



# Architectural

Technical/Installation Information

# IMPORTANT NOTICE

**This information is designed to assist you in product selection, detailing and application. MBCI is prepared and staffed to provide professional assistance to architects, engineers, and contractors. At your request, assistance in budget development, product selection, design data, and application information will be provided.**

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The Engineering data contained herein is for the expressed use of customers and design professionals. Along with this data, it is recommended that the design professional have a copy of the most current version of the North American Specification for the Design of Cold-Formed Steel Structural Members published by the American Iron and Steel Institute to facilitate design. This Specification contains the design criteria for cold-formed steel components. Along with the Specification, the designer should reference the most current building code applicable to the project jobsite in order to determine environmental loads. If further information or guidance regarding cold-formed design practices is desired, please contact the manufacturer.

Descriptions and specifications contained herein were in effect at the time this publication was approved for printing. In a continuing effort to refine and improve products, MBCI reserves the right to discontinue products at any time or change specifications and/or designs without incurring obligation. To ensure you have the latest information available, please inquire or visit our website at [www.mbcicom.com](http://www.mbcicom.com).

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# PRODUCT INFORMATION

## MBCI GLOSSARY OF TERMS

**AAMA** - Architectural Aluminum Manufacturers Association

**AISI** - American Iron and Steel Institute

**AISC** - American Institute of Steel Construction

**ASTM** - American Society for Testing and Materials

**Approval Drawings** - Drawings provided by MBCI which illustrate our interpretation of the general architectural drawings; to be submitted for verification.

**Base Angle** - An angle used to secure the base of the wall panel to the foundation.

**Bevel** - A sloped or canted surface contiguous with a vertical or horizontal surface.

**Bill of Materials** - An itemized list of materials for fabrication and shipment.

**Building Code** - Regulations established by a recognized agency describing such items as design loads, procedures, construction details, etc. for structures, usually applying to designated geographical locations (city, state, county, etc.).

**Cee Section** - A cold formed secondary structural member formed in the shape of a block "C".

**Canopy** - A sheltering roof structure normally open on one or more sides.

**Caulk** - To seal and make weather-tight the joints, seams, or voids by filling with a compound or material. To fill cracks and crevices using a non-hardening, putty-like compound often applied from a pressure gun.

**Clip** - (Panel) A concealed fastening device.

**Closure Strip** - Any material used to close openings created by joining metal panels and flashing, usually formed to the panel profile.

**Color Bond** - Galvanized steel prepared to accept field painting.

**Coping** - The capping or top course of a wall, usually adapted to the protection of the wall from weather.

**Curtain Wall** - Perimeter wall panels which carry only their own weight and wind load.

**Design Loads** - Engineering criteria used to establish or meet safety factors as set forth by building codes.

**Eave** - The line formed by the intersection of the roof and sidewall.

**Eave Strut** - A structural member at the eave to support roof panels and wall panels.

**Embossing** - A process used to imprint a textured surface on preformed metal products.

**Facade** - A false front of a building; e.g., sloped mansard, vertical fascia, canted soffit.

**Felt** - Impregnated paper, commercially supplied in rolls, used as a moisture barrier between preformed panel and substructure.

**Gable** - A triangular portion of the endwall of a building directly under the sloping roof and above the eave line.

**Gable Roof** - A double sloped roof.

**Galvalume®** - The Bethlehem Steel trade name for a patented sheet steel having a hot-dip coating of corrosion resistant aluminum-zinc alloy. The Galvalume sheet coating consists of an alloy of nominally 55% aluminum, 1.6% silicon, and the balance zinc by weight, as listed in ASTM designation A792. On a volume basis, the coating is approximately 80% aluminum. GALVALUME® is a registered trademark of BIEC International Inc.

## PRODUCT INFORMATION

### MBCI GLOSSARY OF TERMS (cont.)

**Girt** - A secondary horizontal structural member attached to sidewall or endwall columns to which wall covering is attached.

**Gutter** - A channel member installed at the eave of the roof for the purpose of carrying water from the roof to the drains or downspouts.

**Hip Roof** - A roof which rises by inclined planes from two or more sides of the building.

**Hylar 5000®** - A resin used in premium architectural finishes. Also known as PVF2 or polyvinylidene fluoride.

**Kynar 500®** - A resin used in premium architectural finishes. Also known as PVF2 or polyvinylidene fluoride.

**Liner Panel** - A panel applied as an interior finish.

**Mansard** - A sloped facade.

**Oil Canning** - Visible stresses, inherent in the flat surface of preformed metal panels, that are cosmetic in nature and do not affect the structural integrity of the panel.

**Parapet** - That portion of the vertical wall of a building which extends above the roof line at the intersection of the wall and roof.

**Pop Rivet** - A small headed pin with expandable shank for joining light gauge metal. Typically used to attach flashing, gutter, etc.

**Purlin** - A secondary horizontal structural member attached to the primary frame which transfers the roof loads from the roof covering to the primary members.

**Rake** - The intersection of the roof and wall at the gable end.

**Ridge** - Highest point on the roof of the building which describes a horizontal line running the length of the building.

**Roof Slope** - The ratio of rise to base width, usually expressed in inches of vertical rise to 12 inches of horizontal run.

**Self-Drilling Fastener** - A fastener which combines the functions of drilling and tapping.

**Self-Tapping Fastener** - A fastener which taps its own threads in a predrilled hole.

**Signature® 200** - An inorganic pigmented siliconized polyester coating, available with a 20 year warranty upon written request.

**Signature® 300 and Signature® 300 Metallic** - A fluorocarbon coating produced with Kynar 500® or Hylar 5000® resin, available with a 20 year warranty upon written request.

**Single Slope** - A sloping roof with only one plane.

**Soffit** - The underside covering of any exterior portion of a building.

**Span** - The distance between two supporting members.

**Substrate** - Base metal of MBCI panel; e.g., Galvalume.

**Substructure** - Framework that MBCI panels are attached to; e.g., plywood decking, metal decking, light gauge framing, etc.

**Valley Gutter** - A channel used to carry off water from the "V" of roofs of multi-gabled buildings.

**Zee Section** - A cold-formed secondary structural member formed in the shape of a block "Z".

## PRODUCT INFORMATION

### FASTENER APPLICATION CHART

	PLYWOOD	LiteFrame™ or FURRING "Z"	METAL DECKING	STRUCTURAL (16 ga. to 12 ga.)	STRUCTURAL (% Maximum)	BAR JOIST
<b>LokSeam®</b>	10x1 Pancake Head Type A	10x1 Pancake Head Driller	#14 Dekfast Driller	10x1 Pancake Head Driller	12x1¼ Impax 45, #3 Phillips Pan Head	12x1¼ Impax 45, #3 Phillips Pan Head
<b>Craftsman™ Series SB or HB</b>	10x1 Pancake Head Type A	10x1 Pancake Head Driller	10x1 Pancake Head Driller	N/A	N/A	N/A
<b>Classic® Series</b>	10x1 Woodgrip with washer	12x1 Tapered Shank	N/A	14x1¼ Self-Driller or Fab-Lok	14x1¼ Self-Driller, 12x1¼ Impax 45, or Fab-Lok	14x1¼ Self-Driller, 12x¼ Self-Driller, or Fab-Lok
<b>Artisan®</b>	10x1 Woodgrip without washer or 10x1 Pancake Head Type A	8x¼ Nibbed Driller, 12x1 Tapered Shank, or 10x1 Pancake Head Type A	8x¼ Nibbed Driller, 12x1 Tapered Shank, or 10x1 Pancake Head Type A	N/A	N/A	N/A
<b>FlexLok®</b>	10x1 Pancake Head Type A	10x1 Pancake Head Driller	#14 Dekfast	10x1 Pancake Head Driller	N/A	N/A
<b>ShadowRib™</b>	N/A	12x1 Tapered Shank	N/A	14x1¼ Self-Driller or Fab-Lok	12x1¼ Impax 45 Fab-Lok	14x1¼ Self-Driller, 12x1¼ Self-Driller or Fab-Lok
<b>QwikLok™</b>	N/A	12x1 Tapered Shank	N/A	14x¼ Self-Driller	12x1¼ Impax 45	14x1¼ Self-Driller or 12x1¼ Self-Driller
<b>LiteFrame®</b>	N/A	12x1 Tapered Shank	N/A	14x1¼ Self-Driller	12x1¼ Impax 45	14x1¼ Self-Driller or 12x1¼ Self-Driller
<b>NuWall®</b>	10x1 Pancake Head Type A or 10x1 Woodgrip without washer	12x1 Tapered Shank	N/A	14x1¼ Self-Driller	12x1¼ Impax 45	N/A

### PRODUCT APPLICATION CHART

	ROOF SYSTEM	FACADE SYSTEM	EXTERIOR WALL	INTERIOR WALL LINER	MINI-STORAGE OR CANOPY ROOF SYSTEM	SOFFIT SYSTEM	CURVED ARCHES	EQUIPMENT SCREENS
<b>LokSeam®</b>	•	•	•					•
<b>Craftsman™ Series</b>	•	•	•			•		•
<b>Classic® Series</b>					•	•		
<b>Artisan®</b>				•		•		
<b>FlexLok® Series</b>						•	•	
<b>ShadowRib™</b>		•	•					•
<b>QwikLok™</b>					•	•		
<b>NuWall®</b>		•	•					•

This "Product Application Chart" is for general reference only. Not all panels, gauges, and widths should be used for these applications. Please call MBCI for the best product for your specific application.

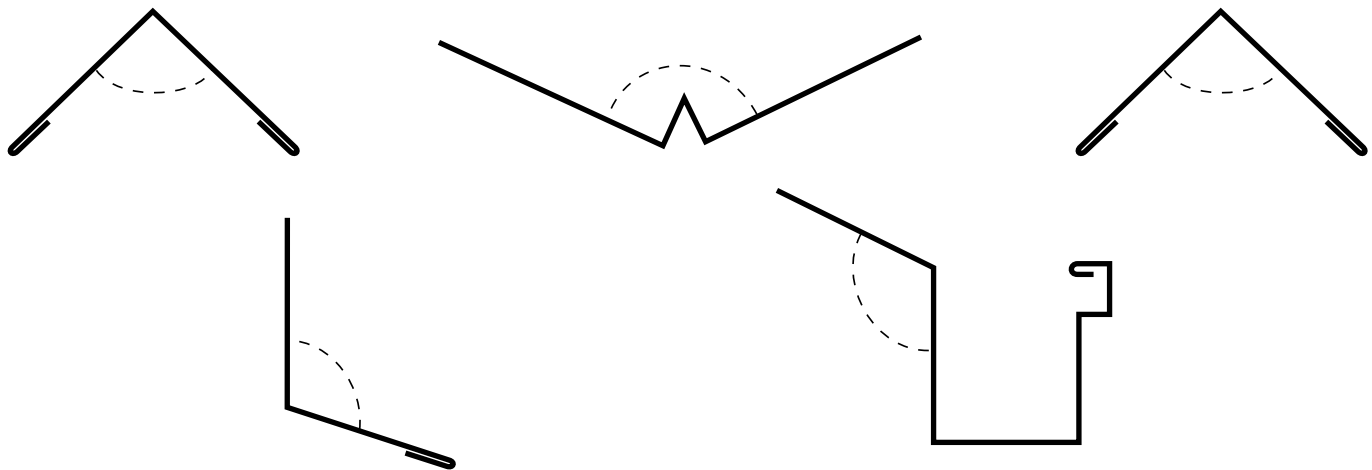
## PRODUCT INFORMATION

### HIP/RIDGE COVER SELECTION CHART



	ROOF SLOPE										
	3:12	4:12	5:12	6:12	7:12	8:12	9:12	10:12	11:12	12:12	
Craftsman™ SB Series	4½"	4½"	4½"	4½"	4½"	4½"	4½"	4½"	4½"	4½"	5½"
Craftsman™ LB Series	4½"	4½"	4½"	5½"	5½"	5½"	5½"	5½"	5½"	5½"	5½"
Craftsman™ HB Series	4½"	4½"	4½"	5½"	5½"	5½"	5½"	5½"	5½"	5½"	5½"

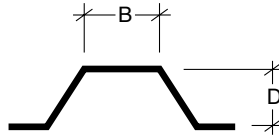
### ANGLE CHART FOR HIP, VALLEY, RIDGE, GUTTER AND PITCH BREAK TRIM



	ROOF SLOPE											
	1:12	2:12	3:12	4:12	5:12	6:12	7:12	8:12	9:12	10:12	11:12	12:12
HIP AND VALLEY	173°	166°	160°	154°	148°	143°	138°	133°	129°	126°	123°	120°
RIDGE	170°	161°	152°	143°	135°	127°	120°	113°	106°	100°	95°	90°
GUTTER AND PITCH BREAK	94°	99°	104°	108°	112°	116°	120°	123°	126°	129°	132°	135°

## PRODUCT INFORMATION

### 1" SUBGIRT



SECTION PROPERTIES												
SECTION B x D 1.63 x 1				AXIS X - X							AXIS Y - Y	
				TOP IN COMPRESSION			BOTTOM IN COMPRESSION					
F <sub>y</sub>	GAUGE	WEIGHT LB/FT	AREA IN <sup>2</sup>	I <sub>x</sub> IN <sup>4</sup>	S <sub>e</sub> IN <sup>3</sup>	M <sub>a</sub> KIP-FT	I <sub>x</sub> IN <sup>4</sup>	S <sub>e</sub> IN <sup>3</sup>	M <sub>a</sub> KIP-FT	R <sub>x</sub> IN	I <sub>x</sub> IN <sup>4</sup>	R <sub>y</sub> IN
33	18	0.95	0.279	0.0466	0.0909	1.7686	0.0449	0.0844	1.6679	0.4086	0.5993	1.4655
57	16	1.19	0.350	0.0582	0.1122	3.7983	0.0556	0.1032	3.5217	0.4076	0.7529	1.4660
57	14**	1.45	0.416	0.0688	0.1312	4.4680	0.0681	0.1287	4.3920	0.4068	0.8939	1.4666

#### NOTES

- All calculations for the properties of 1" Subgirt are calculated in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members.
  - M<sub>a</sub> is allowable bending movement.
  - S<sub>e</sub> is for bending.
  - I<sub>y</sub> is for the full section.
- \*\* 14 Gauge available as a press broken part only.

### LOAD TABLES FOR SUBGIRTS (Fully Braced) CONTINUOUS 3 SPAN CONDITION

SECTION B x D	GAUGE	SPAN FT.	LIVE LOAD LB/FT	DEFLECTION IN.	REACTION		NEGATIVE WIND LOAD LB/FT
					END KIPS	INT KIPS	
1.63 x 1	18	2	347.5	0.05	0.28	0.76	491.3
		3	154.4	0.11	0.19	0.51	218.3
		4	86.9	0.19	0.14	0.38	122.8
		5	55.6	0.30	0.11	0.31	78.6
		6	35.6*	0.40	0.09	0.23	54.6
1.63 x 1	16	2	717.5	0.08	0.59	1.61	1055.1
		3	326.1	0.18	0.39	1.08	468.9
		4	150.0*	0.27	0.24	0.66	263.8
		5	76.8*	0.33	0.15	0.42	168.8
		6	44.5*	0.40	0.11	0.29	117.2
1.63 x 1	14**	2	845.2	0.08	0.68	1.86	1241.1
		3	395.4	0.19	0.47	1.30	551.6
		4	177.2*	0.27	0.28	0.78	310.3
		5	90.7*	0.33	0.18	0.50	198.6
		6	52.5*	0.40	0.13	0.35	137.9

#### NOTES

- LOAD is allowable total load that can be supported by the section. The weight of the section has not been subtracted from these values.
- Allowable loads have been calculated in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members for uniform span lengths and F<sub>y</sub> of 33 KSI for 18 Ga. and 57 KSI for 16 and 14 gauges. Wind Load is for uplift for orientation as shown on Properties and Allowables. These values are valid for the compression flange being fully braced.
- Minimum bearing length of 1.5" required.
- Deflection values are the amount of deflection that occurs when the full allowable load is applied. For applications with special deflection requirements, it may be necessary to modify the allowable loads.
- \* Indicates that a Deflection of L/180 controlled for allowable loads.  
\*\*14 Gauge available as a press broken part only.



## PRODUCT INFORMATION

### LOAD TABLES FOR SUBGIRTS (Unbraced) CONTINUOUS 3 SPAN CONDITION

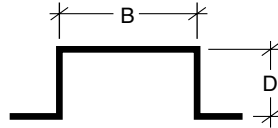
SECTION B x D	GAUGE	SPAN FT.	LIVE LOAD LB/FT	DEFLECTION IN.	REACTION		NEGATIVE WIND LOAD LB/FT
					END KIPS	INT KIPS	
1.63 x 1	18	2	180.30	0.03	0.15	0.40	270.2
		3	47.50	0.03	0.06	0.16	135.5
		4	20.00	0.05	0.03	0.09	59.1
		5	10.55	0.06	0.03	0.06	32.9
		6	6.35	0.08	0.02	0.05	21.2
1.63 x 1	16	2	264.90	0.03	0.21	0.59	601.0
		3	76.40	0.04	0.09	0.26	216.8
		4	34.40	0.06	0.06	0.16	100.2
		5	19.20	0.09	0.04	0.11	57.9
		6	12.00	0.12	0.03	0.09	38.0
1.63 x 1	14**	2	365.00	0.03	0.29	0.81	785.0
		3	112.80	0.05	0.14	0.38	318.6
		4	53.20	0.08	0.09	0.24	153.0
		5	30.60	0.12	0.06	0.18	90.5
		6	19.70	0.16	0.05	0.14	60.2

#### NOTES

- LOAD is allowable total load that can be supported by the section. The weight of the section has not been subtracted from these values.
- Allowable loads have been calculated in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members for uniform span lengths and  $F_y$  of 33 KSI for 18 Ga. and 57 KSI for 16 and 14 gauges. Wind Load is for uplift for orientation as shown on Properties and Allowables. These values are valid for the compression flange being total unbraced between supports.
- Minimum bearing length of 1.5" required.
- Deflection values are the amount of deflection that occurs when the full allowable load is applied. For applications with special deflection requirements, it may be necessary to modify the allowable loads.
- \* Indicates that a Deflection of  $L/180$  controlled for allowable loads.  
\*\*14 Gauge available as a press broken part only.

## PRODUCT INFORMATION

### 1/2" SUBGIRT



SECTION PROPERTIES												
SECTION B x D 1.63 x 1				AXIS X - X							AXIS Y - Y	
				TOP IN COMPRESSION			BOTTOM IN COMPRESSION					
F <sub>y</sub>	GAUGE	WEIGHT LB/FT	AREA IN <sup>2</sup>	I <sub>x</sub> IN <sup>4</sup>	S <sub>e</sub> IN <sup>3</sup>	M <sub>a</sub> KIP-FT	I <sub>x</sub> IN <sup>4</sup>	S <sub>e</sub> IN <sup>3</sup>	M <sub>a</sub> KIP-FT	R <sub>x</sub> IN	I <sub>x</sub> IN <sup>4</sup>	R <sub>y</sub> IN
33	18	0.158	0.539	0.0069	0.0286	0.5739	0.0069	0.0255	0.5739	0.2094	0.0931	0.7665
57	16	0.197	0.670	0.0083	0.0337	1.0420	0.0083	0.0305	1.0420	0.2047	0.1159	0.7669

#### NOTES

- All calculations for the properties of 1/2" Subgirt are calculated in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members.
- I<sub>x</sub> is for deflection determination.
- S<sub>e</sub> is for bending.
- M<sub>a</sub> is allowable bending movement.
- I<sub>y</sub> is for the full section.

### LOAD TABLES FOR SUBGIRTS (Fully Braced) CONTINUOUS 3 SPAN CONDITION

SECTION B x D	GAUGE	SPAN FT.	LIVE LOAD LB/FT	DEFLECTION IN.	REACTION		NEGATIVE WIND LOAD LB/FT
					END KIPS	INT KIPS	
1.5 x .5	18	2	109.6	0.100	0.09	0.24	159.4
		3	42.4*	0.200	0.05	0.14	70.9
		4	17.9*	0.267	0.03	0.08	39.9
1.5 x .5	16	2	154.4*	0.133	0.12	0.34	266.0
		3	45.8*	0.200	0.05	0.15	118.2
		4	19.3*	0.267	0.03	0.08	66.5

#### NOTES

- LOAD is allowable total load that can be supported by the section. The weight of the section has not been subtracted from these values.
- Allowable loads have been calculated in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members for uniform span lengths and F<sub>y</sub> of 33 KSI for 18 Ga. and 57 KSI for 16 and 14 gauges. Wind Load is for uplift for orientation as shown on Properties and Allowables. These values are valid for the compression flange being fully braced.
- Minimum bearing length of 1.5" required.
- Deflection values are the amount of deflection that occurs when the full allowable load is applied. For applications with special deflection requirements, it may be necessary to modify the allowable loads.
- \* Indicates that a Deflection of L/180 controlled for allowable loads.

## PRODUCT INFORMATION

### LOAD TABLES FOR SUBGIRTS (Unbraced) CONTINUOUS 3 SPAN CONDITION

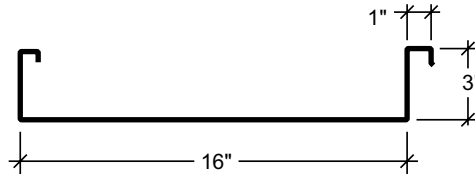
SECTION B x D	GAUGE	SPAN FT.	LIVE LOAD LB/FT	DEFLECTION IN.	REACTION		NEGATIVE WIND LOAD LB/FT
					END KIPS	INT KIPS	
1.5 x .5	18	2	80.90	0.08	0.07	0.18	132.6
		3	30.85	0.15	0.04	0.10	57.2*
		4	15.80	0.24	0.03	0.07	24.4*
1.5 x .5	16	2	140.3	0.110	0.11	0.31	228.0*
		3	49.8*	0.200	0.06	0.17	68.0*
		4	20.6*	0.267	0.03	0.09	29.1*

#### NOTES

1. LOAD is allowable total load that can be supported by the section. The weight of the section has not been subtracted from these values.
2. Allowable loads have been calculated in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members for uniform span lengths and  $F_y$  of 33 KSI for 18 Ga. and 57 KSI for 16 and 14 gauges. Wind Load is for uplift for orientation as shown on Properties and Allowables. These values are valid for the compression flange being total unbraced between supports.
3. Minimum bearing length of 1.5" required.
4. Deflection values are the amount of deflection that occurs when the full allowable load is applied. For applications with special deflection requirements, it may be necessary to modify the allowable loads.
5. \* Indicates that a Deflection of  $L/180$  controlled for allowable loads.

## PRODUCT INFORMATION

### CLASSIC<sup>®</sup> SERIES 16"



SECTION PROPERTIES								
PANEL	F <sub>y</sub>	WEIGHT	NEGATIVE BENDING			POSITIVE BENDING		
			l <sub>xe</sub>	S <sub>xe</sub>	Maxo	l <sub>xe</sub>	S <sub>xe</sub>	Maxo
GAUGE	(KSI)	(PSF)	(IN.4/FT.)	(IN.3/FT.)	(KIP-IN.)	(IN.4/FT.)	(IN.3/FT.)	(KIP-IN.)
24	50	1.48	0.1574	0.0988	2.9587	0.3176	0.1360	4.0721
22	50	1.87	0.2167	0.1406	4.2098	0.4518	0.1981	5.9328

#### NOTES:

- All calculations for the properties of 16" Classic Series panels are calculated in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members.
- l<sub>xe</sub> is for deflection determination.
- S<sub>xe</sub> is for bending.
- Maxo is allowable bending moment.
- All values are for the one foot of panel width.

### ALLOWABLE UNIFORM LOADS IN POUNDS PER SQUARE FOOT

24 Gauge (F <sub>y</sub> = 50 KSI)								
SPAN TYPE	LOAD TYPE							
		3.0	4.0	5.0	6.0	7.0	8.0	9.0
SINGLE	NEGATIVE WIND LOAD	219.2	123.3	78.9	54.8	40.3	30.8	24.4
	LIVE LOAD/DEFLECTION	119.2	89.4	71.5	59.6	51.1	42.4	33.5
2-SPAN	NEGATIVE WIND LOAD	301.6	169.7	108.6	75.4	55.4	42.4	33.5
	LIVE LOAD/DEFLECTION	100.4	75.3	60.2	50.2	40.3	30.8	24.4
3-SPAN	NEGATIVE WIND LOAD	342.4	192.6	123.3	85.6	62.9	48.2	38.0
	LIVE LOAD/DEFLECTION	114.1	85.6	68.4	57.0	48.9	38.5	30.4
4-SPAN	NEGATIVE WIND LOAD	352.1	198.0	126.7	88.0	64.7	49.5	39.1
	LIVE LOAD/DEFLECTION	109.8	82.3	65.9	54.9	47.0	36.0	28.4

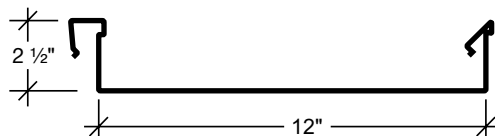
22 Gauge (F <sub>y</sub> = 50 KSI)								
SPAN TYPE	LOAD TYPE							
		3.0	4.0	5.0	6.0	7.0	8.0	9.0
SINGLE	NEGATIVE WIND LOAD	311.8	175.4	112.3	78.0	57.3	43.9	34.6
	LIVE LOAD/DEFLECTION	208.5	156.4	125.1	104.3	80.7	61.8	48.8
2-SPAN	NEGATIVE WIND LOAD	439.5	247.2	158.2	109.9	80.7	61.8	48.8
	LIVE LOAD/DEFLECTION	163.5	122.6	98.1	78.0	57.3	43.9	34.6
3-SPAN	NEGATIVE WIND LOAD	487.2	274.1	175.4	121.8	89.5	68.5	54.1
	LIVE LOAD/DEFLECTION	185.8	139.4	111.5	92.9	71.6	54.8	43.3
4-SPAN	NEGATIVE WIND LOAD	504.9	284.0	181.8	126.2	92.7	71.0	56.1
	LIVE LOAD/DEFLECTION	178.8	134.1	107.3	89.4	66.8	51.2	40.4

#### NOTES:

- Allowable loads are based on uniform span lengths and F<sub>y</sub> = 50-ksi.
- LIVE LOAD is limited by bending, shear, combined shear & bending and web crippling
- NEGATIVE WIND LOAD does not contain a 33.333% increase and does not consider fastener pullout or pullover.**
- Above loads consider a maximum deflection ratio of L/180.
- The weight of the panel has not been deducted from the allowable loads.
- The use of any accessories other than those provided by the manufacturer may damage panels, void all warranties and will void all engineering data
- This material is subject to change without notice. Please contact MBCI for most current data.

## PRODUCT INFORMATION

### QWIKLOK™



SECTION PROPERTIES								
			NEGATIVE BENDING			POSITIVE BENDING		
PANEL	Fy	WEIGHT	Ixe	Sxe	Maxo	Ixe	Sxe	Maxo
GAUGE	(KSI)	(PSF)	(IN.4/FT.)	(IN.3/FT.)	(KIP-IN.)	(IN.4/FT.)	(IN.3/FT.)	(KIP-IN.)
24	50	1.85	0.1303	0.0903	2.7034	0.3106	0.1671	5.0025
22	50	2.23	4.1474	0.1896	0.1385	0.0422	0.2307	6.9060

#### NOTES:

- All calculations for the properties of QWIKLOK panels are calculated in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members.
- Ixe is for deflection determination.
- Sxe is for bending.
- Maxo is allowable bending moment.
- All values are for the one foot of panel width.

### ALLOWABLE UNIFORM LOADS IN POUNDS PER SQUARE FOOT

24 Gauge (Fy = 50 KSI)						
SPAN TYPE	LOAD TYPE	SPAN IN FEET				
		6.0	8.0	10.0	12.0	14.0
SINGLE	POSITIVE WIND LOAD	92.6	52.1	33.4	23.2	17.0
	NEGATIVE WIND LOAD	50.1	28.2	18.0	12.5	9.2
2-SPAN	POSITIVE WIND LOAD	50.1	28.2	18.0	12.5	9.2
	NEGATIVE WIND LOAD	89.0	50.1	32.0	22.3	16.3
3-SPAN	POSITIVE WIND LOAD	62.6	35.2	22.5	15.6	11.5
	NEGATIVE WIND LOAD	78.2	44.0	28.2	19.6	14.4
4-SPAN	POSITIVE WIND LOAD	58.4	32.9	21.0	14.6	10.7
	NEGATIVE WIND LOAD	81.1	45.6	29.2	20.3	14.9

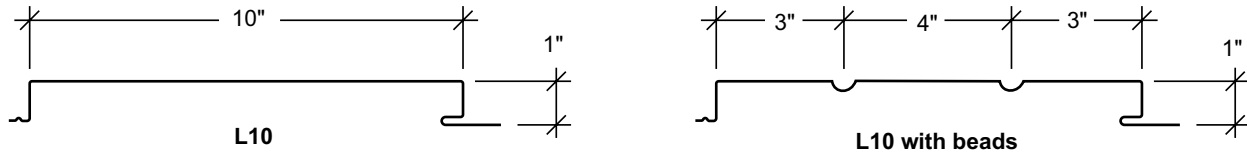
22 Gauge (Fy = 50 KSI)						
SPAN TYPE	LOAD TYPE	SPAN IN FEET				
		6.0	8.0	10.0	12.0	14.0
SINGLE	POSITIVE WIND LOAD	127.9	71.9	46.0	32.0	23.5
	NEGATIVE WIND LOAD	76.8	43.2	27.6	19.2	14.1
2-SPAN	POSITIVE WIND LOAD	76.8	43.2	27.6	19.2	14.1
	NEGATIVE WIND LOAD	127.9	71.9	46.0	32.0	23.5
3-SPAN	POSITIVE WIND LOAD	96.0	54.0	34.6	24.0	17.6
	NEGATIVE WIND LOAD	120.0	67.5	43.2	30.0	22.0
4-SPAN	POSITIVE WIND LOAD	89.6	50.4	32.3	22.4	16.5
	NEGATIVE WIND LOAD	124.4	70.0	44.8	31.1	22.8

#### NOTES:

- Allowable loads are based on uniform span lengths.
- NEGATIVE WIND LOAD has not been increased by 33.333% and does not consider fastener pullout or pullover.**
- POSITIVE WIND LOAD has not been increased by 33.333%.**
- Above loads consider a maximum deflection ratio of L/120.
- The weight of the panel has not been deducted from the allowable loads.
- The use of any accessories other than those provided by the manufacturer may damage panels, void all warranties and will void all engineering data.
- This material is subject to change without notice. Please contact MBCI for most current data.

## PRODUCT INFORMATION

### ARTISAN<sup>®</sup> L10



SECTION PROPERTIES								
			NEGATIVE BENDING			POSITIVE BENDING		
PANEL	F <sub>y</sub>	WEIGHT	l <sub>xe</sub>	S <sub>xe</sub>	Max <sub>o</sub>	l <sub>xe</sub>	S <sub>xe</sub>	Max <sub>o</sub>
GAUGE	(KSI)	(PSF)	(IN.4/FT.)	(IN.3/FT.)	(KIP-IN.)	(IN.4/FT.)	(IN.3/FT.)	(KIP-IN.)
24	50	1.37	0.0309	0.0361	1.0803	0.0209	0.0348	1.0418
22	50	1.73	0.0425	0.0501	1.4989	0.0296	0.0517	1.5478

#### NOTES:

- All calculations for the properties of Artisan L10 panels are calculated in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members.
- l<sub>xe</sub> is for deflection determination.
- S<sub>xe</sub> is for bending.
- Max<sub>o</sub> is allowable bending moment.
- All values are for one foot of panel width.

### ALLOWABLE UNIFORM LOADS IN POUNDS PER SQUARE FOOT

24 Gauge (F <sub>y</sub> = 50 KSI)								
SPAN TYPE	LOAD TYPE	SPAN IN FEET						
		2.0	2.5	3.0	3.5	4.0	4.5	5.0
SINGLE	POSITIVE WIND LOAD	173.6	111.1	67.7	42.6	28.5	20.0	14.6
2-SPAN	POSITIVE WIND LOAD	164.7	107.4	75.3	55.7	42.8	33.9	27.5
3-SPAN	POSITIVE WIND LOAD	200.0	132.3	93.2	69.1	53.2	37.8	27.6
4-SPAN	POSITIVE WIND LOAD	189.5	124.1	87.3	64.7	49.8	39.5	29.3

22 Gauge (F <sub>y</sub> = 50 KSI)								
SPAN TYPE	LOAD TYPE	SPAN IN FEET						
		2.0	2.5	3.0	3.5	4.0	4.5	5.0
SINGLE	POSITIVE WIND LOAD	200.0	165.1	95.8	60.3	40.4	28.4	20.7
2-SPAN	POSITIVE WIND LOAD	200.0	157.7	111.0	81.6	62.5	49.3	40.0
3-SPAN	POSITIVE WIND LOAD	200.0	193.5	136.9	101.8	76.3	53.6	39.1
4-SPAN	POSITIVE WIND LOAD	200.0	181.8	128.4	95.2	72.9	56.9	41.5

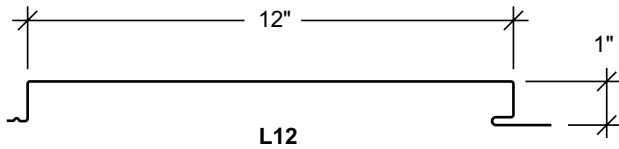
#### NOTES:

- Allowable loads are based on uniform span lengths.
- POSITIVE WIND LOAD is limited by bending, shear, combined shear & bending.
- Above loads consider a maximum deflection ratio of L/180.
- The weight of the panel has not been deducted from the allowable loads.
- THE ABOVE LOADS ARE NOT FOR USE WHEN DESIGNING PANELS TO RESIST WIND UPLIFT.**
- The use of any accessories other than those provided by the manufacturer may damage panels, void all warranties and will void all engineering data.
- Please contact manufacturer or manufacturer's website for most current allowable wind uplift loads.

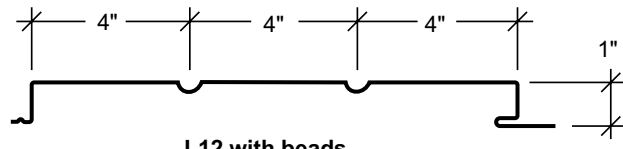
The Engineering data contained herein is for the expressed use of customers and design professionals. Along with this data, it is recommended that the design professional have a copy of the most current version of the North American Specification for the Design of Cold-Formed Steel Structural Members published by the American Iron and Steel Institute to facilitate design. This Specification contains the design criteria for cold-formed steel components. Along with the Specification, the designer should reference the most current building code applicable to the project jobsite in order to determine environmental loads. If further information or guidance regarding cold-formed design practices is desired, please contact the manufacturer.

## PRODUCT INFORMATION

### ARTISAN® L12



L12



L12 with beads

SECTION PROPERTIES								
			NEGATIVE BENDING			POSITIVE BENDING		
PANEL	Fy	WEIGHT	lxe	Sxe	Maxo	lxe	Sxe	Maxo
GAUGE	(KSI)	(PSF)	(IN.4/FT.)	(IN.3/FT.)	(KIP-IN.)	(IN.4/FT.)	(IN.3/FT.)	(KIP-IN.)
24	50	1.31	0.0270	0.0309	0.9248	0.0178	0.0296	0.8871
22	50	1.65	0.0374	0.0428	1.2821	0.0252	0.0441	1.3199

**NOTES:**

- All calculations for the properties of Artisan L12 panels are calculated in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members.
- lxe is for deflection determination.
- Sxe is for bending.
- Maxo is allowable bending moment.
- All values are for one foot of panel width.

### ALLOWABLE UNIFORM LOADS IN POUNDS PER SQUARE FOOT

24 Gauge (Fy = 50 KSI)								
SPAN TYPE	LOAD TYPE	SPAN IN FEET						
		2.0	2.5	3.0	3.5	4.0	4.5	5.0
SINGLE	POSITIVE WIND LOAD	147.9	94.6	57.6	36.3	24.3	17.1	12.4
2-SPAN	POSITIVE WIND LOAD	142.2	92.3	64.6	47.7	36.6	29.0	23.5
3-SPAN	POSITIVE WIND LOAD	174.9	114.1	80.1	59.2	45.5	32.2	23.5
4-SPAN	POSITIVE WIND LOAD	164.2	106.9	75.0	55.4	42.6	33.7	24.9

22 Gauge (Fy = 50 KSI)								
SPAN TYPE	LOAD TYPE	SPAN IN FEET						
		2.0	2.5	3.0	3.5	4.0	4.5	5.0
SINGLE	POSITIVE WIND LOAD	200.0	140.8	81.6	51.4	34.4	24.2	17.6
2-SPAN	POSITIVE WIND LOAD	200.0	136.1	95.0	69.8	53.4	42.2	34.2
3-SPAN	POSITIVE WIND LOAD	200.0	167.8	118.2	87.2	66.8	45.6	33.3
4-SPAN	POSITIVE WIND LOAD	200.0	157.4	110.7	81.4	62.3	48.4	35.3

**NOTES:**

- Allowable loads are based on uniform span lengths.
- POSITIVE WIND LOAD is limited by bending, shear, combined shear & bending.
- Above loads consider a maximum deflection ratio of L/180.
- The weight of the panel has not been deducted from the allowable loads.
- THE ABOVE LOADS ARE NOT FOR USE WHEN DESIGNING PANELS TO RESIST WIND UPLIFT**
- The use of any accessories other than those provided by the manufacturer may damage panels, void all warranties and will void all engineering data.
- Please contact manufacturer or manufacturer's website for most current allowable wind uplift loads.

The Engineering data contained herein is for the expressed use of customers and design professionals. Along with this data, it is recommended that the design professional have a copy of the most current version of the North American Specification for the Design of Cold-Formed Steel Structural Members published by the American Iron and Steel Institute to facilitate design. This Specification contains the design criteria for cold-formed steel components. Along with the Specification, the designer should reference the most current building code applicable to the project jobsite in order to determine environmental loads. If further information or guidance regarding cold-formed design practices is desired, please contact the manufacturer.

## PRODUCT INFORMATION

### GALVALUME® PLUS COATED SHEET STEEL SPECIFICATIONS

#### A. PRODUCT NAME

Galvalume® Plus Sheet Steel.

#### B. MANUFACTURER

Bethlehem Steel Corporation - Bethlehem, Pennsylvania.

#### C. PRODUCT DESCRIPTION

##### 1. COATING

"Galvalume® Plus" is the trade name for a patented sheet steel product having a coating of corrosion resistant aluminum-zinc alloy applied by a continuous hot dipping process. The alloy coating of aluminum and zinc combines the best properties of both metals. It has the corrosion resistance, high-temperature oxidation resistance, and heat reflectivity characteristic of aluminum coatings, with the formability and galvanic protection of cut edges characteristic of zinc coatings.

##### 2. BASIC USE

Galvalume® Plus sheet, both bare and painted, is intended for applications where superior corrosion resistance is required, as in roofing, siding, and pre-engineered buildings.

##### 3. LIMITATIONS

Based on our experience to date, we recommend against (a) contact of Galvalume® Plus sheet with either lead or copper, (b) exposure of Galvalume® Plus sheet to water rundown from copper or lead, and (c) use of Galvalume® Plus sheet in harsh chemical or agricultural environs.

#### D. TECHNICAL DATA

##### 1. COATING

The composition of the Galvalume® Plus sheet coating is typically 55% aluminum, 1.6% silicon and the balance zinc, nominal percentages by weight. The product is described in ASTM Specification A792 and is available in two coating classes:

- ASTM Designation AZ50 - Triple Spot, Average Minimum Ounces/Square Foot-.50; Single Spot, Average Minimum Ounces/Square Foot-.43.
- ASTM Designation AZ55 - Triple Spot, Average Minimum Ounces/Square Foot-.55; Single Spot, Average Minimum Ounces/Square Foot-.50.

A nominal coating weight of .50 ounces/square foot (total both sides) is equivalent to .8 mil thickness on each side. The coating is available as regular spangle or extra smooth surface, with or without chemical treatment. An oil coating may also be specified.

##### 2. ATMOSPHERIC CORROSION RESISTANCE

Based on 20-year atmospheric test results, it is estimated that Galvalume® Plus (AZ50) sheet will outlast G90 galvanized by two to four times in marine, industrial and rural atmospheres. When compared to aluminum coated sheet steel, Galvalume Plus sheet has superior corrosion resistance at sheared edges in industrial and rural environments, and much better resistance to crevice corrosion in marine environments.

##### 3. SALT SPRAY CORROSION RESISTANCE

With cut edges protected, the coating on Galvalume® Plus sheet steel (AZ50) lasts five to ten times longer than the coating on G90 galvanized. In salt spray tests conducted with bare cut edges exposed, the corrosion resistance is typically three to four times that of G90 galvanized.

##### 4. HIGH TEMPERATURE BEHAVIOR

Galvalume® Plus sheet can be used at temperatures up to 600°F without discoloration and up to 1250°F without heavy oxidation and scaling.

##### 5. FORMABILITY

Galvalume® Plus sheet can be formed about as readily as continuously annealed galvanized sheet. Lock forming and roll forming are readily accomplished.

##### 6. PAINTABILITY

Properly pretreated Galvalume® Plus sheet has excellent paint adhesion. Bethlehem has approved specific pretreatment and primer systems which should be used to provide optimum long-term outdoor performance. The conditions of treatment, concentration, temperature, and time should be determined for each application to obtain the best paint-bonding properties and avoid excessive attack on the Galvalume Plus coating. Bethlehem's *Specification for Prepainting Galvalume® Plus Sheet* which contains approved pretreatments and primer systems is available on request.

#### E. INSTALLATION

Galvalume® Plus sheet can be handled the same as aluminum or zinc coated sheet steel. When using bare Galvalume® Plus in aesthetic architectural applications, cotton gloves must be worn during handling and installation. Body oil can produce black marks on the panel that cannot be removed, which may result in an unacceptable installation. Fasteners and other component parts should have equivalent corrosion resistance. Galvalume® Plus sheet steel joints can be effectively closed using appropriate sealants such as neutral silicone rubber, butyl rubber and styrene butadiene. Soldering is not recommended.

#### F. WARRANTY

A warranty is available upon written request for bare and prepainted Galvalume® Plus sheet when used for roofing and/or siding.

#### G. MAINTENANCE

Properly installed Galvalume® Plus sheet requires no maintenance. Galvalume® Plus sheet, like galvanized, is subject to wet storage staining and turns gray to black if moisture is trapped between coil laps, cut length sheets, or roll formed parts during shipping and storage. The mill treats Galvalume® Plus sheet to retard wet storage staining (unless otherwise requested); however the user should take precautions to keep Galvalume® Plus sheet dry in transit, in storage, and at work sites.

\*Galvalume Plus® is a trademark of BIEC International Inc.



## PRODUCT INFORMATION

# Signature® 200 SPECIFICATIONS

### SPECIFICATIONS

#### Product Name

Signature® 200, a premium coating with proven, proprietary polymer and premium pigments.

#### Product Description

**Uses:** Signature® 200 is a factory-applied and oven-baked protective coating used on GALVALUME®, galvanized steel or aluminum substrate. Signature® 200 combines excellent physical characteristics and aesthetic values for metal panels and components. Its uses in architectural, industrial, commercial, residential and institutional metal construction are numerous. Signature® 200 coatings are formulated for hardness and flexibility, making it a versatile and durable coating system when applied over a proprietary, corrosion-resistant primer.

**Limitations:** Since Signature® 200 coatings require baking to cure, they cannot be field applied. Signature® 200 coatings are not approved for use on hot or cold rolled bare steel substrates intended for exterior exposure.

**Composition and Materials:** Signature® 200 is a thermoset coating consisting of a proprietary polyester resin modified by silicone resin intermediate. Signature® 200 uses premium,

proven-durability ceramic pigments which give superior exterior protection and resistance to chemical corrosion and ultraviolet radiation.

**Color:** Signature® 200 coatings are available in a wide range of standard, field-proven colors. Special colors are available (minimum quantity requirements may apply) if approved by manufacturer. Polar White may not meet these specifications – please inquire.

#### Installation

The Signature® 200 system is factory applied over metal substrates using the coil coating process. Surfaces shall be chemically cleaned and pretreated according to manufacturers' specifications to remove contaminants and provide acceptable corrosion resistance. Total dry film thickness of topcoat (Signature® 200 protective coating and primer) is within the 0.9 - 1.05 mil range for coil coated applications. The pretreated substrate is primed with 0.2 - 0.25 mil of a high performance primer. The Signature® 200 protective coating is applied over the primed substrate at 0.7 - 0.8 mil. The

Signature® 200 systems incorporate outstanding exterior durability, while affording superior coil line application and post-forming capabilities.

#### Warranty

The Signature® 200 warranty is backed by the strictest production specifications and is one of the strongest in the industry. Details and further information are available by contacting the manufacturer.

#### Maintenance

The factory applied finish of Signature® 200 is baked-on coating designed to give trouble-free performance for years with little service required. However, mild detergents and/or mineral spirits are recommended for removal of surface dust and airborne chemical deposits. Air-dry touch-up paints are also available for repair of minor scratches.

#### Technical Assistance

Complete technical information and literature is available from manufacturer.

Signature® is a registered trademark of NCI Group, Inc. KYNAR® 500 is a registered trademark of Arkema, Inc. HYLAR® 5000 is a registered trademark of Solvay Solexis. GALVALUME® is a registered trademark of BIEC International Inc.

### PHYSICAL PROPERTIES

PROPERTY	VALUE	TEST DESIGNATION
<b>Gloss @ 60°</b>	20-80	ASTM D523
<b>Film Hardness</b>	F-Min (Eagle Turq.)	ASTM D3363
<b>Impact Resistance, 3x Metal Thickness</b>	No Adhesion Loss	ASTM D2794
<b>Cross-Hatch Adhesion</b>	No Adhesion Loss	ASTM D3359
<b>Formability: T-Bend</b>	(1) Acceptable	ASTM D4145
<b>Abrasion Resistance, Falling Sand</b>	35 ± 5 Liters	ASTM D968
<b>ACCELERATED TESTS:</b>		
<b>Humidity, 1,000 hrs.</b>	(2) Acceptable	ASTM D2247
<b>Dew Cycle Weatherometer, 200 Total Hours</b>	(4) Acceptable	ASTM D3361
<b>Salt Spray, 1,000 hrs.</b>	(3) Acceptable	ASTM B117
<b>Chemical Spot Test</b>	(5) Acceptable	ASTM D1308

- (1) 2T to 4T, No loss of adhesion.
- (2) No field blisters.
- (3) ≤¼ inch creep from scribe, few blisters, rating of 8.
- (4) Chalk rating no less than 8. Color change, no more than 5ΔE Hunter units.
- (5) 10% Hydrochloric acid solution 24 hours no visible changes. 25% sodium hydroxide 1 hour test no visible change.

Descriptions and specifications contained herein were in effect at the time this publication was approved for printing. MBCI reserves the right to discontinue products at any time or change specifications and/or designs without notice and without incurring obligation.

## PRODUCT INFORMATION

### Signature® 300 and Signature® 300 Metallic SPECIFICATIONS

#### SPECIFICATIONS

##### Product Name

Signature® 300 and Signature® 300 Metallic, a premium fluoropolymer low gloss coating, produced with KYNAR® 500 or HYLAR® 5000 resin.

##### Product Description

**Basic Uses:** Signature® 300 coatings are specified by leading architects and used by manufacturers of metal curtain wall and other building products as a long-life exterior finish for aluminum, galvanized steel and Galvalume®. The liquid coating is factory applied and oven baked on properly prepared and primed substrates. Signature® 300 coatings typically are used as exterior finishes for metal roofing, siding, louvers, fascia, curtain wall, spandrel paneling and column covers. The building components can be post-formed from pre-coated coil stock.

**Limitations:** Since Signature® 300 coatings require baking to cure, they cannot be field applied. Signature® 300 coatings are not approved for use on hot or cold rolled bare steel substrates intended for exterior exposure.

**Composition and Materials:** Signature® 300 coatings are based on 70% KYNAR® 500 or HYLAR® 5000 PVDF fluoropolymer resin. They also are formulated with highly

durable pigments and solvents blended for optimum application properties.

**Color:** Signature® 300 coatings are available in a wide range of standard, field-proven colors. Special colors are available (minimum quantity requirements may apply) if approved by manufacturer.

##### Technical Data

See Chart Below.

##### Installation

Signature® 300 coatings may be coil coated on HDG steel, Aluminum or Galvalume® substrates that have been pretreated and primed according to manufacturer specifications. The entire system is applied in the factory and oven baked. Topcoat dry film thicknesses are within the 0.9-1.1 mil range (Note: which refers to the combination of primer and the Signature® 300 protective coating) for coil coated applications. The pretreated substrate is primed with 0.2 - 0.30 mil of a high performance primer. The Signature® 300 protective coating is applied over the primed substrate at 0.7 - 0.8 mil. The flexibility of the system permits coil-coated stock to be post-formed by either a roll former or press brake. All applicators of Signature® 300 coatings must have the approval of manufacturer. A list of approved applicators is available upon request.

##### Warranty

The Signature® 300 warranty is backed by the strictest production specifications and is one of the strongest in the industry. Details and further information are available by contacting manufacturer.

##### Maintenance

Signature® 300 coatings are virtually maintenance free and non-staining. If necessary, surface residue may be removed by conventional cleaning solvents or detergents. Minor scratches may be touched-up with a specially formulated, field-applied coating of the same color.

Signature® 300 coatings can be used in conjunction with conventional sealants and caulking compounds. Mortar, plaster, etc. will neither adhere to nor stain the surface.

##### Technical Assistance

Complete technical information and literature is available from manufacturer.

Signature® is a registered trademark of NCI Group, Inc. KYNAR® 500 is a registered trademark of Arkema, Inc. HYLAR® 5000 is a registered trademark of Solvay Solexis. GALVALUME® is a registered trademark of BIEC International Inc.

#### TECHNICAL DATA

##### PHYSICAL PROPERTIES Signature® 300

Property	Value	Test Designation
<b>Gloss @ 85°</b>	8-15	ASTM D523
<b>Film Hardness</b>	HB-Min (Eagle Turq.)	ASTM D3363 (NCCA II-12) (2)
<b>Impact Resistance, .5" Ball Indenter, 3x Metal Thickness</b>	(8) Acceptable	ASTM D2794
<b>Formability:</b>	(1) Acceptable	ASTM D522
<b>180° bend around 1/8" mandrel</b>	(2) Acceptable	ASTM D3359 (NCCA II-5)
<b>Adhesion</b>	67 Liters	ASTM D968
<b>Abrasion Resistance, Falling Sand</b>	(3) Acceptable	ASTM D4587, G53, or G154
<b>Accelerated Weathering, 5,000 hrs. exposure</b>	(4) Acceptable	ASTM D2247, Apparatus A1
<b>Humidity, 3,000 hrs.</b>	(5) Acceptable	ASTM B117 (NCCA III-2)
<b>Salt Spray, 2,000 hrs.</b>	(6) Acceptable	ASTM D5894
<b>Cyclic Salt Fog/UV exposure, 3,000 hrs.</b>	(7) Acceptable	ASTM D1308
<b>Chemical Spot Test</b>		

- (1) No evidence of cracking, and no loss of adhesion to the point of metal rupture.
- (2) No removal of finish after 1/16-inch cross-hatching to bare metal, to impact limits or point of metal rupture.
- (3) No cracking, peeling, blistering, loss of adhesion or corrosion of base metal. Chalk rating of 8 per ASTM D4214. Color change less than 5ΔE per ASTM D2244.
- (4) Rating of 10, no blistering, cracking, creepage or corrosion per ASTM D1654.
- (5) No more than 5/32-inch average creepage from scribed line rating of 7, field test rating of 8 per ASTM D1654.
- (6) No more than 1/32-inch creepage from scribed line, rating of 8. No blistering, rating of 10 per ASTM D1654.
- (7) 10% Hydrocoloric acid solution 24 hours no visible changes. 25% sodium hydroxide 1 hour test no color change, no blistering.
- (8) Reverse impact and direct impact, no cracking or loss of adhesion.

Descriptions and specifications contained herein were in effect at the time this publication was approved for printing. We reserve the right to discontinue products at any time or change specifications and/or designs without notice and without incurring obligation.

## NOTES



**NOTES**

## NOTES



*Metal Roof and Wall Systems*

**For the most current information available, visit our Web site at [www.mbc.com](http://www.mbc.com)**

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