



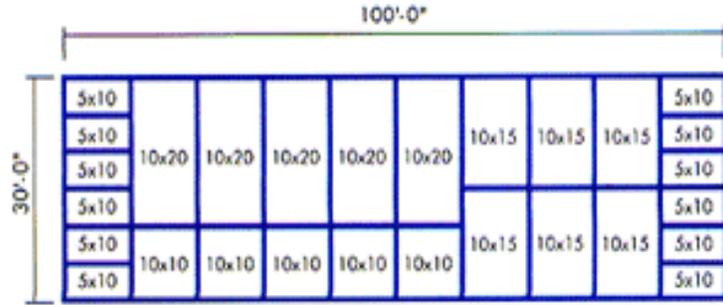
1-800-467-0626 or 479-787-6264

# STEEL ROOFING and SIDING

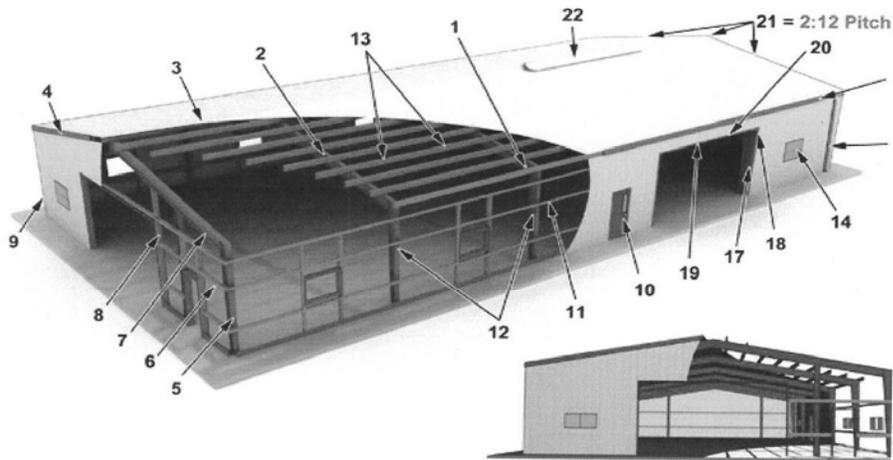
Ordering– Installation and  
Self-Help Guide



MBS Self-Storage buildings offer a wide variety of layouts– Typically based on 5ft spacing. Common roof slopes 1:12 to 1/2:12 and eave heights of 8'6 or 9'6 . All roof and wall panels are made from strong 26ga sheeting either bare galvalume or painted sheeting with a 45 year warranty. Interior partition panels commonly use 29ga bare galvalume



Steel Building kits from Metal Building Supply offer many advantages you won't find in other buildings. All building components are pre-cut, pre-punched and ready to bolt together in the field w/ solid I-beam frames all engineered for your area. You will receive a comprehensive set of erection drawings showing all details. All buildings are made with the highest quality Materials, all painted sheeting carries a 45 year warranty.



- 1. Eave Strut
- 2. Frame Rafter
- 3. Ridge Cap
- 4. Gable Trim
- 5. Corner Column

- 6. Endwall Girt
- 7. Endwall Rafter
- 8. Endwall Columns
- 9. Corner Trim
- 10. Walk Door
- 11. Sidewall Girt

- 12. Frame Column
- 13. Purlins
- 14. Window
- 15. Gutter or Eave Trim
- 16. Downspout
- 17. Framed Opening Jamb

- 18. Jamb Trim
- 19. Framed Opening
- 20. Door Head Trim
- 21. Roof Slope
- 22. Ridge Vent



## Installation Instructions

### Building Design and Construction

To ensure adequate performance and longevity, protect metal panels from potentially corrosive situations and materials. When treated lumber will be in direct contact with metal panels please note the following: Galvanized steel is compatible with the CCA (Chromated Copper Arsenate) pressure-treated lumber that is predominantly used today, but not with the older Penta treated lumber. Aluminum, however, must be separated from contact with all treated wood since the chemical preservatives are corrosive to aluminum. Likewise, dissimilar metals also require a protective barrier between them to prevent galvanic corrosion.

Plastic, builders' felt, bituminous paint, caulking, or gasket material may be used to separate panels from treated wood and dissimilar metals. When using aluminum panels in direct contact with steel use one of the above methods to separate the two metals.

Fertilizer, lime, acids, feeds, manure, soils, and many other substances also cause corrosion in metal panels. Contact between metal panels and any potentially corrosive materials should be prevented.

Porous insulation board may absorb and retain moisture, and requires a vapor barrier similar to that described above. This vapor barrier should be installed such that moisture is prevented from contacting both the insulation and the metal panel.

### **MBS supplied translucent panels are intended for siding applications only.**

In all situations, foot traffic should be avoided on translucent panels. Translucent panels used in roofing applications will break down over a short period and stain metal panels below, eventually causing corrosion of the metal. If used on roofs, use butyl caulking to separate the fiberglass from the metal. The fiberglass panels should be sealed regularly, as recommended by the translucent panel manufacturer.

### Purlins, Girts and Roof Deck

The material to which the metal panel is fastened should be properly spaced and sufficiently thick to provide a roof or wall system able to meet required design loads. Refer to the Wind Uplift chart on page 7. MBS recommends spacing the purlins a maximum of 24" on-center for roofing.

In re-roofing jobs where the condition of the old decking is in question, or where existing shingles will be left in place, new 2x4 purlins should be fastened through the decking and into the rafters. This will provide a solid framework for attaching the metal panels.

A 2" nominal lumber thickness provides the maximum pullout values for both screws and nails when the fasteners achieve a minimum of 1" penetration into the wood. (Note that 1" nominal lumber is only 3/4" thick and, therefore, results in lower pullout values. Pullout values may decrease slightly if the fasteners protrude completely through the purlins or girts. (refer to the load table below ) Kiln-dried softwood is recommended for purlins, girts, or decking (pine, fir, hemlock, and spruce). Hardwoods are difficult to fasten into without splitting and contain acids that are corrosive to metal panels. Green (non-kiln-dried) lumber may warp, twist, and shrink as the wood seasons fully, causing waviness in the panels and loosening of the fasteners.

## Roofing

Sidelaps should face away from wind driven rain. Therefore, begin installation by installing the first sheet square with the eave and gable at the downwind end of the roof, farthest away from the direction of prevailing winds.

In applications requiring a panel endlap, please refer to the details shown on this manual on page 6. For best results, lap panels as shown and install in the indicated sequence. **All endlaps require sealant.** When weather tightness is critical use sealant tape in all sidelaps.

To provide a drip edge, allow an overhang of 1" to 2" at the eave. If gutter is to be used allow 2 1/2" to 3" overhang. At the gable edge, use a gable or sidewall flashing. This will keep weather out, prevent lifting in high winds, and provide a neat, finished appearance. The trim and roofing sheet should be fastened every 6" to 10" inches along the gable edge.

## Roof Pitch

The metal roofing panels shown in this manual require a minimum pitch of 2-1/2" per foot to ensure proper drainage. Refer to the Installation Guide for the suggested endlap and the suggested "horizontal projected roof lengths" that apply to the various panels. For wider buildings and lower roof pitches, contact your MBS dealer for other suitable MBS profiles.

## Bending and Bowing

Steel roofing and siding sheets are rollformed from hardened, tempered metal for maximum strength. If a sheet must be bent, a gentle 90-degree bend is the maximum recommended. Metal should not be re-bent once it has been formed, nor should it be folded back on itself, since it is not designed to take a lockseam. When a metal roofing sheet must be installed on a curved roof, screws should be installed at every overlapping rib at the sheet ends to resist the natural tendency of the metal to spring back. Standard fastener spacing is permitted over the rest of the sheet.

Additional care and fasteners must be provided when securing the top and bottom purlins on a laminated rafter building to prevent the curved panels

from pulling the purlins loose from the rafters. Ring-shank pole barn nails, heavy wood screws, lag screws, or bolts are often used for attaching these purlins.

## Siding

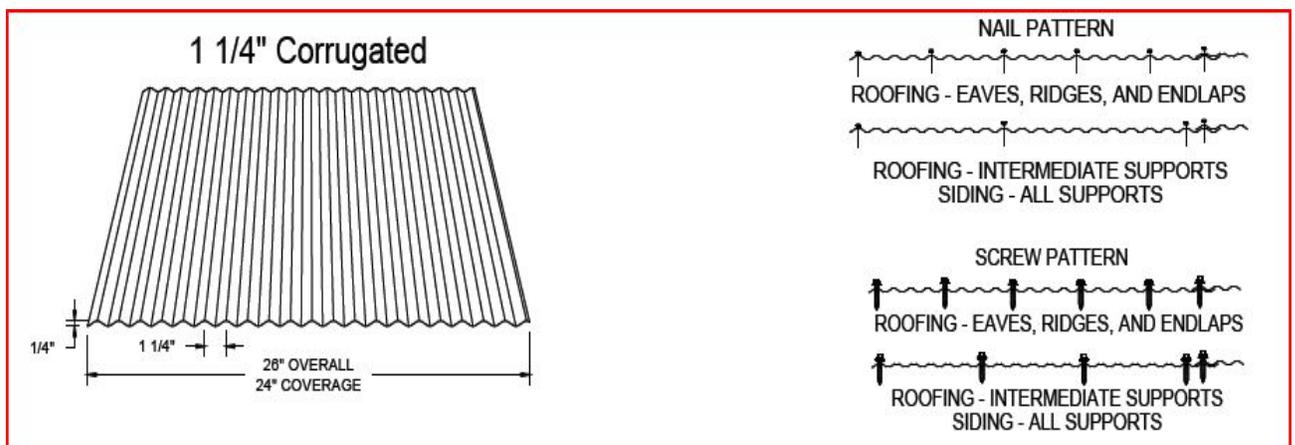
Siding should be installed using the standard fastening and overlap patterns to ensure optimum performance. For strong, neat corners use hemmed corner flashings. **Do not run siding sheets all the way to the ground.** Instead, provide a protective base of concrete, masonry, treated wood, or similar material 12" to 18" from ground level and end the siding sheets there.

If siding sheets are installed horizontally, use sealant tape or butyl caulking at the vertical laps to ensure weathertight joints. Install panels from the bottom up so that water is directed away from, and not into, the lap joints.

## Fastening

MBS only supplies screws for fastening into dimension lumber, because screws offer better pullout values. Wood grip screws for use with steel panels are galvanized and then coated with an organic polymer for optimum corrosion resistance. See page 7 for proper torque on screws.

The correct way to fasten steel panels with nails is to drive the nail through the top of the rib so the washer is compressed securely against the metal. Nail placement must be in the ribs for roofing applications to minimize the potential for roof leaks. Over-driving the nail can split the washer and dimple the metal, causing leaks.



Wood screws with combination metal and neoprene washers should be installed in the flat area of the panel adjacent to the ribs, and tightened such that the washer is compressed as illustrated below. This will ensure a lasting, leak-proof seal. See page 5 & 6 for proper screw attachment.

A rule of thumb is to figure 75 screws per square of roof and wall panels. If stitch screws are desired figure 20-30 screws per square.

### **TOOLS RECOMMENDED:**

**Screw Gun**-2000-2500rpm

1/4" hex magnetic socket and or 5/16" hex magnetic socket.

**Tin Snips**- For miscellaneous panel and flashing cutting.

**Chalk Line**- Used to assist in the alignment of panels and flashings.

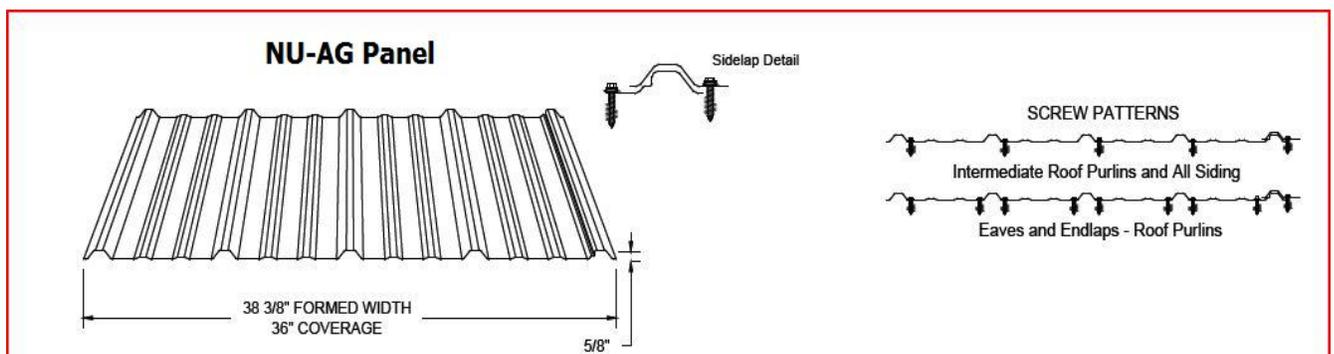
**Caulking gun**- Used for miscellaneous caulking and sealing to inhibit water infiltration.

**Rivet Tool**- May be used for miscellaneous trim fastening.

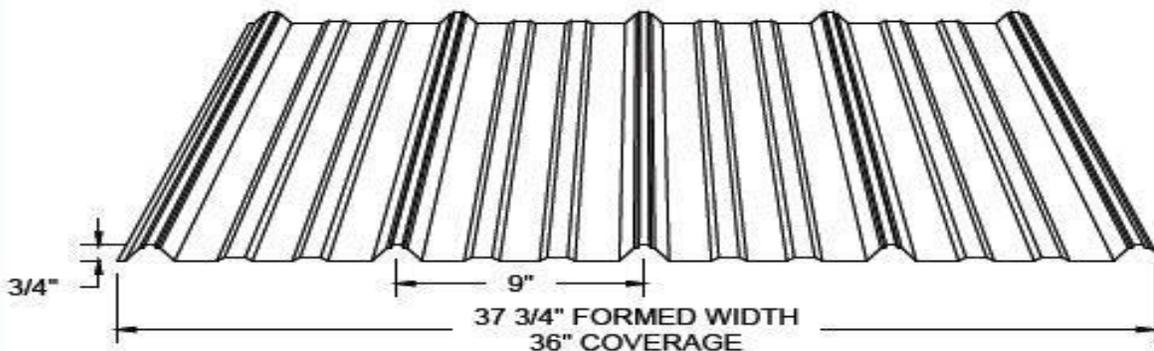
**Electric Nibblers or Metal Shears**- Used for general cutting of panels in hip, end wall, and valley areas. Some installers' prefer to use a circular saw with a metal cutting abrasive blade. Some drawbacks are:

1. Saw cut edges are jagged and tend to rust more quickly than sheared edges.
2. Saw cut edges produce hot metal filings that can embed in the paint and will cause rust specs to develop on the face of the panel.
3. Saw cut burns the paint and Galvalume at the cut edge which may cause rust to start at the edges. (nibblers and steel cutting blades have a tendency to leave hot metal particles that may burn into the surface of the paint- the same steel shavings may appear with the application of screws. CAUTION: You must wipe off the particles or rust will occur voiding all warranties)

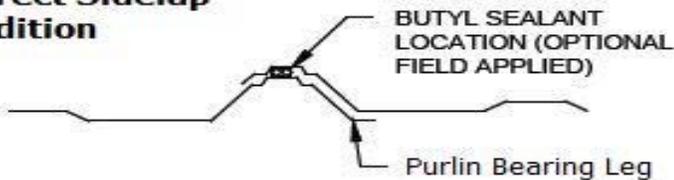
**Electric drill**- Used to drill holes as for pop rivets or applying screws to panels.



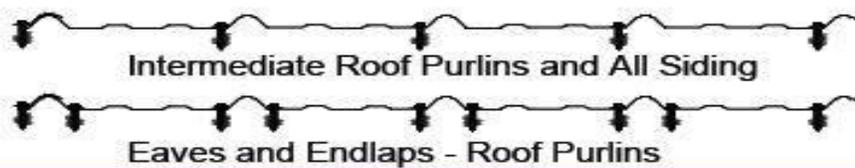
### 29ga NU-MAG Bare or Painted Galvalume

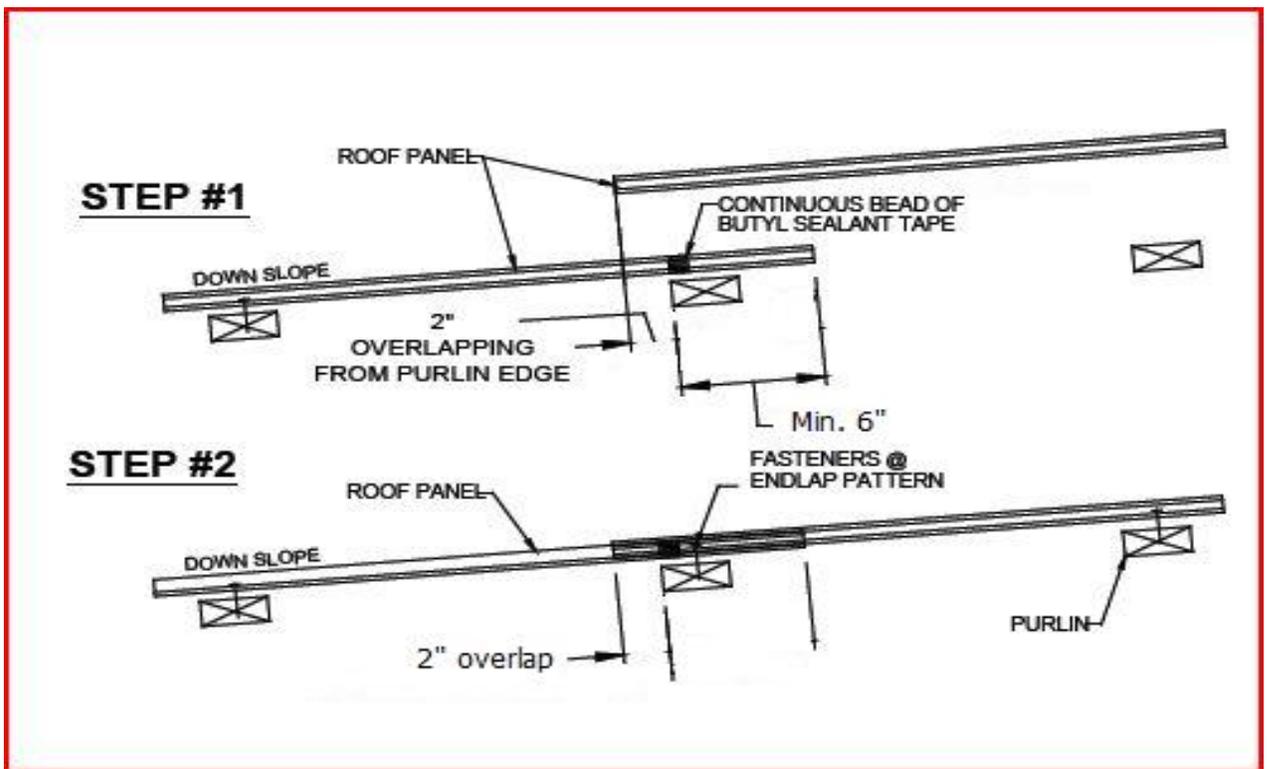
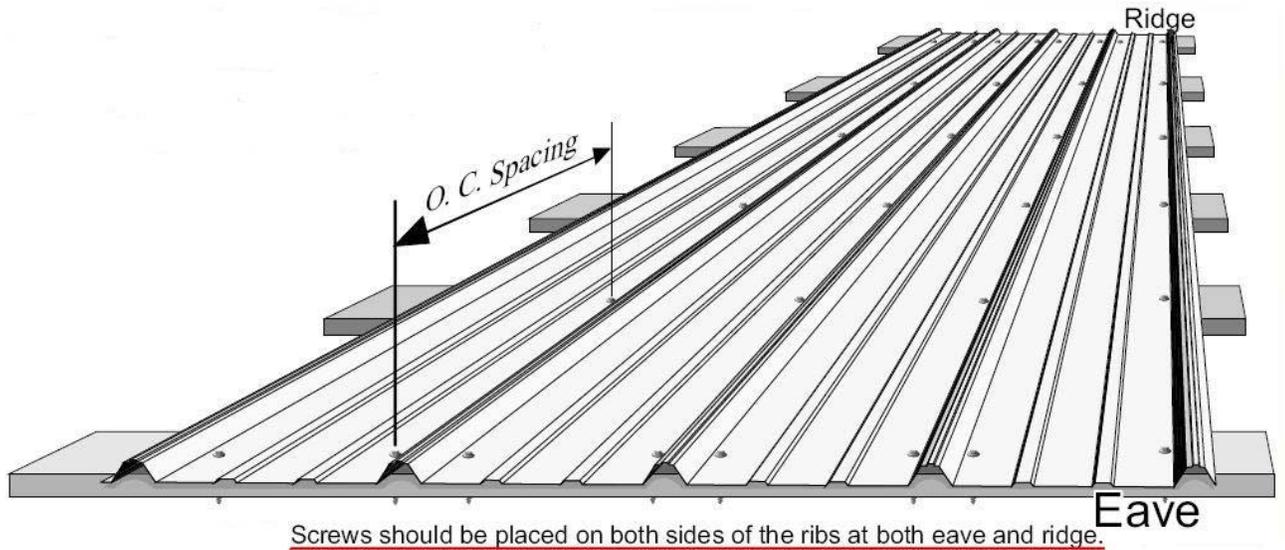


#### Correct Sidelap condition



#### SCREW PATTERNS





### Lapping Requirements

Slope 3/12 or less- not recommended  
 Greater than 3/12- endlap 6" minimum with sealant required  
 Sidewall- 4" minimum, sealant not required.

## Proper Installation of fasteners

Correctly Driven



Under-Driven



Over-Driven



ALLOWABLE WIND UPLIFT LOADS (PSF)

Substrate	Fastener	9"	12"	15"	18"	21"	24"
3/4" Plywood	#14 x 1" MP	261.1	195.0	156.5	130.5	111.5	97.5
5/8" Plywood	#14 x 1" MP	242.0	181.5	145.3	121.0	103.5	90.5
1/2" Plywood	#14 x 1" MP	165.0	123.5	99.0	82.5	70.5	61.75
7/16" OSB	#14 x 1" MP	99.5	74.5	59.7	49.75	42.5	37.0
19/32" OSB	#14 x 1" MP	122.0	91.5	73.0	61.0	52.0	45.75
23/32" OSB	#14 x 1" MP	181.5	136.0	109.0	90.75	77.75	68.0
Solid 2x SPF	#14 x 1" MP	313.8	235.3	188.3	156.9	134.5	117.6
Solid 1x Pine	#14 x 1" MP	313.8	235.3	188.3	156.9	134.5	117.6
Screws	per Sq.	190	150	120	100	90	80

## **Safety**

Always work safely when installing metal products. Use extreme caution on the roof at all times, and wear gloves and safety glasses to avoid injury. Hearing protection should be used when power-cutting metal panels. Do not walk on panels until all the fasteners are installed. Metal panels are slippery when wet, dusty, frosty, or oily. Do not attempt to walk on a metal roof under these conditions. Wear soft soled shoes to improve traction and to minimize damage to the paint finish. Always be aware of your position on the roof relative to any roof openings, roof edges, co-workers, and penetrations. Installing metal panels on a windy day can be dangerous and should be avoided. Consult OSHA guidelines for more complete safety requirements

## **Delivery, Handling & Storage**

Always inspect the shipment upon delivery. Check for damage and verify quantities against the shipping list. Note any damage or shortages at time of delivery.

Handle panel bundles and individual panels with care to avoid damage. Longer bundles may require more than one "pick-up" point properly spaced to prevent buckling or bending of panels.

Store panels in a dry, well ventilated area away from traffic. Elevate one end of the bundle so that moisture can run off if needed. Be sure that air will be able to circulate freely around the bundles to avoid moisture build-up. Never store materials in direct contact with the ground.

Wear clean, non-marking soft-soled shoes when walking on the panels to avoid shoe marks.

## **Building Maintenance**

A metal roof should be inspected annually and cleaned as necessary to maintain its beauty and performance. Any debris or residue, including leaves, twigs, and dust should be cleaned off promptly to prevent moisture entrapment against the metal, which may lead to finish deterioration or premature corrosion.

Every metal panel manufacturer has maintenance guidelines for its products, despite whether or not those products have a warranty. In addition to basic maintenance instructions, there often are instructions for maintenance during the installation of panels and trim. For example, instructions advise keeping the panels clean of metal shavings and cuttings created when fasteners are drilled into the panel to the structure or from trim to panels. You may not see the fine metal shavings, but they are there. If not wiped off, rust from these particles may start to show in as little as 12 hours of exposure to moisture in the atmosphere.

FAILURE TO COMPLY WITH THESE INSTALLATION AND STORAGE PROCEDURES WILL RELIEVE THE MANUFACTURER OF ANY RESPONSIBILITY FOR ANY RESULTANT DAMAGE TO, OR DETERIORATION OF, THE PRODUCT AND VOIDS ALL WARRANTIES.

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For further information on potential jobsite concerns, imperfections, and field questions- refer to: **Resolution Manual for Metal Building Construction – Jobsite Imperfections.** Published by U.S. Steel Corp. and your Metal Building Supply Representative.

## Post Frame Estimating & Roof Types

### Estimating Metal Roofing, Siding & Flashings

Panel lengths are to be determined by the truss top chord or actual field measurements. Remember to add for overhangs at the eaves; subtract for a gap at the ridge. Siding should be kept up away from the ground with a skirt board.

### Number of Panels

The coverage of the panel being used will determine the number of panels at a length (i.e.: 3' coverage panel on a 30 ft. long building would require 10 panels on each side of the ridge or 20 panels at the particular length.)

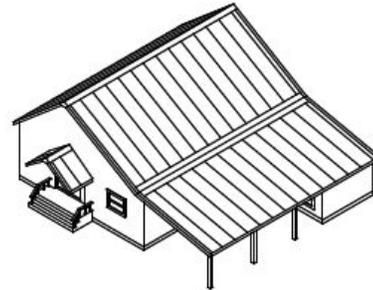
### Horizontal Measurement to a Roof

Divide the building width in half, then multiply by the slope factor (i.e.: 40' wide building with 4/12 slope. 40 divided by 2 equals 20' times 1.054 equals 21'-1" in slope dimension.) Allow for 1/2" to 1" gap at peak and 1" to 2" eave overhang.

Roof Pitch	Slope Factor
3/12	1.031
4/12	1.054
5/12	1.083
6/12	1.120
8/12	1.202
10/12	1.302
12/12	1.414



Gambrel Roof



Transition Roof

### Flashing Conditions

Roof - Eave, Ridge, Gable, Sidewall, Endwall, Valley, Hip, Transition, Gambrel, Soffits

Siding - Base Perimeter, Corners, Inside Corners, Man Doors, Windows, Sliding Doors, Overhead Doors

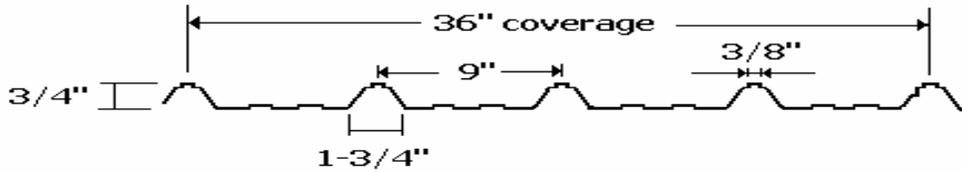


Hip Roof

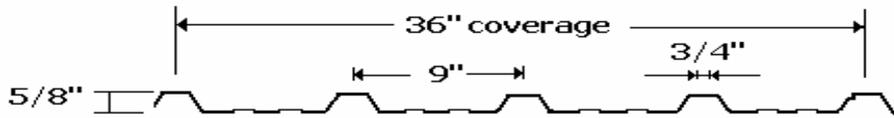
# PANEL PROFILES



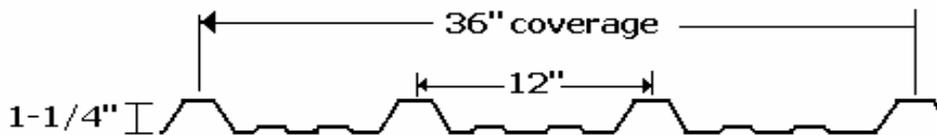
**NU-MAG**



**NU-AG**



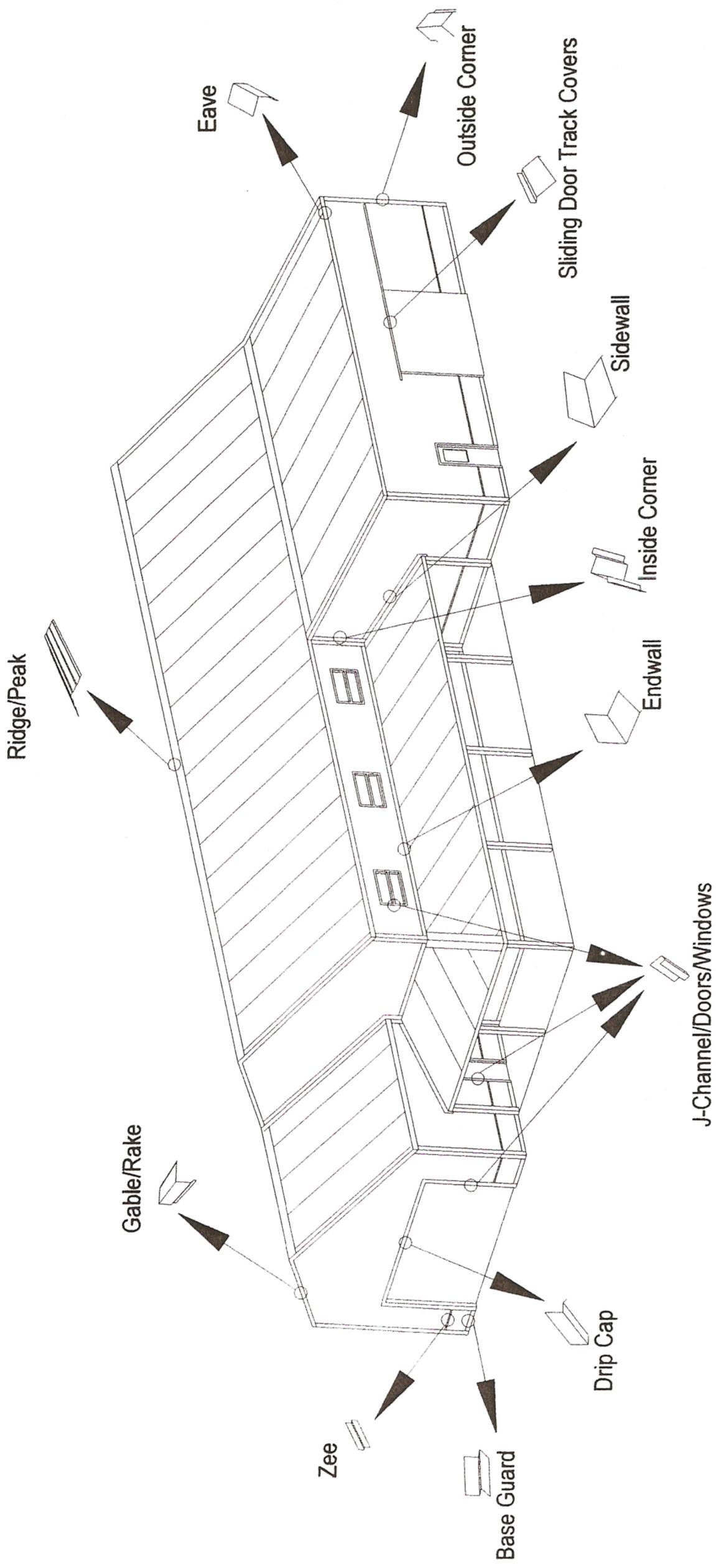
**R/ PBR Panel**



**1 1/4" corrugated**

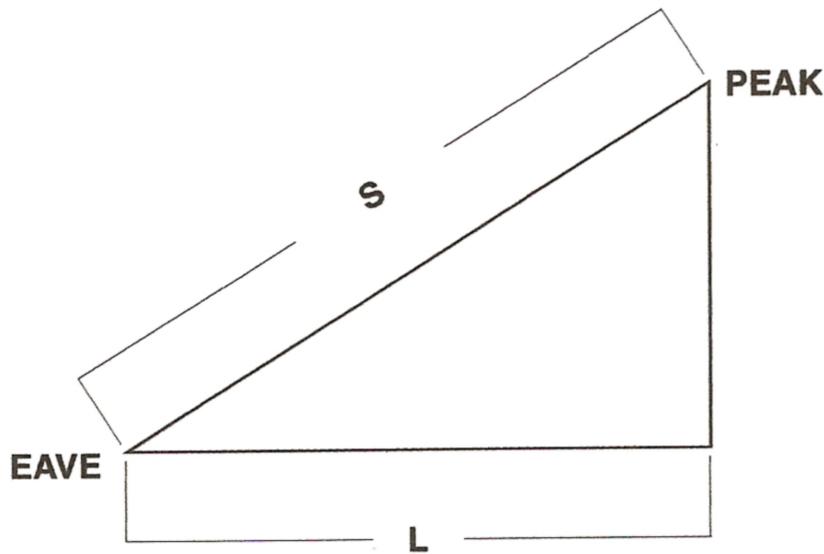


# Post Frame Building Details

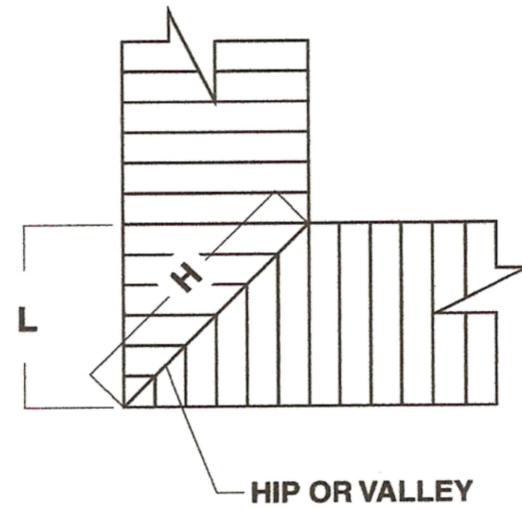


# Slope Factor

This chart should be used when specifying and ordering panels and flashings. It will help you determine overall required length of material on sloped applications.

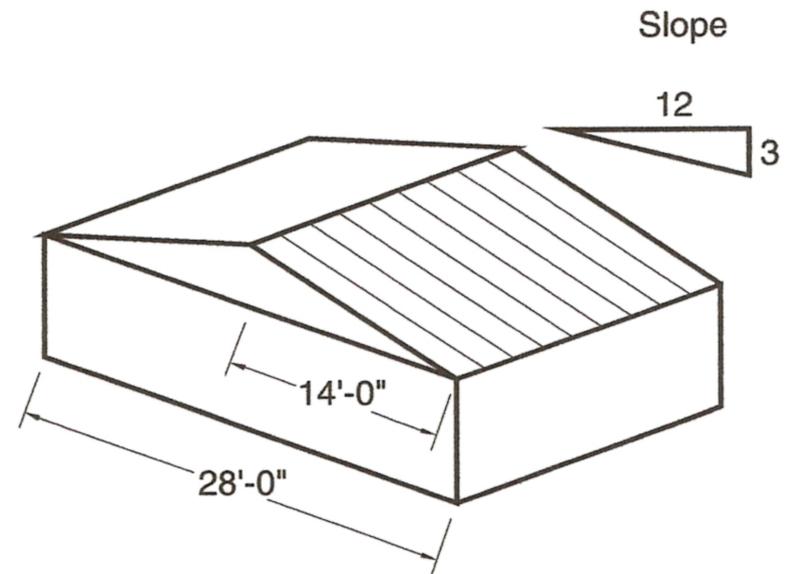
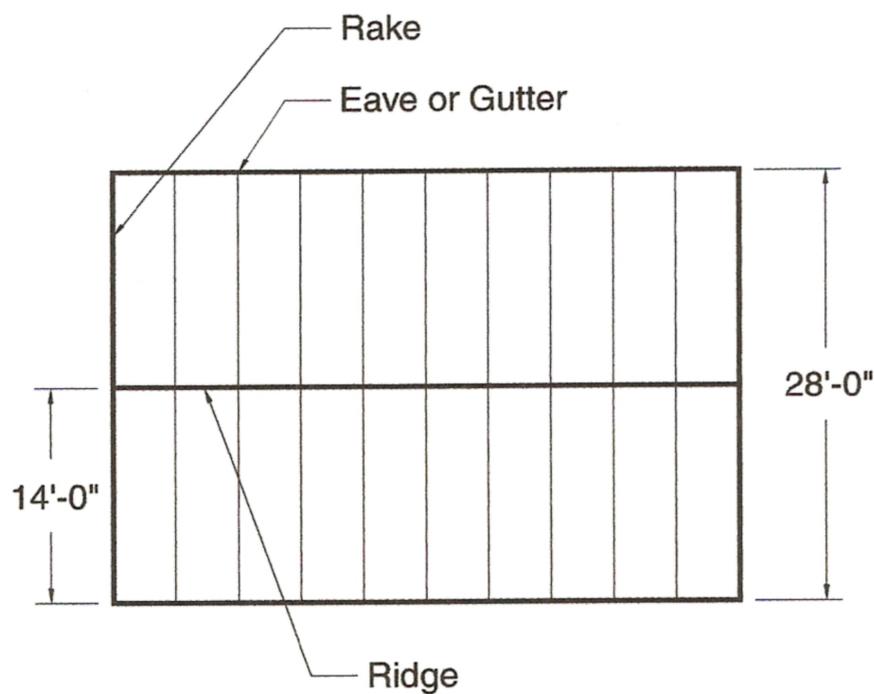


$$(L) \times (\text{SLOPE FACTOR}) = S$$



$$(L) \times (\text{HIP VALLEY MULTIPLIER}) = H$$

SLOPE	SLOPE FACTOR	HIP / VALLEY MULTIPLIER	SLOPE	SLOPE FACTOR	HIP / VALLEY MULTIPLIER
1:12	1.0035	1.4167	7:12	1.1577	1.5298
2:12	1.0138	1.4240	8:12	1.2019	1.5635
3:12	1.0308	1.4362	9:12	1.2500	1.6008
4:12	1.0541	1.4530	10:12	1.3017	1.6415
5:12	1.0833	1.4743	11:12	1.3566	1.6853
6:12	1.1180	1.5000	12:12	1.4142	1.7320

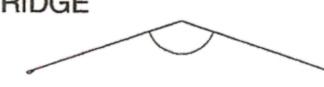
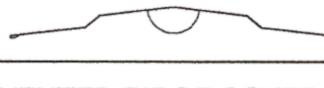
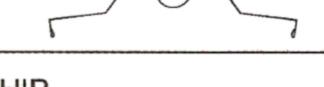
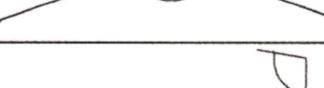
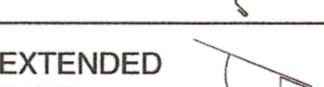
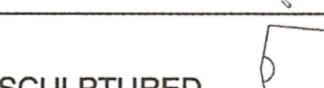
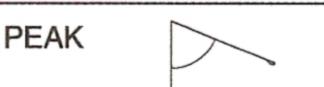
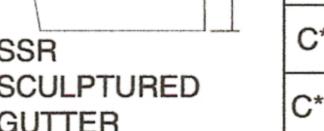


Your building is 28'-0" wide with a 3:12 pitch  
 To determine the panel lengths for each side:  $(L) \times (\text{SLOPE FACTOR}) = S$

$$14'-0" \times 1.0308 (\text{from chart above for } 3:12 \text{ slope}) = 14.4312' \text{ OR } 14'-5"$$

# Trim angle chart

This chart should be used to determine the required specified angle when considering the following flashings.

PROFILE/FLASHING	1/4:12	1/2:12	1:12	2:12	3:12	4:12	5:12	6:12	7:12	8:12	9:12	10:12	11:12	12:12	
RIDGE 	178°	175°	170°	161°	152°	143°	135°	127°	120°	113°	106°	100°	95°	90°	
RIDGE 	178°	175°	170°	161°	152°	143°	*135°	*127°	*120°	*113°	*106°	*100°	*95°	*90°	
VENTED RIDGE COVER 	178°	175°	170°	161°	152°	143°	*135°	*127°	*120°	*113°	*106°	*100°	*95°	*90°	
HIP 	178°	177°	173°	167°	160°	154°	*148°	*143°	*138°	*134°	*130°	*126°	*123°	*120°	
SCULPTURED EAVE 	91°	92°	95°	99°	104°	108°	113°	117°	120°	124°	127°	130°	133°	135°	
EAVE 	91°	92°	95°	99°	104°	108°	113°	117°	120°	124°	127°	130°	133°	135°	
EXTENDED EAVE 	91°	92°	95°	99°	104°	108°	113°	117°	120°	124°	127°	130°	133°	135°	
SCULPTURED HIGH SIDE EAVE 	99°	98°	95°	91°	86°	82°	*77°	*73°	*70°	*66°	*63°	*60°	*57°	*55°	
PEAK 	89°	88°	85°	81°	76°	72°	67°	63°	60°	56°	53°	50°	47°	45°	
VALLEY 	178°	177°	173°	167°	160°	154°	148°	143°	138°	134°	130°	126°	123°	120°	
PITCH BREAK 	91°	92°	95°	99°	104°	108°	113°	117°	120°	124°	127°	130°	133°	135°	
SSR HIGH SIDE PITCH BREAK 	91°	92°	95°	99°	104°	108°	113°	117°	120°	124°	127°	130°	133°	135°	
GUTTER DRIP 	91°	92°	95°	99°	104°	108°	113°	117°	120°	124°	127°	130°	133°	135°	
BOX GUTTER 	91°	92°	95°	99°	104°	108°	113°	117°	120°	124°	127°	130°	133°	135°	
 SSR SCULPTURED GUTTER	A	101°	102°	105°	109°	114°	118°	123°	127°	130°	134°	137°	140°	143°	145°
	B	89°	88°	85°	81°	76°	72°	67°	63°	60°	56°	53°	50°	49°	45°
	C*	5 5/8"	5 3/4"	6"	6 1/2"	7"	7 1/2"	8"	8 1/2"	9"	9 1/2"	10"	10 1/2"	11"	11 1/2"
	C**	5 1/8"	5 1/4"	5 1/2"	6"	6 1/2"	7"	7 1/2"	8"	8 1/2"	9"	9 1/2"	9 7/8"	10 1/4"	10 5/8"
	C***	5"	5 1/8"	5 3/8"	5 7/8"	6 3/8"	6 7/8"	7 3/8"	7 3/4"	8 1/8"	8 5/8"	9"	9 3/8"	9 3/4"	10 1/4"