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
**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

**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

**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**: Green Girt- Simple Z, Armatherm ZGirt
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

**Example Products:**
A-Clip, MFSSCHAN

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**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:**
Alpha Brackets

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**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:**
Pos-I-Tie Thermal Clip, Nvelope NV1 Thermal Clip

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**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

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**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:**

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**Standard Product**

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**For Cladding Finish Systems: Clips**

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Steven Winter Associates, Inc.
NEW YORK, NY | WASHINGTON, DC | NORWALK, CT

CALL US 866.676.1972 | SWINTER.COM
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
- **Example Products:** 2 Seal Tie Thermal, Original Pos-I-Tie

### 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.
- **Example Products:** Block Shear Connector

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*Steven Winter Associates, Inc. 2017*
For Brick Veneer Systems: Angles

**Typical Shelf Angle**

Typically, shelf-angles are made of galvanized steel.

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

- 58% for Steel backup
- 69% for CMU backup

**Stand-off Shelf Angle**

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**

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

<table>
<thead>
<tr>
<th>Brick Ties</th>
<th>Standard Shelf Angle</th>
<th>63%</th>
<th>69%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Brick Ties</td>
<td>Standard Shelf Angle</td>
<td>74%</td>
<td>69%</td>
</tr>
<tr>
<td>Galvanized Brick Ties</td>
<td>Standoff Shelf Angle</td>
<td>75%</td>
<td>73%</td>
</tr>
<tr>
<td>Standoff Shelf Angle</td>
<td>Traffic Ties</td>
<td>81%</td>
<td>73%</td>
</tr>
<tr>
<td>Thermally Broken Shelf Angle</td>
<td>Traffic Ties</td>
<td>74%</td>
<td>63%</td>
</tr>
<tr>
<td>Standard Shelf Angle</td>
<td>Thermal Ties</td>
<td>87%</td>
<td>94%</td>
</tr>
<tr>
<td>Standard Shelf Angle</td>
<td>Stainless Ties</td>
<td>88%</td>
<td>93%</td>
</tr>
</tbody>
</table>

- CMU Backup
- Steel Backup
Results: Panel Cladding

Clip and Rail

- Thermal Stop Clip and Rail
- Fiberglass Clip and Rail
- Stainless Clip and Rail
- Galvanized Clip and Rail
- Aluminum Clip and Rail

Girts

- Thermoset Resin Girt
- Fiberglass Girt
- Galvanized Girt

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

CMU Backup
Steel Backup