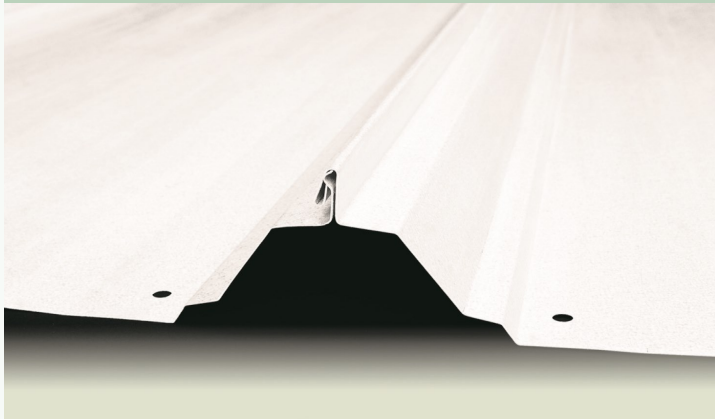


**TS-324 ROOF SYSTEM**

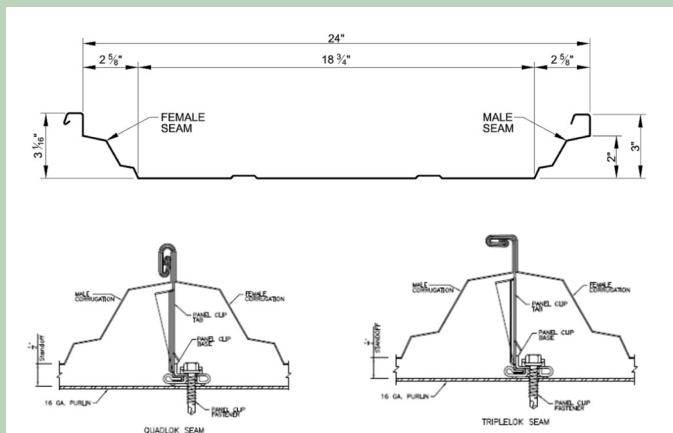


Metal roof systems are an exceptional choice for your next roof. These systems:

- can be used in either new construction or current roof replacement.
- provide years of excellent weather resistance if installed properly.
- are virtually maintenance-free.
- provide an architectural detail not available with traditional roofs.
- are weather resistant.

The **TS-324 Metal Roof System** by Horizon Structural System, Inc. is one of several roofing options available from Horizon Structural Systems, Inc. Although similar in appearance, each metal roofing system has differing performance specifications. The **TS-324 Metal Roof System** may be the perfect choice for your next roofing project.

**TS-324 PROFILE AND SEAM TYPES**



Section Properties:  $F_y = 50 \text{ ksi}$

Gauge	Thickness (in)	Weight (psf)	Allowable Shear (kips/ft)	Top Flange in Compression (Positive Bending)			Bottom Flange in Compression (Negative Bending)		
				I <sub>xe</sub> in <sup>4</sup>	S <sub>xe</sub> in <sup>3</sup>	Maxo K-in	I <sub>xe</sub> in <sup>4</sup>	S <sub>xe</sub> in <sup>3</sup>	Maxo K-in
24	0.0227	1.18	0.84	0786	0.3262	9.767	0.332	0.2000	5.902
22	0.0272	1.41	1.16	0.947	0.3932	11.772	0.413	0.2521	7.548

**TS-324 ALLOWABLE GRAVITY LOADS**

	Span Condition	Span (ft)						
		2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"
24	Single	516	413	343	265	203	160	130
	Double	332	213	148	108	83.2	65.8	53.3
	Triple	416	266	185	135	104	82.2	66.6
22	Single	616	493	411	320	245	193	157
	Double	421	269	187	137	105	83.2	67.4
	Triple	513	336	234	171	131	104	84.2

**Notes:**  
 Allowable loads are based on uniform span length and load distribution.  
 Allowable gravity loads is limited by bending, shear or deflection.  
 Allowable gravity load is computed for a maximum total load deflection of L/60.  
 Weight of material must be included with gravity load combinations as appropriate.  
 This material is subject to change without notice.  
 This material has been developed in accordance with the 2012 North American Specification for Cold-Formed Structural Steel Members.

**TS-324 ALLOWABLE WIND UPLIFT LOADS**

TS-324 24 Gauge Allowable Uplift Load (psf)

Span	ASTM E1692 Test Ultimate Load	Allowable Design Load	ASTM E1692 Test Ultimate Load	Allowable Design Load
	TripleLok		QuadLok	
2'-0"	180.0	90.0	240.0	120.0
2'-6"		81.0		107.5
3'-0"		72.0		95.0
3'-6"		63.0		82.5
4'-0"		54.0		70.0
4'-6"		45.0		57.5
5'-0"	72.0	36.0	90.0	45.0

TS-324 22 Gauge Allowable Uplift Load (psf)

Span	ASTM E1692 Test Ultimate Load	Allowable Design Load	ASTM E1692 Test Ultimate Load	Allowable Design Load
	TripleLok		QuadLok	
2'-0"	245.0	122.5	315.0	157.5
2'-6"		109.4		140.6
3'-0"		96.3		123.7
3'-6"		83.3		106.7
4'-0"		70.2		89.8
4'-6"		57.1		72.9
5'-0"	88.0	44.0	112.0	56.0

**Notes:**  
 Allowable uplift loads shown above have not been increased by 33%.  
 Allowable uplift loads shown above include the panel weight.

**Horizon Structural Systems TS-324 Panel Approvals**

**Texas Department of Insurance:** Pending Approval

**Underwriters Laboratories:**

Construction Numbers: 552, 552A and 552B

Uplift UL 580 Class 90

Impact Resistant Class 4

External Fire Exposure Class A

## **PHYSICAL DESCRIPTION**

The TS-324 Roof System will consist of metal panels joined together by a unique factory- formed, interlocking seam that is easily assembled and seamed in the field. The TS-324 Roof System is secured to the roof structure with clips that are locked into the seam during the field seaming process. Associated components such as perimeter adapters, perimeter trim and flashing have been designed to accommodate most types of structures.

## **PANEL**

The panel will be fabricated from steel which is coated with Galvalume, and optional factory applied paint. Galvalume coated steel sheet will provide a long-lasting weathering membrane. Galvalume coating has a proven weather resistance in excess of 20 years. The steel sheet is impervious to moisture and will resist falling objects and roof traffic better than other known roof membranes commonly used. The steel panel profiles are designed to resist live load and wind uplift without the complexity and cost of additional substrate as required on most other roofing systems. The ultimate performance of a Galvalume coated steel panel is determined by effectiveness of the design of the steel panel, perimeter seals, and panel attachment methods.

## **PANEL AND FLASHING MATERIALS**

The roof panels will be of 24 ga. or 22 ga. steel, 50,000 psi minimum yield strength (ASTM A792- SS, Grade 50, Class 1), coated with AZ50 (minimum) aluminum/ zinc alloy for painted finish or AZ55 aluminum/zinc alloy for unpainted finish.

The flashing and trim will be a 24 or 26 ga. steel 50,000 psi minimum yield strength (ASTM A792, SS Grade 50, Class 1), coated with AZ50 (minimum) aluminum/zinc alloy for painted finish zinc or AZ55 aluminum zinc for unpainted finish.

## **PANEL CLIPS**

Panel clips fasten the roof panels to the structure. The clips are designed to allow the panel to float over the secondary structurals. Floating clips will have a tab and a base with a sliding interlock allowing the roof 1-1/2" of expansion and 1-1/2" of contraction movement. The floating clip tab will move in the sliding interlock of the galvanized steel clip base. The clip base will be protected from corrosion by galvanized coating that has similar weather resistance to that of the panel coating. Panel clips will be attached to 16 gauge minimum, cold-formed, secondary structurals with two 1/4"- 14 self-drilling screws. Fasteners required for other types of secondary structurals will be determined by building applications or the substrate used on the building.

## **SEAM**

The TS-324 panels have a sidelap that can be formed into two types of seams:

- 1) TripleLok - The TripleLok seam is formed continuously by folding the adjacent panel's sides over each other to interlock the two panels so they form a watertight seal that will resist separation even if the panels are severely deformed. The TripleLok seam is partially formed in the factory and completed in the field with a mechanical seamer. The TripleLok seam will resist greater uplift forces than any known seam.
- 2) QuadLok - The "QuadLok" seam, commonly referred to as the "Pittsburgh 360" is used in high wind load areas and can

reduce the need for additional sub-framing due to increased uplift forces at eaves and rakes.

## **SEALANTS**

The seam sealant will be a non-drying, non- hardening, non-oxidizing sealant specifically formulated for factory sealing standing seam roof panels. Sealant for the eave, end splice, ridge flashing, and rake trim will be non-drying, non-hardening tape sealant specifically formulated for field application at temperatures of 20° F to 120° F. Service temperature of both sealants will be -60° F to 180° F.

## **CLOSURES**

The end dam to be used at the ridge and high side of a single slope roof is a 22 ga. die-formed steel closure with factory punched holes. The end dam seals the outside of the panel at the ridge or high edge of a single slope roof panel to the ridge or high edge of roof flashing. The seal is developed using gasket techniques similar to those used at the endlap. The tape sealant is sandwiched between the roof panel, which is fully supported by a rigid heavy gauge back- up channel and the flange of the end dam. The fasteners placed in the factory-punched holes clamp the back-up channel and end dam together. The clamping force uniformly compresses the sealant between the panel and the end dam causing the sealant to be extruded with over one ton of force. The extruded sealant provides a seal that will resist wind-blown water.

## **FASTENERS**

The TS-324 Roof System does not have exposed through-fasteners that penetrate the roof membrane over the building envelope except at panel endlaps on roof runs that are longer than the length a panel can be shipped. Endlap fasteners: Only four (4) endlap fasteners will be required to seal the panel endlaps. Endlap fasteners will be oversized #17 fasteners to minimize potential for fastener strip out. All exposed fasteners are self-drilling and will not require special tools other than industry standard screw guns. Fasteners will have metal backed neoprene sealing washers with aluminum/zinc caps.

## **TESTING DATA**

The TS-324 panel outperforms all known existing single skin trapezoidal roof systems in leading tests for wind uplift resistance. These tests are UL 580 Class 90; ASTM E1592.

## **PRODUCT NOTES**

"Oil-canning", a slight waviness inherent in light gauge metal may exist in this panel. This minor waviness does not affect the finish or structural integrity of the panel and is therefore not a cause for rejection.

## **WARRANTY**

Twenty year material and weather tightness warranties are available.

UL Construction Numbers: 552, 552A, 552B

*Galvalume® is an internationally recognized trademark of BIEC International, Inc., and its licensed producers.*