



# IKO Report: Insulation Fastener Guide

Guidelines for the Installation of IKO EnerAir and EnerFoil Insulation



## Design Notes

### ❑ **Design**

The type and frequency of a fastener is typically decided by a structural engineer or through collaboration between a design professional and a structural engineer.

### ❑ **Design Loads**

IKO EnerFoil and EnerAir rigid insulation is not intended to be used as structural panels. All fastening types (mechanical or adhesives) should be designed to withstand all the combined applied loads on a structure. Primarily, the design professional and structural engineer should always be aware of applied Dead-Load and Wind-Loads. Live-Load, Wind-Driven Rain-Load and Seismic Loads are not taken into consideration in this guide.

### ❑ **Dead Load**

The term 'Dead-Load' refers to the combined applied loads of cladding, insulation, fasteners and any other building component that will be supported by the fastener connection.

### ❑ **Wind Load/Live Load**

The term 'Live Load' refers to temporary or transient forces imposed on the fastener connections. In upright building construction this is primarily horizontal/lateral forces due to wind pressures.

### ❑ **Fastener Suitability**

Fasteners, as indicated by the design professional, must be:

1. Compatible with the type of substrate.
2. Compatible with the climatic environment they are being used in.
3. Installed at a frequency and at the appropriate depth to withstand the "pull-out", "shear strength" and, "tear through" imposed on them.

### ❑ **Mechanical Fasteners**

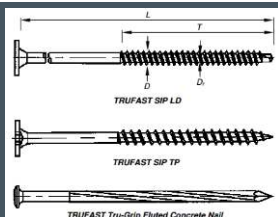
Mechanical fasteners are the preferred method of installation for permanent attachment of IKO EnerFoil and EnerAir rigid insulation to the structure or substrate.

### ❑ **Adhesives**

Readily available construction adhesives can be used as a temporary insulation retention system to reduce the number of required mechanical fasteners for permanent attachment in the system as directed by a design professional. IKO does not recommend the use of adhesives as the primary fastener to the structure.

## Fastener Type Examples

Below are several examples of common fasteners. Different fasteners are more effective than others at reducing the effect of thermal bridging. Using a thermally broken or isolated fastener like the Insulation Fastener seen below will provide the best performance. Please consult your design professional for the best practices applicable to your specific building design.



### Regular

- Typical wood, concrete or drill point screws and nails.
- Must be appropriate type for substrate and climatic conditions.
- When paired with a washer, washer must have a minimum diameter of 1.5".
- IKO recommends using thermally broken plastic washers to help reduce the effect of thermal bridging through the fasteners



### Masonry Tie

- Commonly used to fasten through insulation to structural members while providing adjustable tie-in for masonry work.
- Must be appropriate type for substrate and climatic conditions.
- Must have minimum washer diameter of 1.5".



### Fastener and Washer

- Fastener must be appropriate type for substrate and climatic conditions.
- When paired with a washer, washer must have minimum diameter of 1.5".



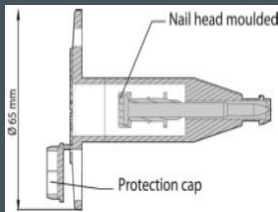
### Plastic Cap Nails

- Appropriate for temporarily attaching insulation before applying wood or metal strapping.
- Must be appropriate type for substrate and climatic conditions.
- Must have minimum washer diameter of 1.5".



### Dual Thread Fasteners

- Most commonly used for applications featuring treated wood strapping. Please see page 4 of this guide for more information regarding strapping applications.



### Insulation Fastener

- Thermally broken insulation fastener to reduce thermal bridging.
- Must be appropriate type for substrate and climatic conditions.
- Must have minimum cap diameter of 1.5".



## Basic Insulation Attachment Guidelines

### □ General Application

Basic insulation attachment applications include:

- Interior Basement.
- Concrete Masonry Unit (CMU).
- Exposed Exterior Insulation.
- Exposed Interior Insulation.
- Parking Garages.

### □ Typical Fasteners Used

Types of fasteners used for basic insulation attachment applications are:

- Fastener and Washer.
- Insulation Fastener.
- Plastic Cap Nails (for temporary attachment).

### □ Fastener Frequency

Fasteners are installed at a frequency of:

- 12 inches on center around the edge of the board where it meets the perimeter of the wall.
- 16 inches on center in the field of the board.

On wood or steel framing the fasteners in the field should be installed in line with the studs.

### □ Fastener Depth

IKO recommends a minimum embedded depth of 1.5 inches for wood and concrete substrates and a minimum of 3 full threads past the inside face of the steel framing stud. The appropriate length of a fastener should be selected to allow for the embedded depth required and the thickness of the insulation being used.

*Example: If the insulation thickness is 4 inches and the substrate that it is being attached to is wood framing, where the minimum embedded depth is 1.5 inches, the calculation would be as follows:*

$$\text{Total Fastener Length} = \text{Insulation Thickness} + \text{Required Embedded Depth}$$

$$\text{Total Fastener Length} = 4" + 1.5"$$

$$\text{Total Fastener length} = 5.5" \text{ minimum}$$

### □ Design Alteration

Design professionals may reduce or increase the frequency of fasteners to be used as well as the recommended fastener embedded depth based on information provided by the fastener manufacturers and in accordance with specific building project needs. A structural engineer should be consulted to ensure that the system can withstand the applied loads.

# Insulation with Strapping Attachment Guidelines

## □ General Application

Strapping is applied over the face of the exterior insulation to support the cladding or finish of the building. The strapping will also act as exaggerated clamps against the insulation, permanently and mechanically attaching the insulation if designed to withstand all the applicable loads. Minimal fasteners can be used as a temporary insulation retention system to hold the plain insulation in place until the strapping is applied. Please consult your design professional or engineer for the appropriate number of fasteners required for your application.

Strapping attachment is appropriate for insulation thickness less than or equal to 4 inches in thickness. For thicknesses greater than 4 inches additional design considerations must be made. Please consult your design professional or engineer for the appropriate number of fasteners required for your application. Please consult your design professional or engineer for the appropriate number of fasteners required for your application.

## □ Design Principles

IKO recommends the following design practices be followed when installing insulation with strapping attachment:

- IKO recommends installing wood strapping only in the vertical orientation in order to maintain a dry cavity. If wood strapping is installed horizontally ensure that the strapping is slightly sloped to allow for water drainage if wetting occurs.
- A metal hat channel can be installed vertically or horizontally.
- A strapping attachment must be designed to withstand all applied loads on the system (please see [NTA Engineering Evaluation Report: TRU110910-21 – “Guide to Attaching Sheathing, Furring and/or Cladding through Continuous Foam Insulation to Wood Framing, Steel Framing, Concrete and CMU Substrates with TRUFast SIP TP, SIP LD and Tru-Grip Fasteners”](#) for details on fastener frequency and strapping spacing at specific design loads.
- IKO recommends a maximum design load of 10 pounds per fastener.

## □ Fastener Requirements

Fasteners should be selected such that:

- They are the appropriate type for the substrate (dual thread fasteners are suggested for use with wood strapping).
- They are capable of withstanding the applied loads of the system.
- They are the appropriate length to ensure a minimum of 1.5 inch embedded depth in wood studs and concrete or 3 full threads past the inside of a steel framing stud.

## □ Strapping Requirements

Metal or treated wood can be used for strapping. If strapping is used IKO recommends installing using:

- Metal Hat channel.
- Minimum thickness of 1"x4" treated wood laid on the flat.

# Masonry Tie Application Guidelines

## ❑ General Application

Masonry Ties can be installed through IKO EnerAir and EnerFoil rigid insulation following the same practices as discussed in the basic insulation attachment section. Design professionals may reduce or increase the frequency of fasteners to be used as well as the recommended fastener embedded depth based on information provided by the fastener manufacturers and in accordance with specific building project needs. A structural engineer should be consulted to ensure that the system can withstand the applied loads.

## ❑ Fastener Frequency

Fasteners are installed at a recommended frequency of:

- 12 inches on center around the edge of the board where it meets the perimeter of the wall
- 16 inches on center in the field of the board

On wood or steel framing the fasteners in the field should be installed in line with the studs.

## ❑ Fastener Depth

IKO recommends a minimum embedded depth of 1.5 inches for wood and concrete substrates and a minimum of 3 full threads past the end inside of steel framing stud. The appropriate length of fastener should be selected to allow for the embedded depth required and the thickness of the insulation being used.

*Example: If the insulation thickness is 4 inches and the substrate that it is being attached to is wood framing, where the minimum embedded depth is 1.5 inches, the calculation would be as follows:*

*Total Fastener Length = Insulation Thickness + Required Embedded Depth*

*Total Fastener Length = 4" + 1.5"*

*Total Fastener length = 5.5" minimum*

## ❑ Design Principles

Masonry ties should be installed such that: they are spaced appropriately to withstand the applied loads of the system. Additional fasteners such as plastic cap nails, insulation fasteners and fastener and washers can be used to meet the fastening requirements of the insulation. Design professionals may reduce or increase the frequency of fasteners to be used as well as the recommended fastener embedded depth based on information provided by the fastener manufacturers and in accordance with specific building project needs. A structural engineer should be consulted to ensure that the system can withstand the applied loads.

## Disclaimer

The information contained in the brochure is for general information only and is dispensed in order to aid the design professional. In the case of a discrepancy between the recommendations made in this document and the advice of a design professional, the advice of the design professional should be followed.

