

SHEET AND COIL

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Russel Metals

SHEET AND COIL

THEORETICAL WEIGHT
PER SQUARE FOOT
HOT ROLLED, COLD ROLLED
GALVANIZED, ALLOY-COATED



HOT ROLLED (.1793-.060) AND COLD ROLLED (.135-.0149)			GALVANIZED AND ALLOY COATED		
Gauge	Nominal Thickness In Inches	Estimated Weight Per Square Foot	Gauge	Nominal Thickness In Inches	Estimated Weight Per Square Foot
7	.1793	7.500	—	—	—
8	.1644	6.875	—	—	—
9	.1495	6.250	—	—	—
10	.1344	5.625	10	.1382	5.781
11	.1196	5.000	11	.1233	5.196
12	.1046	4.375	12	.1084	4.531
13	.0897	3.750	13	.0934	3.906
14	.0747	3.125	14	.0785	3.281
16	.0598	2.500	16	.0635	2.656
18	.0478	2.000	18	.0516	2.156
20	.0359	1.500	20	.0396	1.656
22	.0299	1.250	22	.0336	1.406
24	.0239	1.000	24	.0276	1.156
26	.0179	.750	26	.0217	.906
28	.0149	.625	28	.0187	.781
—	—	—	30	.0150	.656

For material heavier than 7 gauge (.1793) see plate section.

ESTIMATED WEIGHT PER SHEET

HOT ROLLED
COLD ROLLED

GAUGE	7	8	9	10	11	12	13	14
DECIMAL	.1793	.1644	.1495	.1344	.1196	.1046	.0897	.0747
Weight Per Sq. Ft.	7.500	6.875	6.250	5.625	5.000	4.375	3.750	3.125
Size in Inches	WEIGHT PER SHEET IN POUNDS							
30 x 96	150	138	125	113	100	88	75	63
30 x 120	188	172	156	141	125	109	94	78
30 x 144	225	206	188	169	150	131	113	94
36 x 96	180	165	150	135	120	105	90	75
36 x 120	225	206	188	169	150	131	113	94
36 x 144	270	248	225	203	180	158	135	113
48 x 96	240	220	200	180	160	140	120	100
48 x 120	300	275	250	225	200	175	150	125
48 x 144	360	330	300	270	240	210	180	150
60 x 96	300	275	250	225	200	175	150	125
60 x 120	375	343	313	281	250	219	188	156
60 x 144	450	413	375	338	300	263	225	188
72 x 96	360	330	300	270	240	210	180	150
72 x 120	450	413	375	338	300	263	225	188
72 x 144	540	495	450	405	360	315	270	225

GAUGE	16	18	20	22	24	26	28
DECIMAL	.0598	.0478	.0359	.0299	.0239	.0179	.0149
Weight Per Sq. Ft.	2.500	2.000	1.500	1.125	1.000	.750	.625
Size in Inches	WEIGHT PER SHEET IN POUNDS						
30 x 96	50	40	30	23	20	15	13
30 x 120	63	50	38	28	25	19	16
30 x 144	75	60	45	34	30	23	19
36 x 96	60	48	36	27	24	18	15
36 x 120	75	60	45	34	30	23	19
36 x 144	90	72	54	41	36	27	23
48 x 96	80	64	48	36	32	24	20
48 x 120	100	80	60	45	40	30	25
48 x 144	120	96	72	54	48	36	30
60 x 96	100	80	60	45	40	30	25
60 x 120	125	100	75	56	50	38	31
60 x 144	150	120	90	68	60	45	38
72 x 96	120	96	72	54	48	36	30
72 x 120	150	120	90	68	60	45	38
72 x 144	180	144	108	81	72	54	45

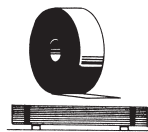
ESTIMATED WEIGHT PER SHEET

**GALVANIZED
ALLOY COATED**

GAUGE	10	11	12	13	14	16	18
DECIMAL	.1382	.1233	.1084	.0934	.0785	.0635	.0516
Weight Per Sq. Ft.	5.781	5.156	4.531	3.906	3.281	2.656	2.156
Size in Inches	WEIGHT PER SHEET IN POUNDS						
30 x 96	116	103	91	78	66	53	43
30 x 120	145	129	113	98	82	66	54
30 x 144	173	155	136	117	98	80	65
36 x 96	139	124	109	94	79	64	52
36 x 120	173	155	136	117	98	80	65
36 x 144	208	186	163	141	118	96	78
48 x 96	185	165	145	125	105	85	69
48 x 120	231	206	181	156	131	106	86
48 x 144	277	247	217	187	157	127	103
60 x 96	231	206	181	156	131	106	86
60 x 120	289	258	227	195	164	133	108
60 x 144	347	309	272	234	197	159	129
72 x 96	277	247	217	187	157	127	103
72 x 120	347	309	272	234	197	159	129
72 x 144	416	371	326	281	236	191	155

GAUGE	20	22	24	26	28	30
DECIMAL	.0396	.0336	.0276	.0217	.0187	.015
Weight Per Sq. Ft.	1.656	1.406	1.156	.906	.781	.656
Size in Inches	WEIGHT PER SHEET IN POUNDS					
30 x 96	33	28	23	18	16	13
30 x 120	41	35	29	23	20	16
30 x 144	50	42	35	27	23	20
36 x 96	40	34	28	22	19	16
36 x 120	50	42	35	27	23	20
36 x 144	60	51	42	33	28	24
48 x 96	53	45	37	29	25	21
48 x 120	66	56	46	36	31	26
48 x 144	79	67	55	43	37	31
60 x 96	66	56	46	36	31	26
60 x 120	83	70	58	45	39	33
60 x 144	99	84	69	54	47	39
72 x 96	79	67	55	43	37	31
72 x 120	99	84	69	54	47	39
72 x 144	119	101	83	65	56	47

HOT ROLLED COIL AND SHEET STEEL



General

Hot rolled steel is rolled on a continuous strip mill, generally above 1600°F (870°C), to the desired thickness. The steel is supplied with either a standard “black” finish, or pickled and oiled, in slit coil or sheet form.

Quality	Relevant Specifications	Characteristics
Carbon – Manganese Commercial Steel	A1011 CS Type A, B, C	Suitable for simple bending and moderate forming, mechanical properties not specified.
Drawing Steel Special Killed	A1011 DS Type A, B	Non Aging Steel, eliminates possible fluting and stretcher strains during forming.
Structural Steel	A1011 SS (various strength levels) minimum yield strength ranging from 30,000 PSI to 55,000 PSI	Specified whenever guaranteed mechanical properties are required.

CSA W grades are now available in selected sheet sizes (per CSA G 40.21).

TOLERANCES HOT ROLLED

Thickness Tolerances

All tolerance tables apply to hot rolled and hot rolled pickled carbon steel sheets, to a maximum carbon content of .25%. When the carbon content is over .25%, tolerances are subject to negotiation and acceptance.

Carbon Steel

Specified Width Inches	Allowable Tolerances (Plus or Minus) of Specified Thickness, Inches				
	over .375 to .500 incl.	over .313 to .375 incl.	over .230 to .313 incl.	over .180 to .230 incl.	over .098 to .180 incl.
Over 12 to 20 incl.	.014*	.012*	.010	.007	.007
Over 20 to 40 incl.	.014*	.012*	.011	.008	.007
Over 40 to 48 incl.	.014*	.013*	.012	.009	.008
Over 48 to 60 incl.	.015*	.014*	.012	.010	.008
Over 60 to 72 incl.	.016*	.015*	.013	.011	.008
Over 72	.018*	.016*	.015*	.012	.008

*Applicable to coils only.

Specified Width Inches	Allowable Tolerances (Plus or Minus) of Specified Thickness, Inches			
	over .071 to .098 incl.	over .057 to .071 incl.	over .051 to .057 incl.	over .044 to .051 incl.
Over 12 to 20 incl.	.006	.006	.005	.005
Over 20 to 40 incl.	.007	.006	.005	.005
Over 40 to 48 incl.	.007	.006	.006	.005
Over 48 to 60 incl.	.007	.007	.006	—
Over 60 to 72 incl.	.008	.007	.007	—
Over 72	.008	—	—	—

High-Strength Low-Alloy Steel

Specified Width Inches	Allowable Tolerances (Plus or Minus) of Specified Thickness, Inches			
	.229 .180	.179 .097	.096 .083	.082 .071
Over 12 to 15 incl.	.007	.007	.006	.006
Over 15 to 20 incl.	.008	.008	.007	.007
Over 20 to 32 incl.	.009	.008	.007	.007
Over 32 to 40 incl.	.009	.009	.008	.007
Over 40 to 48 incl.	.010	.010	.008	.007
Over 48 to 60 incl.	.010	.010	.008	.007
Over 60 to 72 incl.	.011	.012	.010	.009
Over 72 to 80 incl.	.012	.013	.010	.009
Over 80	—	.014	.011	—

Cont'd

TOLERANCES HOT ROLLED (cont'd)

Width Tolerances

Hot Rolled Mill Edge Sheets Coils and Cut Lengths

	Carbon Steel		High Strength Low Alloy
Specified Width Inches	Tolerance Over Specified Width – Inches No Tolerance Under	Specified Width Inches	Tolerance Over Specified Width – Inches No Tolerance Under
Over 12 to 14 incl.	$\frac{7}{16}$	Over 12 to 14 incl.	$\frac{7}{16}$
Over 14 to 17 incl.	$\frac{1}{2}$	Over 14 to 17 incl.	$\frac{1}{2}$
Over 17 to 19 incl.	$\frac{9}{16}$	Over 17 to 19 incl.	$\frac{9}{16}$
Over 19 to 21 incl.	$\frac{5}{8}$	Over 19 to 21 incl.	$\frac{5}{8}$
Over 21 to 24 incl.	$\frac{11}{16}$	Over 21 to 24 incl.	$\frac{11}{16}$
Over 24 to 26 incl.	$\frac{13}{16}$	Over 24 to 26 incl.	$\frac{13}{16}$
Over 26 to 30 incl.	$\frac{15}{16}$	Over 26 to 28 incl.	$\frac{15}{16}$
Over 30 to 50 incl.	$1\frac{1}{8}$	Over 28 to 35 incl.	$1\frac{1}{8}$
Over 50 to 78 incl.	$1\frac{1}{2}$	Over 35 to 50 incl.	$1\frac{1}{4}$
Over 78	$1\frac{1}{8}$	Over 50 to 60 incl.	$1\frac{1}{2}$
		Over 60 to 65 incl.	$1\frac{5}{8}$
		Over 65 to 70 incl.	$1\frac{3}{4}$
		Over 70 to 80 incl.	$1\frac{7}{8}$
		Over 80	2

This table does not apply to the uncropped ends of mill edge coils.

Hot Rolled Slit Edge Sheets (Not Resquared) Coils and Cut Lengths

Specified Width Inches	Tolerance Over Specified Width – Inches No Tolerance Under
To 30 incl.	$\frac{1}{8}$
Over 30 to 48 incl.	$\frac{3}{16}$
Over 48 to 60 incl.	$\frac{1}{4}$
Over 60 to 80 incl.	$\frac{5}{16}$
Over 80	$\frac{3}{8}$

The above tolerances apply to thicknesses 0.229 inches and lighter.

Cont'd

TOLERANCES HOT ROLLED (cont'd)

Length Tolerances

Hot Rolled Slit Edge Sheets (Not Resquared)

Specified Length Inches	Tolerance Over Specified Length – Inches No Tolerance Under
To 15 incl.	$\frac{1}{8}$
Over 15 to 30 incl.	$\frac{1}{4}$
Over 30 to 60 incl.	$\frac{1}{2}$
Over 60 to 120 incl.	$\frac{3}{4}$
Over 120 to 156 incl.	1
Over 156 to 192 incl.	$1\frac{1}{4}$
Over 192 to 240 incl.	$1\frac{1}{2}$
Over 240	$1\frac{3}{4}$

Camber Tolerances

Camber is the greatest deviation of a side edge from a straight line, the measurement being taken on the concave side with a straight edge. The camber tolerances for cut length sheets not resquared are as follows:

Specified Length – Inches	Camber Tolerances – Inches
To 48 incl.	$\frac{1}{8}$
Over 48 to 72 incl.	$\frac{3}{16}$
Over 72 to 96 incl.	$\frac{1}{4}$
Over 96 to 120 incl.	$\frac{5}{16}$
Over 120 to 144 incl.	$\frac{3}{8}$
Over 144 to 168 incl.	$\frac{1}{2}$
Over 168 to 192 incl.	$\frac{5}{8}$
Over 192 to 216 incl.	$\frac{3}{4}$
Over 216 to 240 incl.	$\frac{7}{8}$
Over 240 to 360 incl.	$1\frac{1}{4}$
Over 360 to 480 incl.	$1\frac{1}{2}$

The camber tolerance for coils should not exceed one inch in any 20 feet of length.

TOLERANCES HOT ROLLED (cont'd)

Flatness Tolerances^A of Temper Rolled or Pickled Hot Rolled Sheet Cut Lengths^B (All Designations)

Specified Minimum Thickness, in.	Specified Width, in.	Flatness Tolerances, ^C in.	
		Specified Yield Strength, min, ksi	
		Under 45	45 to 50 ^{D,E}
0.031 to 0.057 incl	over 12 to 36 incl	½	¾
	over 36 to 60 incl	¾	1⅛
	over 60	1	...
0.057 to 0.180 excl	over 12 to 60 incl	½	¾
	over 60 to 72 incl	¾	1⅛
	over 72	1	1½
0.180 to 0.230 excl	over 12 to 48 incl	½	¾

Flatness Tolerances^A of Non-Processed Hot Rolled Sheet Cut Lengths^B (All Designations)

Specified Minimum Thickness, in.	Specified Width, in.	Flatness Tolerances, ^C in.	
		Specified Yield Strength, min, ksi	
		Under 45	45 to 50 ^{D,E}
0.031 to 0.057 incl	over 12 to 36 incl	1½	2¼
	over 36 to 60 incl	2¼	3⅜
	over 60	3	...
over 0.057 to 0.180 excl	over 12 to 60 incl	1½	2¼
	over 60 to 72 incl	2¼	3⅜
	over 72	3	4½
0.180 to 0.230 excl	over 12 to 48 incl	1½	2¼

^A The above table also applies to lengths cut from coils by the consumer when adequate flattening operations are performed.

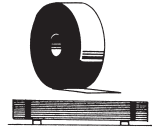
^B Application of this table to product in coil form is not appropriate unless the coil has been rolled out and adequately flattened with all coil set removed.

^C Maximum deviation from a horizontal flat surface.

^D Tolerances for steels with specified minimum yield strength in excess of 50 ksi are subject to negotiation.

^E 0.071 minimum thickness of HSLA.

COLD ROLLED COIL AND SHEET STEEL



General

Cold rolled steel is produced by further processing hot rolled steel through cold reduction mills (at room temperature) followed by annealing and/or temper rolling to produce steel with closer dimensional tolerances and a wider range of surface finishes.

Quality	Relevant Specifications	Characteristics
Carbon – Manganese Commercial Steel	A1008 CS Type A, B, C	Good Formability, Mechanical Properties not specified.
Drawing Steel	A1008 DS Type A, B	Non Aging Steel, minimizes possible fluting and stretcher strains during forming.
Deep Drawing Steel	A1008 DDS	
Extra Deep Drawing Steel	A1008 EDDS	
Structural Steel	A1008 SS (various strength levels) minimum yield strength ranging from 25,000 PSI to 80,000 PSI	Specified whenever guaranteed mechanical properties are required.

TOLERANCES COLD ROLLED

Thickness Tolerances

2 inches to 12 inches Wide in Coils or Cut Lengths

	Allowable Tolerances (Plus or Minus) of Specified Thickness – Inches			
Specified Width Inches	Over .057 to .082 incl.	Over .039 to .057 incl.	Over .019 to .039 incl.	Over .014 to .019 incl.
2 to 12 incl.	.005	.004	.003	.002

Thickness is measured at any point on the sheet not less than $\frac{3}{8}$ inch from an edge.

Over 12 inches Wide in Coils or Cut Lengths

	Allowable Tolerances (Plus or Minus) of Specified Thickness – Inches					
Specified Width Inches	Over .098 to .142 incl.	Over .071 to .098 incl.	Over .057 to .071 incl.	Over .039 to .057 incl.	Over .019 to .039 incl.	Over .014 to .019 incl.
Over 12 to 15 incl.	.005	.005	.005	.004	.003	.002
Over 15 to 72 incl.	.006	.005	.005	.004	.003	.002
Over 72	.007	.006	.005	.004	.003	–

Thickness is measured at any point on the sheet not less than $\frac{3}{8}$ inch from an edge.

Width Tolerances

2 inches to 12 inches in Width (Not Resquared) in Coils or
Cut Lengths

Specified Thickness Inches	Specified Width, (Plus or Minus) Inches		
	2 to 6 incl.	Over 6 to 9	Over 9 to 12 incl.
.014 to .082 incl.	.012	.016	.032

This table applied to widths produced by slitting from wider material.

Over 12 inches in Width (Not Resquared) in Coils and Cut Lengths

Specified Width, Inches	Tolerances Over Specified Width, Inches, No Tolerance Under
Over 12 to 30 incl.	$\frac{1}{8}$
Over 30 to 48 incl.	$\frac{3}{16}$
Over 48 to 60 incl.	$\frac{1}{4}$
Over 60 to 80 incl.	$\frac{5}{16}$
Over 80	$\frac{3}{8}$

Cont'd

TOLERANCES COLD ROLLED (cont'd)

Length Tolerances

For Sheets 2 inches to 12 inches in Width (Not Resquared)

.015 to .082 inches in Thickness

Specified Width, Inches	Tolerances Over Specified Length, Inches, No Tolerance Under		
	24 to 60 incl.	Over 60 to 120 incl.	Over 120 to 240 incl.
2 to 12 incl.	$\frac{1}{2}$	$\frac{3}{4}$	1

For Sheets over 12 inches in Width (Not Resquared)

.015 to .082 inches in Thickness

Specified Length, Inches	Tolerances Over Specified Length, Inches, No Tolerance Under
Over 12 to 30 incl.	$\frac{1}{8}$
Over 30 to 60 incl.	$\frac{1}{4}$
Over 60 to 96 incl.	$\frac{1}{2}$
Over 96 to 120 incl.	$\frac{3}{4}$
Over 120 to 156 incl.	1
Over 156 to 192 incl.	$1\frac{1}{4}$
Over 192 to 240 incl.	$1\frac{1}{2}$
Over 240	$1\frac{3}{4}$

Camber Tolerances

Camber is the greatest deviation of a side edge from a straight line, the measurement being taken on the concave side with a straight edge. The camber tolerances for sheets not resquared are as follows:

For Sheets 2 inches to 12 inches in Width .015 to .082 inches in Thickness
Coils Only $\frac{1}{4}$ " in any 8 feet

For Sheets over 12 inches in Width

Specified Length, Inches	Camber Tolerances, Inches
To 48 incl.	$\frac{1}{8}$
Over 48 to 72 incl.	$\frac{3}{16}$
Over 72 to 96 incl.	$\frac{1}{4}$
Over 96 to 120 incl.	$\frac{5}{16}$
Over 120 to 144 incl.	$\frac{3}{8}$
Over 144 to 168 incl.	$\frac{1}{2}$
Over 168 to 192 incl.	$\frac{5}{8}$
Over 192 to 216 incl.	$\frac{3}{4}$
Over 216 to 240 incl.	$\frac{7}{8}$
Over 240 to 360 incl.	$1\frac{1}{4}$
Over 360 to 480 incl.	$1\frac{1}{2}$

The camber tolerance for coils should not exceed one inch in any 20 feet of length.

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TOLERANCES COLD ROLLED (cont'd)

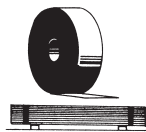
Flatness Tolerances

For Sheets over 12 inches in Width Not Specified to Stretcher Levelled
Standard of Flatness

Specified Thickness Inches	Flatness Tolerances (Maximum Deviation From a Horizontal Flat Surface) Inches		
	Specified Width Inches	Carbon Steel	High-Strength Low-Alloy Steel*
.045 and heavier	To 36 incl.	$\frac{1}{4}$	$\frac{3}{4}$
	Over 36 to 60 incl.	$\frac{3}{8}$	$\frac{3}{4}$
	Over 60 to 72 incl.	$\frac{5}{8}$	$1\frac{1}{8}$
	Over 72	$\frac{7}{8}$	$1\frac{1}{2}$
.044 and lighter	To 36 incl.	$\frac{3}{8}$	$\frac{3}{4}$
	Over 36 to 60 incl.	$\frac{5}{8}$	$1\frac{1}{8}$
	Over 60	$\frac{7}{8}$	$1\frac{1}{2}$

*Tolerances for High-Strength Low-Alloy Steels with specified minimum yield point in excess of 50,000 psi are subject to negotiation.

GALVANIZED COIL AND SHEET STEEL



GALVANIZED

Galvanized or zinc coated steels are unexcelled where economy, strength and corrosion resistance are the prime requirements.

These products are available with a variety of coating weights, surface finishes and mechanical properties, designed to meet the particular requirements of the customer.

The steel core provides high strength and formability, and the zinc coating is unmatched as an effective and economical protection. Zinc is used as a protective coating because of its extremely slow oxidation rate and its protective sacrificial action which inhibits corrosion of the steel.

Zinc coated steel sheets are produced on modern continuous hot dip or electro-galvanizing lines, and the finished product is excellent in appearance, formability, and the coatings' adhesion and uniformity.

Zinc coated material can be ordered as Unpassivated or Passivated, Dry or Oiled.

Passivation is a treatment used to prevent storage stain; however it impedes on the effectiveness of paint adhesion, while unpassivated material offers excellent paint adhesion.

Light Oil is recommended for temporary protection against storage stain.

The following products are available in coils and sheets with a variety of qualities and surface finishes, detailed in the following tables.

GALVANIZED ALLOY-COATED

This Zinc-Iron alloy coating has a uniform matte grey, spangle free appearance without wipe lines on the surface. Carbon steel sheet is processed through a molten zinc bath and continuously run in an annealing furnace, enhancing physical and surface properties with a ratio of Zinc-Iron alloy of 8% to 12%. The product is suitable for painting applications provided usual precautions have been taken to ensure the absence of oil or grease; all forming/bending should be performed prior to painting.

In the unpainted condition, it is suitable for interior dry applications only. Designed as a replacement for **"WIPE COAT FINISH"**, it offers superior bonding of alloys and a smoother surface finish.

GALVANIZED & ALLOY COATED – CHEMICAL COMPOSITION

Composition, %—Heat Analysis Element, max (unless otherwise shown)												
Designation	Carbon	Manganese	Phosphorus	Sulfur	Aluminum, min	Cu	Ni	Cr	Mo	V	Cb	Ti ^B
CS Type A ^{C,D,E}	0.10	0.60	0.030	0.035	...	0.20	0.20	0.15	0.06	0.008	0.008	0.025
CS Type B ^{F,G}	0.02 to 0.15	0.60	0.030	0.035	...	0.20	0.20	0.15	0.06	0.008	0.008	0.025
CS Type C ^{C,D,E}	0.08	0.60	0.100	0.035	...	0.20	0.20	0.15	0.06	0.008	0.008	0.025
FS Type A ^{C,G}	0.10	0.50	0.020	0.035	...	0.20	0.20	0.15	0.06	0.008	0.008	0.025
FS Type B ^{F,G}	0.02 to 0.10	0.50	0.020	0.030	...	0.20	0.20	0.15	0.06	0.008	0.008	0.025
DDS ^{D,E}	0.06	0.50	0.020	0.025	0.01	0.20	0.20	0.15	0.06	0.008	0.008	0.025
EDDS ^H	0.02	0.40	0.020	0.020	0.01	0.20	0.20	0.15	0.06	0.10	0.10	0.15

^AWhere an ellipsis (...) appears in this table, there is no requirement, but the analysis shall be reported.

^BFor steels containing more than 0.02% carbon, titanium is permitted to 0.025% provided the ratio of % titanium to % nitrogen does not exceed 3.4.

^CWhen a deoxidized steel is required for the application, the purchaser has the option to order CS and FS to a minimum of 0.01% total aluminum.

^DSteel is permitted to be furnished as a vacuum degassed or chemically stabilized steel, or both, at the producer's option.

^EFor carbon levels less than or equal to 0.02%, vanadium, columbium, or titanium, or combinations thereof are permitted to be used as stabilizing elements at the producer's option. In such cases, the applicable limit for vanadium and columbium shall be 0.10% max. and the limit for titanium shall be 0.15% max.

^FFor CS and FS, specify Type B to avoid carbon levels below 0.02%.

^GShall not be furnished as a stabilized steel.

^HShall be furnished as a stabilized steel.

Weight [Mass] of Coating Requirements

		Minimum Requirement ^p		
		Triple-Spot Test	Single-Spot Test	
Inch-Pound Units				
Type	Coating Designation	Total Both Sides, oz/ft²	One Side	Total Both Sides, oz/ft²
Zinc	G360	3.60	1.28	3.20
	G300	3.00	1.04	2.60
	G235	2.35	0.80	2.00
	G210	2.10	0.72	1.80
	G185	1.85	0.64	1.60
	G165	1.65	0.56	1.40
	G140	1.40	0.48	1.20
	G115	1.15	0.40	1.00
	G90	0.90	0.32	0.80
	G60	0.60	0.20	0.50
	G40	0.40	0.12	0.30
	G30	0.30	0.10	0.25
	G01	no minimum	no minimum	no minimum
Zinc-iron alloy	A60	0.60	0.20	0.50
	A40	0.40	0.12	0.30
	A25	0.25	0.08	0.20
	A01	no minimum	no minimum	no minimum
SI Units				
Type	Coating Designation	Total Both Sides, g/m²	One Side	Total Both Sides, g/m²
Zinc	Z1100	1100	390	975
	Z900	900	316	790
	Z700	700	238	595
	Z600	600	204	510
	Z550	550	190	475
	Z500	500	170	425
	Z450	450	154	385
	Z350	350	120	300
	Z275	275	94	235
	Z180	180	60	150
	Z120	120	36	90
	Z90	90	30	75
	Z001	no minimum	no minimum	no minimum
Zinc-iron alloy	ZF180	180	60	150
	ZF120	120	36	90
	ZF75	75	24	60
	ZF001	no minimum	no minimum	no minimum

TOLERANCES – GALVANIZED & ALLOY COATED

Thickness Tolerances

Thickness is measured at any point across the width not less than $\frac{3}{8}$ inch from a side edge. Regardless of whether total thickness tolerance is specified equally or unequally, plus or minus, the total tolerance should be equal to twice the tolerances shown in table below.

Specified Width, Inches	Allowable Tolerances (Plus or Minus) of Specified Thickness, Inches					
	>.101 to .187 incl.	>.075 to .101 incl.	>.061 to .075 incl.	>.043 to .061 incl.	>.023 to .043 incl.	.023 & lighter
To 32	.008	.007	.006	.005	.004	.003
Over 32 to 40	.008	.008	.006	.005	.004	.003
Over 40 to 60	.009	.008	.006	.005	.004	.003
Over 60 to 72	.009	.009	.006	.005	.004	—

Width Tolerances

Width 2 inches to 12 inches – Not Resquared

Specified Thickness Inches	Tolerances (Plus or Minus) of Specified Width, Inches		
	2 to 6	Over 6 to 9	Over 9 to 12
.069 and thicker	.012	.016	.032
.068 and thinner	.008	.016	.032

This table applies to widths produced by slitting from wider coils.

Width over 12 inches – Not Resquared

Specified Width, Inches	Tolerances Over Specified Width, Inches, No Tolerance Under
Over 12 to 30	$\frac{1}{8}$
Over 30 to 48	$\frac{3}{16}$
Over 48 to 60	$\frac{1}{4}$
Over 60	$\frac{5}{16}$

Cont'd

TOLERANCES – GALVANIZED & ALLOY COATED (cont'd)

Length Tolerances

Width 2 inches to 12 inches – Not Resquared

Specified Thickness Inches	Tolerances Over Specified Length, Inches No Tolerance Under		
	24 to 60	Over 60 to 120	Over 120 to 240
2 to 12	$\frac{1}{2}$	$\frac{3}{4}$	1

This table applies to widths produced by slitting from wider coils.

Width over 12 inches – Not Resquared

Specified Width, Inches	Tolerances Over Specified Length, Inches, No Tolerance Under
Over 12 to 30	$\frac{1}{8}$
Over 30 to 60	$\frac{1}{4}$
Over 60 to 96	$\frac{1}{2}$
Over 96 to 120	$\frac{1}{2}$
Over 120 to 156	1
Over 156 to 192	$1\frac{1}{4}$
Over 192 to 240	$1\frac{1}{2}$
Over 240	$1\frac{3}{4}$

Cont'd

TOLERANCES – GALVANIZED (cont'd)

Camber Tolerances

Camber is the greatest deviation of a side edge from a straight line. Measurement is taken on the concave side with a straight edge.

Widths over 12 inches – Coils

$\frac{1}{4}$ inch in any 8 feet

This camber tolerance applied to widths produced by slitting from wider coils.

Widths over 12 inches – Not Resquared

Sheet Length, Feet	Camber Tolerances, Inches
To 4	$\frac{1}{8}$
Over 4 to 6	$\frac{3}{16}$
Over 6 to 8	$\frac{1}{4}$
Over 8 to 10	$\frac{5}{16}$
Over 10 to 12	$\frac{3}{8}$
Over 12 to 14	$\frac{1}{2}$
Over 14 to 16	$\frac{5}{8}$
Over 16 to 18	$\frac{3}{4}$
Over 18 to 20	$\frac{7}{8}$

The camber tolerance for coils should not exceed one inch in any 20 feet of length.

Out-of-Square

Not resquared

Out-of-square is the greatest deviation of an end edge from a straight line at right angle to a side and touching one corner. It is also obtained by measuring the difference between the diagonals of the cut length sheet; the out-of-square deviation is one-half of that difference. The tolerance for all thicknesses and all sizes is $\frac{1}{16}$ inch per 6 inches, or fraction thereof, of width.

Resquared

When sheets are specified resquared, the width and length may not be less than the dimensions specified. The tolerance for over-width, over-length, camber and out-of-square is $\frac{1}{16}$ inch for sheets up to and including 48 inches in width and up to and including 120 inches in length; or $\frac{1}{8}$ inch for wider or longer sheets.

Cont'd

TOLERANCES – GALVANIZED (cont'd)

Flatness Tolerances

Not Specified to Stretcher Levelled Standard of Flatness

Specified Thickness Inches	Flatness Tolerance (maximum deviation from a horizontal flat surface), Inches	
	.049 and thicker	.048 and thinner
To 36	$\frac{1}{4}$	$\frac{3}{8}$
Over 36 to 60	$\frac{3}{8}$	$\frac{5}{8}$
Over 60	$\frac{5}{8}$	$\frac{7}{8}$

Note 1: The above table does not apply when product is ordered to a hardness range.

Note 2: The above table also applied to lengths cut from coils by the consumer when adequate flattening measures are performed.

Specified to Stretcher Levelled Standard of Flatness*

Specified Thickness, Inches	Specified Width, Inches	Specified Length, Inches	Flatness Tolerance (maximum deviation from a horizontal flat surface) Inches
.029 and thicker	to 48	to 120	$\frac{1}{8}$
	over 48	over 120	$\frac{1}{4}$
.015 to .028	to 36	to 120	$\frac{1}{4}$
	over 36	over 120	$\frac{3}{8}$

*Not applicable to lengths cut from coils by the consumer.

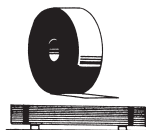
Allowances in Width and Length

Specified to stretcher levelled standard of flatness – not resquared

When galvanized sheets are ordered to stretcher levelled standard of flatness and not resquared, the allowances over specified dimensions in width and length given above apply. The camber tolerances do not apply.

Cont'd

ALUMINIZED COIL AND SHEET STEEL



ASTM A463

Description

Aluminized steel type 1 is a low-cost sheet steel coated on both sides with a 10% Silicon-Aluminum alloy on a continuous hot-dip coating line. This product has excellent heat resistance, superior heat reflectivity and the corrosion resistance of aluminum combined with the inherent strength of steel.

Availability

- (A) Commercial Steel
- (B) Structural Steel
- (C) Deep Drawing Steel
- (D) Extra Deep Drawing Steel

Coating Weight

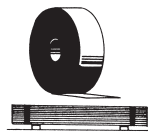
Imperial – Ounces per square foot

Coating Designation	Minimum Limit Triple Spot Check	Minimum Limit Single Spot Check
T1 40 (Regular)	0.40	0.30
T1 25 (Light)	0.25	0.20

Metric – Grams per Square Metre

Coating Designation	Minimum Limit Triple Spot Check	Minimum Limit Single Spot Check
T1 120 (T1 40 Regular)	120	90
T1 75 (T1 25 Light)	80	60

GALVALUME COIL AND SHEET STEEL



Description

The galvalume coating is an alloy consisting of approximately 55% aluminum, 43.4% zinc and 1.5% silicon by weight, which is applied to steel by the continuous hot dip process.

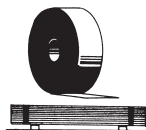
Galvalume steel sheet offers the best qualities of aluminum coated (aluminized) and zinc coated steel sheet (galvanized). The aluminum/zinc coating has barrier corrosion resistance and heat resistance similar to aluminum coated steel. It also has good bare edge galvanic protection and forming qualities similar to continuously annealed commercial quality galvanized.

The appearance of Galvalume coating is quite distinctive. Its smooth, flat and fine spangle and a silvery metallic appearance make it attractive in unpainted applications.

Galvalume Specifications ASTM A792 / A792M

Designation	
Commercial Steel	
CS Type A	Allows application of very low carbon grades (up to maximum of 0.10% carbon), including vacuum degassed & interstitial-free steels.
CS Type B	Specified to avoid carbon levels below 0.02%. Carbon range is 0.02 to 0.15%. This describes the typical ASTM CQ of the past.
CS Type C	Allows application of very low carbon grades (up to a maximum of 0.08% carbon). Also allows higher phosphorus (0.10 max) levels.
Forming Steel	FS
Drawing Steel	DS
High Temperature Steel	HTS
Structural Steel	SS

SPECIALTY STEELS



Alloy Steels

Standard A.I.S.I. designated alloy grades from 4130 through the 9200 grade series, as well as special purpose alloys in hot and cold rolled plate, bar and strip sizes. Available in “As Rolled” or “Spherodized Annealed”.

Precision Coated Steels

Available (A) hot dip galvanized in coil or sheet; and strip, ribbon wound or oscillated coil.

(B) Electro galvanized (which can be coated on one side only or two sides) in coil or sheet; and strip, ribbon wound or oscillated coil.

Patterned Steels

Available in designs such as textures, trade marks, geometrical figures, etc., embossed in the surface of the steel.

High Strength, Low Alloy (HSLA)

This product has a higher yield strength than ordinary low carbon steel due to the addition of alloying elements. These elements also provide superior resistance to atmospheric corrosion than normal low carbon steels. Both “Formable” and “Weldable” grades are available.

Forging Quality Steels

(A) Ingots – rectangular, square and round.

(B) Blooms and billets to the full range of alloy and carbon grades.

Quality	Relevant Specifications	Characteristics
High Strength Low Alloy Cor Ten Stelcoloy Dofascoloy	ASTM A606 CSA G40.21 50A & 50R	Atmospheric Corrosion Resistance, Good Formability, High Strength and Wearability.
Columbium/Vanadium	A1008 (CR) or A1011 (HR) HSLAS GR45 to 70	High Strength, Good Wearability and Formability.
HSLA with Improved Formability	A1008 (CR) or A1011 (HR) HSLAS-F GR50 to 80	Better Formability than HSLAS Material, High Strength and Wearability.

GENERAL INFORMATION

1. Product information

Strict control is exercised during each of the many processing steps required to produce the finished product.

However, there are variations inherent in the steel and processing which prevent the realization of consistent, complete conformity to the product attributes desired by the customer. Similarly, there are hazards beyond the control of the user which contribute to difficulties during fabrication. In order that our customers will have a clear understanding of such hazards (including inherent variations in the steel) and our responsibility in connection therewith, the most common of such situations are outlined below.

When cut length sheets are ordered, it is our practice to reject at the mill individual sheets having abnormal surface imperfections. When coils are ordered, it is not possible to remove such defects; therefore, it is to be expected that coils will contain these abnormal surface imperfections and also more minor imperfections than cut length sheets. Coils may also contain welds, and inner and outer coil wraps may be damaged in handling.

The customer will be expected to accept without claim:

- (a) The inside and outside coil wraps.
- (b) Welds unless specified "to be without welds".
- (c) Surface imperfections mentioned above, when encountered in parts, blanks or cut length sheets from coils, should not exceed a set amount usually 2% by weight on any accumulated basis. It is the usual practice of customers to shear or blank at least **10% of any given coil before rejecting that coil in order to ensure that the condition is prevalent throughout the coil.**

If a defect exceeds 2% but runs out before 7% of the coil is sheared, then the remainder of that coil should be processed and lifts of blanks containing defective material should be considered together and as a percentage accumulation on a monthly (or large run) basis. Depending upon the extent and severity of the defect, the customer should be required to absorb up to 2%.

2. Chemical analysis of carbon steels

For the A.I.S.I. or S.A.E. designation and chemical composition limits of Carbon, Manganese Phosphorus and Sulphur, see information in Miscellaneous Section of this book.

3. Olsen test

This is a cupping test made on an Olsen machine as an aid in determining ductility and deep drawing properties. The test simulates a deep drawing operation. It is continued until the cup formed from the steel sample fractures. Ductility and drawing properties are judged by the depth of the cup, position of the break, condition of the surface after the break, etc.

4. Rockwell Hardness test

Forcing a cone-shaped diamond or hardened steel ball into the specimen being tested under standard pressure. The depth of penetration is an indication of the Rockwell Hardness.

5. Optional Testing Available at Customers Request. Note: Charges will be applied to Sales Order.

- (a) Physical Tests Yield, Tensile, Elongation.
- (b) Fracture Analysis.
- (c) Micrography.
- (d) Chemistry Verification Analysis.

DESCRIPTION OF TEMPERS

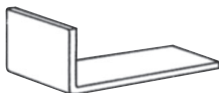
COLD ROLLED

Tempers



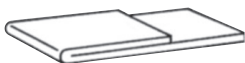
No. 1 – Hard

For stamping or punching flat pieces requiring rigidity and strength.



No. 2 – Half Hard

For simple blanking operations. Will bend at sharp right angle across the grain (direction of rolling).



No. 3 – Quarter Hard

Will bend flat on itself across the grain. Takes some bending with the grain.



No. 4 – Pinch Pass or Skin Rolled

For tubing, moulding, some deep drawing. Will bend both ways of the grain.



No. 5 – Dead Soft

For deep drawing and difficult forming. Extremely soft, it will bend flat on itself both ways of the grain.

Edges

No. 1 – Perfect square or round edge.

No. 2 – Natural mill edge.

No. 3 – Approx. square edge by slitting, not filed.

No. 4 – Round edge produced by edge rolling.

No. 5 – Approx. sq. edge by rolling or filing after slitting.

No. 6 – Square edge produced by edge rolling.

