



# HIGH PERFORMANCE WALLS

## CLADDING ATTACHMENT SYSTEMS AND THEIR IMPACT ON CONTINUOUS EXTERIOR INSULATION EFFICIENCY

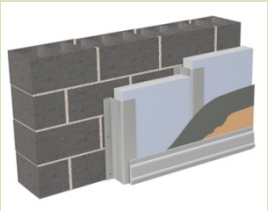
**Document Summary:** This document is meant to serve as a guide for designers and builders to compare the thermal performance of different cladding attachment systems. The first section is a catalogue of products, split into brick veneer and cladding finish systems. The second section presents thermal modeling results of these systems from a study conducted by Steven Winter Associates (SWA).

**Thermal Efficiency:** percentage of continuous insulation R-value that is effective.

- 100% thermal efficiency = continuous insulation without thermal bridging
- 20% thermal efficiency = continuous insulation derated to 20% of installed R-value

# For Cladding Finish Systems: Girts

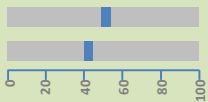
## Galvanized Girts



### Description

Typical z-girts are usually galvanized steel. Most projects use these to support their cladding systems.

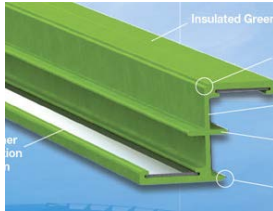
Thermal efficiency per SWA: **43%-53%**



**53%** for Steel backup  
**43%** for CMU backup

Standard Product

## Fiberglass Girts



### Description

Fiberglass girts are installed and used the same way as typical metal z-girt. The fiberglass material reduces thermal bridging.

Thermal efficiency per SWA: **91%-95%**



**91%** for Steel backup  
**95%** for CMU backup

Example Products:  
Green Girt- Simple Z

## Thermoset Resin Girts



### Description

These girts have a low thermal conductivity. Made of fire resistant resin material. Can be spaced 16" or 24" o.c. and is very strong.

Thermal efficiency per SWA: **96%**



**96%** for Steel backup  
**96%** for CMU backup

Example Products:  
Armatherm Z Girt

# For Cladding Finish Systems: Clips

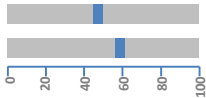
## Galvanized Metal Clips



### Description

These clips are usually galvanized steel and are used to support rainscreen and panel cladding systems.

Thermal efficiency per SWA: **46-59%**



**46%** for Steel backup  
**59%** for CMU backup

**Standard Product**

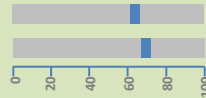
## Stainless Steel Clips



### Description

Replacing galvanized steel clips with stainless steel ones can greatly reduce the thermal conductivity.

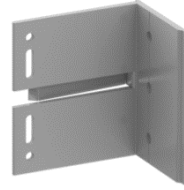
Thermal efficiency per SWA: **63-74%**



**63%** for Steel backup  
**74%** for CMU backup

Example Products:  
A-Clip, MFSSCHAN

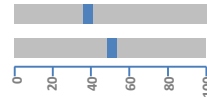
## Aluminum Clips



### Description

Aluminum clips are light weight and strong. They are a more elastic and non corrosive alternative to traditional metal clips.

Thermal efficiency per SWA: **38-52%**



**38%** for Steel backup  
**52%** for CMU backup

Example Products:  
Alpha Brackets

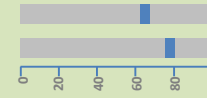
## Fiberglass Clips



### Description

Fiberglass clips have a much lower thermal transmittance coefficient than any metal equivalent.

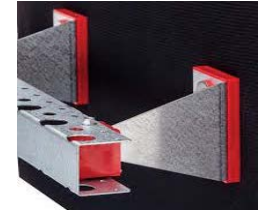
Thermal efficiency per SWA: **64-79%**



**64%** for Steel backup  
**79%** for CMU backup

Example Products:  
Cascada Clip

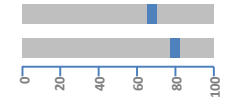
## Thermal Stop Clips



### Description

This clip has a plastic thermal stop at the base and head to help mitigate thermal bridging.

Thermal efficiency per SWA: **67-80%**



**67%** for Steel backup  
**80%** for CMU backup

Example Products:  
Pos-I-Tie Thermal Clip,  
Nvelope NV1 Thermal Clip

# For Brick Veneer Systems: Ties

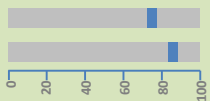
## Galvanized Steel Brick Ties



### Description

Typical brick ties are galvanized steel. Most brick veneer projects use this type of product.

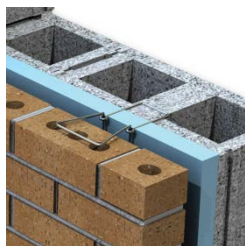
Thermal efficiency per SWA: **75-84%**



**75%** for Steel backup  
**84%** for CMU backup

Standard Product

## Stainless Steel Brick Ties



### Description

Stainless steel ties are less conductive than galvanized steel ties.

Thermal efficiency per SWA: **87-93%**



**87%** for Steel backup  
**93%** for CMU backup

Example Products:  
2 Seal Tie Thermal,  
Original Pos-I-Tie

## Thermal Break Brick Ties



### Description

This stainless steel brick tie has a plastic coating, which reduces thermal bridging.

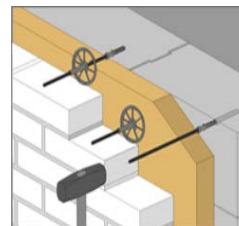
Thermal efficiency per SWA: **88-94%**



**88%** for Steel backup  
**94%** for CMU backup

Example Products:  
2 Seal Tie Thermal  
Wing Nut Anchor

## Basalt Fiber Wall Ties



### Description

Basalt fiber is a material made from fine fibers of basalt. They tend to be stronger and lighter than stainless steel wall ties and much less thermally conductive.

Example Products:  
Teplo Ties, Galen Wall Ties

## Connectors



### Description

These are used in place of brick ties. The combination of horizontal and vertical elements increases strength despite its small size.

These can be applied prior to liquid applied air barrier installation, so air tightness is improved.

Example Products:  
Block Shear Connector

# For Brick Veneer Systems: Angles

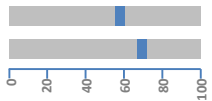
## Typical Shelf Angle



### Description

Typically, shelf-angles are made of galvanized steel.

Thermal efficiency per SWA: **58-69%**



**58%** for Steel backup  
**69%** for CMU backup

Standard Product

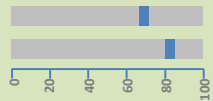
## Stand-off Shelf Angle



### Description

This stand off shelf angle allows insulation to be installed behind it. The bracket can be used with readily available shelf angles.

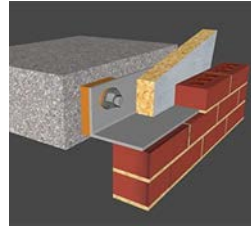
Thermal efficiency per SWA: **73-81%**



**73%** for Steel backup  
**81%** for CMU backup

Example Products:  
FAST (Fero Angle Support Technology),

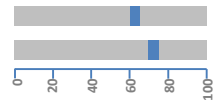
## Shelf Angle with Thermal Break



### Description

The thermal break plate is installed between the shelf angle and bracket to reduce the thermal bridge at those points.

Thermal efficiency per SWA: **63-74%**

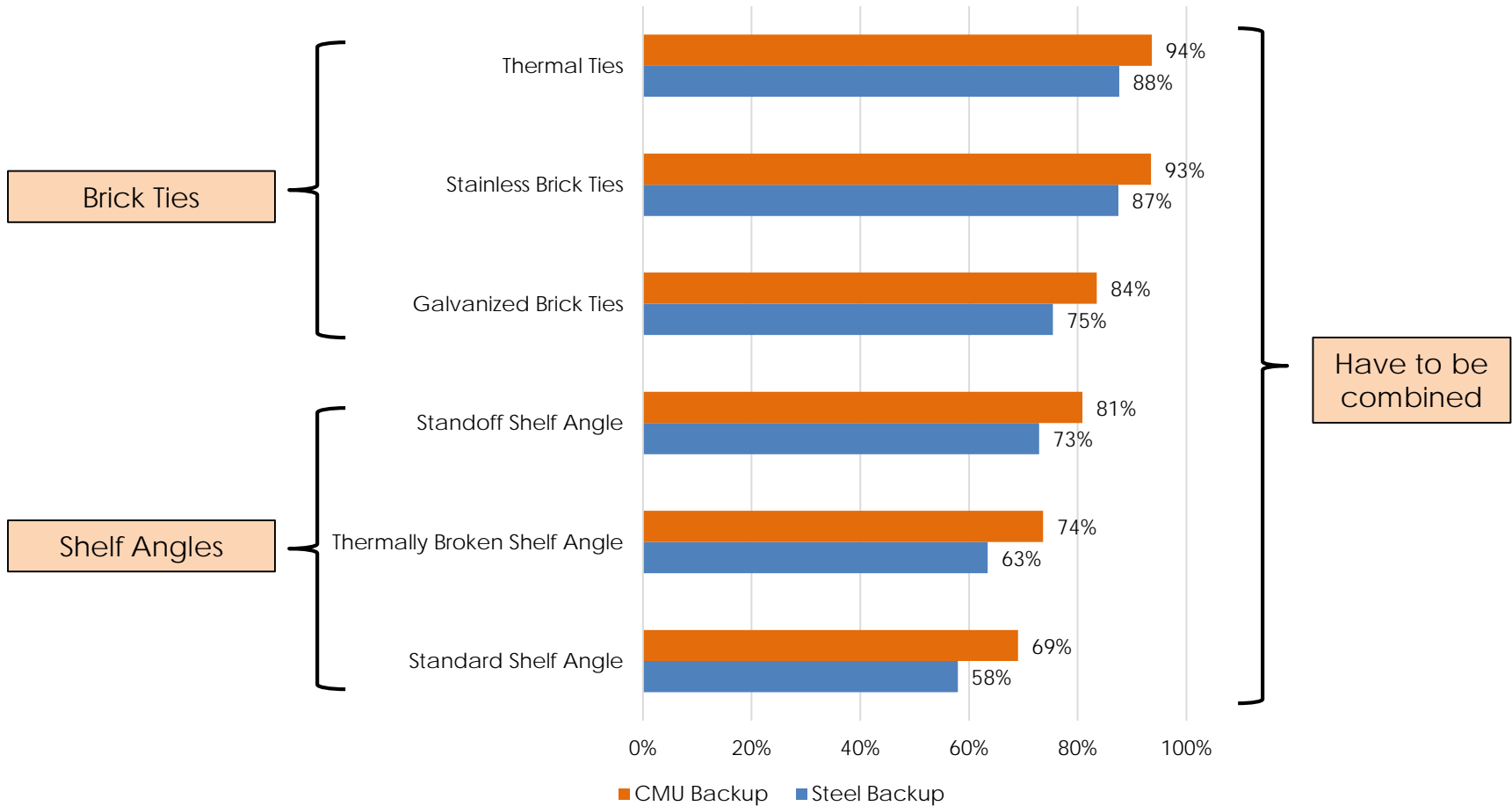


**63%** for Steel backup  
**74%** for CMU backup

Example Products:  
Armatherm Shelf Angle



# Results: Brick Veneer





# Results: Panel Cladding

