

The following pages are an excerpt from the North American Product Technical Guide, Volume 1: Direct Fastening Technical Guide, Edition 22.

Please refer to the publication in its entirety for complete details on this product including data development, base materials, general suitability, installation, corrosion, and product specifications.

Direct Fastening Technical Guide, Edition 22

To consult directly with a team member regarding our direct fastening products, contact Hilti's team of technical support specialists between the hours of 7:00am - 5:00pm CST.

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Direct Fastening Technical Guide, Edition 22

3.2.20 X-IE-G INSULATION FASTENER 3.2.20.1 PRODUCT DESCRIPTION

The X-IE-G Insulation Fastening system consists of a Gas-Actuated Fastener pre-mounted in a non-metallic insulation fastener assembly, and installed using the Hilti GX-IE Gas-Actuated tool. The resulting fastener assembly allows for various insulation materials to be attached more rapidly and securely to concrete base materials, providing more efficient and safer installation. Due to the design of the fastener and the non-metallic material, the thermal conductivity of the fastening point is minimal, regardless of the insulation thickness. Thermal bridging is minimized.

| 3.2.20.1 | Product description |
|----------|---------------------|
|----------|---------------------|

- 3.2.20.2 Specifications
- 3.2.20.3 Additional System Requirements
- 3.2.20.4 Technical Data
- 3.2.20.5 Ordering information

3.2.20.2 SPECIFICATIONS

Dimensions





X-IE-G6

| Material specification | | | | | |
|------------------------|--|--|--|--|--|
| Plate | X-IE-G 6 — HDPE, colorless | | | | |
| Nail | Carbon steel shank: HRC 57.5 Zinc coating: 2 – 13 µm Designation: X-P 36 | | | | |



Insulation behind curtain walls





PIR, PUR

Multi layer board

EPS

Temporary fixing of insulation of moisture barriers/drainage plates



X-IE-G 6



3.2.20.3 ADDITIONAL SYSTEM REQUIREMENTS

| ΤοοΙ | GX-IE, GX-IE XL* |
|---------|------------------|
| Gas can | GC52 |

*Required for all X-IE G6 with length > 150 mm

3.2.20.4 TECHNICAL DATA

Thickness of base material

Concrete: h_{min} = 3 1/8"

Thickness of fastened material

Insulation thickness [in.]:

| X-IE-G 6 (for the use with mineral wool, EPS, XPS, PIR, PUR) |
|--|
| |

1 – 8

Note: Max. tolerance of insulation thickness = +/- 1/8"

Edge distances and minimum number of X-IE-G

For spacing of insulation fasteners, and minimum distances to the insulation edges, please consult with the insulation material supplier. If spacing recommendations are not available from supplier, please use a minimum of (2) X-IE G fasteners per ft².

Application limits

Concrete: f' = 2200–6500 psi (aggregate size \leq 1 ¼")

Performance data

| Recommended Loads [Ib] for concrete base material: | | | | | |
|--|--|--|--|--|--|
| Tension (lb) 22 | | | | | |
| Shear (lb) 22 | | | | | |



When base material properties are questionable, jobsite testing is recommended

Thermal efficiency

Example for insulation material (EPS or mineral wool) with a thermal conductivity λ = 0.03 W/mK

| Insulation thickness (inch) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--|-----------|-----------|-----------|------------|------------|------------|------------|------------|
| Hilti insulation fastener | X-IE-G 25 | X-IE-G 50 | X-IE-G 75 | X-IE-G 100 | X-IE-G 120 | X-IE-G 150 | X-IE-G 180 | X-IE-G 200 |
| Thermal conductivity λ [W/mK] | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Thermal resistance R [m ² K/W] | 0.85 | 1.69 | 2.54 | 3.39 | 4.23 | 5.08 | 5.93 | 6.77 |
| Thermal transmittance U [W/m ³ K] | 1.181 | 0.591 | 0.394 | 0.295 | 0.236 | 0.197 | 0.169 | 0.148 |
| Point thermal transmittance x [W/K] | 0.002 | 0.002 | 0.002 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Uc = U + n*x [W/m²K] for n = 1 | 1.183 | 0.593 | 0.396 | 0.296 | 0.237 | 0.198 | 0.170 | 0.149 |
| Thermal efficiency = U/Uc | 99.8% | 99.7% | 99.5% | 99.7% | 99.6% | 99.5% | 99.4% | 99.3% |

Thermal conductivity [W/mK]

λ R U Thermal resistance [m²K/W], R = d/ λ with d = thickness of inslation or component Thermal transmittance [W/m³K] Point thermal transmittance x [W/K] per single fastener Corrected thermal transmittance [W/m²K]

Up = x . Uc

Fastening quality assurance

Fastening inspection



Insulation thickness t, [mm]¹

| | | | • • | | | | | |
|----------------------------|-------|----|-----|----|----|----|----|----|
| | 25/30 | 40 | 50 | 60 | 70 | 75 | 80 | 90 |
| h _{ET} = 12-19 mm | | | | | | | | |
| x _{min} [mm] | 3 | 14 | 24 | 34 | 44 | 49 | 54 | 64 |
| x _{max} [mm] | 10 | 21 | 31 | 41 | 51 | 56 | 61 | 71 |

Insulation thickness t, [mm]¹

| | 100 | 120 | 130 | 140 | 150 | 160 | 180 | 200 |
|----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| h _{ET} = 12-19 mm | | | | | | | | |
| x _{min} [mm] | 74 | 94 | 104 | 114 | 124 | 134 | 154 | 174 |
| x _{max} [mm] | 81 | 100 | 111 | 121 | 131 | 141 | 161 | 181 |

1 Dimensions are provided in millimeters for accurate field measurement.

3.2.20.5 ORDERING INFORMATION



Select fastener with designation equivalent to the insulation thickness $t_{\!_{\!\!H}}$



Soft insulation boards (Mineral wool, EPS):

Fasteners are allowed to be countersunk as shown in the drawing.

Note:

For mineral wool of intermediate thicknesses use next shorter X-IE-G.



Hard insulation boards (XPS, PIR, PUR):

The fastener is not countersunk, fastener disc needs to be flush with the board prior to installation as shown in the drawing. For convenience, pre-core the board before installation.

Note:

For intermediate thicknesses, use the next longer X-IE-G.

| Designation | ltem number | t, (mm) | Insulation thickness [in] ¹ |
|--------------|-------------|---------|---|
| X-IE-G 6-25 | 2192914 | 25 | 1 |
| X-IE-G 6-30 | 2163810 | 30 | 1 1/8 |
| X-IE-G 6-40 | 2163811 | 40 | 1 5/8 |
| X-IE-G 6-50 | 2163812 | 50 | 2 |
| X-IE-G 6-60 | 2163813 | 60 | 2 1/2 |
| X-IE-G 6-70 | 2163814 | 70 | 2 3/4 |
| X-IE-G 6-75 | 2192915 | 75 | 3 |
| X-IE-G 6-80 | 2163815 | 80 | 3 1/4 |
| X-IE-G 6-90 | 2192916 | 90 | 3 1/2 |
| X-IE-G 6-100 | 2163816 | 100 | 4 |
| X-IE-G 6-120 | 2192917 | 120 | 4 3/4 |
| X-IE-G 6-130 | 2192918 | 130 | 5 1/8 |
| X-IE-G 6-140 | 2163817 | 140 | 5 1/2 |
| X-IE-G 6-150 | 2163818 | 150 | 6 |
| X-IE-G 6-160 | 2163819 | 160 | 6 1/4 |
| X-IE-G 6-180 | 2163820 | 180 | 7 1/8 |
| X-IE-G 6-200 | 2163821 | 200 | 8 |

1 Equivalent insulation thickness converted from mm (Soft Conversion.)