITS**POZMIX® 140****RECOMMENDED TEMPERATURE RANGE**

Formation Temperature °F (Static)	Per Cent Chemical Activator	Per Cent Retarder	24-Hour Compressive Strength—PSI	Thickening Time (Hrs.)
140-230	4	None	300-4000	2-4
230-290	2	0.3-0.5	2500-4000	2-4
290 plus	0	0.6-1.5	1500 plus	2-4

SLURRY PROPERTIES

Pozmix A Lbs.	Lbs.	Hydrated Lime Gals./Sk.	Water Requirements Ft./Sk.	Slurry Weight Lbs./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
74	11	4.65	0.62	14.0	1.10

Note: Water value is an average for Pozmix A from St. Louis, Louisville and Kansas City and is based on 74 pounds.

Per Cent activator not shown.

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Per Cent Retarder*	API CASING TESTS				
	6,000'	8,000'	10,000'	12,000'	14,000'
0.0	4:00+	4:00+	3:30	1:59	1:12
0.3	4:00+	4:00+	4:00+	3:15	2:15
0.5	4:00+	4:00+	4:00+	4:00+	2:45

*Retarder added by weight of Pozmix A.

COMPRESSIVE STRENGTHS — PSI

Curing Time Days	CURING TEMPERATURE					
	120°F**	140°F**	160°F**	180°F**	220°F***	270°F***
1	195	780	2385	2505	4400	4005
3	1890	3410	4200	4285	4925	4950
7	2460	4070	4470	3940	4925	4950

** Atmospheric Pressure

*** Values above 200°F were cured under pressure of 3,000 psi and contained 0.30% retarder.

METRIC UNITS
POZMIX® 140
RECOMMENDED TEMPERATURE RANGE

Formation Temperature °C (Static)	Per Cent Chemical Activator	Per Cent Retarder	24-Hour Compressive Strength—MPa	Thickening Time (Hrs.)
60-110	4	None	2.06-27.57	2-4
110-143	2	0.3-0.5	17.23-27.57	2-4
143 plus	0	0.6-1.5	10.34 plus	2-4

SLURRY PROPERTIES

Pozmix A Kg.	Hydrated Lime Kg.	Water Requirements L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
33.5	4.9	17.60	1.68	33.41

Note: Water value is an average for Pozmix A from St. Louis, Louisville and Kansas City and is based on 33.6 Kg.
Per Cent activator not shown.

THICKENING TIME — HOURS:MINUTES
(Pressure-Temperature Thickening-Time Test)

Per Cent Retarder*	API CASING TESTS				
	1830m	2440m	3050m	3660m	4270m
0.0	4:00+	4:00+	3:30	1:59	1:12
0.3	4:00+	4:00+	4:00+	3:15	2:15
0.5	4:00+	4:00+	4:00+	4:00+	2:45

*Retarder added by weight of Pozmix A.

COMPRESSIVE STRENGTHS — MPa

Curing Time Days	CURING TEMPERATURE					
	49°C**	60°C**	71°C**	82°C**	104°C***	132°C***
1	1.34	5.37	16.44	17.27	30.33	27.61
3	13.03	22.82	28.95	29.54	33.95	34.12
7	16.96	28.06	30.82	27.16	33.95	34.12

** Atmospheric Pressure

*** Values above 93°C were cured under pressure of 20.68 MPa and contained 0.30% retarder.

ENGLISH UNITS**POZMIX® 140 (74-11)**

(With Salt)

SLURRY PROPERTIES

Water Gal./Sk.	Salt Per Cent	Slurry Density Lbs./Gal.	Slurry Density Lbs./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
4.65	0	14.0	105	1.18
4.65	4	14.0	105	1.19
4.65	6	14.1	105	1.19
4.65	10	14.2	106	1.20
4.65	18	14.3	107	1.22

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

API Casing Cementing Schedules

Depth Feet	Temperature—°F Static	Temperature—°F Circulating	Calcium Chloride Per Cent	Retarder Per Cent	Thickening Time Hrs:Min.
10,000	230	144	4	0.0	4:00+
10,000	230	144	4	0.0	5:00+
12,000	260	172	0	0.0	5:38
14,000	290	206	0	0.1	4:18
14,000	290	206	0	0.1	5:00+
16,000	320	248	0	0.4	3:06
SALT — 4 PER CENT					
10,000	230	144	2	0.0	5:00+
10,000	230	144	2	0.0	5:00+
12,000	260	172	0	0.0	5:05
14,000	290	206	0	0.1	3:45
16,000	320	248	0	0.4	3:05
SALT — 6 PER CENT					
10,000	230	144	2	0.0	5:00+
12,000	260	172	0	0.0	4:53
14,000	290	206	0	0.1	3:20
16,000	320	248	0	0.4	3:13
SALT — 10 PER CENT					
10,000	230	144	2	0.0	3:43
12,000	260	172	0	0.0	4:45
14,000	290	206	0	0.1	3:45
16,000	320	248	0	0.4	3:50
SALT — 18 PER CENT					
10,000	230	144	2	0.0	3:07
10,000	230	144	2	0.0	5:00+
12,000	260	172	0	0.1	6:54
14,000	290	206	0	0.2	4:28
14,000	290	206	0	*0.2	5:00*
16,000	320	248	0	0.3	3:06

*—Slurries contain 1.0% CFR-2

METRIC UNITS
POZMIX® 140 (74-11)
(With Salt)

SLURRY PROPERTIES

Water L/Sk.	Salt Per Cent	Slurry Density Kg/L	Slurry Volume L/Sk
17.60	0	1.68	33.41
17.60	4	1.68	33.69
17.60	6	1.69	33.69
17.60	10	1.70	33.97
17.60	18	1.73	34.57

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

API Casing Cementing Schedules

Depth meters	Temperature—°C Static	Temperature—°C Circulating	Calcium Chloride Per Cent	Retarder Per Cent	Thickening Time Hrs:Min.
3050	110	62	4	0.0	4:00+
3050	110	62	4	0.0	5:00+
3660	127	78	0	0.0	5:38
4270	143	97	0	0.1	4:18
4270	143	97	0	0.1	5:00+
4880	160	120	0	0.4	3:06
SALT — 4 PER CENT					
3050	110	62	2	0.0	5:00+
3050	110	62	2	0.0	5:00+
3660	127	78	0	0.0	5:05
4270	143	97	0	0.1	3:45
4880	160	120	0	0.4	3:05
SALT — 6 PER CENT					
3050	110	62	2	0.0	5:00+
3660	127	78	0	0.0	4:53
4270	143	97	0	0.1	3:20
4880	160	120	0	0.4	3:13
SALT — 10 PER CENT					
3050	110	62	2	0.0	3:43
3660	127	78	0	0.0	4:45
4270	143	97	0	0.1	3:45
4880	160	120	0	0.4	3:50
SALT — 18 PER CENT					
3050	110	62	2	0.0	3:07
3050	110	62	2	0.0	5:00+*
3660	127	78	0	0.1	6:54
4270	143	97	0	0.2	4:28
4270	143	97	0	*0.2	5:00*
4880	160	120	0	0.3	3:06

*—Slurries contain 1.0% CFR-2

ENGLISH UNITS**COMPRESSIVE STRENGTH — PSI
API CURING CONDITIONS**

Temp °F	Calcium Chloride Per Cent	Retarder Per Cent	Curing Time — Hours		
			12	24	48
230	4	0.0	2535	3000	3900
230	4	0.0	1435*	2150*	3500
260	0	0.0	1550	1700	1875
290	0	0.1	875	975	1560
290	0	0.1	600*	950*	1200
320	0	0.4	1200	1575	1610
SALT — 4 PER CENT					
230	2	0.0	2850	3225	3600
260	0	0.0	885	1075	1135
290	0	0.1	825	1175	1335
320	0	0.4	1375	1435	1560
SALT — 6 PER CENT					
230	2	0.0	2625	3225	3355
260	0	0.0	1060	1125	1250
290	0	0.1	860	1135	1375
320	0	0.4	1310	1500	1610
SALT — 10 PER CENT					
230	2	0.0	2325	2610	3160
260	0	0.0	1035	1185	1210
290	0	0.1	850	1010	1175
320	0	0.4	1510	1700	1755
SALT — 18 PER CENT					
230	2	0.0	2400	2660	2975
230	2	0.0	2335*	2600*	2925*
260	0	0.1	860	1035	1075
290	0	0.2	775*	875*	935*
290	0	0.2	975	1310	1335
320	0	0.3	1425	1625	1760

*—Slurries contain 1.0% CFR-2

POZMIX® A 140 WEIGHTED WITH BARITE**SLURRY PROPERTIES**

Pozmix A Lbs.	Hydrated		Water Requirements		Slurry Weight Lbs./Gal.	Slurry Volume Cu. Ft./Sk.
	Lime Lbs.	Barite Lbs.	Gals/Sk.	Cu. Ft./Sk.		
74	11.0	4.65	0.62	14.00	105	1.18
74	11.0	50	5.85	0.78	16.00	1.53
74	11.0	90	6.95	0.93	17.00	1.83
74	11.0	155	8.81	1.18	18.00	2.33

Note: Water based on 74 pounds Pozmix A.

Per Cent activator not shown.

METRIC UNITS

COMPRESSIVE STRENGTH — MEGAPASCALS API CURING CONDITIONS

Temp °C**	Calcium Chloride Per Cent	Retarder Per Cent	Curing Time — Hours		
			12	24	48
110	4	0.0	17.47	20.68	26.88
110	4	0.0	9.89*	14.82*	24.13
127	0	0.0	10.68	11.72	10.85
143	0	0.1	6.03	6.72	10.75
143	0	0.1	4.13*	6.55*	8.27
160	0	0.4	8.27	10.85	11.10
SALT — 4 PER CENT					
110	2	0.0	19.85	22.23	24.82
127	0	0.0	6.10	7.41	7.82
143	0	0.1	5.68	8.10	9.20
160	0	0.4	9.48	9.89	10.75
SALT — 6 PER CENT					
110	2	0.0	18.09	22.23	22.99
127	0	0.0	7.30	7.75	8.61
143	0	0.1	5.92	7.82	9.48
160	0	0.4	9.03	10.34	11.10
SALT — 10 PER CENT					
110	2	0.0	16.03	12.99	21.78
127	0	0.0	7.13	8.17	8.34
143	0	0.1	5.86	6.96	8.10
160	0	0.4	10.40	11.71	20.09
SALT — 18 PER CENT					
110	2	0.0	16.54	18.34	20.51
110	2	0.0	16.09*	17.92*	20.16*
127	0	0.1	5.92	7.13	7.41
143	0	0.2	5.34*	6.03	6.44*
143	0	0.2	6.72	9.03	9.20
160	0	0.3	9.82	11.20	12.13

*—Slurries contain 1.0% CFR-2

**—20.68 MPa Curing Pressure

POZMIX® A 140 WEIGHTED WITH BARITE

SLURRY PROPERTIES

Pozmix A Kg	Hydrated Lime Kg	Barite Kg	Water Requirements L/Sk	Slurry Weight Kg/L	Slurry Volume L/Sk
33.6	5	—	17.60	1.68	33.41
33.6	5	22.7	22.14	1.92	43.32
33.6	5	40.8	23.31	2.04	51.81
33.6	5	70.3	33.35	2.16	65.97

Note: Water based on 33.6 Kg Pozmix A.

Per Cent activator not shown.

ENGLISH UNITS**POZMIX® A 140****WEIGHTED WITH HI-DENSE NO. 3****SLURRY PROPERTIES**

Water Requirement — 4.65 Gals./Sk. — 0.62 Cu. Ft./Sk.

2 PER CENT ACTIVATOR

Pozmix A Lbs.	Lime Lbs.	Hi-Dense No. 3 Lbs.	Water Requirement Gals./Sk.	Cu. Ft./Sk.	Slurry Weight Lbs./Gal.	Slurry Weight Lbs./Cu. Ft.	Slurry Volume Cu. Ft./Sk.
74	11	—	4.65	0.62	14.00	105	1.18
74	11	30	4.76	0.64	16.00	120	1.30
74	11	47	4.82	0.64	17.00	127	1.36
74	11	66	4.89	0.65	18.00	135	1.43
74	11	88	4.97	0.66	19.00	142	1.51

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Simulated Well Depths Feet	Per Cent Retarder	Per Cent Activator	API CASING TESTS	
			16 Lbs./Gal	18 Lbs./Gal.
10,000	0.0	2	3:00+	3:00+
12,000	0.0	2	3:00+	3:00+
14,000	0.5	2	3:00+	3:00+
16,000	1.0	2	2:22	2:50
16,000	1.5	2	3:00+	3:00+

COMPRESSIVE STRENGTHS — PSI

Pozmix A 140 (2 Per Cent Activator)

Slurry Weight Lbs./Gal.	Lbs./Cu.Ft.	CURING TEMPERATURE							
		140°F		160°F		180°F			
		Per Cent Retarder	0.0	0.5	Per Cent Retarder	0.0	0.5	Per Cent Retarder	0.0
24 HOURS									
16.00	120	350	*	1005	*	1520	*		
18.00	135	360	*	1065	*	1350	*		
72 HOURS									
16.00	120	1860	1545	1815	1230	1960	1930		
18.00	135	1840	1800	1800	1175	2005	2530		
7 DAYS									
16.00	120	2085	1690	2020	2005	1980	2200		
18.00	135	2110	2135	2200	2605	2095	4350		

*Not Set

COMPRESSIVE STRENGTHS — PSI

Pozmix A 140 (4 per Cent Activator)

Slurry Weight Lbs./Gal.	Lbs./Cu.Ft.	CURING TEMPERATURE		
		140°F	160°F	180°F
24 HOURS				
16.0	120	755	1740	1750
18.0	135	730	1845	1860
72 HOURS				
16.0	120	2465	2685	2375
18.0	135	2245	2240	2400

Note: Properties shown on Pozmix A 140 typical of Kansas City, St. Louis, or Louisville Pozmix A.

METRIC UNITS**POZMIX® A 140****WEIGHTED WITH HI-DENSE NO. 3****SLURRY PROPERTIES**

Water Requirement — 17.6 Liters per Sack

2 PER CENT ACTIVATOR

Pozmix A Kg	Lime Kg	Hi-Dense No. 3 Kg	Water Requirement L/Sk.	Slurry Weight Kg/L	Slurry Volume L/Sk.
33.6	5	—	17.6	1.68	33.41
33.6	5	13.6	18.0	1.92	36.81
33.6	5	21.3	18.2	2.04	38.50
33.6	5	29.8	18.5	2.16	40.49
33.6	5	39.9	18.8	2.28	42.75

THICKENING TIME — HOURS:MINUTES

(Pressure-Temperature Thickening-Time Test)

Simulated Well Depths meters	Per Cent Retarder	Per Cent Activator	API Casing Tests 1.92 Kg/L	API Casing Tests 2.16 Kg/L
3050	0.0	2	3:00+	3:00+
3660	0.0	2	3:00+	3:00+
4270	0.5	2	3:00+	3:00+
4880	1.0	2	3:22	2:50
4880	1.5	2	3:00+	3:00+

COMPRESSIVE STRENGTHS — MEGAPASCALS

Pozmix A 140 (2 Per Cent Activator)

Slurry Weight Kg/L	CURING TEMPERATURE (20.68 mPa)					
	60°C		71°C		82°C	
	Per Cent Retarder	0.0	Per Cent Retarder	0.0	Per Cent Retarder	0.0
24 HOURS						
1.92	2.41	*	6.92	*	10.48	*
2.16	2.48	*	7.24	*	9.30	*
72 HOURS						
1.92	12.82	10.65	12.51	8.48	13.51	13.30
2.16	12.68	12.41	12.41	8.10	13.62	17.44
7 DAYS						
1.92	14.37	11.65	13.92	13.82	13.65	15.16
2.16	14.54	14.72	15.16	17.96	14.44	29.99

*Not Set

COMPRESSIVE STRENGTHS — MEGAPASCALS

Pozmix A 140 (4 per Cent Activator)

Slurry Weight Kg/L	CURING TEMPERATURE (20.68 mPa)		
	60°C	71°C	82°C
24 HOURS			
1.92	5.20	11.99	12.06
2.16	5.03	12.72	12.82
72 HOURS			
1.92	16.99	18.51	16.37
2.16	15.47	15.44	16.54

Note: Properties shown on Pozmix A 140 typical of Kansas City, St. Louis, or Louisville Pozmix A.

SECTION VII

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ENGLISH UNITS

FOAM CEMENT

Halliburton's FOAM CEMENT makes lightweight slurries (6 to 11 lb/gal) for well cementing relatively easy to produce. Also, FOAM CEMENT makes ultra-lightweight slurries (3 to 4 lb/gal) for specialty applications readily available.

Lightweight FOAM CEMENT slurries are especially useful for cementing wells that pass through zones having very sensitive fracture gradients that have consistently failed to support the hydrostatic pressure of conventional lightweight slurries. Also, FOAM CEMENT has potential for low density grouting mixtures and for lightweight slurries used for cementing offshore conductor and casing pipe in weak unconsolidated formations. It can also be used to form floating cement plugs on hydrocarbon or aqueous fluids.

The nature of Halliburton's FOAM CEMENT helps make it economically attractive. It increases the yield of a sack of cement from 1 cu. ft. to as much as 4 cu. ft. depending on weight of the foamed slurry. Also FOAM CEMENT acts as a lost circulation aid thereby reducing the amount of other additives required.

FOAM CEMENT may be formed by using readily available, standard equipment and a gas such as nitrogen. Halliburton's FMCEM computer program can provide the proper mixing rates and volumes for the desired final slurry weight.

Whether you need a lightweight slurry for cementing through problem zones, an ultra-lightweight slurry for specialty applications, or a slurry to provide inexpensive fillup, Halliburton's FOAM CEMENT may meet your needs.

COMPRESSIVE STRENGTH OF FOAM CEMENT CURED AT ATMOSPHERIC PRESSURE

CLASS A CEMENT

Surface Slurry: Class A cement + 2.0% CaCl₂ + 5.2 Gal/Sk - 15.6 Lb/Gal

Curing Temperature:	65°F			100°F			140°F		
Density of FOAM CEMENT	Compressive Strength (psi)								
(lbs/gal)	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.
10	390	480	1540	850	1460	1900	980	1120	1530
8	160	250	1020	470	650	1020	440	460	740
6	50	90	400	140	250	400	230	250	360

CLASS C CEMENT

Surface Slurry: Class C cement + 2.0% CaCl₂ + 6.3 Gal/Sk - 14.8 Lb/Gal

Curing Temperature:	65°F			100°F			140°F		
Density of FOAM CEMENT	Compressive Strength (psi)								
(lbs/gal)	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.
10	480	890	1680	1110	1380	1880	1220	1250	1790
8	290	440	920	690	790	1000	530	590	720
6	150	270	410	320	330	720	360	280	460

CLASS G CEMENT

Surface Slurry: Class G cement + 2.0% CaCl₂ + 5.0 Gal/Sk - 15.8 Lb/Gal

Curing Temperature:	65°F			100°F			140°F		
Density of FOAM CEMENT	Compressive Strength (psi)								
(lbs/gal)	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.
10	200	470	1070	620	890	1100	600	900	1270
8	120	260	500	260	420	570	310	330	550
6	40	80	140	130	170	220	150	160	180

CLASS H CEMENT

Surface Slurry: Class H cement + 2.0% CaCl₂ + 4.3 Gal/Sk - 16.4 Lb/Gal

Curing Temperature:	65°F			100°F			140°F		
Density of FOAM CEMENT	Compressive Strength (psi)								
(lbs/gal)	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.
10	100	180	710	270	600	760	400	620	750
8	70	90	250	160	370	540	200	300	350
6	30	50	150	130	130	240	90	130	150

METRIC UNITS

FOAM CEMENT

Halliburton's FOAM CEMENT makes lightweight slurries (0.72 to 1.32 Kg/L) of well cementing relatively easy to produce. Also, FOAM CEMENT makes ultra-lightweight slurries (0.36 to 0.48 Kg/L) for specialty applications readily available.

Lightweight FOAM CEMENT slurries are especially useful for cementing wells that pass through zones having very sensitive fracture gradients that have consistently failed to support the hydrostatic pressure of conventional lightweight slurries. Also, FOAM CEMENT has potential for low density grouting mixtures and for lightweight slurries used for cementing offshore conductor and casing pipe in weak unconsolidated formations. It can also be used to form floating cement plugs on hydrocarbon or aqueous fluids.

The nature of Halliburton's FOAM CEMENT helps make it economically attractive. It increases the yield of a sack of cement from 28.32 L. to as much as 113.27 L. depending on weight of the foamed slurry. Also FOAM CEMENT acts as a lost circulation aid thereby reducing the amount of other additives required.

FOAM CEMENT may be formed by using readily available, standard equipment and a gas such as nitrogen. Halliburton's FMCEM computer program can provide the proper mixing rates and volumes for the desired final slurry weight.

Whether you need a lightweight slurry for cementing through problem zones, an ultra-lightweight slurry for specialty applications, or a slurry to provide inexpensive fillup, Halliburton's FOAM CEMENT may meet your needs.

COMPRESSIVE STRENGTH OF FOAM CEMENT CURED AT ATMOSPHERIC PRESSURE

CLASS A CEMENT

Surface Slurry: Class A cement + 2.0% CaCl₂ + 19.7 L/Sk - 1.87 Kg/L

Curing Temperature:	18°C	38°C	60°C						
Density of FOAM CEMENT	Compressive Strength (MPa)								
(Kg/L)	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.
1.20	2.68	3.31	10.62	5.86	10.07	13.10	6.76	7.72	10.55
0.96	1.10	1.72	7.03	3.24	4.48	7.03	3.03	3.17	5.10
0.72	0.34	0.62	2.76	0.97	1.72	2.76	1.59	1.72	2.48

CLASS C CEMENT

Surface Slurry: Class C cement + 2.0% CaCl₂ + 23.8 L/Sk - 1.77 Kg/L

Curing Temperature:	18°C	38°C	60°C						
Density of FOAM CEMENT	Compressive Strength (MPa)								
(Kg/L)	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.
1.20	3.31	6.14	4.58	7.65	9.51	12.96	8.41	8.62	12.34
0.96	2.00	3.03	6.34	4.76	5.45	6.89	3.65	4.07	4.96
0.72	1.03	1.86	2.83	2.21	2.28	4.96	2.48	2.62	3.17

CLASS G CEMENT

Surface Slurry: Class G cement + 2.0% CaCl₂ + 18.9 L/Sk - 1.89 Kg/L

Curing Temperature:	18°C	38°C	60°C						
Density of FOAM CEMENT	Compressive Strength (MPa)								
(Kg/L)	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.
1.20	1.38	3.24	7.38	4.27	6.14	7.58	4.14	6.21	8.76
0.96	0.83	1.79	3.45	1.79	2.90	3.93	2.14	2.28	3.79
0.72	0.28	0.55	0.97	0.90	1.17	1.52	1.03	1.10	1.24

CLASS H CEMENT

Surface Slurry: Class H cement + 2.0% CaCl₂ + 16.3 L/Sk - 1.97 Kg/L

Curing Temperature:	18°C	38°C	60°C						
Density of FOAM CEMENT	Compressive Strength (MPa)								
(Kg/L)	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.	12 Hr.	24 Hr.	72 Hr.
1.20	0.69	1.24	4.90	1.86	4.14	5.24	2.76	4.27	5.17
0.96	0.48	0.62	1.72	1.10	2.55	3.72	1.38	2.07	2.41
0.72	0.21	0.34	1.03	0.90	0.90	1.65	0.62	0.90	1.03

GAS-CHEK® CEMENT

GAS-CHEK® cement additive has been introduced to provide an effective means of helping prevent gas flow into the annulus after cement has been placed. Historically, the industry has been plagued with the problem of annular gas flow following completion of cementing jobs. Numerous corrective practices have been attempted in order to help prevent annular gas flow, but previously no completely reliable process had been found.

GAS-CHEK® cement provides a new cementing technique for annular gas flow problems. GAS-CHEK® cement does not have to be used in the entire cementing operation but should be used across all possible gas invasion zones.

A cement slurry mixed and initially placed into a well annulus behaves as a fluid, i.e. it transmits hydrostatic pressure throughout the cement column based on slurry density and depth. After the cement sets, it behaves as a solid. Solids do not transmit hydrostatic pressure. However, between the liquid and solid states of the cement it passes through a transition or plastic phase. In this transition phase the cement is neither a fluid nor a solid. When in this phase the cement will not transmit hydrostatic pressure but is not strong enough to prevent gas cutting or flow.

When the cement slurry in the annulus enters this transition phase, the original hydrostatic pressure is trapped within the cement matrix. This pressure is maintained by the water present in the cement matrix.

This water within the cement matrix is not compressible; therefore, any change in volume will cause a rapid decrease in pressure which in this transition state cannot be resupplied from the column above. This decrease in volume can and does occur by two mechanisms:

1. Fluid Loss-Although it is possible to reduce fluid loss of a slurry to a low value, sufficient to prevent dehydration, it is impossible to reduce fluid loss to zero.
2. Cement Hydration-During initial cement hydration, the same time period in which the slurry fails to transmit hydrostatic pressure, water within the pore space undergoes a decrease in volume. The chemical reactions involved cause decreases in volume by a factor of 0.2-0.5 percent.

These decreases in volume, since the pressure-maintaining water phase is not compressible to any great extent, allows the original trapped hydrostatic pressure to decrease. When the pressure decreases to less than formation gas pressure, annular gas flow can occur.

Expanding cements undergo these same decreases in internal volume and pore pressure. Their expansion only occurs after the cement reaches a set or solid condition. By this time, gas invasion may already have occurred. Expanding cements, zero free water cements and gel cements do nothing towards solving annular gas migration.

GAS-CHEK® cement slurries are designed and tailored to meet the requirements of individual job conditions. Knowledge of downhole conditions is a necessary element of proper planning and job design. Information requested for GAS-CHEK® cement slurry design includes:

1. Temperature at T.D. (log, circulating or static)
2. Well geometry (hole and casing diameters and true vertical depth)
3. Density of wellbore fluid
4. Desired cement slurry density
5. Desired height of cement
6. Anticipated cement and displacement pumping rates

ENGLISH / METRIC UNITS

CAL-SEAL

Cal-Seal is a high strength, controlled setting gypsum cement, which has been designed specifically for use in oil and gas wells. Its controlled setting makes Cal-Seal highly adaptable to a wide range of remedial jobs such as bridging plugs, split pipe and lost circulation. It can be placed by either conventional cementing methods or Dump Bailer equipment; however, the dump bailer technique is generally preferred.

SLURRY PROPERTIES

Cal-Seal Lbs. (Kg)	Water Gal. (L)	Slurry Weight Lbs./Gal. (Kg/L)	Slurry Volume Gals. (L)	Setting Time 60° - 180°F (16° - 82°C)	Compressive Strength psi (MPa)
100 (45.4)	4.8 (18.2)	15.1 (1.81)	9.2 (34.8)	50-60 Min.	2500 psi (17.24 MPa) (within 1 hr. after setting)

HYDROMITE

Hydromite is a combination of a powdered resin and gypsum cement. It is mixed with fresh water and a catalyst, or retarder, to form a slurry with a setting time controlled to fit the temperature conditions of the well in which it is to be used.

TEMPERATURE RANGE		ADDITIVE
60° - 120°F	(16° - 49°C)	Catalyst A
120° - 180°F	(49° - 82°C)	Catalyst A-120
180° - 225°F	(82° - 107°C)	Sodate Retarder

Hydromite is placed in the well with regular Dump Bailer equipment. With the application of pressure, the resin phase is squeezed into the formation where it sets to form a hard impervious barrier to formation fluids or gases.

SLURRY PROPERTIES

Hydromite Lbs. (Kg)	Water Gal. (L)	Slurry Weight Lbs./Gal. (Kg/L)	Slurry Volume Gals. (L)	Setting Time 60° - 225°F (15° - 107°C)	Compressive Strength 3 Hours psi (MPa)
100 (45.4)	3.0 (11.4)	14.9 (1.79)	8.4 (31.8)	75-100 Min.	1500 psi (10.34 MPa)

ENGLISH UNITS

MICRO MATRIX CEMENT

Description and Primary Function: Micro Matrix is an ultra-fine cement designed to penetrate gravel packs, very small channels, and repair casing leaks. Micro Matrix can be used as a lightweight cement for primary cementing. Its primary application is to squeeze off gravel packs and repair casing leaks. It can penetrate openings as small as 0.05 mm because it is as much as ten times smaller than standard cement.

Usage Restrictions: MICROSAND must be added when Micro Matrix is used at temperatures higher than 140°F. Do not mix 100% Micro Matrix at a density greater than 12 lb/gal because severe gelation problems will occur. **To overcome gelation problems, use Micro fly ash at a 50:50 ratio.**

**Summary of Compressive Strength (psi)
Development for Various Micro Fly Ash and Micro Matrix Systems**

	3 Days	7 Days	21 Days	3 Days	7 Days	21 Days
Slurry #	150°F Data			200°F Data		
1	777	727	748	—	—	—
2	517	710	1,111	—	—	—
3	N.S.	2,260	2,150	2,200	3,110	—
4	661	1,379	1,910	—	—	—
	200°F Data			350°F Data		
1	576	592	601	88	70	60
2	1,654	1,904	2,370	1,262	1,120	259
3	1,400	1,814	2,500	1,233	657	671
4	1,484	2,100	2,370	769	1,581	1,412
5	—	—	—	1,607	—	2,250

Cube Descriptions (all mixed at 12.0 lb/gal)

1. Micro Matrix +0.05 gal/sk defoamer + 1.0% fluid loss + 0.05 gal/sk retarder + 116.4% Water
2. Same as #1 + 60% MicroSand + 178.4% water
3. 50:50 Blend + 0.05 gal/sk defoamer + 1% fluid loss + 0.05 gal/sk + 106.2% water
4. Same as #3 + 40% MicroSand (by weight of blend) + 148.24% water
5. Same as #3 + 35% MicroSand (by weight of cement) + 124.6% water

ENGLISH UNITS**MICRO BOND CEMENT**

MicroBond was developed to provide cement expansion for a wide variety of cements at in place static conditions of 32 to 175 deg F.

**Low Temperature Class A Slurries with Salt, 80 deg F
Cement: Foreman Class A, Duncan, Oklahoma**

	A	B	C	D
Formulation (% bwc)				
MicroBond	8.2	8.2	11.5	11.5
Fluid Loss Additive	0.4	0.4	0.4	0.4
Dispersant	0.51	0.51	0.6	0.6
Salt	2.14	2.14	3.0	3.0
Calcium Chloride	0	2.0	0	2.0
Water	50	50	51.6	51.6
Slurry Properties				
Density (lb/gal)	15.5	15.6	15.5	15.6
Yield (cu ft/sk)	1.30	1.31	1.34	1.35
Expansion (% linear)(b)				
1 Day	0.13	0.19	0.18	0.33
3 Day	0.16	0.31	0.24	0.44
28 Day	0.26	0.33	0.36	0.64
UCA Compressive Strengths				
Initial Set (hr:min)	4:09	7:26	8:33	8:02
24 Hour (psi)	2100	1800	1800	1600
3 Day (psi)	3750	3300	3100	2500
7 Day (psi)	4640	4130	4400	3700

(a) Atmospheric Consistometer, 80 deg F

(b) Water bath, unrestrained.

ENGLISH UNITS

MICROBOND M

MicroBond M is a chemical expansive additive that was developed specifically for use at moderate temperatures ranging from about 130°F to 210°F. It will provide more expansion than MicroBond at 130°F to 170°F. It will also provide significant expansion much quicker than MicroBond HT at 170°F to 190°F, i.e., in three days versus 7 to 14 days. The good expansive properties of MicroBond M make it very easy to design an expansive cement slurry at moderate temperatures.

TEST SLURRIES

Component	Slurry No. 1		Slurry No. 2		Slurry No. 3	
	Percent	lbs/sk	Percent	lbs/sk	Percent	lbs/sk
Premium cement	100	94	100	94	100	94
SSA-1	0	0	35	32.9	0	0
Salt	0	0	0	0	12	4.3
MicroBond M	5	4.7	5	4.7	5	4.7
Fluid Loss #1	0.5	0.47	0.5	0.47	0	0
Fluid Loss #2	0	0	0	0	0.5	0.47
Retarder	variable	35.8	0.2	0.188	0	0
Water						
Component	Slurry No. 4		Slurry No. 5		Slurry No. 6	
	percent	lbs/sk	Percent	lbs/sk	Percent	lbs/sk
Premium Cement	100	94	100	94	100	94
SSA-1	0	0	0	0	35	32.9
Salt	18	6.45	Sat'd	13.3	34.8	18.9
MicroBond M	5	4.7	5	4.7	5	4.7
Fluid Loss #2	0.5	0.47	0.5	0.47	0.5	0.47
Fluid Loss #3	0	0	0	0	0.5	0.47
Dispersant	0	0	0	0	0.2	0.188
Retarder	0	0	0.2	0.188	0	0
Water	38.1	35.8	38.1	35.8	57.6	54.1

EXPANSION DATA

Slurry No.	Salt (%)	Curing Temp (°F)	Expansion		
			3 Day (%)	7 Day (%)	14 Day (%)
1	0	95	0.14 ¹	0.18	0.27
1	0	110	0.17 ¹	0.21	0.28
1	0	130	0.21	0.54	1.21 ²
1	0	150	0.13	0.68	1.45 ²
1	0	170	—	1.3	—
1	0	190	0.39	0.50	0.46 ²
1	0	210	0.36	0.44	0.37 ²
2	0	240	0.31 ¹	0.30	—
3	12	150	0.40	0.84	1.27
4	18	150	0.40	0.58	1.02
5	37	150	0.42 ³	0.56	0.61
6	34.8	275	0.49	0.51	—

¹ Actual measurements made after 4 days.

² Actual measurements made after 15 days.

³ Actual measurements made after 2 days.

ENGLISH UNITS

MICROBOND HT

MicroBond HT is an expansive cement additive for use at temperatures above 170 deg F. Previously, cement expansion additives have been limited by either the type of cement in which they could be used, or by a maximum effective temperature. MicroBond HT not only provides expansion above 170 deg F, but also is functional in all API cement classifications. MicroBond HT can provide up to 1 to 3% linear expansion from dosages ranging from approximately 3 to 5% (by weight of cement).

Dosage vs Expansion at 275 deg F and 3000 psi

MicroBond HT (%)	Water (%)	3 Day Expansion (%)
Class H cement, 40% SSA-2 + 10% SSA-1 + Fluid Loss Additive + Retarder		
2.00	37.0	0.14
3.00	37.5	1.73
2.66	42.1	0.28
3.55	41.4	1.18
4.44	41.8	2.96
5.33	41.0	4.49
Class H cement, 40% SSA-2 + Fluid Loss Additive + Retarder		
4.44	38	2.14
3.5	38	1.34
3.0	37.5	1.73
2.0	37	0.14

ENGLISH UNITS

SILICALITE

Silicalite consists of a finely divided, high surface area silica that can be provided as a liquid or a powder. The physical and chemical properties of this silica material make it very useful for a variety of cementing applications including (1) use as an extender for lightweight cement, (2) compressive strength enhancement of low temperature lightweight cement, (3) thixotropic properties for squeeze cementing, lost circulation and gas migration control. In addition to these properties, Silicalite also provides a degree of fluid loss control and acts as a low temperature accelerator for saturated salt slurries.

Compressive Strength Development of Blends Containing POZMIX® Silicalite and Cement

Silicalite Base: 1:1:2.54 POMIX:Silicalite:Cement (84 lb/sk)

Slurry Density (lb/gal)	Slurry Volume (cu ft/sk)	Water (gal/sk)	Additive (% by Wt.)	Cement Type	Compressive Strength (psi)	
					24 Hr	72 Hr
60°F (Atmospheric)						
12.0	1.97	11.19	4%CaCl2	Standard	60	130
12.5	1.74	9.42	4%CaCl2 0.5% Dispersant	Standard	115	300
80°F (Atmospheric)						
11.0	2.71	16.72	None	Standard	30	95
11.5	2.29	13.52	None	Standard	80	195
12.0	1.97	11.19	1% CaCl2	Standard	180	—
12.3	1.83	10.08	1% CaCl2	Standard	285	—
12.6	1.70	9.18	1% CaCl2	Standard	360	—
12.0	1.97	11.19	1% CaCl2	Premium Plus	170	455
12.1	1.92	10.80	0.5% CaCl2	Premium Plus	240	700
12.4	1.78	9.74	0.5% CaCl2	Premium Plus	350	960
90°F (Atmospheric)						
11.5	2.29	13.52	None	Premium (4.3)	—	295
11.5	2.24	13.52	0.5% CaCl2	Premium (4.3)	—	320
11.5	2.29	13.52	1.0% CaCl2	Premium (4.3)	—	420
11.5	2.40	14.20	5.0% Salt	Premium (4.3)	—	515
11.75	2.12	12.27	0.5% CaCl2	Premium (4.3)	—	300
11.75	2.12	12.27	1.0% CaCl2	Premium (4.3)	—	370
11.75	2.24	13.10	5.0% Salt	Premium (4.3)	—	680
95°F (Atmospheric)						
12.0	1.97	11.19	1%CaCl2	Standard	—	1585
12.2	1.87	10.43	1%CaCl2	Standard	—	1735
12.4	1.78	9.74	1%CaCl2	Standard	—	1525
12.0	1.97	11.19	1%CaCl2	Premium Plus	—	1520
100°F (Atmospheric)						
11.0	2.71	16.72	None	Premium Plus	60	330
12.0	1.97	11.19	None	Premium Plus	135	925
13.7	1.35	6.52	0.75% Dispersant 2% CaCl2	Standard	1835	4615
140°F (Atmospheric)						
10.0	4.34	28.88	4% Bentonite	Standard	160	200
11.0	2.71	16.72	2% Bentonite	Standard	1115	1440
12.0	1.97	11.19	None	Standard	1290	1455
12.5	1.74	9.42	0.5% Dispersant	Standard	1825	2335
11.5	2.40	14.20	5% Salt	Premium(4.3)	825	—
150°F (Atmospheric)						
11.5	2.29	13.52	None	Premium Plus	580	675
12.0	1.97	11.19	None	Premium Plus	900	1010
230°F (Atmospheric)						
12.0	1.97	16.72	None	Standard	2380	1960
12.5	1.74	9.42	0.5% Dispersant	Standard	2750	2825
13.7	1.35	6.52	0.75 % Dispersant 2% CaCl2	Standard	5265	5600

ENGLISH UNITS

PERMEABILITY OF VARIOUS CEMENTING COMPOSITIONS TO WATER (Millidarcies)

SLURRY COMPOSITION	Water Gal./Sk.	1 Day	80°F (1)			100°F (1)			120°F (1)			140°F (1)		
			7 Days	28 Days	1 Day	7 Days	28 Days	1 Day	7 Days	28 Days	1 Day	7 Days	28 Days	
CLASS A CEMENT (COMMON PORTLAND)														
Neat	5.2	0.102	*	*	0.005	*	*	*	*	*	*	*	*	
4% Bentonite	7.7	0.423	*	*	0.116	*	*	0.075	*	0.001	0.020	0.005	0.005	
25 Lbs. Gilsonite	6.2	0.791	*	*	0.234	*	*	0.398	*	*	0.019	*	0.002	
20% Diacel D	13.5	**	0.304	0.003	**	0.001	*	**	*	*	0.026	0.002	*	
40% Diacel DLR-11 Resin	25.6	**	1.546	0.002	**	0.007	*	**	*	*	0.059	0.011	*	
LR-11 Resin	3.4	**	0.005	0.002	0.017	0.003	*	**	0.003	*	0.004	0.002	*	
0.9 Gal. LA-2 (Latex Cement)	6.0	3.00+	*	*	0.097	*	*	0.016	*	*	0.007	0.006	0.004	
Pozmix®A Cement - 0% Bentonite	4.4	0.530	0.002	*	0.124	*	*	0.039	*	*	0.022	*	*	
Pozmix®A Cement - 2% Bentonite	5.75	0.748	0.014	*	0.726	0.002	*	0.046	*	*	0.099	*	*	
Pozmix®A Cement - 2% Bentonite (with 0.9 Gal. LA-2)	4.5	3.00+	0.004	*	0.452	*	*	0.012	*	*	*	*	*	
CLASS C CEMENT (HIGH EARLY)														
Neat	6.3	0.030	*	*	0.002	*	*	*	*	*	*	*	*	
3% Bentonite	8.3	0.006	*	*	0.011	*	*	*	*	*	0.003	0.003	0.016	
25 Lbs. Gilsonite	7.3	0.202	*	*	0.078	*	*	0.049	*	0.002	0.017	0.003	0.005	
LR-11 Resin	3.4	**	0.003	0.002	0.010	0.002	*	**	0.001	*	0.010	*	*	
0.9 Gal. LA-2 Latex	6.0	0.086	*	*	0.003	*	*	*	*	*	0.002	*	0.002	
Pozmix®A Cement - 0% Bentonite	5.1	0.420	*	*	0.116	*	*	0.014	*	*	0.006	*	*	
Pozmix®A Cement - 2% Bentonite	6.1	1.466	0.002	*	0.147	0.002	*	0.044	*	*	0.016	*	*	
CLASS E CEMENT (RETARDED)														
Class D - neat	4.5	—	—	—	0.223	*	*	—	—	—	1.240	*	*	
Class D - 4% Bentonite	7.1	—	—	—	0.077	0.003	*	—	—	—	0.032	0.003	0.004	

* Less than 0.001 millidarcies

** Specimen strength too low to permit measurement of permeability

(1) Atmospheric Pressure

ENGLISH / METRIC UNITS

TIME TO RUN TEMPERATURE SURVEYS

The following values are given as the approximate time to run temperature surveys when using different admixtures in oil well cements:

		TIME - HOURS			
		Admixture	100°F 38°C	120°F 49°C	140°F 60°C
Portland Cement	0 % Gel		8-12	8-12	6-9
	4% Gel		8-12	8-12	6-9
	8% Gel		9-12	9-12	6-9
	12% Gel		9-12	9-12	9-12
Pozmix® Cement	0% Gel		8-12	8-12	6-9
	2% Gel		8-12	8-12	6-9
	4% Gel		8-12	8-12	6-9
Portland Cement with 2 or 4% Gel and Perlite	0 cu. Ft. (0 cu. m)		8-12	8-12	6-9
	¼ cu. Ft. (.007 cu. m)		8-12	8-12	6-9
	½ cu. Ft. (.014 cu. m)		9-12	9-12	6-9
	1 cu. Ft. (.028 cu. m)		9-12	9-12	9-12
Portland Cement with Diacel D*	10%		10-14	10-14	9-12
	20%		10-14	10-14	9-12
	40%		12-16	12-16	10-14

HIGH TEMPERATURE CEMENTS

		140°F 60°C	160°F 71°C	180°F 82°C	220°F 104°C	260°F 127°C
Pozmix Cement or Portland Cement with Retarder	0.3% 0.5%	15-18 16-24	12-15 16-24	9-12 12-18	8-12 9-12	6-9 8-12
Retarded Cements: Texcon®		16-24	16-24	12-18	9-12	9-12
Pozmix 140*		16-24	16-20	12-16	8-12	6-9

* Has low heat of hydration and may be difficult to pick up on a temperature survey.

ENGLISH/METRIC UNITS

TIME TO PERFORATE

The perforating properties of any cementing composition are largely dependent upon sheath thickness, cement strength at the time of perforating and the charge size to casing size relationship. Using expendable jet charges, higher compressive strengths yield less damage to casing or cement, while bullet perforators result in less penetration and more shattering. Generally hollow tube jet carrier perforators produce minimum damage to casing or cement.

An old technique using bullets was to perforate early or when the cement was strong enough to keep from flowing back or closing up the perforations. Then cement strength was allowed to build up for a period of 12-18 hours (depending on well temperature) before performing any additional work. The same procedure may be employed with hollow tube jet carrier perforators. However, with expendable type charges this method of perforating is not normally recommended.

The following indicated "time to perforate" data are based upon the cementing composition attaining a minimum compressive strength of 500 psi (3.450 MPa) at the corresponding temperature. These data are primarily to be used as a guide when perforating with bullets or hollow tube carrier perforators.

These times are only approximate since variations in the chemical and physical properties of different brands of cement as well as different batches of the same brand may result in variations in the data shown below.

CLASS A CEMENT

API CURING TEMPERATURE & PRESSURE

TIME - HOURS

Per Cent Retarder	110°F 43°C	140°F 60°C	170°F 76°C	200°F 93°C	230°F 110°C	260°F 127°C
0	12	10	8	6	—	—
0.30	—	20	16	12	8	6-8
0.40	—	22	18	16	10-12	8
0.50	—	24	30	18	14	10
4 Per Cent Bentonite						
0	18	16	14	10	8	—
8 Per Cent Bentonite						
0	24-36	24	20	18-20	16	—

POZMIX® CEMENT

Per Cent Retarder	110°F 43°C	140°F 60°C	170°F 76°C	200°F 93°C	230°F 110°C	260°F 127°C
0	18	14	12	8	—	—
0.2	—	24	20	18	16	12
0.3	—	30	20-24	18-20	16-18	14
0.4	—	36	24	20	18	16

CLASS E (RETARDED) CEMENT

140°F - 60°C	170°F - 76°C	230°F - 110°C	290°F - 143°C
24	16-18	0% Bentonite 12	8
36	24-30	4% Bentonite 18-24	12-14

POZMIX® 140

Per Cent Retarder	200°F 93°C	230°F 110°C	260°F 127°C	290°F 143°C	320°F 160°C
0.00	24-28	20-24	18	12-16	—
0.40	—	—	18-20	12	8

ENGLISH / METRIC UNITS

SECTION 240

HALLIBURTON TECHNICAL DATA

**CALCULATIONS,
FORMULAE
AND
SLURRY TABLES**



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ENGLISH/METRIC UNITS

USEFUL DATA TO CALCULATE LENGTHS, AREAS AND VOLUMES

1. Linear Measurements (Length):

To find the circumference of a circle multiply the diameter by 3.1416.

To find the diameter of a circle divide the circumference by 3.1416.

The radius of a circle is one-half the diameter.

2. Square Measurement (Area):

To find the area of a square multiply the length by the width.

To find the area of a rectangle multiply the length by the width.

To find the area of a circle multiply one-half the diameter by one-half the diameter and multiply the answer by 3.1416, or diameter \times diameter \times .7854.

To find the vertical surface area of a cylinder standing on its end multiply the circumference by its vertical height.

To find the surface area of a sphere multiply the circumference by the diameter.

3. Cubic Measurement (Volume, capacity and displacement):

To find the volume of a cube or rectangular solid multiply the length by the height and multiply the answer by the width.

To find the volume, capacity or displacement of a square or rectangular tank multiply the length by the height, then multiply the answer by the width.

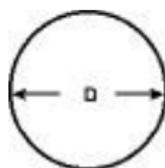
To find the volume, capacity or displacement of a cylinder multiply the area of its end by its height.

To find the volume, capacity or displacement of a sphere or spherical tank multiply one-half of its diameter by the surface area and divide the answer by three.

ENGLISH/METRIC UNITS

GEOMETRICAL RELATIONSHIPS

CIRCLE:



$$\text{AREA} = 0.7854 \times D^2$$

SPHERE:



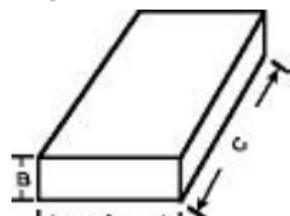
$$\text{SURFACE AREA} = 3.14 \times D^2$$

ELLIPSE:



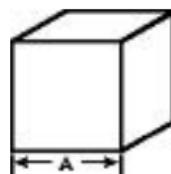
$$\text{AREA} = 0.7854 \times A \times B$$

RECTANGULAR PARALLELOPIPED:



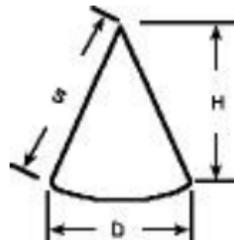
$$\text{SURFACE AREA} = 2 \times (AB + BC + CA)$$

CUBE:



$$\text{(ALL SIDES EQUAL)} \\ \text{SURFACE AREA} = 6 \times A^2$$

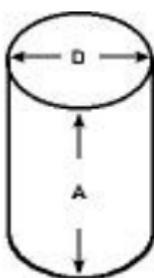
CONE:



$$\text{SURFACE AREA} = 1.57 \times D \times 5$$

$$\text{VOLUME} = \frac{3.14 \times D^2 \times H}{12}$$

CYLINDER:



1. HOLLOW

$$\text{SURFACE AREA} = 3.14 \times D \times A \\ \text{VOLUME} = D^2 \times A \times .7854$$

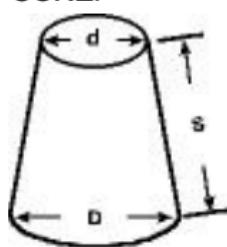
2. SOLID

SURFACE

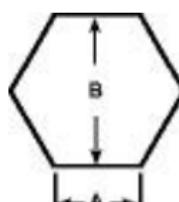
$$\text{AREA} = 3.14 \times D \times A + 1.57 \times D^2$$

$$\text{VOLUME} = D^2 \times A \times .7854$$

FRUSTRUM OF CONE:



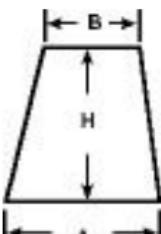
$$\text{SURFACE AREA} = 1.57 \times (D+d) \times 5$$



HEXAGON:

$$\text{AREA} = 3/2 \times A \times B$$

TRAPEZOID:



$$\text{AREA} = \frac{1}{2} \times (A + B) \times H$$

ENGLISH/METRIC UNITS

WEIGHTS AND MEASURES

1 U.S. gal equals 1 U.S. gal. water at 20°C. (68°F.) weighs 8.33 Lbs. – 3.778 kg. 1 Imperial or English gal. equals ... 277.420 Cu. In. – 4.54596 L. 1 Imperial gal. of water weighs 10 Lbs. – 4.535924 kg. 1 Square Foot equals 144 square In. – .092903 m2. 1 Cubic Inch equals 	{ 231 Cu. In. – 3785.4 cm3. 0.1337 Cu. Ft. – .00379 m3. 0.0238 bbls. – 3.785 L. .0043291 Gals. – .016387 L. .0005787 Cu. Ft. – .000016 m3. { 1728 Cu. In.–.02832.4 cm3. 7.4805 U.S. Gal.–28.32 L. 0.1781 bbls.–28.32 L. 1 cu. ft. water at 20°C. (68°F.) weighs . 62.31 Lbs.–28.263341 kg. 1 cu. ft. salt water(4.6%) weighs 64.3 Lbs.–29.165989 kg. 1 cu. ft. Saturated Salt Water weighs .. 74.7 Lbs.–33.8335 kg. 1 Standard Barrel equals 31.5 U.S. Gals.–119.2379 L. { 42 Gals.–158.98386 L. 9702 Cu. In.–158987.6 cm3. 5.6146 Cu. Ft.–.159 m3. 1 cu. in. of water weighs03606 Lbs.–.01636 kg. 12 cu. in. of water weighs433 Lbs.–.1964 kg.
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A pressure of one lb. per sq. in. is exerted by a column of water 2.3110 feet high, or 27.73 inches high, at 20°C. (68°F.).

A pressure of 1 kPa is exerted by a column of water .102 meters high at 20°C.

A column of water, at 20°C (68°F.) one foot high presses on the base with a force of .433 lbs. per square inch.

A column of water, at 20°C (68°F.) one foot high presses on the base with a force of 9.807 kPa.

To find the pressure in lbs. per sq. in. of a column of water multiply the height of the column in feet by .433.

To find the pressure in kPa of a column of water multiply the height of the column in meters by 9.807.

To find the capacity of a mud pit per inch (mm) of depth multiply the length by the width in feet (m), which gives the area in square feet (m^2), then multiply by the depth in feet (m), which gives total capacity of pit in Cu.Ft. (m^3). Now divide the depth in inches (mm) to get Cu. Ft. per In. (m^3) of depth. If it is desired to convert the cubic feet (m^3/mm) into gallons (L) multiply by 7.48 (1000).

Doubling the inside diameter of a pipe increases its capacity four times.

Friction of liquids in pipe increases as the square of the velocity.

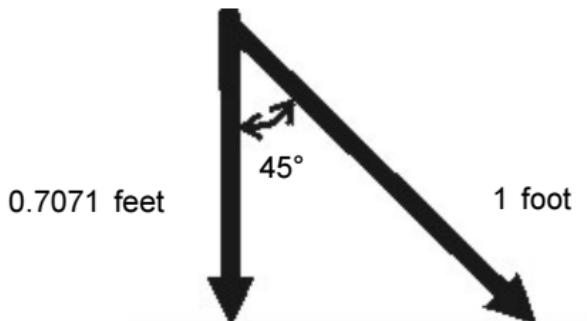
A horsepower is equivalent to raising 33,000 Lbs. 1 foot per minute, or 745.6999 W.

Steam rising from water at its boiling point has a pressure of 14.7 psi (101.34 kPa) at sea level.

ENGLISH/METRIC UNITS

DEVIATED WELL CALCULATIONS

The cosine is the ratio of the True Vertical Depth (TVD) compared to the Measured Depth (MD). For example the Cosine (COS) of a 45 degree angle is 0.7071. This means for every foot of measured depth the true vertical depth is only 0.7071 feet.



Example:

A well is deviated from the surface at a 30 degree angle. The MD is 800 feet. If the well is loaded with 11.4 lb/gal drilling fluid what is the hydrostatic pressure at the TD?

$$\text{COS } 30 = 0.8660$$

$$800 \text{ ft} \times 0.8660 \times 0.5922 \text{ psi/ft} = 410.2762 \text{ psi}$$

ENGLISH/METRIC UNITS**DEVIATED WELL CALCULATIONS****COSINE TABLE**

Degree	Cosine	Degree	Cosine	Degree	Cosine
1	0.9998	31	0.8572	61	0.4848
2	0.9994	32	0.8480	62	0.4695
3	0.9986	33	0.8387	63	0.4540
4	0.9976	34	0.8290	64	0.4384
5	0.9962	35	0.8192	65	0.4226
6	0.9945	36	0.8090	66	0.4067
7	0.9925	37	0.7986	67	0.3907
8	0.9903	38	0.7880	68	0.3746
9	0.9877	39	0.7771	69	0.3584
10	0.9848	40	0.7660	70	0.3420
11	0.9816	41	0.7547	71	0.3256
12	0.9781	42	0.7431	72	0.3090
13	0.9744	43	0.7314	73	0.2924
14	0.9703	44	0.7193	74	0.2756
15	0.9659	45	0.7071	75	0.2588
16	0.9613	46	0.6947	76	0.2419
17	0.9563	47	0.6820	77	0.2250
18	0.9511	48	0.6691	78	0.2079
19	0.9455	49	0.6561	79	0.1908
20	0.9397	50	0.6428	80	0.1736
21	0.9336	51	0.6293	81	0.1564
22	0.9272	52	0.6157	82	0.1392
23	0.9205	53	0.6018	83	0.1219
24	0.9135	54	0.5878	84	0.1045
25	0.9063	55	0.5736	85	0.0872
26	0.8988	56	0.5592	86	0.0698
27	0.8910	57	0.5446	87	0.0523
28	0.8829	58	0.5299	88	0.0349
29	0.8746	59	0.5150	89	0.0175
30	0.8660	60	0.5000	90	0.0000

ENGLISH UNITS

CALCULATING CONTENTS OF HORIZONTAL CYLINDRICAL TANKS

First calculate the depth ratio (D) by dividing the depth of water or other fluid in the tank in inches (h) by the diameter of the tank in inches (d).

Opposite this value for the depth ratio (D) in the following table you will find the percentage of the total capacity of the tank. Multiplying the capacity of the tank by this percentage gives the contents of the tank for that fluid depth.

D	Percent of Capacity	D	Percent of Capacity	D	Percent of Capacity
.02	.004799	.34	.299762	.66	.700238
.04	.013480	.36	.324061	.68	.724271
.06	.024509	.38	.348667	.70	.747702
.08	.037501	.40	.373539	.72	.770805
.10	.052025	.42	.398525	.74	.79348
.12	.067979	.44	.423749	.76	.815334
.14	.085114	.46	.449132	.78	.836923
.16	.103234	.48	.464560	.80	.857654
.18	.122421	.50	.500000	.82	.877579
.20	.14346	.52	.525440	.84	.896766
.22	.163077	.54	.550868	.86	.914886
.24	.184466	.56	.576251	.88	.932021
.26	.206502	.58	.601475	.90	.947975
.28	.229195	.60	.626461	.92	.962499
.30	.252298	.62	.651333	.94	.975491
.32	.275729	.64	.675939	.96	.986520
				.98	.995201



$$D = \frac{h}{d}$$

Example: Find contents of tank 60" in diameter (d) which has 24" of water in it. Tank is 10 feet long. (Capacity of tank is 1469 gal.)

$$D = \frac{24}{60} = .40 \text{ and from table, the}$$

percent of capacity is .373539.

$$\text{Contents} = 1469 \times .373539 = 550.62 \text{ gal.}$$

ENGLISH UNITS

EQUATIONS FOR CALCULATING CAPACITY OF PIPE

$$\text{Barrels per lineal foot} = .0009714 \times D^2$$

$$\text{Lineal feet per barrel} = \frac{1029.4}{D^2}$$

$$\text{Cubic feet per lineal foot} = .005454 \times D^2$$

$$\text{Lineal feet per cubic foot} = \frac{183.35}{D^2}$$

$$\text{Gallons per lineal foot} = .0408 \times D^2$$

$$\text{Lineal feet per gallon} = \frac{24.51}{D^2}$$

D = Diameter in inches

EQUATIONS FOR VOLUME AND HEIGHT BETWEEN MULTIPLE TUBING STRINGS AND HOLE (OR CASING)

$$\text{Barrels per lineal foot} = (D^2 - nd^2) 0.0009714$$

$$\text{Lineal feet per barrel} = \frac{1029.4}{D^2 - nd^2}$$

$$\text{Cubic feet per lineal foot} = (D^2 - nd^2) 0.005454$$

$$\text{Lineal feet per cubic foot} = \frac{183.35}{D^2 - nd^2}$$

$$\text{Gallons per lineal foot} = (D^2 - nd^2) 0.0408$$

$$\text{Lineal feet per gallon} = \frac{24.51}{D^2 - nd^2}$$

WHERE:

D = Diameter of hole, inches (or ID of casing)

d = Outside diameter of tubing, inches

n = Number of tubing strings

METRIC UNITS

EQUATIONS FOR CALCULATING CAPACITY OF PIPE

Cubic meters per lineal meter	=	$\frac{D^2}{1,273,000}$
Lineal meters per cubic meter	=	$\frac{1,273,000}{D^2}$
Hectoliter per lineal meter	=	$\frac{D^2}{127,300}$
Lineal meter per hectoliter	=	$\frac{127,300}{D^2}$
Liter per Lineal meter	=	$\frac{D^2}{1273}$
Lineal meter per liter	=	$\frac{1273}{D^2}$

D = Diameter in mm

EQUATIONS FOR VOLUME AND HEIGHT BETWEEN MULTIPLE TUBING STRINGS AND HOLE (OR CASING)

Cubic meter per meter	=	$\frac{(D^2 - nd^2)}{1,273,000}$
Meter per cubic meter	=	$\frac{1,273,000}{(D^2 - nd^2)}$
Hectoliter per meter	=	$\frac{(D^2 - nd^2)}{127,300}$
Meter per hectoliter	=	$\frac{127,300}{(D^2 - nd^2)}$
Liter per meter	=	$\frac{(D^2 - nd^2)}{1273}$
Meter per liter	=	$\frac{1273}{(D^2 - nd^2)}$

WHERE:

D = Diameter of hole or ID of casing, mm

d = Outside diameter of tubing, mm

n = Number of tubing strings

ENGLISH UNITS

BALANCE CEMENT PLUG JOB

It is desired to place a 110 Cu. Ft. cement plug in the bottom of 8,000' of 7", 26# casing, using 2.875" tubing. The operator wants the cement column equalized. He also wants a balanced column of water (the same height of water in the space between the tubing and casing as exists within the tubing).

EQUALIZATION POINT FORMULA

$$h = \frac{N}{C + T} \quad - \text{where}$$

N = Cu. Ft. of Cement slurry used.

h = height of balanced cement column.

C = Cu. Ft. per linear foot of space between tubing (or drill pipe), and casing (or hole). C may be found in Volume and Height Tables, Section 221 and/or Section 122.

T = Cu. Ft. per linear foot inside tubing (or drill pipe, or casing). T may be found in Capacity Tables, Section 210.

N = 110 Cu. Ft. Cem. slurry: C = .1697 Cu. Ft./Ft.

T = .0325 Cu. Ft./Ft.

$$h = \frac{110}{.1697 + .0325} = \frac{110}{.2022} = 544'$$

8000' - 544' = 7456' x .00579 Bbls./Ft. (Capacity Tables) = 43.17 Bbls. displacement required to equalize the cement column.

To balance the water that is to be placed ahead of the cement with the water that is to follow the cement, one must obtain (from the Handbook) the height that one Bbl. of water will fill in the space between the casing and the tubing, and the height that one Bbl. of water will fill inside the tubing.

Height between tubing and casing = 33.11'/Bbl. (Handbook).

Height inside tubing = 172.7'/Bbl. (Handbook).

A ratio of 5.22 Bbl. $\frac{(172.6')}{33.11}$ of water ahead of the cement to one

bbl. of water behind will give a balanced column of 172.7' of water. This ratio may be used to balance any desired amount of water the operator wants to use. 2 Bbls. of water behind the cement - $2 \times 5.22 = 10.44$ Bbls. of water ahead of the cement. This gives a balanced water column of 345.4'.

ENGLISH UNITS

DISPLACEMENT

BUOYANCY FACTORS FOR STEEL PIPE IN VARIOUS WEIGHT FLUIDS

(Fluid Density — lb./gal.)

Lb./Gal.	Buoyancy Factor	Lb./Gal.	Buoyancy Factor	Lb./Gal.	Buoyancy Factor
6.0	.9083	11.0	.8319	16.0	.7555
6.1	.9068	11.1	.8304	16.1	.7540
6.2	.9053	11.2	.8289	16.2	.7524
6.3	.9037	11.3	.8273	16.3	.7509
6.4	.9022	11.4	.8258	16.4	.7494
6.5	.9007	11.5	.8243	16.5	.7479
6.6	.8991	11.6	.8227	16.6	.7463
6.7	.8976	11.7	.8212	16.7	.7448
6.8	.8961	11.8	.8197	16.8	.7433
6.9	.8946	11.9	.8182	16.9	.7417
7.0	.8930	12.0	.8166	17.0	.7402
7.1	.8915	12.1	.8151	17.1	.7387
7.2	.8900	12.2	.8136	17.2	.7372
7.3	.8884	12.3	.8120	17.3	.7356
7.4	.8869	12.4	.8105	17.4	.7341
7.5	.8854	12.5	.8090	17.5	.7326
7.6	.8839	12.6	.8075	17.6	.7311
7.7	.8823	12.7	.8059	17.7	.7295
7.8	.8808	12.8	.8044	17.8	.7280
7.9	.8793	12.9	.8029	17.9	.7265
8.0	.8778	13.0	.8013	18.0	.7249
8.1	.8762	13.1	.7998	18.1	.7234
8.2	.8747	13.2	.7983	18.2	.7219
8.3	.8732	13.3	.7968	18.3	.7204
8.33*	.8727	13.4	.7952	18.4	.7188
8.4	.8716	13.5	.7937	18.5	.7173
8.5	.8701	13.6	.7922	18.6	.7158
8.6	.8686	13.7	.7906	18.7	.7142
8.7	.8671	13.8	.7891	18.8	.7127
8.8	.8655	13.9	.7876	18.9	.7112
8.9	.8640	14	.7861	19	.7097
9.0	.8625	14.1	.7845	19.1	.7081
9.1	.8609	14.2	.783	19.2	.7066
9.2	.8594	14.3	.7815	19.3	.7051
9.3	.8579	14.4	.7800	19.4	.7035
9.4	.8564	14.5	.7784	19.5	.7020
9.5	.8548	14.6	.7769	19.6	.7005
9.6	.8533	14.7	.7754	19.7	.6990
9.7	.8518	14.8	.7738	19.8	.6974
9.8	.8502	14.9	.7723	19.9	.6960
9.9	.8487	15.0	.7708	20.0	.6944
10.0	.8472	15.1	.7693		
10.1	.8457	15.2	.7677		
10.2	.8441	15.3	.7662		
10.3	.8426	15.4	.7647		
10.4	.8411	15.5	.7631		
10.5	.8395	15.6	.7616		
10.6	.8380	15.7	.7601		
10.7	.8365	15.8	.7586		
10.8	.8350	15.9	.7570		
10.9	.8334				

FOR OPEN ENDED PIPE

Pipe Wt. (in Fluid) = Pipe Wt. (In Air) x Buoyancy Factor

*Weight of Water at 68°F (20°C)

TABLE 204

STRETCH DATA FOR DRILL PIPE, TUBING AND CASING

Size of Tubing, D.P. or Casing	Stretch Per Length of Pipe Suspended in Well, Feet	Pull Above 1000 Lb. Pull Above Wt. of Pipe, Inches Factor C	Stretch Weight of Pipe Per In. Stretch of Pipe Pounds	Due To Own Weight Suspended in Water, Inches
2.375" Upset Tubing 4.70#/Ft.	500	.115	6,450	.14
	1,000	.310	3,225	.56
	2,000	.620	1,612	2.22
	3,000	.930	1,075	5.00
	4,000	1.240	806	8.88
	5,000	1.550	644	13.88
	10,000	3.100	322	55.51
2.875" Upset Tubing 6.50#/Ft.	500	.110	9,080	.14
	1,000	.220	4,540	.56
	2,000	.440	2,270	2.22
	3,000	.660	1,513	5.00
	4,000	.880	1,135	8.88
	5,000	1.100	908	13.88
	10,000	2.200	454	55.51
3.500" Upset Tubing 9.30#/Ft.	500	.0772	12,960	.14
	1,000	.1544	6,480	.56
	2,000	.3088	3,240	2.22
	3,000	.4632	2,160	5.00
	4,000	.6176	1,620	8.88
	5,000	.7720	1,296	13.88
	10,000	1.544	648	55.51
2.875" Drill Pipe 10.40#/Ft.	500	.070	14,300	.14
	1,000	.140	7,150	.56
	2,000	.280	3,575	2.22
	3,000	.420	2,383	5.00
	4,000	.560	1,787	8.88
	5,000	.700	1,430	13.88
	10,000	1.40	715	55.51

FORMULA FOR DETERMINING STRETCH IN PIPE

$$S = \frac{L \times P \times C}{1000 \times 1000}$$

(use to set tension packer with no weight indication)

FORMULA FOR DETERMINING PULL OF PIPE

$$P = \frac{1000 \times 1000 \times S}{C \times L}$$

FORMULA FOR FREE PIPE DEPTH

$$L = \frac{S \times 1000 \times 1000}{P \times C}$$

Where: L = Length of free pipe in feet.

S = Stretch pulled in pipe, in inches.

P = Pull on pipe to get the stretch "S" in pounds

C = Constant for given pipe size and weight being stretched.
(For this equation use C factor at pipe length of 1000 ft.)

TABLE 204

STRETCH DATA FOR DRILL PIPE, TUBING AND CASING

Size of Tubing, D.P. or Casing	Stretch Per Length of Pipe Suspended in Well, Feet	Pull Above 1000 Lb. Pull Above Wt. of Pipe, Inches Factor C	Stretch Weight of Pipe Per In. Stretch of Pipe Pounds	Due To Own Weight Suspended in Water, Inches
3.500" Drill Pipe 13.30#/Ft.	500	.055	18,200	.14
	1,000	.110	9,100	.56
	2,000	.220	4,550	2.22
	3,000	.330	3,033	5.00
	4,000	.440	2,275	8.88
	5,000	.550	1,820	13.88
	10,000	1.10	910	55.51
4.500" Drill Pipe 16.60 #/Ft.	500	.0450	22,200	.14
	1,000	.0900	11,100	.56
	2,000	.180	5,550	2.22
	3,000	.270	3,700	5.00
	4,000	.360	2,775	8.88
	5,000	.450	2,220	13.88
	10,000	.900	1,110	55.51
5.500" Casing 17 #/Ft.	500	.0402	24,800	.14
	1,000	.0804	12,400	.56
	2,000	.160	6,230	2.22
	3,000	.240	4,133	5.00
	4,000	.320	3,100	8.88
	5,000	.402	2,480	13.88
	10,000	.804	1,240	55.51
7.000" Casing 23 #/Ft.	500	.0301	33,220	.14
	1,000	.0602	16,610	.56
	2,000	.120	8,305	2.22
	3,000	.181	5,537	5.00
	4,000	.241	4,152	8.88
	5,000	.301	3,322	13.88
	10,000	.602	1,661	55.51

NOTE: The above figures apply only to steel pipe that has not been stretched or is not being stretched beyond its elastic limit.

Example:

A 7" RTTS is set at 15,000 feet on 2 3/8: 4.7 #/ft. EU tubing. There are indications that the casing has collapsed above the tool. Pick up pipe weight, mark pipe and pull 20,000 pounds above pipe weight. This 20,000 pounds stretches pipe 25 inches. Where is the casing collapsed?

$$S = 25 \text{ inches}$$

$$P = 20,000 \text{ pounds}$$

$$C = .31 \text{ (C factor from table at 1000 ft.)}$$

$$L = \frac{25 \times 1000 \times 1000}{20,000 \times .31}$$

$$L = 4032 \text{ feet}$$

TABLE 205

SLACK-OFF DATA FOR TUBING AND DRILL PIPE

Size of Tubing or Drill Pipe	Slack-Off Factor*
1.900 O.D. EUE Tubing	0.68
2.375 O.D. EUE Tubing	0.39
2.875 O.D. EUE Tubing	0.26
3.500 O.D. EUE Tubing	0.17
2.875 O.D. 10.40 lb/ft DP	0.16
3.500 O.D. 13.30 lb/ft DP	0.12
4.500 O.D. 16.60 lb/ft DP	0.10

* Inches to slack-off to obtain 1000 lbs. weight on packer for each 1000 ft. of depth.
An allowance is included for coiling and friction.

$$\text{Required slack (inc.)} = \frac{\text{Desired Weight}}{1000} \times \frac{\text{Packer Depth}}{1000} \times \text{Factor}$$

Example:

Weight desired on packer 15,000 lbs.

Depth packer set 5,000"

Size of Tubing 2.375" EUE

Slack-off factor for 2.375" EUE from table = 0.39

$$\frac{15,000}{1000} \times \frac{5,000}{1000} \times 0.39 = 29.25 \text{ (use 29 inches)}$$

The setting stroke required to set any particular tool is not included in these figures and will have to be added.

NOTE: The above figures apply only to pipe that has not been stretched, or is not being stretched beyond its elastic limit.

ENGLISH UNITS

EFFECT OF TEMPERATURE ON STEEL

Steel expands or contracts .0000828" per foot per degree (F) of temperature change.

Therefore:

$$^eT = \text{depth} \times .0000828 \times \Delta T (F^\circ)$$

when:

eT = change in length in inches

depth = feet

ΔT = average temperature change

ENGLISH/METRIC UNITS

HYDROSTATIC PRESSURE AND FLUID WEIGHT CONVERSION TABLES

To find the Hydrostatic pressure of a column of fluid, multiply the appropriate value in Lbs./Sq. in. per foot of depth times the depth in feet.

Example: find the Hydrostatic Pressure at a depth of 13,760 feet (4194m) in a hole filled with mud weighing 12.3 Lbs./Gal. (92.01 Lbs./Cu. Ft.) (1.474 kg/L) The value 0.6390 is found opposite 12.3 Lbs./Gal. in the table. Then $0.6390 \times 13760 = 8793$ Lbs. per Sq. In. (or 14.455 kPa/m \times 4194m = 60 624 kPa) hydrostatic pressure.

HYDROSTATIC PRESSURE AND FLUID WEIGHT

Lbs./Gal.	Lbs./Cu. Ft.	Sp. Gr.	Lbs./Sq. In. Per Ft. of Depth	kg/L	kPa/m
7.0	52.36	0.84	0.3636	0.839	8.225
7.1	53.11	0.85	0.3688	0.851	8.342
7.2	53.86	0.86	0.3740	0.863	8.460
7.3	54.61	0.87	0.3792	0.875	8.578
7.4	55.36	0.89	0.3844	0.887	8.695
7.5	56.10	0.90	0.3896	0.899	8.813
7.6	56.85	0.91	0.3948	0.911	8.931
7.7	57.60	0.92	0.4000	0.923	9.048
7.8	58.35	0.93	0.4052	0.935	9.166
7.9	59.10	0.95	0.4104	0.947	9.283
8.0	59.84	0.96	0.4156	0.959	9.401
8.1	60.59	0.97	0.4208	0.971	9.519
8.2	61.34	0.98	0.4260	0.983	9.636
8.3	62.09	0.99	0.4312	0.995	9.754
8.33*	62.31	1.00	0.4330	1.000	9.807
8.4	62.84	1.01	0.4364	1.007	9.872
8.5	63.58	1.02	0.4416	1.019	9.989
8.6	64.33	1.03	0.4468	1.031	10.107
8.7	65.08	1.04	0.4519	1.043	10.222
8.8	65.83	1.05	0.4571	1.054	10.340
8.9	66.58	1.07	0.4623	1.066	10.457
9.0	67.32	1.08	0.4675	1.078	10.575
9.1	68.07	1.09	0.4727	1.090	10.693
9.2	68.82	1.10	0.4779	1.102	10.810
9.3	69.57	1.11	0.4831	1.114	10.928
9.4	70.32	1.13	0.4883	1.126	11.046
9.5	71.06	1.14	0.4935	1.138	11.163
9.6	71.81	1.15	0.4987	1.150	11.281
9.7	72.56	1.16	0.5039	1.162	11.399
9.8	73.31	1.17	0.5091	1.174	11.516
9.9	74.06	1.19	0.5143	1.186	11.634
10.0	74.80	1.20	0.5195	1.198	11.751
10.1	75.55	1.21	0.5247	1.210	11.869
10.2	76.30	1.22	0.5299	1.222	11.987
10.3	77.05	1.23	0.5351	1.234	12.104
10.4	77.80	1.25	0.5403	1.246	12.222

* Density of water at 20°C. or 68°F.

ENGLISH/METRIC UNITS

HYDROSTATIC PRESSURE AND FLUID WEIGHT

Lbs./Gal.	Lbs./Cu. Ft.	Sp. Gr.	Lbs./Sq. In. Per Ft. of Depth	kg/L	kPa/m
10.5	78.55	1.26	0.5455	1.258	12.340
10.6	79.29	1.27	0.5506	1.270	12.455
10.7	80.04	1.28	0.5558	1.282	12.573
10.8	80.79	1.29	0.5610	1.294	12.690
10.9	81.54	1.31	0.5662	1.306	12.808
11.0	82.29	1.32	0.5714	1.318	12.925
11.1	83.03	1.33	0.5766	1.330	13.043
11.2	83.78	1.34	0.5818	1.342	13.161
11.3	84.53	1.35	0.5870	1.354	13.278
11.4	85.28	1.37	0.5922	1.366	13.396
11.5	86.03	1.38	0.5974	1.378	13.514
11.6	86.77	1.39	0.6026	1.390	13.631
11.7	87.52	1.40	0.6078	1.402	13.749
11.8	88.27	1.412	0.6130	1.414	13.866
11.9	89.02	1.43	0.6182	1.426	13.984
12.0	89.77	1.44	0.6234	1.438	14.102
12.1	90.51	1.45	0.6286	1.450	14.219
12.2	91.26	1.46	0.6338	1.462	14.337
12.3	92.01	1.47	0.6390	1.474	14.455
12.4	92.76	1.49	0.6442	1.486	14.572
12.5	93.51	1.50	0.6493	1.498	14.688
12.6	94.25	1.51	0.6545	1.510	14.805
12.7	95.00	1.52	0.6597	1.522	14.923
12.8	95.75	1.53	0.6649	1.534	15.040
12.9	96.50	1.55	0.6701	1.546	15.158
13.0	97.25	1.56	0.6753	1.558	15.276
13.1	97.99	1.57	0.6805	1.570	15.393
13.2	98.74	1.58	0.6857	1.582	15.511
13.3	99.49	1.59	0.6909	1.594	15.629
13.4	100.24	1.61	0.6961	1.606	15.746
13.5	100.99	1.62	0.7013	1.618	15.864
13.6	101.73	1.63	0.7065	1.630	15.981
13.7	102.48	1.64	0.7117	1.624	16.099
13.8	103.23	1.65	0.7169	1.654	16.217
13.9	103.98	1.67	0.7221	1.666	16.334
14.0	104.73	1.68	0.7273	1.678	16.452
14.1	105.48	1.69	0.7325	1.690	16.570
14.2	106.22	1.70	0.7377	1.702	16.687
14.3	106.97	1.71	0.7429	1.714	16.805
14.4	107.72	1.73	0.7480	1.726	16.920
14.5	108.47	1.74	0.7532	1.738	17.038
14.6	109.22	1.75	0.7584	1.750	17.155
14.7	109.96	1.76	0.7636	1.761	17.273
14.8	110.71	1.77	0.7688	1.773	17.391
14.9	111.46	1.79	0.7740	1.785	17.508

ENGLISH/METRIC UNITS

HYDROSTATIC PRESSURE
AND FLUID WEIGHT

Lbs./Gal.	Lbs./Cu.	Ft.	Sp. Gr.	Per Ft. of Depth	Lbs./Sq. In.	kg/L	kPa/m
15.0	112.21	1.80		0.7792	1.797	17.626	
15.1	112.96	1.81		0.7844	1.809	17.744	
15.2	113.70	1.82		0.7896	1.821	17.861	
15.3	114.45	1.83		0.7948	1.833	17.979	
15.4	115.20	1.85		0.8000	1.845	18.096	
15.5	115.95	1.86		0.8052	1.857	18.214	
15.6	116.70	1.87		0.8104	1.869	18.332	
15.7	117.44	1.88		0.8156	1.881	18.449	
15.8	118.19	1.89		0.8208	1.893	18.567	
15.9	118.94	1.91		0.8260	1.905	18.685	
16.0	119.69	1.92		0.8312	1.917	18.802	
16.1	120.44	1.93		0.8364	1.929	18.920	
16.2	121.18	1.94		0.8416	1.941	19.037	
16.3	121.93	1.95		0.8468	1.953	19.155	
16.4	122.68	1.97		0.8519	1.965	19.270	
16.5	123.43	1.98		0.8571	1.977	19.388	
16.6	124.18	1.99		0.8623	1.989	19.506	
16.7	124.92	2.00		0.8675	2.001	19.623	
16.8	125.67	2.01		0.8727	2.013	19.741	
16.9	126.42	2.03		0.8779	2.025	19.859	
17.0	127.17	2.04		0.8831	2.037	19.976	
17.1	127.92	2.05		0.8883	2.049	20.094	
17.2	128.66	2.06		0.8935	2.061	20.211	
17.3	129.41	2.07		0.8987	2.073	20.329	
17.4	130.16	2.09		0.9039	2.085	20.447	
17.5	130.91	2.10		0.9091	2.097	20.564	
17.6	131.66	2.11		0.9143	2.109	20.682	
17.7	132.40	2.12		0.9195	2.121	20.800	
17.8	133.15	2.13		0.9247	2.133	20.917	
17.9	133.90	2.14		0.9299	2.145	21.035	
18.0	134.65	2.16		0.9351	2.157	21.153	
18.1	135.40	2.17		0.9403	2.169	21.270	
18.2	136.15	2.18		0.9455	2.181	21.388	
18.3	136.89	2.19		0.9506	2.193	21.503	
18.4	137.64	2.20		0.9558	2.205	21.621	
18.5	138.39	2.22		0.9610	2.217	21.738	
18.6	139.14	2.23		0.9662	2.229	21.856	
18.7	139.89	2.24		0.9714	2.241	21.974	
18.8	140.63	2.25		0.9766	2.253	22.091	
18.9	141.38	2.26		0.9818	2.265	22.209	
19.0	142.13	2.28		0.9870	2.277	22.327	
19.1	142.88	2.29		0.9922	2.289	22.444	
19.2	143.63	2.30		0.9974	2.301	22.562	
19.3	144.37	2.31		1.0026	2.313	22.679	
19.4	145.12	2.32		1.0078	2.325	22.797	

ENGLISH/METRIC UNITS

HYDROSTATIC PRESSURE AND FLUID WEIGHT

Lbs./Gal.	Lbs./Cu. Ft.	Sp. Gr.	Lbs./Sq. Per Ft. of Depth	In.	kg/L	kPa/m
19.5	145.87	2.34	1.0130	2.337	22.915	
19.6	146.62	2.35	1.0182	2.349	23.032	
19.7	147.37	2.36	1.0234	2.361	23.150	
19.8	148.11	2.37	1.0286	2.373	23.268	
19.9	148.86	2.38	1.0338	2.385	23.385	
20.0	149.61	2.40	1.0390	2.397	23.503	
20.1	150.36	2.41	1.0442	2.409	23.620	
20.2	151.11	2.42	1.0493	2.421	23.736	
20.3	151.85	2.43	1.0545	2.433	23.853	
20.4	152.60	2.44	1.0597	2.445	23.971	
20.5	153.35	2.46	1.0649	2.456	24.089	
20.6	154.10	2.47	1.0701	2.468	24.206	
20.7	154.85	2.48	1.0753	2.480	24.324	
20.8	155.59	2.49	1.0805	2.492	24.442	
20.9	156.34	2.50	1.0857	2.504	24.559	
21.0	157.09	2.52	1.0909	2.516	24.677	
21.1	157.84	2.53	1.0961	2.528	24.794	
21.2	158.59	2.54	1.1013	2.540	24.912	
21.3	159.33	2.55	1.1065	2.552	25.030	
21.4	160.08	2.56	1.1117	2.564	25.147	
21.5	160.83	2.58	1.1169	2.576	25.265	
21.6	161.58	2.59	1.1221	2.588	25.383	
21.7	162.33	2.60	1.1273	2.600	25.500	
21.8	163.07	2.61	1.1325	2.612	25.618	
21.9	163.82	2.62	1.1377	2.624	25.735	
22.0	164.57	2.64	1.1429	2.636	25.853	
22.1	165.32	2.65	1.1480	2.648	25.968	
22.2	166.07	2.66	1.1532	2.660	26.086	
22.3	166.82	2.67	1.1584	2.672	26.204	
22.4	167.56	2.68	1.1636	2.684	26.321	
22.5	168.31	2.70	1.1688	2.696	26.439	
22.6	169.06	2.71	1.1740	2.708	26.557	
22.7	169.81	2.72	1.1792	2.720	26.674	
22.8	170.56	2.73	1.1844	2.732	26.792	
22.9	171.30	2.74	1.1896	2.744	26.909	
23.0	172.05	2.76	1.1948	2.756	27.027	

EFFECT OF WATER ON MUD WEIGHT

Water Added
Bbl./100 bbl.

Mud

Weight of Resulting Mud
Lb./Gal.

0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
5	9.9	10.9	11.8	12.8	13.7	14.7	15.6	16.6
10	9.8	10.8	11.7	12.6	13.5	14.4	15.3	16.2
15	9.8	10.6	11.5	12.4	13.3	14.1	15.0	15.9
20	9.7	10.6	11.4	12.2	13.1	13.7	14.7	15.6
25	9.7	10.5	11.3	12.1	12.9	13.7	14.5	15.3
30	9.6	10.4	11.1	11.9	12.7	13.5	14.2	15.0
35	9.6	10.3	11.0	11.8	12.5	13.3	14.0	14.7
40	9.5	10.2	10.9	11.7	12.4	13.1	13.8	14.5
45	9.5	10.2	10.9	11.6	12.2	12.9	13.6	14.3
50	9.4	10.1	10.8	11.4	12.1	12.8	13.4	14.1
60	9.4	10.0	10.6	11.2	11.9	12.5	13.1	13.7
70	9.3	9.9	10.5	11.1	11.7	12.2	12.8	13.4
80	9.3	9.8	10.4	10.9	11.5	12.0	12.6	13.1
90	9.2	9.7	10.3	10.8	11.3	11.8	12.4	12.9
100	9.2	9.2	10.2	10.7	11.2	11.7	12.2	12.7

ENGLISH UNITS

(From "Principles of Drilling Mud Control" Eleventh Edition)

ENGLISH UNITS

MUD WEIGHT ADJUSTMENT WITH BARITE OR WATER

Initial Mud Weight, lb/gal	Desired Mud Weight, lb/gal																	
	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0
9	29	59	90	123	156	192	229	268	308	350	395	442	490	542	596	653	714	778
9.5	29	60	92	125	160	196	234	273	315	359	405	452	503	557	612	672	735	
10	43	30	61	93	128	164	201	239	280	323	368	414	464	516	571	630	691	
10.5	85	30	31	62	96	131	167	205	245	287	331	376	426	479	531	588	648	
11	128	60	23	31	64	98	134	171	210	251	294	339	387	437	490	546	605	
11.5	171	90	46	19	32	66	101	137	175	215	258	301	348	397	449	504	562	
12	214	120	69	37	16	33	67	103	140	179	221	263	310	357	408	462	518	
12.5	256	150	92	56	32	14	34	68	105	144	184	226	271	318	367	420	475	
13	299	180	115	75	48	27	12	34	70	108	147	188	232	278	327	378	432	
13.5	342	210	138	94	63	41	24	11	35	72	111	150	194	238	286	336	389	
14	385	240	161	112	76	54	36	21	10	36	74	113	155	199	245	294	345	
14.5	427	270	185	131	95	68	48	32	19	9	37	75	116	159	204	252	302	
15	470	300	208	150	110	82	60	43	29	18	8	37	77	119	163	210	259	
15.5	513	330	231	169	126	95	72	54	39	26	16	8	39	79	122	168	216	
16	556	360	254	187	142	109	84	64	48	35	24	15	7	40	81	126	172	
16.5	598	390	277	206	158	123	96	75	58	44	32	23	14	7	41	84	129	
17	641	420	300	225	174	136	108	86	68	53	40	30	21	13	6	42	86	
17.5	684	450	323	244	189	150	120	96	77	62	49	38	28	20	12	6	43	
18	726	480	346	262	205	163	132	107	87	71	57	45	35	26	18	12	5	

The lower left half of this table shows the number of barrels of water which must be added to 100 bbl. of mud to produce desired weight reductions. To use this portion of the table, locate the initial mud weight in the vertical column at the left, then locate the desired mud weight in the upper horizontal row. The number of barrels of water to be added per 100 bbl. of mud is read directly across from the initial weight and directly below the desired mud weight. For example to reduce an 11 lb./gal. mud to a 9.5 lb./gal. mud, 128 bbl. of water must be added for every 100 bbl. of mud in the system.

The upper right half of this table shows the number of sacks of barite which must be added to 100 bbl. of mud to produce desired weight increases. To use this portion of the table, locate the initial mud weight in the vertical column to the left, then locate the desired mud weight in the upper horizontal row. The number of sacks of barite to be added per 100 bbl. of mud is read directly across from the initial weight and directly below the desired mud weight. For example, to raise an 11 lb./gal. mud to 14.5 lb./gal., 251 sacks of barite must be added per 100 bbl. of mud in the system.

ENGLISH UNITS

**EQUATIONS FOR CALCULATING
VELOCITY AND HORSEPOWER**

Feet per second	=	$\frac{\text{B.P.H.} \times .2859}{(\text{Diameter in inches})^2}$
Feet per second	=	$\frac{\text{B.P.D.} \times .0119}{(\text{Diameter in inches})^2}$
Feet per second	=	$\frac{\text{G.P.M.} \times .4085}{(\text{Diameter in inches})^2}$
Hydraulic Horsepower	=	$\frac{\text{B.P.H.} \times \text{Pressure (psi)}}{2447}$
Hydraulic Horsepower	=	B.P.H. x Pressure (psi) x .000408
Hydraulic Horsepower	=	B.P.D. x Pressure (psi) x .000017
Hydraulic Horsepower	=	B.P.M. x Pressure (psi) x .0245
Hydraulic Horsepower	=	G.P.M. x Pressure (psi) x .000583
Brake Horsepower	=	$\frac{\text{B.P.H.} \times \text{Pressure (psi)} \times .000408}{\text{Efficiency}}$
Brake Horsepower	=	$\frac{\text{B.P.D.} \times \text{Pressure (psi)} \times .000017}{\text{Efficiency}}$
Brake Horsepower	=	$\frac{\text{G.P.M.} \times \text{Pressure (psi)} \times .000583}{\text{Efficiency}}$

NOTE:

B.P.M. = Barrels per minute
 B.P.H. = Barrels per hour

B.P.D. = Barrels per day
 psi = Pounds per square inch

METRIC UNITS

EQUATIONS FOR CALCULATING VELOCITY AND POWER

$$\text{Meters per second} = \frac{\text{m}^3/\text{hr} \times 353.68}{\text{D}^2}$$

$$\text{Meters per second} = \frac{\text{m}^3/\text{day} \times 14.737}{\text{D}^2}$$

$$\text{Meters per second} = \frac{\text{L/min} \times 21.221}{\text{D}^2}$$

$$\text{Kilowatt} = \text{L/min} \times \text{MPa} \times .0167$$

$$\text{Kilowatt} = \text{m}^3/\text{min} \times \text{MPa} \times 16.7$$

$$\text{Kilowatt} = \text{m}^3/\text{hr} \times \text{MPa} \times 1000$$

$$\text{Kilowatt} = \text{m}^3/\text{day} \times \text{MPa} \times 24000$$

ENGLISH/METRIC UNITS**ABSOLUTE VOLUME FACTORS FOR MATERIALS IN SOLUTION AT 20°C (68°F)**

NaCl Percent by weight of water	NaCl Absolute Volume gal./lb.	KCl Percent by weight of water	KCl Absolute Volume gal./lb	CaCl ₂ Percent by weight of water	CaCl ₂ Absolute Volume gal./lb.
5.00	.0368	1.00	.0436	2.00	.0220
6.00	.0372	2.00	.0440	4.00	.0229
10.00	.0385	3.00	.0444	5.00	.0234
12.00	.0391	5.00	.0450	10.00	.0252
15.00	.0398	10.00	.0463	15.00	.0266
18.00	.0405	15.00	.0475	20.00	.0278
20.00	.0409	20.00	.0481	30.00	.0296
24.00	.0417	25.00	.0488	40.00	.0311
25.00	.0418	30.00	.0493	50.00	.0325
30.00	.0426	31.58	.0495	60.00	.0339
35.14	.0433	—	—	66.67	.0346
37.07*	.0458*	—	—	—	—

*Solution at 60°C (140°F)

Slurry Density, Water Requirements, and Yield Calculations

Weight of Materials in one sack of the following cement slurry:

Premium Cement + 35% SSA-1 + 0.5% GasStop + 0.3% CFR-3 + 0.2% HR-5
 Mix Slurry at 16.0 lb/gal Density; Find Yield and Water Requirements

Cement	94 lbs
SSA-1	(94 lbs X 35/100) = 32.9 lbs
GasStop	(94 lbs X 0.5/100) = 0.47 lbs
CFR-3	(94 lbs X 0.3/100) = 0.282 lbs
HR-5	(94 lbs X 0.2/100) = 0.188 lbs
Water	(8.33 lbs/gal X A gals) = 8.33A lbs

$$\text{Total Weight of Slurry} = 127.84 \text{ lbs} + 8.33A \text{ lbs}$$

Volume of Materials in one sack of the cement slurry:

	Weight lbs	Absolute Vol. Factor gals/lb	=	Volume gals
Cement	94 lbs	X	0.0382	= 3.5908 gals
SSA-1	32.9 lbs	X	0.0456	= 1.5002 gals
GasStop	0.47 lbs	X	0.1009	= 0.0474 gals
CFR-3	0.282 lbs	X	0.0938	= 0.0265 gals
HR-5	0.188 lbs	X	0.0750	= 0.0141 gals
Water	8.33A	X	0.1200	= A gals

$$\text{Total Volume of Slurry} = 5.1790 \text{ gals} + A \text{ gals}$$

Slurry Density, Water Requirements, and Yield Calculations

Density of the cement slurry:

$$\text{Slurry Density} = \frac{\text{Slurry Weight}}{\text{Slurry Volume}} = \frac{127.84 \text{ lbs} + 8.33A \text{ lbs}}{5.1790 \text{ gals} + A \text{ gals}}$$

$$16.0 \text{ lb/gal} = \frac{127.84 \text{ lbs} + 8.33A \text{ lbs}}{5.1790 \text{ gals} + A \text{ gals}}$$

$$16.0 (5.1790 + A) = 127.84 + 8.33A$$

$$16.0 A - 8.33A = 127.84 - 82.864$$

$$A = 44.976 / 7.67 = 5.86 \text{ gals water per sack}$$

Slurry Yield:

$$\text{Slurry Volume (gals)} \times 0.1337 \text{ cuft/gal} = (5.1790 + 5.86) \times 0.1337 \text{ cuft} = 1.48 \text{ cuft/sk}$$

SLURRY TABLES
Neat Cement
Class A, C, G, or H Cements
Mixed With Fresh Water
Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
14.00	1.51	7.71
14.10	1.48	7.52
14.20	1.46	7.33
14.30	1.44	7.14
14.40	1.41	6.97
14.50	1.39	6.80
14.60	1.37	6.63
14.70	1.34	6.47
14.80	1.32	6.31
14.90	1.30	6.16
15.00	1.28	6.02
15.10	1.27	5.88
15.20	1.25	5.74
15.30	1.23	5.60
15.40	1.21	5.47
15.50	1.19	5.35
15.60	1.18	5.22
15.70	1.16	5.11
15.80	1.15	4.99
15.90	1.13	4.88
16.00	1.12	4.76
16.10	1.10	4.66
16.20	1.09	4.55
16.30	1.07	4.45
16.40	1.06	4.35
16.50	1.05	4.25
16.60	1.04	4.16
16.70	1.02	4.07
16.80	1.01	3.98
16.90	1.00	3.89
17.00	0.99	3.80
17.10	0.98	3.72
17.20	0.97	3.63
17.30	0.96	3.55
17.40	0.94	3.48
17.50	0.93	3.40

**35% SSA-1 (BWOC) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
15.00	1.69	7.58
15.10	1.67	7.39
15.20	1.64	7.21
15.30	1.62	7.03
15.40	1.60	6.86
15.50	1.58	6.69
15.60	1.55	6.53
15.70	1.53	6.37
15.80	1.51	6.22
15.90	1.49	6.07
16.00	1.47	5.92
16.10	1.45	5.78
16.20	1.44	5.64
16.30	1.42	5.51
16.40	1.40	5.38
16.50	1.38	5.25

**35% SSA-2 (BWOC) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
16.00	1.47	5.92
16.10	1.45	5.78
16.20	1.44	5.64
16.30	1.42	5.51
16.40	1.40	5.38
16.50	1.38	5.25
16.60	1.37	5.13
16.70	1.35	5.00
16.80	1.33	4.88
16.90	1.32	4.77
17.00	1.30	4.65
17.10	1.29	4.54
17.20	1.27	4.43
17.30	1.26	4.33
17.40	1.25	4.22
17.50	1.23	4.12
17.60	1.22	4.02
17.70	1.21	3.93
17.80	1.19	3.83
17.90	1.18	3.74

**Hi-Dense #4 (10 lbs/sk) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Hi-Dense Conc. Lbs/sk
16.50	1.19	5.01	10.00
16.60	1.18	4.90	10.00
16.70	1.16	4.80	10.00
16.80	1.15	4.70	10.00
16.90	1.14	4.60	10.00
17.00	1.12	4.50	10.00
17.10	1.11	4.41	10.00
17.20	1.10	4.31	10.00
17.30	1.08	4.22	10.00
17.40	1.07	4.13	10.00
17.50	1.06	4.05	10.00
17.60	1.05	3.96	10.00
17.70	1.04	3.88	10.00

**Hi-Dense #4 (15 lbs/sk) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Hi-Dense Conc. Lbs/sk
16.50	1.25	5.39	15.00
16.60	1.23	5.28	15.00
16.70	1.22	5.17	15.00
16.80	1.20	5.06	15.00
16.90	1.19	4.95	15.00
17.00	1.18	4.85	15.00
17.10	1.16	4.75	15.00
17.20	1.15	4.65	15.00
17.30	1.14	4.56	15.00
17.40	1.12	4.46	15.00
17.50	1.11	4.37	15.00
17.60	1.10	4.28	15.00
17.70	1.09	4.20	15.00
17.80	1.08	4.11	15.00
17.90	1.07	4.03	15.00
18.00	1.06	3.94	15.00

**Hi-Dense #4 (20 lbs/sk) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Hi-Dense Conc. Lbs/sk
16.50	1.32	5.77	20.00
16.60	1.30	5.65	20.00
16.70	1.28	5.53	20.00
16.80	1.27	5.42	20.00
16.90	1.25	5.31	20.00
17.00	1.24	5.20	20.00
17.10	1.23	5.10	20.00
17.20	1.21	4.99	20.00
17.30	1.20	4.89	20.00
17.40	1.18	4.79	20.00
17.50	1.17	4.70	20.00
17.60	1.16	4.60	20.00
17.70	1.15	4.51	20.00
17.80	1.13	4.42	20.00
17.90	1.12	4.33	20.00
18.00	1.11	4.25	20.00
18.10	1.10	4.16	20.00
18.20	1.09	4.08	20.00

**Hi-Dense #4 (25 lbs/sk) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Hi-Dense Conc. Lbs/sk
17.00	1.30	5.55	25.00
17.10	1.29	5.44	25.00
17.20	1.27	5.33	25.00
17.30	1.26	5.23	25.00
17.40	1.24	5.12	25.00
17.50	1.23	5.02	25.00
17.60	1.22	4.92	25.00
17.70	1.21	4.83	25.00
17.80	1.19	4.73	25.00
17.90	1.18	4.64	25.00
18.00	1.17	4.55	25.00
18.10	1.16	4.46	25.00
18.20	1.14	4.37	25.00
18.30	1.13	4.28	25.00
18.40	1.12	4.20	25.00
18.50	1.11	4.12	25.00
18.60	1.10	4.04	25.00

**35% SSA-2 (BWOC) + 10 lbs/sk Hi-Dense
Added to Class G or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Hi-Dense Conc. Lbs/sk
16.50	1.52	6.03	10.00
16.60	1.50	5.89	10.00
16.70	1.48	5.76	10.00
16.80	1.46	5.63	10.00
16.90	1.45	5.50	10.00
17.00	1.43	5.37	10.00
17.10	1.41	5.25	10.00
17.20	1.40	5.13	10.00
17.30	1.38	5.02	10.00
17.40	1.37	4.90	10.00
17.50	1.35	4.79	10.00
17.60	1.34	4.68	10.00
17.70	1.32	4.58	10.00
17.80	1.31	4.47	10.00
17.90	1.30	4.37	10.00
18.00	1.28	4.27	10.00
18.10	1.27	4.17	10.00
18.20	1.26	4.07	10.00
18.30	1.24	3.98	10.00
18.40	1.23	3.89	10.00

**35% SSA-2 (BWOC) + 15 lbs/sk Hi-Dense
Added to Class G or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Hi-Dense Conc. Lbs/sk
17.00	1.49	5.72	15.00
17.10	1.48	5.60	15.00
17.20	1.46	5.47	15.00
17.30	1.44	5.35	15.00
17.40	1.43	5.23	15.00
17.50	1.41	5.12	15.00
17.60	1.40	5.00	15.00
17.70	1.38	4.89	15.00
17.80	1.37	4.78	15.00
17.90	1.35	4.68	15.00
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18.00	1.34	4.57	15.00
18.10	1.33	4.47	15.00
18.20	1.31	4.37	15.00
18.30	1.30	4.27	15.00
18.40	1.29	4.17	15.00
18.50	1.27	4.08	15.00

**35% SSA-2 (BWOC) + 20 lbs/sk Hi-Dense
Added to Class G or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Hi-Dense Conc. Lbs/sk
17.00	1.55	6.05	20.00
17.10	1.54	5.92	20.00
17.20	1.52	5.79	20.00
17.30	1.50	5.67	20.00
17.40	1.49	5.54	20.00
17.50	1.47	5.42	20.00
17.60	1.45	5.30	20.00
17.70	1.44	5.19	20.00
17.80	1.42	5.07	20.00
17.90	1.41	4.96	20.00
18.00	1.39	4.85	20.00
18.10	1.38	4.75	20.00
18.20	1.37	4.64	20.00
18.30	1.35	4.54	20.00
18.40	1.34	4.44	20.00
18.50	1.33	4.34	20.00
18.60	1.31	4.25	20.00
18.70	1.30	4.15	20.00
18.80	1.29	4.06	20.00
18.90	1.27	3.97	20.00

**35% SSA-2 (BWOC) + 25 lbs/sk Hi-Dense
Added to Class G or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Hi-Dense Conc. Lbs/sk
17.50	1.53	5.77	25.00
17.60	1.51	5.64	25.00
17.70	1.50	5.52	25.00
17.80	1.48	5.40	25.00
17.90	1.47	5.29	25.00
18.00	1.45	5.18	25.00
18.10	1.44	5.06	25.00
18.20	1.42	4.96	25.00
18.30	1.41	4.85	25.00
18.40	1.39	4.74	25.00
18.50	1.38	4.64	25.00
18.60	1.37	4.54	25.00
18.70	1.35	4.44	25.00
18.80	1.34	4.35	25.00
18.90	1.33	4.25	25.00
19.00	1.32	4.16	25.00

Class A, C, G, or H Cements**Mixed With Fresh Water****Commonly Applied Slurry Properties**

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
14.00	1.51	7.71
14.10	1.48	7.52
14.20	1.46	7.33
14.30	1.44	7.14
14.40	1.41	6.97
14.50	1.39	6.80
14.60	1.37	6.63
14.70	1.34	6.47
14.80	1.32	6.31
14.90	1.30	6.16
15.00	1.28	6.02
15.10	1.27	5.88
15.20	1.25	5.74
15.30	1.23	5.60
15.40	1.21	5.47
15.50	1.19	5.35
15.60	1.18	5.22
15.70	1.16	5.11
15.80	1.15	4.99
15.90	1.13	4.88
16.00	1.12	4.76
16.10	1.10	4.66
16.20	1.09	4.55
16.30	1.07	4.45
16.40	1.06	4.35
16.50	1.05	4.25
16.60	1.04	4.16
16.70	1.02	4.07
16.80	1.01	3.98
16.90	1.00	3.89
17.00	0.99	3.80
17.10	0.98	3.72
17.20	0.97	3.63
17.30	0.96	3.55
17.40	0.94	3.48
17.50	0.93	3.40

**3% Salt (BWOW) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Salt Conc. Lbs/sk
14.00	1.54	7.88	1.97
14.10	1.52	7.68	1.92
14.20	1.49	7.48	1.87
14.30	1.46	7.29	1.82
14.40	1.44	7.10	1.78
14.50	1.41	6.93	1.73
14.60	1.39	6.75	1.69
14.70	1.37	6.59	1.65
14.80	1.35	6.43	1.61
14.90	1.33	6.27	1.57
15.00	1.31	6.12	1.53
15.10	1.29	5.97	1.49
15.20	1.27	5.83	1.46
15.30	1.25	5.69	1.42
15.40	1.23	5.56	1.39
15.50	1.21	5.43	1.36
15.60	1.20	5.30	1.32
15.70	1.18	5.18	1.29
15.80	1.16	5.06	1.26
15.90	1.15	4.94	1.24
16.00	1.13	4.83	1.21
16.10	1.12	4.72	1.18
16.20	1.10	4.61	1.15
16.30	1.09	4.51	1.13
16.40	1.07	4.40	1.10
16.50	1.06	4.31	1.08
16.60	1.05	4.21	1.05
16.70	1.03	4.11	1.03
16.80	1.02	4.02	1.00
16.90	1.01	3.93	0.98
17.00	1.00	3.84	0.96
17.10	0.99	3.76	0.94
17.20	0.98	3.67	0.92
17.30	0.96	3.59	0.90
17.40	0.95	3.51	0.88
17.50	0.94	3.43	0.86
17.60	0.93	3.35	0.84
17.70	0.92	3.28	0.82
17.80	0.91	3.21	0.80
17.90	0.90	3.13	0.78

**5% Salt (BWOW) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Salt Conc. Lbs/sk
14.00	1.57	8.01	3.34
14.10	1.54	7.80	3.25
14.20	1.51	7.59	3.16
14.30	1.48	7.40	3.08
14.40	1.46	7.21	3.00
14.50	1.43	7.03	2.93
14.60	1.41	6.85	2.85
14.70	1.39	6.68	2.78
14.80	1.36	6.51	2.71
14.90	1.34	6.35	2.65
15.00	1.32	6.20	2.58
15.10	1.30	6.05	2.52
15.20	1.28	5.90	2.46
15.30	1.26	5.76	2.40
15.40	1.24	5.62	2.34
15.50	1.23	5.49	2.29
15.60	1.21	5.36	2.23
15.70	1.19	5.24	2.18
15.80	1.17	5.11	2.13
15.90	1.16	4.99	2.08
16.00	1.14	4.88	2.03
16.10	1.13	4.77	1.99
16.20	1.11	4.66	1.94
16.30	1.10	4.55	1.90
16.40	1.08	4.45	1.85
16.50	1.07	4.34	1.81
16.60	1.06	4.25	1.77
16.70	1.04	4.15	1.73
16.80	1.03	4.06	1.69
16.90	1.02	3.96	1.65
17.00	1.01	3.87	1.61
17.10	0.99	3.79	1.58
17.20	0.98	3.70	1.54
17.30	0.97	3.62	1.51
17.40	0.96	3.54	1.47
17.50	0.95	3.46	1.44
17.60	0.94	3.38	1.41
17.70	0.93	3.30	1.38
17.80	0.92	3.23	1.34
17.90	0.91	3.16	1.31

**10% Salt (BWOW) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Salt Conc. Lbs/sk
14.00	1.62	8.28	6.89
14.10	1.59	8.05	6.71
14.20	1.56	7.83	6.53
14.30	1.53	7.63	6.35
14.40	1.50	7.42	6.18
14.50	1.48	7.23	6.02
14.60	1.45	7.04	5.87
14.70	1.43	6.86	5.72
14.80	1.40	6.69	5.57
14.90	1.38	6.52	5.43
15.00	1.36	6.36	5.29
15.10	1.33	6.20	5.16
15.20	1.31	6.04	5.03
15.30	1.29	5.90	4.91
15.40	1.27	5.75	4.79
15.50	1.25	5.61	4.68
15.60	1.24	5.48	4.56
15.70	1.22	5.35	4.45
15.80	1.20	5.22	4.35
15.90	1.18	5.09	4.24
16.00	1.17	4.97	4.14
16.10	1.15	4.86	4.05
16.20	1.13	4.74	3.95
16.30	1.12	4.63	3.86
16.40	1.10	4.52	3.77
16.50	1.09	4.42	3.68
16.60	1.08	4.32	3.60
16.70	1.06	4.22	3.51
16.80	1.05	4.12	3.43
16.90	1.04	4.03	3.35
17.00	1.02	3.93	3.28
17.10	1.01	3.84	3.20
17.20	1.00	3.75	3.13
17.30	0.99	3.67	3.06
17.40	0.97	3.58	2.99
17.50	0.96	3.50	2.92
17.60	0.95	3.42	2.85
17.70	0.94	3.34	2.79
17.80	0.93	3.27	2.72
17.90	0.92	3.19	2.66

**18% Salt (BWOW) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Salt Conc. Lbs/sk
14.00	1.71	8.70	13.04
14.10	1.68	8.45	12.66
14.20	1.64	8.21	12.30
14.30	1.61	7.98	11.96
14.40	1.58	7.76	11.63
14.50	1.55	7.54	11.31
14.60	1.52	7.34	11.00
14.70	1.49	7.14	10.71
14.80	1.47	6.95	10.42
14.90	1.44	6.77	10.15
15.00	1.41	6.59	9.88
15.10	1.39	6.42	9.63
15.20	1.37	6.25	9.38
15.30	1.34	6.10	9.14
15.40	1.32	5.94	8.91
15.50	1.30	5.79	8.68
15.60	1.28	5.65	8.47
15.70	1.26	5.51	8.26
15.80	1.24	5.37	8.05
15.90	1.22	5.24	7.85
16.00	1.20	5.11	7.66
16.10	1.19	4.99	7.48
16.20	1.17	4.87	7.30
16.30	1.15	4.75	7.12
16.40	1.14	4.63	6.95
16.50	1.12	4.52	6.78
16.60	1.11	4.42	6.62
16.70	1.09	4.31	6.46
16.80	1.08	4.21	6.31
16.90	1.06	4.11	6.16
17.00	1.05	4.01	6.02
17.10	1.04	3.92	5.88
17.20	1.02	3.83	5.74
17.30	1.01	3.74	5.60
17.40	1.00	3.65	5.47
17.50	0.99	3.56	5.34
17.60	0.97	3.48	5.22
17.70	0.96	3.40	5.10
17.80	0.95	3.32	4.98
17.90	0.94	3.24	4.86

**36% Salt (BWOW) Added to
Class A, C, G, or H Cements
Mixed With Fresh Water**

Commonly Applied Slurry Properties

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Salt Conc. Lbs/sk
14.00	1.94	9.64	28.91
14.10	1.89	9.33	27.97
14.20	1.85	9.03	27.08
14.30	1.81	8.75	26.23
14.40	1.76	8.48	25.42
14.50	1.73	8.22	24.64
14.60	1.69	7.97	23.90
14.70	1.65	7.73	23.19
14.80	1.62	7.51	22.51
14.90	1.58	7.29	21.86
15.00	1.55	7.08	21.23
15.10	1.52	6.88	20.63
15.20	1.49	6.68	20.05
15.30	1.47	6.50	19.49
15.40	1.44	6.32	18.95
15.50	1.41	6.15	18.44
15.60	1.39	5.98	17.94
15.70	1.36	5.82	17.46
15.80	1.34	5.67	16.99
15.90	1.32	5.52	16.54
16.00	1.29	5.37	16.11
16.10	1.27	5.23	15.69
16.20	1.25	5.10	15.28
16.30	1.23	4.96	14.89
16.40	1.21	4.84	14.51
16.50	1.19	4.71	14.14
16.60	1.18	4.60	13.78
16.70	1.16	4.48	13.43
16.80	1.14	4.37	13.10
16.90	1.13	4.26	12.77
17.00	1.11	4.15	12.45
17.10	1.09	4.05	12.14
17.20	1.08	3.95	11.84
17.30	1.06	3.85	11.55
17.40	1.05	3.76	11.26
17.50	1.04	3.66	10.99
17.60	1.02	3.57	10.72
17.70	1.01	3.49	10.46
17.80	1.00	3.40	10.20
17.90	0.98	3.32	9.95

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties****50/50 Poz Cement with No Bentonite**

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
14.00	1.27	5.93
14.10	1.25	5.77
14.20	1.23	5.61
14.30	1.21	5.45
14.40	1.19	5.30
14.50	1.17	5.16
14.60	1.15	5.02
14.70	1.13	4.89
14.80	1.12	4.75
14.90	1.10	4.63
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15.00	1.08	4.50
15.10	1.07	4.38
15.20	1.05	4.27
15.30	1.04	4.16
15.40	1.02	4.05
15.50	1.01	3.94
<hr/>		
15.60	0.99	3.84
15.70	0.98	3.73
15.80	0.97	3.64
15.90	0.95	3.54
<hr/>		
16.00	0.94	3.45
16.10	0.93	3.36
16.20	0.92	3.27
16.30	0.91	3.18
16.40	0.90	3.10

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties****50/50 Poz Cement with 2% Bentonite**

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
13.00	1.58	8.12
13.10	1.54	7.87
13.20	1.51	7.64
13.30	1.48	7.41
13.40	1.45	7.19
13.50	1.42	6.98
13.60	1.40	6.78
13.70	1.37	6.58
13.80	1.35	6.40
13.90	1.32	6.22
14.00	1.30	6.04
14.10	1.28	5.87
14.20	1.25	5.71
14.30	1.23	5.55
14.40	1.21	5.40
14.50	1.19	5.25
14.60	1.17	5.11
14.70	1.16	4.97
14.80	1.14	4.84
14.90	1.12	4.71
15.00	1.10	4.58
15.10	1.09	4.46
15.20	1.07	4.34
15.30	1.06	4.23
15.40	1.04	4.12

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties****50/50 Poz Cement with 4% Bentonite**

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
12.50	1.80	9.71
12.60	1.76	9.39
12.70	1.72	9.09
12.80	1.68	8.81
12.90	1.64	8.53
13.00	1.61	8.27
13.10	1.57	8.02
13.20	1.54	7.78
13.30	1.51	7.54
13.40	1.48	7.32
13.50	1.45	7.11
13.60	1.42	6.90
13.70	1.40	6.70
13.80	1.37	6.51
13.90	1.35	6.33
14.00	1.32	6.15
14.10	1.30	5.98
14.20	1.28	5.81
14.30	1.26	5.65
14.40	1.24	5.50
14.50	1.22	5.35
14.60	1.20	5.20
14.70	1.18	5.06
14.80	1.16	4.93
14.90	1.14	4.79

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties****50/50 Poz Cement with 6% Bentonite**

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
12.50	1.83	9.88
12.60	1.79	9.56
12.70	1.75	9.26
12.80	1.71	8.96
12.90	1.67	8.68
13.00	1.64	8.42
13.10	1.60	8.16
13.20	1.57	7.91
13.30	1.54	7.68
13.40	1.51	7.45
13.50	1.48	7.23
13.60	1.45	7.02
13.70	1.42	6.82
13.80	1.40	6.63
13.90	1.37	6.44
14.00	1.35	6.26
14.10	1.32	6.08
14.20	1.30	5.91
14.30	1.28	5.75
14.40	1.26	5.59
14.50	1.24	5.44
14.60	1.22	5.29
14.70	1.20	5.15
14.80	1.18	5.01
14.90	1.16	4.88

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties****50/50 Poz Cement with 8% Bentonite**

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
12.00	2.12	11.96
12.10	2.06	11.54
12.20	2.01	11.14
12.30	1.96	10.76
12.40	1.91	10.40
12.50	1.87	10.06
12.60	1.82	9.73
12.70	1.78	9.42
12.80	1.74	9.12
12.90	1.70	8.84
13.00	1.67	8.56
13.10	1.63	8.30
13.20	1.60	8.05
13.30	1.57	7.81
13.40	1.54	7.58
13.50	1.51	7.36
13.60	1.48	7.15
13.70	1.45	6.94
13.80	1.42	6.74
13.90	1.40	6.55
14.00	1.37	6.37
14.10	1.35	6.19
14.20	1.33	6.02
14.30	1.30	5.85
14.40	1.28	5.69

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties****65% Cement / 35% Poz with 6% Bentonite**

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
11.50	2.54	15.19
11.60	2.47	14.61
11.70	2.39	14.06
11.80	2.32	13.55
11.90	2.26	13.06
12.00	2.20	12.60
12.10	2.14	12.16
12.20	2.08	11.75
12.30	2.03	11.36
12.40	1.98	10.98
12.50	1.93	10.63
12.60	1.89	10.29
12.70	1.84	9.97
12.80	1.80	9.66
12.90	1.76	9.36
13.00	1.73	9.08
13.10	1.69	8.81
13.20	1.66	8.55
13.30	1.62	8.30
13.40	1.59	8.06
13.50	1.56	7.83
13.60	1.53	7.61
13.70	1.50	7.40
13.80	1.47	7.19
13.90	1.45	6.99
14.00	1.42	6.80
14.10	1.40	6.62
14.20	1.37	6.44
14.30	1.35	6.27
14.40	1.33	6.10
14.50	1.31	5.94
14.60	1.29	5.79

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties****65% Cement / 35% Poz with 6% Bentonite and 3% Salt**

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Salt Conc. lbs/sk
11.50	2.60	15.45	3.86
11.60	2.52	14.85	3.71
11.70	2.44	14.28	3.57
11.80	2.37	13.74	3.43
11.90	2.30	13.24	3.31
12.00	2.24	12.77	3.19
12.10	2.18	12.32	3.08
12.20	2.12	11.89	2.97
12.30	2.06	11.49	2.87
12.40	2.01	11.10	2.77
12.50	1.96	10.74	2.68
12.60	1.92	10.39	2.60
12.70	1.87	10.06	2.51
12.80	1.83	9.74	2.43
12.90	1.79	9.44	2.36
13.00	1.75	9.15	2.29
13.10	1.71	8.88	2.22
13.20	1.68	8.61	2.15
13.30	1.64	8.36	2.09
13.40	1.61	8.11	2.03
13.50	1.58	7.88	1.97
13.60	1.55	7.65	1.91
13.70	1.52	7.44	1.86
13.80	1.49	7.23	1.81
13.90	1.46	7.03	1.76
14.00	1.44	6.83	1.71
14.10	1.41	6.65	1.66
14.20	1.39	6.47	1.62
14.30	1.36	6.29	1.57
14.40	1.34	6.12	1.53
14.50	1.32	5.96	1.49
14.60	1.30	5.80	1.45

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties**

65% Cement / 35% Poz + 6% Bentonite + 10 lb/sk Gilsonite

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
11.50	2.57	14.27
11.60	2.49	13.69
11.70	2.42	13.13
11.80	2.35	12.61
11.90	2.28	12.12
12.00	2.22	11.66
12.10	2.16	11.21
12.20	2.11	10.80
12.30	2.05	10.40
12.40	2.00	10.02
12.50	1.95	9.66
12.60	1.91	9.32
12.70	1.86	8.99
12.80	1.82	8.68
12.90	1.78	8.38
13.00	1.74	8.10
13.10	1.71	7.82
13.20	1.67	7.56
13.30	1.64	7.31
13.40	1.61	7.07
13.50	1.58	6.84
13.60	1.55	6.61
13.70	1.52	6.40
13.80	1.49	6.19
13.90	1.46	5.99
14.00	1.44	5.80
14.10	1.41	5.61
14.20	1.39	5.43
14.30	1.36	5.26
14.40	1.34	5.09
14.50	1.32	4.93
14.60	1.30	4.77

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties****85% Cement / 15% Poz with 8% Bentonite**

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
11.00	3.28	20.65
11.10	3.17	19.76
11.20	3.06	18.94
11.30	2.95	18.17
11.40	2.86	17.45
11.50	2.77	16.77
11.60	2.68	16.14
11.70	2.60	15.54
11.80	2.53	14.98
11.90	2.46	14.45
12.00	2.39	13.95
12.10	2.33	13.48
12.20	2.27	13.03
12.30	2.21	12.60
12.40	2.15	12.20
12.50	2.10	11.81
12.60	2.05	11.44
12.70	2.01	11.09
12.80	1.96	10.75
12.90	1.92	10.43
13.00	1.88	10.13
13.10	1.84	9.83
13.20	1.80	9.55
13.30	1.76	9.28
13.40	1.73	9.02
13.50	1.70	8.77
13.60	1.66	8.53
13.70	1.63	8.29
13.80	1.60	8.07
13.90	1.57	7.86
14.00	1.55	7.65
14.10	1.52	7.45

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties**

85% Cement / 15% Poz with 8% Bentonite and 3% Salt

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk	Salt Conc. lbs/sk
11.00	3.38	21.12	5.28
11.10	3.25	20.18	5.04
11.20	3.14	19.32	4.83
11.30	3.03	18.51	4.63
11.40	2.93	17.76	4.44
11.50	2.83	17.06	4.26
11.60	2.74	16.40	4.10
11.70	2.66	15.78	3.94
11.80	2.58	15.20	3.80
11.90	2.51	14.66	3.66
12.00	2.44	14.14	3.53
12.10	2.37	13.65	3.41
12.20	2.31	13.19	3.30
12.30	2.25	12.75	3.19
12.40	2.19	12.33	3.08
12.50	2.14	11.93	2.98
12.60	2.09	11.55	2.89
12.70	2.04	11.19	2.80
12.80	1.99	10.85	2.71
12.90	1.95	10.52	2.63
13.00	1.90	10.21	2.55
13.10	1.86	9.91	2.48
13.20	1.82	9.62	2.40
13.30	1.79	9.34	2.33
13.40	1.75	9.08	2.27
13.50	1.72	8.82	2.20
13.60	1.68	8.58	2.14
13.70	1.65	8.34	2.08
13.80	1.62	8.11	2.03
13.90	1.59	7.89	1.97
14.00	1.56	7.68	1.92
14.10	1.54	7.48	1.87

Class A, C, G, or H Cements**74 lb/sk Pozmix****Mixed With Fresh Water****Commonly Applied Slurry Properties****85% Cement / 15% Poz + 8% Bentonite + 10 lb/sk Gilsonite**

Slurry Density Lbs/Gallon	Slurry Yield cuft/sk	Water Ratio gals/sk
11.00	3.32	19.77
11.10	3.20	18.88
11.20	3.09	18.04
11.30	2.98	17.26
11.40	2.89	16.54
11.50	2.79	15.86
11.60	2.71	15.22
11.70	2.63	14.62
11.80	2.55	14.05
11.90	2.48	13.52
12.00	2.41	13.01
12.10	2.35	12.53
12.20	2.29	12.08
12.30	2.23	11.65
12.40	2.18	11.24
12.50	2.12	10.84
12.60	2.07	10.47
12.70	2.03	10.12
12.80	1.98	9.78
12.90	1.94	9.45
13.00	1.90	9.14
13.10	1.86	8.85
13.20	1.82	8.56
13.30	1.78	8.29
13.40	1.75	8.02
13.50	1.71	7.77
13.60	1.68	7.53
13.70	1.65	7.29
13.80	1.62	7.07
13.90	1.59	6.85
14.00	1.56	6.64
14.10	1.54	6.44

ENGLISH UNITS

EQUATIONS FOR MAKING FLOW CALCULATIONS

1. DISPLACEMENT VELOCITY

$$V = \frac{17.157 Q_b}{D^2} = \frac{3.056 Q_{cf}}{D^2}$$

where,

V = velocity, ft. per sec.

Q_b = pumping rate, bbls. per min.

Q_{cf} = pumping rate, cu. ft. per min.

D = inside dia. of pipe, inches.

For annulus $D^2 = D_o^2 - D_i^2$

where,

D_o = outer pipe inside dia. or hole size, in.

D_i = inner pipe outside dia., in.

2 REYNOLDS NUMBER

$$N_{Re} = \frac{1.86 V^{(2-n)} \rho}{K' (96/D)^n}$$

where,

N_{Re} = Reynolds Number, dimensionless.

V = velocity, ft. per sec.

ρ = slurry density, lbs. per gal.

n' = flow behaviour index, dimensionless.

K' = consistency index, lbs.-sec. n' per sq. ft.

D = inside dia. of pipe, in.

For annulus $D = D_o - D_i$

3. FRICTIONAL PRESSURE DROP

$$\Delta P_f = \frac{0.039 L \rho V^2 f}{D}$$

where,

ΔP_f = friction pressure drop, psi.

L = length of pipe, ft.

ρ = slurry density, lbs. per gal.

V = velocity, ft. per sec.

f = friction factor, dimensionless.

D = inside dia. of pipe, in.

For annulus, $D = D_o - D_i$

3a. Turbulent Friction Factor for slurries containing no bentonite.

$$f = 0.0303/N_{Re}^{0.1612}$$

3b. Turbulent Friction Factor for slurries containing bentonite.

$$f = 0.00454 + 0.645/N_{Re}^{0.7}$$

3c. Plug and Laminar Friction Factor $f = 16/N_{Re}$

4. VELOCITY AT SOME SPECIFIC REYNOLDS NUMBER

For generalized calculations:

N_{Re} for Plug Flow = 100 (maximum)

N_{Re} for for Turbulence = 3000

$$V = \left(\frac{N_{Re} K' (96/D)^n}{1.86 \rho} \right)^{\frac{1}{2-n'}}$$

where,

V = velocity, ft. per sec.

K' = consistency index, lb.-sec. n' per sq. ft.

n' = flow behaviour index, dimensionless.

ρ = slurry density, lbs. per gal.

D = inside diamete of pipe, in.

N_{Re} = specified Reynolds No., dimensionless.

For annulus $D = D_o - D_i$

where,

D_o = outer pipe inside dia. or hole size, in.

D_i = inner pipe outside dia., in.

5. HYDROSTATIC PRESSURE

$$P_h = .05195 \rho H$$

where,

P_h = hydrostatic pressure, psi.

ρ = fluid density, lbs. per gal.

H = height of column, ft.

METRIC UNITS

EQUATIONS FOR MAKING FLOW CALCULATIONS

1. DISPLACEMENT VELOCITY

$$V = \frac{21221 Q}{D}$$

where, V = velocity, m per s.
 Q = pumping rate, m^3 per min.
 D = inside diameter of pipe, mm.
For annulus, $D^2 = D_O^2 - D_I^2$
where, D_O = outer pipe inside diameter or hole size, mm.
 D_I = inner pipe outside diameter, mm.

2. REYNOLDS NUMBER

$$N_{Re} = \frac{8 V^{(2-n)} \rho}{K' \left(\frac{8000}{D} \right)^{n'}}$$

where, N_{Re} = Reynolds Number, dimensionless.
 V = velocity, m. per sec.
 ρ = slurry density, kg. per m^3 .
 n' = flow behaviour index, dimensionless.
 K' = consistency index, $\text{Pa}\cdot\text{s}^{n'}$.
 D = inside diameter of pipe, mm.
For annulus $D = D_O - D_I$

3. FRICTIONAL PRESSURE DROP

$$\Delta P_f = \frac{2 L \rho V^2 f}{D}$$

where, P_f = friction pressure drop, kPa.
 L = length of pipe, m.
 ρ = density of slurry, kg/m^3 .
 V = velocity, m/s.
 f = friction factor, dimensionless.
 D = inside diameter of pipe, mm.

For annulus, $D = D_O - D_I$

3a. Turbulent Friction Factor for slurries containing no bentonite.

$$f = 0.0303/N_{Re}^{0.1612}$$

3b. Turbulent Friction Factor for slurries containing bentonite.

$$f = 0.00454 + 0.645/N_{Re}^{0.7}$$

3c. Plug and Laminar Friction Factor $f = 16/N_{Re}^{0.7}$

4. VELOCITY AT SOME SPECIFIC REYNOLDS NUMBER

For generalized calculations:

N_{Re} for Plug Flow = 100 (maximum)

N_{Re} for Turbulence = 3000

$$V = \left(\frac{N_{Re} K' (8000/D)^{n'}}{8 \rho} \right)^{\frac{1}{2-n'}}$$

where, V = velocity, ft. per sec.
 K' = consistency index $\text{Pa}\cdot\text{s}^{n'}$.
 n' = flow behaviour index, dimensionless.
 ρ = slurry density, kg per m^3 .
 D = inside diameter of pipe, mm.
 N_{Re} = specified Reynolds No., dimensionless.
For annulus $D = D_O - D_I$
 D_O = outer pipe inside diameter or hole size, mm.
 D_I = inner pipe outside diameter, mm.

5. HYDROSTATIC PRESSURE

$$P_h = .00981 \rho H$$

where, P_h = hydrostatic pressure, kPa.
 ρ = fluid density, kg/m^3 .
 H = height of column, m.

ENGLISH UNITS

SAND (20-40 MESH) FILL-UP IN CASING

Size in.	Weight lb/ft	ID in.	Capacity ft3/ft	Capacity ft/ft3	Pounds Sand per Linear Foot	Linear Feet per Per Pound of Sand
4½	9.50	4.090	0.0912	10.9604	9.7259	0.1028
	10.50	4.052	0.0896	11.1669	9.5460	0.1048
	11.60	4.000	0.0873	11.4592	9.3026	0.1075
	13.50	3.920	0.0838	11.9316	8.9342	0.1119
5	11.50	4.560	0.1134	8.8174	12.0897	0.0827
	13.00	4.494	0.1102	9.0783	11.7422	0.0852
	15.00	4.408	0.1060	9.4360	11.2971	0.0885
	18.00	4.276	0.0997	10.0276	10.6307	0.0941
	21.00	4.154	0.0941	10.6253	10.0327	0.0997
5½	13.00	5.044	0.1388	7.2065	14.7923	0.0676
	14.00	5.012	0.1370	7.2988	14.6052	0.0685
	15.00	4.974	0.1349	7.4107	14.3845	0.0695
	15.50	4.950	0.1336	7.4828	14.2461	0.0702
	17.00	4.892	0.1305	7.6613	13.9142	0.0719
	20.00	4.778	0.1245	8.0312	13.2732	0.0753
	23.00	4.670	0.1189	8.4070	12.6800	0.0789
	28.00	6.538	0.2331	4.2893	24.8527	0.0402
7	20.00	6.456	0.2273	4.3989	24.2332	0.0413
	22.00	6.398	0.2233	4.4790	23.7998	0.0420
	23.00	6.366	0.2210	4.5242	23.5623	0.0424
	24.00	6.336	0.2190	4.5671	23.3408	0.0428
	26.00	6.276	0.2148	4.6549	22.9008	0.0437
	28.00	6.214	0.2106	4.7482	22.4506	0.0445
	29.00	6.184	0.2086	4.7944	22.2343	0.0450
	30.00	6.154	0.2066	4.8413	22.0191	0.0454
	32.00	6.094	0.2026	4.9371	21.5918	0.0463
	34.00	6.040	0.1990	5.0257	21.2109	0.0471
	35.00	6.004	0.1966	5.0862	20.9588	0.0477
	38.00	5.920	0.1911	5.2315	20.3764	0.0491
7-5/8	40.00	5.836	0.1858	5.3832	19.8023	0.0505
	20.00	7.125	0.2769	3.6116	29.5158	0.0339
	24.00	7.025	0.2692	3.7152	28.6931	0.0349
	26.40	6.969	0.2649	3.7751	28.2375	0.0354
	29.70	6.875	0.2578	3.8791	27.4808	0.0364
	33.70	6.765	0.2496	4.0062	26.6085	0.0376
	39.00	6.625	0.2394	4.1773	25.5186	0.0392
	43.50	6.435	0.2259	4.4277	24.0759	0.0415
8-5/8	24.00	8.097	0.3576	2.7966	38.1182	0.0262
	28.00	8.017	0.3506	2.8527	37.3687	0.0268
	32.00	7.921	0.3422	2.9222	36.4791	0.0274
	36.00	7.825	0.3340	2.9944	35.6003	0.0281
	38.00	7.775	0.3297	3.0330	35.1468	0.0285
	40.00	7.725	0.3255	3.0724	34.6962	0.0288
	43.00	7.651	0.3193	3.1321	34.0346	0.0294
	44.00	7.625	0.3171	3.1535	33.8037	0.0296
	49.00	7.511	0.3077	3.2500	32.8005	0.0305
	29.30	9.063	0.4480	2.2322	47.7561	0.0209
9-5/8	32.30	9.001	0.4419	2.2630	47.1049	0.0212
	36.00	8.921	0.4341	2.3038	46.2713	0.0216
	38.00	8.885	0.4306	2.3225	45.8986	0.0218
	40.00	8.835	0.4257	2.3489	45.3835	0.0220
	43.50	8.755	0.4181	2.3920	44.5653	0.0224
	47.00	8.681	0.4110	2.4329	43.8151	0.0228
	53.50	8.535	0.3973	2.5169	42.3537	0.0236
	58.40	8.435	0.3881	2.5769	41.3671	0.0242
	61.10	8.375	0.3826	2.6140	40.7807	0.0245
	71.80	8.125	0.3601	2.7773	38.3823	0.0261

METRIC UNITS**SAND (20-40 MESH) FILL-UP IN CASING**

Size mm	Weight kg/m	ID mm	Capacity m3/m	Capacity m/m3	Kilograms Sand per Meter	Meters per Per Kilogram of Sand
114.30	14.14	103.89	0.0085	117.98	14.47	0.0691
	15.63	102.92	0.0083	120.20	14.21	0.0704
	17.26	101.60	0.0081	123.35	13.84	0.0723
	20.09	99.57	0.0078	128.43	13.30	0.0752
127.00	17.11	115.82	0.0105	94.91	17.99	0.0556
	19.35	114.15	0.0102	97.72	17.47	0.0572
	22.32	111.96	0.0098	101.57	16.81	0.0595
	26.79	108.61	0.0093	107.94	15.82	0.0632
	31.25	105.51	0.0087	114.37	14.93	0.0670
139.70	19.35	128.12	0.0129	77.57	22.01	0.0454
	20.83	127.31	0.0127	78.56	21.73	0.0460
	22.32	126.34	0.0125	79.77	21.41	0.0467
	23.07	125.73	0.0124	80.54	21.20	0.0471
	25.30	124.26	0.0121	82.47	20.71	0.0483
	29.76	121.36	0.0116	86.45	19.75	0.0506
	34.23	118.62	0.0110	90.49	18.87	0.0530
	25.30	166.07	0.0217	46.17	36.98	0.0270
177.80	29.76	163.98	0.0211	47.35	36.06	0.0277
	32.74	162.51	0.0207	48.21	35.42	0.0282
	34.23	161.70	0.0205	48.70	35.06	0.0285
	35.72	160.93	0.0203	49.16	34.73	0.0288
	38.69	159.41	0.0200	50.10	34.08	0.0293
	41.67	157.84	0.0196	51.11	33.41	0.0299
	43.16	157.07	0.0194	51.61	33.09	0.0302
	44.64	156.31	0.0192	52.11	32.77	0.0305
	47.62	154.79	0.0188	53.14	32.13	0.0311
	50.60	153.42	0.0185	54.10	31.57	0.0317
	52.09	152.50	0.0183	54.75	31.19	0.0320
	56.55	150.37	0.0178	56.31	30.32	0.0330
193.68	59.53	148.23	0.0173	57.94	29.47	0.0340
	29.76	180.98	0.0257	38.87	43.92	0.0228
	35.72	178.44	0.0250	39.99	42.70	0.0234
	39.29	177.01	0.0246	40.63	42.02	0.0237
	44.20	174.63	0.0240	41.75	40.90	0.0244
	50.15	171.83	0.0232	43.12	39.60	0.0253
	58.04	168.28	0.0222	44.96	37.98	0.0263
	64.74	163.45	0.0210	47.66	35.83	0.0280
219.08	35.72	205.66	0.0332	30.10	56.73	0.0176
	41.57	203.63	0.0326	30.71	55.61	0.0180
	47.62	201.19	0.0318	31.45	54.29	0.0184
	53.57	198.76	0.0310	32.23	52.98	0.0189
	56.65	197.49	0.0306	32.65	52.30	0.0191
	59.53	196.22	0.0302	33.07	51.63	0.0194
	63.99	194.34	0.0297	33.70	50.65	0.0197
	65.48	193.68	0.0295	33.94	50.31	0.0199
	72.92	190.78	0.0286	34.98	48.81	0.0204
	43.60	230.20	0.0416	24.03	71.07	0.0140
244.48	48.07	228.63	0.0411	24.36	70.10	0.0143
	53.57	226.59	0.0403	24.80	68.86	0.0145
	56.55	225.68	0.0400	25.00	68.30	0.0146
	59.53	224.41	0.0395	25.28	67.54	0.0148
	64.74	222.38	0.0388	25.75	66.32	0.0150
	69.94	220.50	0.0382	26.19	65.20	0.0153
	79.62	216.79	0.0369	27.09	63.03	0.0159
	86.91	214.25	0.0361	27.74	61.56	0.0162
	90.93	212.73	0.0355	28.14	60.69	0.0165
	106.85	206.38	0.0335	29.89	57.12	0.0175

ENGLISH/METRIC UNITS**DEPTH CONVERSION TABLE**

FEET	FEET OR METERS TO BE CONVERTED	METERS
3.28083	1	0.3048
6.56	2	0.61
9.84	3	0.91
13.12	4	1.22
16.40	5	1.52
19.68	6	1.83
22.97	7	2.13
26.25	8	2.44
29.53	9	2.74
32.81	10	3.05
65.62	20	6.10
98.42	30	9.14
131.23	40	12.19
164.04	50	15.24
196.85	60	18.29
229.66	70	21.34
262.47	80	24.38
295.27	90	27.43
328.08	100	30.48
656.17	200	60.96
984.25	300	91.44
1,312.33	400	121.92
1,640.42	500	152.40
1,968.50	600	182.88
2,296.58	700	213.36
2,624.66	800	243.84
2,952.75	900	274.32
3,280.83	1,000	304.80
6,561.66	2,000	609.60
9,842.49	3,000	914.40
13,123.32	4,000	1,219.20
16,404.15	5,000	1,524.00
19,684.98	6,000	1,828.80
22,965.81	7,000	2,133.60
26,246.64	8,000	2,438.40
29,527.47	9,000	2,743.20
32,808.30	10,000	3,048.00
49,212.45	15,000	4,572.00
65,616.60	20,000	6,096.00
82,020.75	25,000	7,620.00

ENGLISH/METRIC UNITS**VOLUME CONVERSION TABLE**

Gals. Converted to Cu. Ft	Gals. or Cu. Ft to be converted	Cu. Ft. Converted to Gals.	Cu. Meters
Litres			
0.13368	3.78533	1	0.028317
0.27	7.57	2	0.0566
0.40	11.36	3	0.0850
0.53	15.14	4	0.113
0.67	18.93	5	0.142
0.80	22.71	6	0.170
0.94	26.50	7	0.198
1.07	30.28	8	0.227
1.20	34.07	9	0.255
1.34	37.85	10	0.283
2.67	75.71	20	0.57
4.01	113.56	30	0.85
5.35	151.41	40	1.13
6.68	189.27	50	1.42
8.02	227.12	60	1.70
9.36	264.97	70	1.98
10.69	302.83	80	2.27
12.03	340.68	90	2.55
13.37	378.53	100	2.83
26.74	757.07	200	5.66
40.1	1,135.6	300	8.5
53.5	1,514.1	400	11.3
66.8	1,892.7	500	14.2
80.2	2,271.2	600	17.0
93.6	2,649.7	700	19.8
106.9	3,028.3	800	22.7
120.3	3,406.8	900	25.5
133.7	3,785.3	1,000	28.3
267.4	7,570.7	2,000	56.6
401.0	11,356.0	3,000	85.0
534.7	15,141.3	4,000	113.3
668.4	18,926.7	5,000	141.6
802.1	22,712.0	6,000	169.9
935.8	26,497.3	7,000	198.2
1,069.4	30,282.6	8,000	226.5
1,203.1	34,068.0	9,000	254.9
1,336.8	37,853.3	10,000	283.2
2,005.2	56,780.0	15,000	424.8
2,673.6	75,706.6	20,000	566.3
3,342.0	94,633.3	25,000	707.9

ENGLISH/METRIC UNITS

COMPRESSIVE STRENGTH CONVERSION TABLE

PSI	kPa	N/cm ² or PSI to be converted	N/cm ²	kPa
7.25	50	5	3.45	34.5
14.5	100	10	6.89	68.9
29.0	200	20	13.8	138
43.5	300	30	20.7	207
58.0	400	40	27.6	276
72.5	500	50	34.5	345
87.0	600	60	41.4	414
102	700	70	48.3	483
116	800	80	55.2	552
131	900	90	62.1	621
145	1 000	100	68.9	689
290	2 000	200	138	1 380
435	3 000	300	207	2 070
580	4 000	400	276	2 760
725	5 000	500	345	3 450
870	6 000	600	414	4 140
1,020	7 000	700	483	4 830
1,160	8 000	800	552	5 520
1,310	9 000	900	621	6 210
1,450	10 000	1000	689	6 890
1,600	11 000	1,100	758	7 580
1,740	12 000	1200	827	8 270
1,890	13 000	1,300	896	8 960
2,030	14 000	1,400	965	9 650
2,180	15 000	1,500	1 030	10 300
2,320	16 000	1,600	1 100	11 000
2,470	17 000	1,700	1 170	11 700
2,610	18 000	1,800	1 240	12 400
2,760	19 000	1,900	1 310	13 100
2,900	20 000	2,000	1 380	13 800
4,350	30 000	3,000	2 070	20 700
5,800	40 000	4,000	2 760	27 600
7,250	50 000	5,000	3 450	34 500
8,700	60 000	6,000	4 140	41 400
10,200	70 000	7,000	4 830	48 300
11,600	80 000	8,000	5 520	55 200
13,100	90 000	9,000	6 210	62 100
14,500	100 000	10,000	6 890	68 900
21,800	150 000	15,000	10 300	103 000
29,000	200 000	20,000	13 800	138 000

1 N/cm² = 10 kPa1 N/cm² = 1.450377 PSI1 PSI = .6894757 N/cm²

1 PSI = 6.894757 kPa

ENGLISH/METRIC UNITS

TEMPERATURE CONVERSION TABLES

Reading in °F or °C			Reading in °F or °C		
°F	to be converted	°C	°F	to be converted	°C
-0.4	-18	-27.78	+116.6	+47	+8.33
+3.2	-16	-26.67	+118.4	+48	+8.89
+6.8	-14	-25.56	+120.2	+49	+9.44
+10.4	-12	-24.44	+122.0	+50	+10.00
+14.0	-10	-23.33	+123.8	+51	+10.56
+17.6	-8	-22.22	+123.8	+52	+11.11
+19.4	-7	-21.67	+127.4	+53	+11.67
+21.2	-6	-21.11	+129.2	+54	+12.22
+23.0	-5	-20.56	+131.0	+55	+12.78
+24.8	-4	-20.00	+132.8	+56	+13.33
+26.6	-3	-19.44	+134.6	+57	+13.89
+28.4	-2	-18.99	+136.4	+58	+14.44
+30.2	-1	-18.33	+138.2	+59	+15.00
+32.0	±0	-17.78	+140.0	+60	+15.56
+33.8	+1	-17.22	+141.8	+61	+16.11
+35.6	+2	-16.67	+143.6	+62	+16.67
+37.4	+3	-16.11	+145.4	+63	+17.22
+39.2	+4	-15.56	+147.2	+64	+17.78
+41.0	+5	-15.00	+149.0	+65	+18.33
+42.8	+6	-14.44	+150.8	+66	+18.89
+44.6	+7	-13.89	+152.6	+67	+19.44
+46.4	+8	-13.33	+154.4	+68	+20.00
+48.2	+9	-12.78	+156.2	+69	+20.56
+50.0	+10	-12.22	+158.0	+70	+21.11
+51.8	+11	-11.67	+159.8	+71	+21.67
+53.6	+12	-11.11	+161.6	+72	+22.22
+55.4	+13	-10.56	+163.4	+73	+22.78
+57.2	+14	-10.00	+165.2	+74	+23.33
+59.0	+15	-9.44	+167.0	+75	+23.89
+60.8	+16	-8.89	+168.8	+76	+24.44
+62.6	+17	-8.33	+170.6	+77	+25.00
+64.4	+18	-7.78	+172.4	+78	+25.56
+66.2	+19	-7.22	+174.2	+79	+26.11
+68.0	+20	-6.67	+176.0	+80	+26.67
+69.8	+21	-6.11	+177.8	+81	+27.22
+71.6	+22	-5.56	+179.6	+82	+27.78
+73.4	+23	-5.00	+181.4	+83	+28.33
+75.2	+24	-4.44	+183.2	+84	+28.89
+77.0	+25	-3.89	+185.0	+85	+29.44
+78.8	+26	-3.33	+186.8	+86	+30.00
+80.6	+27	-2.78	+188.6	+87	+30.56
+82.4	+28	-2.22	+190.4	+88	+31.11
+84.2	+29	-1.67	+192.2	+89	+31.67
+86.0	+30	-1.11	+194.0	+90	+32.22
+87.8	+31	-0.56	+195.8	+91	+32.78
+89.6	+32	±0.00	+197.6	+92	+33.33
+91.4	+33	+0.56	+199.4	+93	+33.89
+93.2	+34	+1.11	+201.2	+94	+34.44
+95.0	+35	+1.67	+203.0	+95	+35.00
+96.8	+36	+2.22	+204.8	+96	+35.56
+98.6	+37	+2.78	+206.6	+97	+36.11
+100.4	+38	+3.33	+208.4	+98	+36.67
+102.2	+39	+3.89	+210.2	+99	+37.22
+104.0	+40	+4.44	+212.0	+100	+37.78
+105.8	+41	+5.00	+213.8	+101	+38.33
+107.6	+42	+5.56	+215.6	+102	+38.89
+109.4	+43	+6.11	+217.4	+103	+39.44
+111.2	+44	+6.67	+219.2	+104	+40.00
+113.0	+45	+7.22	+221.0	+105	+40.56
+114.8	+46	+7.78	+222.8	+106	+41.11

ENGLISH/METRIC UNITS**TEMPERATURE CONVERSION TABLES**

°F	Reading in °F or °C to be converted	°C	°F	Reading in °F or °C to be converted	°C
+224.6	+107	+41.67	+332.6	+167	+75.00
+226.4	+108	+42.22	+334.4	+168	+75.56
+228.2	+109	+42.78	+336.2	+169	+76.11
+230.0	+110	+43.33	+338.0	+170	+76.67
+231.8	+111	+43.89	+339.8	+171	+77.22
+233.6	+112	+44.44	+341.6	+172	+77.78
+235.4	+113	+45.00	+343.4	+173	+78.33
+237.2	+114	+45.56	+345.2	+174	+78.89
+239.0	+115	+46.11	+347.0	+175	+79.44
+240.8	+116	+46.67	+348.8	+176	+80.00
+242.6	+117	+47.22	+350.6	+177	+80.56
+244.4	+118	+47.78	+352.4	+178	+81.11
+246.2	+119	+48.33	+354.2	+179	+81.67
+248.0	+120	+48.89	+356.0	+180	+82.22
+249.8	+121	+49.44	+357.8	+181	+82.78
+251.6	+122	+50.00	+359.6	+182	+83.33
+253.4	+123	+50.56	+361.4	+183	+83.89
+255.2	+124	+51.11	+363.2	+184	+84.44
+257.0	+125	+51.67	+365.0	+185	+85.00
+258.8	+126	+52.22	+366.8	+186	+85.56
+260.6	+127	+52.78	+368.6	+187	+86.11
+262.4	+128	+53.33	+370.4	+188	+86.67
+264.2	+129	+53.89	+372.2	+189	+87.22
+266.0	+130	+54.44	+374.0	+190	+87.78
+267.8	+131	+55.00	+375.8	+191	+88.33
+269.6	+132	+55.56	+377.6	+192	+88.89
+271.4	+133	+56.11	+379.4	+193	+89.44
+273.2	+134	+56.67	+381.2	+194	+90.00
+275.0	+135	+57.22	+383.0	+195	+90.56
+276.8	+136	+57.78	+384.8	+196	+91.11
+278.6	+137	+58.33	+386.6	+197	+91.67
+280.4	+138	+58.89	+388.4	+198	+92.22
+282.2	+139	+59.44	+390.2	+199	+92.78
+284.0	+140	+60.00	+392.0	+200	+93.33
+285.8	+141	+60.56	+393.8	+201	+93.89
+287.6	+142	+61.11	+395.6	+202	+94.44
+289.4	+143	+61.67	+397.4	+203	+95.00
+291.2	+144	+62.22	+399.2	+204	+95.56
+293.0	+145	+62.78	+401.0	+205	+96.11
+294.8	+146	+63.33	+402.8	+206	+96.67
+296.6	+147	+63.89	+404.6	+207	+97.22
+298.4	+148	+64.44	+406.4	+208	+97.78
+300.2	+149	+65.00	+408.2	+209	+98.33
+302.0	+150	+65.56	+410.0	+210	+98.89
+303.8	+151	+66.11	+411.8	+211	+99.44
+305.6	+152	+66.67	+413.6	+212	+100.00
+307.4	+153	+67.22	+415.4	+213	+100.56
+309.2	+154	+67.78	+417.2	+214	+101.11
+311.0	+155	+68.33	+419.0	+215	+101.67
+312.8	+156	+68.89	+420.8	+216	+102.22
+314.6	+157	+69.44	+422.6	+217	+102.78
+316.4	+158	+70.00	+424.4	+218	+103.33
+318.2	+159	+70.56	+426.2	+219	+103.89
+320.0	+160	+71.11	+428.0	+220	+104.44
+321.8	+161	+71.67	+431.6	+222	+105.56
+323.6	+162	+72.22	+435.2	+224	+106.67
+325.4	+163	+72.78	+438.8	+226	+107.78
+327.2	+164	+73.33	+442.4	+228	+108.89
+329.0	+165	+73.89	+446.0	+230	+110.00
+330.8	+166	+74.44	+449.6	+232	+111.11

ENGLISH/METRIC UNITS**TEMPERATURE CONVERSION TABLES**

°F	Reading in °F or °C to be converted	°C	°F	Reading in °F or °C to be converted	°C
+453.2	+234	+112.22	+669.2	+354	+178.89
+456.8	+236	+113.33	+672.8	+356	+180.00
+460.4	+238	+114.44	+676.4	+358	+181.11
+464.0	+240	+115.56	+680.0	+360	+182.22
+467.6	+242	+116.67	+683.6	+362	+183.33
+471.2	+244	+117.78	+687.2	+364	+184.44
+474.8	+246	+118.89	+690.8	+366	+185.56
+478.4	+248	+120.00	+694.4	+368	+186.67
+482.0	+250	+121.11	+698.0	+370	+187.78
+485.6	+252	+122.22	+701.6	+372	+188.89
+489.2	+254	+123.33	+705.2	+374	+190.00
+492.8	+256	+124.44	+708.8	+376	+191.11
+496.4	+258	+125.56	+712.4	+378	+192.22
+500.0	+260	+126.67	+716.0	+380	+193.33
+503.6	+262	+127.78	+719.6	+382	+194.44
+507.2	+264	+128.89	+723.2	+384	+195.56
+510.8	+266	+130.00	+726.8	+386	+196.67
+514.4	+268	+131.11	+730.4	+388	+197.78
+518.0	+270	+132.22	+734.0	+390	+198.89
+521.6	+272	+133.33	+737.6	+392	+200.00
+525.2	+274	+134.44	+741.2	+394	+201.11
+528.8	+276	+135.56	+744.8	+396	+202.22
+532.4	+278	+136.67	+748.4	+398	+203.33
+536.0	+280	+137.78	+752.0	+400	+204.44
+539.6	+282	+138.89	+755.6	+402	+205.56
+543.2	+284	+140.00	+759.2	+404	+206.67
+546.8	+286	+141.11	+762.8	+406	+207.78
+550.4	+288	+142.22	+766.4	+408	+208.89
+554.0	+290	+143.33	+770.0	+410	+210.00
+557.6	+292	+144.44	+773.6	+412	+211.11
+561.2	+294	+145.56	+777.2	+414	+212.22
+564.8	+296	+146.67	+780.8	+416	+213.33
+568.4	+298	+147.78	+784.4	+418	+214.44
+572.0	+300	+148.89	+788.0	+420	+215.56
+575.6	+302	+150.00	+791.6	+422	+216.67
+579.2	+304	+151.11	+795.2	+424	+217.78
+582.8	+306	+152.22	+798.8	+426	+218.89
+586.4	+308	+153.33	+802.4	+428	+220.00
+590.0	+310	+154.44	+806.0	+430	+221.11
+593.6	+312	+155.56	+809.6	+432	+222.22
+597.2	+314	+156.67	+813.2	+434	+223.33
+600.8	+316	+157.78	+816.8	+436	+224.44
+604.4	+318	+158.89	+820.4	+438	+225.56
+608.0	+320	+160.00	+824.0	+440	+226.67
+611.6	+322	+161.11	+827.6	+442	+227.78

$$^{\circ}\text{F} = \frac{9}{5} \times ^{\circ}\text{C} + 32^{\circ}$$

$$^{\circ}\text{C} = \frac{5}{9} ({}^{\circ}\text{F} - 32^{\circ})$$

ENGLISH/METRIC UNITS

CONVERSION OF PERCENT SALT IN SALT WATER TO PARTS PER MILLION

Per Cent Salt	Parts per Million	Milligrams per Liter
½	5,000	5,020
1	10,000	10,050
2	20,000	20,250
3	30,000	30,700
4	40,000	41,100
5	50,000	52,000
6	60,000	62,500
7	70,000	73,000
8	80,000	84,500
9	90,000	95,000
10	100,000	107,100
11	110,000	118,500
12	120,000	130,300
13	130,000	142,000
14	140,000	154,100
15	150,000	166,500
16	160,000	178,600
17	170,000	191,000
18	180,000	203,700
19	190,000	216,500
20	200,000	229,600
21	210,000	243,000
22	220,000	256,100
23	230,000	270,000
24	240,000	279,500
25	250,000	283,300
26	260,000	311,300

The parts per million column is true parts per million by weight of the salt solution.

It is quite common for many laboratories, analyzing water samples, to report milligrams of salt per liter as parts per million. If it is known that an analysis is reported in this way, the milligram per liter column should be used in converting to percent salt rather than the parts per million column. At low concentrations the error of using the incorrect column is very small. At high concentrations the error is appreciable unless the correct column is used.

PHYSICAL PROPERTIES OF SODIUM CHLORIDE SOLUTIONS

ENGLISH/METRIC UNITS

Percent Sodium Chloride by Weight of Solution	Percent Water	Density of Solution†		Specific† Gravity @ 20° C	Weight of Salt			Yield of Solution	Freeze Point	
		Lbs./Gal.	kg/m3		Lbs./Gal. of Water	Lbs./Bbl. of Water	kg/m3 of Water		°F	°C
0		8.34	998	0.998				1.000		
1	1.01	8.38	1005	1.005	0.08	3.54	10.08	1.005	30.9	- 0.6
2	2.04	8.45	1013	1.013	0.17	7.15	20.36	1.008	29.9	- 1.2
3	3.09	8.51	1020	1.020	0.26	10.82	30.85	1.011	28.8	- 1.8
4	4.17	8.57	1027	1.027	0.35	14.61	41.63	1.015	27.7	- 2.4
5	5.26	8.62	1034	1.034	0.44	18.42	52.51	1.018	26.2	- 3.0
6	6.38	8.68	1041	1.041	0.53	22.35	63.69	1.022	25.3	- 3.7
8	8.70	8.81	1056	1.056	0.73	30.47	86.85	1.029	22.9	- 5.1
10	11.11	8.93	1071	1.071	0.93	38.92	110.90	1.038	20.2	- 6.6
12	13.64	9.06	1086	1.086	1.14	47.78	136.16	1.047	17.3	- 8.2
14	16.28	9.18	1101	1.101	1.36	57.03	162.51	1.056	14.1	- 9.9
16	19.05	9.31	1116	1.116	1.59	66.73	190.16	1.067	10.6	-11.9
18	21.95	9.44	1132	1.132	1.83	76.89	219.11	1.077	6.7	-14.0
20	25.00	9.57	1148	1.148	2.09	87.57	249.56	1.089	2.4	-16.5
22	28.21	9.71	1164	1.164	2.35	98.81	281.60	1.101	-2.5	-19.2
24	31.58	9.84	1180	1.180	2.63	110.62	315.24	1.115	+ 1.4*	-17.0*
26	35.14	9.98	1197	1.197	2.93	123.09	350.78	1.129	+27.9*	- 2.3*

* Precipitation @ -17°C, 1.4°F **Precipitation @ -2.3°C, 27.9°F

† Density in kg/L and kg/dm3 is equal in numerical value to specific gravity.

PHYSICAL PROPERTIES OF CALCIUM CHLORIDE SOLUTIONS

Percent Calcium Chloride by Wt. of Solution	by Wt. of Water	Density of Solution*		Specific* Gravity @ 20° C	Weight of Anhydrous Calcium Chloride			Yield of Solution	Freeze Point	
		Lbs./Gal.	kg/m3		Lbs./Gal. of Water	Lbs./Bbl. of Water	Kg/m3 of Water		°F	°C
0.0	—	8.34	998	0.998	—	—	—	1.000	32.	0.0
1.0	1.01	8.41	1008	1.008	0.08	3.54	10.08	1.002	31.1	-10.5
2.0	2.04	8.47	1015	1.015	0.17	7.15	20.36	1.004	30.2	-11.0
3.0	3.09	8.54	1024	1.024	0.26	10.82	30.85	1.006	29.7	-11.3
4.0	4.17	8.61	1032	1.032	0.35	14.61	41.63	1.008	28.4	-12.0
5.0	5.26	8.69	1042	1.042	0.44	18.42	52.51	1.012	27.7	-12.4
10.0	11.11	9.04	1084	1.084	0.93	38.92	110.90	1.024	22.3	-15.4
15.0	17.65	9.44	1132	1.132	1.47	61.74	176.19	1.040	13.5	-10.3
20.2	25.00	9.82	1178	1.178	2.09	87.57	249.56	1.060	-10.4	-18.0
25.0	33.33	10.24	1228	1.228	2.78	116.76	332.71	1.090	-20.6	-29.2
30.0	42.86	10.69	1282	1.282	3.57	149.94	427.84	1.114	-49.0	-45.0
35.0	53.85	11.15	1337	1.337	4.49	188.58	537.55	1.151	—	—
40.0	66.67	11.72	1405	1.405	5.56	233.52	665.52	1.186	—	—

* Density in kg/L and kg/dm3 is equal in numerical value to specific gravity.

PHYSICAL PROPERTIES OF POTASSIUM CHLORIDE SOLUTIONS

ENGLISH/METRIC UNITS

Percent Potassium Chloride by Weight of Solution	Density of Solution† Lbs./Gal. kg/m3	Sp. Gr.† @ 20° C	Weight of Potassium Chloride			kg of Pottassium per m3 of Water	kg of Chloride per m3 of Water	Freeze Point	
			Lbs./Gal. of Water	Lbs./Bbl. of Water	kg/m3 of Water			°F	°C
0	8.34	998	0.998	—	—	—	—	—	—
1	8.38	1005	1.005	0.08	3.54	10.08	5.27	4.78	31.2 - 0.44
2	8.43	1011	1.011	0.17	7.15	20.36	10.6	9.6	30.3 - 0.94
3	8.48	1017	1.017	0.26	10.82	30.85	16.0	14.5	29.5 - 1.39
4	8.54	1024	1.024	0.35	14.61	41.63	21.5	19.5	28.7 - 1.83
6	8.65	1037	1.037	0.53	22.35	63.69	32.6	29.6	27.0 - 2.78
8	8.75	1050	1.050	0.73	30.47	86.85	44.0	39.8	25.2 - 3.78
10	8.87	1063	1.063	0.93	38.92	110.90	55.8	50.5	23.3 - 4.83
12	8.98	1077	1.077	1.14	47.78	136.16	67.8	61.4	21.4 - 5.89
14	9.10	1091	1.091	1.36	57.03	162.51	80.0	72.5	19.3 - 7.06
16	9.21	1104	1.104	1.59	66.73	190.16	92.6	84.0	17.4 - 8.11
18	9.33	1119	1.119	1.83	76.89	219.11	105.4	95.5	14.9 - 9.50
20	9.45	1133	1.113	2.09	87.57	249.56	118.8	107.8	15.0 - 9.44
22	9.57	1147	1.147	2.35	98.81	281.60	132.1	119.8	32.6 10.33
24	9.69	1162	1.162	2.63	110.62	315.24	146.3	132.6	52.0* 11.11*
26.5	9.82	1178	1.178	3.01	126.28	359.86	163.7	148.5	78.3* 25.72*

* Precipitates

† Density in kg/L and kg/dm3 is equal in numerical value to specific gravity.

ENGLISH/METRIC UNITS

API GRAVITY CONVERSION TABLE

API Gravity	Specific* Gravity	Density* Lbs./Gal.	Density* Kg/m3	Pressure Gradient PSI/Ft.	Pressure Gradient kPa/m
15% HCL	1.0750	8.962	1075.0	.4654	10.547
10 (Water)	1.0000	8.337	1000.0	.4330	9.807
12	.9861	8.221	986.1	.4270	9.670
15	.9659	8.053	965.9	.4182	9.472
18	.9465	7.891	946.5	.4098	9.282
20	.9340	7.787	934.0	.4044	9.159
22	.9218	7.685	921.8	.3991	9.044
24	.9100	7.587	910.0	.3940	8.924
26	.8984	7.490	898.4	.3890	8.810
28	.8871	7.396	887.1	.3841	8.700
30	.8762	7.305	876.2	.3794	8.592
31	.8708	7.260	870.8	.3771	8.539
32	.8654	7.215	865.4	.3747	8.487
33	.8602	7.171	860.2	.3725	8.436
34	.8550	7.128	855.0	.3702	8.385
35	.8498	7.085	849.8	.3680	8.334
36	.8448	7.043	844.8	.3658	8.284
37	.8398	7.001	839.8	.3638	8.235
38	.8348	6.960	834.8	.3615	8.187
39	.8299	6.919	829.9	.3593	8.139
40	.8251	6.879	825.1	.3573	8.091
41	.8203	6.839	820.3	.3552	8.044
42 (Diesel)	.8156	6.800	815.6	.3532	7.998
43	.8109	6.760	810.9	.3511	7.952
44	.8063	6.722	806.3	.3491	7.907
46	.7972	6.646	797.2	.3452	7.818
48	.7883	6.572	788.3	.3413	7.731
50	.7796	6.500	779.6	.3376	7.645
55	.7587	6.325	758.7	.3285	7.440
60	.7389	6.160	738.9	.3200	7.246

*Density in kg/L and kg/dm³ are equal in value to specific gravity.

$$\text{Sp gr @ } 60^{\circ}\text{F} = \frac{141.5}{131.5 + \text{API Gravity}}$$

$$\text{API Gravity} = \frac{141.5}{\text{Sp gr @ } 60^{\circ}\text{F}} - 131.5$$

ENGLISH/METRIC UNITS

DETERMINE THE API GRAVITY OF AN OIL

Use the API Hydrometer and obtain the gravity of the oil. At the same time obtain the temperature of the oil. The gravity should be reported in API* at 60°F. If the temperature of the oil is not 60°F., a correction must be made. If the oil is above 60°F., the correction is (-) minus. If the oil is below 60°F., the correction is (+) plus.

The correction is 1° API for every 10°F. over or under 60°F. (15.56°C.)*

Example:

Temperature above 60°F.

$$\begin{array}{lcl} \text{Observed API Gravity} & = & 35.2^\circ \text{ API} \\ \text{Observed Temperature} & = & 77^\circ \text{F.} \\ \text{Correction is } (-) \text{ minus} & & 77-60 \\ \text{temperature is above } 60^\circ \text{F.} & = & \frac{\text{_____}}{10} = 1.7 \\ \text{Correction} & & \end{array}$$

The API Gravity corrected to 60°F., is:

$$35.2 - 1.7 = 33.5^\circ \text{ API @ } 60^\circ \text{F.}$$

Temperature below 60°F.

$$\begin{array}{lcl} \text{Observed API Gravity} & = & 38.3^\circ \text{ API} \\ \text{Observed Temperature} & = & 51.0^\circ \text{F.} \\ \text{Correction is } (+) \text{ plus as} & & 60-51 \\ \text{temperature is below } 60^\circ \text{F.} & = & \frac{\text{_____}}{10} = 0.9 \\ \text{Correction} & & \end{array}$$

The API Gravity corrected to 60°F., is:

$$38.3 + 0.9 = 39.2^\circ \text{ API @ } 60^\circ \text{F.}$$

* Must convert Celsius (°C) to Fahrenheit (F°) for this correction. See Section 240, pages 9, 10 and 11 for temperature conversions.

ENGLISH/METRIC UNITS

STANDARDS FOR METRIC CONVERSION FACTORS

The following conversion factors are those published by the American Society for Testing and Materials (ASTM) in E380-76. These same units may be found in literature published by all U.S. Technical Societies, i.e., API Bulletin 2563, American National Standards Institute ANSIZ 210.1, Society of Petroleum Engineers, The Canadian Petroleum Association (CPA) and others.

The metric units and conversion factors adopted by the ASTM are based on the "International System of Units" (designated SI for Système International d'Unités), fixed by the International Committee for Weights and Measures. This system has been adopted by the International Organization for Standardization in ISO Recommendation R-31.

Conversion factors herein are written as a number equal to or greater than one and less than ten with six or less decimal places. This number is followed by the letter E (for exponent), a plus or minus symbol, and two digits which indicate the power of 10 by which the number must be multiplied to obtain the correct value. For example:

$$(1) \quad 3.523\ 907 \text{ E}-02 \text{ is } 3.523\ 907 \times 10^{-2}$$

or

$$\quad \quad \quad 0.035\ 239\ 07$$

$$(2) \quad 3.386\ 389 \text{ E}+03 \text{ is } 3.386\ 389 \times 10^3$$

or

$$\quad \quad \quad 3\ 387.389$$

(3) Further examples of conversion are:

To convert from:	To	multiply by:
pound-force per square foot	Pa	4.788 026 E+01
inch	m	2.540 000 E-0

$$1 \text{ lbf}/\text{ft}^2 = 47.880\ 26 \text{ Pa}$$

$$1 \text{ inch} = 0.0254 \text{ m (exactly)}$$

ENGLISH/METRIC UNITS**CLASSIFIED LIST OF UNITS**

To convert from	To	Multiply by
ACCELERATION		
ft/s ²	meter per second ² (m/s ²)	3.048 000 *E-01
free fall, standard (g)	meter per second ² (m/s ²)	9.806 650 *E+00
gal	meter per second ² (m/s ²)	1.000 000 *E-02
in/s ²	meter per second ² (m/s ²)	2.540 000 *E-02
ANGLE		
degree (angle)	radian (rad)	1.745 329 E-02
minute (angle)	radian (rad)	2.908 882 E-04
second (angle)	radian (rad)	4.848 137 E=06
AREA		
acre (U.S. survey) ¹	meter ² (m ²)	4.046 873 E+03
are	meter ² (m ²)	1.000 000 *E+02
barn	meter ² (m ²)	1.000 000 *E-28
circular mil	meter ² (m ²)	5.067 075 E-10
ft ²	meter ² (m ²)	9.290 304 *E-02
hectar	meter ² (m ²)	1.000 000 *E+04
in ²	meter ² (m ²)	6.451 600 *E-04
mi ² (international)	meter ² (m ²)	2.589 988 E+06
mi ² (U.S. survey) ¹	meter ² (m ²)	2.589 988 E+06
section	meter ² (m ²)	(see footnote 1)
township	meter ² (m ²)	(see footnote 1)
yd ²	meter ² (m ²)	8.361 274 E-01

CLASSIFIED LIST OF UNITS

To convert from	To	Multiply by
BENDING MOMENT OR TORQUE		
dyne • cm	newton meter (N•m)	1.000 000 *E-07
kgf • m	newton meter (N•m)	9.806 650 *E+00
ozf • in	newton meter (N•m)	7.061 552 E-03
lbf • in	newton meter (N•m)	1.129 848 E-01
lbf • in	newton meter (N•m)	1.355 818 E+00
BENDING MOMENT OR TORQUE PER UNIT LENGTH		
lbf • ft/in	newton meter per meter (N•m/m)	5.337 866 E+01
lbf • ft/in	newton meter per meter (N•m/m)	4.448 222 E+00
CAPACITY (See Volume)		
DENSITY (See Mass Per Unit Volume)		
ELECTRICITY AND MAGNETISM^a		
abampere	ampere (A)	1.000 000 *E+01
abcoulomb	coulomb (C)	1.000 000 *E+01
abfarad	farad (F)	1.000 000 *E+09
abhenry	henry (H)	1.000 000 *E-09
abmho	siemens (S)	1.000 000 *E-09
abohm	ohm (Ω)	1.000 000 *E-09
abvolt	volt (V)	1.000 000 *E-08
ampere hour	coulomb (C)	3.600 000 *E+03
EMU of capacitance	farad (F)	1.000 000 *E+09
EMU of current	ampere (A)	1.000 000 *E+01
EMU of electric potential	volt (V)	1.000 000 *E-08

^aESU means electrostatic cgs unit. EMU means electromagnetic cgs unit.

ENGLISH/METRIC UNITS**CLASSIFIED LIST OF UNITS**

To convert from	To	Multiply by
ELECTRICITY AND MAGNETISM⁸ (Cont'd)		
EMU of inductance	henry (H)	1.000 000 *E-09
EMU of resistance	ohm (Ω)	1.000 000 *E-09
ESU of capacitance	farad (F)	1.112 650 E-12
ESU of current	ampere (A)	3.335 6 E-10
ESU of electric potential	volt (V)	2.997 9 E+12
ESU of inductance	henry (H)	8.987 554 E+11
ESU of resistance	ohm (Ω)	8.987 554 E+11
faraday (based on carbon-12)	coulomb (C)	9.648 70 E+04
faraday (chemical)	coulomb (C)	9.649 57 E+04
faraday (physical)	coulomb (C)	9.652 19 E+04
gamma	tesla (T)	1.000 000 *E-09
gauss	tesla (T)	1.000 000 *E-04
gilbert	ampere (A)	7.957 747 *E-01
maxwell	weber (Wb)	1.000 000 *E-08
mho	siemens (S)	1.000 000 *E+00
oersted	ampere per meter (A/m)	7.957 747 E+01
ohm centimeter	ohm meter (Ω m)	1.000 000 *E-02
ohm circular-mil per foot	ohm millimeter ² per meter (Ω mm ² /m)	1.662 426 E-03
statampere	ampere (A)	3.335 640 E-10
statcoulomb	coulomb (C)	3.335 640 E-10
stafarad	farad (F)	1.112 650 E-12
stathenry	henry (H)	8.987 554 E+11
statmho	siemens (S)	1.112 650 E-12
statohm	ohm (Ω)	8.987 554 E+11
statvolt	volt (V)	2.997 925 E+02
unit pole	weber (Wb)	1.256 637 E-07

CLASSIFIED LIST OF UNITS

To convert from	To	Multiply by
ENERGY (Includes Work)		
British thermal unit (International Table)3	joule (J)	1.055 056 E+03
British thermal unit (mean)	joule (J)	1.055 87 E+03
British thermal unit (thermochemical)	joule (J)	1.054 350 E+03
British thermal unit (39°F)	joule (J)	1.059 67 E+03
British thermal unit (59°F)	joule (J)	1.054 80 E+03
British thermal unit (60°F)	joule (J)	1.054 68 E+03
calorie (International Table)	joule (J)	4.186 800 *E+00
calorie (mean)	joule (J)	4.190 02 E+00
calorie (thermochemical)	joule (J)	4.184 000 *E+00
calorie (15°C)	joule (J)	4.185 80 E+00
calorie (20°C)	joule (J)	4.181 90 E+00
calorie (kilogram, International Table)	joule (J)	4.186 800 *E+03
calorie (kilogram, mean)	joule (J)	4.190 02 E+03
calorie (kilogram, thermochemical)	joule (J)	4.184 000 *E+03
electrovolt	joule (J)	1.602 19 E-19
erg	joule (J)	1.000 000 *E-07
ft • lbf	joule (J)	1.355 818 E+00
ft • poundal	joule (J)	4.214 011 E-02
kilocalorie (International Table)	joule (J)	4.186 800 *E+03
kilocalorie (mean)	joule (J)	4.190 02 E+03
kilocalorie (thermochemical)	joule (J)	4.184 000 *E+03
kW•h	joule (J)	3.600 000 *E+06
therm	joule (J)	1.055 056 E+08
ton (nuclear equivalent of TNT)	joule (J)	4.184 E+0920
W•h	joule (J)	3.600 000 *E+03
W•s	joule (J)	1.000 000 *E+00

ENGLISH/METRIC UNITS**CLASSIFIED LIST OF UNITS**

To convert from	To	Multiply by
ENERGY PER UNIT AREA TIME		
Btu (thermochemical)/ft ² •s	watt per meter ² (W/m ²)	1.134 893 E+04
Btu (thermochemical)/ft ² •min	watt per meter ² (W/m ²)	1.891 489 E+02
Btu (thermochemical)/ft ² •h	watt per meter ² (W/m ²)	3.152 481 E+00
Btu (thermochemical)/in ² •s	watt per meter ² (W/m ²)	1.634 246 E+06
cal (thermochemical)/cm ² •min	watt per meter ² (W/m ²)	6.973 333 E+02
erg/(cm ² •s)	watt per meter ² (W/m ²)	1.000 000 *E+03
W/cm ²	watt per meter ² (W/m ²)	1.000 000 *E+03
W/in ²	watt per meter ² (W/m ²)	1.550 003 E+03
FLOW		
(See Mass Per Unit Time or Volume Per Unit Time)		
FORCE		
dyne	newton (N)	1.000 000 *E-05
kilogram-force	newton (N)	9.806 650 *E+00
kilopond	newton (N)	9.806 650 *E+00
kip (1000 lbf)	newton (N)	4.448 222 E+03
ounce-force	newton (N)	2.780 139 E-01
pound-force (lbf) ⁷	newton (N)	4.448 222 E+00
lbf/lb (thrust/weight (mass) ratio)	newton per kilogram (N/kg)	9.806 650 E+00
poundal	newton (N)	1.382 550 E-01
ton-force (2000 lbf)	newton (N)	8.896 444 E+03
FORCE PER UNIT AREA		
(See Pressure)		
FORCE PER UNIT LENGTH		
lbf/ft	newton per meter (N/m)	1.459 390 E+01
lbf/in	newton per meter (N/m)	1.751 268 E+02

CLASSIFIED LIST OF UNITS

To convert from	To	Multiply by
	HEAT	
Btu (International Table) • ft/h • ft ² • °F (k, thermal conductivity)	watt per meter kelvin (W/m • K)	1.730 735 E+00
Btu (thermochemical) • ft/h • ft ² • °F (k, thermal conductivity)	watt per meter kelvin (W/m • K)	1.729 577 E+00
Btu (International Table) • in/h • ft ² • °F (k, thermal conductivity)	watt per meter kelvin (W/m • K)	1.442 279 E-01
Btu (thermochemical) • in/h • ft ² • °F (k, thermal conductivity)	watt per meter kelvin (W/m • K)	1.441 314 E-01
Btu (International Table) • in/s • ft ² • °F (k, thermal conductivity)	watt per meter kelvin (W/m • K)	5.192 204 E+02
Btu (thermochemical) • in/s • ft ² • °F (k, thermal conductivity)	watt per meter kelvin (W/m • K)	5.188 732 E+02
Btu (International Table) ft ²	joule per meter ² (J/m ²)	1.135 653 E+04
Btu (thermochemical)/ft ²	joule per meter ² (J/m ²)	1.134 893 E+04
Btu (International Table) • h • ft ² • °F (C, thermal conductance)	watt per meter ² kelvin (W/m ² • K)	5.678 263 E+00
Btu (thermochemical)/h • ft ² • °F (C, thermal conductance)	watt per meter ² kelvin (W/m ² • K)	5.674 466 E+00
Btu (International Table)/s • ft ² • °F	watt per meter ² kelvin (W/m ² • K)	2.044 175 E+04
Btu (thermochemical)/s • ft ² • °F	watt per meter ² kelvin (W/m ² • K)	2.042 808 E+04
Btu (International Table)/lb	joule per kilogram (J/kg)	2.326 000 *E+03
Btu (thermochemical)/lb	watt per kilogram (J/kg)	2.324 444 E+03
Btu (International Table)/lb • °F (c, heat capacity)	joule per kilogram kelvin (J/kg • K)	4.186 800 *E+03
Btu (thermochemical)/lb • °F (c, heat capacity)	joule per kilogram kelvin (J/kg • K)	4.184 000 E+03
cal (thermochemical)/cm • s • °C	watt per meter kelvin (W/m • K)	4.184 000 *E+02
cal (thermochemical)/cm ²	joule per meter ² (J/m ²)	4.184 000 *E+04
cal (thermochemical)/cm ² • min	watt per meter ² (W/m ²)	6.973 333 E+02
cal (thermochemical)/cm ² • s	watt per meter ² (W/m ²)	4.184 000 *E+04
cal (International Table)/g	joule per kilogram (J/kg)	4.186 800 *E+03
cal (thermochemical)/g	joule per kilogram (J/kg)	4.186 000 *E+03

ENGLISH/METRIC UNITS**CLASSIFIED LIST OF UNITS**

To convert from	To	Multiply by
cal (International Table)/g • °C	HEAT (Cont'd)	
cal (thermochemical)/g • °C	joule per kilogram kelvin (J/kg • K)	4.186 800 *E+03
cal (thermochemical)/min	joule per kilogram kelvin (J/kg • K)	4.184 000 *E+03
cal (thermochemical)/s	watt (W)	6.973 333 E-02
clo	watt (W)	4.184 000 *E+00
°F • h • ft ² /Btu (International Table) (R, thermal resistance)	kelvin meter ² per watt (K • m ² /W)	2.003 712 E-01
°F • h • ft ² /Btu (thermochemical) (R, thermal resistance)	kelvin meter ² per watt (K • m ² /W)	1.761 102 E-01
ft ² /hl (thermal diffusivity)	kelvin meter ² per watt (K • m ² /W)	1.762 280 E-01
	meter ² per second (m ² /s)	2.580 640 *E-05
angstrom	LENGTH	
astronomical unit ²	meter (m)	1.000 000 *E-10
caliber (inch)	meter (m)	1.495 979 E+10
fathom	meter (m)	2.540 000 *E-02
fermi (femtometer)	meter (m)	1.828 8 E+00
foot	meter (m)	1.000 000 *E-15
foot (U.S. survey) ²	meter (m)	3.048 000 *E-01
inch	meter (m)	3.048 006 E-01
league	meter (m)	2.540 000 *E-02
light year	meter (m)	(see footnote 1)
microinch	meter (m)	9.460 55 E+15
micron	meter (m)	2.540 000 *E-08
mil	meter (m)	1.000 000 *E-06
mile (international nautical)	meter (m)	2.540 000 *E-05
mile (U.K. nautical)	meter (m)	1.852 000 *E+03
mile (U.S. nautical)	meter (m)	1.853 184 *E+03
mile (international)	meter (m)	1.852 000 *E+03
mile (statute)	meter (m)	1.609 344 *E+03
	meter (m)	1.609 3 E+03

CLASSIFIED LIST OF UNITS

To convert from	To	Multiply by
mile (U.S. survey) ¹	meter (m)	1.609 347 E+03
parsec ¹³	meter (m)	3.085 678 E+16
pica (printer's)	meter (m)	4.217 518 E-03
point (printer's)	meter (m)	3.514 598 *E-04 (see footnote 1)
rod	meter (m)	9.144 000 *E-01
yard	meter (m)	
LIGHT		
footcandle	lux (lx)	1.076 391 E+01
footlambert	candela per meter ² (cd/m ²)	3.426 259 E+00
lambert	candela per meter ² (cd/m ²)	3.183 099 E+03
MASS		
carat (metric)	kilogram (kg)	2.000 000 *E-04
grain	kilogram (kg)	6.479 891 *E-05
gram	kilogram (kg)	1.000 000 *E-03
hundredweight (long)	kilogram (kg)	5.080 235 E+01
hundredweight (short)	kilogram (kg)	4.535 924 E+01
kgf • s ² /m (mass)	kilogram (kg)	9.806 659 *E+00
ounce (avordupois)	kilogram (kg)	2.834 952 E-02
ounce (troy or apothecary)	kilogram (kg)	3.110 348 E-02
pennyweight	kilogram (kg)	1.555 174 E-03
pound (lb avordupois) ⁶	kilogram (kg)	4.535 924 E-01
pound (troy or apothecary)	kilogram (kg)	3.732 417 E-01
slug	kilogram (kg)	1.459 390 E+01
ton (assay)	kilogram (kg)	2.916 667 E-02
ton (long, 2240 lb)	kilogram (kg)	1.016 047 E+03
ton (metric)	kilogram (kg)	1.000 000 *E+03
ton (short, 2000 lb)	kilogram (kg)	9.071 847 E+02
tonne	kilogram (kg)	1.000 000 *E+03

ENGLISH/METRIC UNITS

CLASSIFIED LIST OF UNITS

To convert from	To	Multiply by
MASS PER UNIT AREA		
oz/ft ²	kilogram per meter ² (kg/m ²)	3.051 517 E-01
oz/yd ²	kilogram per meter ² (kg/m ²)	3.390 575 E-02
lb/ft ²	kilogram per meter ² (kg/m ²)	4.882 428 E+00
MASS PER UNIT CAPACITY (See Mass Per Unit Volume)		
MASS PER UNIT LENGTH		
denier	kilogram per meter (kg/m)	1.111 111 E-07
lb/ft	kilogram per meter (kg/m)	1.488 164 E+00
lb/in	kilogram per meter (kg/m)	1.785 797 E+01
tex	kilogram per meter (kg/m)	1.000 000 *E-06
MASS PER UNIT TIME (Includes Flow)		
perm (0° C)	kilogram per pascal second meter ² (kg/Pa • s • m ²)	5.721 35 E-07
perm (23° C)	kilogram per pascal second meter ² (kg/ Pa • s • m ²)	5.745 25 E-11
perm • in (0° C)	kilogram per pascal second meter (kg/ Pa • s • m)	1.453 22 E-12
perm • (23° C)	kilogram per pascal second meter (kg/ Pa • s • m)	1.459 29 E-12
lb/h	kilogram per second (kg/s)	1.259 29 E-12
lb/min	kilogram per second (kg/s)	7.559 873 E-03
lb/s	kilogram per second (kg/s)	4.535 924 E-01
lb/hp • h (SFC, specific fuel consumption)	kilogram per joule (kg/J)	1.689 659 E-07
ton (short)/h	kilogram per second (kg/s)	2.519 958 E-01

CLASSIFIED LIST OF UNITS

To convert from	To	Multiply by
MASS PER UNIT VOLUME (Includes Desntiy and Mass Capacity)		
grain (lb avoirdupois/7000)/gal (U.S. liquid)	kilogram per meter ³ (kg/m ³)	1.711 806 E-02
g/cm ³	kilogram per meter ³ (kg/m ³)	1.000 000 *E+03
oz (avoirdupois)/gal (U.K. liquid)	kilogram per meter ³ (kg/m ³)	6.236 021 E+00
oz (avoirdupois)/gal (U.S. liquid)	kilogram per meter ³ (kg/m ³)	7.489 152 E+00
oz (avoirdupois)/in ³	kilogram per meter ³ (kg/m ³)	1.729 994 E+03
lb/ft ³	kilogram per meter ³ (kg/m ³)	1.601 846 E+01
lb/in ³	kilogram per meter ³ (kg/m ³)	2.767 990 E+04
lb/gal (U.K. liquid)	kilogram per meter ³ (kg/m ³)	9.977 633 E+01
lb/gal (U.S. liquid)	kilogram per meter ³ (kg/m ³)	1.198 264 E+02
lb/yd ³	kilogram per meter ³ (kg/m ³)	5.932 764 E-01
slug/ft ³	kilogram per meter ³ (kg/m ³)	5.153 788 E+02
ton (long)/yd ³	kilogram per meter ³ (kg/m ³)	1.328 939 E+03
ton (short)/yd ³	kilogram per meter ³ (kg/m ³)	1.186 553 E+03
POWER		
Btu (International Table)/h	watt (W)	2.930 711 E-01
Btu (International Table)/s	watt (W)	1.055 056 E+03
Btu (thermochemical)/h	watt (W)	2.928 751 E-01
Btu (thermochemical)/min	watt (W)	1.757 250 E+01
Btu (thermochemical)/s	watt (W)	1.054 350 E+03
cal (thermochemical)/min	watt (W)	6.973 333 E-02
cal (thermochemical)/s	watt (W)	4.184 000 *E+00
erg/s	watt (W)	1.000 000 E-07
ft • lbf/h	watt (W)	3.766 161 E-04
ft • lbf/min	watt (W)	2.259 697 E-02
ft • lbf/s	watt (W)	1.355 818 E+00
horsepower (550 ft • lbf/s)	watt (W)	7.456 999 E+02
horsepower (boiler)	watt (W)	9.809 50 E+03
horsepower (electric)	watt (W)	7.460 000 *E+02

ENGLISH/METRIC UNITS**CLASSIFIED LIST OF UNITS**

To convert from	To	Multiply by
horsepower (metric)	POWER (Cont'd)	
horsepower (water)	watt (W)	7.354 99 E+02
horsepower (U.K.)	watt (W)	7.460 43 E+02
kilocalorie (thermochemical)/min	watt (W)	7.457 0 E+02
kilocalorie (thermochemical)/s	watt (W)	6.973 333 E+01
ton (refrigeration)	watt (W)	4.184 000 *E+03
	watt (W)	3.516 800 E+03
atmosphere (standard)	PRESSURE OR STRESS	
atmosphere (technical = 1 kgf/cm ²)	(Force Per Unit Area)	
bar	pascal (Pa)	1.013 250 *E+05
centimeter of mercury (0° C)	pascal (Pa)	9.806 650 *E+04
centimeter of water (4° C)	pascal (Pa)	1.000 000 *E+05
dyne/cm ²	pascal (Pa)	1.333 22 E+03
foot of water (39.2° F)	pascal (Pa)	9.806 38 E+01
gram-force/cm ²	pascal (Pa)	1.000 000 *E-01
inch of mercury (32° F)	pascal (Pa)	2.988 98 E+03
inch of mercury (60° F)	pascal (Pa)	9.806 650 E+01
inch of water (39.2° F)	pascal (Pa)	3.386 38 E+03
inch of water (60° F)	pascal (Pa)	3.376 85 E+03
kgf/cm ²	pascal (Pa)	2.490 82 E+02
kgf/m ²	pascal (Pa)	2.488 4 E+02
kgf/mm ²	pascal (Pa)	9.806 650 *E+04
kip/in ² (ksi)	pascal (Pa)	9.806 650 *E+00
millibar	pascal (Pa)	9.806 650 *E+06
millimeter of mercury (0° C)	pascal (Pa)	6.894 757 E+06
poundal/ft ²	pascal (Pa)	1.000 000 *E+02
lbf/ft ²	pascal (Pa)	1.333 22 E+02
	pascal (Pa)	1.488 164 E+00
	pascal (Pa)	4.788 026 E+01

CLASSIFIED LIST OF UNITS

To convert from	To	Multiply by
PRESSURE OR STRESS (Cont'd)		
lbf/in ² (psi)	pascal (Pa)	6.894 757 E+03
psi	pascal (Pa)	6.894 757 E+03
torr (mm Hg, 0° C)	pascal (Pa)	1.333 22 E+02
SPEED (See Velocity)		
STRESS (See Pressure)		
TEMPERATURE		
degree Celsius	kelvin (K)	tK = toC + 273.15
degree Fahrenheit	degree Celsius	toC = (toF - 32)/1.8
degree Fahrenheit	kelvin (K)	tK = (toF - 459.67)/1.8
degree Rankine	kelvin (K)	tK = toR/1.8
kelvin	degree Celsius	toc = tK - 273.15
TIME		
day (mean solar)	second (s)	8.640 000 E+04
day (sidereal)	second (s)	8.616 409 E+04
hour (mean solar)	second (s)	3.600 000 E+03
day (sidereal)	second (s)	3.590 170 E+03
minute (mean solar)	second (s)	6.000 000 E+01
minute (sidereal)	second (s)	5.983 617 E+01
month (mean calendar)	second (s)	2.628 000 E+06
second (sidereal)	second (s)	9.972 696 E-01
year (365 days)	second (s)	3.153 600 E+07
year (sidereal)	second (s)	3.155 815 E+07
year (tropical)	second (s)	3.155 693 E+07

ENGLISH/METRIC UNITS**CLASSIFIED LIST OF UNITS**

To convert from	To	Multiply by
TORQUE (See Bending Moment)		
ft/h		
ft/min		8.466 667 E-05
ft/s		5.080 000 *E-03
in/s		3.048 000 *E-01
km/h		2.540 000 *E-02
knot (international)		2.777 778 E-01
mi/h (international)		5.144 444 E-01
mi/min (international)		4.470 400 *E-01
mi/s (international)		2.682 240 *E+01
mi/h (international)		1.609 344 *E+03
		1.609 344 *E+00
VELOCITY (Includes Speed)		
meter per second (m/s)		
meter per second (m/s)		2.777 778 E-01
meter per second (m/s)		5.144 444 E-01
meter per second (m/s)		4.470 400 *E-01
meter per second (m/s)		2.682 240 *E+01
meter per second (m/s)		1.609 344 *E+03
kilometer per hour (km/h)*		1.609 344 *E+00
VISCOSITY		
centipoise		1.000 000 *E-03
centistokes		1.000 000 *E-06
ft ² /s		9.290 304 *E-02
poise		1.000 000 *E-01
poundal • s/ft ²		1.488 164 E+00
lb/ft • h		4.133 789 E-04
lb/ft • s		1.488 164 E+00
lb/ft • h ²		4.788 026 E-01
lbf • in ²		6.894 757 E+03
rhe		1.000 000 *E+01
slug/ft • s		4.788 026 E+01
stokes		1.000 000 *E-04

* Although speedometers may read km/h, the correct SI unit is m/s.

CLASSIFIED LIST OF UNITS

To convert from	To	Multiply by
VOLUME (Includes Capacity)		
acre-foot (U.S. survey) ¹	meter ³ (m ³)	1.233 489 E+03
barrel (oil, 42 gal)	meter ³ (m ³)	1.589 873 E-01
board foot	meter ³ (m ³)	2.359 737 E-03
bushel (U.S.)	meter ³ (m ³)	3.523 907 E-02
cup	meter ³ (m ³)	2.365 882 E-04
fluid ounce (U.S.)	meter ³ (m ³)	2.957 353 E-05
ft ³	meter ³ (m ³)	2.831 685 E-02
gallon (Canadian liquid)	meter ³ (m ³)	4.546 090 E-03
gallon (U.K. liquid)	meter ³ (m ³)	4.546 092 E-03
gallon (U.S. dry)	meter ³ (m ³)	4.404 884 E-03
gallon (U.S. liquid)	meter ³ (m ³)	3.785 412 E-03
gill (U.K.)	meter ³ (m ³)	1.420 654 E-04
gill (U.S.)	meter ³ (m ³)	1.182 941 E-04
in ³ (U.K.)	meter ³ (m ³)	1.638 706 E-05
litre (see footnote 5)	meter ³ (m ³)	1.000 000 *E-03
ounce (U.K. fluid)	meter ³ (m ³)	2.841 307 E-05
ounce (U.S. fluid)	meter ³ (m ³)	2.957 353 E-05
peck (U.S.)	meter ³ (m ³)	8.809 768 E-03
pint (U.S. dry)	meter ³ (m ³)	5.506 105 E-04
pint (U.S. liquid)	meter ³ (m ³)	4.731 765 E-04
quart (U.S. dry)	meter ³ (m ³)	1.101 221 E-03
quart (U.S. liquid)	meter ³ (m ³)	9.463 529 E-04
stere	meter ³ (m ³)	1.000 000 E+00
tablespoon	meter ³ (m ³)	1.478 676 E-05
teaspoon	meter ³ (m ³)	4.928 922 E-06
ton (register)	meter ³ (m ³)	2.831 685 E+00
yd ³	meter ³ (m ³)	7.645 549 E-01

ENGLISH/METRIC UNITS

CLASSIFIED LIST OF UNITS

To convert from	To	Multiply by
VOLUME PER UNIT TIME (Includes Flow)		
ft ³ /min	meter ³ per second (m ³ /s)	4.719 474 E-04
ft ³ /s	meter ³ per second (m ³ /s)	2.831 685 E-02
gallon (U.S. liquid)/hp • h (SFC, specific fuel consumption)	meter ³ per joule (m ³ /J)	1.410 089 E-09
in ³ /min	meter ³ per second (m ³ /s)	2.731 177 E-07
yd ³ /min	meter ³ per second (m ³ /s)	1.274 258 E-02
gallon (U.S. liquid) per day	meter ³ per second (m ³ /s)	4.381 264 E-08
gallon (U.S. liquid) per minute	meter ³ per second (m ³ /s)	6.309 020 E-05
WORK (See Energy)		

- (1) "Units and Systems of Weights and Measures. Their Origin, Development, and Present Status," NBS Letter Circ, LC 1035, January 1960, amended January 1976.
- (2) "NBS Guidelines for Use of the Metric System," NBS LC 1056, August 1975.
- (3) Chart—"The Modernized Metric System" NBS Spec. Publ. 304, 1972.
- (4) Mechtly, EA, "The International System of Units—Physical Constants and Conversion Factors," National Aeronautics and Space Administration, Publication SP-7012. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
- (5) McNish, A G, "The International System of Units," Materials Research and Standards, Am, Soc, Testing Mats., Vol. 5, No. 10, October 1965.
- (6) "Changing to the Metric System, Conversion Factors, Symbols, Definitions," Nat. Physical Lab., Her Majesty's Stationery Office, London, England, 1965.
- (7) Metric Standards for Engineering, British Standard Handbook No. 18 (1972).
- (8) Hvistendahl, H S, Engineering Units and Physical Quantities, Macmillan and Co. Ltd., London, 1964.

ENGLISH/METRIC UNITS

CONVERSION CONSTANTS

MULTIPLY	BY		AND OBTAIN
Barrels	x 5.6146	=	Cu. Ft.
Barrels	x 9702	=	Cu. In.
Barrels	x 42.0	=	Gal.
Cu. Ft.	x 1728	=	Cu. In.
Cu. Ft.	x 0.037037	=	Cu. Yd.
Cu. Ft.	x 7.4805	=	Gal.
Cu. Ft.	x 0.1781	=	Bbls. (42 Gal.)
Cu. Ft./Min.	x 0.1781	=	Bbls./Min.
Cu. Ft./Min.	x 10.686	=	Bbls./Hr.
Cu. Ft.-Water	x 62.31*	=	Pounds
Cu. In.	x 0.0005787	=	Cu. Ft.
Cu. In.	x 0.004329	=	Gal.
Cu. In.	x 0.0001031	=	Bbls.
Cu. Yd.	x 27.0	=	Cu. Ft.
Cu. Yd.	x 201.977	=	Gal.
Gal.-Water	x 8.33*	=	Pounds
Gal.	x 0.13368	=	Cu. Ft.
Gals./Lb.	x 8.345	=	Litres/Kg.
Lbs./Gal.	x 0.119839	=	Kg./Litres
Specific Gravity	x 62.42	=	Lbs./Cu. Ft.
Specific Gravity	x 8.345	=	Lbs./Gal.
Feet	x 0.3048	=	Metres
Feet	x 3.048	=	Decimeters
Feet	x 30.48	=	Centimeters
Inch	x 2.54	=	Centimeters
Inch	x 25.4	=	Millimeters
Miles	x 5280	=	Feet
Miles/Hr.	x 1.4666	=	Ft./Sec.
Sq. In.	x 0.006944	=	Sq. Ft.
Sq. Ft.	x 144	=	Sq. In.
Pounds-Water	x 0.12005*	=	Gal.-Water
Pounds-Water	x 0.016048*	=	Cu. Ft. Water
Horsepower	x 33000	=	Ft. Lbs./Min.
Horsepower	x 550	=	Ft. Lbs./Sec.
Square of Dia.	x 0.7854	=	Area of Circle

*Water at 20°C. (68°F.)

**Water at 4°C. (39.2°F.)

ENGLISH/METRIC UNITS**FRACTIONAL INCHES
TO: DECIMAL INCHES/MILLIMETERS**

Fractional Inches	Decimal Inches	Millimeters	Fractional Inches	Decimal Inches	Millimeters
1/1000	.001000	0.02540	17/32	.531250	13.49375
2/1000	.002000	0.05080	35/64	.546875	13.89063
3/1000	.003000	0.07620	9/16	.562500	14.28750
4/1000	.004000	0.10160	37/64	.578125	14.68437
5/1000	.005000	0.12700	19/32	.593750	15.08125
6/1000	.006000	0.15240	39/64	.609375	15.47813
			5/8	.625000	15.87500
7/1000	.007000	0.17780	41/64	.640625	16.27187
8/1000	.008000	0.20320	21/32	.656250	16.66875
9/1000	.009000	0.22860	43/64	.671875	17.06563
10/1000	.010000	0.25400	11/16	.687500	17.46250
15/1000	.015000	0.38100	45/64	.703125	17.85937
1/64	.015625	0.39687	23.32	.718750	18.25625
1/32	.031250	0.79375	47/64	.734375	18.65313
3/64	.046875	1.19061	3/4	.750000	19.05000
1/16	.062500	1.58750	49/64	.765625	19.44687
5/64	.078125	1.98437	25/32	.781250	19.84375
3/32	.093750	2.38125	51/64	.796875	20.24063
7/64	.109375	2.77813	13/16	.812500	20.63750
1/8	.125000	3.17500	53/64	.828125	21.03437
9/64	.140625	3.57187	27/32	.843750	21.43125
5/32	.156250	3.96875	55/64	.859375	21.82813
11/64	.171875	4.36563	7/8	.875000	22.22500
3/16	.187500	4.76250	57/64	.890625	22.62187
13/64	.203125	5.15937	29/32	.906250	23.01875
7/32	.218750	5.55625	59/64	.921875	23.41563
15/64	.234375	5.95313	15/16	.937500	23.81250
1/4	.250000	6.35000	61/64	.953125	24.20937
17/64	.265625	6.74687	31/32	.968750	24.60625
9/32	.281250	7.14375	63/64	.984375	25.00313
19/64	.296875	7.54063	1 in.	1.0 in.	25.40000
5/16	.312500	7.93750	2 in.	2.0 in.	50.80000
21/64	.328125	8.33437	3 in.	3.0 in.	76.20000
11/32	.343750	8.73125	4 in.	4.0 in.	101.60000
23/64	.359375	9.12813	5 in.	5.0 in.	127.00000
3/8	.375000	9.52500	6 in.	6.0 in.	152.40000
25/64	.390625	9.92187	7 in.	7.0 in.	177.80000
13/32	.406250	10.31875	8 in.	8.0 in.	203.20000
27/64	.421875	10.71563	9 in.	9.0 in.	228.60000
7/16	.437500	11.11250	10 in.	10.0 in.	254.00000
29/64	.453125	11.50938	11 in.	11.0 in.	279.40000
15/32	.468750	11.90625	12 in.	12.0 in.	304.80000
31/64	.484375	12.30313	13 in.	13.0 in.	330.20000
1/2	.500000	12.70000	14 in.	14.0 in.	355.60000
33/64	.515625	13.09687	15 in.	15.0 in.	381.00000

ENGLISH/METRIC UNITS



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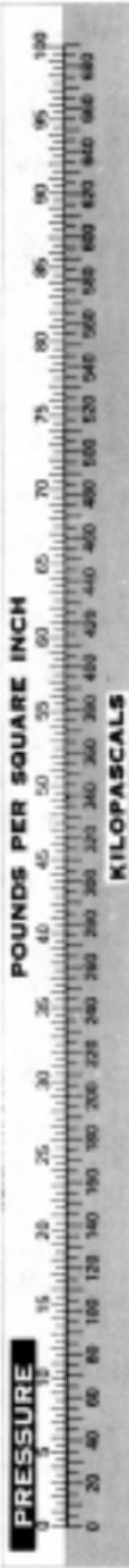
ENGLISH/METRIC UNITS



TEMPERATURE	
° FAHRENHEIT	0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250
° CELSIUS*	-173 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250

*Formerly known as Centigrade

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(1 Bar equals 100 Kilopascals)

