DURA-BAR®
METAL SERVICES

Resource Guide

Section 3: Ductile Iron

Ductile Iron

Ductile iron was developed in the 1940s and became widely recognized as an engineering material by 1960. The popularity of using ductile iron continues to increase especially with the concern over leaded steels being an environmental hazard. The nodular graphite provides the same free machining benefits as lead (see Fig. 1 & Fig. 2 below) without creating the machining and waste disposal problems.

Ductile irons contain Type I & II nodular graphite, as defined in ASTM A247, in a matrix of pearlite and ferrite. The spheroidal shaped graphite maximizes the strength in cast iron. The ratio of ferrite to pearlite in the matrix is altered for each of the three grades in order to produce the required values for tensile strength, yield strength, and elongation.

The ductile iron grades will conform to those listed under ASTM A536, with the primary difference being the high nodule count and fine grain size inherent to the Dura-Bar continuous casting process. Mechanical properties for each grade are guaranteed in the actual bar, not a separately cast test sample.

The different grades are produced by controlling the matrix structure around the graphite nodules. Minimum tensile strengths range from 65,000-100,000 psi, with corresponding minimum elongation requirements from 2-12%.

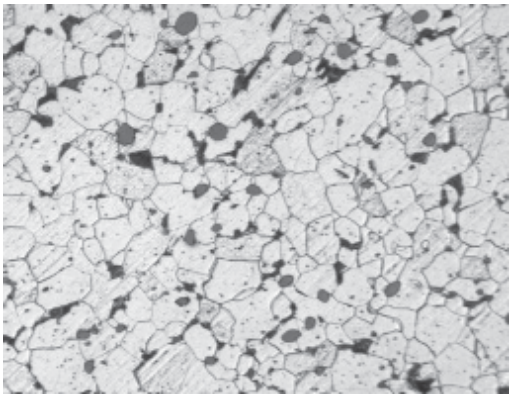

Fig. 1 (Left)
Photo of 12L14 steel (200x, etched in 5% Nitol). Lead particles can be seen to be spheroidal in shape & uniformly distributed throughout the structures.

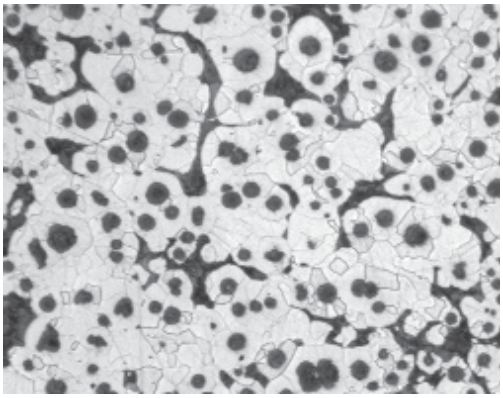

Fig. 2 (Right) Photo of Dura-Bar 65-45-12 ductile iron (100x, etched in 5% Nitol). Graphite nodules are uniformly distributed throughout the structure providing the same free machining characteristics inherent to leaded steels.

General Description

Dura-Bar 65-45-12 ductile iron contains nodular graphite in a matrix of ferrite with small amounts of pearlite. The ferritic structure gives excellent machinability with good surface finishes along with optimal impact strengths, fatigue properties, electrical conductivity and high magnetic permeability. This iron has approximately the same tensile and yield strengths as AISI 1020 steel in the as-rolled condition. This specification conforms to ASTM A536 grade 65-45-12

Microstructure

The microstructure consists of Types I and II nodular graphite as defined in ASTM A247. The matrix is ferrite with approximately 5-25% pearlite. The "rim" will have a higher nodule count and will be mostly ferrite. Chill carbides will be less than 5% in any field at 100x and will be well dispersed.

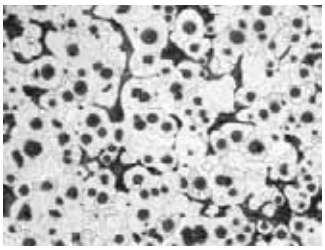

Fig. 1 (Left) Typical microstructure in the center area (100x, etched in 5% Nitol)

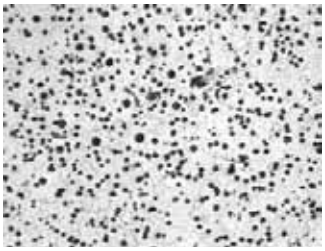

Fig. 2 (Right) Typical microstructure in the rim area (100x, etched in 5% Nitol)

Chemical Composition

The chemical analysis is subordinate to the mechanical properties. Typical analysis will be as shown in Table 1 below.

Table 1
65-45-12 chemical composition.

Element	Percentage
Carbon[1]	3.50 - 3.90%
Silicon[1]	2.25 - 3.00%
Manganese	0.15 - 0.35%
Sulfur	0.025% max.
Phosphorus	0.05% max.

[1] Carbon and silicon targets are specified for each bar size in order to maintain mechanical properties.

Mechanical Properties

Hardness properties for various diameters are shown in Table 2 below. Hardness properties listed are minimum, maximum across the bar. For rectangles, squares and shapes, the hardness properties will depend on minimum and maximum section thickness and will be supplied on request.

Table 2
65-45-12 hardness properties

Size Range		BHN	
Inches	mm	Min.	Max.
01.000 - 02.000	25 - 51	156	217
02.001 - 03.000	51 - 76	153	207
03.001 - 06.000	76 - 152	143	207
06.001 - 20.000	152-508	131	207

Tensile strength is determined from a longitudinal test specimen taken from mid-radius of the as-cast bar. Tensile strength psi (min) 65,000. Yield strength psi (min) 45,000. Elongation (min) 12%. In bars under 2.0" diameter, elongation will be 9% minimum.

Heat Treat Response

Dura-Bar 65-45-12 can be oil quench hardened from 1600°F (870°C) to 50 Rc minimum on the outside of the bar. Hardness in the core will be less than the hardness on the outside surfaces. Typical Jominy end quench test data are shown in the section on Heat Treating (page 5-7).

This grade also responds well to surface hardening methods such as flame or induction heat treating. It is well suited for austempering because of the low residual alloy content, and the highly ferritic matrix provides predictable growth with minimal heat-treat distortion.

Typical Applications

Typical applications for 65-45-12 Dura-Bar ductile iron are listed below. They are classified by industry.

Fluid Power:	Cylinder blocks, end caps, gear rack housings, gerotors, manifolds, pistons, glands, rotors, & valves
Machinery:	Bushings, chuck bodies, die blocks, gears, journals, pulleys, rotary tables, side frames, spindle housings, tie rod nuts, flywheels, pulleys, & rams
Transportation:	Rail spacers & sprockets
Pump and Compressor:	Gears, housings, pistons, & rotary screws
Glass mold:	Blank molds & plungers

Availability of Sizes and Shapes

The stock listing for Dura-Bar 65-45-12 follows this section. Sizes and shapes not listed are available by special order.

General Description

Dura-Bar 80-55-06 ductile iron will contain nodular graphite in a matrix of ferrite and pearlite. The pearlite/ferrite structure provides higher wear resistance and strength when compared to a ferritic grade of ductile iron. This material will be readily machinable with good surface finishes. Tensile and yield strengths will be similar to AISI 1040 steel in the as-rolled condition. This grade conforms to ASTM A536 grade 80-55-06.

Microstructure

The microstructure consists of Type I and II nodular graphite as defined in ASTM A247. The matrix is pearlite and ferrite. The "rim" will have a higher nodule count and ferrite content. Chill carbides will be less than 5% in any field at 100x and will be well dispersed.

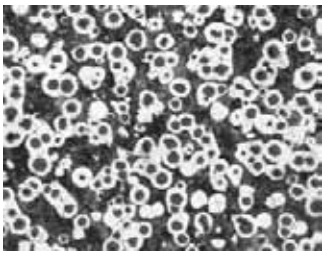

Fig. 1 (Left) Typical microstructure in the center area (100x, etched in 5% Nitol)

Fig. 2 (Right) Typical microstructure in the rim area (100x, etched in 5% Nitol)

Chemical Composition

The chemical analysis is subordinate to the mechanical properties. Typical analysis will be as shown in Table 1 below.

Table 1
65-45-12 chemical composition.

Element	Percentage
Carbon[1]	3.50 - 3.90%
Silicon[1]	2.25 - 3.00%
Manganese	0.15 - 0.35%
Sulfur	0.025% max.
Phosphorus	0.05% max.

[1] Carbon and silicon targets are specified for each bar size in order to maintain mechanical properties.

Small amounts of alloying elements are used to stabilize the pearlitic structure.

Mechanical Properties

Hardness properties for various diameters are shown in Table 2 below. Hardness properties listed are minimum, maximum across the bar. For rectangles, squares and shapes, the hardness properties will depend on minimum and maximum section thickness and will be supplied on request.

Table 2
80-55-06 hardness properties

Size Range		BHN	
Inches	mm	Min.	Max.
01.000 - 01.500	25 - 38	187	255
01.501 - 03.000	38 - 76	187	255
03.001 - 20.000	76 - 508	187	255

The tensile strength is determined from a longitudinal test specimen taken from mid-radius of the as-cast bar. Tensile strength psi (min) 80,000. Yield strength psi (min) 55,000. Elongation (min) 6%. In bars under 1.5" diameter, elongation will be a minimum of 4%.

Heat Treat Response

Dura-Bar 80-55-06 can be oil quench hardened from 1600°F (870°C) to a minimum hardness of 50 Rc on the outside of the bar. The inside diameter hardness will be less than 50 Rc. Lower quench hardness on the inside diameters are a result of larger graphite nodules and not a loss of matrix hardness. Typical Jominy end quench test data are shown in the section on Heat Treating (page 5-7).

Typical Applications

Typical applications for 80-55-06 Dura-Bar ductile iron are listed below. They are classified by industry.

Fluid Power:	Cylinder blocks, gerotors, manifolds, pistons, glands, rotors, & valve bodies
Machinery:	Bushings, chain sheave rollers, chuck bodies, die blocks, gears, gear racks, pulleys, press rams, rotary tables, tie rod nuts, guide ways, barrel rollers (cement truck), flywheels, pile drivers, pulleys, & rams
Transportation:	Pulleys, gears, & rail spacers
Pump and Compressor:	Gears, housings, liners, pistons, & rotary screws
Steel Mill:	Guide rolls, pinch rolls, & runout table rolls
Miscellaneous:	Disamatic pouring rails, dies, pattern plates, core boxes, grinding rolls, & mill Liners

Availability of Sizes and Shapes

The stock listing for Dura-Bar 80-55-06 follows this section. Sizes and shapes not listed are available by special order.

General Description

Dura-Bar 100-70-02 ductile iron contains nodular graphite in a matrix of pearlite with small amounts of ferrite. The pearlitic structure maximizes strength and wear characteristics in a non-alloyed as-cast ductile iron. This specification is similar to ASTM A536 grade 100-70-03.

Microstructure

The microstructure consists of Type I and II nodular graphite as defined in ASTM A247. The matrix is highly pearlite with small amounts of ferrite. The rim will have a higher nodule count and contain slightly higher ferrite concentration when compared to the center. Chill carbides will be less than 5% in any field at 100x and will be well dispersed.

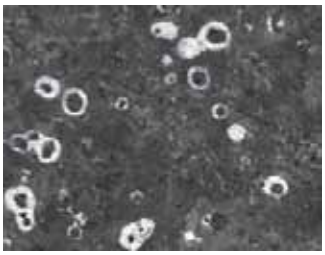

Fig. 1 (Left) Typical microstructure in the center area (100x, etched in 5% Nitol)

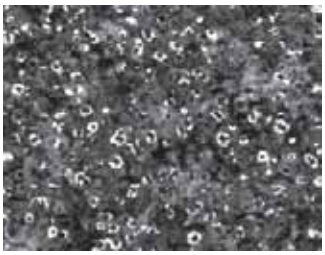

Fig. 2 (Right) Typical microstructure in the rim area (100x, etched in 5% Nitol)

Chemical Composition

The chemical analysis is subordinate to the mechanical properties. Typical analysis will be as shown in Table 1 below.

Table 1
100-70-02 chemical composition

Element	Percentage
Carbon[1]	3.50 - 3.90%
Silicon[1]	2.25 - 3.00%
Manganese	0.15 - 0.35%
Sulfur	0.025% max.
Phosphorus	0.05% max.

[1] Carbon and silicon targets are specified for each bar size in order to maintain mechanical properties.

Small amounts of alloying elements are used to stabilize the pearlitic structure.

Mechanical Properties

Hardness properties for various diameters are shown in Table 2 below. Hardness properties listed are minimum, maximum across the bar. For rectangles, squares and shapes, the hardness properties will depend on minimum and maximum section thickness and will be supplied on request.

Table 2
100-70-02 hardness properties.

Size Range		BHN	
Inches	mm	Min.	Max.
01.000 - 20.000	25 - 508	241	329

Tensile strength is determined from a longitudinal test specimen taken from mid-radius of the as-cast bar. Tensile strength psi (min) 100,000. Yield strength psi (min) 70,000. Elongation (min) 2%.

Heat Treat Response

Dura-Bar 100-70-02 can be oil quench hardened from 1600°F (870°C) to a minimum hardness of 50 Rc on the outside of the bar. The inside diameter hardness will be less than 50 Rc. Lower quench hardness on the inside diameters are a result of larger graphite nodules and not a loss of matrix hardness. Typical Jominy end quench test data for 80-55-06 ductile iron are shown in the section on Heat Treating (page 5-7). Similar data applies to 100-70-02.

Typical Applications

Typical applications for 100-70-02 Dura-Bar ductile iron are listed below. They are classified by industry.

Fluid Power:	For higher pressure: cylinder blocks, gerotors, manifolds, pistons, glands, rotors, & valves
Machinery:	Bushings, chain sheave rollers, chuck bodies, die blocks, gears, gear racks, pulleys, rams, rotary tables, guide ways, barrel rollers (cement truck), flywheels, pile drivers, pulleys, & rams *(also see Fluid Power)*
Transportation:	Pulleys, gears, rail spacers, hubs, carriers, & camshafts
Pump and Compressor:	Gears, housings, liners, & pistons
Steel Mill:	Guide rolls, pinch rolls, & runout table rolls
Miscellaneous:	Disamatic pouring rails & dies

Availability of Sizes and Shapes

Dura-Bar 100-70-02 is a non-inventoried item. A wide variety of sizes and shapes is available by special order.

General Description

Dura-Bar 4512 HRDS is a high-silicon ductile iron intended for use at elevated temperatures or when a part is subjected to thermal cycling, such as permanent mold applications. The ferritic structure will remain stable so that no significant transformation takes place, thereby minimizing stresses that lead to cracks and distortion of the finished part.

Microstructure

The microstructure will contain Type I and II nodules as defined in ASTM A247. The matrix will be predominantly ferrite with some pearlite. Chill carbides will be less than 5% in any field at 100x and will be well dispersed.

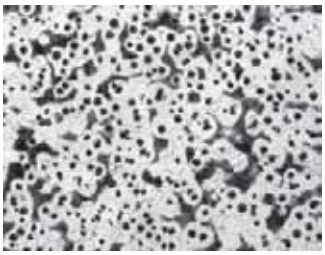

Fig. 1 (Left) Typical microstructure in the center area (100x, etched in 5% Nitol)

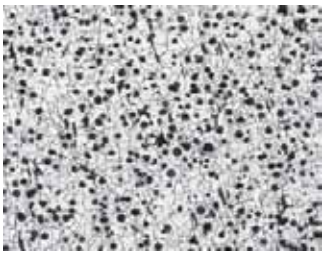

Fig. 2 (Right) Typical microstructure in the rim area (100x, etched in 5% Nitol)

Chemical Composition

Typical chemical composition is shown in Table 1 below. Specific targets may be adjusted slightly, although the silicon level is required.

Table 1
65-45-12 HRDS chemical composition

Element	Percentage
Carbon	3.45 - 3.75%
Silicon	3.25 - 4.00%
Manganese	0.15 - 0.35%
Sulfur	0.025% max.
Phosphorus	0.05% max.

Mechanical Properties

Brinell hardness values for 4512 HRDS will typically be 167-229. Material hardness is subordinate to chemistry, and the silicon level must be maintained in order to achieve elevated temperature properties.

Tensile strength, as determined from a longitudinal test specimen taken from the mid-radius, will have the following properties:

Tensile strength psi (min)	65,000
Yield strength psi (min)	45,000
Elongation (min)	12%

In bars under 2.0” diameter, elongation will be 9% minimum.

Mechanical Properties Continued

Table 2 below shows typical mechanical properties at elevated temperatures.

Table 2
Mechanical properties at elevated temperatures

Temperature	Tensile Strength (psi)	Yield Strength (psi)	Elongation
900°F (482°C)	52,000	47,000	20%
1100°F (593°C)	27,000	23,000	25%
1300°F (704°C)	10,000	7,500	45%
1450°F (788°C)	5,500	4,500	60%

Heat Treat Response

4512 HRDS is not intended for hardening. The matrix structure may be softened slightly by heating to 1400°F (760°C) and furnace cooling to 400°F (205°C).

Typical Applications

4512 HRDS is most commonly used in high temperature applications where resistance to growth and oxidation is required. Common applications are listed below:

- Glass molds
- Plate glass furnace rolls
- Steel mill rolls
- Turbocharger bushings
- Sealing knives

Availability of Sizes and Shapes

Dura-Bar 4512 HRDS is a non-inventoried item. A wide variety of sizes and shapes is available by special order.

Sizes and Shapes

Stock listings for rounds, trepanned tubes, rectangles, and squares are listed on the following pages. Dura-Bar ductile 65-45-12 and 80-55-06 are stock grades; 100-70-02 and 65-45-12 HRDS are non-inventory items.

Round bar stock is available in sizes ranging from 1.250" to 20.000" in diameter. Any size round bar in this category can be produced, although stock sizes are made to specific increments.

Round bars are sold to clean up at the nominal size. Additional stock is added to allow for out-of-round and normal imperfections in the as-cast surface. Stock allowance is a function of the bar diameter.

The stock listing for trepanned tubes contains the possible inside diameters for each stock size outside diameter. Any stock size can be trepanned to the inside diameter listed on the chart. Tubes are sold with clean-up stock on the inside and outside diameters.

Rectangles and squares are available in sizes ranging from 0.750" x 1.500" to 18.000" x 22.000". Stock sizes are made to specific increments within this range, although a wide range of height and width combinations can be produced.

Rectangles and squares are sold to the actual size with no allowance for machine stock added.

Custom shapes are special order and are quoted individually.

All custom shapes are special order and are quoted individually.

Stock List - Rounds

Ductile Iron

Nominal Diameter (inches)	Stock Allowance (inches)	Nominal Length (inches)	Bundle Quantity	As-Cast Weight (lbs./ft.)	As-Cast 65-45-12	As-Cast 80-55-06	Cold-Finished* Weight (lbs./ft.)	Cold-Finished* 65-45-12	Cold-Finished* 80-55-06
1.250	0.088	72	74	4.4	▪	▪	3.9	•	•
1.375	0.095	72	63	5.3		▪	4.7		•
1.500	0.095	72	69	6.2	▪	▪	5.6	•	•
1.625	0.095	72	63	7.2		▪	6.5		•
1.750	0.095	72	53	8.3	▪	▪	7.5	•	•
1.875	0.095	72	51	9.5			8.7		
2.000	0.095	72	42	10.8	▪	▪	9.9	▪	▪
2.125	0.118	72	38	12.3		▪	11.1		•
2.250	0.118	72	45	13.7	▪	▪	12.5	▪	•
2.375	0.118	72	39	15.2		▪	13.9		▪
2.500	0.118	72	38	16.8	▪	▪	15.4	▪	•
2.625	0.118	72	33	18.4	▪	▪	16.9	▪	▪
2.750	0.118	72	30	20.2	▪	▪	18.6	•	•
3.000	0.118	72	26	23.8	▪	▪	22.1	▪	▪
3.125	0.136	72	23	26.1	▪		24.0	•	
3.250	0.136	72	22	28.1	▪	▪	26.0	•	•
3.375	0.136	72	20	30.2	▪		28.0	•	
3.500	0.136	72	18	32.4	▪	▪	30.1	•	•
3.625	0.136	72	18	34.7	▪	▪	32.3	•	
3.750	0.136	72	17	37.0	▪	▪	34.6	•	▪
3.875	0.136	72	17	39.4	▪		36.9	•	
4.000	0.136	72	14	41.9	▪	▪	39.3	▪	•
4.125	0.154	72	14	44.9	▪		41.8	•	
4.250	0.154	72	14	47.5	▪	▪	44.4	•	•
4.375	0.154	72	11	50.3	▪		47.0	•	
4.500	0.154	72	11	53.1	▪	▪	49.7	•	•
4.625	0.154	72	11	56.0	▪	▪	52.5	•	•
47.50	0.154	72	11	58.9	▪	▪	55.4	•	•
5.00	0.154	72	9	65.1	▪	▪	61.4	•	•
5.250	0.172	72	9	72.0	▪	▪	67.7	•	•
5.500	0.172	72	7	78.8	▪	▪	74.3	•	•
5.750	0.172	72	7	85.9	▪	▪	81.2	•	•

▪ Available as stock item
• Available upon request
**Cold-finished bars in sizes 1.250" through 5.000" are centerless turned. All others available are centerless ground.*

Stock List - Rounds

Ductile Iron

Nominal Diameter (inches)	Stock Allowance (inches)	Nominal Length (inches)	Bundle Quantity	As-Cast Weight (lbs./ft.)	As-Cast 65-45-12	As-Cast 80-55-06	Cold-Finished* Weight (lbs./ft.)	Cold-Finished* 65-45-12	Cold-Finished* 80-55-06
6.000	0.172	72	7	93.3	▪	▪	88.4	•	•
6.250	0.190	72	4	101.6	▪	▪			
6.500	0.190	72	4	109.7	▪	▪			
6.750	0.190	72	4	118.0	▪	▪			
7.000	0.190	72	3	126.7	▪	▪			
7.250	0.213	72	3	136.5	▪	▪			
7.500	0.213	72	3	145.8	▪	▪			
7.750	0.213	72	3	155.4	▪	▪			
8.000	0.213	72	3	165.3	▪	▪			
8.250	0.242	72	3	176.7		▪			
8.500	0.242	72	3	187.3	▪	▪			
9.00	0.242	72	2	209.3	▪	▪			
9.250	0.283	72	2	222.7		▪			
9.500	0.283	72	2	234.5	▪	▪			
10.000	0.283	72	2	259.1	▪	▪			
10.500	0.432	72	2	292.8	▪	▪			
11.000	0.432	72	2	320.2	▪	▪			
11.500	0.623	72	2	360.1		▪			
12.000	0.623	72	2	390.5	▪	▪			
13.000	0.623	72	1	454.8	▪	▪			
14.000	0.623	72	1	524.0	▪	▪			
15.000	0.623	72	1	598.1	▪	▪			
16.000	0.623	72	1	677.1	▪	▪			
17.000	0.815	72	1	777.7		▪			
18.000	0.815	72	1	867.5	▪	▪			
20.000	0.819	54	1	1062.0	▪	▪			

▪ Available as stock item
• Available upon request
**Cold-finished bars in sizes 1.250" through 5.000" are centerless turned. All others available are centerless ground.*

Trepanned Tube Weights

Ductile Iron

Outside Diameter (inches)	Inside Diameter (inches)								
	1.500	2.000	2.250	2.500	2.750	3.00	3.250	3.500	3.750
2.250	10								
2.375	11								
2.500	13								
2.625	15								
2.750	16	13							
2.875	18	14							
3.000	20	16	14						
3.125	22	18	16						
3.250	24	20	18	16					
3.375	26	23	20	18					
3.500	28	25	22	20	17				
3.625	31	27	25	22	19				
3.750	33	29	27	24	21	18			
3.875	35	32	29	27	24	21			
4.000	38	34	32	29	26	23	20		
4.125	41	37	35	32	29	26	23	19	
4.250	43	40	37	35	32	29	25	21	
4.375	46	42	40	38	35	31	28	24	
4.500	49	45	43	40	37	34	31	27	23
4.625	52	48	46	43	40	37	34	30	26
4.750	55	51	49	46	43	40	37	33	29
5.000	61	57	55	52	49	46	43	39	35
5.250	68	64	62	59	56	53	50	46	42
5.500	75	71	69	66	63	60	56	52	48
5.750	82	78	76	73	70	67	63	60	55
6.000	89	85	83	80	77	74	71	67	63
6.250				89	86	82	79	75	71
6.500				97	94	90	87	83	79
6.750				105	102	99	95	91	87
7.000				114	111	107	104	100	96
7.250				123	120	117	114	110	106
7.500				133	130	126	123	119	115
7.750				142	139	136	132	129	124
8.000				152	149	146	142	138	134
8.250				163	160	157	154	150	146
8.500				174	171	168	164	160	156
8.750				185	182	178	175	171	167
9.000				196	193	190	186	182	178

All weights expressed in lbs./ft.
0.250" concentricity tolerance between the inside diameter and average outside diameter

Trepanned Tube Weights

Ductile Iron

Inside Diameter (inches)									Outside Diameter (inches)
4.000	4.250	4.500	4.750	5.000	5.500	6.00	6.500	7.000	
									2.250
									2.375
									2.500
									2.625
									2.750
									2.875
									3.000
									3.125
									3.250
									3.375
									3.500
									3.625
									3.750
									3.875
									4.000
									4.125
									4.250
									4.375
									4.500
									4.625
24									4.750
30	26								5.000
37	32	27							5.250
44	39	34	29						5.500
51	46	41	36	30					5.750
58	54	49	43	38					6.000
67	62	57	51	46					6.250
75	70	65	59	54	41				6.500
83	78	73	68	62	50				6.750
92	87	82	76	71	58	45			7.000
101	96	91	86	80	68	55			7.250
110	106	101	95	90	77	64	49		7.500
120	115	110	105	99	87	73	59		7.750
130	125	120	115	109	97	83	69	53	8.000
141	136	131	126	120	109	95	80	64	8.250
152	147	142	137	131	119	105	90	75	8.500
163	158	153	147	142	129	116	101	85	8.750
174	169	164	159	153	141	127	112	96	9.000

All weights expressed in lbs./ft.
0.250" concentricity tolerance between the inside diameter and average outside diameter

Rectangle Stock List/Weights

65-45-12 Ductile Iron

As-Cast Size (Inches)			Length (Inches)	Weight (lbs./ft.)	Finish Size (Inches)			Bundle Quantity
2.150	x	2.930	74	19.7	1.970	x	2.750	18
2.250	x	3.250	72	22.8	2.070	x	3.070	24
2.250	x	4.250	72	29.8	2.070	x	4.070	20
2.550	x	2.930	74	23.3	2.350	x	2.730	15
2.750	x	3.000	72	25.7	2.550	x	2.800	20
3.250	x	4.250	72	43.1	3.050	x	4.050	12
3.250	x	4.750	72	48.2	3.050	x	4.550	12
3.250	x	5.250	72	53.2	3.050	x	5.050	9
3.250	x	5.750	72	58.3	3.050	x	5.550	9
3.250	x	6.250	72	63.4	3.050	x	6.050	9
3.500	x	4.550	73	49.7	3.300	x	4.350	12
4.250	x	5.250	72	69.6	4.026	x	5.026	8
4.250	x	5.500	72	72.9	4.026	x	5.276	8
4.250	x	5.750	72	76.2	4.026	x	5.526	8
4.250	x	6.250	72	82.9	4.026	x	6.026	6
4.250	x	6.750	72	89.5	4.026	x	6.526	6
4.250	x	7.250	72	96.1	4.026	x	7.026	6
4.750	x	6.250	72	92.6	4.526	x	6.026	6
5.000	x	6.500	72	101.4	4.776	x	6.276	6
5.250	x	6.250	72	102.4	5.026	x	6.026	6
5.250	x	7.250	72	118.8	5.026	x	7.026	6
5.250	x	8.250	72	135.1	5.026	x	8.026	4
6.080	x	9.040	77	171.5	5.830	x	8.790	4
7.250	x	11.875	72	268.6	7.000	x	11.625	2
7.680	x	9.180	79	220.0	7.430	x	8.930	2
8.000	x	21.000*	72	524.2	7.500	x	20.500	1
8.190	x	11.190	75	285.9	7.940	x	10.940	2
8.250	x	12.250	72	315.3	8.000	x	12.000	2
8.750	x	9.250	72	252.5	8.374	x	8.874	2
8.750	x	10.750	73	293.5	8.374	x	10.374	2
8.770	x	13.500	83	369.4	8.394	x	13.124	1
9.300	x	11.500	79	333.7	8.924	x	11.124	2
10.250	x	12.250	72	391.8	9.874	x	11.874	2
10.340	x	13.540	79	436.8	9.964	x	13.164	1
11.340	x	12.700	74	449.3	10.964	x	12.324	1
12.100	x	12.400	74	468.1	11.600	x	11.900	1
12.540	x	14.540	72	568.9	12.040	x	14.040	1
14.000	x	21.000	54	917.3	13.500	x	20.500	1
18.500	x	22.000	54	1269.8	18.000	x	21.500	1

**8.000" x 21.000" also available in 80-55-06*

Square Stock List/Weights

65-45-12 Ductile Iron

As-Cast Size (Inches)			Length (Inches)	Weight (lbs./ft.)	Finish Size (Inches)			Bundle Quantity
3.250	x	3.250	72	33.0	3.050	x	3.050	20
4.250	x	4.250	72	56.4	4.026	x	4.026	9
5.250	x	5.250	72	86.0	5.026	x	5.026	8
6.180	x	6.180	74	119.2	5.930	x	5.930	4
6.250	x	6.250	72	121.9	6.000	x	6.000	4
6.680	x	6.680	74	139.2	6.430	x	6.430	4
7.250	x	7.250	72	164.0	7.000	x	7.000	4
8.250	x	8.250	72	212.4	8.000	x	8.000	2
9.375	x	9.375	72	274.2	9.000	x	9.000	2
10.375	x	10.375	72	335.8	10.000	x	10.000	2

Milled Bar Stock List/Weights

65-45-12 Ductile Iron

Milled Size (Inches)					Weight (lbs./ft.)
*2.530	x	2.530	x	72	19.6
*3.030	x	3.030	x	72	28.1
*3.030	x	3.530	x	72	32.7
*3.030	x	4.030	x	72	37.4
*3.030	x	4.530	x	72	42.0
*3.030	x	5.030	x	72	46.6
*3.030	x	5.530	x	72	51.2
*3.030	x	6.030	x	72	55.9
*3.530	x	3.530	x	72	38.1
*4.030	x	4.030	x	72	49.7
*4.030	x	5.030	x	72	62.0
*4.030	x	5.530	x	72	68.2
*4.030	x	6.030	x	72	74.4
**4.030	x	7.030	x	72	86.7
*4.530	x	6.030	x	72	83.6
*5.030	x	5.030	x	72	77.4
*5.030	x	6.030	x	72	92.8
**5.030	x	7.030	x	72	108.2
**5.030	x	8.030	x	72	123.6
*6.030	x	6.030	x	72	111.3
**6.030	x	7.030	x	72	129.7
**6.030	x	8.030	x	72	148.2
**6.530	x	6.530	x	72	130.5
**7.000	x	9.000	x	72	192.8
**7.000	x	10.00	x	72	214.2
**7.030	x	7.030	x	72	151.2
**7.030	x	8.030	x	72	172.7
**7.530	x	7.530	x	72	173.5
**8.000	x	8.000	x	72	195.8
**8.030	x	10.03	x	73	246.5
**11.03	x	11.03	x	74	372.3

Dimensional Tolerances:
** +/-.005"*
*** +.030"/-.000"*
(Square, parallel, flat within .010" in any 6" section)