

GUIDE TO SELECTION Sheet and Coil

HOT ROLLED SHEETS AND COILS

ASTM A-1011 CS and DS

This specification covers commercial quality and drawing quality hot rolled carbon steel. Commercial Steel (CS) comes in four different Types (A, B, C, and D) and Drawing Steel (DS) comes in two different types (A and B). This material is intended for parts that may need to be bent, formed, drawn, punched, or welded. Commercial Steel comes in various carbon ranges with carbon maximums of 0.08%, 0.10%, and 0.15%. Drawing Steel is aluminum killed and is available with a minimum carbon level (0.02% - Type B). Applications for this material include agricultural implements, automotive equipment, barrels, drums, and general fabrication. This material is capable of being bent at room temperature in any direction through 180° flat on itself without cracking on the outside of the bent portion. The surface has a normal mill oxide finish. For improved flatness and improved processing performance, this material may be provided in the temper passed, stretcher leveled, or the pickled and oiled condition. Special surface finishes are also available for applications requiring a more uniform surface for painting.

ASTM A-1011 SS

This part of the specification covers structural quality hot rolled sheets. A-1011 SS is used in structural applications where specified strengths are required. Applications for these grades include agricultural implements, automotive equipment, utility bodies, tanks, construction equipment, and trailers. This material can be formed, punched, machined, and welded using acceptable shop practices. The surface has a normal mill oxide finish. For improved flatness and improved processing performance, this material may be provided in the temper passed, stretcher leveled, or the pickled and oiled condition. Grades included with the SS designation are 30, 33, 36 (Type 1), 36 (Type 2), 40, 45, 50, 55, 60, 70, and 80.

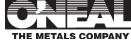
ASTM A-36

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.

HIGH STRENGTH LOW ALLOY (HSLA)

ASTM A-606 - Type 4

This specification covers HSLA sheet with improved corrosion resistance. Type 4 has four times the atmospheric corrosion resistance of structural carbon steel. This sheet product is used in all types of structural applications from truck trailers frames to building components. It is weldable, formable, punchable, and machinable using the proper techniques. This product is often used in the unpainted condition as the



GUIDE TO SELECTION Sheet and Coil

HIGH STRENGTH LOW ALLOY (HSLA) - continued

surface will develop a weathered orange-brown oxide that is resistant to corrosion. ASTM A-606 Type 4 has a yield point of 50,000 psi minimum and a tensile strength of 70,000 psi minimum. Some of the trade names associated with this grade are Corten A, Mayari R, and Hi-Steel.

ASTM A-1011 HSLAS and HSLAS-F

This part of the specification covers high strength grades, and high strength grades with improved formability used where greater specified strength levels are required. The high strength grades are columbium-vanadium steels used in applications such as transmission towers, truck trailers, automotive parts and agricultural implements. This material can be formed, punched, machined, and welded using acceptable shop practices. For improved formability the HSLAS-F grades are available. The surface has a normal mill oxide finish. For improved flatness and improved processing performance, this material may be provided in the temper passed, stretcher leveled, or the pickled and oiled condition. Grades included in the HSLAS designation are 45 (Class 1 & 2), 50 (Class 1 & 2), 55 (Class 1 & 2), 60 (Class 1 & 2), 65 (Class 1 & 2), and 70 (Class 1 & 2). Grades included in HSLAS-F designation are 50, 60, 70, and 80.

COLD ROLLED

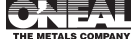
ASTM A-1008

This specification covers cold rolled low carbon commercial, drawing, structural, high-strength low-alloy, and high-strength low-alloy with improved formability steel sheet in coils and cut lengths. O'Neal inventories grade CS Type B which is suitable for exposed applications such as appliances, automotive parts, signs, shelving, furniture, and stamped parts. The surface is matte finish and is oiled to prevent rust. Once the oil is removed, CS Type B will readily accept paint. This material is easily formed, punched, welded, or moderately drawn. It is also available in bright finish for plating applications.

COATED

ASTM A-653 CS and FS - Galvanized

This product is a zinc coated steel produced by the continuous hot dip method. The coating weight is G90 or G60/G40 per ASTM A-653 and has a minimum spangle. Our material is chemically treated with zinc chromate in order to retard the formation of white rust. Also available is chemically treated galvanized material compliant to RoHS restrictions (Please request RoHS compliant treatment when ordering.). It can be formed through 180 degrees without cracking of the base metal or flaking of the zinc coating. It can also be welded with proper precautions. Thicknesses 14 gauge and heavier conform to ASTM A-653 CS while 16 gauge and lighter conform to all gauges are CS. This material is



GUIDE TO SELECTION Sheet and Coil

COATED - continued

intended for many uses where corrosion resistance is important such as corrugated roofing and siding, culverts, window frames, heating and ventilation systems, and farm implements. Some familiar trade names are Weirkote, Tite Kote, Bethcon, Ti-Co. and Zincgrip.

ASTM A-653 CS and FS - Galvannealed

This product is a zinc coated steel produced by the continuous hot dip method. After hot dipping, the material is heat treated to produce a zinc-iron alloy coating. This surface is gray in appearance and is totally free from spangle. Paintability of galvannealed is excellent. It can be formed without sacrificing paintability or corrosion resistance. It is more weldable than galvanized but should be welded with proper precautions. Thicknesses 14 gauge and heavier conform to A-653 CS while 16 gauge all are CS and lighter conform to A-653 FS. All gauges can be bought to A60 or A40. This material is intended for uses where a corrosion resistant material with good paintability is needed. Applications include signs, metal doors, truck bodies, automobile bodies, farm implements, and playground equipment. Some familiar trade names are Weirkote Type J.P., Paint-Tite, Jetcoat, and Redi-Kote.

ASTM A-463 - Type 1 - Aluminized

This product is a hot dipped, aluminum-silicon alloy coated steel. The coating weight to T1-40. Aluminized will provide long term service up to 1250 degrees F and will reflect approximately 80% of radiant heat up to 900 degrees F. It also has good general corrosion resistance. Moderate forming, drawing, and spinning will normally not flake or peel the aluminum-silicon coating. Applications include dryers, incinerators, mufflers, ovens, and space heaters.

ASTM A-424 – Enameling Steel

Enameling steel is melted to a specific chemistry and is specially processed to allow direct-on cover coat porcelain enameling without fear of boiling or fishscaling. This product offers superior drawability and sag resistance, and because it is interstitial-free, it is non-aging and nonfluting.



SHEETS
HOT ROLLED

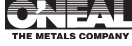
Gauge Width Length	Nominal Thkns In.	Min. Thkns In.	Lbs. Per Sq. Ft.	CS, DS ASTM A-1011 Type B	SS ASTM A-1011 A1011	ASTM A-606 T-4
7 Ga. x 36 x 120	.1793	.171	7.500	X		
48 x 96	.1793	.171	7.500	X		
48 x 120	.1793	.171	7.500	X		
48 x 144	.1793	.171	7.500	X		
60 x 120	.1793	.171	7.500	X		
60 x 144	.1793	.171	7.500	X		
72 x 96	.1793	.171	7.500	X		
72 x 120	.1793	.171	7.500	X		
72 x 144	.1793	.171	7.500	X		
10 Ga. x 36 x 96	.1345	.127	5.625	X		
36 x 120	.1345	.127	5.625	X		
48 x 96	.1345	.127	5.625	X		
48 x 120	.1345	.127	5.625	X		X
48 x 240	.1345	.127	5.625	X		
48 x 288	.1345	.127	5.625	X		
60 x 96	.1345	.127	5.625	X		
60 x 120	.1345	.127	5.625	X	xGR50	
60 x 144	.1345	.127	5.625	X		X
60 x 240	.1345	.127	5.625	X		
60 x 360	.1345	.127	5.625	X		
72 x 96 .1345	.127	5.625	X			
72 x 120	.1345	.127	5.625	X		
72 x 144	.1345	.127	5.625	X		
72 x 240	.1345	.127	5.625	X		
84 x 120	.1345	.127	5.625	X		
84 x 240	.1345	.127	5.625	X		
11 Ga. x 36 x 72	.1196	.112	5.000	X		
36 x 96	.1196	.112	5.000	X		
36 x 120	.1196	.112	5.000	X		
48 x 96	.1196	.112	5.000	X		
48 x 120	.1196	.112	5.000	X		X
48 x 144	.1196	.112	5.000	X		
60 x 96	.1196	.112	5.000	X		
60 x 120	.1196	.112	5.000	X		
60 x 144	.1196	.112	5.000	X		
60 x 240	.1196	.112	5.000	X		

4 SHEET AND COIL



SHEETS
HOT ROLLED

Gauge Width Length	Nominal Thkns In.	Min. Thkns In.	Lbs. Per Sq. Ft.	CS, DS ASTM A-1011 Type B	SS ASTM A-1011 A1011	ASTM A-606 T-4
11 Ga. x 72 x 96	.1196	.112	5.000	X		
72 x 120	.1196	.112	5.000	X		
72 x 144	.1196	.112	5.000	X		
72 x 240	.1196	.112	5.000	X		
12 Ga. x 36 x 96	.1046	.097	4.375	X		
36 x 120	.1046	.097	4.375	X		
36 x 144	.1046	.097	4.375	X		
48 x 96	.1046	.097	4.375	X		
48 x 120	.1046	.097	4.375	X		X
48 x 144	.1046	.097	4.375	X		
60 x 96	.1046	.097	4.375	X		
60 x 120	.1046	.097	4.375	X		
60 x 144	.1046	.097	4.375	X		
60 x 240	.1046	.097	4.375	X		
72 x 96	.1046	.097	4.375	X		
72 x 120	.1046	.097	4.375	X		
72 x 144	.1046	.097	4.375	X		
72 x 240	.1046	.097	4.375	X		
12 Ga. x 36 x 96	.1046	.097	4.375	X		
36 x 120	.1046	.097	4.375	X		
48 x 96	.1046	.097	4.375	X		
48 x 120	.1046	.097	4.375	X		X
48 x 144	.1046	.097	4.375	X		
60 x 96	.1046	.097	4.375	X		
60 x 120	.1046	.097	4.375	X		
60 x 144	.1046	.097	4.375	X		
72 x 96	.1046	.097	4.375	X		
72 x 120	.1046	.097	4.375	X		
72 x 144	.1046	.097	4.375	X		



SHEETS
HOT ROLLED

Gauge Width Length	Nominal Thkns In.	Min. Thkns In.	Lbs. Per Sq. Ft.	CS, DS	SS	
				ASTM A-1011 Type B	ASTM A-1011 A1011	ASTM A-606 T-4
16 Ga. x 36 x 96	.0598	.054	2.500	X		
36 x 120	.0598	.054	2.500	X		
36 x 144	.0598	.054	2.500	X		
48 x 96	.0598	.054	2.500	X		
48 x 120	.0598	.054	2.500	X		
48 x 144	.0598	.054	2.500	X		
60 x 96	.0598	.054	2.500	X		
60 x 120	.0598	.054	2.500	X		
60 x 144	.0598	.054	2.500	X		

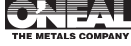


SHEET

COLD ROLLED - ASTM A-1008, LIGHT MATTE FINISH, OILED,
COMMERCIAL QUALITY (CS)

Gauge	Nominal Thickness In Inches	Minimum Thickness In Inches	Size In Inches	Lbs. Per Sq. Ft.	Lbs. Per Piece
11	.1196	.114	48 x 120	5.000	200.00
	.1196	.114	60 x 120	5.000	250.00
12	.1046	.099	48 x 96	4.375	140.00
	.1046	.099	48 x 120	4.375	175.00
	.1046	.099	60 x 120	4.375	218.75
14	.0747	.070	36 x 120	3.125	93.75
	.0747	.070	48 x 96	3.125	100.00
	.0747	.070	48 x 120	3.125	125.00
16	.0598	.055	36 x 96	2.500	60.00
	.0598	.055	36 x 120	2.500	75.00
	.0598	.055	48 x 96	2.500	80.00
	.0598	.055	48 x 120	2.500	100.00
	.0598	.055	48 x 144	2.500	120.00
	.0598	.055	60 x 120	2.500	125.00
	.0598	.055	60 x 144	2.500	150.00
18	.048	.044	36 x 96	2.000	48.00
	.048	.044	36 x 120	2.000	60.00
	.048	.044	48 x 96	2.000	64.00
	.048	.044	48 x 120	2.000	80.00
	.048	.044	48 x 144	2.000	96.00
	.048	.044	60 x 120	2.000	100.00
20	.036	.033	36 x 96	1.500	36.00
	.036	.033	36 x 120	1.500	45.00
	.036	.033	48 x 96	1.500	48.00
	.036	.033	48 x 120	1.500	60.00
	.036	.033	48 x 144	1.500	72.00
	.036	.033	60 x 120	1.500	75.00
22	.030	.027	36 x 96	1.250	30.00
	.030	.027	36 x 120	1.250	37.50
	.030	.027	48 x 96	1.250	40.00
	.030	.027	48 x 120	1.250	50.00
24	.024	.021	48 x 96	1.000	32.00
	.024	.021	48 x 120	1.000	

SHEET AND COIL



COATED SHEET

GALVANIZED - ASTM A-653 - CS
 G90, REGULAR SPANGLE, CHEM TREAT, DRY
 ALL SIZES CS B

Sizes 14 gauge and heavier are A-653 Commercial Quality

Gauge	Nominal Thickness In Inches	Minimum Thickness In Inches	Size In Inches	Lbs. Per Sq. Ft.	Lbs. Per Piece
10	.1382	.129	48 x 120	5.781	231.24
11	.1233	.114	48 x 96	5.156	164.99
	.1233	.114	48 x 120	5.156	206.24
12	.1084	.099	48 x 120	4.531	181.24
14	.079	.071	36 x 120	3.281	98.43
	.079	.071	48 x 96	3.281	104.99
	.079	.071	48 x 120	3.281	131.24
16	.064	.058	36 x 96	2.656	63.74
	.064	.058	36 x 120	2.656	79.68
	.064	.058	48 x 96	2.656	84.99
	.064	.058	48 x 120	2.656	106.24
	.064	.058	60 x 120	2.656	132.80
18	.052	.047	36 x 96	2.156	51.74
	.052	.047	36 x 120	2.156	64.68
	.052	.047	48 x 96	2.156	68.99
	.052	.047	48 x 120	2.156	86.24
	.052	.047	60 x 120	2.156	107.80
20	.040	.036	36 x 96	1.656	39.74
	.040	.036	48 x 96	1.656	52.99
	.040	.036	48 x 120	1.656	66.24
	.040	.036	60 x 120	1.656	82.80
22	.040	.030	36 x 120	1.406	42.18
	.040	.030	48 x 96	1.406	44.99
	.040	.030	48 x 120	1.406	56.24



COATED SHEET

GALVANIZED - ASTM A-653 - CS
G90, REGULAR SPANGLE, CHEM TREAT, DRY
ALL SIZES CS B

Sizes 14 gauge and heavier are A-653 Commercial Quality

Gauge	Nominal Thickness In Inches	Minimum Thickness In Inches	Size In Inches	Lbs. Per Sq. Ft.	Lbs. Per Piece
24	.028	.024	36 x 120	1.156	36.68
	.028	.024	48 x 96	1.156	36.99
	.028	.024	48 x 120	1.156	46.24
	.028	.024	60 x 120	1.156	57.80
26	.022	.019	48 x 96	.906	28.99
	.022	.019	48 x 120	.906	36.24



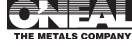
COATED SHEET

GALVANNEALED - ASTM A-653 - CS, CHEM TREAT, DRY
EXTRA SMOOTH
ALL SIZES CS B

Sizes 14 gauge and heavier are A-653, Commercial Quality

ALL SIZES CAN BE A40 OR A60

Gauge	Nominal Thickness In Inches	Minimum Thickness In Inches	Size In Inches	Lbs. Per Sq. Ft.	Lbs. Per Piece
10	.1382	.129	48 x 96	5.781	184.99
11	.1233	.114	48 x 96	5.156	164.99
	.1233	.114	48 x 120	5.156	206.24
12	.1084	.099	48 x 120	4.531	181.24
	.1084	.099	60 X 120	4.531	226.55
14	.079	.071	48 x 120	3.281	131.24
16	.064	.058	48 x 120	2.656	106.24
18	.052	.047	48 x 120	2.156	86.24
20	.040	.036	48 x 96	1.656	52.99
	.040	.036	48 x 120	1.656	66.24
22	.034	.030	48 x 120	1.406	56.24
24	.028	.024	48 x 120	1.156	46.24
26	.022	.019	48 x 120	.906	36.24



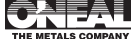
ALUMINIZED SHEET

ASTM A-463, TYPE 1, COMMERCIAL QUALITY
T1-40 COATING, DRY

Gauge	Nominal Thickness In Inches	Minimum Thickness In Inches	Size In Inches	Lbs. Per Sq. Ft.	Lbs. Per Sheet
12	.108	.099	48 x 120	4.531	181.24
			48 x 96	4.531	144.99
14	.079	.071	48 x 120	3.281	131.24
			60 x 120	3.281	164.05
16	.064	.058	48 x 120	2.656	106.24
18	.052	.047	48 x 120	2.156	86.24
20	.040	.036	48 x 96	1.656	52.99
			48 x 120	1.656	66.24
22	.084	.030	48 x 120	1.406	56.24
			60 x 120	1.406	70.30
24	.028	.024	48 x 120	1.156	46.24
			60 x 120	1.156	57.80

SHEET AND COIL

F 1



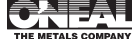
COILS

HOT ROLLED PLATE SIZE

Thickness x Width Inches	Nominal Thickness Inches	Lbs. Per Sq. Ft.	CS ASTM A-1011	ASTM A-36*	ASTM A-606 T-4	ASTM HSLAS A-1011 GR50
3/16 x 36	.1875	7.65	xGR50	X		
	48 .1875	7.65		X	X	X
	60 .1875	7.65		X	X	X
	72 .1875	7.65		X		X
	84 .1875	7.65		X		
	96 .1875	7.65		X		
1/4 x 36	.2500	10.20		X		
	48 .2500	10.20		X	X	X
	60 .2500	10.20		X	X	X
	72 .2500	10.20		X	X	X
	84 .2500	10.20		X		
	96 .2500	10.20		X		
5/16 x 48	.3125	12.75		X	X	X
	60 .3125	12.75		X	X	X
	72 .3125	12.75		X		X
	84 .3125	12.75		X		
3/8 x 48	.3750	15.30		X	X	X
	60 .3750	15.30		X	X	X
	72 .3750	15.30		X		X
	96 .3750	15.30		X		
1/2 x 48	.5000	20.40		X		X
	60 .5000	20.40		X		X
	72 .5000	20.40		X		X
	84 .5000	20.40		X		
	96 .5000	20.40		X		

*Certified to ASTM A36 when cut to length

SHEET AND COIL



COILS

HOT ROLLED SHEET SIZE

Thickness x Width Inches	Nominal Thickness Inches	Min. Thickness Inches	Lbs. Per Sq. Ft.	CS, DS ASTM A-1011 Type B	SS ASTM A-1011	ASTM A-606 T-4
7 Ga. x 48	.1793	.171	7.500	X		
	60 .1793	.171	7.500	X		
	72 .1793	.171	7.500	X		
10 Ga. x 36	.1345	.126	5.625	X		
	48 .1345	.126	5.625	X	xGR50	
	60 .1345	.126	5.625	X	xGR50	
	72 .1345	.126	5.625	X		
	84 .1345	.126	5.625	X		
11 Ga. x 36	.1196	.112	5.000	X		
	48 .1196	.112	5.000	X		X
	60 .1196	.112	5.000	X		X
	72 .1196	.112	5.000	X		
12 Ga. x 36	.1046	.097	4.375	X		
	48 .1046	.097	4.375	X		X
	60 .1046	.097	4.375	X		X
	72 .1046	.097	4.375	X		
14 Ga. x 36	.0747	.068	3.125	X		
	48 .0747	.068	3.125	X	xGR33	
	60 .0747	.068	3.125	X	xGR33	
	72 .0747	.068	3.125	X		
16 Ga. x 48	.0598	.053	2.500	X		
	60 .0598	.053	2.500	X		
	72 .0598	.053	2.500	X		

SHEET AND COIL



FLOOR PLATE COIL

4-WAY MEDIUM PATTERN

ASTM A-786, COMMERCIAL QUALITY

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

FLOOR SHEET COIL

4-WAY MEDIUM PATTERN

ASTM A-786, COMMERCIAL QUALITY

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

SHEET AND COIL



COILS

COLD ROLLED - ASTM A-1008 LIGHT MATTE FINISHED, OILED
COMMERCIAL QUALITY

Gauge	Nominal Thickness Inches	Minimum Thickness Inches	Lbs. Per Sq. Ft.	Width In Inches
11	.1196	.114	5.000	48
	.1196	.114	5.000	60
12	.1046	.099	4.375	48
	.1046	.099	4.375	60
14	.0747	.070	3.125	36
	.0747	.070	3.125	48
	.0747	.070	3.125	60
16	.0598	.055	2.500	36
	.0598	.055	2.500	48
	.0598	.055	2.500	60
18	.048	.044	2.000	36
	.048	.044	2.000	48
	.048	.044	2.000	60
20	.036	.033	1.500	36
	.036	.033	1.500	48
	.036	.033	1.500	60
22	.030	.027	1.250	36
	.030	.027	1.250	48
	.030	.027	1.250	60
24	.024	.021	1.000	48

SHEET AND COIL



COILS

GALVANIZED - ASTM A-653 CS FS, G90, REGULAR
 SPANGLE, CHEM TREAT, DRY
 ALL SIZES CS B

Sizes 14 Gauge and heavier are A-653 Commercial Quality

Gauge	Nominal Thickness Inches	Minimum Thickness Inches	Lbs. Per Sq. Ft.	Width In Inches
10	.1382	.129	5.781	48
11	.1233	.114	5.156	48
12	.1084	.099	4.531	48
14	.0785	.071	3.281	36
	.0785	.071	3.281	48
	.0785	.071	3.281	60
16	.0635	.058	2.656	36
	.0635	.058	2.656	48
	.0635	.058	2.656	60
18	.052	.047	2.156	36
	.052	.047	2.156	48
	.052	.047	2.156	60
20	.040	.036	1.656	36
	.040	.036	1.656	48
	.040	.036	1.656	60
22	.034	.030	1.406	36
	.034	.030	1.406	48
	.034	.030	1.406	60
24	.028	.024	1.156	36
	.028	.024	1.156	48
	.028	.024	1.156	60
26	.022	.019	.906	48



COILS

GALVANNEALED - ASTM A-653 CS and FS, CHEM TREAT, DRY
EXTRA SMOOTH OR NOT OILED

ALL SIZES CS B

Sizes 14 Gauge and heavier are A-653 Commercial Quality

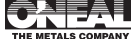
All is A60 or A40

Gauge	Nominal Thickness Inches	Minimum Thickness Inches	Lbs. Per Sq. Ft.	Width In Inches
10	.1382	.129	5.871	48
11	.1233	.114	5.156	48
12	.1084	.099	4.531	48
	.1084	.100	4.531	60
14	.0785	.071	3.281	48
	.0785	.071	3.281	60
16	.0635	.058	2.656	48
	.0635	.058	2.656	60
18	.052	.047	2.156	48
	.052	.047	2.156	60
20	.040	.036	1.656	48
22	.034	.030	1.406	48
24	.028	.024	1.156	48
26	.022	.019	.906	48

COILS

ALUMINIZED ASTM-463, TYPE 1, COMMERCIAL QUALITY
T1-40 COATING, DRY OR T125

Gauge	Nominal Thickness Inches	Minimum Thickness Inches	Lbs. Per Sq. Ft.	Width In Inches
16	.064	.058	2.656	48
18	.052	.047	2.156	48
20	.040	.036	1.656	48



COIL

ENAMELING STEEL

Gauge & Width	Nom	Min	Lbs. Per Sq. Ft.
14 Ga. x 48 x 32	.079	.071	3.281
20 Ga. x 48	.040	.036	1.656
18 Ga. x 36 x 48	.052	.047	2.156
16 Ga. x 48 x 36	.064	.058	2.656

HOT ROLLED SHEET GRADES - CARBON / SS

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A1011 CS Type A	ASTM A1011 CS Type B	ASTM A1011 CS Type C	ASTM A1011 CS Type D	ASTM A1011 DS Type A	ASTM A1011 DS Type B	ASTM A1011 SS GR 30	ASTM A1011 SS GR 33	ASTM A1011 SS GR 36 Ty 1	ASTM A1011 SS GR 36 Ty 2
Yield Point KSI										
Tensile Strength KSI										
% Elongation 2"										
Carbon	0.10 max	0.02 - 0.15	0.08 max	0.10 max	0.08 max	0.02 - 0.08	0.25 max	0.25 max	0.25 max	0.25 max
Manganese	0.60 max	0.60 max	0.60 max	0.70 max	0.50 max	0.50 max	0.90 max	0.90 max	0.90 max	1.35 max
Phosphorus	0.030 max	0.030 max	0.10 max	0.030 max	0.020 max	0.020 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	0.030 max	0.030 max	0.04 max	0.04 max	0.04 max	0.04 max
Aluminum					0.01 min	0.01 min				
Silicon										
Copper	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Nickel	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Chromium	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max
Molybdenum	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max
Vanadium	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max
Columbium	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max
Titanium	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max

NO SHEET AND COIL

HOT ROLLED SHEET GRADES - SS / HSLAS

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A 1011 SS GR 40	ASTM A 1011 SS GR 45	ASTM A 1011 SS GR 50	ASTM A 1011 SS GR 55	ASTM A 1011 SS GR 60	ASTM A 1011 SS GR 70	ASTM A 1011 SS GR 80	ASTM A 1011 HSLAS GR 45 CL 1	ASTM A 1011 HSLAS GR 45 CL 2	ASTM A 1011 HSLAS GR 50 CL 1
Yield Point KSI	40 min	45 min	50 min	55 min	60 min	70 min	80 min	45 min	45 min	50 min
Tensile Strength KSI	55 min	60 min	65 min	70 min	75 min	85 min	95 min	60 min	55 min	65 min
% Elongation 2"	21 min	19 min	17 min	15 min	14 min	13 min	12 min	25 min	25 min	22 min
Carbon	0.25 max	0.25 max	0.25 max	0.25 max	0.25 max	0.25 max	0.25 max	0.22 max	0.15 max	0.23 max
Manganese	0.90 max	1.35 max	1.35 max	1.35 max	1.35 max	1.35 max	1.35 max	1.35 max	1.35 max	1.35 max
Phosphorus	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max	0.04 max	0.04 max	0.04 max
Sulfur	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max
Aluminum										
Silicon	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Copper	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Nickel	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max
Chromium	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max
Molybdenum	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.005 min	0.005 min	0.005 min
Vanadium	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.005 min	0.005 min	0.005 min
Columbium	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.005 min	0.005 min	0.005 min
Titanium								0.005 min	0.005 min	0.005 min



HOT ROLLED SHEET GRADES - HSLAS

Typical Mechanical Properties and Chemical Ranges and Limits

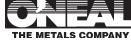
	ASTM A1011 HSLAS GR 50 CL 2	ASTM A1011 HSLAS GR 55 CL 1	ASTM A1011 HSLAS GR 55 CL 2	ASTM A1011 HSLAS GR 60 CL 1	ASTM A1011 HSLAS GR 60 CL 2	ASTM A1011 HSLAS GR 65 CL 1	ASTM A1011 HSLAS GR 65 CL 2	ASTM A1011 HSLAS GR 70 CL 1	ASTM A1011 HSLAS GR 70 CL 2	ASTM A606 TYPE 4
Yield Point KSI	50 min 60 min 22 min	55 min 70 min 20 min	55 min 65 min 20 min	60 min 75 min 18 min	60 min 75 min 18 min	65 min 80 min 16 min	65 min 75 min 16 min	70 min 85 min 14 min	70 min 80 min 14 min	50 min 70 min 22 min
Tensile Strength KSI	0.15 max 1.35 max 0.04 max 0.04 max	0.25 max 1.35 max 0.04 max 0.04 max	0.15 max 1.35 max 0.04 max 0.04 max	0.26 max 1.50 max 0.04 max 0.04 max	0.26 max 1.50 max 0.04 max 0.04 max	0.26 max 1.50 max 0.04 max 0.04 max	0.26 max 1.50 max 0.04 max 0.04 max	0.26 max 1.65 max 0.04 max 0.04 max	0.15 max 1.65 max 0.04 max 0.04 max	0.22 max 1.25 max 0.050 max
% Elongation 2"										
Carbon										
Manganese										
Phosphorus										
Sulfur										
Aluminum										
Silicon										
Copper	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	
Nickel	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	
Chromium	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	
Molybdenum	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	
Vanadium	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	
Columbium	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	
Titanium	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	

2 SHEET AND COIL

HOT ROLLED SHEET GRADES - HSLAS-F / PRESSURE VESSEL QUALITY

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A1011 HSLAS-F GR 50	ASTM A1011 HSLAS-F GR 60	ASTM A1011 HSLAS-F GR 70	ASTM A1011 HSLAS-F GR 80	ASTM A414 PVQ GR A	ASTM A414 PVQ GR B	ASTM A414 PVQ GR C	ASTM A414 PVQ GR D	ASTM A414 PVQ GR E	ASTM A414 PVQ GR F	ASTM A414 PVQ GR G
Yield Point KSI	50 min	60 min	70 min	80 min	25 min	30 min	33 min	35 min	38 min	42 min	45 min
Tensile Strength KSI	60 min	70 min	80 min	90 min	45-60	50-65	55-70	60-75	65-85	70-90	75-95
% Elongation 2"	24 min	22 min	20 min	18 min	23 min	21 min	19 min	17 min	15 min	13 min	13 min
Carbon	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.22 max	0.25 max	0.25 max	0.27 max	0.31 max	0.31 max
Manganese	1.65 max	1.65 max	1.65 max	1.65 max	0.90 max	0.90 max	0.90 max	1.20 max	1.20 max	1.20 max	1.35 max
Phosphorus	0.020 max	0.020 max	0.020 max	0.020 max	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max
Sulfur	0.025 max	0.025 max	0.025 max	0.025 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max
Aluminum											
Silicon											
Copper	0.20 max	0.20 max	0.20 max	0.20 max							
Nickel	0.20 max	0.20 max	0.20 max	0.20 max							
Chromium	0.15 max	0.15 max	0.15 max	0.15 max							
Molybdenum	0.06 max	0.06 max	0.06 max	0.06 max							
Vanadium	0.005 min	0.005 min	0.005 min	0.005 min							
Columbium	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min
Titanium	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min



THE METALS COMPANY

COLD ROLLED SHEET GRADES - CARBON / SS

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A794 CS Hi Carbon	ASTM A1008 CS Type A	ASTM A1008 CS Type B	ASTM A1008 CS Type C	ASTM A1008 DS Type A	ASTM A1008 DS Type B	ASTM A1008 DDS	ASTM A1008 EDDS	ASTM A1008 SS GR 25	ASTM A1008 SS GR 30	ASTM A1008 SS GR 33 Ty 1
Yield Point KSI	50 min								25 min	30 min	33 min
Tensile Strength KSI	60 min								42 min	45 min	48 min
% Elongation 2"	24 min								26 min	24 min	22 min
Carbon	0.30-0.90	0.10 max	0.02 - 0.15	0.08 max	0.08 max	0.02 - 0.08	0.06 max	0.02 max	0.20 max	0.20 max	0.20 max
Manganese		0.60 max	0.60 max	0.60 max	0.50 max	0.50 max	0.50 max	0.40 max	0.60 max	0.60 max	0.60 max
Phosphorus	0.04 max	0.030 max	0.030 max	0.10 max	0.020 max	0.020 max	0.020 max	0.020 max	0.035 max	0.035 max	0.035 max
Sulfur	0.04 max	0.035 max	0.035 max	0.035 max	0.030 max	0.030 max	0.025 max	0.025 max	0.035 max	0.035 max	0.035 max
Aluminum					0.01 min	0.02 min	0.01 min	0.01 min			
Silicon											
Copper		0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.10 max	0.20 max	0.20 max	0.20 max
Nickel		0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.10 max	0.20 max	0.20 max	0.20 max
Chromium		0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max
Molybdenum		0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.03 max	0.06 max	0.06 max	0.06 max
Vanadium		0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.10 max	0.008 max	0.008 max	0.008 max
Columbium		0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.10 max	0.008 max	0.008 max	0.008 max
Titanium		0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.15 max	0.025 max	0.025 max	0.025 max

COLD ROLLED SHEET GRADES - SS / HSLAS

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A1008 SS GR 33 Ty 2	ASTM A1008 SS GR 40 Ty 1	ASTM A1008 SS GR 40 Ty 2	ASTM A1008 SS GR 50	ASTM A1008 SS GR 60	ASTM A1008 SS GR 70	ASTM A1008 SS GR 80	ASTM A1008 HSLAS GR 45 CL 1	ASTM A1008 HSLAS GR 45 CL 2	ASTM A1008 HSLAS GR 50 CL 1
Yield Point KSI	33 min	40 min	40 min	50 min	60 min	70 min	80 min	45 min	45 min	50 min
Tensile Strength KSI	48 min	52 min	52 min	65 min	75 min	85 min	82 min	60 min	55 min	65 min
% Elongation 2"	22 min	20 min	20 min	18 min	12 min	6 min	None	25 min	25 min	22 min
Carbon	0.15 max	0.20 max	0.15 max	0.20 max	0.20 max	0.20 max	0.20 max	0.22 max	0.15 max	0.23 max
Manganese	0.60 max	0.90 max	0.60 max	0.70 max	0.70 max	0.70 max	0.60 max	1.65 max	1.65 max	1.65 max
Phosphorus	0.02 max	0.035 max	0.02 max	0.035 max	0.035 max	0.035 max	0.035 max	0.04 max	0.04 max	0.04 max
Sulfur	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max
Aluminum										
Silicon										
Copper	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Nickel	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Chromium	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max
Molybdenum	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max
Vanadium	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.005 min	0.005 min	0.005 min
Columbium	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.005 min	0.005 min	0.005 min
Titanium	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.005 min	0.005 min	0.005 min

COLD ROLLED SHEET GRADES - HSLAS

Typical Mechanical Properties and Chemical Ranges and Limits

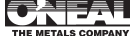
	ASTM A1008 HSLAS GR 50 CL 2	ASTM A1008 HSLAS GR 55 CL 1	ASTM A1008 HSLAS GR 55 CL 2	ASTM A1008 HSLAS GR 60 CL 1	ASTM A1008 HSLAS GR 60 CL 2	ASTM A1008 HSLAS GR 65 CL 1	ASTM A1008 HSLAS GR 65 CL 2	ASTM A1008 HSLAS GR 70 CL 1	ASTM A1008 HSLAS GR 70 CL 2	ASTM A606 TYPE 4
Yield Point KSI	50 min	55 min	55 min	60 min	60 min	65 min	65 min	70 min	70 min	50 min
Tensile Strength KSI	60 min	70 min	65 min	75 min	70 min	80 min	75 min	85 min	80 min	70 min
% Elongation 2"	20 min	18 min	18 min	16 min	16 min	15 min	15 min	14 min	14 min	22 min
Carbon	0.15 max	0.25 max	0.15 max	0.26 max	0.15 max	0.26 max	0.15 max	0.26 max	0.15 max	0.22 max
Manganese	1.65 max	1.65 max	1.65 max	1.65 max	1.65 max	1.65 max	1.65 max	1.65 max	1.65 max	1.25 max
Phosphorus	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	
Sulfur	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.050 max
Aluminum										
Silicon										
Copper	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	
Nickel	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	
Chromium	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	
Molybdenum	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	
Vanadium	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	
Columbium	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	
Titanium	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min	

SHEET AND COIL

COLD ROLLED SHEET GRADES - HSLAS-F

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A1008 HSLAS-F GR 50	ASTM A1008 HSLAS-F GR 60	ASTM A1008 HSLAS-F GR 70	ASTM A1008 HSLAS-F GR 80	ASTM A1008 HSLAS-F SHS-GR 26	ASTM A1008 HSLAS-F SHS GR 31	ASTM A1008 HSLAS-F SHS GR 35	ASTM A1008 HSLAS-F SHS GR 41	ASTM A1008 HSLAS-F SHS GR 44
Yield Point KSI	50 min 60 min 22 min	60 min 70 min 18 min	70 min 80 min 16 min	80 min 90 min 14 min	26 min 43 min 32 min	31 min 46 min 30 min	35 min 50 min 26 min	41 min 53 min 24 min	44 min 57 min 22 min
Tensile Strength KSI	0.15 max 1.65 max 0.020 max 0.025 max	0.15 max 1.65 max 0.020 max 0.025 max	0.15 max 1.65 max 0.020 max 0.025 max	0.15 max 1.65 max 0.020 max 0.025 max	0.12 max 1.50 max 0.12 max 0.03 max	0.12 max 1.50 max 0.12 max 0.03 max	0.12 max 1.50 max 0.12 max 0.03 max	0.12 max 1.50 max 0.12 max 0.03 max	0.12 max 1.50 max 0.12 max 0.03 max
% Elongation 2"									
Carbon									
Manganese									
Phosphorus									
Sulfur									
Aluminum									
Silicon									
Copper	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Nickel	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Chromium	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max
Molybdenum	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max
Vanadium	0.005 min	0.005 min	0.005 min	0.005 min	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max
Columbium	0.005 min	0.005 min	0.005 min	0.005 min	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max
Titanium	0.005 min	0.005 min	0.005 min	0.005 min	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max



COLD ROLLED SHEET GRADES - HSLAS-F

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A1008 HSLAS-F BHS GR 26	ASTM A1008 HSLAS-F BHS GR 31	ASTM A1008 HSLAS-F BHS GR 35	ASTM A1008 HSLAS-F BHS GR 41	ASTM A1008 HSLAS-F BHS GR 44
Yield Point KSI	26 min	31 min	35 min	41 min	44 min
Tensile Strength KSI	43 min 30 min	46 min 28 min	50 min 24 min	53 min 22 min	57 min 20 min
% Elongation 2"					
Carbon	0.12 max	0.12 max	0.12 max	0.12 max	0.12 max
Manganese	1.50 max	1.50 max	1.50 max	1.50 max	1.50 max
Phosphorus	0.12 max	0.12 max	0.12 max	0.12 max	0.12 max
Sulfur	0.030 max	0.030 max	0.030 max	0.030 max	0.030 max
Aluminum					
Silicon					
Copper	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Nickel	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Chromium	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max
Molybdenum	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max
Vanadium	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max
Columbium	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max
Titanium	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max

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COATED SHEET GRADES

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A653 CS Type A	ASTM A653 CS Type B	ASTM A653 CS Type C	ASTM A653 FS Type A	ASTM A653 FS Type B	ASTM A653 DDS Type A	ASTM A653 DDS Type C	ASTM A653 EDDS	ASTM A653 SS GR 33	ASTM A653 SS GR 37	ASTM A653 SS GR 40
Yield Point KSI									33 min 45 min 20 min	37 min 52 min 18 min	40 min 55 min 16 min
Tensile Strength KSI									0.20 max 0.20 max 0.20 max	0.20 max 0.20 max 0.20 max	0.25 max 1.35 max 0.10 max
% Elongation 2"									0.04 max 0.04 max 0.04 max	0.10 max 0.10 max 0.04 max	0.10 max 0.10 max 0.04 max
Carbon	0.10 max	0.02 - 0.15	0.08 max	0.10 max	0.02-0.10	0.06 max	0.02 max	0.02 max	0.20 max	0.20 max	0.25 max
Manganese	0.60 max	0.60 max	0.60 max	0.50 max	0.50 max	0.50 max	0.50 max	0.40 max	1.35 max	1.35 max	1.35 max
Phosphorus	0.030 max	0.030 max	0.10 max	0.020 max	0.020 max	0.020 max	0.020-0.10	0.020 max	0.04 max	0.10 max	0.10 max
Sulfur	0.035 max	0.035 max	0.035 max	0.035 max	0.030 max	0.025 max	0.025 max	0.020 max	0.04 max	0.04 max	0.04 max
Aluminum						0.01 min	0.01 min	0.01 min			
Silicon	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.10 max	0.10 max	0.20 max	0.20 max	0.20 max
Copper	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.10 max	0.10 max	0.20 max	0.20 max	0.20 max
Nickel	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max
Chromium	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max
Molybdenum	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.10 max	0.10 max	0.008 max	0.008 max	0.008 max
Vanadium	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.10 max	0.10 max	0.008 max	0.008 max	0.008 max
Columbium	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.15 max	0.15 max	0.008 max	0.008 max	0.008 max
Titanium									0.025 max	0.025 max	0.025 max

COATED SHEET GRADES

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A653 SS GR 50 CL 1	ASTM A653 SS GR 50 CL 2	ASTM A653 SS GR 50 CL 3	ASTM A653 SS GR 50 CL 4	ASTM A653 SS GR 80 CL 1	ASTM A653 SS GR 80 CL 2	ASTM A653 HSLAS GR 40	ASTM A653 HSLAS GR 50	ASTM A653 HSLAS GR 60	ASTM A653 HSLAS GR 70	ASTM A653 HSLAS GR 80
Yield Point KSI	50 min	50 min	50 min	50 min	80 min	80 min	40 min	50 min	60 min	70 min	80 min
Tensile Strength KSI	65 min	70 min	70 min	60 min	82 min	82 min	50 min	60 min	70 min	80 min	90 min
% Elongation 2"	12 min	12 min	12 min	12 min	None	None	22 max	20 max	16 max	12 max	10 max
Carbon	0.25 max	0.25 max	0.25 max	0.25 max	0.20 max	0.02 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Manganese	1.35 max	1.35 max	1.35 max	1.35 max	1.35 max	1.35 max	1.20 max	1.20 max	1.35 max	1.65 max	1.65 max
Phosphorus	0.20 max	0.20 max	0.04 max	0.20 max	0.04 max	0.05 max	0.035 max	1.20 max	1.35 max	1.65 max	1.65 max
Sulfur	0.04 max	0.04 max	0.04 max	0.04 max	0.04 max	0.02 max	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max
Aluminum											
Silicon	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max					
Copper	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max					
Nickel	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.20 max	0.20 max	0.20 max	0.20 max	0.20 max
Chromium	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.06 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max
Molybdenum	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.10 max	0.16 max	0.16 max	0.16 max	0.16 max	0.16 max
Vanadium	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max	0.10 max	0.01 min	0.01 min	0.01 min	0.01 min	0.01 min
Columbium	0.008 max	0.008 max	0.008 max	0.008 max	0.015 max	0.10 max	0.005 min	0.005 min	0.005 min	0.005 min	0.005 min
Titanium	0.025 max	0.025 max	0.025 max	0.025 max	0.025 max	0.15 max	0.01 min	0.01 min	0.01 min	0.01 min	0.01 min



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COATED SHEET GRADES

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A653 HSLAS-F GR 40	ASTM A653 HSLAS-F GR 50	ASTM A653 HSLAS-F GR 60	ASTM A653 HSLAS-F GR 70	ASTM A653 HSLAS-F GR 80	ASTM A653 HSLAS-F SHS GR 26	ASTM A653 HSLAS-F SHS GR 31	ASTM A653 HSLAS-F SHS GR 35	ASTM A653 HSLAS-F SHS GR 41	ASTM A653 HSLAS-F SHS GR 44
Yield Point KSI	40 min 50 min 24 min	50 min 60 min 22 min	60 min 70 min 18 min	70 min 80 min 14 min	80 min 90 min 12 min	26 min 43 min 32 min	31 min 46 min 30 min	35 min 50 min 26 min	41 min 53 min 24 min	44 min 57 min 22 min
Tensile Strength KSI	0.15 max 1.20 max	0.15 max 1.20 max	0.15 max 1.20 max	0.15 max 1.65 max	0.15 max 1.65 max	0.12 max 1.50 max 0.12 max	0.12 max 1.50 max 0.12 max	0.12 max 1.50 max 0.12 max	0.12 max 1.50 max 0.12 max	0.12 max 1.50 max 0.12 max
% Elongation 2"	0.035 max	0.035 max	0.035 max	0.035 max	0.035 max	0.030 max	0.030 max	0.030 max	0.030 max	0.030 max
Carbon										
Manganese										
Phosphorus										
Sulfur										
Aluminum										
Silicon										
Copper										
Nickel										
Chromium										
Molybdenum										
Vanadium										
Columbium										
Titanium										



COATED SHEET GRADES

Typical Mechanical Properties and Chemical Ranges and Limits

	ASTM A653 HSLAS-F BHS GR 26	ASTM A653 HSLAS-F BHS GR 31	ASTM A653 HSLAS-F BHS GR 35	ASTM A653 HSLAS-F BHS GR 41	ASTM A653 HSLAS-F BHS GR 44	ASTM A653 Coating Zinc	ASTM A653 Coating Zn - Fe
Yield Point KSI	26 min 43 min 30 min	31 min 46 min 28 min	35 min 50 min 24 min	41 min 53 min 22 min	44 min 57 min 20 min	G360 G300 G235 G210 G185 G165 G140 G115 G100 G90 G60 G40 G30 G01	A60 A40 A25 A01
Tensile Strength KSI	0.12 max 1.50 max 0.12 max 0.030 max	0.12 max 1.50 max 0.12 max 0.030 max	0.12 max 1.50 max 0.12 max 0.030 max	0.12 max 1.50 max 0.12 max 0.030 max	0.12 max 1.50 max 0.12 max 0.030 max		
% Elongation 2"	0.20 max 0.20 max 0.15 max 0.06 max 0.008 max 0.008 max 0.025 max	0.20 max 0.20 max 0.15 max 0.06 max 0.008 max 0.008 max 0.025 max	0.20 max 0.20 max 0.15 max 0.06 max 0.008 max 0.008 max 0.025 max	0.20 max 0.20 max 0.15 max 0.06 max 0.008 max 0.008 max 0.025 max	0.20 max 0.20 max 0.15 max 0.06 max 0.008 max 0.008 max 0.025 max		
Carbon							
Manganese							
Phosphorus							
Sulfur							
Aluminum							
Silicon							
Copper							
Nickel							
Chromium							
Molybdenum							
Vanadium							
Columbium							
Titanium							

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