



UNITED STRUCTURES OF AMERICA
I N C O R P O R A T E D

TECHNICAL BULLETIN

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THERMAL BLOCKS

New energy codes and innovative insulation systems have put thermal blocks back in the spot light. The use of thicker insulation over the purlin as well as specifications calling for higher R-value thermal blocks have required many people to learn exactly what purpose thermal blocks perform.

Thermal blocks are used to help close the gap between the pan of a standing seam roof panel and the purlin. Several reasons for this are noted below:

- Thermal blocks ensure a higher R-value when used in conjunction with insulation.
- They also minimize the potential for “roof rattle” on floating clip systems – especially on uninsulated buildings.
- The proper size thermal block can help the installer maintain module during insulation.
- Lack of a thermal block can cause the installer to get off module. Moreover, foot traffic on a high clip system without a thermal block can damage the roof system.

U.S.A. utilizes a Type IX (2 lb. density – reported at 1.80 per ASTM C578-06) thermal blocks as a standard. These thermal blocks in a 1” thickness offer an R-value = 4.20 at 75°F. Additional data regarding our standard thermal block is attached. Keep in mind the reported values are the minimum per ASTM C578-06.

Our standard standing seam roof clips only offer a small gap between the pan and the purlin varying from 3/8” to 1 3/8”. This is the area which insulation will pass over the purlin. Non-standard, high efficiency clips, like MBCI’s hi-thermal clips offer up to 2” of clearance between the panel and the purlin. Therefore, there are **many** combinations available in regards to clips, thermal blocks, and insulation systems. The chart on page 2 detail all options available. Please use the chart to determine the best combination for your project. Contact the office for special pricing on high thermal standing seam roof clips. Feel free to discuss the various options with your customers to help educate them on our product as well.

KNOW YOUR PRODUCT

U.S.A. Guardian/Guardian Lok SSR systems:

Low Float clips are 3 3/8" high providing 3/8" clearance

High Float clips are 4 3/8" high providing 1 3/8" clearance

Hi-Thermal clips are 5" high providing 2" clearance (AVAILABLE FOR GUARDIAN LOK ONLY)

Insulation / Thermal Block Selection Chart			
Insulation Thickness	Low System	High System	2" Hi-Thermal System
No Insulation	3/8 Thermal Block	High System Not Recommended	2" Thermal System Not Recommended
3" Insulation	Thermal Block Not Recommended	1" Thermal Block Recommended	2" Thermal System Not Recommended
4" Insulation	Thermal Block Not Recommended	5/8" Thermal Block Recommended	2" Thermal System Not Recommended
6" Insulation	Low System Not Recommended	3/8" Thermal Block Recommended	1" Thermal Block Recommended
8" Insulation	Low System Not Recommended	Thermal Block Not Recommended	5/8" Thermal Block Recommended
10" Insulation	Low System Not Recommended	High System Not Recommended	3/8" Thermal Block Recommended
12" Insulation	Low System Not Recommended	High System Not Recommended	Thermal Block Not Recommended

U.S.A. Supreme Lok/Sure Lok SSR systems:

Low Float clips are 2 3/8" high providing 3/8" clearance

High Float clips are 3" high providing 1" clearance

Hi-Thermal clips are not available with Supreme Lok/Sure Lok

Insulation / Thermal Spacer Selection Chart		
Insulation Thickness	Low System	High System
No Insulation	3/8" Thermal Block	High System Not Recommended
3" Insulation	Thermal Block Not Recommended	5/8" Thermal Block
4" Insulation	Thermal Block Not Recommended	3/8" Thermal Block
6" Insulation	Low System Not Recommended	Thermal Block Not Recommended

HOUSTON FOAM PLASTICS

TYPICAL PHYSICAL PROPERTIES OF EPS INSULATION

Typical Physical Properties of EPS Insulation							
Specification Reference: ASTM C578-06							
Property	Units	ASTM TEST	Type I	Type VIII	Type II	Type IX	Type XIV
Density, minimum	pcf	D303 or D1622	0.90	1.15	1.35	1.80	2.40
Thermal Resistance at 25° F	at 1 inch thickness		4.20	4.40	4.60	4.80	
R-Value**** at 40° F			4.00	4.20	4.40	4.60	
at 75° F			3.60	3.80	4.00	4.20	4.20
Strength Properties							
Compressive 10% Deformation	psi	D 1621	10-14	13-18	15-21	25-33	40
Flexural	psi	C 203	25-30	30-38	40-50	50-75	60
Tensile	psi	D 1623	16-20	17-21	18-22	23-27	
Sheer	psi	D 723	18-22	23-25	26-32	33-37	
Sheer Modulus	psi		230-320	370-410	460-500	600-640	
Modulus of Elasticity	psi		180-220	250-310	320-360	460-500	
Moisture Resistance							
WVT	perm.in.	E 96	2.0-5.0	1.5-3.5	1.0-3.5	0.6-2.0	2.5
Absorption(vol.)	%	C 272	less than 4.0	less than 3.0	less than 3.0	less than 2.0	less than 2.0
Capillarity			none	none	none	none	none
Co-efficient of							
Thermal Expansion	in/(in.)(F)	D696	0.000035	0.000035	0.000035	0.000035	0.000035
Maximum Service Temp °.F							
Long-term exposure			167	167	167	167	167
Intermittent exposure			180	180	180	180	180
Oxygen Index	%	D2863	24.0	24.0	24.0	24.0	24.0
Buoyancy	lb/ft ³		60	60	60	60	60

* R-value means the resistance to heat flow. The higher the R-value, the greater insulating power.

** These are minimum R-values. Higher values can often be achieved. Please ask your HFP representative for details.