

## AISI-SAE CLASSIFICATIONS OF STEELS

### Base Metals Code Designations and Filler Metal Classifications as per AISI, SAE, ASME and CSA

AISI American Iron and Steel Institute  
 SAE Society of Automotive Engineers  
 ASME American Society of Mechanical Engineers  
 CSA Canadian Standards Association

### AISI-SAE Classification of Steels

Classifications	Specifications
Carbon steels	10XX
Carbon steels, resulfurized	11XX
Carbon steels, resulfurized and rephosphorized	12XX
Manganese steels	13XX
Nickel steels	2XXX
Nickel steels 3.50% Ni	23XX
Nickel steels 5.0% Ni	25XX
Nickel chromium steels	3XXX
Ni-Cr steels 0.7% Ni, 0.7% Cr	30XX
Ni-Cr steels 1.25% Ni, 0.6% Cr	31XX
Ni-Cr steels 1.75% Ni, 1.0% Cr	32XX
Ni-Cr steels 3.50% Ni, 1.50% Cr	33XX
Carbon-molybdenum steels	40XX
Chromium-molybdenum steels	41XX
Chromium-nickel-molybdenum steels	43XX
Nickel-moly steels 1.65% Ni, 0.25% Mo	46XX
Nickel-moly steels 3.25% Ni, 0.25% Mo	48XX
Low chromium steels	50XX
Medium chromium steels	51XX
Carbon-chromium steels	52XX
Chromium-vandium steels	61X
Low Ni-Cr-Moly steels 0.20% Mo	86XX
Low Ni-Cr-Moly steels, 0.25% Mo	87XX
Silicon-Manganese Spring steels	92X
Silicon-Manganese-Cr Spring steels	93XX

Note: First figure indicates the major class of steel.  
 Second figure indicates a sub-division of the major class  
 And the percentage of the major alloying elements.  
 This is true of many of the alloy steels. The third and  
 Fourth figures are most important for welding because they  
 indicate carbon in hundredths of a percent.

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## AISI-SAE Standard carbon steels

Free-Machining Grades					
AISI No.	Composition *, %				SAE No.
	C	Mn	P	S	
Resulfurized					
1108	0.08 to 0.13	0.50 to 0.80	0.040 max	0.08 to 0.13	1108
1109	0.08 to 0.13	0.60 to 0.90	0.040 max	0.08 to 0.13	1109
1110	0.08 to 0.13	0.30 to 0.60	0.040 max	0.08 to 0.13	1110
1116	0.14 to 0.20	1.10 to 1.40	0.040 max	0.16 to 0.23	1116
1117	0.14 to 0.20	1.00 to 1.30	0.040 max	0.08 to 0.13	1117
1118	0.14 to 0.20	1.30 to 1.60	0.040 max	0.08 to 0.13	1118
1119	0.14 to 0.20	1.0 to 1.30	0.040 max	0.24 to 0.33	1119
1132	0.27 to 0.34	1.35 to 1.65	0.040 max	0.08 to 0.13	1132
1137	0.32 to 0.39	1.35 to 1.65	0.040 max	0.08 to 0.13	1137
1139	0.35 to 0.43	1.35 to 1.65	0.040 max	0.13 to 0.20	1139
1140	0.37 to 0.44	0.70 to 1.00	0.040 max	0.08 to 0.13	1140
1141	0.37 to 0.45	1.35 to 1.65	0.040 max	0.08 to 0.13	1141
1144	0.40 to 0.48	1.35 to 1.65	0.040 max	0.24 to 0.33	1144
1145	0.42 to 0.49	0.70 to 1.00	0.040 max	0.04 to 0.07	1145
1146	0.42 to 0.49	0.70 to 1.00	0.040 max	0.08 to 0.13	1146
1151	0.48 to 0.55	0.70 to 1.00	0.040 max	0.08 to 0.13	1151
Resulfurized and rephosphorized					
1211	0.13 max	0.60 to 0.90	0.07 to 0.12	0.10 to 0.15	1211
1212	0.13 max	0.70 to 1.00	0.07 to 0.12	0.16 to 0.23	1212
1213	0.13 max	0.70 to 1.00	0.07 to 0.12	0.24 to 0.33	1213
1215	0.09 max	0.75 to 1.05	0.04 to 0.09	0.26 to 0.35	1215
12L 14++	0.15 max	0.85 to 1.15	0.04 to 0.09	0.26 to 0.35	12L14

- Copper can be added to a standard steel.

‡ 0.15 to 0.35%Pb. When lead is required as an added element to a standard steel, a range of 0.15 to 0.35%, inclusive, is generally used. Such a steel is identified by inserting the letter "L" between the second and third numeral of the AISI number.

Sources: American Iron & Steel Institute, New York; SAE Standard J403f. Reprinted with permission.

## AISI-SAE Standard carbon Steels

Nonresulfurized Grades					
AISI No.	Composition *, %				SAE No.
	C	Mn	P Max	S Max	
1005	0.06 max	0.35 max	0.040	0.050	1005
1005	0.08 max	0.25 to 0.40	0.040	0.050	1005
1008	0.10 max	0.30 to 0.50	0.040	0.050	1008
1010	0.08 to 0.13	0.25 to 0.40	0.040	0.050	1010
1011	0.08 to 0.13	0.30 to 0.50	0.040	0.050	1011
1012	0.10 to 0.15	0.30 to 0.60	0.040	0.050	1012
1013	0.11 to 0.16	0.50 to 0.80	0.040	0.050	1013
1013	0.10 to 0.16	1.10 to 1.40	0.040	0.050	1013
1015	0.13 to 0.18	0.30 to 0.60	0.040	0.050	1015
1016	0.13 to 0.18	0.60 to 0.90	0.040	0.050	1016
1017	0.15 to 0.20	0.30 to 0.60	0.040	0.050	1017
1018	0.15 to 0.20	0.60 to 0.90	0.040	0.050	1018
1518	0.15 to 0.21	1.10 to 1.40	0.040	0.050	1518
1019	0.15 to 0.20	0.70 to 1.00	0.040	0.050	1019
1020	0.18 to 0.23	0.30 to 0.60	0.040	0.050	1020
1021	0.18 to 0.23	0.60 to 0.90	0.040	0.050	1021
1022	0.18 to 0.23	0.70 to 1.00	0.040	0.050	1022
1522	0.18 to 0.24	1.10 to 1.40	0.040	0.050	1522
1023	0.20 to 0.25	0.30 to 0.60	0.040	0.050	1023
1524	0.19 to 0.25	1.35 to 1.65	0.040	0.050	1524
1025	0.22 to 0.28	0.30 to 0.60	0.040	0.050	1025
1525	0.23 to 0.29	0.80 to 1.10	0.040	0.050	1525
1026	0.22 to 0.28	0.60 to 0.90	0.040	0.050	1026
1526	0.22 to 0.29	1.10 to 1.40	0.040	0.050	1526
1527	0.22 to 0.29	1.20 to 1.50	0.040	0.050	1527
1029	0.25 to 0.31	0.60 to 0.90	0.040	0.050	1029
1030	0.28 to 0.34	0.60 to 0.90	0.040	0.050	1030
1033	0.29 to 0.36	0.70 to 1.00	0.040	0.050	1033
1034	0.32 to 0.38	0.50 to 0.80	0.040	0.050	1034
1035	0.32 to 0.38	0.60 to 0.90	0.040	0.050	1035
1536	0.30 to 0.37	1.20 to 1.50	0.040	0.050	1536
1037	0.32 to 0.38	0.70 to 1.00	0.040	0.050	1037
1038	0.35 to 0.42	0.60 to 0.90	0.040	0.050	1038
1039	0.37 to 0.44	0.70 to 1.00	0.040	0.050	1039
1040	0.37 to 0.44	0.60 to 0.90	0.040	0.050	1040
1541	0.36 to 0.44	1.35 to 1.65	0.040	0.050	1541
1042	0.40 to 0.47	0.60 to 0.90	0.040	0.050	1042
1043	0.40 to 0.47	0.70 to 1.00	0.040	0.050	1043
1044	0.43 to 0.50	0.30 to 0.60	0.040	0.050	1044
1045	0.43 to 0.50	0.60 to 0.90	0.040	0.050	1045
1046	0.43 to 0.50	0.70 to 1.00	0.040	0.050	1046
1547	0.45 to 0.51	1.35 to 1.65	0.040	0.050	1547
1548	0.44 to 0.52	1.10 to 1.40	0.040	0.050	1548
1049	0.46 to 0.53	0.60 to 0.90	0.040	0.050	1049
1050	0.48 to 0.55	0.60 to 0.90	0.040	0.050	1050

\* Copper can be added to a standard steel.

++ 0.15 to 0.35% Pb. When lead is required as an added element to a standard steel a range of 0.15 to 0.35%, inclusive, is generally used. Such a steel is identified by inserting the letter "L" between the second and third numeral of the AISI number.

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## SAE Alloy Steel Compositions

SAE No.	Composition * %								Corresponding AISI No.
	C	Mn	P	S	Si	Ni	Cr	Other	
1330	0.28-0.33	1.60-1.90	0.035	0.040	0.15 – 0.35.	-	-	-	1330
1335	0.33-0.38	1.60-1.90	0.035	0.040	0.15 – 0.35	-	-	-	1335
1340	0.38-0.43	1.60-1.90	0.035	0.040	0.15 – 0.35	-	-	-	1340
1345	0.43-0.48	1.60-1.90	0.035	0.040	0.15 – 0.35	-	-	Mo	1345
4012	0.09-0.14	0.75- 1.00	0.035	0.040	0.15 – 0.35	-	-	0.15 - 0.25	4012
4023	0.20-0.25	0.70-0.90	0.035	0.040	0.15 – 0.35	-	-	0.20 - 0.30	4023
4024	0.20-0.25	0.70-0.90	0.035	0.035-0.050	0.15 – 0.35	-	-	0.20 - 0.30	4024
4027	0.25-0.30	0.70-0.90	0.035	0.040	0.15 – 0.35	-	-	0.20 - 0.30	4027
4028	0.25-0.30	0.70-0.90	0.035	0.035-0.050	0.15 – 0.35	-	-	0.20 - 0.30	4028
4032	0.30-0.35	0.70-0.90	0.035	0.040	0.15 – 0.35	-	-	0.20 - 0.30	4032
4037	0.35-0.40	0.70-0.90	0.035	0.040	0.15 – 0.35	-	-	0.20 - 0.30	4037
4042	0.40-0.45	0.70-0.90	0.035	0.040	0.15 – 0.35	-	-	0.20 - 0.30	4042
4047	0.45-0.50	0.70-0.90	0.035	0.040	0.15 – 0.35	-	-	0.20 - 0.30	4047
4118	0.18-0.23	0.70-0.90	0.035	0.040	0.15 – 0.35	-	0.40-0.60	0.08 – 0.15	4118
4130	0.28-0.33	0.40-0.60	0.035	0.040	0.15 – 0.35	-	0.80-1.10	0.15 – 0.25	4130
4135	0.33-0.38	0.70-0.90	0.035	0.040	0.15 – 0.35	-	0.80-1.10	0.15 – 0.25	4135
4137	0.35-0.40	0.70-0.90	0.035	0.040	0.15 – 0.35	-	0.80-1.10	0.15 – 0.25	4137
4140	0.38-0.43	0.75-1.00	0.035	0.040	0.15 – 0.35	-	0.80-1.10	0.15 – 0.25	4140
4142	0.40-0.45	0.75-1.00	0.035	0.040	0.15 – 0.35	-	0.80-1.10	0.15 – 0.25	4142
4145	0.43-0.48	0.75-1.00	0.035	0.040	0.15 – 0.35	-	0.80-1.10	0.15 – 0.25	4145
4147	0.45-0.50	0.75-1.00	0.035	0.040	0.15 – 0.35	-	0.80-1.10	0.15 – 0.25	4147
4150	0.48-0.53	0.75-1.00	0.035	0.040	0.15 – 0.35	-	0.80-1.10	0.15 – 0.25	4150
4161	0.56-0.64	0.75-1.00	0.035	0.040	0.15 – 0.35	-	0.70-0.90	0.15 – 0.25	4161
4320	0.17-0.22	0.45-0.65	0.035	0.040	0.15 – 0.35	1.65-2.00	0.40-0.60	0.20 – 0.30	4320
4340	0.38-0.43	0.60-0.80	0.035	0.040	0.15 – 0.35	1.65-2.00	0.70-0.90	0.20 – 0.30	4340
E4340++	0.38-0.43	0.65-0.85	0.035	0.040	0.15 – 0.35	1.65-2.00	0.70-0.90	0.20 – 0.30	E4340
4419	0.18-0.23	0.45-0.65	0.035	0.040	0.15 – 0.35	-	-	0.45 – 0.60	4419
4422	0.20-0.25	0.70-0.90	0.035	0.040	0.15 – 0.35	-	-	0.35 – 0.45	4422
4427	0.24-0.29	0.70-0.90	0.035	0.040	0.15 – 0.35	-	-	0.35 – 0.45	4427

\* Small quantities of certain elements are present which are not specified or required.

Considered as incidental, they are acceptable to the following amounts: 0.35 Cu, 0.25 Ni, 0.20 Cr and 0.06 Mo.

++ Electric furnace steel.

Source: NORME SAE J404g

## CSA Standard G40.21-M Structural Quality Steels

Chemical Composition – Heat Analysis Plates, Bars, Spapes and Sheet Piling											
Grade	C	Mn	P	S	Si (a) (b)	Grain Refining Elements (c)	Cr	Ni	Cu (d)	Usual Deoxidation	Grain Size
230G	0.26 max	1.20 max <sup>(e)</sup>	0.05 max	0.05 max	0.40 max	0.10 max				Semi-killed	
350G	0.28 max <sup>(f)</sup>	1.65 max	0.04 max	0.05 max	0.40 max	0.10 max				Semi-killed	
400G	0.28 max <sup>(f)</sup>	1.65 max	0.04 max	0.05 max	0.40 max	0.10 max	-	-	-	Semi-killed	
260W	0.20 max	0.50-1.50	0.04 max	0.05 max	0.40 max	0.10 max	-	-	-	Semi-killed	(g)
300W	0.22 max	0.50-1.50	0.04 max	0.05 max	0.40 max	0.10 max	-	-	-	Semi-Killed	(g)
350W	0.23 max	0.50-1.50	0.04 max	0.05 max	0.40 max	0.10 max	-	-	-	Semi-Killed	(g)
380W	0.20 max	0.50-1.50	0.04 max	0.05 max	0.40 max	0.10 max	-	-	-	Semi-Killed	(g)
400W	0.23 max	0.50-1.50	0.04 max	0.05 max	0.40 max	0.10 max	-	-	-	Semi-Killed	(g)
480W	0.26 max	0.50-1.50	0.04 max	0.05 max	0.40 max	0.10 max	-	-	-	Semi-Killed	(g)
260WT	0.20 max	0.80-1.50	0.03 max	0.04 max	0.15-0.40	0.10 max	-	-	-	Killed	Fine Grain Practice
300WT	0.22 max	0.80-1.50	0.03 max	0.04 max	0.15-0.40	0.10 max	-	-	-	Killed	Fine Grain Practice
350WT	0.22 max	0.80-1.50 <sup>(h)</sup>	0.03 max	0.04 max	0.15-0.40	0.10 max <sup>(i)</sup>				Killed	Fine Grain Practice
400WT	0.22 max	0.80-1.50 <sup>(h)</sup>	0.03 max	0.04 max	0.15-0.40	0.10 max <sup>(i)</sup>				Killed	Fine Grain Practice
480Wt	0.26 max	0.80-1.50 <sup>(h)</sup>	0.03 max	0.04 max	0.15-0.40	0.10 max <sup>(i)</sup>				Killed	Fine Grain Practice
350R	0.16 max	0.75 max	0.05-0.15	0.04 max	0.75 max	0.10 max	0.30-1.25 <sup>(j)</sup>		0.20-0.60 <sup>(j)</sup>	Killed	-
350A	0.20 max	0.75-1.35	0.03 max	0.04 max	0.15-0.40	0.10 max	0.70 max <sup>(k)</sup>		0.20-0.60	Killed	Fine Grain Practice
400A	0.20 max	0.75-1.35	0.03 max	0.04 max	0.15-0.40	0.10 max	0.70 max <sup>(k)</sup>		0.20-0.60	Killed	Fine Grain Practice
480A	0.20 max	1.00-1.60	0.025 max	0.035 max	0.15-0.40	0.12 max	0.70 max <sup>(k)</sup>		0.20-0.60	Killed	Fine Grain Practice
350AT	0.20 max	0.75-1.35 <sup>(h)</sup>	0.03 max	0.04 max	0.15-0.40	0.10 max	0.70 max <sup>(k)</sup>		0.20-0.60	Killed	Fine Grain Practice
400AT	0.20 max	0.75-1.35 <sup>(h)</sup>	0.03 max	0.04 max	0.15-0.40	0.10 max	0.70 max <sup>(k)</sup>		0.20-0.60	Killed	Fine Grain Practice
480AT	0.20 max	1.00-1.60 <sup>(h)</sup>	0.025 max	0.035 max	0.15-0.40	0.12 max	0.70 max <sup>(k)</sup>		0.20-0.60	Killed	Fine Grain Practice
700Q	0.20 max	1.50 max	0.03 max	0.04 max	0.15-0.35	-	Boron 0.0005-0.005		-	Killed	Fine Grain
700QT	0.20 max	1.50 max	0.03 max	0.04 max	0.15-0.35	-	Boron 0.0005-0.005		-	Killed	Fine Grain

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## Structural Quality Steels Notes

- a. Silicon content of 0.15-0.40% is required for Type W steel over 40 mm(1-6 in)in thickness, or bar diameter, except as modified by footnote lb).
- b. At the purchaser's request or at the producer's option, the steel may be made with no minimum silicon content provided that the steel contains a minimum of 0.02% total aluminum content.
- c. The elements columbium and vanadium may be used singly or in combination up total percentage indicated, except that, if columbium is used singly or in combination vanadium in plates thicker than 14 mm (0.56 in) or shapes heavier than Group 1, the a content shall be 0.15 minimum. Aluminum may be used as a grain refining element without prior approval by the purchaser, and when so used, shall not be included in the sum of grain refining elements included in CSA Standard G40.21-M, Table 4.
- d. Copper content of 0.20% minimum may be specified by the purchaser on all grades.
- e. At the producer's option, material having a manganese content of 1.50% maximum be supplied.
- f. For thicknesses over 20 mm (0.8in), carbon maximum may be 0.32%.
- g. See clauses 3.3 and 3.4 in CSA Standard G40.21-M.
- h. With the prior agreement of the purchaser, the manganese content may be increase provided the sum of the carbon content Plus 1/6 of the manganese content does not a 0.40% for grade 350 WT or 0.42% for grade 400 VIT or 480 WT.
- i. A nitrogen content of 0.01-0.02% may be used if the nitrogen content does not exceed of the vanadium content.
- j. The combined content of chromium, nickel and copper shall be not less than 1.00%.
- k. The combined total of chromium and nickel contents shall be not less than 0.40%.

Note: In order to meet the required mechanical properties, the producer may use additional alloying elements with the prior approval of the purchaser.

## Mechanical properties of plates, Floor Plates, Bars, and Welded Shapes

Grade	Usual Nominal Maximum Thickness mm	Tensile Strength MPa	Yield point, Mpa, minimum					Elongation, % minimum†				Remarks
			Up to 65 mm	65mm 100mm	100mm 150mm	150mm 200mm	200,mm	Longitudinal		Transverse‡		
								200 mm	50 mm	200mm	50 mm	
230G	300	380-500	230	230	230	230	230	21	24	19	22	Not Available in plate. Bar-size shapes only. Not available in plate. Bar-size shapes only.
350G	30	480-690	350	-	-	-	-	17	19	15	17	
400G	30	550-720	400	-	-	-	-	16	19	13	17	
260W*	200	410-590	260	250	250	250	-	20	23	18	21	Available in angles And bars only
300W*	200	450-620	300	280	280	280	-	20	23	18	21	
350W*	150	450-620	350	320	320	-	-	19	22	17	20	
380W*	20	480-650	380	-	-	-	-	18	21	-	-	
400W	20	520-690	400	-	-	-	-	16	18	15	15	
480W	20	590-790	480	-	-	-	-	15	17	14	14	
260WT*	150	410-590	260	250	250	-	-	20	23	18	21	
300WT*	150	450-620	300	280	280	-	-	20	23	18	21	
350WT*	150	480-650	300	280	280	-	-	19	22	17	20	
400WT	20	520-690	400	-	-	-	-	18	20	15	17	
480WT	20	590-790	480	-	-	-	-	15	17	12	14	
350R	14	480-650	350	-	-	-	-	19	21	16	18	
350A	100	480-650	350	350	350	-	-	19	21	17	19	
400A	40	520-690	400	-	-	-	-	18	21	15	18	
480A	20	590-790	480	-	-	-	-	15	17	12	14	
350AT	100	480-650	350	350	350	-	-	19	21	17	19	
400AT	40	520-690	400	-	-	-	-	18	21	15	18	
480AT	20	590-790	480	-	-	-	-	15	17	12	14	
700Q	5	800-950	700	700	-	-	-	-	18	-	16	BHN-235-293
700QT	65	800-950	700	700	-	-	-	18	-	-	16	BHN-235-293

## **Mechanical properties of plates, Floor Plates, Bars, and Welded Shapes Notes**

\* Plates for API applications shall have an upper limit of tensile strength 140 MPa above the specified minimum.

† Per cent elongation is not specified or required for rolled floor plates.

‡ Transverse values apply to plates wider than 600 mm only.

### **Notes:**

- (1) In the absence of yield point, the yield strength value can be measured by 0.5% extension under-load or 0.2% offset method. The value obtained shall meet the specified minimum yield point for the grade.
- (2) For material having a thickness under 8 mm (5/16 in), refer to Clause 8.4.1 of CSA Standard CAN/CSA-G40.20-M.
- (3) 1 MPa      1 N/mm<sup>2</sup>.

## Mechanical Properties- Rolled Shapes and Sheet Piling

Grade	Usual Maximum Shape Size Group	Tensile Strength Mpa	Yield Point Mpa Minimum			Elongation Per Cent Minimum	
			Groups 1 and 2	Groups 3 and 4	Group 5	In 200 mm*	In 50 mm
230G	5	380-520	230	230	230	21	14
350G	3	480-690	350	350	-	17	19
400G	3	550-720	400	400	-	16	19
260W	4	410-590	260	260	-	20	23
300W	3	450-620	300	290	-	20	23
350W	2	450-650	350	-	-	19	-
380W	2	480-650	380	-	-	18	21
400W	1	520-690	400	-	-	16	-
480W	1	590-790	480	-	-	15	-
260WT	5	410-590	260	260	250	20	23/23
300WT	5	450-620	300	290	280	20	23
350WT	4	480-650	350	330	-	19	22
400WT	2	520-690	400	-	-	18	-
480WT	1	590-790	480	-	-	15	-
350R	1	480-650	350	-	-	19	-
350A	5	480-650	350	350	320	19	21
400A	2	520-690	400	-	-	18	-
350AT	5	480-650	350	350	320	19	21
400AT	2	520-690	400	-	-	18	-

### Notes:

- (1) In the absence of yield point, the yield strength value can be measured by 0.5% extension-under-load or 0.2% offset method. The value obtained shall meet the specified minimum yield point for the grade.
- (2) For material having a thickness under 8mm, refer to Clause 8.3 of CSA Standard CAN3-G40.20-M. "General Requirements for Rolled or Welded Structural Quality Steel."
- (3) Mpa = 1 N/mm<sup>2</sup>

## Mechanical properties – Hollow Sections

Grade	Usual Nominal Maximum Thickness	Tensile Strength MPa	Yield Point Minimum MPA	Percent Elongation In 50 mm Minimum
300W	16 mm	410-590	300	23
350W	16 mm	450-620	350	22
380W*	16 mm	480-650	380	21
350WT	16 mm	480-650	350	22
380WT*	16 mm	480-650	380	21
350A	16 mm	480-650	350	21
350AT	16 mm	480-650	350	21

Applicable also to angles

Notes:

(1) 1 MPa = 1 N/mm<sup>2</sup>

(2) For material having a thickness under 8mm, refer to clause 8.3 of CSA Standard CAN3-G40.20M General Requirements for Rolled or Welded Quality Steel.

## Standard Impact Test \* Temperature for Specified Category

Category	Standard Test Temperature, °C
1	0
2	-20
3	-30
4	-45
5	To be specified by the purchaser †

\*Charpy V-Notch, longitudinal specimens

†Before specifying, availability of product should be verified.

Note: Absorbed energy values obtained from Charpy V-Notch tests conducted at a particular testing temperature cannot be used to determine expected values at any other temperature. Values other than those shown may be available upon consultation between the purchaser and the producer, and shall be ordered as Category 5 material.

## Standard Charpy Impact Energy \* for Specified Grade †

Grade	Minimum Average Absorbed Energy –J	
	Categories 1-4	Category 5
260 WT	20	To be specified by the purchaser †
300WT	20	
350WT	27	
400WT	27	
480WT	27	
350AT	27	
400AT	27	
480AT	27	
700QT	34	

\*Charpy V-Notch, longitudinal specimens.

†Before specifying, availability of product should be verified.

Note: Absorbed energy values obtained from Charpy V-Notch tests conducted at a particular testing temperature cannot be used to determine expected values at any other temperature. Values other than those shown may be available upon consultation between the purchaser and the producer, and shall be ordered as Category 5 material.

## P Numbers

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### ASME QW-422 P Numbers

P No.	Group No.	Type of base metal
1	1	Carbon Steel Plate
1	2	C-Mn-Si Steel Pipe
1	3	Carbon Steel Casting
3	1	Cr-Mo Pipe (½ Cr -½ Mo)
4	1	Cr-Mo Pipe (1 Cr -½Mo)
5	1	Cr-Mo Pipe (2¼ Cr-1Mo)
3	3	Mn-Mo Steel Plate
5	2	Cr-Mo Pipe (5 Cr-½ Mo)
6	1	Alloy Pipe Flangers (13 Cr)
6	2	Alloy Steel Plate (15 Cr)
6	3	Alloy Steel Forgings (13 Cr)
6	4	Alloy Castings (13 Cr-4 Ni)
7	1	Alloy Steel Tubes (12 Cr-1Al)
7	2	Alloy Steel Plates (17 Cr-Ti)
7	3	St. Steel Bars (Type XM-30 Ann.)
8	1	Alloy Pipe Flanges (18 Cr-8Ni)
8	2	Alloy Pipe Flanges (25Cr-20 Ni)
9A, 9B, 10A, 10B, on, up to and including p No. 61		