MAXIMUM TEMPERATURE RANGE Thermocouple Grade -32 to 4208°F -0 to 2320°C Extension Grade 32 to 1600°F 0 to 870°C

LIMITS OF ERROR (whichever is greater) Standard: 4.5°C to 425°C 1.0% to 2320°C

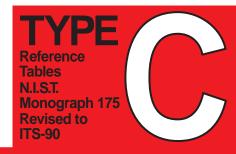
Special: Not Established

COMMENTS, BARE WIRE ENVIRONMENT: Vacuum, Inert; Hydrogen; Beware of Embrittlement; Not Practical Below 750°F; Not for Oxidizing Atmosphere

TEMPERATURE IN DEGREES °C REFERENCE JUNCTION AT 0°C

+ Thermocouple Grade
- NONE
ESTABLISHED
Tungsten5% Rhenium
vs.
Tungsten26% Rhenium +

Revised Thermocouple Reference Tables



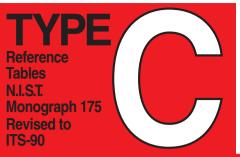
Thermoelectric Voltage in Millivolts

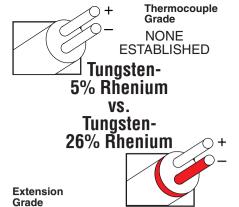
Extension

Grade

°C	0	1	2	3	4	5	6	7	8	9	10	°C	°C	0	1	2	3	4	5	6	7	8	9	10	°C
0	0.000	0.013	0.026	0.040	0.053	0.067	0.080	0.094	0.107	0.121	0.135	0	500	8.655	8.674	8.694	8.713	8.733	8.752	8.772	8.791	8.810	8.830	8.849	500
10	0.135	0.148		0.176				0.231	0.244	0.258	0.272	10	510	8.849	8.869		8.908			8.966	8.986	9.005	9.024	9.044	510
20	0.272	0.286	0.300		0.328			0.370	0.384	0.398	0.412	20	520	9.044	9.063		9.102			9.161	9.180	9.200	9.219	9.239	520
30 40	0.412	0.426	0.440		0.469			0.511	0.525	0.540	0.554	0 40	530 540	9.239	9.258 9.453		9.297 9.492			9.356 9.551	9.375 9.570	9.395 9.590	9.414	9.434	530 540
40	0.554	0.568	0.583	0.597	0.012	0.020	0.640	0.000	0.009	0.084	0.098	40	540	9.434	9.453	9.473	9.492	9.512	9.531	9.551	9.570	9.590	9.609	9.629	540
50	0.698	0.713	0.727	0.742	0.757	0.771	0.786	0.801	0.815	0.830	0.845	50	550	9.629	9.648	9.668	9.687	9.707	9.726	9.746	9.765	9.785	9.804	9.824	550
60	0.845	0.860	0.874		0.904				0.963	0.978	0.993	60	560				9.883								560
70	0.993	1.008	1.023	1.038	1.053	1.068	1.083	1.098	1.114	1.129	1.144	70	570	10.019	10.039	10.058	10.078	10.097	10.117	10.137	10.156	10.176	10.195	10.215	570
80	1.144		1.174		1.205		1.235		1.266	1.281	1.296	80	580				10.273								580
90	1.296	1.312	1.327	1.342	1.358	1.373	1.389	1.404	1.420	1.435	1.451	90	590	10.410	10.430	10.449	10.469	10.488	10.508	10.528	10.547	10.567	10.586	10.606	590
100	1.451	1.466	1.482	1.497	1.513	1.529	1.544	1.560	1.576	1.591	1.607	100	600	10.606	10-625	10.645	10.664	10.684	10.703	10.723	10.743	10.762	10.782	10.801	600
110	1.607			1.654				1.718		1.749	1.765	110	610				10.860								610
120	1.765	1.781	1.797	1.813	1.829	1.845	1.861	1.877	1.893	1.909	1.925	120	620	10.997	11.016	11.036	11.055	11.075	11.095	11.114	11.134	11.153	11.173	11.192	620
130	1.925	1.941	1.957	1.973	1.989	2.006	2.022	2.038	2.054	2.070	2.087	130	630	11.192	11.212	11.231	11.251	11.270	11.290	11.310	11.329	11.349	11.368	11.388	630
140	2.087	2.103	2.119	2.135	2.152	2.168	2.184	2.201	2.217	2.233	2.250	140	640	11.388	11.407	11.427	11.446	11.466	11.485	11.505	11.525	11.544	11.564	11.583	640
150	2 250	2 266	2 283	2 200	2 316	2 332	2 3/10	2.365	2 382	2 308	2.415	150	650	11.583	11 603	11 622	11 6/12	11 661	11 691	11 700	11 720	11 730	11 750	11 770	650
160	2.415	2.431	2.448		2.481		2.514	2.531		2.564		160		11.778											660
170	2.581	2.598			2.648			2.698		2.732		170		11.974											670
180	2.749	2.766	2.783	2.800	2.816	2.833	2.850	2.867	2.884	2.901	2.918	180	680	12.169	12.188	12.208	12.227	12.247	12.266	12.286	12.305	12.325	12.344	12.364	680
190	2.918	2.935	2.952	2.969	2.986	3.003	3.020	3.038	3.055	3.072	3.089	190	690	12.364	12.383	12.403	12.422	12.442	12.461	12.481	12.500	12-519	12.539	12.558	690
200	3.089	3 106	3 123	3 140	3 158	3 175	3 192	3.209	3 227	3 244	3 26	200	700	12.558	12 578	12 597	12 617	12 636	12 656	12 675	12 695	12 714	12 734	12 753	700
210	3.261			3.313				3.382		3.417		210	ı	12.753											710
220	3.434	3.452	3.469		3.504			3.557	3.574	3.592	3.609	220	720	12.947	12.967	12.986	13.006	13.025	13.045	13.064	13.083	13.103	13.122	13.142	720
230	3.609	3.627	3.644	3.662	3.679	3.697	3.714	3.732	3.750	3.767	3.785	230	730	13.142	13.161	13.180	13.200	13.219	13.239	13.258	13.277	13.297	13.316	13.336	730
240	3.785	3.803	3.820	3.838	3.856	3.873	3.891	3.909	3.927	3.944	3.962	240	740	13.336	13.355	13.374	13.394	13.413	13.432	13.452	13.471	13.491	13.510	13.529	740
250	20/2	2.000	2 000	4.015	4.022	4.051	4.0/0	4.007	4 104	4 1 2 2	4.140	250	750	12 520	12 5 40	12 5/0	12 507	12 /07	12 / 2/	12 / 45	12 // 5	12 / 04	12 702	10 700	750
260	3.962 4.140	4.158	3.998 4.176	4.015	4.033				4.104 4.284	4.122 4.301	4.140	260	ı	13.529 13.723											760
270	4.319	4.138	4.176		4.391			4.446	4.464	4.482	4.500	270	ı	13.723											770
280	4.500	4.518	4.536		4.572		4.608	4.627	4.645	4.663	4.681	280		14.109											780
290	4.681	4.699	4.717	4.736	4.754	4.772	4.790	4.809	4.827	4.845	4.863	290	790	14.302	14.321	14.340	14.359	14.378	14.398	14.417	14.436	14.455	14.475	14.494	790
300	4.863	4.882						4.992				300	ı	14.494											800
310 320	5.047 5.231	5.065 5.249	5.083 5.268		5.120 5.305		5.157	5.175 5.360	5.194 5.379	5.212 5.397	5.231	310 320		14.686 14.877											810 820
330	5.416	5.434		5.471				5.546			5.601	330		15.069											830
340	5.601							5.732				340	ı	15.260											840
350	5.788	5.807	5.825	5.844				5.919		5.956		350	850				15.507								850
360	5.975	5.994	6.013		6.050		6.088	6.107	6.126		6.163	360	860				15.697								860
370 380	6.163 6.352	6.182 6.371	6.201 6.390		6.239		6.276 6.465	6.295 6.484	6.314		6.352 6.541	370 380	870	15.830			16.076								870 880
390	6.541	6.560	6.579		6.617					6.712		390	890	16.208											890
070	0.011	0.000	0.077	0.070	0.017	0.000	0.000	0.07	0.070	0.712	0.701	0,0	0,0	10.200	TO.LL?	10.210	10.200	10.201	10.000	10.022	10.010	10.007	10.070	10.077	0,0
400	6.731	6.750	6. 69	6.788	6.807	6.826	6.845	6.864	6.883	6.902	6.921	400	900	16.397	16.416	16.435	16.453	16.472	16.491	16.510	16.529	16.547	16.566	16.585	900
410	6.921	6.940	6.959		6.998				7.074	7.093		410		16.585											910
420				7.170				7.246			7.304	420		16.773											920
430 440	7.304 7.496	7.323 7.515		7.361				7.438		7.476 7.669		430 440		16.960 17.147											930 940
440	1.470	1.010	1.534	1.333	1.312	1.372	7.011	1.030	7.047	1.007	1.000	UFF	740	17.147	17.100	17.104	17.203	11.221	11.240	17.200	11.211	11.270	17.314	11.333	740
450	7.688	7.707	7.726	7.746	7.765	7.784	7.804	7.823	7.842	7.861	7.881	450	950	17.333	17.352	17.370	17.389	17.407	17.426	17.444	17.463	17.482	17.500	17.519	950
460	7.881		7.919		7.958		7.996			8.054	8.074	460		17.519											960
470	8.074	8.093			8.151		8.190	8.209	8.229		8.267	470		17.704											970
480	8.267	8.287	8.306	8.325	8.345	8.364	8.383	8.403	8.422	8.422	8.461	480		17.889											980
490	8.461	8.480	8.500	8.519	8.539	გ. ეეგ	8.577	8.597	8.616	8.636	8.655	490	990	18.073	18.092	18.110	18.128	18.14/	18.165	18.184	18.202	18.220	18.239	18.25/	990
°C	0	1	2	3	4	5	6	7	8	9	10	°C	°C	0	1	2	3	4	5	6	7	8	9	10	°C

Revised Thermocouple Reference Tables





MAXIMUM TEMPERATURE RANGE Thermocouple Grade

-32 to 4208°F -0 to 2320°C

Extension Grade
32 to 1600°F
0 to 870°C
LIMITS OF ERROR

LIMITS OF ERROR (whichever is greater) Standard: 4.5°C to 425°C 1.0% to 2320°C Special: Not Established

COMMENTS, BARE WIRE ENVIRONMENT: Vacuum, Inert; Hydrogen; Beware of Embrittlement; Not Practical Below 750°F;

Not for Oxidizing Atmosphere TEMPERATURE IN DEGREES °C REFERENCE JUNCTION AT 0°C

Thermoelectric Voltage in Millivolts

	_		_	_		_	_	_	_				•	nago	-		_	_		_	_	_	_	_		
°C	0	1	2	3	4	5	6	7	8	9	10	°C		°C	0	1	2	3	4	5	6	7	8	9	10	°C
									18.404														26.845			
									18.587														26.999			
									18.769														27.152			
									18.951														27.304			
1040	18.987	19.005	19.023	19.041	19.060	19.078	19.096	19.114	19.132	19.150	19.168	1040		1540	27.335	27.350	27.365	27.380	27.396	27.411	27.426	27.441	27.456	27.471	27.486	1540
									19.313														27.607			
1060	19.349	19.367	19.385	19.403	19.421	19.439	19.457	19.475	19.493	19.511	19.529	1060		1560	27.637	27.653	27.668	27.683	27.698	27.713	27.728	27.743	27.758	27.773	27.788	1560
1070	19.529	19.547	19.565	19.583	19.601	19.619	19.637	19.655	19.673	19.691	19.709	1070		1570	27.788	27.803	27.818	27.833	27.848	27.863	27.878	27.893	27.908	27.923	27.938	1570
1080	19.709	19.727	19.744	19.762	19.780	19.798	19.816	19.834	19.852	19.870	19.888	1080		1580	27.938	27.953	27.968	27.983	27.997	28.012	28.027	28.042	28.057	28.072	28.087	1580
1090	19.888	19.905	19.923	19.941	19.959	19.977	19.995	20.013	20.030	20.048	20.066	1090		1590	28.087	28.102	28.117	28.132	28.146	28.161	28.176	28.191	28.206	28.221	28.236	1590
1100	20.066	20.084	20.102	20.120	20.137	20.155	20.173	20.191	20.208	20.226	20.066	1100		1600	28.236	28.250	28.265	28.280	28.295	28.310	28.324	28.339	28.354	28.369	28.384	1600
1110	20.244	20.262	20.279	20.297	20.315	20.333	20.350	20.368	20.386	20.404	20.421	1110		1610	28.384	28.398	28.413	28.428	28.443	28.457	28.472	28.487	28.502	28.516	28.531	1610
1120	20.421	20.439	20.457	20.474	20.492	20.510	20.527	20.545	20.563	20.580	20.598	1120		1620	28.531	28.546	28.560	28.575	28.590	28.604	28.619	28.634	28.648	28.663	28.678	1620
1130	20.598	20.616	20.633	20.651	20.669	20.686	20.704	20.721	20.739	20.757	20.774	1130		1630	28.678	28.692	28.707	28.722	28.736	28.751	28.765	28.780	28.795	28.809	28.824	1630
									20.915														28.940			
1150	20.950	20.967	20.985	21.002	21.020	21.037	21.055	21.072	21.090	21.107	21.125	1150		1650	28.969	28.984	28.998	29.013	29.027	29.042	29.056	29.071	29.085	29.100	29.114	1650
									21.265														29.230			
									21.439														29.374			
									21.612														29.517			
									21.785														29.660			
1100	21.017	21.001	21.001	21.000	21.710	21.700	21.700	21.700	21.700	21.002	21.010	1100		1000	20.010	20.000	20.07 1	20.000	20.000	20.017	20.001	20.010	20.000	20.07 1	20.000	1000
1200	21 819	21 837	21 854	21 871	21 888	21 905	21 923	21 940	21.957	21 974	21 991	1200		1700	29 688	29 702	29 716	29 731	29 745	29 759	29 773	29 787	29.802	29 816	29 830	1700
									22.129														29.943			
									22.300														30.084			
									22.470														30.224			
									22.640														30.363			
1240	22.304	22.321	22.550	22.000	22.312	22.303	22.000	22.020	22.040	22.001	22.014	1240		1740	30.232	30.200	30.200	30.234	30.300	30.321	30.333	30.343	30.303	30.377	30.331	1740
1250	22 674	22 601	22 708	22 725	22 7/12	22 750	22 776	22 702	22.809	22 826	22 843	1250		1750	30 301	30 405	30 /10	30 433	30 447	30 460	30 474	30 488	30.502	30 516	30 530	1750
									22.978														20.640			
									23.146														30.778			
									23.314														30.915			
									23.481														31.051			
1290	23.347	23.304	23.300	23.397	23.414	23.431	23.447	23.404	23.401	23.497	23.314	1290		1790	30.942	30.930	30.909	30.903	30.997	31.010	31.024	31.030	31.031	31.000	31.070	1790
1000	00.514	00 500	00 5 47	00.504	00 500	00 507	00.014	00.000	00.047	00.000	00.000	1000		1000	04 070	04 000	01 105	01 110	04 400	04 440	04 400	04 470	04 407	04 000	01.014	1000
									23.647														31.187			
									23.812														31.322			
									23.978														31.456			
									24.142														31.590			
1340	24.1/5	24.191	24.208	24.224	24.240	24.257	24.273	24.290	24.306	24.322	24.339	1340		1840	31.617	31.630	31.643	31.656	31.670	31.683	31.696	31./10	31.723	31./36	31.749	1840
1050	04.000	04.055	04.074	04.000	04 404	04 400	04 407	04 450	04.40	04 405	04 500	1050		1050	01 740	04 700	01 770	04 700	01.000	01.010	21 000	01.040	21 055	01.000	04 000	1050
									24.46														31.855			
									24.632														31.987			
									24.794														32.118			
									24.955														32.248			
1390	24.988	25.004	25.020	25.036	25.052	25.068	25.084	25.100	25.116	24.132	25.148	1390		1890	32.274	32.287	32.300	31.313	32.326	32.339	32.352	32.365	32.378	32.391	32.404	1890
									25.276														32.507			
									25.436														32.635			
									25.595														32.763			
									25.753														32.890			
1440	25.785	25.801	25.817	25.832	25.848	25.864	25.880	25.896	25.911	25.927	25.943	1440		1940	32.915	32.928	32.940	32.953	32.966	32.978	32.991	33.003	33.016	33.028	33.041	1940
									26.069														33.141			
									26.225														33.266			
									26.381														33.390			
									26.537														33.513			
1490	26.568	26.583	26.599	26.614	26.629	26.645	26.660	26.676	26.691	26.707	26.722	1490		1990	33.538	33.550	33.562	33.575	33.587	33.599	33.611	33.623	33.636	33.648	33.660	1990
°C	0	1	2	3	4	5	6	7	8	9	10	°C		°C	0	1	2	3	4	5	6	7	8	9	10	°C
U	3	'	-	J	-	J	J	'	J	J	.0	U	- 1	U	3	•	-	3	-	J	J	'	J	J	.0	3

MAXIMUM TEMPERATURE RANGE Thermocouple Grade -32 to 4208°F -0 to 2320°C

Extension Grade 32 to 1600°F 0 to 870°C

LIMITS OF ERROR (whichever is greater) Standard: 4.5°C to 425°C 1.0% to 2320°C

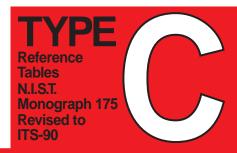
Special: Not Established

COMMENTS, BARE WIRE ENVIRONMENT: Vacuum, Inert; Hydrogen; Beware of Embrittlement; Not Practical Below 750°F; Not for Oxidizing Atmosphere

TEMPERATURE IN DEGREES °C REFERENCE JUNCTION AT 0°C

Thermocouple Grade NONE **ESTABLISHED** Tungsten-5% Rhenium VS. Tungsten-26% Řhenium Extension Grade

Revised Thermocouple Reference Tables



Thermoelectric Voltage in Millivolts

°C	0	1	2	3	4	5	6	7	8	9	10	°C	°C	0	1	2	3	4	5	6	7	8	9	10	°C
2000	33.660	33.672	33.684	33.697	33.709	33.721	33.733	33.745	33.757	33.769	33.782	2000	2200	35.932	35.942	35.953	35.963	35.973	35.984	35.994	36.004	36.015	36.025	36.036	2200
2010	33.782	33.794	33.806	33.818	33.830	33.842	33.854	33.866	33.878	33.890	33.902	2010	2210	36.036	36.046	36-056	36.067	36.077	36.087	36.097	36.108	36.118	36.128	36.138	2210
2020	33.902	33.914	33.926	33.938	33.950	33.962	33.974	33.986	33.998	34.010	34.022	2020	2220	36.138	36.149	36.159	36.169	36.179	36.189	36.200	36.210	36.220	36.230	36.240	2220
2030	34.022	34.034	34.046	34.058	34.070	34.082	34.094	34.106	34.118	34.130	34.142	2030	2230	36.240	36.250	36.260	36.271	36.281	36.291	36.301	36.311	36.321	36.331	36.341	2230
2040	34.142	34.153	34.165	34.177	34.189	34.201	34.213	34.225	34.236	34.248	34.260	2040	2240	36.341	36.351	36.361	36.371	36.381	36.391	36.401	36.411	36.421	36.431	36.441	2240
2050	34.260	34.272	34.284	34.295	34.307	34.319	34.331	34.342	34.354	34.366	34.378	2050	2250	36.441	36.451	36.460	36.470	36.480	36.490	36-500	36.510	36.520	36.529	36.539	2250
2060	34.378	34.389	34.401	34.413	34.424	34.436	34.448	34.459	34.471	34.483	34.494	2060	2260	36.539	36.549	36.559	36.569	36.578	36.588	36.598	36.608	36.617	36.627	36.637	2260
2070	34.494	34.506	34.518	34.529	34.541	34.552	34.564	34.576	34.587	34.599	34.610	2070	2270	36.637	36.646	36.656	36.666	36.675	36.685	36.695	36.704	36.714	36.723	36.733	2270
2080	34.610	34.622	34.633	34.645	34.656	34.668	34.679	34.691	34.702	34.714	34.725	2080	2280	36.733	36.743	36.752	36,762	36,771	36.781	36,790	36.800	36.809	36.819	36.828	2280
2090	34.725	34.737	34.748	34.760	34.771	34.782	34.794	34.805	34.817	34.828	34.839	2090	2290	36.828	36.838	36.847	36.857	36,866	36.875	36.885	36.894	36,903	36,913	36.922	2290
2100	34.839	34.851	34.862	34.874	34.885	34.896	34.908	34.919	34.930	34.942	34.953	2100	2300	36.922	36.932	36.941	36.950	36.959	36.969	36.978	36.987	36.997	37.006	37.015	2300
2110	34.953	34.964	34.975	34.987	34,998	35.009	35.020	35.032	35.043	35.054	35.065	2110	2310	37.015	37.024	37.033	37.043	37.052	37.061	37.070	37.079	37.088	37.097	37.107	2310
2120	35.065	35.077	35.088	35.099	35.110	35.121	35.132	34.144	35.155	35.166	35.177	2120													
2130	35.177	35.188	35.199	35.210	35.221	35.232	35.243	35.254	35.265	35.277	35.288	2130													
	35.288																								
2110	00.200	00.277	00.010	00.021	00.002	00.010	00.000	00.001	00.070	00.000	00.077	2110													
2150	35.397	35.408	35.419	35.430	35.441	35.452	35.463	35.474	35.484	35.495	35.506	2150													
2160	35.506	35.517	35.528	35.539	35.549	35.560	35.571	35.582	35.592	35.603	35.614	2160													
	35.614																								
	35.721																								
	35.827																								
°C	0	1		33.030	4			33.700 7		9	10	°C.	°C	0	1	2	3	4	5	6	7	8	Q	10	°C
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