

FLOOR PLATES		GRADE 40 & 60 CONFORMING TO ASTM A617		STRUCTURAL CHANNELS A-36:20'-40' LG			MISC. CHANNELS A-36:20'-40' LG								
#/Sq. Ft.		#/Sq. Ft.													
14 Ga.	3.75	7/16	18.92	3@	4.1#	7@	9.8#	10@	20.0#	3@	7.1#	8@	18.7#	10@	28.5#
12 Ga.	5.25	1/2	21.47	3@	5.0#	7@	12.25#	10@	25.0#	4@	13.8#	8@	20.0#	10@	33.6#
1/8	6.16	9/16	24.02	3@	6.0#	7@	14.75#	10@	30.0#	6@	12.0#	8@	21.4#	12@	10.6#
3/16	8.71	5/8	26.58	4@	5.4#	8@	8.5#	12@	20.7#	6@	15.3#	8@	22.8#	12@	32.0#
1/4	11.26	3/4	31.68	4@	6.25#	8@	11.5#	12@	25.0#	6@	16.3#	9@	23.9#	12@	35.0#
5/16	13.81			4@	7.25#	8@	13.75#	12@	31.0#	6@	18.0#	9@	25.4#	13@	31.8#
3/8	16.37			5@	6.7#	8@	18.75#	15@	33.9#	7@	17.6#	10@	6.5#	13@	50.0#
				5@	9.0#	9@	13.4#	15@	40.0#	7@	19.1#	10@	8.4#	18@	42.7#
				6@	8.2#	9@	15.0#	15@	50.0#	7@	22.7#	10@	22.0#	18@	45.8#
				6@	10.5#	9@	20.0#			8@	8.5#	10@	25.0#	18@	58.0#
				6@	13.0#	10@	15.3#								

PLATES						STANDARD BEAMS			BAR SIZE CHANNELS A-36:20' LG								
#/Sq. Ft.											#/ft.	#/ft.					
3/16	7.66	7/8	35.73	2-1/2	102.10	5-1/2	224.16	3@	5.7#	6@	17.25#	12@	31.8#	1 x 1/2 x 1/8	0.84	2 x 9/16 x 3/16	1.86
1/4	10.21	1-1/8	45.94	2-3/4	112.31	6	245.03	3@	7.5#	7@	15.3#	12@	35.0#	1-1/4 x 1/2 x 1/8	1.01	2 x 5/8 x 1/4	2.28
5/16	12.76	1-1/4	51.05	3-1/4	132.73	6-1/2	265.45	4@	7.7#	8@	18.4#	12@	40.8#	1-1/2 x 1/2 x 1/8	1.12	2 x 1 x 1/8	1.59
3/8	15.32	1-3/8	56.15	3-1/2	142.93	7	285.87	4@	9.5#	8@	23.0#	12@	50.0#	1-1/2 x 9/16 x 3/16	1.44	2 x 1 x 3/16	2.37
7/16	17.87	1-1/2	61.26	3-3/4	153.15	7-1/2	306.29	5@	10.0#	10@	25.4#	15@	42.9#	2 x 1/2 x 1/8	1.43		
1/2	20.42	1-5/8	66.36	4	163.35	8	326.71	6@	12.5#	10@	35.0#	15@	50.0#				
9/16	22.97	1-3/4	71.47	4-1/4	173.56	8-1/2	347.13										
5/8	25.52	2	81.68	4-1/2	183.77	9	367.55										
3/4	30.63	2-1/4	91.89	5	204.19	10	408.38										

WIDE FLANGE BEAMS A-36:20'-60' LG		FLATS Hot Rolled (20'); Cold Drawn (12' R/L) HR:A-36 CD: C-1018		JUNIOR CHANNELS "D" Depth of Channel & Wt./Ft. Wt. for 20" Wt. for 30" "WT" Thickness of Web in Inches "FW" Width of Flange in Inches					
4@ 13#	12@ 58#	1/4 x 3/8	0.319	10" x 6.5 lbs.	130	195	0.150	1.125	
5@ 16#	12@ 65#	1/4 x 1/2	0.425	10" x 8.4 lbs.	168	252	0.170	1.500	
5@ 19#	12@ 72#	1/4 x 5/8	0.531	12" x 10.6 lbs.	212	318	0.190	1.500	
		1/4 x 3/4	0.638	12" x 14.3 lbs.	286	429	0.250	2.125	
		1/4 x 7/8	0.744						
		1/4 x 1	0.850	5/16 x 12	12.750	1/2 x 3-1/4	5.530	3/4 x 9	22.950
		1/4 x 1-1/8	0.956	3/8 x 1/2	0.638	1/2 x 3-1/2	5.950	3/4 x 10	25.500
6@ 9#	14@ 22#	1/4 x 1-1/4	1.063	3/8 x 5/8	0.797	1/2 x 3-3/4	6.380	3/4 x 11	28.820
6@ 12#	14@ 26#	1/4 x 1-3/8	1.170	3/8 x 3/4	0.958	1/2 x 4	6.800	3/4 x 12	30.600
6@ 15#	14@ 30#	1/4 x 1-1/2	1.280	3/8 x 7/8	1.120	1/2 x 4-1/2	7.650	7/8 x 1	2.980
6@ 16#	14@ 34#	1/4 x 1-5/8	1.380	3/8 x 1	1.280	1/2 x 5	8.500	7/8 x 1-1/4	3.720
6@ 20#	14@ 38#	1/4 x 1-3/4	1.490	3/8 x 1-1/8	1.430	1/2 x 5-1/2	9.350	7/8 x 1-1/2	4.463
6@ 25#	14@ 43#	1/4 x 2	1.700	3/8 x 1-1/4	1.594	1/2 x 6	10.200	7/8 x 1-3/4	5.210
	14@ 53#	1/4 x 2-1/4	1.913	3/8 x 1-3/8	1.750	1/2 x 7	11.900	7/8 x 2	5.950
	14@ 53#	1/4 x 2-1/2	2.130	3/8 x 1-1/2	1.913	1/2 x 8	13.600	7/8 x 2-1/2	7.440
8@ 10#	14@ 61#	1/4 x 2-3/4	2.340	3/8 x 1-5/8	2.070	1/2 x 9	15.300	7/8 x 3	8.930
8@ 13#	14@ 68#	1/4 x 3	2.550	3/8 x 1-3/4	2.231	1/2 x 10	17.000	7/8 x 4	11.900
8@ 15#	14@ 74#	1/4 x 3-1/4	2.760	3/8 x 2	2.550	1/2 x 11	18.700	7/8 x 5	14.880
8@ 18#	14@ 82#	1/4 x 3-1/2	2.980	3/8 x 2-1/4	2.870	1/2 x 12	20.400	7/8 x 6	17.850
8@ 21#		1/4 x 3-3/4	3.190	3/8 x 2-1/2	3.190	5/8 x 3/4	1.590	7/8 x 7	20.830
8@ 24#	16@ 26#	1/4 x 4	3.400	3/8 x 2-3/4	3.510	5/8 x 1	2.130	7/8 x 8	23.800
8@ 28#	16@ 31#	1/4 x 4-1/4	3.610	3/8 x 3	3.830	5/8 x 1-1/4	2.660	1 x 1-1/8	3.830
8@ 31#	16@ 36#	1/4 x 4-1/2	3.830	3/8 x 3-1/4	4.140	5/8 x 1-1/2	3.190	1 x 1-1/4	4.250
8@ 35#	16@ 40#	1/4 x 5	4.250	3/8 x 3-1/2	4.463	5/8 x 1-3/4	3.720	1 x 1-1/2	5.100
8@ 40#	16@ 45#	1/4 x 5-1/2	4.680	3/8 x 4	5.100	5/8 x 2	4.250	1 x 1-3/4	5.950
8@ 48#	16@ 45#	1/4 x 6	5.100	3/8 x 4-1/2	5.740	5/8 x 2-1/4	4.760	1 x 2	6.800
8@ 53#	16@ 50#	1/4 x 7	5.950	3/8 x 5	6.380	5/8 x 2-1/2	5.313	1 x 2-1/4	7.650
	16@ 58#	1/4 x 8	6.800	3/8 x 5-1/2	7.013	5/8 x 2-3/4	5.884	1 x 2-1/2	8.500
	16@ 67#	1/4 x 9	7.650	3/8 x 6	7.650	5/8 x 3	6.380	1 x 2-3/4	9.350
	16@ 77#	1/4 x 10	8.500	3/8 x 7	8.930	5/8 x 3-1/2	7.440	1 x 3	10.200
	16@ 89#	1/4 x 11	9.350	3/8 x 8	10.200	5/8 x 4	8.500	1 x 3-1/2	11.900
10@ 12#		1/4 x 11-1/2	9.780	3/8 x 9	11.480	5/8 x 4-1/2	9.563	1 x 4	13.600
10@ 15#		1/4 x 12	10.200	3/8 x 10	12.750	5/8 x 5	10.630	1 x 4-1/2	15.300
10@ 17#	18@ 35#	5/16 x 1/2	0.531	3/8 x 11	14.030	5/8 x 5-1/2	11.690	1 x 5	17.000
10@ 19#	18@ 40#	5/16 x 5/8	0.664	3/8 x 12	15.300	5/8 x 6	12.750	1 x 5-1/2	18.700
10@ 22#	18@ 46#	5/16 x 3/4	0.797	7/16 x 1	1.490	5/8 x 7	14.880	1 x 6	20.400
10@ 26#	18@ 50#	5/16 x 7/8	0.930	7/16 x 1-1/2	2.230	5/8 x 8	17.000	1 x 7	23.800
10@ 30#	18@ 55#	5/16 x 1	1.063	7/16 x 2	2.980	5/8 x 9	19.130	1 x 8	27.200
10@ 33#	18@ 60#	5/16 x 1-1/4	1.330	7/16 x 2-1/2	3.720	5/8 x 10	21.250	1 x 9	30.500
10@ 39#	18@ 71#	5/16 x 1-1/2	1.594	7/16 x 3	4.460	5/8 x 11	23.380	1 x 10	34.000
10@ 45#	18@ 76#	5/16 x 1-3/4	1.860	7/16 x 3-1/2	5.210	5/8 x 12	25.500	1 x 11	37.400
10@ 49#	18@ 86#	5/16 x 2	2.130	7/16 x 4	5.950	3/4 x 1	2.550	1 x 12	40.800
10@ 54#	18@ 97#	5/16 x 2-1/4	2.391	7/16 x 5	7.440	3/4 x 1-1/4	3.190	1-1/8 x 1-1/2	5.740
10@ 60#		5/16 x 2-1/2	2.660	7/16 x 6	8.930	3/4 x 1-1/2	3.830	1-1/8 x 2	7.650
		5/16 x 2-3/4	2.920	1/2 x 5/8	1.060	3/4 x 1-3/4	4.463	1-1/8 x 3	11.480
		5/16 x 3	3.190	1/2 x 3/4	1.280	3/4 x 2	5.100	1-1/8 x 4	15.300
		5/16 x 3-1/4	3.450	1/2 x 7/8	1.490	3/4 x 2-1/4	5.740	1-1/8 x 6	22.950
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		5/16 x 4	4.250	1/2 x 1-1/8	1.910	3/4 x 2-3/4	7.013	1-1/4 x 1-1/2	6.380
		5/16 x 4-1/2	4.780	1/2 x 1-1/4	2.130	3/4 x 3	7.650	1-1/4 x 1-3/4	7.440
		5/16 x 5	5.313	1/2 x 1-3/8	2.340	3/4 x 3-1/4	8.290	1-1/4 x 2	8.500
		5/16 x 5-1/2	5.840	1/2 x 1-1/2	2.550	3/4 x 3-1/2	8.930	1-1/4 x 2-1/2	9.560
		5/16 x 6	6.380	1/2 x 1-5/8	2.760	3/4 x 4	10.200	1-1/4 x 2-1/2	10.630
		5/16 x 7	7.440	1/2 x 1-3/4	2.980	3/4 x 4-1/2	11.480	1-1/4 x 3	12.750
		5/16 x 8	8.500	1/2 x 2	3.400	3/4 x 5	12.750	1-1/4 x 3-1/2	14.880
		5/16 x 9	9.560	1/2 x 2-1/4	3.830	3/4 x 5-1/2	14.030	1-1/4 x 4	17.000
		5/16 x 10	10.630	1/2 x 2-1/2	4.250	3/4 x 6	15.300	1-1/4 x 4-1/2	19.130
		5/16 x 11	11.890	1/2 x 2-3/4	4.680	3/4 x 7	17.850	1-1/4 x 5	21.250
				1/2 x 3	5.100	3/4 x 8	20.400	1-1/4 x 5-1/2	23.380

SPECIFICATIONS FOR STEEL PIPE

Published pipe standards serve three functions.

1. They dictate manufacturing and testing requirements and prescribed methods of measuring the required mechanical and physical properties.
2. Without specifications, it would be difficult for the pipe buyer to establish a common ground of understanding with the producer as to product requirements.
3. When the pipe producer marks a specification on this product they warrant that the pipe is made from prime quality steel and meets all the requirements of the specification.

Standard pipe is manufactured and tested as prescribed by ASTM (formerly American Society for Testing Materials), an international, non-profit technical and Scientific organization formed for "the consensus development of standards on characteristics and performance of materials, products, systems and services." The society operates through more than 127 main technical committees. These committees function under regulations that ensure balanced representation among producers, users and general interest groups. The published standards, therefore, represent the consensus viewpoint of all involved. Line pipe and Oil Country products are manufactured and tested as prescribed by the American Petroleum Institute (API). The API operates similarly to the ASTM except that producers, consumers, and associations with primary interests in oil or gas are involved.

GRADE

Grade refers to divisions within different types of seamless and ERW pipe and designates mechanical properties such as minimum yield and tensile strengths. Grade B has higher tensile and yield strength than Grade A. It is manufactured to higher carbon content steel. Grade A, being a softer steel, is easier to bend and is recommended for use in close coiling and cold bending. Grade B has higher stress values and is better suited for machining operations. Grade C, which is available in ASTM-106, has higher tensile and yield strength than Grades A & B.

DIMENSIONS

Many changes have been made to ASTM specifications over the years. One of the more recent has been to make the specifications fit with metric, and more correctly, with the measurements of pipe and the related fittings.

To change the pipe outside diameter (OD) and wall thickness, simply multiply the SI dimensions by the appropriate factor to convert to metric. However, an inch is not a real inch. Nowhere on pipe 12" and smaller is there a corresponding measurement because this size has no real numerical value.

To solve this problem and still retain the intent of the size designation, the inch mark was removed from the column showing the size, and the term NPS was added as were the following words: The dimensionless designator NPS (nominal pipe size) has been substituted in this standard for such traditional terms as "nominal diameter," "size," and "nominal size." They are now stated as NPS 1, NPS 2, NPS 6, NPS 12, NPS 14, etc.

WARNING

Most pipe specifications are restricted by tolerances for outside diameter, wall thickness, and weight. Pipe must meet all three criteria or material could be rejected. Please refer to the applicable specifications.

DIGEST OF COMMON - PIPE SPECIFICATIONS

Specification and Size Range Where Indicated	Scope	Type	Grades	Chemistry																																																																																																																					
A-120 (has been withdrawn) NPS 1/8 - 16	Blk & Galv Welded & SMLS pipe for ordinary use - not Intended for close coiling bending or high temperature service	CW ERW SMLS	None Specified	None Specified																																																																																																																					
A-53 NPS 1/8 - 26	Blk & Galv Welded & SMLS pipe suitable for welding and forming operations CW not intended for flanging. Grade B not intended for close coiling or severe cold forming. Pipe required for close coiling should be specified on order.	CW - Type F ERW - Type E SMLS - Type S	CW - Type F ERW & SMLS Grade A & B	<p style="text-align: center;">Composition, max %</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>C</th> <th>Mg</th> <th>P</th> <th>S</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center;">Type S (seamless pipe)</td> </tr> <tr> <td colspan="5">Open-health, electric-furnace or basic-oxygen:</td> </tr> <tr> <td>Grade A</td> <td>0.25</td> <td>.095</td> <td>0.05</td> <td>0.045</td> </tr> <tr> <td>Grade B</td> <td>0.30</td> <td>1.20</td> <td>0.05</td> <td>0.045</td> </tr> <tr> <td colspan="5" style="text-align: center;">Type E (electric resistance welded)</td> </tr> <tr> <td colspan="5">Open-health, electric-furnace or basic-oxygen:</td> </tr> <tr> <td>Grade A</td> <td>0.25</td> <td>.095</td> <td>0.05</td> <td>0.045</td> </tr> <tr> <td>Grade B</td> <td>0.30</td> <td>1.20</td> <td>0.05</td> <td>0.045</td> </tr> <tr> <td colspan="5" style="text-align: center;">Type F (furnace welded pipe)</td> </tr> <tr> <td colspan="5">Open-health, electric-furnace or basic-oxygen:</td> </tr> <tr> <td></td> <td>0.30</td> <td>1.20</td> <td>0.05</td> <td>0.045</td> </tr> </tbody> </table> <p style="text-align: center;">Ladle and Check Limits</p>		C	Mg	P	S	Type S (seamless pipe)					Open-health, electric-furnace or basic-oxygen:					Grade A	0.25	.095	0.05	0.045	Grade B	0.30	1.20	0.05	0.045	Type E (electric resistance welded)					Open-health, electric-furnace or basic-oxygen:					Grade A	0.25	.095	0.05	0.045	Grade B	0.30	1.20	0.05	0.045	Type F (furnace welded pipe)					Open-health, electric-furnace or basic-oxygen:						0.30	1.20	0.05	0.045																																																									
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A-106 NPS 1/8 - 26	SMLS for high temperature service. Suitable for bending, flanging, and similar forming operations.	SMLS Only	Grades A, B & C	<p style="text-align: center;">Composition, max %</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Element*</th> <th>Grade A</th> <th>Grade B</th> <th>Grade C</th> </tr> </thead> <tbody> <tr> <td>Chrome</td> <td>0.40</td> <td>0.40</td> <td>0.40</td> </tr> <tr> <td>Copper</td> <td>0.40</td> <td>0.40</td> <td>0.40</td> </tr> <tr> <td>Molybdenum</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> </tr> <tr> <td>Nickel</td> <td>0.40</td> <td>0.40</td> <td>0.40</td> </tr> <tr> <td>Vanadium</td> <td>0.08</td> <td>0.08</td> <td>0.08</td> </tr> </tbody> </table> <p>*These five elements combined shall not exceed 1%.</p>	Element*	Grade A	Grade B	Grade C	Chrome	0.40	0.40	0.40	Copper	0.40	0.40	0.40	Molybdenum	0.15	0.15	0.15	Nickel	0.40	0.40	0.40	Vanadium	0.08	0.08	0.08																																																																																													
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A-135 NPS 2-30	Electric resistance welded for conveying fluid, gas or vapor.	ERW Only	Grades A & B	<p style="text-align: center;">% max</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Element</th> <th>Grade A</th> <th>Grade B</th> </tr> </thead> <tbody> <tr> <td>Carbon</td> <td>0.25</td> <td>0.30</td> </tr> <tr> <td>Manganese</td> <td>0.95</td> <td>1.20</td> </tr> <tr> <td>Phosphorus</td> <td>0.035</td> <td>0.035</td> </tr> <tr> <td>Sulfur</td> <td>0.035</td> <td>0.035</td> </tr> </tbody> </table> <p style="text-align: center;">Ladle and check limits</p>	Element	Grade A	Grade B	Carbon	0.25	0.30	Manganese	0.95	1.20	Phosphorus	0.035	0.035	Sulfur	0.035	0.035																																																																																																						
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A-252 NPS 6 - 24	ERW or SMLS for Pipe Piles	ERW SMLS DSAW	Grades 1, 2, 3	<p style="text-align: center;">All grades .05 Max. % Phos.</p> <p style="text-align: center;">Ladle & check limits</p>																																																																																																																					
A-333	SMLS & Welded Carbon & Alloy Steel pipe for low temperature service	SMLS ERW	1, 3, 4, 6, 7, 8, 9	<p style="text-align: center;">% max</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>GR</th> <th>C</th> <th>MN</th> <th>P</th> <th>S</th> <th>Si</th> <th>Ni</th> <th>CR</th> <th>CU</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>.30</td> <td>.40-1.05</td> <td>.025</td> <td>.025</td> <td>.18 - .37</td> <td>3.18-3.82</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>.19</td> <td>.31 - .64</td> <td>.025</td> <td>.025</td> <td>.08 - .37</td> <td>.47 - .98</td> <td>44 - 1.01</td> <td>40 - .75 .04 - .30</td> </tr> <tr> <td>4</td> <td>.12</td> <td>.50-1.05</td> <td>.025</td> <td>.025</td> <td>.10min</td> <td></td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>.30</td> <td>.29-1.06</td> <td>.025</td> <td>.025</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>.10</td> <td>.90 max</td> <td>.025</td> <td>.025</td> <td>.13 - .32</td> <td>2.03-2.57</td> <td></td> <td></td> </tr> <tr> <td>8</td> <td>.13</td> <td>.90 max</td> <td>.025</td> <td>.025</td> <td>.13 - .32</td> <td>8.40 - 9.60</td> <td></td> <td></td> </tr> <tr> <td>9</td> <td>.20</td> <td>.40 - 1.05</td> <td>.025</td> <td>.025</td> <td></td> <td>1.80-2.24</td> <td>.75 - 1.25</td> <td></td> </tr> <tr> <td>10</td> <td>.20</td> <td>1.15-1.50</td> <td>.035</td> <td>.018</td> <td>.10 - .36</td> <td>.25 max</td> <td>.15 max</td> <td>.06 max</td> </tr> <tr> <td>11</td> <td>.10</td> <td>0.90 max</td> <td>.025</td> <td>.025</td> <td>0.36 max</td> <td>35.0-37.0</td> <td>.50 max</td> <td></td> </tr> </tbody> </table>	GR	C	MN	P	S	Si	Ni	CR	CU	1	.30	.40-1.05	.025	.025	.18 - .37	3.18-3.82			3	.19	.31 - .64	.025	.025	.08 - .37	.47 - .98	44 - 1.01	40 - .75 .04 - .30	4	.12	.50-1.05	.025	.025	.10min				6	.30	.29-1.06	.025	.025					7	.10	.90 max	.025	.025	.13 - .32	2.03-2.57			8	.13	.90 max	.025	.025	.13 - .32	8.40 - 9.60			9	.20	.40 - 1.05	.025	.025		1.80-2.24	.75 - 1.25		10	.20	1.15-1.50	.035	.018	.10 - .36	.25 max	.15 max	.06 max	11	.10	0.90 max	.025	.025	0.36 max	35.0-37.0	.50 max																												
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A-335 NPS 1/8 - 26	SMLS Alloy Steel Pipe for high temperature service	SMLS Only	P1, P2, P5, P5b, P5c, P9, P11, P12, P15, P21, P22, P91	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Grade</th> <th>UNS Des.</th> <th>C</th> <th>Mg</th> <th>P max</th> <th>S max</th> <th>Si</th> <th>Cr</th> <th>Mo</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>K11522</td> <td>.10-20</td> <td>.30-80</td> <td>.025</td> <td>.025</td> <td>.10-50</td> <td></td> <td>.44-65</td> </tr> <tr> <td>P2</td> <td>K11547</td> <td>.10-20</td> <td>.30-61</td> <td>.025</td> <td>.025</td> <td>.10-30</td> <td>5-81</td> <td>.44-65</td> </tr> <tr> <td>P5</td> <td>K41545</td> <td>.15max</td> <td>.30-80</td> <td>.025</td> <td>.025</td> <td>50max</td> <td>46</td> <td>.45-65</td> </tr> <tr> <td>P5b</td> <td>K51545</td> <td>.15max</td> <td>.30-80</td> <td>.025</td> <td>.025</td> <td>1.00-2.00</td> <td>46</td> <td>.45-65</td> </tr> <tr> <td>P5c</td> <td>K41246</td> <td>.12max</td> <td>.30-80</td> <td>.025</td> <td>.025</td> <td>50max</td> <td>46</td> <td>.45-65</td> </tr> <tr> <td>P9</td> <td>S50400</td> <td>.15max</td> <td>.30-80</td> <td>.025</td> <td>.025</td> <td>25-1.00</td> <td>8-10</td> <td>.80-1.10</td> </tr> <tr> <td>P11</td> <td>K11507</td> <td>.05-15</td> <td>.30-80</td> <td>.025</td> <td>.025</td> <td>50-1.00</td> <td>1-1.5</td> <td>.44-65</td> </tr> <tr> <td>P12</td> <td>K11582</td> <td>.05-15</td> <td>.30-80</td> <td>.025</td> <td>.025</td> <td>50max</td> <td>80-125</td> <td>.44-65</td> </tr> <tr> <td>P15</td> <td>K11578</td> <td>.05-15</td> <td>.30-80</td> <td>.025</td> <td>.025</td> <td>1.15-1.65</td> <td></td> <td>.44-65</td> </tr> <tr> <td>P21</td> <td>K31545</td> <td>.05-15</td> <td>.30-80</td> <td>.025</td> <td>.025</td> <td>50max</td> <td>265-335</td> <td>.80-1.06</td> </tr> <tr> <td>P22</td> <td>K21580</td> <td>.05-15</td> <td>.30-80</td> <td>.025</td> <td>.025</td> <td>50max</td> <td>1.9-2.5</td> <td>.87-1.13</td> </tr> <tr> <td>P91</td> <td>K91580</td> <td>.08-12</td> <td>.30-80</td> <td>.020</td> <td>.010</td> <td>20-50</td> <td>8-9.5</td> <td>.85-1.05</td> </tr> </tbody> </table> <p>a. New designation established in accordance with Practice E-527 and SAE J1086. Practice for Numbering Metals and Alloys (UNS). b. Grade P5c shall have a titanium content of not less than 4 times the carbon content and not more than 0.70% or a columbium content of 8 to 10 times the carbon content.</p>	Grade	UNS Des.	C	Mg	P max	S max	Si	Cr	Mo	P1	K11522	.10-20	.30-80	.025	.025	.10-50		.44-65	P2	K11547	.10-20	.30-61	.025	.025	.10-30	5-81	.44-65	P5	K41545	.15max	.30-80	.025	.025	50max	46	.45-65	P5b	K51545	.15max	.30-80	.025	.025	1.00-2.00	46	.45-65	P5c	K41246	.12max	.30-80	.025	.025	50max	46	.45-65	P9	S50400	.15max	.30-80	.025	.025	25-1.00	8-10	.80-1.10	P11	K11507	.05-15	.30-80	.025	.025	50-1.00	1-1.5	.44-65	P12	K11582	.05-15	.30-80	.025	.025	50max	80-125	.44-65	P15	K11578	.05-15	.30-80	.025	.025	1.15-1.65		.44-65	P21	K31545	.05-15	.30-80	.025	.025	50max	265-335	.80-1.06	P22	K21580	.05-15	.30-80	.025	.025	50max	1.9-2.5	.87-1.13	P91	K91580	.08-12	.30-80	.020	.010	20-50	8-9.5	.85-1.05
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A-501 Square & Rectangular 1" - 10" Round 1" - 24"	Hot Formed Welded & SMLS Round, Square & Rectangular Tubing	SMLS Welded	None Specified	<p style="text-align: center;">Composition %</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Element</th> <th>Heat Analysis</th> <th>Product Analysis</th> </tr> </thead> <tbody> <tr> <td>Carbon, max.</td> <td>0.26</td> <td>0.30</td> </tr> <tr> <td>Phosphorus, max.</td> <td>0.035</td> <td>0.045</td> </tr> <tr> <td>Sulfur, max.</td> <td>0.035</td> <td>0.045</td> </tr> <tr> <td>Copper, min.*</td> <td>0.20</td> <td>0.18</td> </tr> </tbody> </table> <p>*When copper steel is specified</p>	Element	Heat Analysis	Product Analysis	Carbon, max.	0.26	0.30	Phosphorus, max.	0.035	0.045	Sulfur, max.	0.035	0.045	Copper, min.*	0.20	0.18																																																																																																						
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A-587 NPS 1/2" - 10"	EW Pipe for process lines suitable for severe forming involving flanging and close bending	ERW Only	None Specified	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="4">% MAX.</th> <th>% MIN.</th> </tr> <tr> <th>C</th> <th>MN</th> <th>P</th> <th>S</th> <th>AL</th> </tr> </thead> <tbody> <tr> <td>.15</td> <td>.27-.63</td> <td>.035</td> <td>.035</td> <td>.02-.11</td> </tr> </tbody> </table>	% MAX.				% MIN.	C	MN	P	S	AL	.15	.27-.63	.035	.035	.02-.11																																																																																																						
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A-589 Type 1 NPS 6-16	SMLS & Welded Water Pipe Type 1 Drive Pipe	Type 1 SMLS or Welded	Type 1 A or B	<p style="text-align: center;">% MAX.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>P</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>.050</td> <td>.060</td> </tr> </tbody> </table>	P	S	.050	.060																																																																																																																	
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DIGEST OF COMMON - PIPE SPECIFICATIONS

Specification and Size Range Where Indicated	Tensiles	Hydrostatic	Tests Bend	Flattening	Wall Tolerance	OD Tolerance																																	
A-120 (has been withdrawn) NPS 1/8 - 16	None Specified	yes	None Specified	None Specified	Min. wall shall not be more than 12.5% under nominal wall	1/2" - 1-1/2" + 1/64" -1/32" 2" & over +/- 1% of OD																																	
A-53 NPS 1/8 - 26	<table border="1"> <thead> <tr> <th colspan="3">MIN. P.S.I.</th> </tr> <tr> <th>Grade</th> <th>Yield</th> <th>Tensile</th> </tr> </thead> <tbody> <tr> <td>CW</td> <td>25,000</td> <td>45,000</td> </tr> <tr> <td>GR-A</td> <td>30,000</td> <td>48,000</td> </tr> <tr> <td>GR-B</td> <td>35,000</td> <td>60,000</td> </tr> </tbody> </table>	MIN. P.S.I.			Grade	Yield	Tensile	CW	25,000	45,000	GR-A	30,000	48,000	GR-B	35,000	60,000	yes	yes - 2" & under Std. & XHY 90° to 12 times nom. diameter. Close coiling 180° to 8 times nom. dia.	yes - over 2" nom. XHY & lighter. CW 90° to 75% ODv	Min. wall shall not be more than 12.5% under nominal wall	1/2" - 1-1/2" + 1/64" -1/32" 2" & over +/- 1% of OD																		
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A-501 Square & Rectangular 1" - 10" Round 1" - 24"	<table border="1"> <thead> <tr> <th colspan="3">MIN. P.S.I.</th> </tr> <tr> <th>Yield</th> <th colspan="2">Tensile</th> </tr> </thead> <tbody> <tr> <td>36,000</td> <td colspan="2">58,000</td> </tr> </tbody> </table>	MIN. P.S.I.			Yield	Tensile		36,000	58,000		None Specified	Round None Shapes Yes	None Specified	None Specified Weight shall not be less than specified by more than 3.5%. Surface defect no more than 15%	Round: 1-1/2" & under + 1/65" - 1/32" 2" & over +/- 1% of OD Shapes: 2-1/2" & under +/- .020 2-1/2" - 3-1/2" +/- .025 3-1/2" - 5-1/2" +/- .030 5-1/2" & over +/- 1%																								
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A-587 NPS 1/2" - 10"	<table border="1"> <thead> <tr> <th colspan="3">MIN. P.S.I.</th> </tr> <tr> <th>Yield</th> <th colspan="2">Tensile</th> </tr> </thead> <tbody> <tr> <td>30,000</td> <td colspan="2">48,000</td> </tr> </tbody> </table>	MIN. P.S.I.			Yield	Tensile		30,000	48,000		None Specified Nondestructive test shall be made	None Specified A flange test shall be made	yes - for all sizes	Refer to table 4 ASTM Standards for A-587	Refer to table 4 ASTM Standards for A-587																								
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A-589 Type 1 NPS 6-16	<table border="1"> <thead> <tr> <th colspan="3">MIN. P.S.I.</th> </tr> <tr> <th>Grade</th> <th>Yield</th> <th>Tensile</th> </tr> </thead> <tbody> <tr> <td>CW</td> <td>25,000</td> <td>45,000</td> </tr> <tr> <td>A</td> <td>30,000</td> <td>48,000</td> </tr> <tr> <td>B</td> <td>35,000</td> <td>60,000</td> </tr> </tbody> </table>	MIN. P.S.I.			Grade	Yield	Tensile	CW	25,000	45,000	A	30,000	48,000	B	35,000	60,000	yes	None Specified	None Specified	Min. wall shall not be more than 12.5% nominal wall	1-1/2" & under + 1/64" - 1/32" 2" & over +/- 1% of OD																		
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DIGEST OF COMMON - PIPE SPECIFICATIONS (cont.)

Specification and Size Range Where Indicated	Scope	Type	Grades	Chemistry																																																																																				
Type II NPS 1-12	Type II Water well reamed and drifted	Type II SMLS, ERW or CW	Type II A or CW	<table border="1"> <thead> <tr> <th colspan="2">% MAX.</th> </tr> <tr> <th>P</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>.050</td> <td>.060</td> </tr> </tbody> </table>	% MAX.		P	S	.050	.060																																																																														
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Type III NPS 1-2	Type III Driven well pipe	Type III SMLS, ERW or CW	Type III A or CW																																																																																					
Type IV NPS 3-8	Type IV Water well casing	Type IV SMLS, ERW or CW	Type IV A or CW																																																																																					
API 5L	Welded and SMLS Line pipe	CW, ERW, SMLS DSAW	CW Grade 25 DSAW ERW & SMLS Grades A & B	<table border="1"> <thead> <tr> <th colspan="5">Ladle % Max</th> </tr> <tr> <th>GR</th> <th>C</th> <th>MN</th> <th>P</th> <th>S</th> </tr> </thead> <tbody> <tr> <td>A-25 SMLS</td> <td>.21</td> <td>.60</td> <td>.08</td> <td>.06</td> </tr> <tr> <td>A</td> <td>.22</td> <td>.90</td> <td>.04</td> <td>.05</td> </tr> <tr> <td>B</td> <td>.27</td> <td>1.15</td> <td>.04</td> <td>.05</td> </tr> <tr> <td>ERW</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>A</td> <td>.21</td> <td>.90</td> <td>.04</td> <td>.05</td> </tr> <tr> <td>B</td> <td>.26</td> <td>1.15</td> <td>.04</td> <td>.05</td> </tr> </tbody> </table>	Ladle % Max					GR	C	MN	P	S	A-25 SMLS	.21	.60	.08	.06	A	.22	.90	.04	.05	B	.27	1.15	.04	.05	ERW					A	.21	.90	.04	.05	B	.26	1.15	.04	.05																																												
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API 5LX	Welded and SMLS High test line pipe	ERW & SMLS DSAW	X-42 X-46 X-52 X-60 X-65 X-70 X-80	<table border="1"> <thead> <tr> <th colspan="5">Ladle % Max</th> <th colspan="2">% Min</th> </tr> <tr> <th>GR</th> <th>C</th> <th>MN</th> <th>P</th> <th>S</th> <th>CB</th> <th>V</th> </tr> </thead> <tbody> <tr> <td>SMLS</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-42</td> <td>.29</td> <td>1.25</td> <td>.04</td> <td>.05</td> <td></td> <td></td> </tr> <tr> <td>X-46</td> <td>.31</td> <td>1.35</td> <td>.04</td> <td>.05</td> <td></td> <td></td> </tr> <tr> <td>X-52</td> <td>.31</td> <td>1.35</td> <td>.04</td> <td>.05</td> <td></td> <td></td> </tr> <tr> <td>X-60</td> <td>.26</td> <td>1.35</td> <td>.04</td> <td>.05</td> <td></td> <td>.02</td> </tr> <tr> <td>ERW</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-42</td> <td>.28</td> <td>1.25</td> <td>.04</td> <td>.05</td> <td></td> <td></td> </tr> <tr> <td>X-46</td> <td>.30</td> <td>1.35</td> <td>.04</td> <td>.05</td> <td></td> <td></td> </tr> <tr> <td>X-52</td> <td>.30</td> <td>1.35</td> <td>.04</td> <td>.05</td> <td></td> <td></td> </tr> <tr> <td>X-60</td> <td>.26</td> <td>1.35</td> <td>.04</td> <td>.05</td> <td>.005</td> <td></td> </tr> </tbody> </table>	Ladle % Max					% Min		GR	C	MN	P	S	CB	V	SMLS							X-42	.29	1.25	.04	.05			X-46	.31	1.35	.04	.05			X-52	.31	1.35	.04	.05			X-60	.26	1.35	.04	.05		.02	ERW							X-42	.28	1.25	.04	.05			X-46	.30	1.35	.04	.05			X-52	.30	1.35	.04	.05			X-60	.26	1.35	.04	.05	.005	
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Federal WWP-406	Comparable to A-120 (has been withdrawn)																																																																																							
Federal WWP-404	Comparable to A-53																																																																																							

ASTM & API SPECIFICATIONS WITH COMPARABLE ANSI DESIGNATIONS

ASTM OR API DESIGNATIONS	ANSI DESIGNATIONS		TITLE
	CURRENT	REPLACED	
ASTM A-53	B-125.1	B-36.1	Welded & Seamless pipe
ASTM A-106	B-125.30	B-36.3	Seamless carbon steel pipe for high temperature service
ASTM A-120*	B-125-2	B-36.20	Black & galvanized and seamless steel pipe for ordinary uses
ASTM A-134	B-125.55	B-36.4	Electric-fusion (Arc) welded steel plate pipe (sizes 16" & over)
ASTM A-135	B-125.3	B-36.5	Electric resistance welded pipe
ASTM A-139	B-125.31	B-36.9	Electric-fusion (Arc) welded steel plate pipe (sizes 4" & over)
ASTM A-155	B-125.4	B-36.11	Electric fusion welded steel pipe for high temperature service
ASTM A-211	B-125.56	B-36.16	"Insert discontinued 1994"
ASTM A-312	B-125.16	B-36.26	Seamless and welded austenitic stainless steel pipe
ASTM A-333	B-125.17	B-36.40	Seamless and welded steel pipe for low temperature service
ASTM A-335	B-124.24	B-36.42	Seamless ferritic alloy steel pipe for high temperature service

* has been withdrawn

DIGEST OF COMMON - PIPE SPECIFICATIONS

Specification and Size Range Where Indicated	Tensiles	Hydrostatic	Tests Bend	Flattening	Wall Tolerance	OD Tolerance	
Type II NPS 1-12	MIN. P.S.I.		yes	None Specified	None Specified	Min. wall shall not be more than 12.5% under nominal wall	
	Grade	Yield					Tensile
	CW	25,000					45,000
	A	30,000					48,000
	B	35,000	60,000				
Type III NPS 1-2	MIN. P.S.I.		yes	yes-for A-25 pipe 2-3/8 & smaller	yes	2-7/8" & smaller + 20% - 12.5%	
	Grade	Yield					Tensile
	A-25	25,000					45,000
	A	30,000					48,000
Type IV NPS 3-8						1.900 & under + .016" - .031"	
						2-3/8" - 4" OD +/- 1%	
API 5L						4-1/2" & over +/- .75%	
API 5LX	MIN. P.S.I.		yes	None Specified	yes - for ERW	+ 15% - 12.5%	
	Grade	Yield					Tensile
	X-42	42,000					60,000
	X-46	46,000					63,000
	X-52	52,000					66,000
	X-60	60,000	75,000			+/- .75%	
Federal WWP-406	Comparable to A-120						
Federal WWP-404	Comparable to A-53						

ASTM & API SPECIFICATIONS WITH COMPARABLE ANSI DESIGNATIONS

ASTM A-358	B-125.57	B-36.47	Electric fusion welded austenitic chromium-nickel alloy steel pipe for high temperature service
ASTM A-369	B-125.77	B-36.48	Carbon & ferritic alloy steel forged and bored pipe for high temperature service
ASTM A-376	B-125-25	B-36.43	Seamless austenitic steel pipe for high temperature temperature central station service
ASTM A-381	B-125.25	B-36.49	Metal arc welded steel pipe for high pressure transmission systems
ASTM A-405	B-125.26	B-36.44	Seamless ferritic alloy steel pipe specially heat treated for high temperature service
ASTM A-523	G-62.5		Plain end seamless & ERW steel pipe for high pressure pipe type cable circuits
ASTM A-524	B-125.37	B-36.56	Seamless C.S. pipe for process piping
ASTM A-530	B-125.20	B-36.57	General requirements for specialized carbon and alloy steel pipe
API 5L			Line pipe
API 5LX			High test line pipe
API 5LS			Spiral weld line pipe

FEDERAL

WWP-404c is similar to ASTM A-53 except that Government inspection and continuous identification marking of electric weld and seamless is mandatory. It covers black and galvanized welded and seamless pipe for flanging, bending, and coiling and for use with fresh water, oil, steam, air, and gas on shore plus a limited number of shipboard uses. Sizes 1/8 inch through 24 inch. WWP-406c is a federal specification comparable to ASTM A-120 (withdrawn 1988). Mills can certify that A-120 pipe in a distributor's stock meets all the requirements of WWP-406c.

A.W.W.A.

C-200 covers black welded and seamless pipe intended for the conveyance of water in sizes 6 inch and larger. Specification prescribes hydrostatic test pressures for sizes of pipe covered. Tensile, flattening, and bending tests are required.

ASME

B31.1 Code for pressure piping. Prescribes minimum requirements for design, manufacture, test, and installations of power piping systems for steam generating plants, central heating plants, and industrial plants.

B31.2 Fuel Gas Piping.

B31.3 Petroleum Refinery Piping.

B31.4 Liquid Petroleum Transportation Piping Systems.

B31.5 Refrigeration Piping.

B31.7 Nuclear Power Piping

B31.8 Gas Transmission and Distributing Piping Systems. Covers design, fabrication, installation, inspection, testing, and the safety aspects of operation and maintenance of gas transmission and distribution systems.

ANSI (ASME)

B36.10 American Standard for Wrought-Steel and Wrought-Iron pipe. Designates dimensions, weights, and schedule numbers for welded and seamless pipe. Schedules 10 through Schedules Double Extra Heavy (DXH/XXH).

B36.19 American Standard for Stainless Steel Pipe. Designates dimensions, weights, and schedule numbers for welded and seamless Stainless Steel Pipe, Schedules 5 through Schedules 80.

A.A.R.

M-111 covers black and galvanized welded and seamless pipe intended for coiling, bending, flanging, and other special purposes; and is suitable for welding. Purpose for which pipe is intended should be stated on orders. M-111 is comparable in most requirements to ASTM A-53.

M-130 covers black and galvanized welded and seamless pipe for ordinary uses in steam, water, gas, and air lines. Sizes 1/8 inch through 12 inch. Pipe to this specification is not intended for close coiling, bending, or high temperature service. M-130 is comparable in most requirements to ASTM A-120.