



Essex Trading Company
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GALVANNEALED STEEL SHEET

Product Summary

Galvannealed is a form of hot-dipped galvanized sheet consisting of an iron-zinc alloy coating on both sides. It is produced from Cold Rolled coil (or Hot Rolled Pickled & Oiled typically thicker than 14-gauge) that has been passed continuously through a pot of molten zinc. The coating amount applied to the surface is controlled by wiping, rollers and/or air jets. When the coil exits the zinc bath, the molten zinc is subjected to inline annealing (thus the name "Galvannealed") that forms the zinc-iron alloy layer. It is subsequently run through leveling rolls for shape correction. The coating is denoted by an "A" designation, i.e., A60 (as opposed to regular Galvanized denoted with a "G" prefix, i.e., G60). Galvannealed has a uniform light-medium gray color and a semi-porous finish. Galvannealed is especially intended for painting applications. Compared to regular hot-dipped Galvanized, it has similar corrosion resistance and a harder coating that is more resistant to scratching. Galvannealed tends to have slightly less ductility and the coating sometimes powders (especially in heavier coating weight, i.e., A60) under severe forming.

As in regular hot-dipped Galvanized, the zinc coating protects the steel substrate in two ways. First, it creates a barrier that retards the formation of rust. Second, zinc has a self-sacrificial character and will extend itself to cover nearby small uncoated areas (i.e., cut edges, scratches).

There is generally a direct correlation between the amount of zinc application and the steel's atmospheric corrosion resistance. The more the zinc, the more the corrosion resistance. The amount of zinc (referred to as coating weight) is usually represented in ounces per square foot (or sometimes grams per square meter) total both sides. For example, its designation may be A40, constituting .40 oz/ft². As such, the material would have approximately one-third less protection than A60 (.60 oz/ft²).

Generally, Galvannealed has become the preferred product of automobile, appliance and many other OEMs and fabricators, given the product's excellent paintability, and lower cost compared to ElectroGalvanized. Since the 1980s, it has almost completely supplanted Bonderized (phosphatized).

Galvannealed (like hot-dipped Galvanized sheet) is typically produced in accordance with ASTM A653 standards and tolerances.

Essex Trading Company has very competitive Galvannealed pricing, and especially for high strength stocks. This material will almost always accept a 90° bend on 1T (T = thickness); refer to page 3, table 3 for more specific characteristics. With quite good formability, high strength Galvannealed is often suitable for pressbrake and rollforming applications, i.e., including stud, track and metal framing, deck and roof components, and panels. Samples can be furnished for your fabrication testing.



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Product Classifications

Commercial Steel (CS Types A,B,C), Forming Steel (FS), Deep Drawing Steel (DDS), Extra Deep Drawing Steel, Structural Steel (SS), High Strength Low Alloy (HSLAS), Full Hard

Mechanical Properties – Table 1				
<i>Classification</i>	<i>Yield Str. psi</i>	<i>Tensile Str. psi</i>	<i>Elong. % / 2"</i>	<i>Rock. B typical</i>
Commercial Steel (Type B)	40000 typ.		>20 typ.	48
Forming Steel	35000 typ.	--	>26 typ.	38
Deep Drawing Steel	28000 typ.	48000 typ.	>32 typ.	34
Extra Deep Drawing Steel	20000 typ.	--	>40 typ.	30
Struct. Steel – Grade 33	33000 min.	45000 min.	20 min.	58
Struct. Steel – Grade 40	40000 min.	55000 min.	16 min.	65
Struct. Steel – Grade 50 Cl. 1	50000 min.	65000 min.	12 min.	75
Struct. Steel – Grade 80	80000 min.	82000 min.	--	85
Full Hard	70000 typ.	90000 typ.	--	90
HSLAS Grade 40	40000 min.	50000 min.	22 min.	65
HSLAS Grade 50	50000 min.	60000 min.	20 min.	70
HSLAS Grade 60	60000 min.	70000 min.	16 min.	80
HSLAS Grade 70	70000 min.	80000 min.	12 min.	85
HSLAS Grade 80	80000	90000 min.	10 min.	90

(typ. denotes industry typical; min. denotes minimum per ASTM A653)

Structural Steel/Bending Properties – Table 2 90° long. bend · t = steel thickness	
<i>Classification</i>	<i>Min. Inside Diameter</i>
Grade 33	1-1/2 t
Grade 40	2t
Grade 50 Cl. 1	not applicable
Grade 50 Cl. 2	not applicable
Grade 80	not applicable

(per ASTM A653)



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Physical/Chemical Properties & Comparisons
Galvannealed – High Strength

The following sampling data was compiled from independent metallurgical analyses on a wide range of Galvannealed high-strength 14-20 gauge samples. Long. = longitudinal bend (with grain, easy way); Trans. = transverse bend (against grain, hard way); OK = passed; NG = failed.

Physical/Chemical Properties: High Strength – Table 3													
Physical Props.				Bending Props.				Chem. Props.					
Rock.	Yield psi	Tens. Psi	Elong. %/2"	90° 1T	180° 0T	180° 1T	180° 2T	C	Mn	Si	Al	Cr	Nb
				Long.	Long.	Long.	Long.						
				Trans.	Trans.	Trans.	Trans.						
B86	54900	92400	23.0										
B87	64800	84700	22.5	OK OK	OK OK	OK OK	OK OK	.15	1.39	.10	.054		
B88	66400	84400	23.0					.15	1.45	.11	.048	.03	.034
B89	61800	93200	24.0										
B90	59500	91100	26.5					.20	1.42	.20	.20	.03	.013
B92	67400	119800	23.5					.24	1.58	.061	.20	.22	.022
B96	83600	126500	16.0					.24	1.57	.073	.204	.22	.022
B96	70600	124900	19.0	OK OK	NG NG	NG NG	OK OK	.23	1.52	.062	.20		
B96	63900	103000	20.5	OK OK	OK OK	OK	OK OK	.08	1.72	.017	.057		
B97	66800	131400	19.0					.25	1.58	.083	.204	.22	.021
B97	68400	114400	18.5	OK OK	OK OK	OK OK	OK OK	.10	1.75	.026	.047		
C25	81400	122400	15.0	OK OK	NG NG	OK NG	OK OK	.10	1.72	.036	.058		
C27	99100	138400	15.5	OK OK	NG NG	OK NG	OK OK	.10	1.77	.319	.051		
C29	93700	133700	17.0	OK OK	NG NG	OK OK	OK OK	.10	1.77	.323	.052		
C31	104400	140900	12.5	OK OK	NG NG	NG NG	OK OK	.10	1.79	.315	.059		
C31	113100	147400	11.5	OK OK	NG NG	NG OK	OK OK	.10	1.82	.325	.052		



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Coating Properties & Comparisons

Coating weights are usually expressed in ounces per square foot total both sides, i.e., A40, equal to approximately .40 oz/ft². Coating weights can also be expressed on a per side basis, i.e., .20/.20. To convert a per side indication to the applicable coating designation, add the weight of both sides.

The following tables 4, 5 and 6 provide more complete information regarding coating weights. For determination of our coil coating weights, Essex normally uses the single spot test method and as performed by the independent, highly trusted, Kieh Metallurgical Laboratory.

Zinc Coating Categories – Table 4			
<i>Minimum Coating Wt. oz/ft² Total Both Sides</i>			
<i>Designation</i>	<i>Triple Spot Test</i>		<i>Single Spot Test</i>
	<i>Both Sides</i>	<i>One Side</i>	
A60	.60	.20	.50
A40	.40	.12	.30
A30	.30	.10	.25
A25	.25	.08	.20

Sometimes coatings are denoted in metric standards (SI units), grams per square meter each side. For example, category 60G/60G stipulates that each side have a minimum single spot coating weight of 60 grams per square meter (g/m²). US and metric conversion factors are: 1 oz/ft² = 305.15 g/m² and 1 g/m² = 0.328 oz/ft². For converting to the applicable coating designation, add both sides and apply the multipliers shown in Table 5 below. In terms of coating thickness, 1 oz/ft² = 1.7 mils.

Coating Conversion Formula – Table 5		
<i>Convert From</i>	<i>Convert To</i>	<i>Multiply By</i>
ounces/square foot (oz/ft ²)	grams/square meter (g/m ²)	305.15
grams/square meter (g/m ²)	ounces/square foot (oz/ft ²)	0.328

Coating Comparisons (Approx.) – Table 6		
<i>Grams per Sq. Meter Per Side</i>	<i>Grams per Sq. Meter Both Sides</i>	<i>Ozs. Per Sq. Ft. Both Sides (approx. equiv.)</i>
ZF180	180	A60
ZF120	120	A40
ZF75	75	A25
ZF001	none	none

(based upon ASTM A653)



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Coating Bend Test Requirements – Table 7 (ratio of inside bend diameter to thickness)						
Coat. Wt.	CS, FS, DDS, EDDS	Grd. 33	Grd. 37	Grd. 40	Grd. 50	Grd. 80
A60	0	1-1/2	2	2-1/2	n/a	n/a
A40	0	1-1/2	2	2-1/2	n/a	n/a
A30	0	1-1/2	2	2-1/2	n/a	n/a
A25	0	1-1/2	2	2-1/2	n/a	n/a

(based upon ASTM A653)



Galvanized Secondary Coil

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