GUIDE TO SELECTION
Plate

LOW CARBON

AISI-1008
A low carbon steel that offers excellent formability and weldability. Used in applications such as farm implements, tanks, brackets, and other formed parts. The surface has a normal mill oxide finish.

MEDIUM CARBON

AISI-1045
A medium carbon steel that offers greater strength and hardness as compared to the low carbon steels. Formability and weldability of AISI 1045 is fair when using accepted shop practices. Machinability is good. This grade responds to heat treating and induction hardening in the lighter thicknesses. Applications include gears, machine parts, brake dies, wear plates, and base plates.

HOT ROLLED STRUCTURAL QUALITY

ASTM A-36
Intermediate tensile strength carbon steel for use in riveted, bolted, or welded construction of bridges and buildings and for general structural use. A-36 is one of the most widely used carbon steels for construction purposes. It is weldable, formable, and machinable. The minimum yield point is 36,000 psi and the tensile strength is 58,000 - 80,000 psi. Plates over 1.500" in thickness are silicon killed to insure uniform properties.

ASTM A-283, Grade C
Low and intermediate tensile strength carbon steel. This specification has a lower carbon and manganese limit as compared to ASTM A-36. Frequently used in storage tanks fabrication. It is weldable, formable, and machinable. For ASTM A-283, Grade C, the minimum yield point is 30,000 psi and the tensile strength is 55,000 - 70,000 psi. Plates over 1.500" in thickness are silicon killed to insure uniform properties. ASTM A-283 is also available in grades A, B, and D.

HIGH STRENGTH LOW ALLOY PLATES (HSLA)

ASTM A-572, Grade 50
A HSLA columbium-vandium steel with a higher yield and tensile strength as compared to ASTM A-36. It is used in bridges, buildings, construction equipment, freight cars, machinery, truck parts, and other applications. These stronger steels permit the reduction of section thickness and weight, providing added payload capacity in transportation applications as well as material cost savings. ASTM A-572, Grade 50 is weldable, formable, and machinable when using appropriate techniques. For Grade 50, the minimum yield point is 50,000 psi and the minimum tensile strength is 65,000 psi. Plates over 1.500" in thickness are silicon

GUIDE TO SELECTION
Plate

HIGH STRENGTH LOW ALLOY PLATES (HSLA)

ASTM A-572, Grade 50 – continued
killed to insure uniform properties. ASTM A-572 is also available in grades 42, 55, 60 and 65. Some of the trade names associated with this grade are Ex-Ten, INX, X-W, and V-Steel.

ASTM A-588, Grade A, Corten B
A HSLAS steel containing small additions of copper, chromium, and nickel. For use in bridges, buildings, freight cars, construction equipment, smokestack liners, precipitators, transmission towers, and light poles where savings in weight and/or added durability are important. The atmospheric corrosion resistance of this steel is a minimum of four times that of regular carbon steel. These steels are often used unpainted and develop a weathered, orange-brown surface that is resistant to corrosion. ASTM A-588, Grade A is weldable, formable, and machinable when using the appropriate techniques. The minimum yield point is 50,000 psi and the minimum tensile strength is 70,000 psi. All sizes of ASTM A-588 are silicon killed. ASTM A-588 is also available in grades B, C, and K. Some of the trade names associated with this grade are Cor-Ten, Mayari, Hi-Steel and Dura-Plate.

ASTM A-656, Grade 50
A HSLAS columbium-vanadium steel with improved formability as compared to other HSLAS steels. ASTM A-656 is made to a killed steel fine grain practice. It is used in truck frames, brackets, crane booms, rail cars, and similar demanding applications where strength-to-weight ratios are maximized. Its formability allows replacement of multi-piece weldments with formed parts. ASTM A-656, Grade 50 is very formable and weldable. The minimum yield point is 50,000 psi and the minimum tensile strength is 60,000 psi. ASTM A-656 is also available in grades 60, 70, and 80. Some of the trade names associated with this grade are Hi-Form and Bethstar.

PRESSURE VESSEL QUALITY

ASTM A-285, Grade C
This specification covers carbon steel plates of low and intermediate tensile strengths. ASTM A-285 is designed for welded pressure vessels. The maximum thickness of plates produced to this specification is 2". This grade is weldable, formable, and machinable. For ASTM A-285, Grade C, the minimum yield point is 30,000 psi and the tensile strength is 55,000 psi to 75,000 psi. It is also available in grades A and B.

GUIDE TO SELECTION
Plate

PRESSURE VESSEL QUALITY

ASTM A-516 Grade 70
This specification covers carbon steel plates intended primarily for service in welded pressure vessels where improved notch toughness at moderate to lower temperatures is important. ASTM A-516 is made to a silicon killed steel fine grain practice. This specification requires plates over 1.500" to be normalized. This plate grade is weldable, formable, and machinable. For ASTM A-516 Grade 70, the minimum yield point is 38,000 psi and the tensile strength is 70,000 psi to 90,000 psi. ASTM-516 is also available in grades 55, 60, and 65.

FLOOR PLATE

ASTM A-786
Our 4-Way floor plate is produced to ASTM A-786 in a low carbon commercial quality grade. This material is easily formed and welded using accepted practice. 4-Way floor plates provide maximum skid resistance with an easy to clean surface. Both medium and large patterns are available. We can also service your special floor plate needs such as ASTM A-36 and ASTM A-572 Grade 50 floor plate. Additionally, floor plate from coil can be provided in custom lengths up to 60 feet.

HIGH STRENGTH ALLOY – STRUCTURAL QUALITY

ASTM A-514 (AASHTO NO. M244)
This specification covers 8 grades of quenched and tempered high strength alloy steel intended for use in welded structures. ASTM A-514 is made to a silicon killed fine grain practice. Its advantages include high strength, weldability, and good toughness at low atmospheric temperatures. ASTM A-514 is suitable for use in bridges, towers, building members, earth moving and transportation equipment, booms, buckets and other industrial applications where high strength, low weight and high impact values are required. It is weldable, formable, and machinable using the appropriate techniques. In plates .750" thick and less, ASTM A-514 has a minimum yield point of 100,000 psi and a tensile strength of 110,000 psi to 130,000 psi. The trade names most often associated with this specification are USS T1, T1A, T1B, and T1C. O'Neal stocks ASTM A-514 in grades B, F, H, and Q.

GUIDE TO SELECTION
Plate

ABRASION RESISTING

AR 235
Is a medium carbon steel supplied in the as-rolled condition. It is intended for use primarily in the materials handling and mining industries, in smooth sliding applications where impact is not a factor. AR 235 is ordered to a typical hardness range of 200 to 250 BHN and no other mechanical properties are guaranteed. This inexpensive abrasion resistant product can be machined, drilled and punched.

ABRASION RESISTING ALLOY PLATE

MANGANESE (12 to 14% Mn)
Also known as Hadfield or Austenitic Manganese Steel, this material is designed for abrasive applications where severe impact is a factor. It has an as-rolled hardness of 210255 BHN and will work harden to approximately 550 BHN upon impact or shot peening. This unique property makes it the ideal choice for heavy duty high wear and impact applications in the mine, quarry, construction, steel, foundry, cement, and lumber industries. This material conforms to the chemical requirements of ASTM A-128, Grade B-2.

AR 360 / AR 400 / AR 500
Is a high carbon steel supplied in the as-rolled condition. It is intended for use in applications involving erosion, where abrasive materials such as grains, coal, ore, cement, gravel, light aggregate, and earth are being handled. Often used in the materials handling and mining industries. This grade has strong carbide-forming elements such as chromium, molybdenum and vanadium to provide complex carbines that can enhance abrasion resistance, and contribute to hardenability. Quench and tempering Is employed to obtain a high hardness level with optimum microstructure. As hardness increases, it is generally true that formability and weldability decrease. Abrasion resistant steels are not intended for structural applications. These steels should not be used for structural or main load-bearing members because of the possibility that brittle fracture may occur in these high hardness steels at the high stress levels encountered in such applications. Material is tested to the Brinell Hardness Number to determine the level of hardness.

HOT ROLLED PLATE

STOCK LENGTHS AVAILABE - 8', 10', 12', 20', 40'

Size In Inches	Lbs. Per Sq. Ft.	ASTM A-36	ASTM A-572 GR 50	ASTM A-588 GR A	ASTM A-285 GR C	ASTM A-516 GR 70
3/16 x 48	7.66	X				
60	7.66	X	X			
72	7.66	X	X			
84	7.66	X	X			
96	7.66	X	X	X		X
120	7.66	X				
1/4 x 48	10.21	X	X	X		
60	10.21	X	X			X
72	10.21	X	X			X
84	10.21	X				
96	10.21	X	X	X		X
120	10.21	X	X			
5/16 x 48	12.76	X				
60	12.76	X				
72	12.76	X	X			
84	12.76	X	X			
96	12.76	X	X	X		X
120	12.76	X				
3/8 x 48	15.32	X				
60	15.32	X	X			
72	15.32	X	X			
84	15.32	X				
96	15.32	X	X	X		XX
120	15.32	X				
7/16 x 60	17.87					
72	17.87					
1/2 x 48	20.42	X				
60	20.42	X				
72	20.42	X	X	X		X
84	20.42	X				
96	20.42	X	X	X		XX
120	20.42	X	X			

HOT ROLLED PLATE

STOCK LENGTHS AVAILABE - 8', 10', 12', 20', 40'

Size In Inches	Lbs. Per Sq. Ft.	ASTM A-36	ASTM A-572 GR 50	ASTM A-588 GR A	ASTM A-285 GR C	ASTM A-516 GR 70
9/16 x 72	22.97					
96	22.97	X	X			
5/8 x 48	25.53	X				
60	25.53	X				
72	25.53	X				
84	25.53	X	X			
96	25.53	X	X	X		X
120	25.53	X	X			
3/4 x 48	30.63	X				
60	30.63	X				
72	30.63	X	X			
84	30.63	X	X			
96	30.63	X	X	X		XX
120	30.63	X	X			
7/8 x 48	35.74					
60	35.74					
72	35.74	X				
84	35.74	X				
96	35.74	X	X			X
120	35.74	X				
1 x 48	40.84	X				
60	40.84	X				
72	40.84	X				
84	40.84	X				
96	40.84	X	X	X		XX
120	40.84	X	X			
1-1/8 x 72	45.95	X				
96	45.95	X	X			
1-1/4 x 48	51.05	X				
60	51.05	X				
72	51.05	X	X	X		
84	51.05	X				

HOT ROLLED PLATE

STOCK LENGTHS AVAILABE - 8', 10', 12', 20', 40'

Size In Inches	Lbs. Per Sq. Ft.	ASTM A-36	ASTM A-572 GR 50	ASTM A-588 GR A	ASTM A-285 GR C	ASTM A-516 GR 70
1-1/4 x 96	51.05	X	X			X
120	51.05	X				
1-3/8 x 48	56.16	X				
72	56.16	X				
96	56.16	X	X			X
1-1/2 x 48	61.26	X				
60	61.26	X				
72	61.26	X	X			
84	61.26	X				
96	61.26	X	X			X
120	61.26					
1-5/8 x 72	66.37	X				
96	66.37	X				
1-3/4 x 48	71.47					
60	71.47					
84	71.47		X			
96	71.47	X	X			
1-7/8 x 96	76.58	X	X			
2 x 48	81.68	X				
60	81.68	X				
72	81.68	X				
84	81.68	X				
96	81.68	X	X			X
2-1/8 x 96	86.79	X				
2-1/4 x 72	91.89	X				
96	91.89	X	X			X
2-3/8 x 96	97.00	X				
2-1/2 x 72	102.10	X				
96	102.10	X	X			X

HOT ROLLED PLATE

STOCK LENGTHS AVAILABE - 8', 10', 12', 20', 40'

Size In Inches	Lbs. Per Sq. Ft.	ASTM A-36	ASTM A-572 GR 50	ASTM A-588 GR A	ASTM A-285 GR C	ASTM A-516 GR 70
2-3/4 x 96	112.31	X	X			X
3 x 48	122.52					
72	122.52					
96	122.52	X	X			X
3-1/4 x 72	132.72					
96	132.72	X	X			
3-1/2 x 72	142.93					
96	142.93	X	X			X
3-3/4 x 96	153.14	X	X			
4 x 60	163.35					
72	163.35		X			
96	163.35	X				X
4-1/2 x 60	183.77					
96	183.77	X				X
5 x 60	204.19					
72	204.19					
96	204.19	X				
6 x 60	245.03					
72	245.03					
96	245.03	X				X
6-1/2 x 96	264.45	X				
7 x 60	285.87					
96	285.87	X				
8 x 60	326.71	X				
10 x 84	408.38	X				

HOT ROLLED PLATE – AISI

STOCK LENGTHS AVAILABLE – 8', 10', 12', 20', 40'

Size	Lbs./Sq.Ft.	AISI 1045
1/4 x 48	10.21	
1/4 x 60	10.21	
5/16 x 60	12.76	
3/8 x 48	15.32	
1/2 x 60	20.42	
5/8 x 96	25.53	X
3/4 x 84	30.63	
96	30.63	X
1 x 60	40.84	
96	40.84	X
1-1/2 x 72	61.26	
2 x 72	81.68	
2-1/2 x 72	102.10	
3 x 72	122.52	

FLOOR PLATE

4-WAY MEDIUM PATTERN
ASTM A-786, COMMERCIAL QUALITY
STOCK LENGTHS: 8', 10', 12', 20', 24'

Thickness x Width Inches	Lbs. Per Sq. Ft.	Thickness x Width Inches	Lbs. Per Sq. Ft.
3/16 x 48	8.71	3/8 x 48	16.37
60	8.71	60	16.37
72	8.71	72	16.37
96	8.71	96	16.37
1/4 x 48	11.26	1/2 x 48	21.47
60	11.26	60	21.47
72	11.26	72	21.47
96	11.26	96	21.47
5/16 x 48	13.81	3/4 x 72	31.68
60	13.81	96	31.68
72	13.81		
96	13.81		

FLOOR SHEET

4-WAY MEDIUM PATTERN
ASTM A-786, COMMERCIAL QUALITY
STOCK LENGTHS: 8', 10', 12', 20', 24'

Gauge x Width Inches	Lbs. Per Sq. Ft.	Gauge x Width Inches	Lbs. Per Sq. Ft.
11 Ga. x 48	6.16	12 Ga. x 48	5.25
11 Ga. x 60	6.16	14 Ga. x 48	3.75
11 Ga. x 72	6.16	16 Ga. x 48	3.00

PLATE – High Strength Alloy – Structural Quality

Size In Inches	Lbs. Per Sq. Ft.	ASTM A-514 Grade B Q & T	ASTM A-514 Grade H Q & T	ASTM A-514 Grade F Q & T	ASTM A-514 Grade Q Q & T
3/16 x 96 x 240	7.66	X			
1/4 x 96 x 240	10.21	X			
1/4 x 96 x 288	10.21	X			
5/16 x 96 x 240	12.76	X			
3/8 x 96 x 240	15.32	X			
1/2 x 96 x 240	20.42	X			
5/8 x 96 x 240	25.53	X			
3/4 x 96 x 240	30.63	X			
1 x 96 x 240	40.84	X			
1-1/4 x 96 x 240	51.05	X			
1-1/2 x 96 x 240	61.26		X		
1-3/4 x 96 x 240	71.47		X		
2 x 96 x 240	81.68		X		
2-1/2 x 96 x 240	102.10			X	
3 x 96 x 240	122.50				X

PLATE – Abrasion Resisting

STOCK SIZES

Size In Inches	Lbs. Per Sq. Ft.	AR 235 BHN (Typical)	Manganese 12%-14%
3/16 x 60 x 240	7.66		
72 x 240	7.66		
84 x 240	7.66		
96 x 240	7.66		
96 x 288	7.66		
1/4 x 48 x 96	10.21		
60 x 120	10.21	X	
60 x 240	10.21		
72 x 240	10.21		
96 x 240	10.21	X	
96 x 288	10.21		
5/16 x 72 x 240	12.76		
3/8 x 48 x 96	15.32		
48 x 240	15.32		
60 x 120	15.32		
60 x 144	15.32		X
60 x 240	15.32		
60 x 288	15.32		
72 x 144	15.32		
72 x 240	15.32		
96 x 240	15.32	X	
96 x 288	15.32		
1/2 x 48 x 96	20.42		
60 x 120	20.42	X	
60 x 144	20.42		X
60 x 240	20.42		
72 x 240	20.42		
72 x 288	20.42		
96 x 240	20.42	X	
96 x 288	20.42		
5/8 x 72 x 240	25.53		
	25.53		

PLATE – Abrasion Resisting

STOCK SIZES

Size In Inches	Wt. Per Sq. Ft. in Lbs.	AR 235 BHN (Typical)	AR 400	Manganese 12%-14%
5/8 x 96 x 288	25.53		X	
3/4 x 48 x 96	30.63			
72 x 240	30.63			
72 x 288	30.63			
96 x 240	30.63		X	
96 x 288	30.63		X	
1 x 60 x 288	40.84			
72 x 240	40.84			
96 x 240	40.84		X	
96 x 288	40.84		X	
	45.95			
1-1/8 x 96 x 240	51.05			
	51.05			
1-1/4 x 60 x 144	61.26			
96 x 240	61.26			
	71.47			
1-1/2 x 72 x 144	81.68			
96 x 240	81.68		X	
	81.68			
1-3/4 x 72 x 240	102.10			
	122.50			
2 x 72 x 240	142.90			
96 x 240	163.40		X	
96 x 288				
2-1/2 x 96 x 240				
3 x 72 x 240				
3-1/2 x 60 x 120				
4 x 60 x 144				

PLATE – Abrasion Resisting

STOCK SIZES

Size In Inches	Lbs. Per Sq. Ft.
1 x 72 x 240	40.84
96 x 240	40.84
96 x 288	40.84
1-1/8 x 96 x 240	45.95
1-1/4 x 60 x 144	51.05
96 x 240	51.05
1-1/2 x 72 x 240	61.26
96 x 240	61.26
1-3/4 x 72 x 240	71.47
2 x 72 x 240	81.69
96 x 240	81.68
96 x 288	81.68
2-1/2 x 96 x 240	102.10
3 x 72 x 240	122.50
3-1/2 x 60 x 120	142.90
4 x 60 x 144	163.40

HOT ROLLED PLATE – CARBON STRUCTURAL QUALITY

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A-36	ASTM A131 Grade B	ASTM A283 Grade A	ASTM A283 Grade B	ASTM A283 Grade C	ASTM A283 Grade D	ASTM A573 Grade 58	ASTM A573 Grade 65	ASTM A573 Grade 70
Yield Point ksi	36 min	34 min	24 min	27 min	30 min	33 min	32 min	35 min	42 min
Tensile Strength ksi	58-80	58-71	45-60	50-65	55-70	60-75	58-71	65-77	70-90
% Elong. 2”	23	24	30	28	25	23	24	32	21
Bend									
Carbon	0.27 max	0.21	0.14	0.17	0.24	0.27	0.23	0.24-0.26	0.27-0.28
Manganese	1.20 max	0.80-1.10	0.90	0.90	0.90	0.90	0.60-0.90	0.85-1.20	0.85-1.20
Phosphorus	0.04 max	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Sulfur	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Silicon	0.15-0.40	0.35 max	0.15-0.40	0.15-0.40	0.15-0.40	0.15-0.40	0.10-0.35	0.15-0.40	0.15-0.40
Copper	0.20		0.20	0.20	0.20	0.20			
Nickel									
Chromium									
Columbium									
Vanadium									
Aluminum									
Molybdenum									

HOT ROLLED PLATE – HSLA STRUCTURAL QUALITY

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A572 Grade 42	ASTM A572 Grade 50	ASTM A572 Grade 60	ASTM A572 Grade 65	ASTM A588 Grade A	ASTM A656 Grade 50	ASTM A656 Grade 60	ASTM A656 Grade 70	ASTM A656 Grade 80
Yield Point ksi	42 min	50 min	60 min	65 min	50 min	50 min	60 min	70 min	80 min
Tensile Strength ksi	60 min	65 min	75 min	80 min	70 min	60 min	70 min	80 min	
% Elong. 2”	24	21	18	17	21	23	20	17	15
Bend									
Carbon	0.21 max	0.23 max	0.26 max	0.23 max	0.19 max	0.18 max	0.18 max	0.18 max	0.18 max
Manganese	1.35 max	1.35 max	1.35 max	1.65 max	0.80-1.25	1.65 max	1.65 max	1.65 max	1.65 max
Phosphorus	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.025 max	0.025 max	0.025 max	0.025 max
Sulfur	0.05 max	0.05 max	0.05 max	0.05 max	0.05 max	0.035 max	0.035 max	0.035 max	0.035 max
Silicon					0.30-0.65	0.60	0.60	0.60	0.60
Copper					0.25-0.40				
Nickel					0.40 max				
Chromium					0.40-0.65				
Columbium						0.005-0.15	0.005-0.15	0.005-0.15	0.005-0.15
Vanadium					0.02-0.10	0.08 max	0.08 max	0.08 max	0.08 max
Aluminum									
Molybdenum									

HOT ROLLED PLATE – CARBON PRESSURE VESSEL QUALITY

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A285 Grade A	ASTM A285 Grade B	ASTM A285 Grade C	ASTM A516 Grade 55	ASTM A516 Grade 60	ASTM A516 Grade 65	ASTM A516 Grade 70
Yield Point ksi	24 min	27 min	30 min	30 min	32 min	35 min	38 min
Tensile Strength ksi	45-65	50-70	55-75	55-75	60-80	65-85	70-90
% Elong. 2”	30	28	27	27	25	23	21
Bend							
Carbon	0.17 max	0.22 max	0.28	0.26 max	0.27 max	0.29 max	0.31 max
Manganese	0.90-0.98	0.90-0.98	0.90-0.98	0.60-1.20	0.85-1.20	0.85-1.20	0.85-1.20
Phosphorus	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max
Sulfur	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max
Silicon				0.15-0.40	0.15-0.40	0.15-0.40	0.15-0.40
Copper							
Nickel							
Chromium							
Columbium							
Vanadium							
Aluminum							
Molybdenum							

PLATE

Typical Mechanical Properties and Chemical Ranges and Limits

Grade or Type	Condition of Steel	Tensile Strength PSI	Yield Strength PSI	Elongation in 2" (%)	Approx. Brinell Hardness
Alloy-Structural Quality					
ASTM A514 B	Quench and Tempered	110,000 / 130,000	100,000 min.	16	235 / 293
ASTM A514 H	Quench and Tempered	110,000 / 130,000	100,000 min.	16	235 / 293
ASTM A514 F	Quench and Tempered	110,000 / 130,000	100,000 min.	16	235 / 293
ASTM A514 Q	Quench and Tempered	100,000 / 130,000	90,000 min.	14	235 / 293
High Strength-Low Alloy					
ASTM A588 A / Cor-Ten B	As Rolled	70,000 min.	50,000 min.	19	143
Abrasion Resisting – Carbon					
AR 225	As Rolled				200 / 250
Abrasion Resisting – Alloy					
Abrasion Resisting – Work Hardening					
Manganese 12% - 14%	Quench-Annealed (Fully Austenitic)				210 / 255

PLATE

Typical Chemical Analysis and Chemical Ranges and Limits

ASTM Grade Trade Name	A514 B T-1 Type A	A514 H T-1 Type B	A514 F T-1	A514 Q T-1 Type C	S.T.A.R.	AR225	A588 A Cor-Ten B	Manganese 12% - 14%
Carbon	0.12 / 0.21	0.12 / 0.21	0.10 / 0.20	0.14 / 0.21	0.12 / 0.21	0.35 / 0.50	0.19 max.	1.05 / 1.20
Manganese	0.70 / 1.00	0.95 / 1.30	0.60 / 1.00	0.95 / 1.30	0.70 / 1.00	1.50 / 2.00	0.80 / 1.25	11.50 / 14.00
Phosphorus	0.035 max.	0.035 max.	0.035 max.	0.035 max.	0.035 max.	0.04 max.	0.04 max.	0.07 max.
Sulphur0.04 max.	0.04 max.	0.04 max.	0.04 max.	0.04 max.	0.05 max.	0.05 max.		
Silicon	0.20 / 0.35	0.20 / 0.35	0.15 / 0.35	0.15 / 0.35	0.20 / 0.35	0.15 / 0.35	0.30 / 0.65	1.00 max.
Chromium	0.40 / 0.65	0.40 / 0.65	0.40 / 0.65	1.00 / 1.50	0.40 / 0.65		0.40 / 0.65	
Nickel	0.30 / 0.70	0.70 / 1.00	1.20 / 1.50			0.40 max.		
Molybdenum	0.15 / 0.25	0.20 / 0.30	0.40 / 0.60	0.40 / 0.60	0.15 / 0.25			
Vanadium	0.03 / 0.08	0.03 / 0.08	0.03 / 0.08	0.03 / 0.08	0.03 / 0.08		0.02 / 0.10	
Titanium	0.01 / 0.03				0.01 / 0.03			
Copper		0.15 / 0.50				0.25 / 0.40		
Boron	0.0005 / 0.005	0.0005 / 0.005	0.0005 / 0.006		0.0005 / 0.005			

RADIUS FOR COLD BENDING

Suggested minimum inside bend radius for cold forming, based on ASTM Standards where t=material thickness.

Specification	Grade	Up to 3/4 in. Thick	Over 3/4 in to 1 in incl.	Over 1 in to 2 in incl.	Over 2 in. Thick
A36		1.5t	1.5t	1.5t	2.0t
A131	A,B,D,CS, and E	1.5t	1.5t	1.5t	2.0t
	AH32,DH32,EH32 ,and FH32	1.5t	1.5t	2.0t	2.5t
	AH36,DH36,EH36, and FH36	1.5t	1.5t	2.0t	2.5t
	AH40,DH40,EH40, and FH40	1.5t	1.5t	2.0t	2.5t
A242		1.5t	1.5t	2.0t	2.5t
A283	A and B	1.5t	1.5t	1.5t	1.5t
	C and D	1.5t	1.5t	1.5t	2.0t
A514	All Grades	1.75t	2.25t	4.5t	5.5t
A529	50 and 55	1.5t	1.5t	2.0t	2.5t
A572	42	1.5t	1.5t	1.5t	2.0t
	50	1.5t	1.5t	2.0t	2.5t
	55	1.5t	1.5t	2.5t	3.0t
	60 and 65	1.5t	1.5t	3.0t	3.5t
A573	58 and 65	1.5t	1.5t	1.5t	2.0t
	70	1.5t	1.5t	2.0t	2.5t
A588	All Grades	1.5t	1.5t	2.0t	2.5t
A633	All Grades	1.5t	1.5t	1.5t	2.0t

NOTE: When bend lines are parallel to the direction of final rolling, multiply values by 1.5.

*** The width across the female die should be at least 8 times the plate thickness. The male die radius should be as large as is possible.**

**** Shear burrs and gas cut edges should be removed by grinding.**

RADIUS FOR COLD BENDING

Suggested minimum inside bend radius for cold forming, based on ASTM Standards where t=material thickness.

Specification	Grade	Up to 3/4 in. Thick	Over 3/4 in to 1 in incl.	Over 1 in to 2 in incl.	Over 2 in. Thick
A656	50	1.5t	1.5t	1.5t	2.0t
	60	1.5t	1.5t	2.5t	3.0t
	70	1.5t	1.5t	3.0t	3.5t
	80	1.75t	2.25t	4.5t	5.5t
A678	A and B	1.5t	1.5t	2.0t	2.5t
	C and D	1.5t	1.5t	2.5t	3.0t
A709	36	1.5t	1.5t	1.5t	2.0t
	50,50W, and HPS 50W	1.5t	1.5t	2.0t	2.5t
	HPS70W	1.5t	1.5t	2.5t	3.0t
	100 and 100W	1.75t	2.25t	4.5t	5.5t
A710	A	1.75t	2.25t	4.5t	5.5t
A808		1.5t	1.5t	2.0t	2.5t
A852		1.5t	1.5t	2.5t	3.0t
A871	60 and 65	1.5t	1.5t	3.0t	3.5t
A945	50 and 65	1.5t	1.5t	1.5t	2.0t
A1008	SS25, SHS26, and BHS26	1/2t			
	SS30,HSLAS-F50,SHS31, and BHS31	1t			
	SS33,HSLAS45, HSLAS-F60, SHS35, BHS35	1 1/2t			
	HSLAS50 CL2	1 1/2t			

NOTE: When bend lines are parallel to the direction of final rolling, multiply values by 1.5.

RADIUS FOR COLD BENDING

Suggested minimum inside bend radius for cold forming, based on ASTM Standards where t=material thickness.

Specification	Grade	Up to 3/4 in. Thick	Over 3/4 in to 1 in incl.	Over 1 in to 2 in incl.	Over 2 in. Thick
A1008	SS40,HSLAS 50 CL1,55,60 CL2,HSLAS-F 70,80	2t			
	SHS 41,44, BHS 41,44	2t			
	SS50,HSLAS 60 CL1,65 CL2,	2 1/2t			
	SS60, HSLAS 65 CL1, 70 CL2	3t			
	HSLAS 70 CL1	3 1/2t			
	SS70	4t			
	SS80	N/A			
A1011	SS30, SS33, HSLAS-F 50	1t			
	SS36 Ty1, HSLAS 45, 50 CL2, HSLAS-F 60	1 1/2t			
	SS36 Ty2, 40,45, HSLAS 50 CL1,55, 60 CL2	2t			
	HSLAS-F 70, 80	2t			
	SS50, HSLAS 60 CL1, 65 CL2	2 1/2t			
	SS55, HSLAS 65 CL1, 70 CL2	3t			
	SS60, HSLAS CL1	3 1/2t			
	SS70,80	4t			
A1018	SS30,33, HSLAS-F 50	1t	1t		
	SS30 Ty1, HSLAS 45, 50 CL2, HSLAS-F 60	1 1/2t	1 1/2t		
	SS36 Ty2, 40,45,HSLAS 50 CL1, 60, HSLAS-F 70,80	2t	2t		
	SS50, HSLAS 60 CL1, 65 CL2	2 1/2t	2 1/2t		
	SS55, HSLAS 65 CL1, 70 CL2	3t	3t		
	HSLAS 70 CL1	3 1/2t	3 1/2t		

NOTE: When bend lines are parallel to the direction of final rolling, multiply values by 1.5.