

2.16 X-IE Wall Insulation Fastener

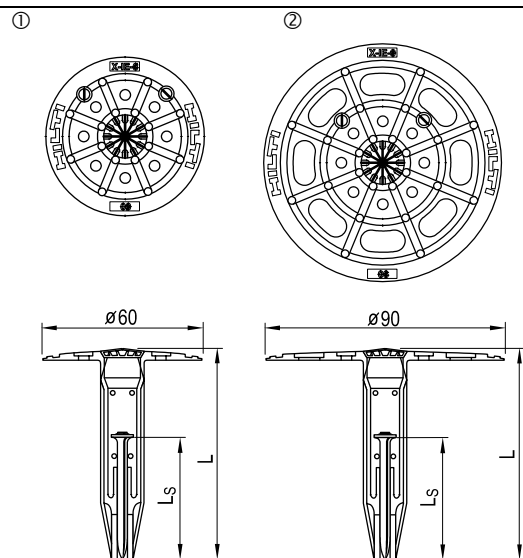
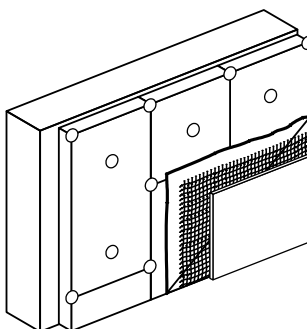
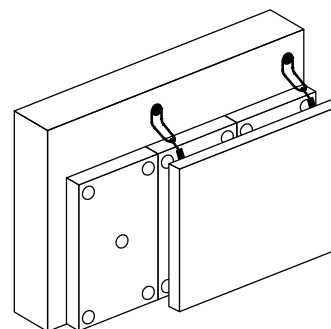


Plate: HDPE, colorless
HDPE, black (BL), UV resistant

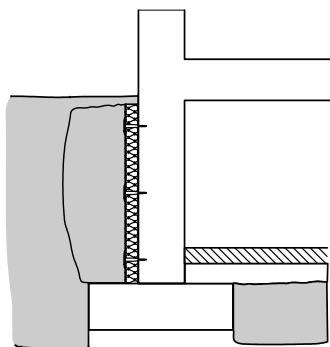
Nail: Carbon steel, hardened to HRC 58±1
Zn coated, 10 - 14 µm



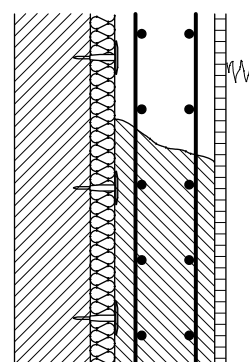
Composite thermal insulation



Insulation behind curtain walls



Moisture barriers / drainage plates



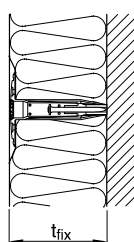
Expansion joint material

Programme (dimensions in mm)

	Designation	L _s	L	DX Tools
①	X-IE 6-25 PH 37	37	25	DX 460 DX-A 40 DX-A 41 DX 36M
	X-IE 6-30 PH 47	47	30	
	X-IE 6-35 PH 47	47	35	
	X-IE 6-40 PH 52	52	40	
	X-IE 6-45 PH 52	52	45	
	X-IE 6-50 PH 52	52	50	
	X-IE 6-60 PH 52	52	60	
	X-IE 6-70 PH 52	52	70	
	X-IE 6-75 PH 52	52	75	
	X-IE 6-80 PH 52	52	80	
	X-IE 6-90 PH 52	52	90	
	X-IE 6-100 PH 52	52	100	
	X-IE 6-120 PH 72	72	120	
②	X-IE 9-40 PH 52	52	40	
	X-IE 9-50 PH 52	52	50	
	X-IE 9-60 PH 52	52	60	
	X-IE 9-70 PH 52	52	70	
	X-IE 9-75 PH 52	52	75	
	X-IE 9-80 PH 52	52	80	
	X-IE 9-100 PH 52	52	100	
	X-IE 9-120 PH 52	52	120	

Fastener Selection and Base Material Limitations

Select L = t_{fix}. For intermediate thicknesses, use next shorter X-IE.
Use 90 mm diameter plate (X-IE 9) for soft insulation.



concrete

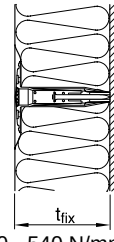
f_{cc} = 15 - 45 N/mm²
aggregate size ≤ 32 mm

sand-lime masonry

f_{cc} = 15 - 45 N/mm²

clinker brick work

f_{cc} = 28 - 45 N/mm²



steel

f_u = 360 - 540 N/mm²
h = 4 - 6 mm

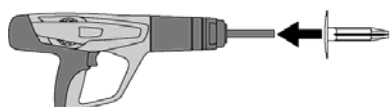
Application Approvals and Governing Design Guidelines

ETA, SOCOTEC

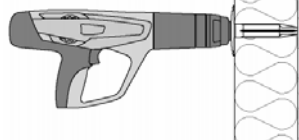
Technical data (design loads, application restrictions, etc.) presented in these approvals and design guidelines reflect specific local conditions and may differ from those published in this handbook. If the project is in a jurisdiction where the fastening is subject to the approval process or where a design guideline must be used, technical data in the approval or design guideline has precedence over data presented here. Approval copies are available from your Hilti technical advisory service.

Fastening Operations

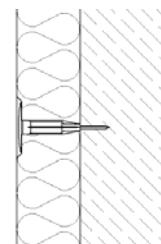
1. Load X-IE on cycled tool



2. Push the X-IE all the way into the insulation



3. Pull the trigger to fasten

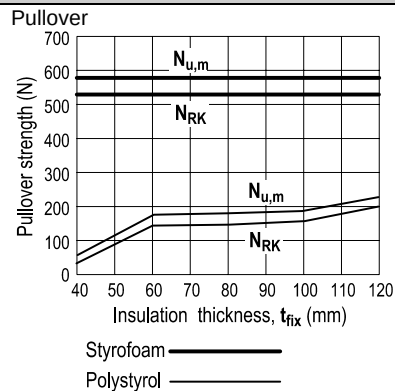
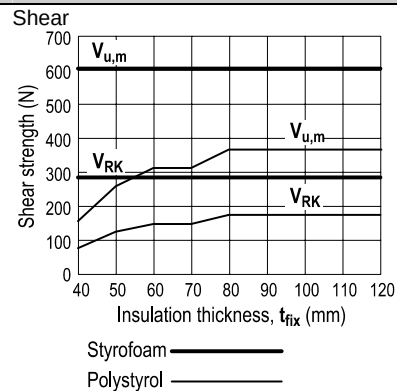


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Recommended Working Loads

	Insulation thickness, t_{fix} (mm)								
	40	45	50	60	70	75	80	100	120
Shear, V_{rec} (N)									
Polystyrol (15 kg/m ³)	150	200	250	300	300	325	350	350	350
Styrofoam (15 kg/m ³)	600	600	600	600	600	600	600	600	600
Pullover, N_{rec} (N)									
Polystyrol (15 kg/m ³)	250	270	290	300	300	300	300	300	300
Styrofoam (15 kg/m ³)	300	300	300	300	300	300	300	300	300
When base material properties are questionable, jobsite qualification is necessary.									

Test Data



Pullout from concrete

Average ultimate:

$N_{u,m} = 940 \text{ N}$

Characteristic:

$N_{Rk} = 840 \text{ N}$

Inspection of Fastening Quality

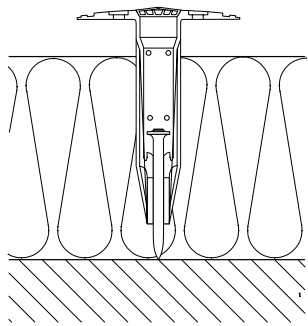
The diagram illustrates a cross-section of a wall assembly. It shows a vertical wall with a horizontal reinforcement bar (dashed line) and a vertical reinforcement bar (solid line). The wall is composed of a concrete core and an outer insulation layer. Key dimensions and labels include:

- L**: Total length of the wall section.
- X**: Distance from the edge of the wall to the center of the reinforcement bar.
- h_{nom}**: Nominal height of the wall section.
- X_{min}**: Minimum distance from the edge to the reinforcement bar.
- X_{max}**: Maximum distance from the edge to the reinforcement bar.
- t_{fix}**: Thickness of the insulation layer.

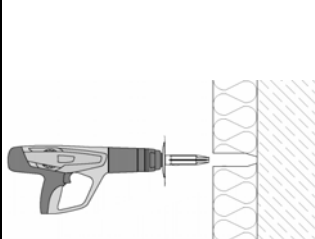
	Insulation thickness, t_{fix} (mm)									
	40	45	50	60	70	75	80	100	120	
Concrete	h_{nom} = 25 - 29 mm									
X_{min} (mm)	10	15	20	30	40	45	50	70	70	
X_{max} (mm)	14	19	24	34	44	49	54	74	74	
Steel and sand-lime	h_{nom} = 20 - 24 mm									
X_{min} (mm)	5	10	15	25	35	40	45	65	65	
X_{max} (mm)	9	14	19	29	39	44	49	69	69	

Recognition of placing failures

Fastener rebounds

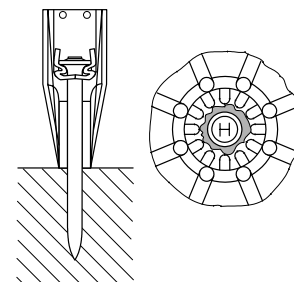


Fastener remains on tool



Visual check immediately after fastening

Correct: Top hat crushed



Incorrect: Top hat not crushed

