

Wall Insulation Fastener Guide

IKO Ener-Air™ & IKO Enerfoil®
Wall Insulation

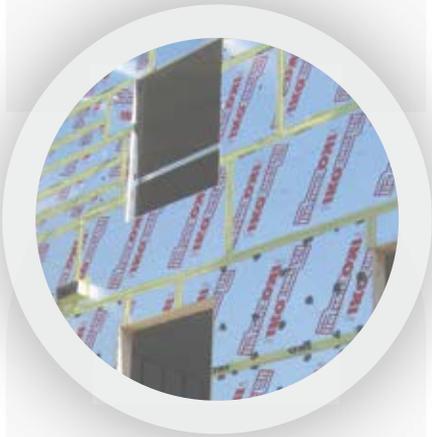
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Design Considerations

The type and frequency of a fastener system is typically decided by a structural engineer or in collaboration with a design professional.

Design Loads

IKO Enerfoil and Ener-Air rigid insulation products are not intended for use as a structural panel. Design professionals and structural engineers should be aware of applied dead-load and wind-loads. All fastening types (mechanical or adhesive) should be designed to withstand all combined applied loads on a structure.

Dead Load

The term 'dead load' refers to the combined applied loads of cladding, insulation, fasteners and any other building component supported by a fastener connection.

Wind Load

The term "wind load" refers to the temporary or transient forces imposed on fastener connections. In upright building construction, these are primarily horizontal/ lateral forces due to wind pressures.

Fastener Suitability

As indicated by the design professional, fasteners must be:

- Compatible with the substrate.
- Compatible with the surrounding climatic environment.
- Installed at a frequency and appropriate depth to withstand the "pull-out", "shear strength" and "tear-through" imposed by wind pressure.

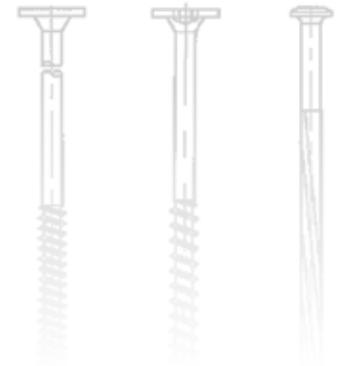
Mechanical Fasteners vs. Adhesives

Mechanical fasteners are the preferred method of installation for permanent attachment of IKO Enerfoil and IKO Ener-Air rigid insulation to a suitable structure or substrate. Common construction adhesives may be used as a temporary insulation retention system in order to reduce the number of required mechanical fasteners, as directed by a design professional for permanent attachment in the system. IKO does not recommend the use of adhesives as the only primary fastener to the structure.

Note: Live load, wind-driven load and seismic loads are not taken into consideration in this guide.

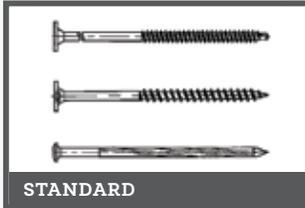
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Fastener Applications



STANDARD



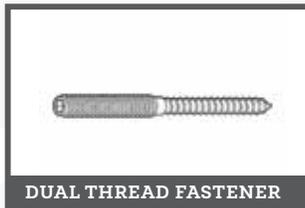
MASONRY TIE



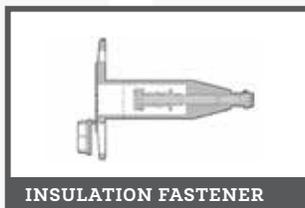
FASTENER AND WASHER



PLASTIC CAP NAIL



DUAL THREAD FASTENER



INSULATION FASTENER

Below are examples of common fasteners. While some fasteners are more effective at reducing thermal bridging than others, a thermally broken or isolated fastener will provide the best performance. Please consult your design professional for the best practices applicable to your specific building scenario.

Standard

- Typical wood, concrete or drill point screws and nails.
- Must be appropriate to substrate and climatic conditions.
- Must have minimum washer diameter of 25 mm (1").
- IKO recommends thermally broken plastic washers to help reduce the effect of thermal bridging through the fastener.

Masonry Tie

- Commonly used to fasten through insulation to structural members while providing an adjustable tie-in for masonry work.
- Must be appropriate to substrate and climatic conditions.

Fastener and Washer

- Must be appropriate to substrate and climatic conditions.
- Must have minimum washer diameter of 25 mm (1").

Plastic Cap Nail

- Appropriate for temporary insulation attachment prior to applying wood or metal strapping.
- Must be appropriate to substrate and climatic conditions.
- Must have minimum washer diameter of 25 mm (1").

Dual Thread Fastener

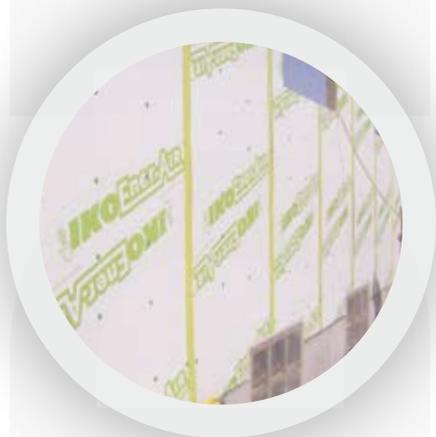
- Most commonly used for applications featuring treated wood strapping. Please see page 5 of this guide for more information regarding strapping applications.

Insulation Fastener

- Thermally broken insulation fastener to reduce thermal bridging.
- Must be appropriate to substrate and climatic conditions.
- Must have minimum cap diameter of 25 mm (1").

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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

IKO recommends a fastener frequency of both:

- 304 mm (12") on center around the edge of the board at the perimeter of the wall.
- 406 mm (16") on center in the field of the board.

Design Alteration

In accordance with specific building project needs, design professionals may recommend either reducing or increasing the frequency of use, as well as the recommended fastener embedded depth, based on information provided by the manufacturer. A structural engineer should be consulted to ensure that the system can withstand the applied loads.

Fastener Depth

IKO recommends a minimum embedded depth of 19 mm (3/4") for fasteners in wood and concrete substrates and a minimum of three 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 101 mm (4") and the substrate to which it will be attached to is wood with a minimum embedded depth of 38 mm (1.5"), the calculation would be as follows:

**Insulation Thickness
+ Required Embedded Depth**

= Total Fastener Length

Total Fastener Length =
101 mm (4") + 38 mm (1.5")

Total Fastener Length =
139 mm (5.5") minimum

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

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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 the applicable loads. Minimal fasteners can be used as a temporary insulation retention system to hold the plane insulation in place until the strapping is applied. Strapping attachment is appropriate for insulation thickness less than or equal to 101 mm (4") in thickness. For thicknesses greater than 101 mm (4"), additional considerations must be made. Please consult a design professional or engineer for the appropriate number of fasteners required for your application.

Insulation with Strapping Attachment Guidelines

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.
- A metal hat channel may 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* for details on fastener frequency and strapping spacing at specific design loads.
- IKO recommends a maximum design load of 10 pounds per fastener.

*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" (http://www.trufast.com/links/pdf/NTA_inc_Engineering_Evaluation_Report_TRU110910-21.pdf).

Fastener Requirements

Fasteners should be selected with the following in mind:

- The fasteners 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 38 mm (1.5") embedded depth in wood studs and concrete or three 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 installation using a metal hat channel or treated wood [minimum thickness of 25 mm (1") x 101 mm (4")] laid on the broad side of the strapping.

Strapping should be applied vertically across the face of the insulation. If applying strapping horizontally, ensure that the strapping is staggered in order to ensure that any condensation build up does not accumulate and is allowed to drain from the surface of the strapping.

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Masonry Ties Application Guidelines

General Application

Masonry ties may be installed through IKO Ener-Air and IKO 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

IKO recommends a fastener frequency of both:

- 305 mm (12") on center around the edge of the board at the perimeter of the wall.
- 406 mm (16") 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.

Design Principles

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

Fastener Depth

IKO recommends a minimum embedded depth of 38 mm (1.5") for fasteners in wood and concrete substrates and a minimum of three full threads past the end inside of steel framing studs. 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 101 mm (4") and the substrate that it is being attached to is wood framing, where the minimum embedded depth is 38 mm (1.5"), the calculation would be as follows:

Insulation Thickness
+ **Required Embedded Depth**

= **Total Fastener Length**

Total Fastener Length =
101 mm (4") + 38 mm (1.5")

Total Fastener Length =
140 mm (5.5") minimum

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Find out more about our products now by talking to an IKO sales representative, your professional contractor or contact us directly at: Canada **1-855-IKO-ROOF** (1-855-456-7663), United States **1-888-IKO-ROOF** (1-888-456-7663) or visit our website at: **IKO.COM/COMM**.



The information contained in this document provides only general instructions to aid the design professional. In the case of a discrepancy between recommendations made here and the advice of a design professional, the advice of the design professional should be followed.

Note: The information in this document is subject to change without notice. IKO assumes no responsibility for errors that may appear in this document.