



VENTILATED FACADES.

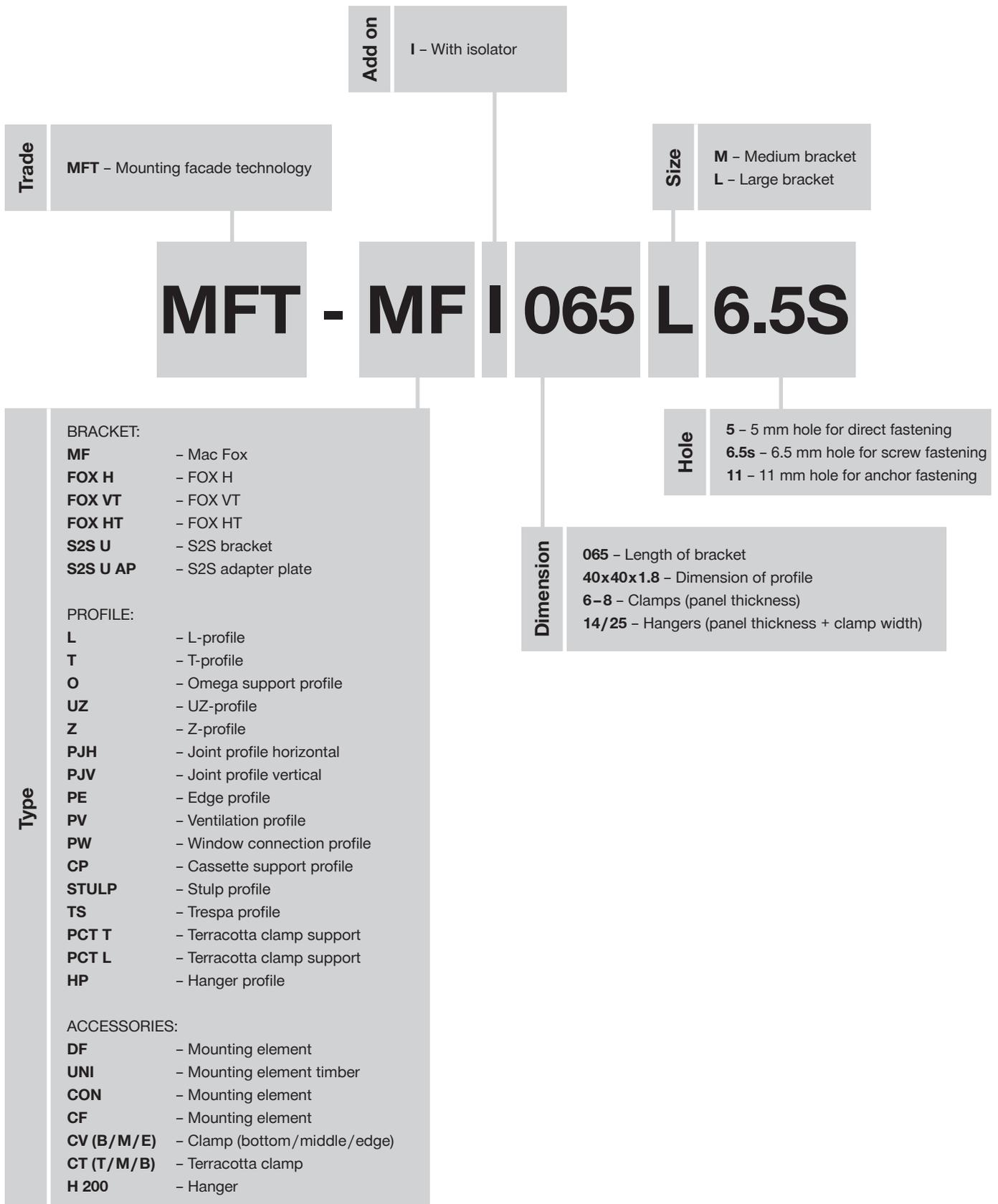
Technical manual



TERMS OF BUSINESS AND LEGAL DISCLAIMERS

Hilti strives to achieve continuous development and innovation. This manual is thus subject to change without notice. Hilti strongly advises customers to verify the respective product application for the intended use by consulting a structural engineer and making the necessary calculations to ensure compliance with the applicable norms and standards. It is essential that the product is used strictly in accordance with the applicable Hilti instructions for use and within the application limits specified in the Hilti technical data sheets, technical specifications and supporting product literature. Due to the fact that construction materials and environmental conditions vary widely, information given in this manual is solely based on principles and safety factors believed to be correct at the time they were established. The customer is ultimately responsible for checking the present condition of supporting materials and the applicability of the selected product application. Hilti shall not be liable for direct, indirect, incidental or consequential damages, losses or expenses in connection with any information contained in this manual or in connection with, or by reason of, the use of, or inability to use the products for any intended purpose. This limitation of liability does not apply to personal damages culpably caused by Hilti. Implied warranties of merchantability or fitness of the products are herewith expressly excluded.

NAMING CONVENTIONS USED IN THE MANUALS FOR TYPICAL APPLICATIONS



CONTENTS AND OVERVIEW OF THIS MANUAL

Sections	Page
1 Basics	
2 General requirements/regulations	
3 Panels and systems	
4 System descriptions	
5 Load tables	
6 U-value	

CONTENTS AND OVERVIEW OF THIS SECTION

Section	Page
1 Basics	
Overview	2–3
Base materials	4
Bracket fasteners	4–5
Bracket fastening	5
Insulation	6
Insulation fasteners	7–8
Brackets/profiles	9–11
Vertical profile fasteners	11–12
Horizontal profile fasteners	12–13
Cladding materials	14–15
Cladding fasteners	16

OVERVIEW

Rain screens/ventilated facades

The need to adhere to ecological and cost-efficiency specifications is becoming an increasingly important part of the planning and construction of buildings. Energy savings, energy efficiency (up to and including so-called passive houses), costs and attractive appearance are important criteria about which decisions have to be made. Facade structures must fulfil high demands in terms of long-term requirements such as protection from the elements, thermal insulation, durability and low maintenance, design elements, fire protection, soundproofing as well as ecological requirements. The decision to incorporate a rain screen/ventilated facade in the design of the building makes it possible to take all of these aspects into account in the optimal way.

A conservative approach to the use of natural resources and the comfort and well-being of the building's occupants as well as the reduction of long-term cost factors (e.g. building costs, service life, maintenance costs) are further advantages of rain screens/ventilated facades. Moreover, when it comes to appearance and design considerations, rain screens/ventilated facades open up a multitude of possibilities. Energy generation systems (solar thermal and photovoltaic) can also be incorporated in the design. In terms of building physics and from a technical as well as cost efficiency point of view, a rain screen/ventilated facade provides the optimum solution for the outer skin of a building, not only in new construction but also in renovation projects.

The main advantages of rain screens/ventilated facades

- Lasting protection from the elements provided by the cladding
- High functionality in terms of building physics – thermal insulation stays permanently dry thanks to ventilation
- High energy efficiency through use of insulating materials suitable for rain screens/ventilated facades plus innovative substructures make it possible to achieve almost any desired U-value
- Simple solutions comprising adjustable substructures for use on uneven, difficult supporting surfaces
- A comfortable indoor climate thanks to a vapor diffusion coefficient that decreases from inside towards the outside
- Cooling effect in summer thanks to the temperature barrier effect of the ventilation cavity – excess heat is dissipated through this cavity
- Thermal insulation in winter thanks to the increased heat transition resistance of the ventilation cavity
- Sustainable method of construction thanks to long life, low maintenance and separate layers (easy demolition and recycling)
- Reliable fire protection through the corresponding choice of system components and building materials classes
- Soundproofing: the high noise absorption characteristics of mineral wool insulation in conjunction with thick cladding is capable of achieving a high noise reduction factor
- Lightning protection: metal substructures and cladding can serve as a natural lightning conductor, or can be connected to separate lightning conductor systems

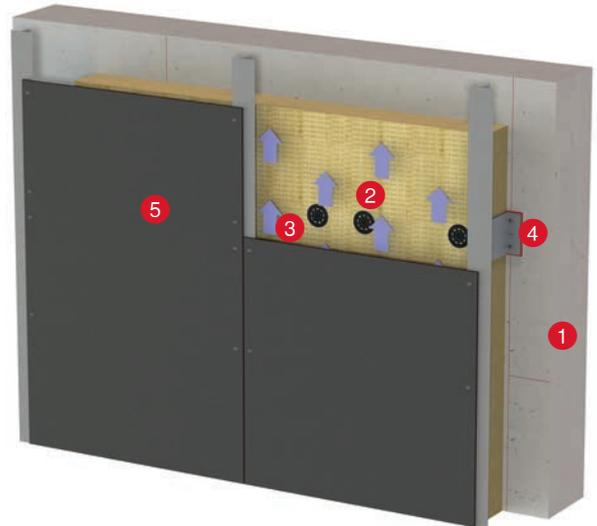
OVERVIEW

A ventilated facade is an outside wall cladding application in which the ventilation zone behind the cladding material is in contact with the atmosphere.

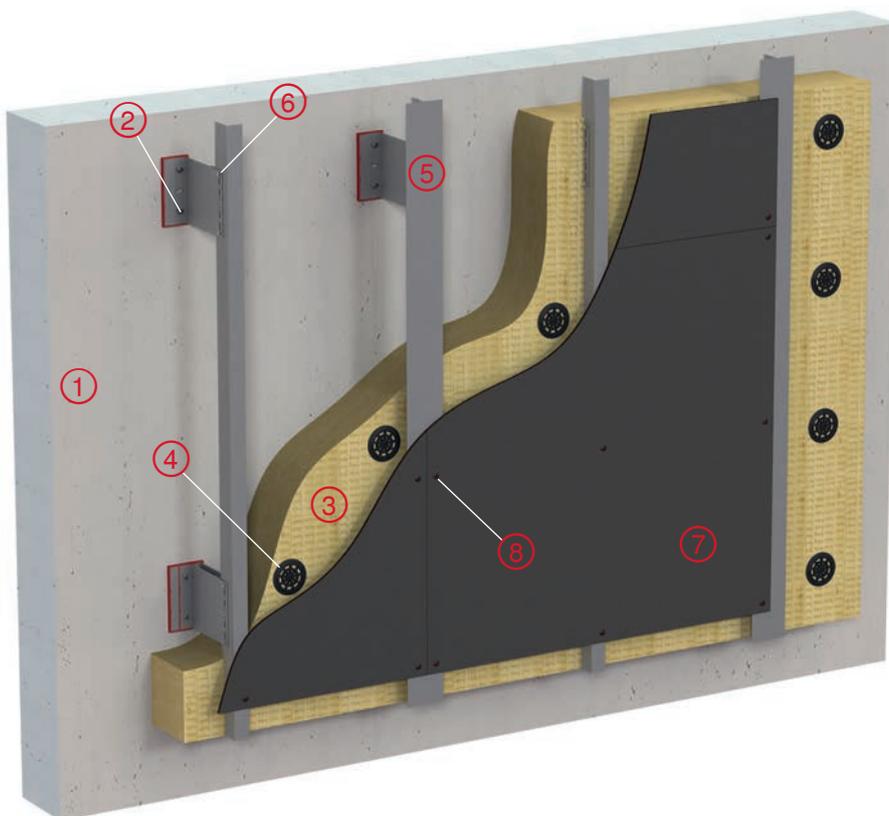
- A ventilated facade is a multi-layered system, which can guarantee long term functionality; combining functional, economical and aesthetic properties; it insulates and protects the primary structure from weather exposure.
- It fulfills all necessary requirements in terms of building physics and static design.

A ventilated facade comprises 5 main parts:

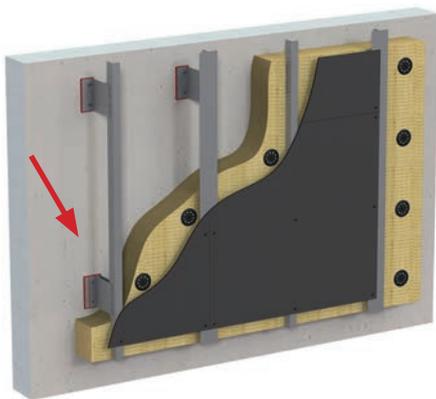
- 1 Base material
- 2 Insulation with fasteners
- 3 Ventilation gap
- 4 Substructure
- 5 Facade panel/cladding material



Schematic structure of a ventilated facade



- 1 Base material
- 2 Bracket fastener
- 3 Insulation
- 4 Insulation fastener
- 5 Bracket/profile
- 6 Profile fastener
- 7 Cladding material
- 8 Cladding fastener

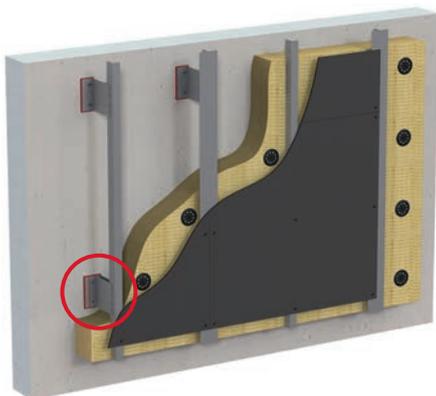


BASE MATERIALS

Surfaces to which the facade can be anchored may consist of standardized materials (e.g. concrete, brick, steel, timber, etc.) or non-standardized materials. Surface layers such as rendering, coatings or facings do not count as load-bearing materials.

The following are suitable base materials:

- Concrete in accordance with EN 206
- Bricks in accordance with EN 771
- Sand-lime block in accordance with EN 771
- Aerated concrete in accordance with EN 771
- Timber in accordance with EN 14081
- Composite lumber in accordance with EN 14080
- Steel frame structures in accordance with EN 1090
- Existing/unclassified masonry (load-bearing capacity must be verified by pull-out tests)
- Sandwich components (e.g. metal, concrete or lightweight concrete) may be considered suitable only after verification



BRACKET FASTENERS

Bracket fasteners are used to anchor substructures to load-bearing base materials.

The bracket fasteners must comply with national and/or European regulations or approval requirements and must also meet the manufacturer's installation specifications. The applicable approval must cover the application for which these items are used, i.e. suitability for the demands of rain screen/ventilated facade installation. Where applicable, corrosion protection measures must also be implemented and the compatibility of materials taken into account.

The load-bearing capacity of the bracket fastener must also be verified by carrying out on-the-spot pull-out tests in accordance with, e.g. ETAG 020 Annex B, ETAG 029 Annex B or an equivalent test method.

The most common bracket fastening methods are:

- Anchor fastening on brick and concrete
- Screw fastening on timber or steel
- Direct fastening on concrete

Anchoring on concrete and brick

Mechanical or chemical anchors can be used.

Concrete



Frame anchors



Expansion and screw anchors



Chemical anchors



Brick/masonry



Frame anchors



Chemical anchors



BRACKET FASTENERS

Screw fastening on timber or steel

Before the right screw for fastening brackets can be selected, the properties of the material, i.e. the thickness of the timber or steel must be known.

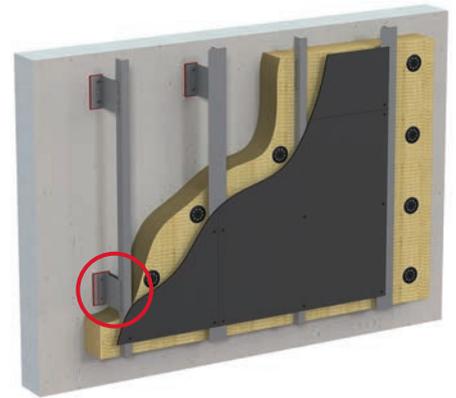


Wood:

S-MD 51 S 5.5x50

Steel:

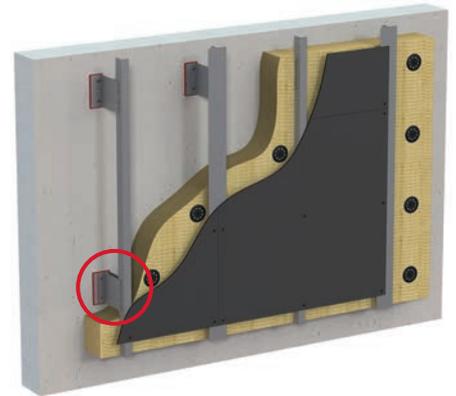
- Thickness 1.25–4 mm: S-MD 51 LS/LSS 5.5xL
- Thickness 2–6 mm: S-MD 53 LS/LSS 5.5xL
- Thickness 4.60–12 mm: S-MD 55 LS/LSS 5.5xL

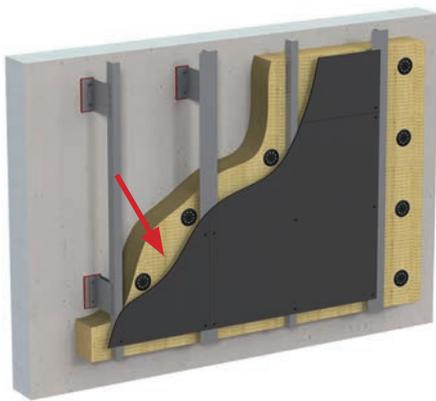


BRACKET FASTENING

Direct fastening on concrete

With the direct fastening technique, a powder-actuated fastening tool is used to drive a nail into a pre-drilled 5 mm hole. The pre-drilled hole serves to guide the nail and ensures extremely high load levels. As the hole is drilled to a depth of only 23 mm, no reinforcing bars are hit during drilling.





INSULATION

A layer of thermal insulation between the supporting surface and the ventilation cavity. Depending on the type of insulating material used, it may also fulfil fire protection and soundproofing requirements.

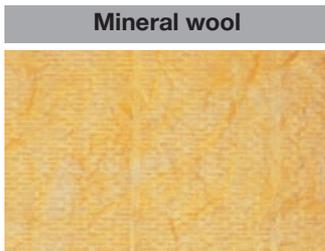
Thermal insulation for rain screen/ventilated facades must consist of an insulating material of a type suitable for the intended purpose (exterior wall insulation behind cladding).

The insulation must meet the following requirements:

- Able to retain its shape
- Able to retain its dimensions
- Completely hydrophobized and non-vapor retardent (as necessary)
- Non-flammable (as necessary)

The following types of facade insulation can be used, for example:

- Mineral wool
- Foam glass
- Rigid foam sheet
- Wood fiber board



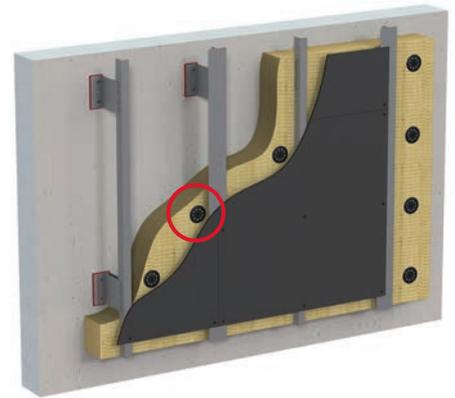
- Insulation sheets must be tightly butted together and fitted in a “brickwork” pattern. This is particularly important at the corners of the building.
- The thermal insulation must be snugly fitted around the points where the substructure penetrates the insulating material.
- Where water spray is to be expected, moisture-resistant insulating material must be used.
- As a basic rule, national regulations and installation instructions issued by the manufacturer must be observed.

INSULATION FASTENERS

The insulation sheets must be fitted without gaps and reliably, permanently secured (depending on the type of substructure, anchors, adhesive, clamps, screws or mechanical pressure may be used). The wind loads to be expected, also during construction, must be taken into account. Excessive compression of the insulating material at the fastening points should be avoided.

Hilti offers a range of insulation fasteners:

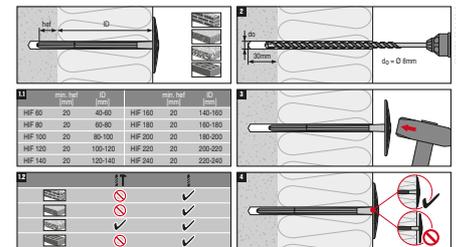
- Insulation fastener with direct fastening (X-IE)
- Insulation fastener (HIF)
- Insulation fastener with expansion pin (IZ)
- Fire-resistant metal insulation fastener (IDMR/IDMS)
- Insulation fastener for thermal optimized fastening (S-ID + S-IP)
- Insulation fastener for fire resistant fastening (S-ID + S-IW)

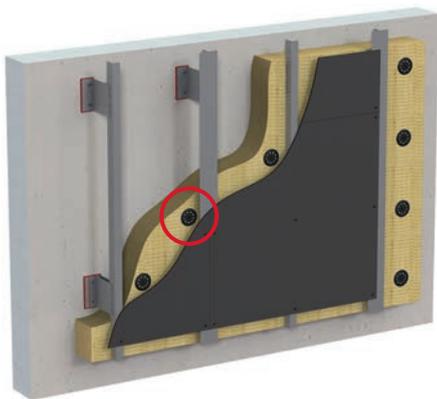


Characteristics X-IE	
Base material	Concrete
Insulation thickness	60 – 200 mm
Load capacity	High
Washer diameter	90 mm
Insulation material	Mineral wool, EPS
Necessary accessories	DX 460 and cartridge 6.8/11



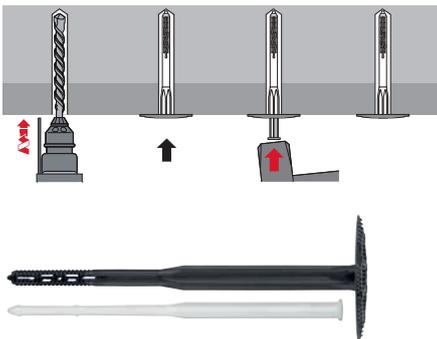
Characteristics HIF	
Base material	Concrete, aerated concrete, brick
Insulation thickness	60 – 240 mm
Load capacity	Medium
Washer diameter	90 mm
Insulation material	Mineral wool, EPS
Necessary accessories	Hammer





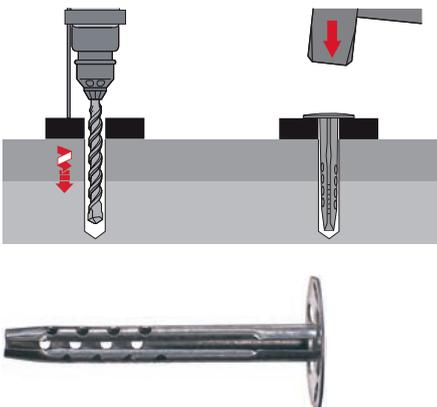
INSULATION FASTENERS

- Direct fastening (X-IE)
- Insulation fastener (HIF)
- **Insulation fastener with expansion pin (IZ)**
- **Fire-resistant metal insulation fastener (IDMR/IDMS)**
- Insulation fastener for thermal optimized fastening (S-ID + S-IP)
- Insulation fastener for fire resistant fastening (S-ID + S-IW)



Characteristics IZ

Base material	Concrete, aerated concrete, brick
Insulation thickness	30 – 210 mm
Load capacity	Medium-high
Washer diameter	90 mm
Insulation material	Mineral wool, EPS
Necessary accessories	Hammer

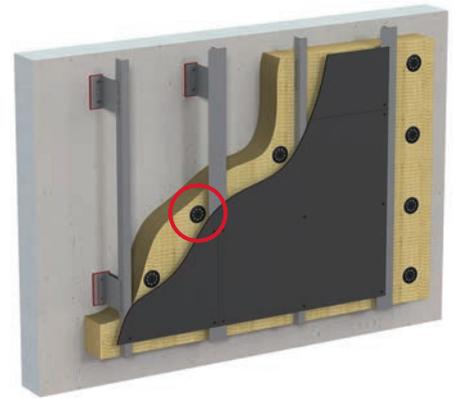


Characteristics IDMR/IDMS

Base material	Concrete
Insulation thickness	60 – 240 mm
Load capacity	Medium
Washer diameter	90 mm
Insulation material	Mineral wool, EPS
Necessary accessories	Hammer

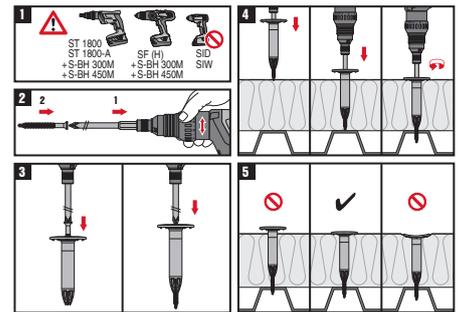
INSULATION FASTENERS

- Direct fastening (X-IE)
- Insulation fastener (HIF)
- **Insulation fastener with expansion pin (IZ)**
- **Fire-resistant metal insulation fastener (IDMR/IDMS)**
- **Insulation fastener for thermal optimized fastening (S-ID + S-IP)**
- **Insulation fastener for fire resistant fastening (S-ID + S-IW)**



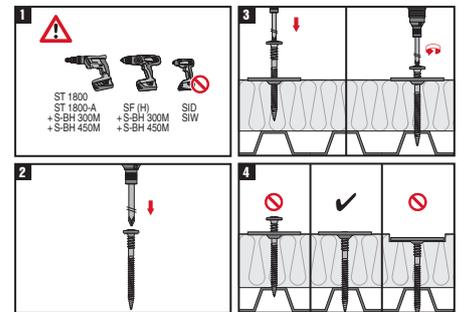
Characteristics S-ID + S-IP (thermal optimized fastening)

Base material	Steel profile 1.2–3.0 mm, sheathing boards, timber OSB/3
Insulation thickness	40–240 mm
Load capacity	Medium/high
Insulation material	Mineral wool, rigid foam panels
Necessary accessories	Cordless drills/screwdrivers, driver bit

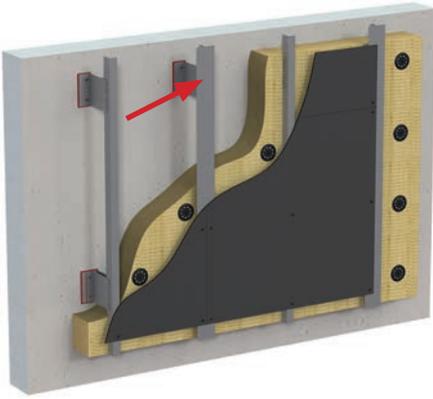


Characteristics S-ID + S-IW (fire resistant fastening)

Base material	Steel profile 1.2–3.0 mm, sheathing boards, timber OSB/3
Insulation thickness	40–240 mm
Load capacity	High
Insulation material	Mineral wool, rigid foam panels
Necessary accessories	Cordless drills/screwdrivers, driver bit

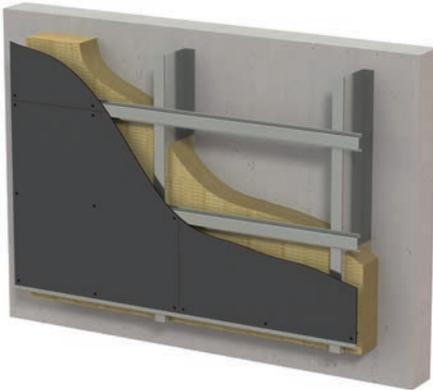


BRACKETS/PROFILES



The substructure is the static connecting link between the load-bearing outer wall and the facade cladding. It generally consists of wall brackets and load-bearing metal profiles (e.g. brackets with sliding and fixed points and load-bearing profiles made from aluminium, hot-dip galvanized steel or stainless steel) and/or timber (e.g. lathing or cross lathing, load-bearing lathing, wood materials) or glass-fiber reinforced plastics.

The substructure must be designed, planned and installed in accordance with type of supporting wall material, the static requirements of the building physics and the requirements in terms of durability.



Metal substructures

Metal substructures may be manufactured from the following:

- Corrosion-resistant steel in accordance with EN 10088 (e.g. 1.4401, 1.4404, 1.4571)
- Aluminium alloys as per EN 573, EN 755 und EN 485 (z.B. EN AW 6063 T66)
- Combinations of metal and fiber-reinforced plastics
- Batch galvanized steel as per ISO 1461 or hot-dip galvanized steel as per EN 10346 (e.g. S350 GD) with corrosion protection as per EN 10169 where necessary

Substructure components are generally as follows:

- Wall brackets, stand-off bolts or rod systems
- Thermal separators/isolators (depending on the application)
- Anchoring components
- Load-bearing profiles (L-, T-, Z-, Ω -profiles or similar)
- Fasteners
- Accessory items (e.g. hooks or U-bolts, clamps, system parts, etc.)

BRACKETS/PROFILES

Timber substructures

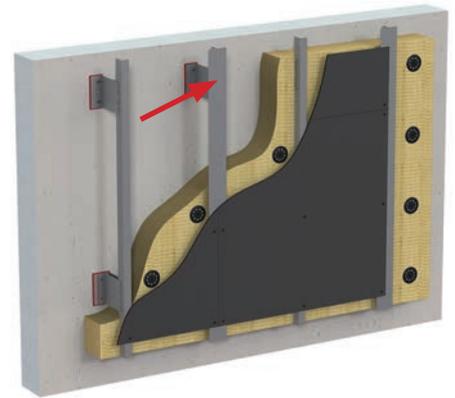
Seasoned timber or laminated wood parts are to be used for the substructure. The applicable national regulations regarding wood preservation must be observed.

When timber substructures are used, compensation for unevenness of the wall surface or use of thick insulating materials is possible only to a certain extent.

Substructure components are generally as follows:

- Lathing (cross lathing)
- Anchors
- Load-bearing lathing
- Cladding/wood materials
- Fasteners

When cladding with exposed joints is to be installed, vertical load-bearing lathing with joint tapes or joint profiles with sealing lips or anticapillary profiles are preferable (e.g. EPDM fluted tapes); simple, unprofiled sheet metal strips are generally unsuitable. Joint tapes or profiles positioned behind the cladding must be fixed to prevent slipping. It is recommended that horizontal profiles are interrupted at the joints in the cladding sections. Vertical profiles can be uninterrupted.



BRACKETS/PROFILES

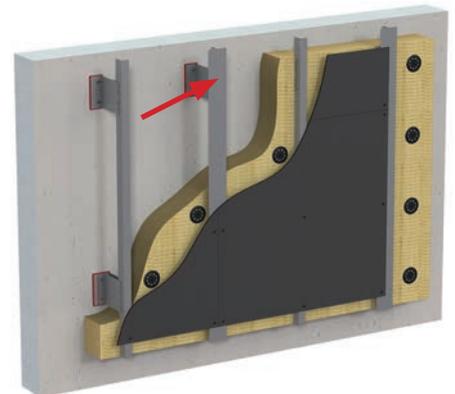
Composite substructures

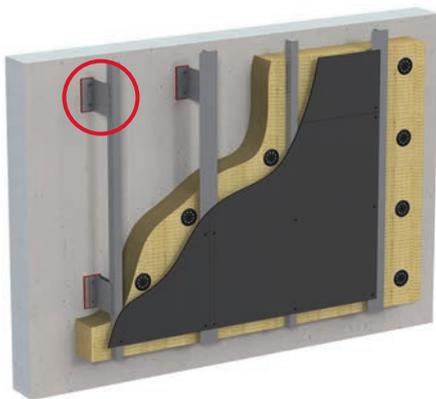
Composite substructures are a combination of metal, fiber-reinforced plastics and/or wood.

The substructure may consist of the following components:

- Brackets made from metal or fiber-reinforced plastics or combinations of these materials
- Stand-off bolts or distance pieces
- Thermal separators/isolators
- Anchor components
- Load-bearing profiles (L-, T-, Z-, Ω -profiles, or similar)
- Fasteners
- Load-bearing lathing
- Cladding/wood materials

During installation, the regulations or building codes applicable to metal as well as wood must be observed.





PROFILE FASTENERS

Fasteners are the components that connect or anchor the various parts of the sub-structure mechanically.

The fasteners must comply with national and/or European regulations or approval requirements as well as the manufacturer's specifications. The intended purpose and applicable approval must cover rain screen/ventilated facade applications. In addition, corrosion protection measures must be implemented and attention must be paid to the compatibility of materials with each other.

Fasteners may be of the following types:

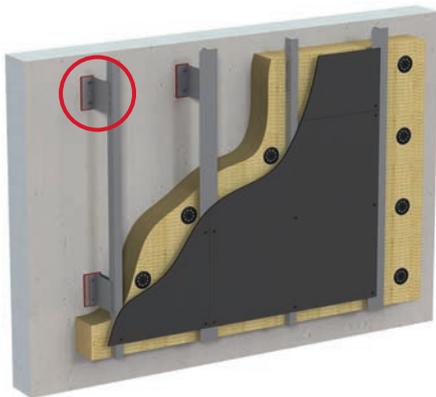
For metal substructures:

Screws (e.g. S-AD) or rivets

For timber substructures:

Screws

or combinations of these may be used.



VERTICAL PROFILE FASTENERS

- The connection between the profile and the bracket is made with self-drilling screws (stainless A2 or A4), using fixed or flexible points.
- The fixed point takes the weight of the cladding material and substructure and the proportional wind load.
- The flexible points allow temperature expansion of the profiles and bear the proportional wind loads.
- Special screws (e.g. S-AD 01 S/SS 5.5xL) are needed for this application (geometry and thread).

Flexible point:
Screws positioned in the slots



- Flexible point (sliding point): The screws must be positioned in the slots.
- The flexible points allow expansion of the profiles (≈ 2 mm per linear meter for $\Delta T = 80K$).

Fixed point:
Screws positioned in the round holes

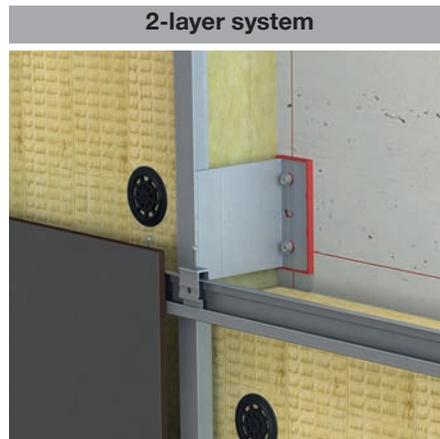
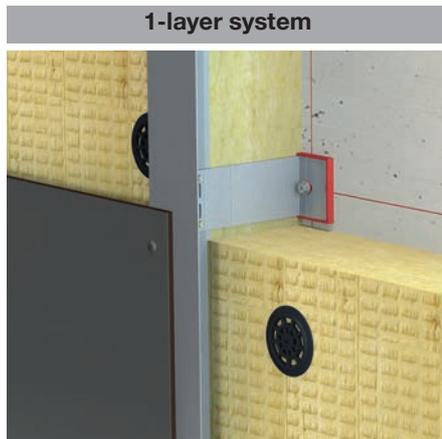
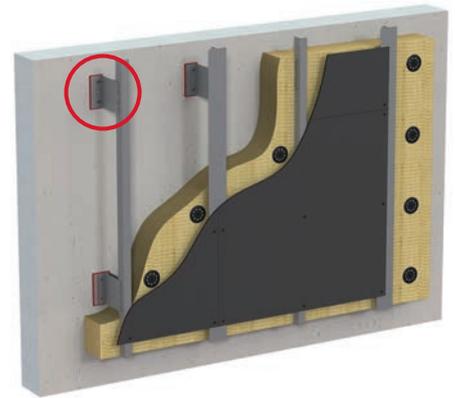


- Fixed point: The screws must be positioned in the round holes to avoid vertical movement. This allows the bracket to carry the dead load of the panel/cladding material and the horizontal wind loads.

VERTICAL PROFILE FASTENERS

Hilti offers two vertical systems:

- 1-layer system
- 2-layer system



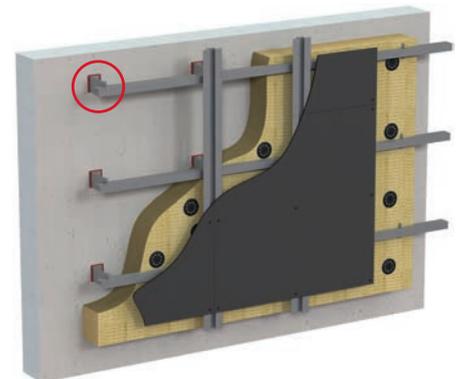
- Vertical bracket in line with the vertical profile.

- Vertical bracket in line with the vertical profile for the 1st layer and the 2nd layer in horizontal alignment (2nd layer profiles with slotted holes for expansion compensation.)

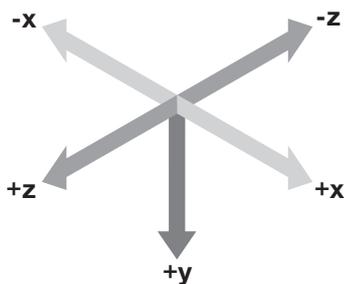
HORIZONTAL PROFILE FASTENERS

The connection between the profile and the bracket is made with pre-installed self-drilling screws (stainless A4) on the bracket. No fixed and flexible points are necessary due to the design and geometry of the bracket.

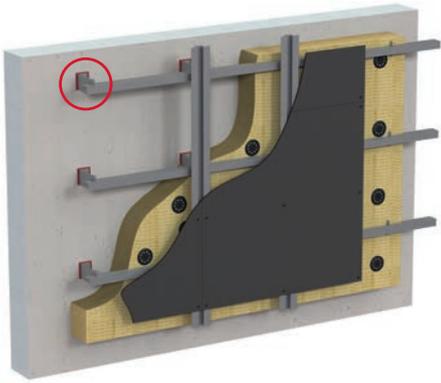
Installation scheme:



Fixed and flexible point

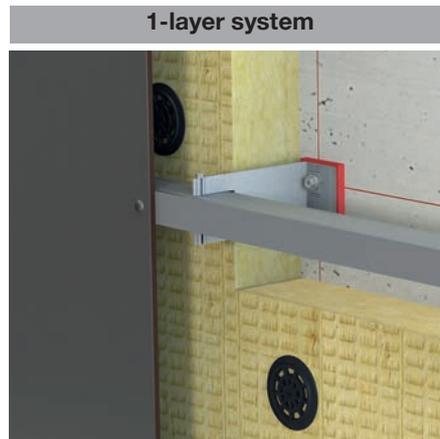


HORIZONTAL PROFILE FASTENERS

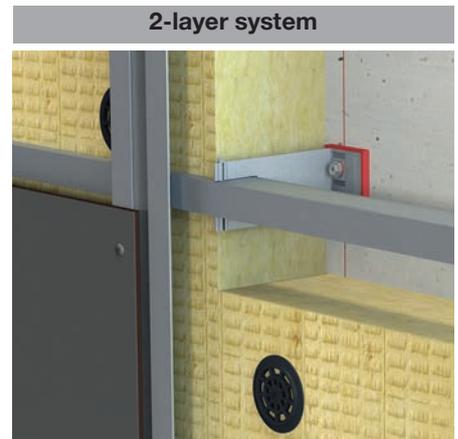


Hilti offers two horizontal systems:

- 1-layer system
- 2-layer system



- Vertical bracket equipped with a pre-installed screw
- Horizontal profile fastened with the pre-installed screw



- Double-layer installation.
- Second-layer profile with fixed and flexible points (slotted holes in the profile) to allow the profile to expand against the first layer

CLADDING MATERIALS

When planning the cladding, in addition to the requirements in terms of protection from the elements, building physics, fire protection and durability, the following points must be taken into account:

- Type, color and means of fastening (visible or concealed)
- Joint spacing (panel size, joint grid, expansion joints, etc.) – the rain screen/ventilated facade can, in principle, be installed with open or closed joints
- Generally speaking, a joint gap of 8 to 10 mm should be planned for large-format cladding panels, but this may need to be increased depending on the material and the size of the panels
- Type of substructure
- Reflections from the surface of the material
- Color differences between material lots
- Alignment of the cladding panels
- Junctions and connections to other building parts in accordance with the manufacturer's instructions

All types of cladding require the facade to be divided up into areas. At penetrations in the wall (e.g. windows) there may be a need for cladding panels of a different size.

The cladding may be fastened using a visible or concealed system.

The number and type of fasteners to be used depend on static design calculations. The position of the fasteners must be taken into account in the static design calculations and the manufacturer's instructions regarding maximum spacing must be adhered to.

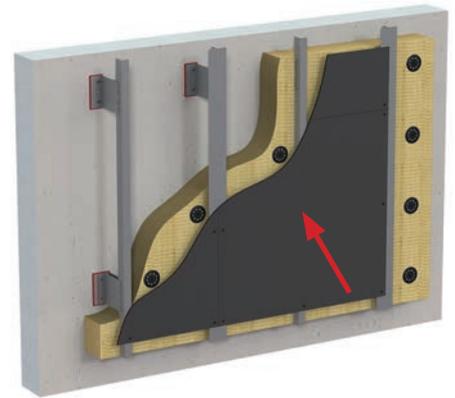
The cladding fastening system must avoid forces of constraint, e.g. through use of fixed and sliding points. Joint gap width must allow for the dimensional changes to be expected, taking the temperature at the time of installation into account.

Drilling and rivet setting gauges should be used in order to avoid forces of constraint in riveted joints.

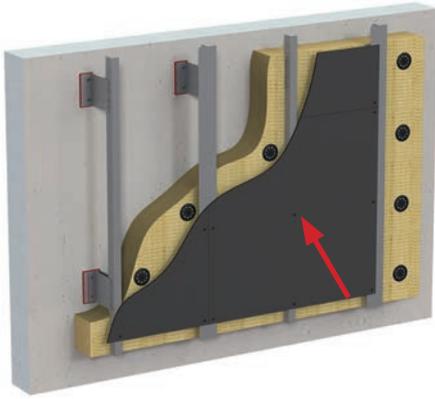
Forces of constraint are also to be avoided at screw fastened joints through use of a depth gauge, correct tightening torque and screws with a thinner shank that allow the necessary room for movement.

With bonded joints, the joint surfaces must be clean and free of grease. The adhesive manufacturer's special instructions must be observed regarding pretreatment, application temperature, etc.

Where "hook-in" systems are used (e.g. with hooks, U-bolts or undercut anchors), possible movement of the substructure and its effects on the cladding panels must be taken into account (movement of the panels).



CLADDING MATERIALS



There are many different cladding materials available. The most common ones are:

- Fiber-cement
- HPL (high-pressure laminate)
- Metal
- Render
- Ceramic
- Terracota
- Stone
- Composite

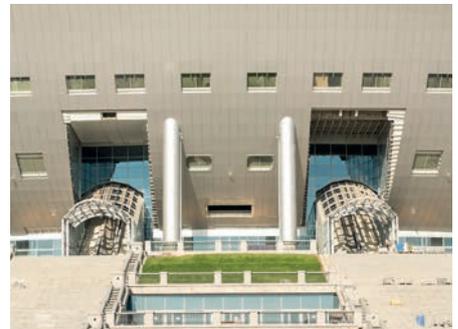
Fiber-cement



HPL



Metal



Render



Ceramic



Terracota



Stone



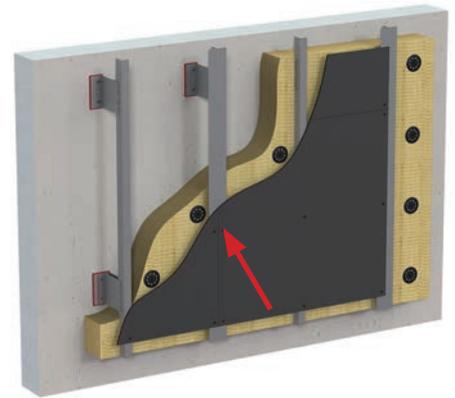
Composite



CLADDING FASTENERS

The following types of fasteners may be used:

- Rivets
- Screws
- Undercut anchors
- Adhesive bonding



Rivets



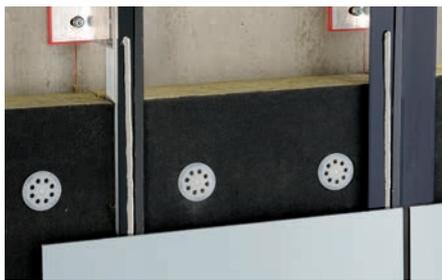
Screws



Undercut anchors



Adhesive bonding



The fasteners must comply with national and/or European regulations or approval requirements and the manufacturer's specifications. The intended application stated in the approval must be suitable for the requirements of rain screen/ventilated facade systems. In addition, attention must be paid to corrosion protection and materials compatibility.

Only approved adhesive systems (test certificate issued by an accredited test institute or equivalent verification of suitability) may be used for the adhesive bonding of cladding panels to the substructure and these adhesive systems must be used in accordance with the manufacturer's instructions.

CONTENT AND OVERVIEW OF THIS SECTION

Section	Page
2 General requirements/regulations	
Requirements	2
European regulations	4

Requirements

Structural stability

Rain screen/ventilated facades are mechanically connected to the load-bearing structure of the building and must remain structurally stable at all times. When considering this point, the following loads must be taken into account:

- Dead weight
- Wind loads (wind uplift and wind pressure)
- Snow and ice
- Dynamic (shock) loads
- Special cases (seismic loads, signage)

Proof of the structural stability of the rain screen/ventilated facade system, including all individual certificates, must be provided in a verifiable form in accordance with the state of the art and the applicable European and/or national regulations. The proof of structural stability must, in particular, include the structural stability calculations for the substructure, the cladding and the anchoring and connecting or fastening components.

The dead weight (own weight) is the sum of the weight of the cladding plus the substructure. The corresponding values can be taken from, for example, national regulations or the manufacturer's specifications.

A difference must be drawn between the two types of wind loads, i.e. wind uplift and wind pressure. The values to be applied in calculations depend, above all, on the shape and dimensions of the building, the type of facade cladding and how it is installed, and the location of the building.

Where necessary, the applicable special loads (impacts, balls being thrown, etc.) must be taken into account (more closely spaced substructure members) in areas where special stresses of this kind are to be expected.

Fire protection

Rain screens/ventilated facades must comply with the applicable national requirements regarding fire protection. The planning of fire protection measures is the responsibility of the planning specialist.

Thermal insulation and protection from dampness

The facade, in terms of its cladding and substructure, must be planned and constructed in such a way that any rainwater that finds its way behind the cladding and any condensation is drained away to the exterior in a controlled manner. This shall ensure that the thermal insulation or any timber components in the substructure, and the material to which it is anchored, do not remain damp.

Rain screens/ventilated facades with thermal insulation on the exterior of the wall present a very favorable solution in terms of building physics. In addition, the ventilation cavity allows any dampness that has found its way through the joints in the cladding to run off.

Airtightness

Requirements regarding the airtightness of the external envelope of the building are to be fulfilled by its design and construction. The rain screen/ventilated facade does not contribute to the airtightness of the building. Airtightness is ensured, for example, by the interior plasterwork and correctly installed doors and windows.

Soundproofing

Requirements in terms of soundproofing must be taken into account during planning of the complete structure and must comply with national regulations. A high sound reduction index can be achieved due to the high sound absorption properties of mineral insulation material in conjunction with thick cladding.

Lightning protection

Lightning protection requirements must be taken into account by the applicable specialists at the planning stage and must comply with national regulations.

Attention must be paid to the compatibility of the materials used for lightning conductors and any parts of the facade cladding that they come into contact with.

Deformation

Deformation may occur, in particular, due to temperature fluctuations and changes in humidity. Attention must be paid to the local temperature differences (ΔT) (usually within the -20° to $+80^{\circ}\text{C}$ range).

Deformation must not cause individual parts of the facade to work loose and must have no detrimental effect on the structural stability of the facade. Such effects can be avoided, for example, by the following:

- Division of the substructure and cladding into separate areas (e.g. height of each floor)
- The positioning of joints
- Avoidance of forces of constraint during installation of the facade cladding and substructure through use of fixed and sliding points or other suitable measures

Building expansion joints must be taken into account by the substructure and cladding and allowance made accordingly.

Tolerances

The surface of the facade cladding must be flat and even. Any unevenness of the load-bearing surface must be taken into account right at the planning stage and evened out by the supporting substructure. The permissible degree of unevenness of the load-bearing surface or facade must be defined or the applicable values taken from national regulations.

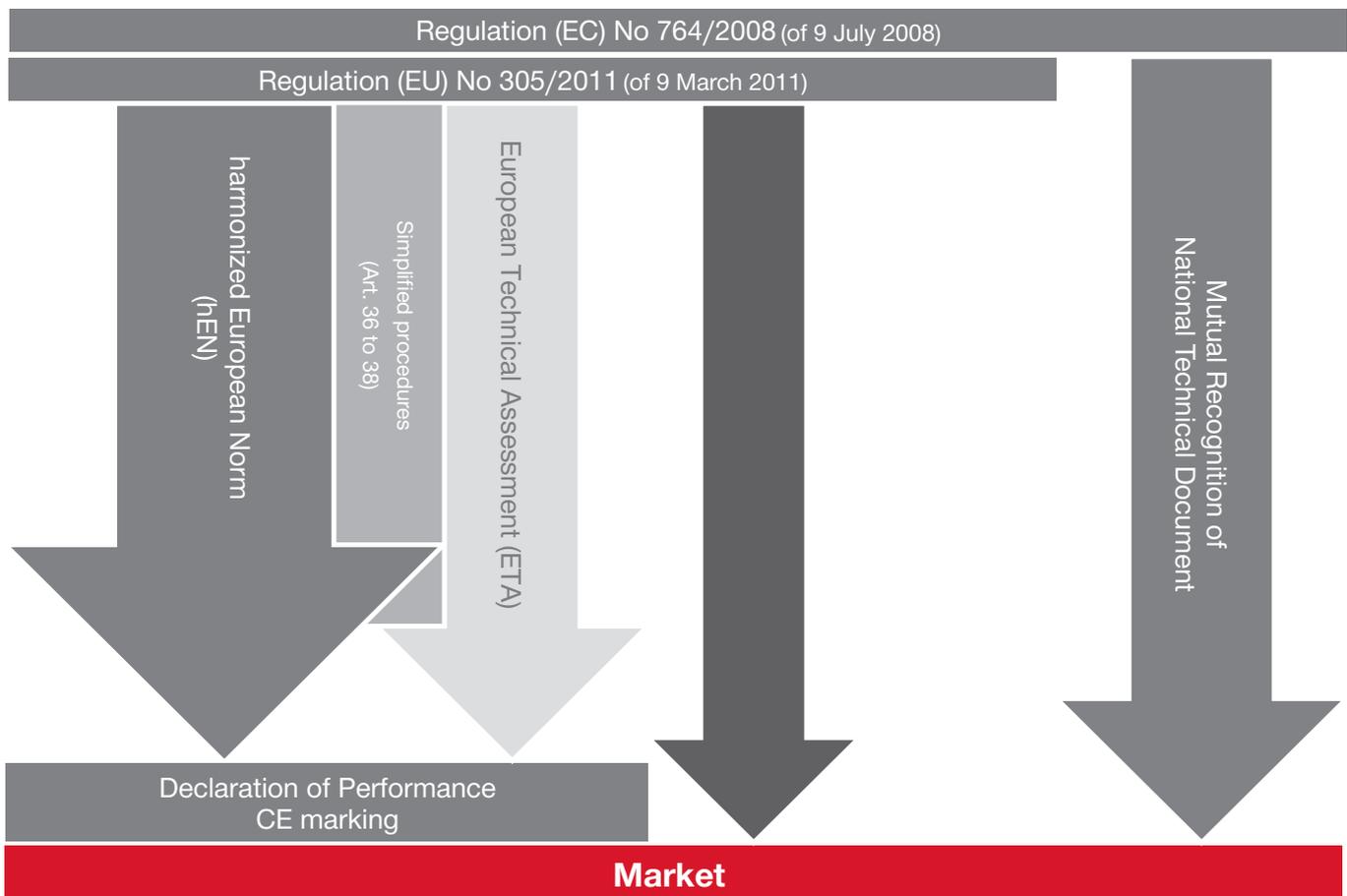
European regulations

At a European level, harmonized standards in terms of general action and design of aluminum structures apply to ventilated facade substructures. This harmonized standard is applicable and is required in all CEN member states.

For aluminum substructures for rain screens/ventilated facades, three European harmonized standards/codes are required:

- Eurocode EC-1: EN 1991-1-1 General actions – self-weight of structures
- Eurocode EC-1: EN 1991-1-4 General actions – wind loads
- Eurocode EC-9: EN 1999-1-1 Design of aluminum structures

If a product is not covered by a European harmonized standard or code, it is necessary to have an ETA (European Technical Assessment) that is valid in all EOTA member states or a national approval for the applicable country (Example: For Germany: National Approval from the DIBt-German Technical Approval body)



CONTENTS AND OVERVIEW OF THIS SECTION

Section	Page
3 Panels and systems	
Fiber-cement	2
High-pressure laminate (HPL)	10
Metal cladding material	18
Render	24
Ceramic	28
Terracotta	34
Stone	38
Composite	44

FIBER-CEMENT

Fiber-cement is a composite material composed of sand, cement and cellulose



HPL



Metal



Render



Ceramic



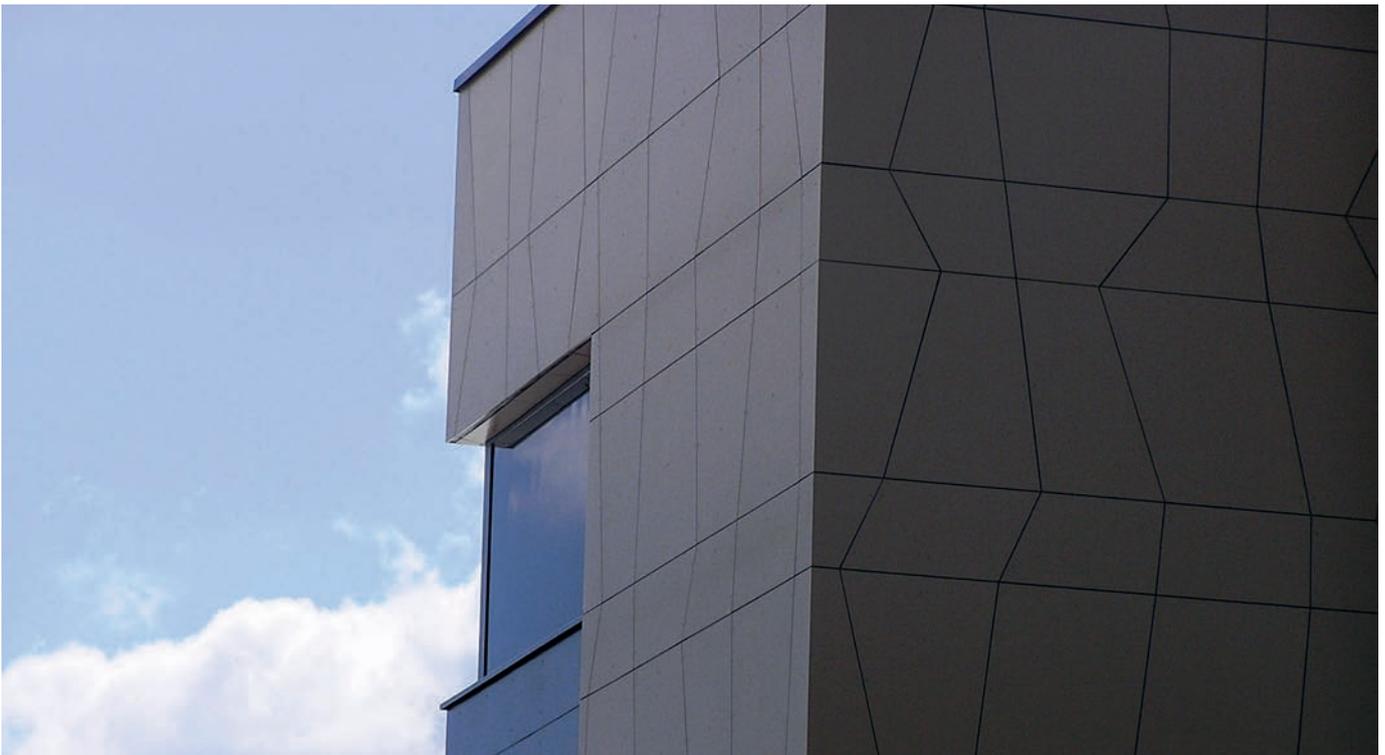
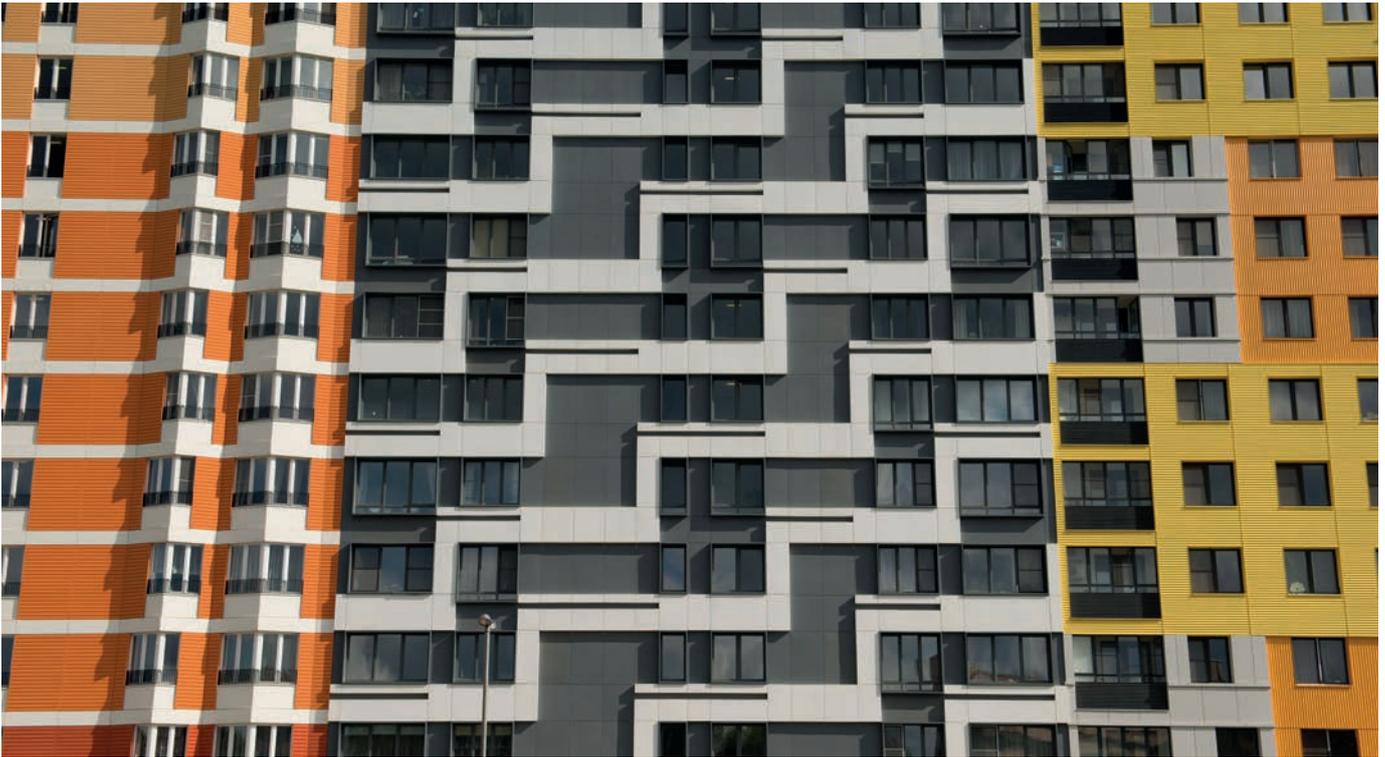
Terracotta



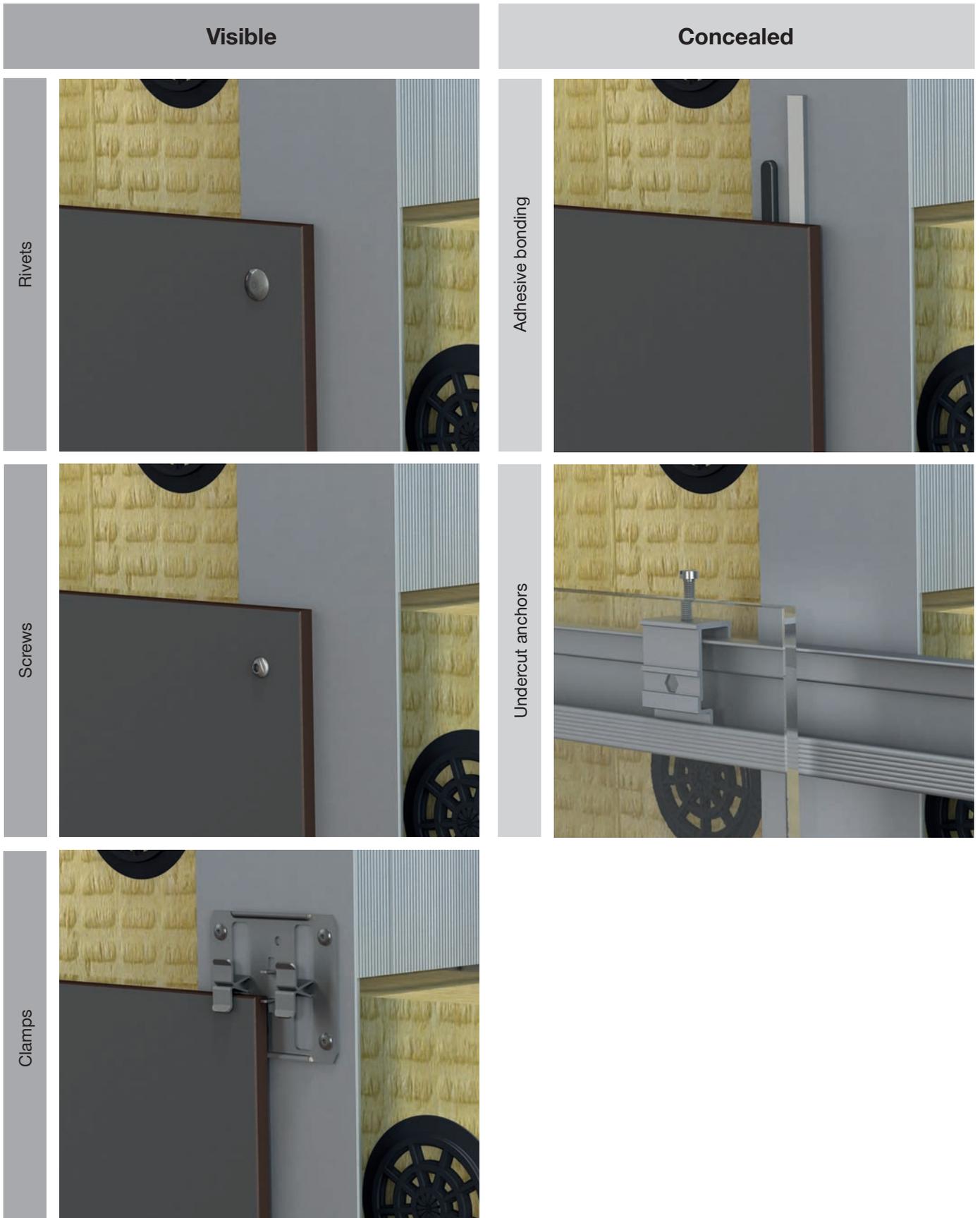
Stone



Composite



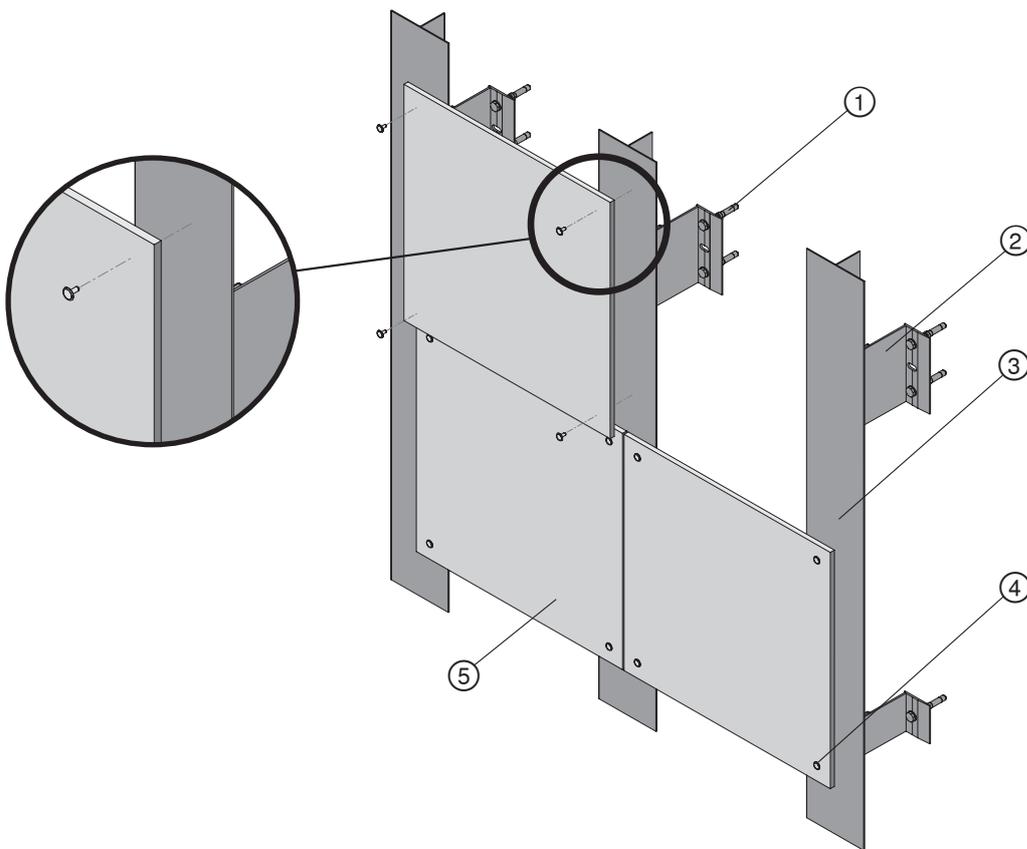
FIBER-CEMENT – PANEL FASTENING





Fiber-cement

FIBER-CEMENT – VISIBLE RIVETS



MFI-bracket



FOX H-bracket



FOX VT-bracket



FOX HT-bracket



S2S-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Rivet	Others
⑤	Fiber-cement panel	Others

Application



Application/system description

- | | |
|--|--|
| <ul style="list-style-type: none"> 1 MFT-MFI 1L adhesive-rivets-screws 2 MFT-FOX VT 1L adhesive-rivets-screws 3 MFT-S2S 1L adhesive-rivets-screws 4 MFT-FOX H 1L rivets-screws | <ul style="list-style-type: none"> 5 MFT-FOX H 2L adhesive-rivets-screws 6 MFT-FOX HT 1L-rivets-screws 7 MFT-FOX HT 2L adhesive-rivets-screws 8 MFT-MFI 2L-stulp |
|--|--|

Base material

Concrete,
masonry,
steel support,
timber

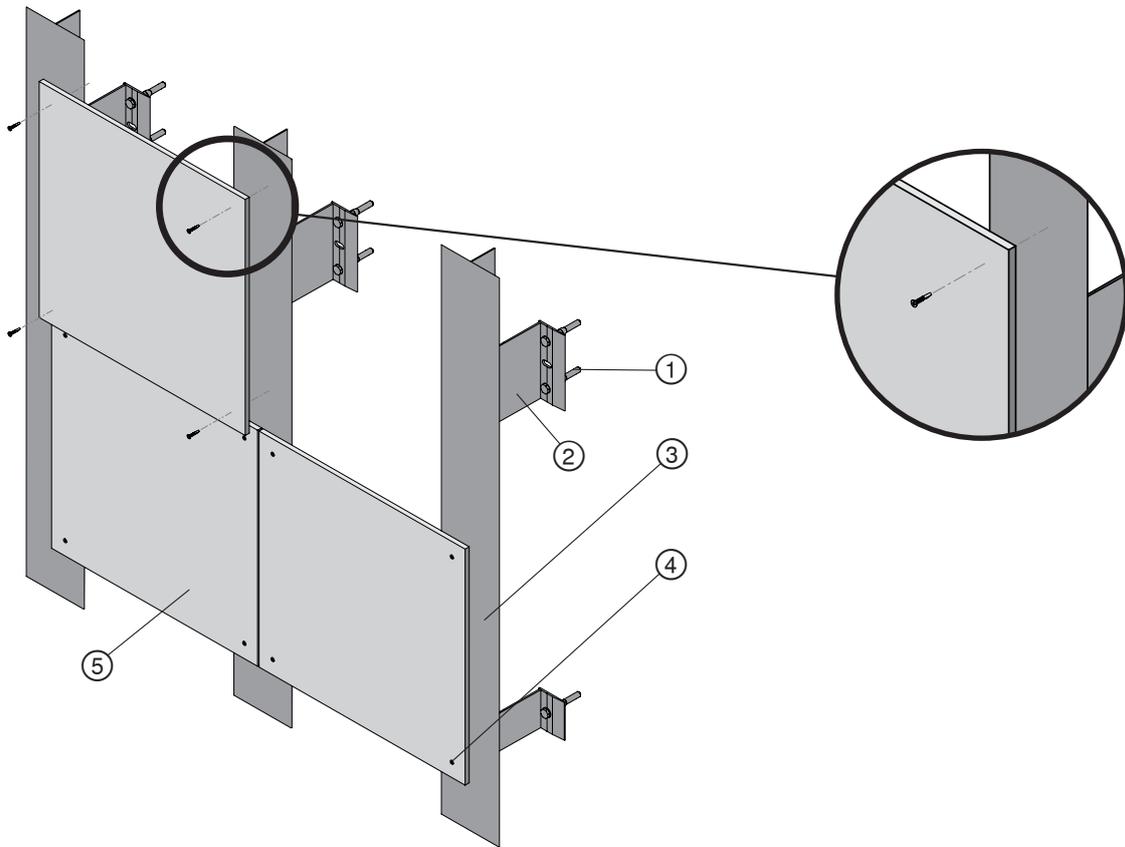
Product line

MFI System
FOX VT System
S2S System
FOX H System

FIBER-CEMENT – VISIBLE SCREWS



Fiber-cement



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Screw	Others
⑤	Fiber-cement panel	Others



MFI-bracket



FOX H-bracket



FOX VT-bracket



FOX HT-bracket



S2S-bracket

Application



Application/system description

- | | |
|--|--|
| 1 MFT-MFI 1L adhesive-rivets-screws | 5 MFT-FOX H 2L adhesive-rivets-screws |
| 2 MFT-FOX VT 1L adhesive-rivets-screws | 6 MFT-FOX HT 1L-rivets-screws |
| 3 MFT-S2S 1L adhesive-rivets-screws | 7 MFT-FOX HT 2L adhesive-rivets-screws |
| 4 MFT-FOX H 1L rivets-screws | 8 MFT-MFI 2L-stulp |

Base material

Concerte,
masonry,
steel support,
timber

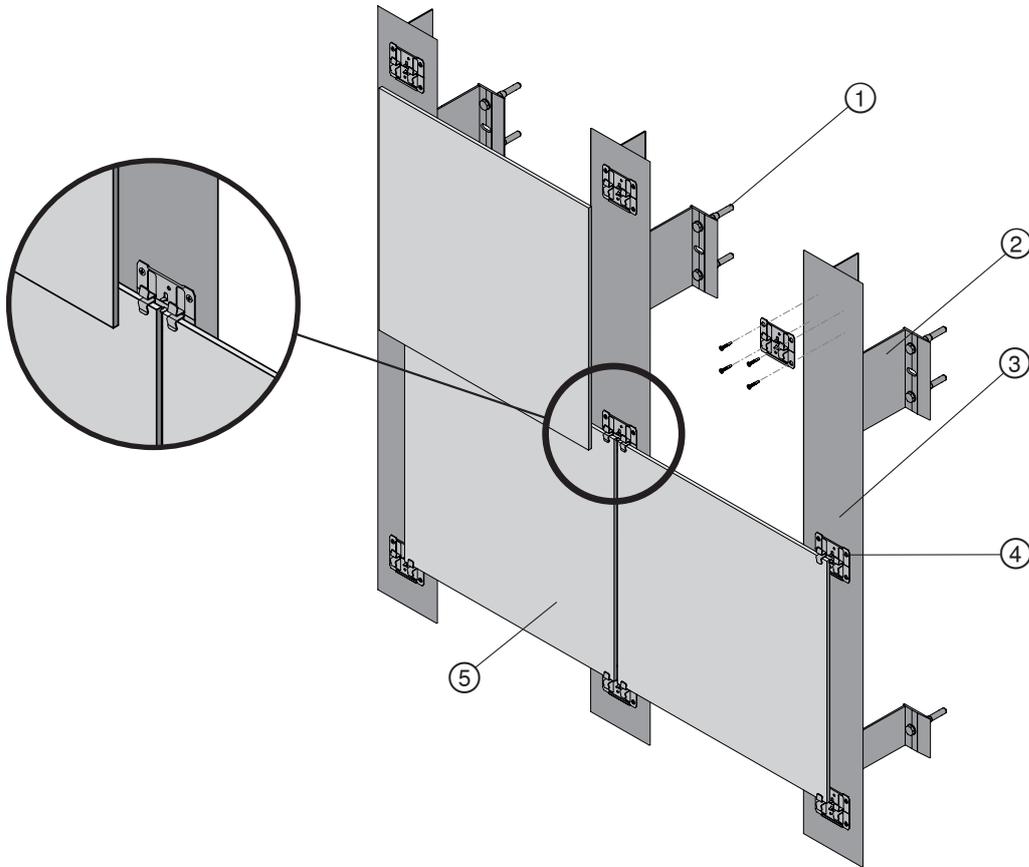
Product line

MFI System
FOX VT System
S2S System
FOX H System



Fiber-cement

FIBER-CEMENT – VISIBLE CLAMPS



MFI-bracket

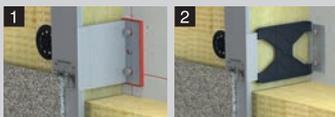


FOX VT-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Clamp	Hilti
⑤	Fiber-cement panel	Others

Application



Application/system description

- 1 MFT-MFI 1L clamps-stainless steel
- 2 MFT-FOX VT 1L clamps-stainless steel

Base material

Concrete,
masonry,
steel support,
timber

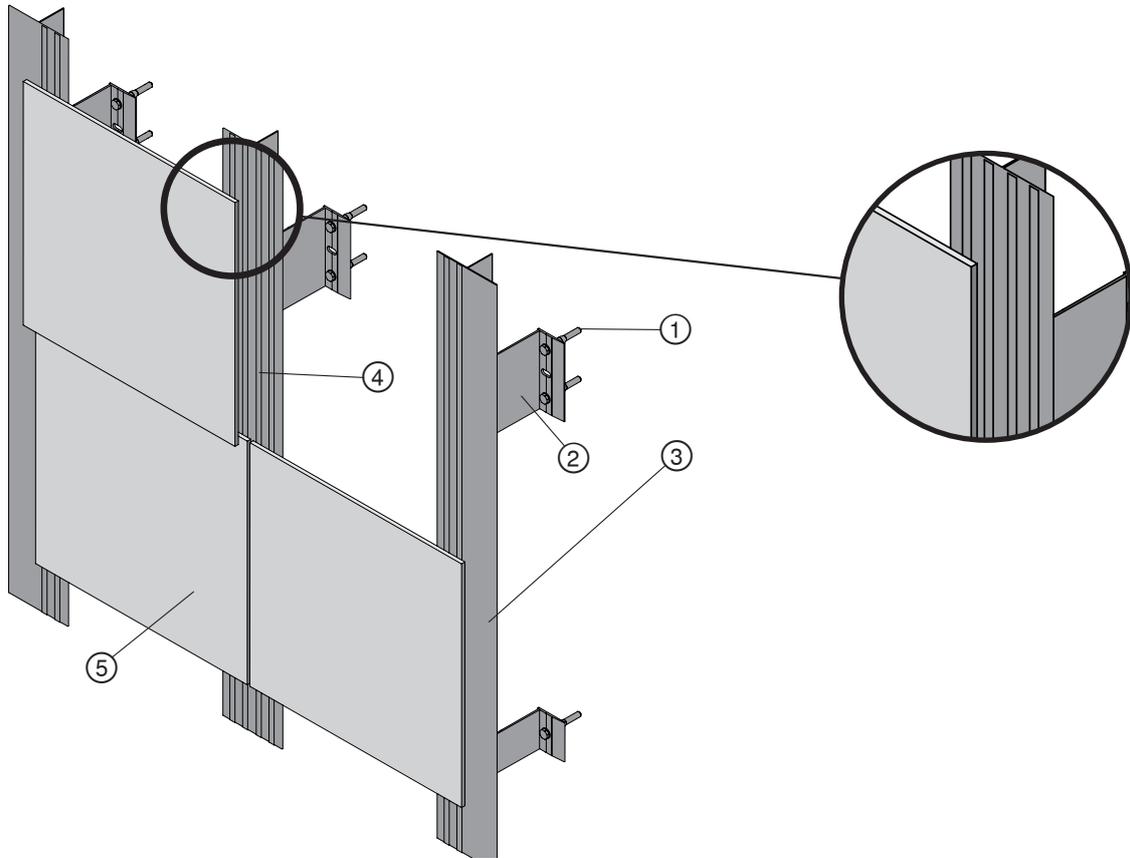
Product line

MFI System
FOX VT System
S2S System
FOX H System

FIBER-CEMENT – CONCEALED ADHESIVE BONDING

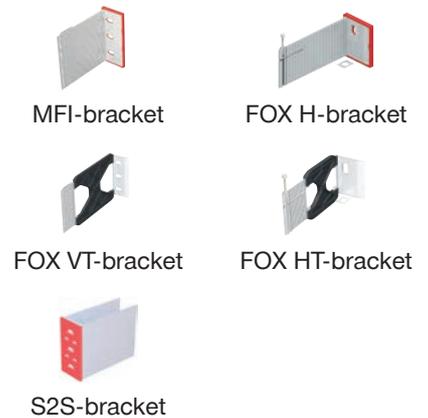


Fiber-cement



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Adhesive bonding material	Others
⑤	Fiber-cement panel	Others



Application



Application/system description

- 1 MFT-MFI 1L adhesive-rivets-screws
- 2 MFT-FOX VT 1L adhesive-rivets-screws
- 3 MFT-S2S 1L adhesive-rivets-screws
- 4 MFT-FOX H 1L adhesive rivets-screws
- 5 MFT-FOX H 2L adhesive-rivets-screws

Base material

Concrete,
masonry,
steel support,
timber

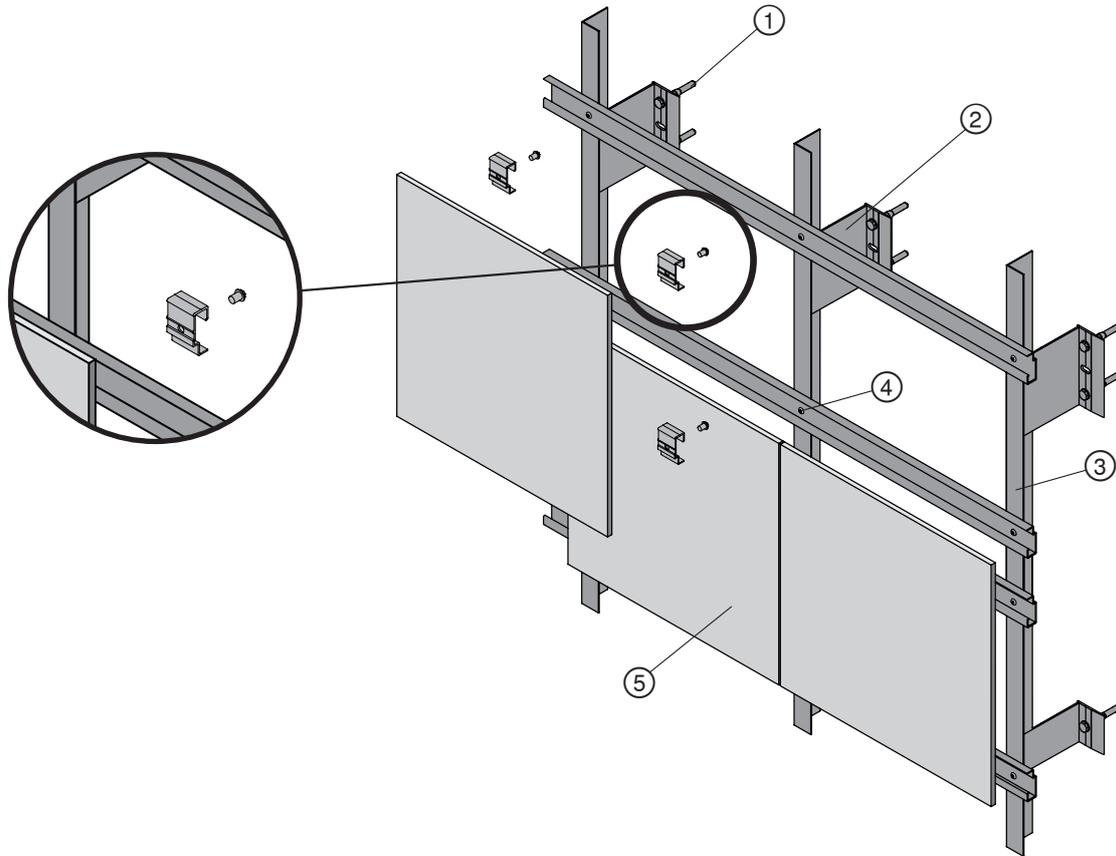
Product line

MFI System
FOX VT System
S2S System
FOX H System



Fiber-cement

FIBER-CEMENT – CONCEALED UNDERCUT ANCHORS



MFI-bracket



FOX VT-bracket



S2S-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Hanger and undercut anchor	Hilti
⑤	Fiber-cement panel	Others

Application



Application/system description

- 1 MFT-MFI 2L hanger-undercut-anchor
- 2 MFT-FOX VT 2L hanger-undercut-anchor
- 3 MFT-S2S 2L hanger-undercut-anchor

Base material

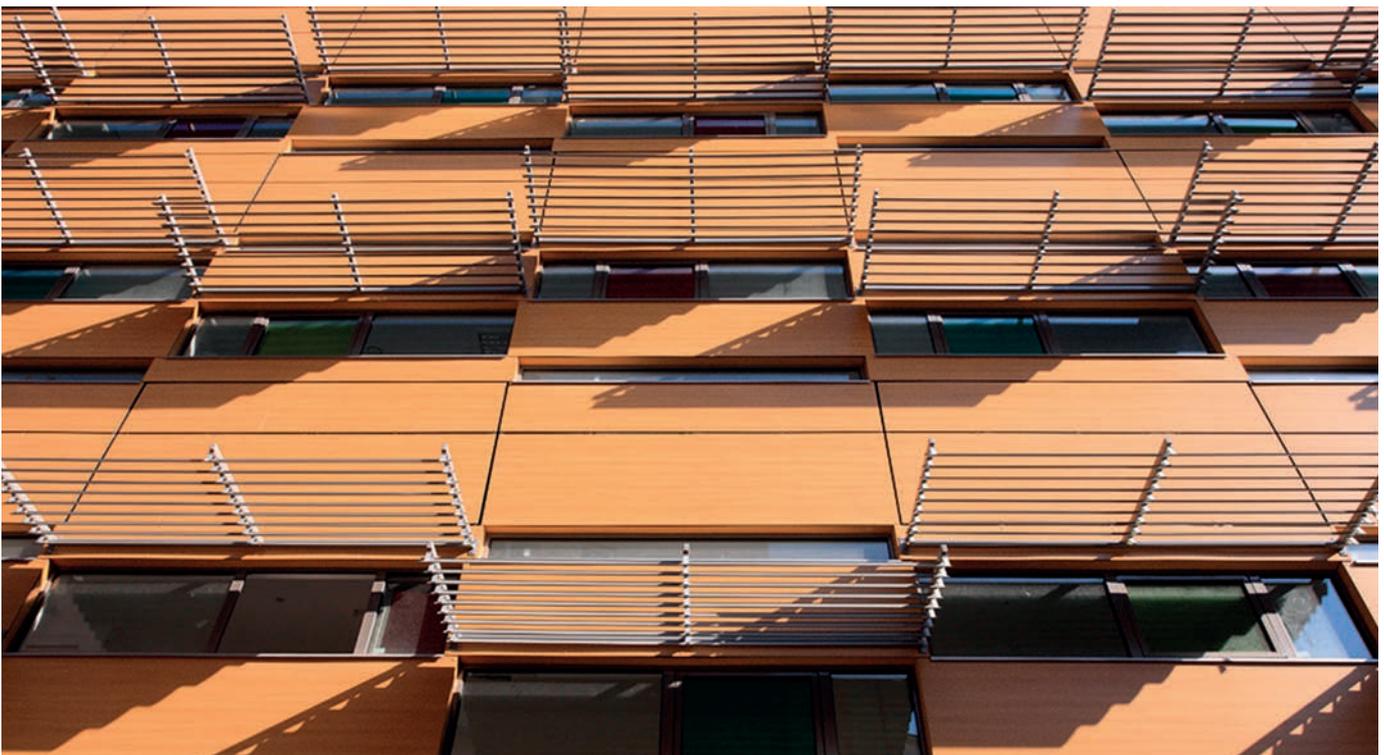
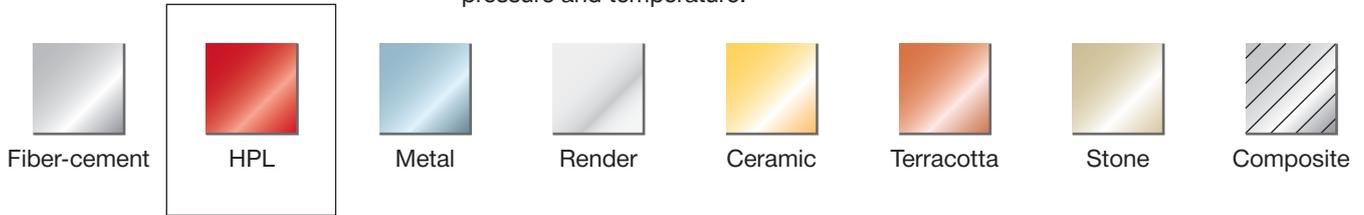
Concrete,
masonry,
steel support,
timber

Product line

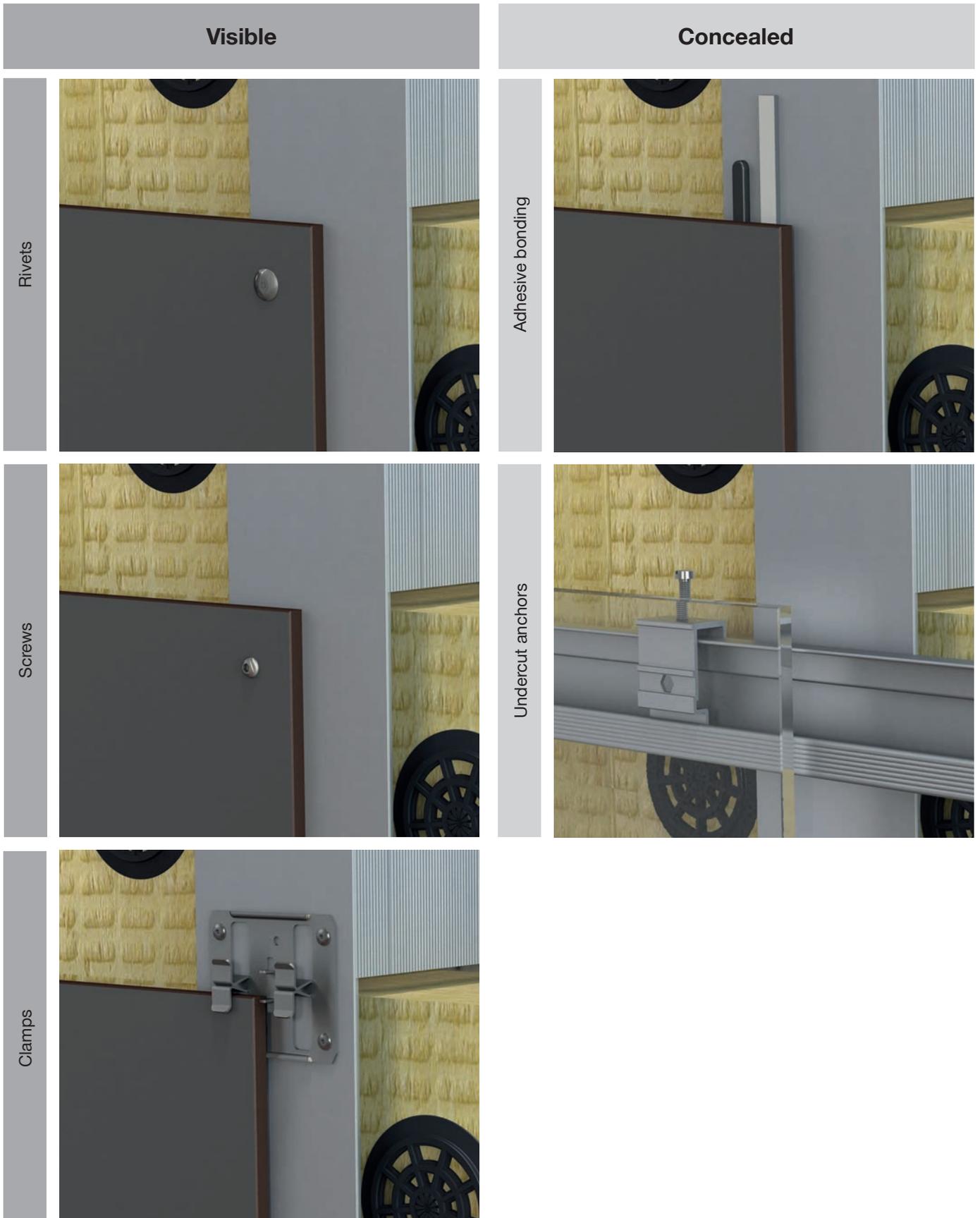
MFI System
FOX VT System
S2S System

HIGH-PRESSURE LAMINATE (HPL)

High-pressure laminate (HPL) is composed of resin, impregnated paper layers, a decorative paper layer and clear melamin overlay. These sheets are bonded at high pressure and temperature.



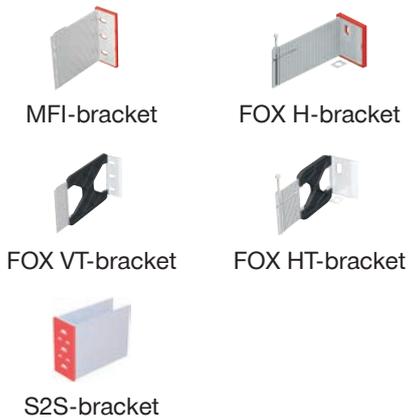
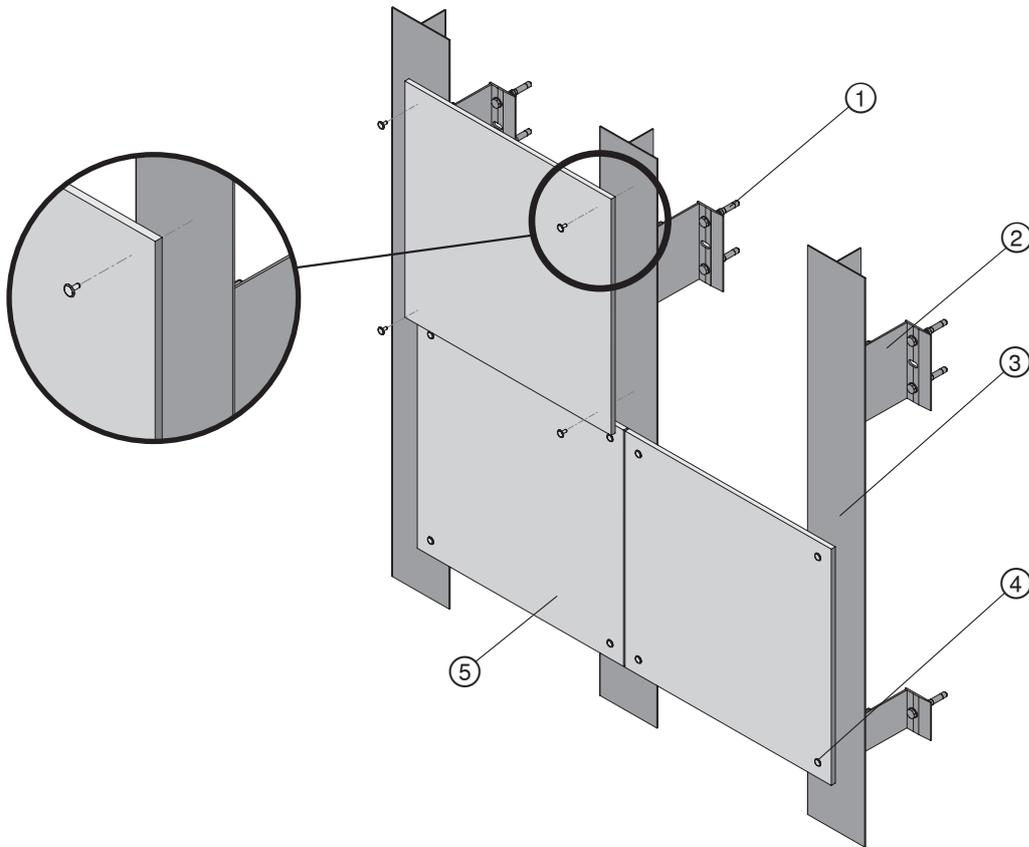
HIGH-PRESSURE LAMINATE (HPL) – PANEL FASTENING





HPL

HPL – VISIBLE RIVETS



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Rivet	Others
⑤	HPL panel	Others

Application



Application/system description

- | | |
|--|--|
| 1 MFT-MFI 1L adhesive-rivets-screws | 5 MFT-FOX H 2L adhesive-rivets-screws |
| 2 MFT-FOX VT 1L adhesive-rivets-screws | 6 MFT-FOX HT 1L-rivets-screws |
| 3 MFT-S2S 1L adhesive-rivets-screws | 7 MFT-FOX HT 2L adhesive-rivets-screws |
| 4 MFT-FOX H 1L rivets-screws | 8 MFT-MFI 2L-stulp |

Base material

Concrete,
masonry,
steel support,
timber

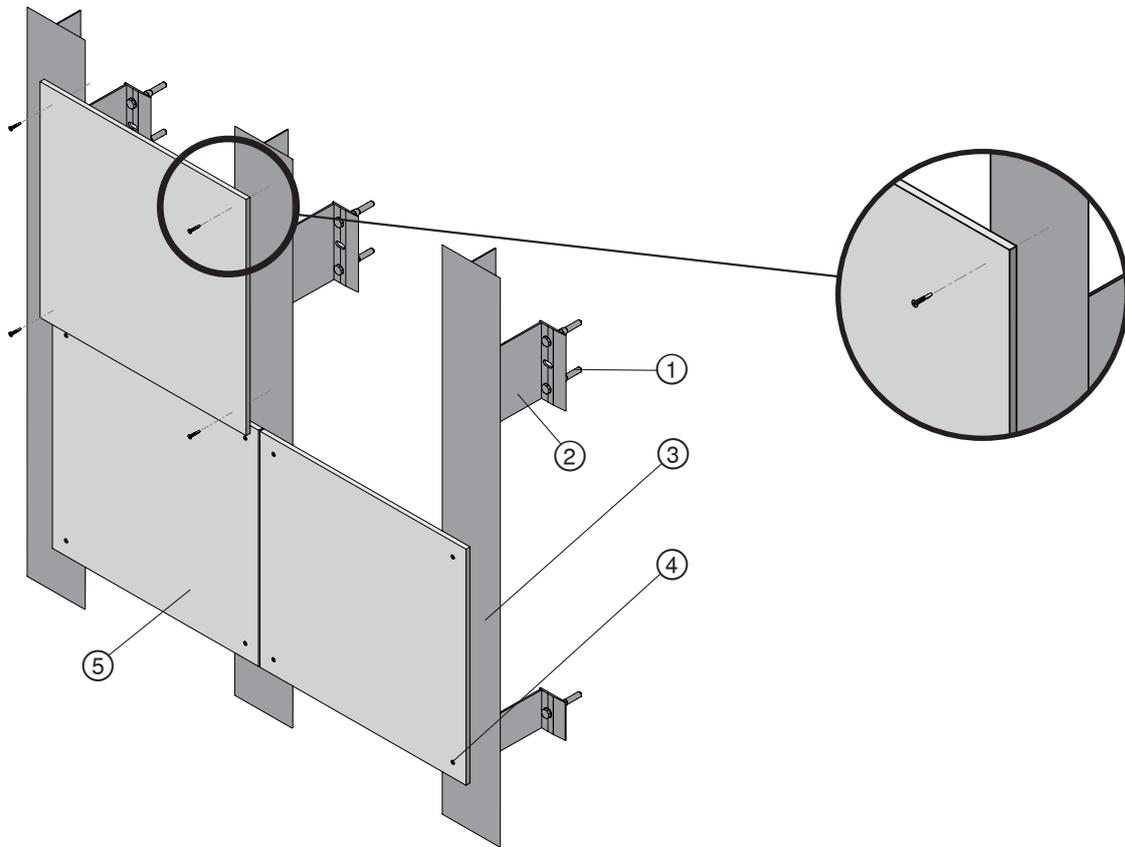
Product line

MFI System
FOX VT System
S2S System
FOX H System

HPL – VISIBLE SCREWS

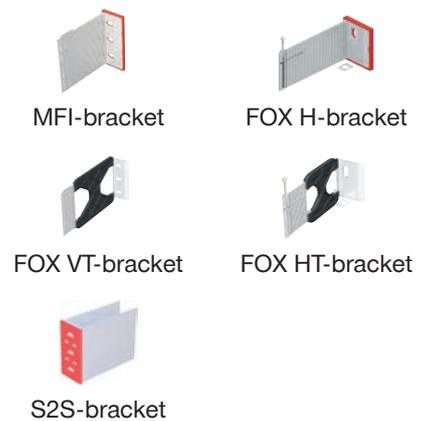


HPL



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Screw	Others
⑤	HPL panel	Others



Application



Application/system description

- | | |
|--|--|
| 1 MFT-MFI 1L adhesive-rivets-screws | 5 MFT-FOX H 2L adhesive-rivets-screws |
| 2 MFT-FOX VT 1L adhesive-rivets-screws | 6 MFT-FOX HT 1L-rivets-screws |
| 3 MFT-S2S 1L adhesive-rivets-screws | 7 MFT-FOX HT 2L adhesive-rivets-screws |
| 4 MFT-FOX H 1L rivets-screws | 8 MFT-MFI 2L-stulp |

Base material

Concerte,
masonry,
steel support,
timber

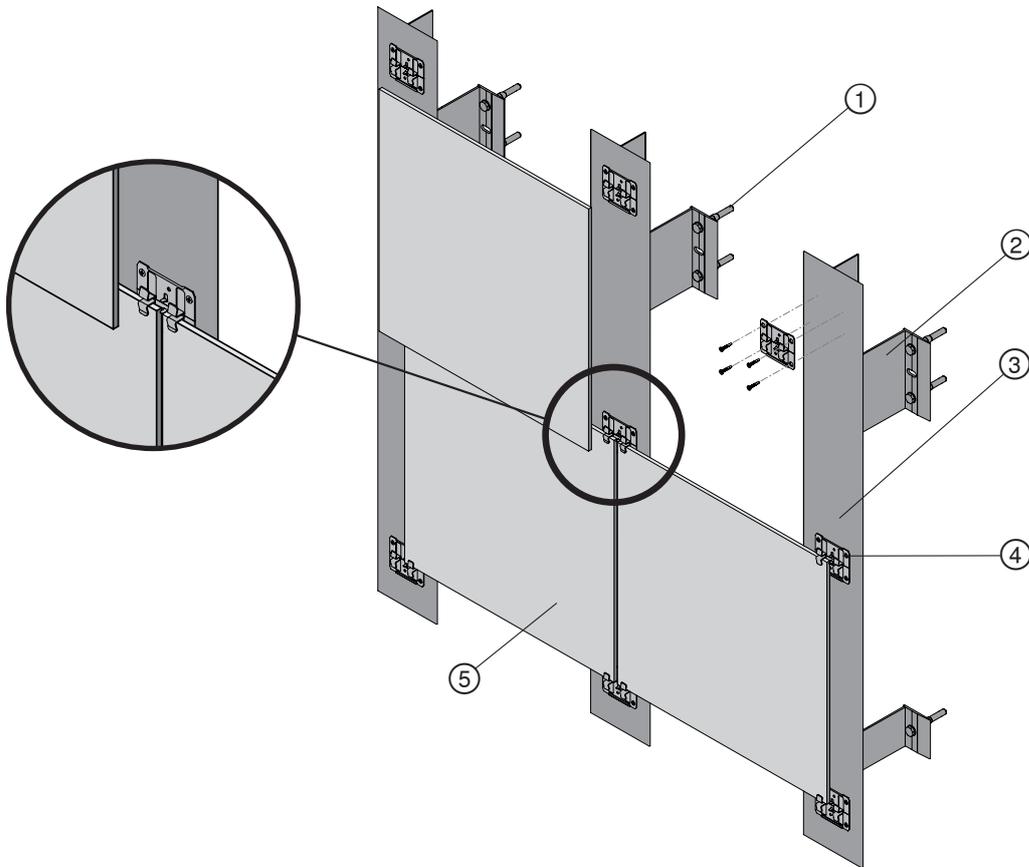
Product line

MFI System
FOX VT System
S2S System
FOX H System



HPL

HPL – VISIBLE CLAMPS



MFI-bracket

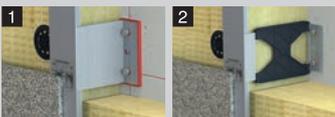


FOX VT-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Clamp	Hilti
⑤	HPL panel	Others

Application



Application/system description

- 1 MFT-MFI 1L clamps-stainless steel
- 2 MFT-FOX VT 1L clamps-stainless steel

Base material

Concrete,
masonry,
steel support,
timber

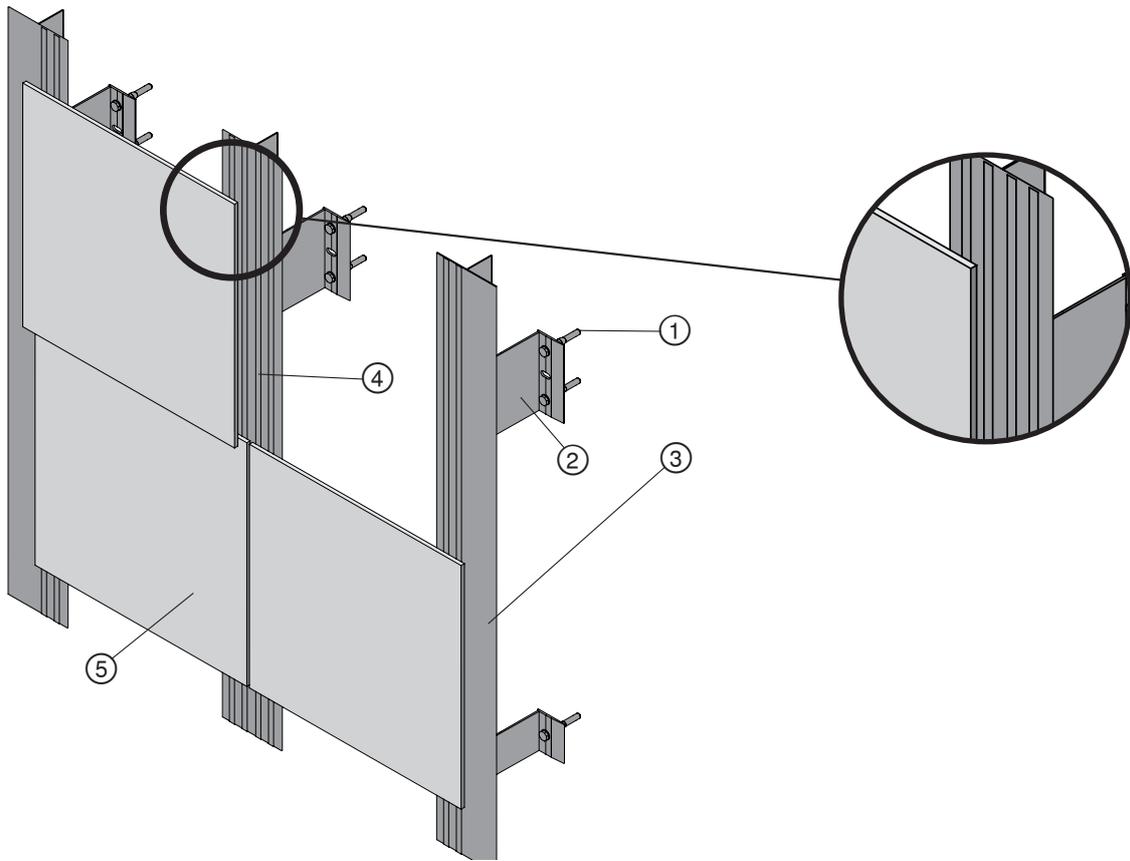
Product line

MFI System
FOX VT System
S2S System
FOX H System

HPL – CONCEALED ADHESIVE BONDING

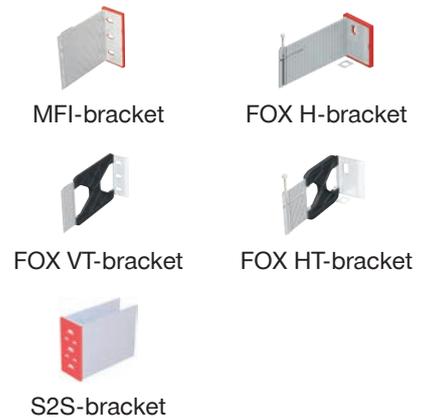


HPL



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Adhesive bonding material	Others
⑤	HPL panel	Others



Application



Application/system description

- ① MFT-MFI 1L adhesive-rivets-screws
- ② MFT-FOX VT 1L adhesive-rivets-screws
- ③ MFT-S2S 1L adhesive-rivets-screws
- ④ MFT-FOX H 2L adhesive rivets-screws
- ⑤ MFT-FOX H 2L adhesive-rivets-screws

Base material

Concrete,
masonry,
steel support,
timber

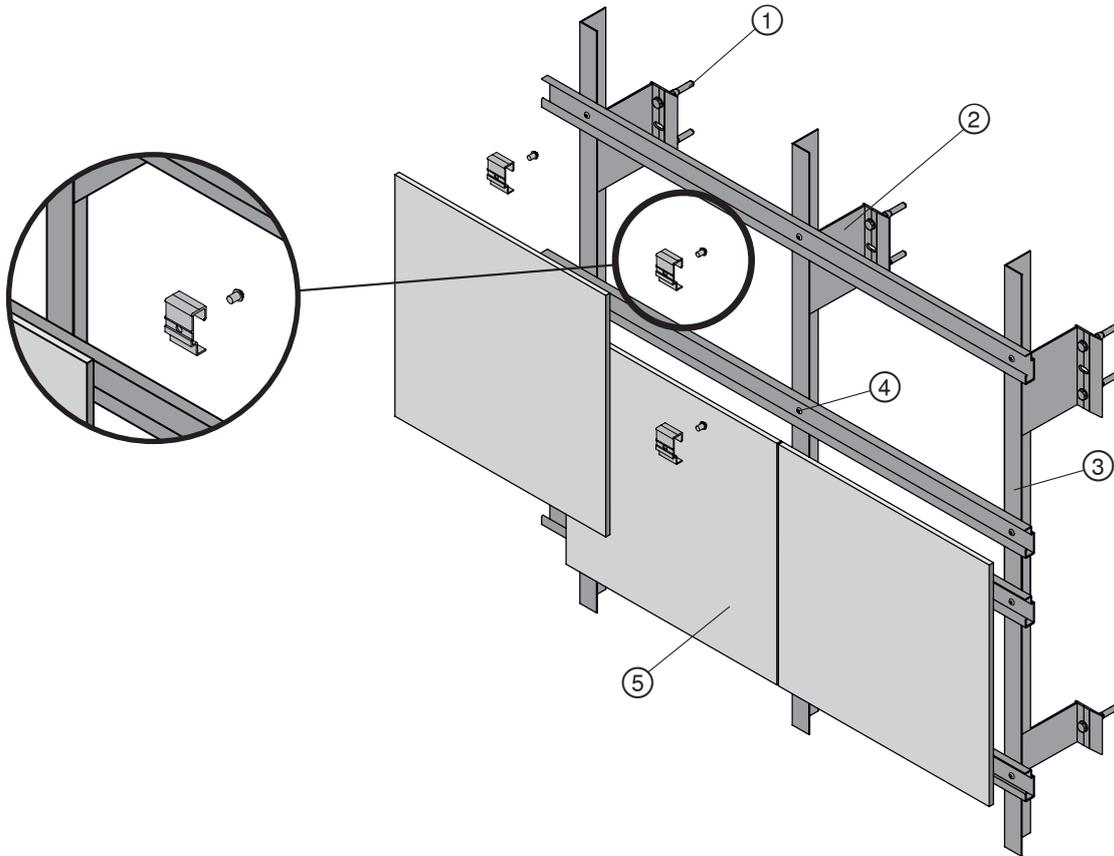
Product line

MFI System
FOX VT System
S2S System
FOX H System



HPL

HPL – CONCEALED UNDERCUT ANCHORS



MFI-bracket



FOX VT-bracket



S2S-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Hanger and undercut anchor	Hilti
⑤	HPL panel	Others

Application



Application/system description

- 1 MFT-MFI 1L adhesive-rivets-screws
- 2 MFT-FOX VT 1L adhesive-rivets-screws
- 3 MFT-S2S 2L hanger-undercut-anchor
- 4 MFT-FOX H 2L rivets-screws
- 5 MFT-FOX HT 2L adhesive-rivets-screws

Base material

Concrete,
masonry,
steel support,
timber

Product line

MFI System
FOX VT System
S2S System
FOX H System

METAL CLADDING MATERIAL

The metal cladding material can be aluminum, stainless steel, copper or steel. These cladding materials are typically fabricated from thin metal sheets.



METAL CLADDING MATERIAL – PANEL FASTENING

Visible

Rivets



Screws



Concealed

Bolt system



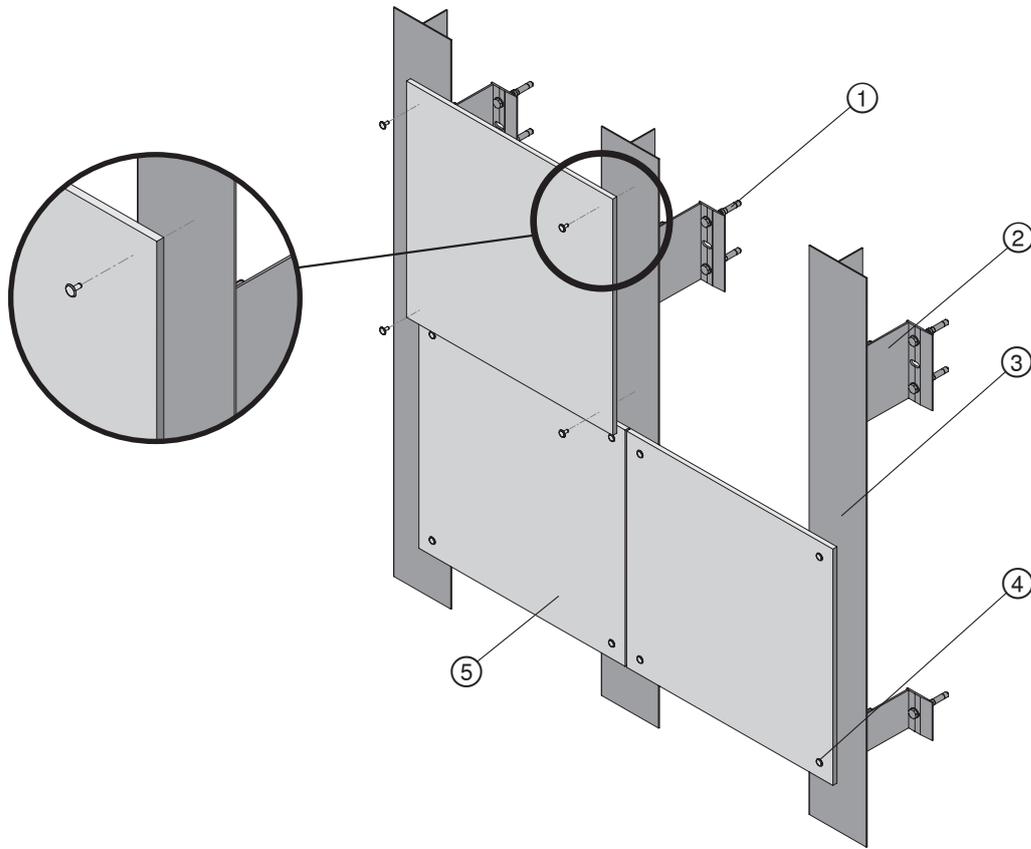
SZ 20 system





Metal

METAL CLADDING MATERIAL - VISIBLE RIVETS



MFI-bracket



FOX H-bracket



FOX VT-bracket



FOX HT-bracket



S2S-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Rivet	Others
⑤	Metal sheet	Others

Application



Application/system description

- | | |
|--|--|
| 1 MFT-MFI 1L adhesive-rivets-screws | 5 MFT-FOX H 2L adhesive-rivets-screws |
| 2 MFT-FOX VT 1L adhesive-rivets-screws | 6 MFT-FOX HT 1L-rivets-screws |
| 3 MFT-S2S 1L adhesive-rivets-screws | 7 MFT-FOX HT 2L adhesive-rivets-screws |
| 4 MFT-FOX H 1L rivets-screws | 8 MFT-MFI 2L-stulp |

Base material

Concrete,
masonry,
steel support,
timber

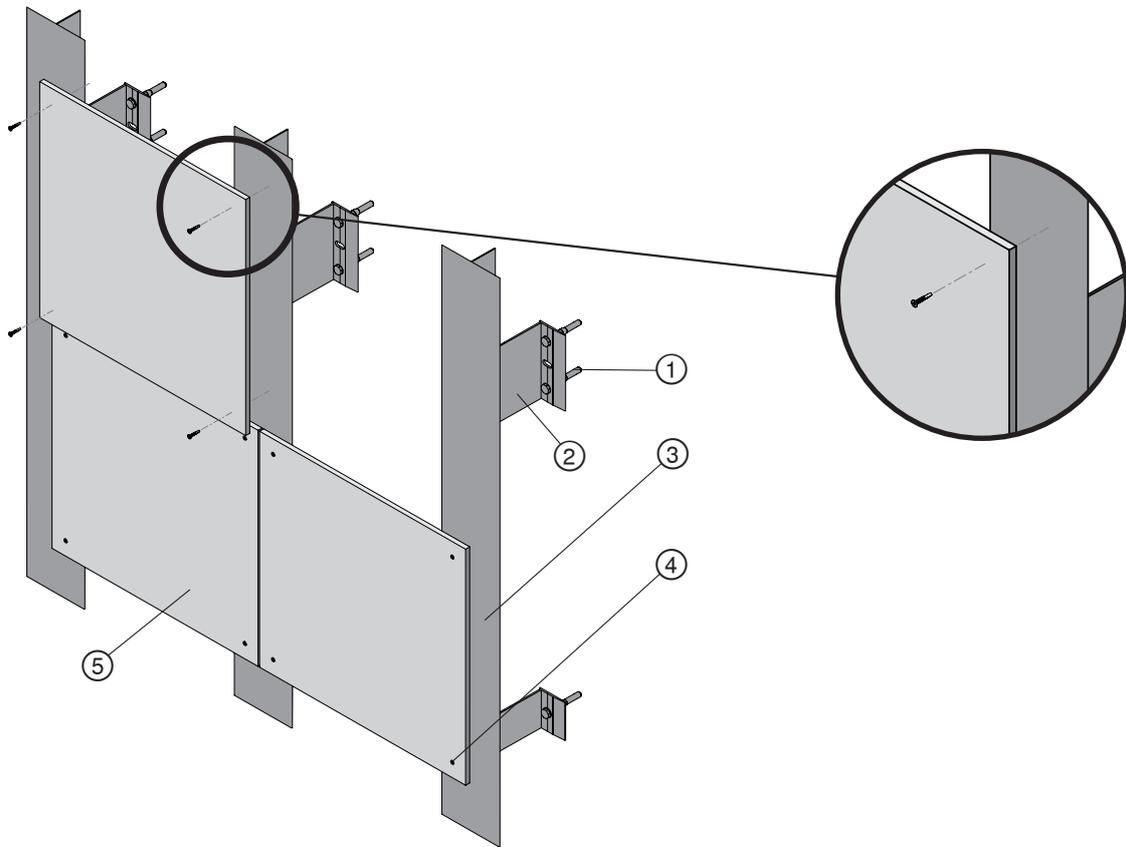
Product line

MFI System
FOX VT System
S2S System
FOX H System

METAL CLADDING MATERIAL – VISIBLE SCREWS

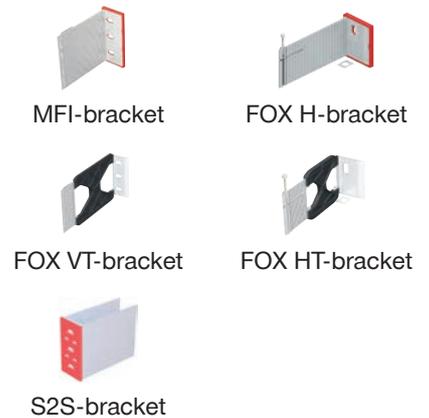


Metal



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Screw	Others
⑤	Metal sheet	Others



Application



Application/system description

- | | |
|--|--|
| 1 MFT-MFI 1L adhesive-rivets-screws | 5 MFT-FOX H 2L adhesive-rivets-screws |
| 2 MFT-FOX VT 1L adhesive-rivets-screws | 6 MFT-FOX HT 1L-rivets-screws |
| 3 MFT-S2S 1L adhesive-rivets-screws | 7 MFT-FOX HT 2L adhesive-rivets-screws |
| 4 MFT-FOX H 1L rivets-screws | 8 MFT-MFI 2L-stulp |

Base material

Concerte,
masonry,
steel support,
timber

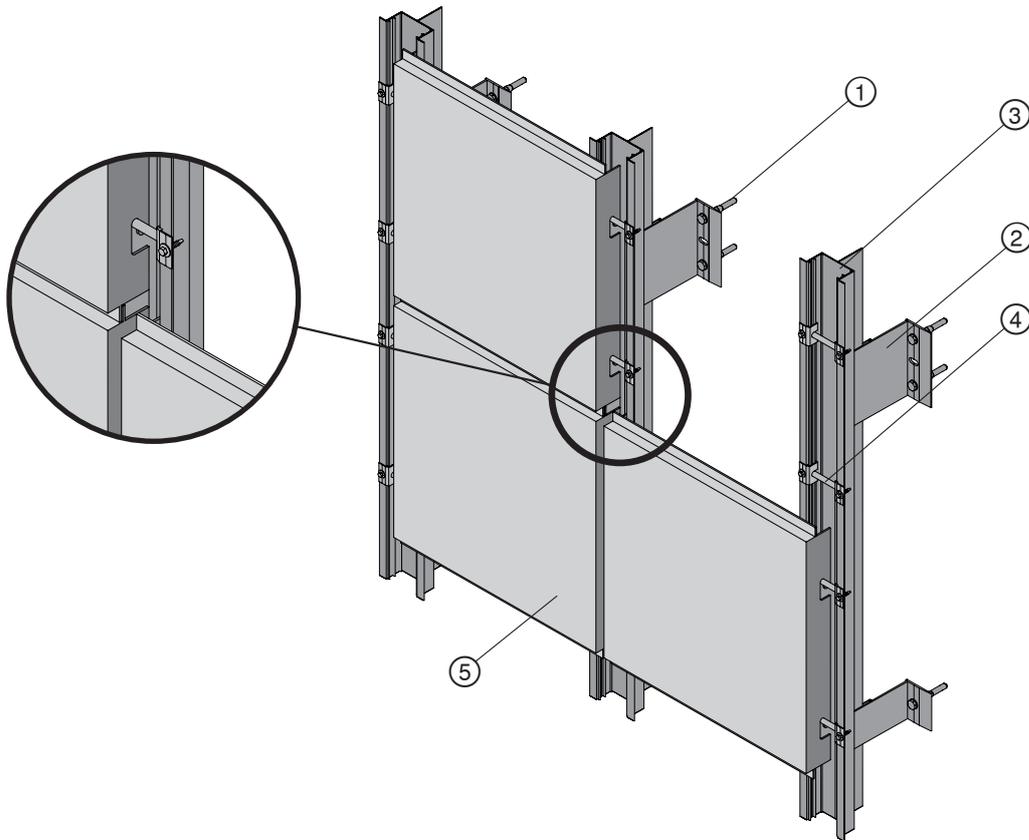
Product line

MFI System
FOX VT System
S2S System
FOX H System



Metal

METAL CLADDING MATERIAL - CONCEALED BOLT SYSTEM



MFI-bracket

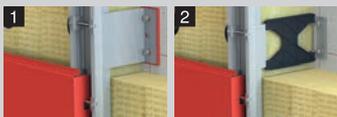


FOX VT-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Bolt system	Hilti
⑤	Metal sheet	Others

Application



Application/system description

- 1 MFT-MFI 1L bolts
- 2 MFT-FOX VT 1L bolts

Base material

Concrete,
masonry,
steel support,
timber

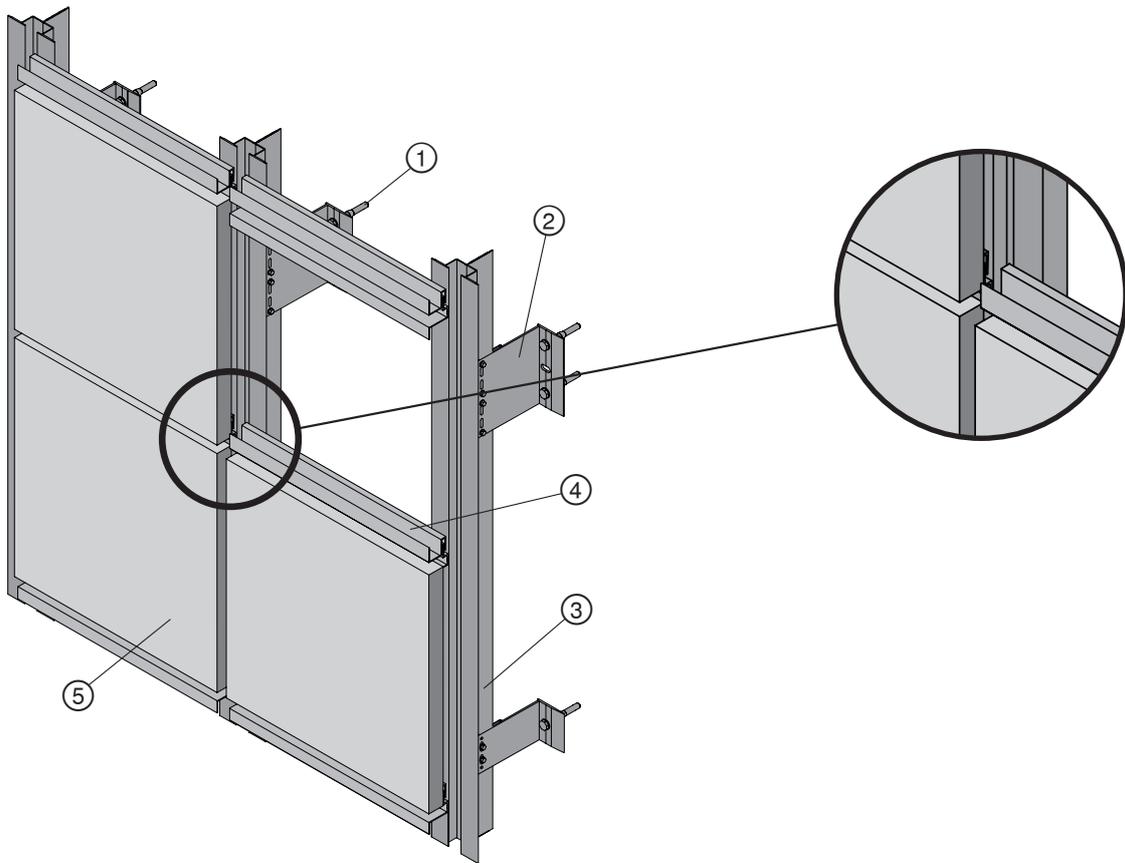
Product line

MFI System
FOX VT System

METAL CLADDING MATERIAL – CONCEALED SZ20 SYSTEM



Metal



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	SZ20 system	Hilti
⑤	Metal sheet	Others



MFI-bracket



FOX VT-bracket

Application



Application/system description

- 1 MFT-MFI 2L SZ20 system
- 2 MFT-FOX VT 2L SZ20 system

Base material

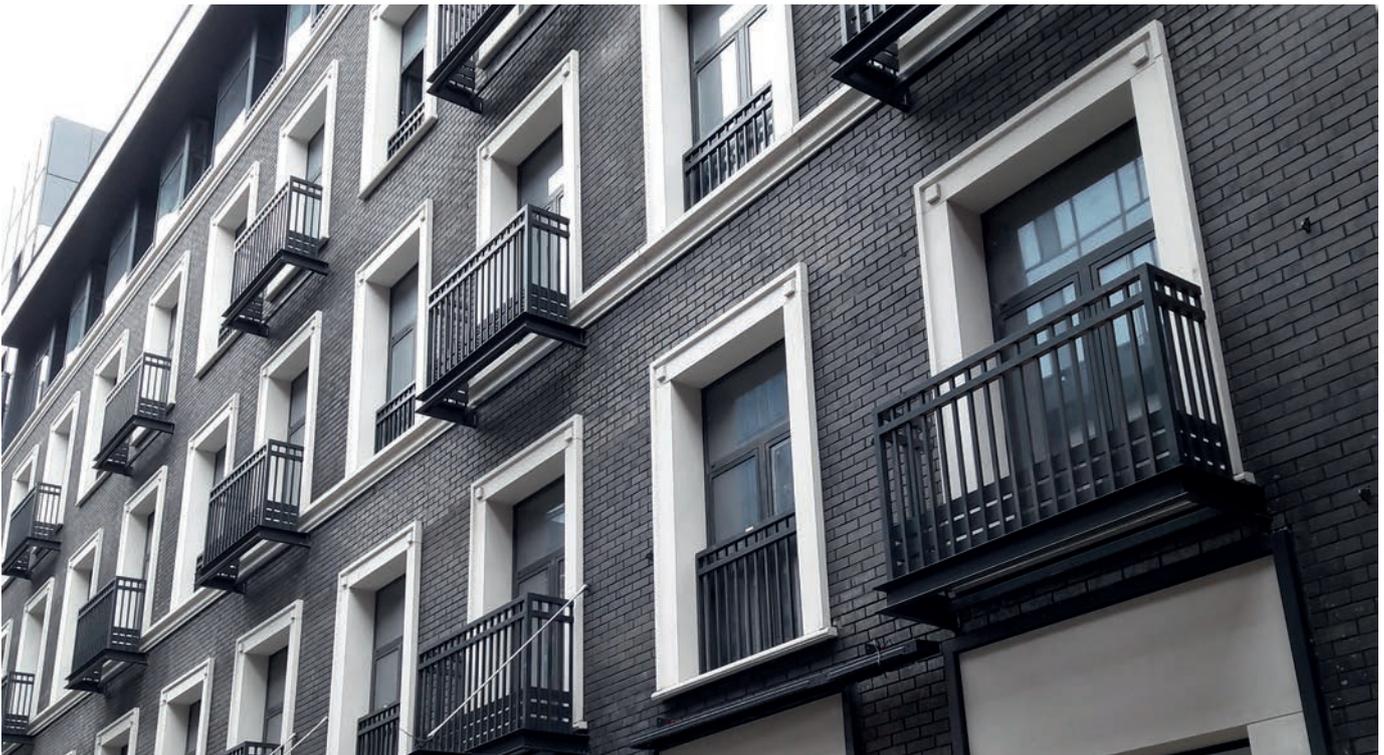
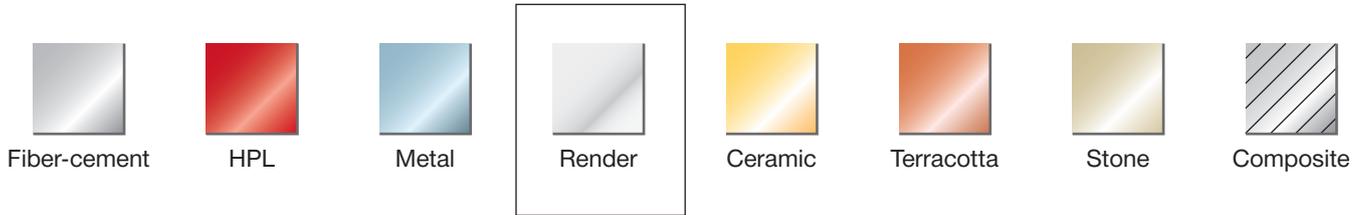
Concrete,
masonry,
steel support,
timber

Product line

MFI System
FOX VT System

RENDER

The base for the cladding material is a cement board. After the cement board is installed a layer of **render** is applied.



RENDER – PANEL FASTENING

Concealed

Rivets



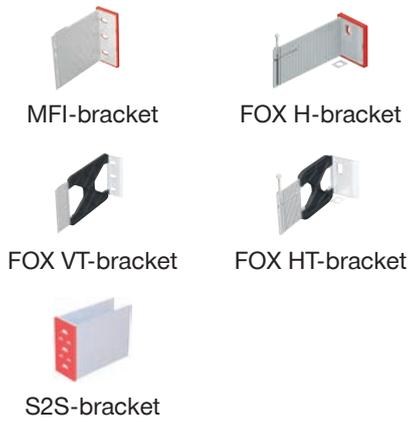
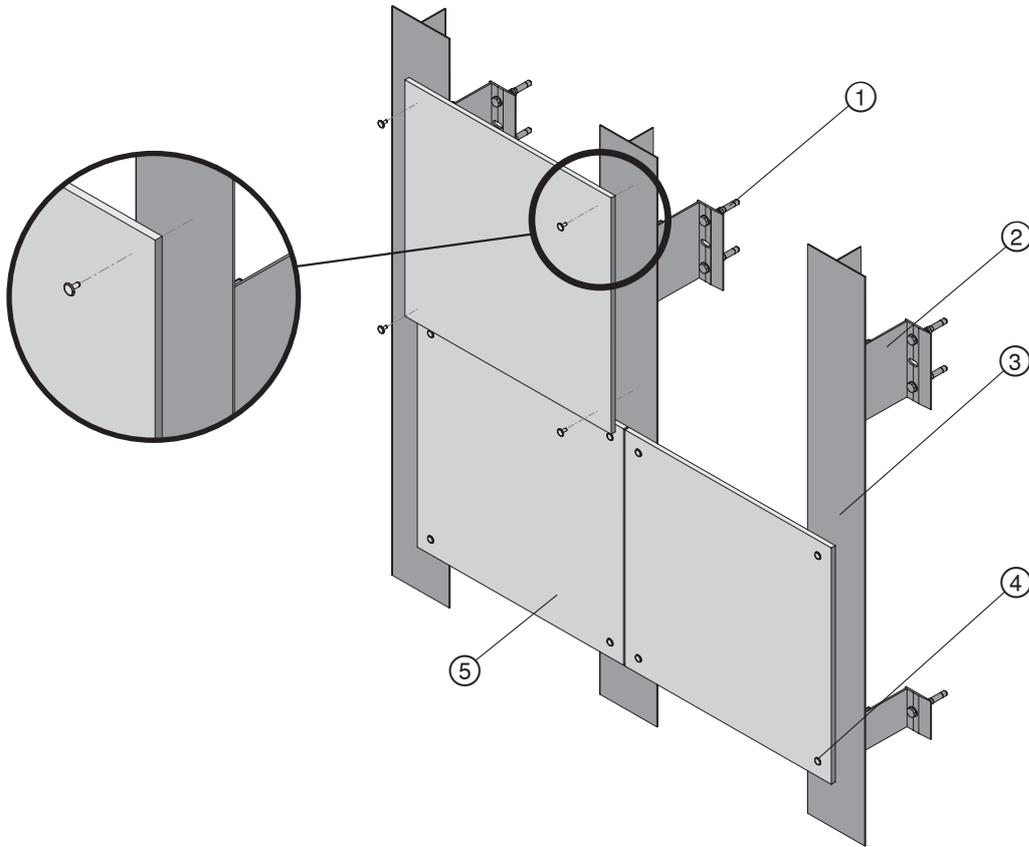
Screws





Render

RENDER – CONCEALED RIVETS



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Rivet	Others
⑤	Render panel	Others

Application



Application/system description

- 1** MFT-MFI 1L adhesive-rivets-screws
- 2** MFT-FOX VT 1L adhesive-rivets-screws
- 3** MFT-S2S 1L adhesive-rivets-screws
- 4** MFT-FOX H 1L rivets-screws
- 5** MFT-FOX H 2L adhesive-rivets-screws
- 6** MFT-FOX HT 1L-rivets-screws
- 7** MFT-FOX HT 2L adhesive-rivets-screws

Base material

Concrete,
masonry,
steel support,
timber

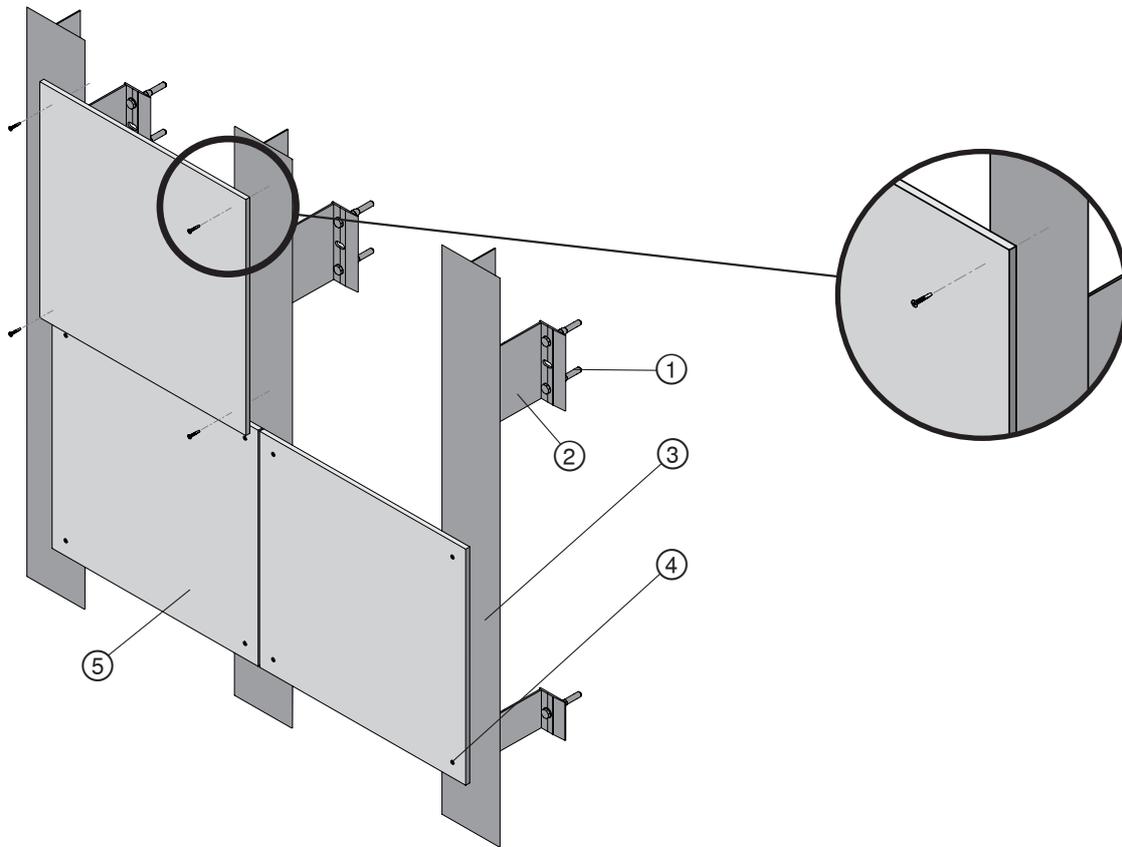
Product line

MFI System
FOX VT System
S2S System
FOX H System

RENDER – CONCEALED SCREWS



Render



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Screw	Hilti
⑤	Render panel	Others



MFI-bracket



FOX H-bracket



FOX VT-bracket



FOX HT-bracket



S2S-bracket

Application



Application/system description

- | | |
|--|--|
| 1 MFT-MFI 1L adhesive-rivets-screws | 5 MFT-FOX H 2L adhesive-rivets-screws |
| 2 MFT-FOX VT 1L adhesive-rivets-screws | 6 MFT-FOX HT 1L-rivets-screws |
| 3 MFT-S2S 1L adhesive-rivets-screws | 7 MFT-FOX HT 2L adhesive-rivets-screws |
| 4 MFT-FOX H 1L rivets-screws | |

Base material

Concerte,
masonry,
steel support,
timber

Product line

MFI System
FOX VT System
S2S System
FOX H System

CERAMIC

Ceramics are composed of natural materials such as quartz, clay, granite and ceramic pigments.



Fiber-cement



HPL



Metal



Render



Ceramic



Terracotta



Stone



Composite

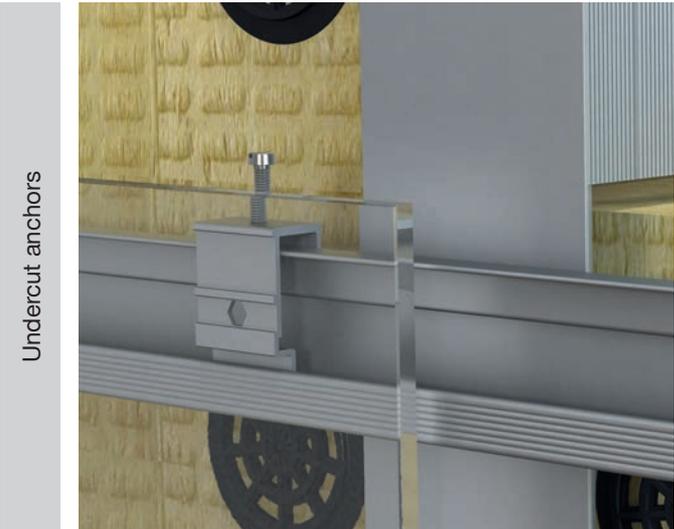


CERAMIC – PANEL FASTENING

Visible



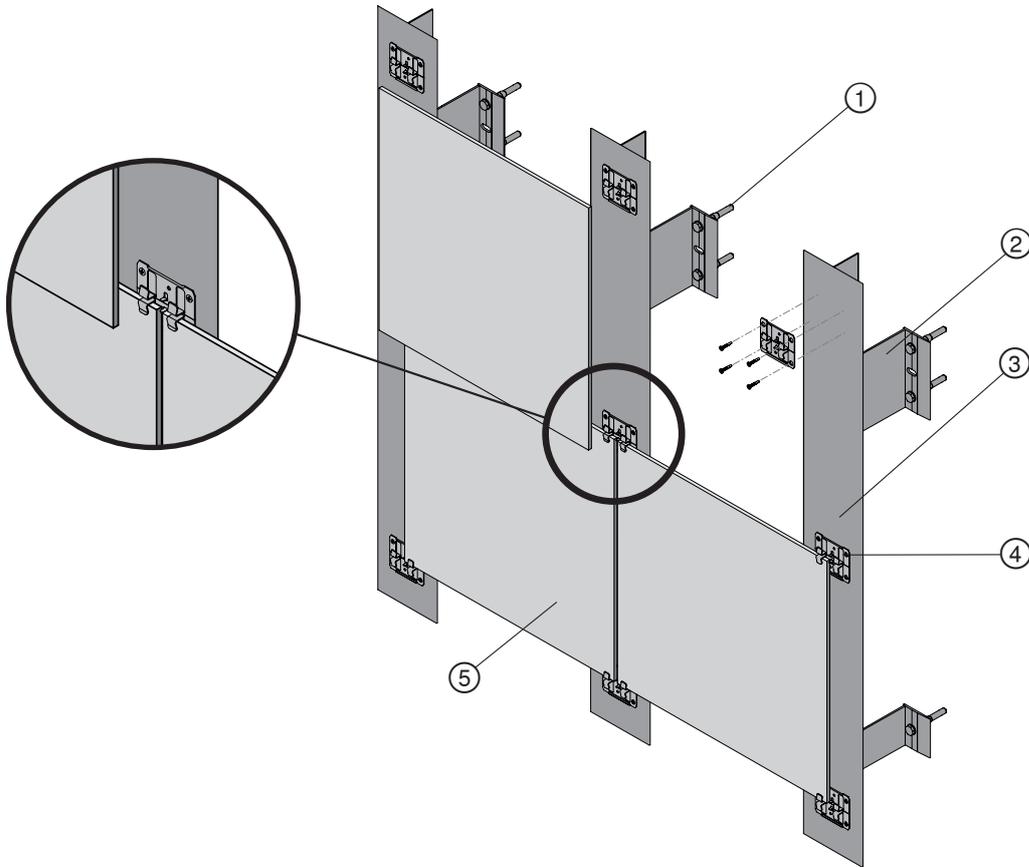
Concealed





Ceramic

CERAMIC – VISIBLE CLAMPS



MFI-bracket

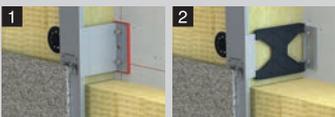


FOX VT-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Clamp	Hilti
⑤	Ceramic panel	Others

Application



Application/system description

- 1 MFT-MFI 1L clamps-stainless steel
- 2 MFT-FOX VT 1L clamps-stainless steel

Base material

Concrete,
masonry,
steel support,
timber

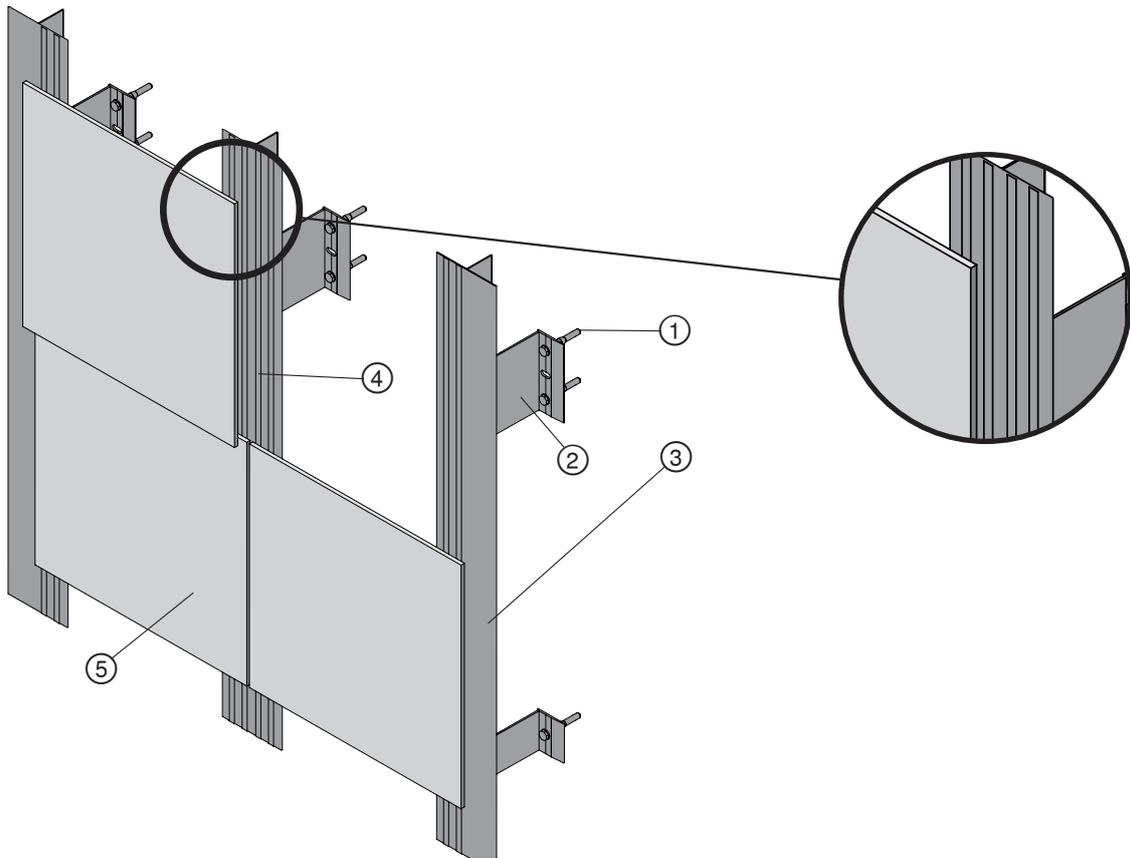
Product line

MFI System
FOX VT System

CERAMIC – CONCEALED ADHESIVE BONDING

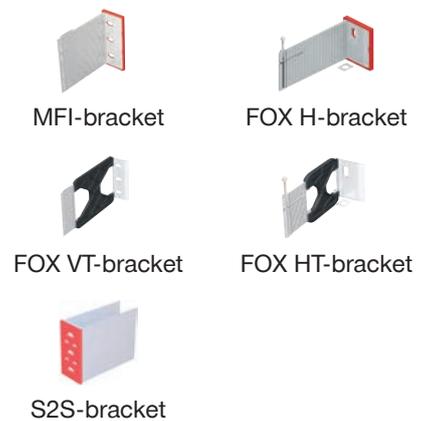


Ceramic



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Adhesive bonding material	Others
⑤	Ceramic panel	Others



Application



Application/system description

- ① MFT-MFI 1L adhesive-rivets-screws
- ② MFT-FOX VT 1L adhesive-rivets-screws
- ③ MFT-S2S 1L adhesive-rivets-screws
- ④ MFT-FOX H 2L adhesive rivets-screws
- ⑤ MFT-FOX HT 2L adhesive-rivets-screws

Base material

Concerte,
masonry,
steel support,
timber

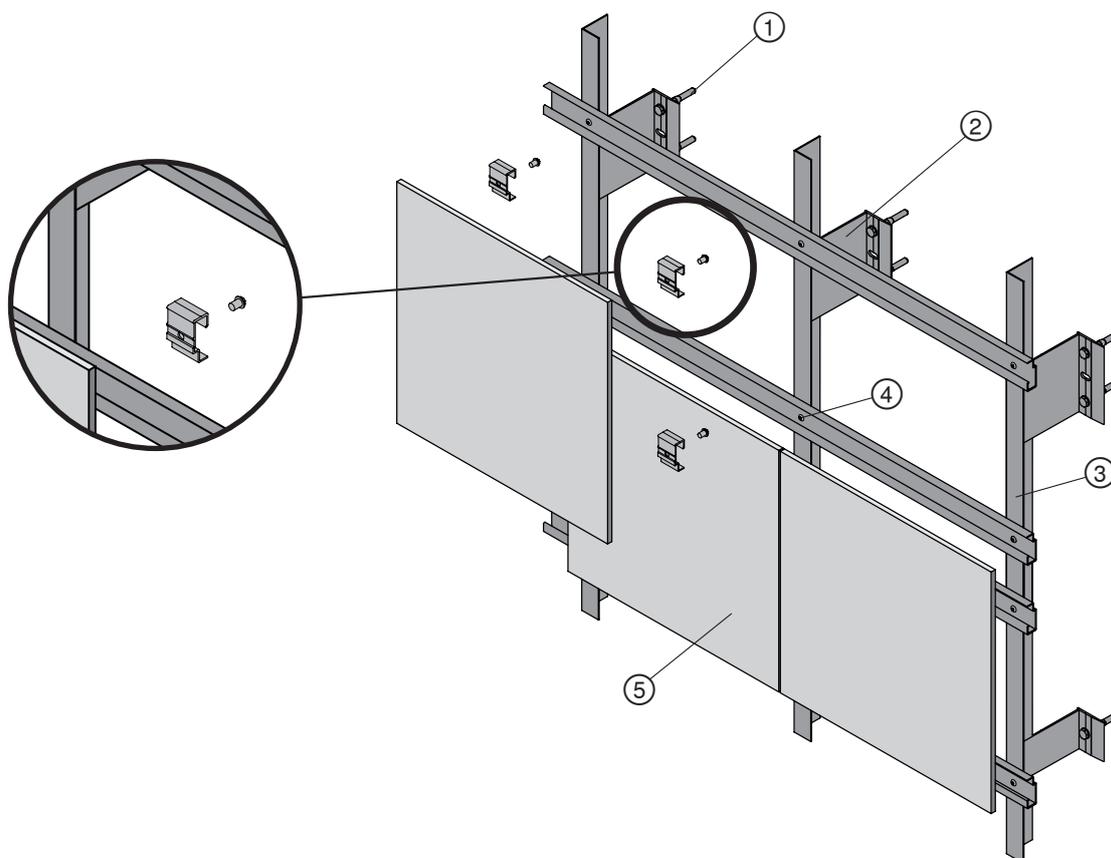
Product line

MFI System
FOX VT System
S2S System
FOX H System



Ceramic

CERAMIC – CONCEALED UNDERCUT ANCHORS



MFI-bracket



FOX VT-bracket



S2S-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Hanger and undercut anchor	Hilti
⑤	Ceramic panel	Others

Application



Application/system description

- 1 MFT-MFI 2L hanger-undercut-anchor
- 2 MFT-FOX VT 2L hanger-undercut-anchor
- 3 MFT-S2S 2L hanger-undercut-anchor

Base material

Concrete,
masonry,
steel support,
timber

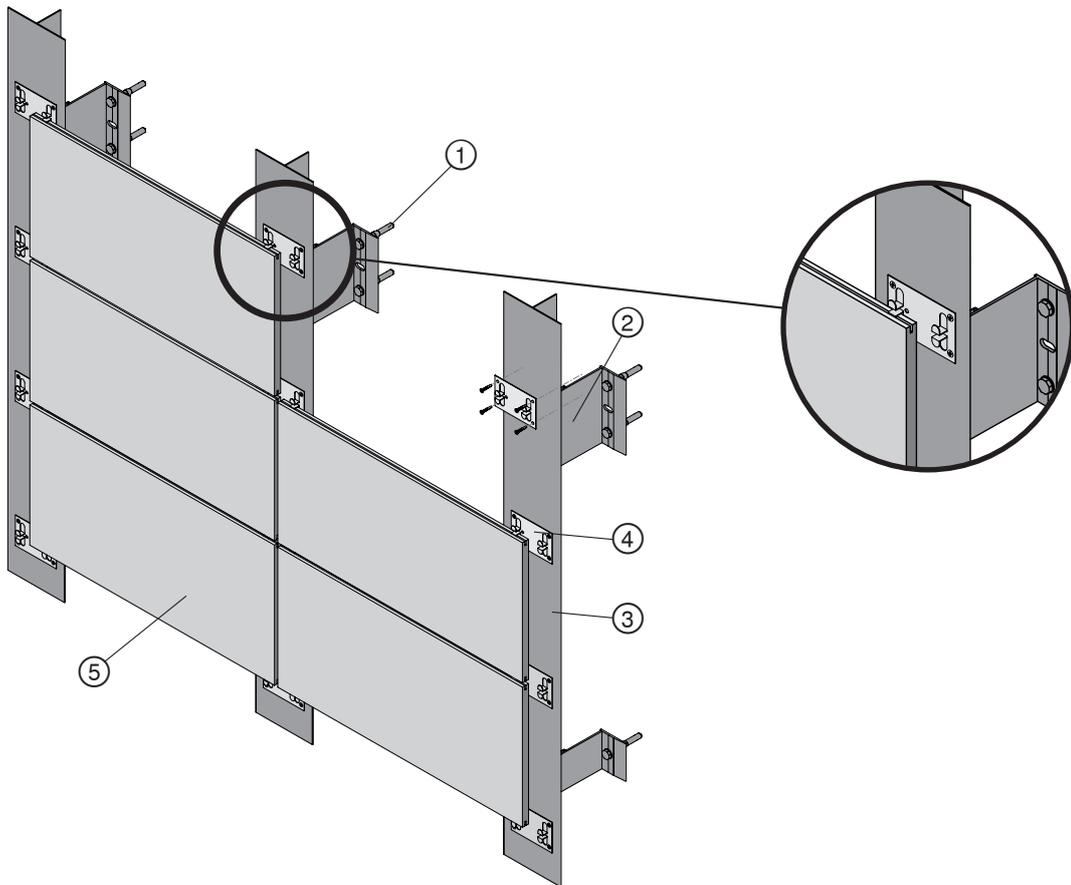
Product line

MFI System
FOX VT System
S2S System

CERAMIC – CONCEALED CLAMPS



Ceramic



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Stainless steel clamp	Hilti
⑤	Ceramic panel	Others



MFI-bracket



FOX VT-bracket

Application



Application/system description

- 1 MFT-MFI 1L clamps-stainless steel
- 2 MFT-FOX VT 1L clamps-stainless steel

Base material

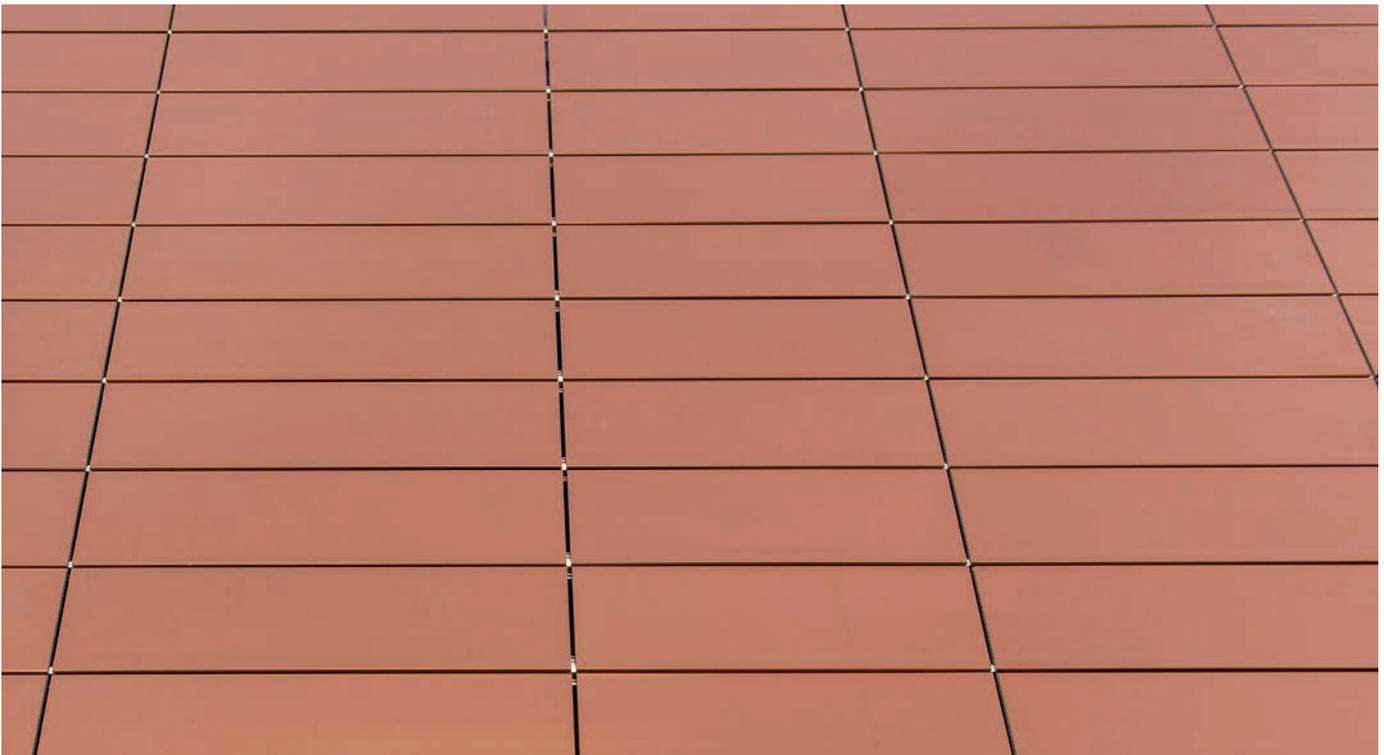
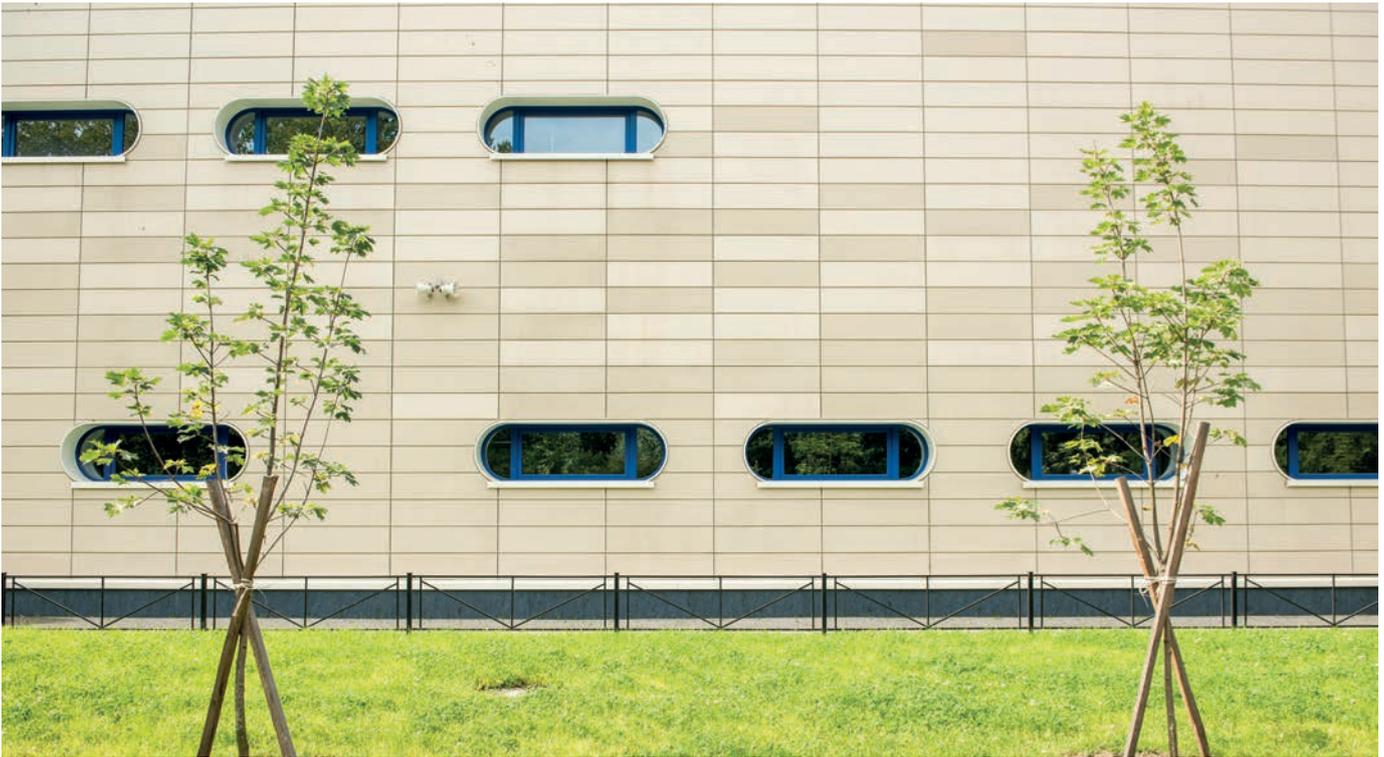
Concreto,
masonry,
steel support,
timber

Product line

MFI System
FOX VT System

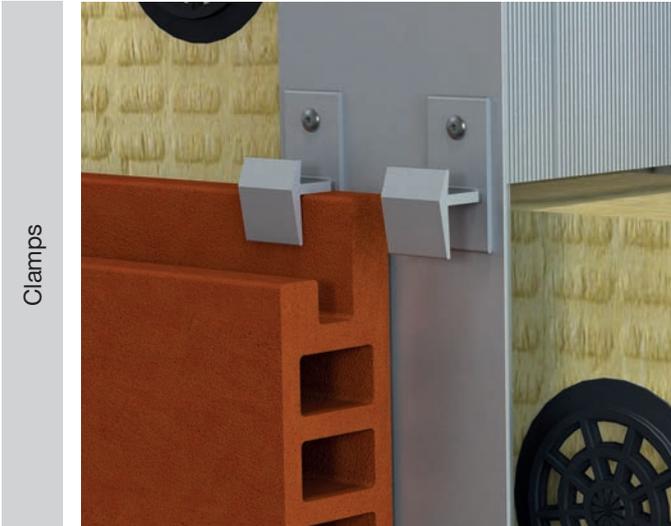
TERRACOTTA

Terracotta is a clay-based unglazed or glazed ceramic cladding material.



TERRACOTTA – PANEL FASTENING

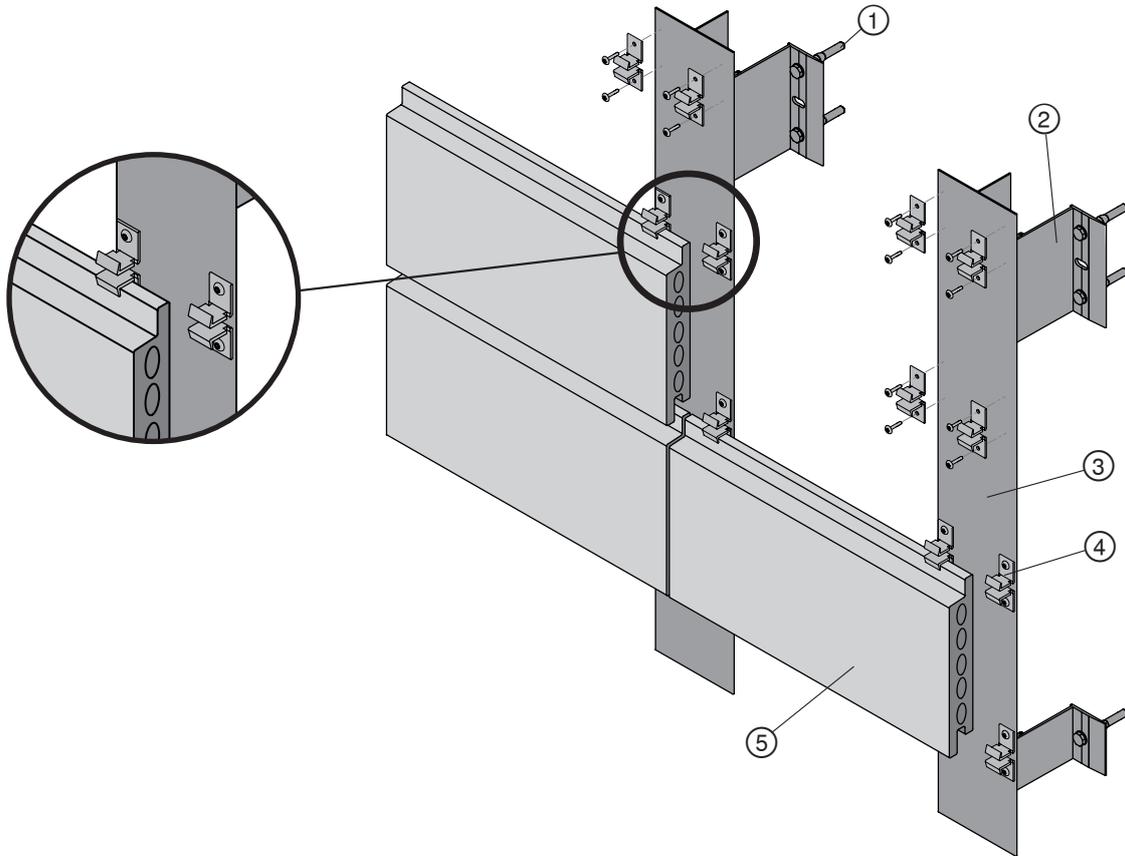
Concealed





Terracotta

TERRACOTTA – CONCEALED CLAMPS



MFI-bracket

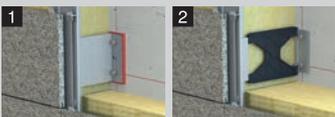


FOX VT-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Aluminum clamp	Hilti
⑤	Ceramic panel	Others

Application



Application/system description

- 1 MFT-MFI 1L clamps-aluminum
- 2 MFT-FOX VT 1L clamps-aluminum

Base material

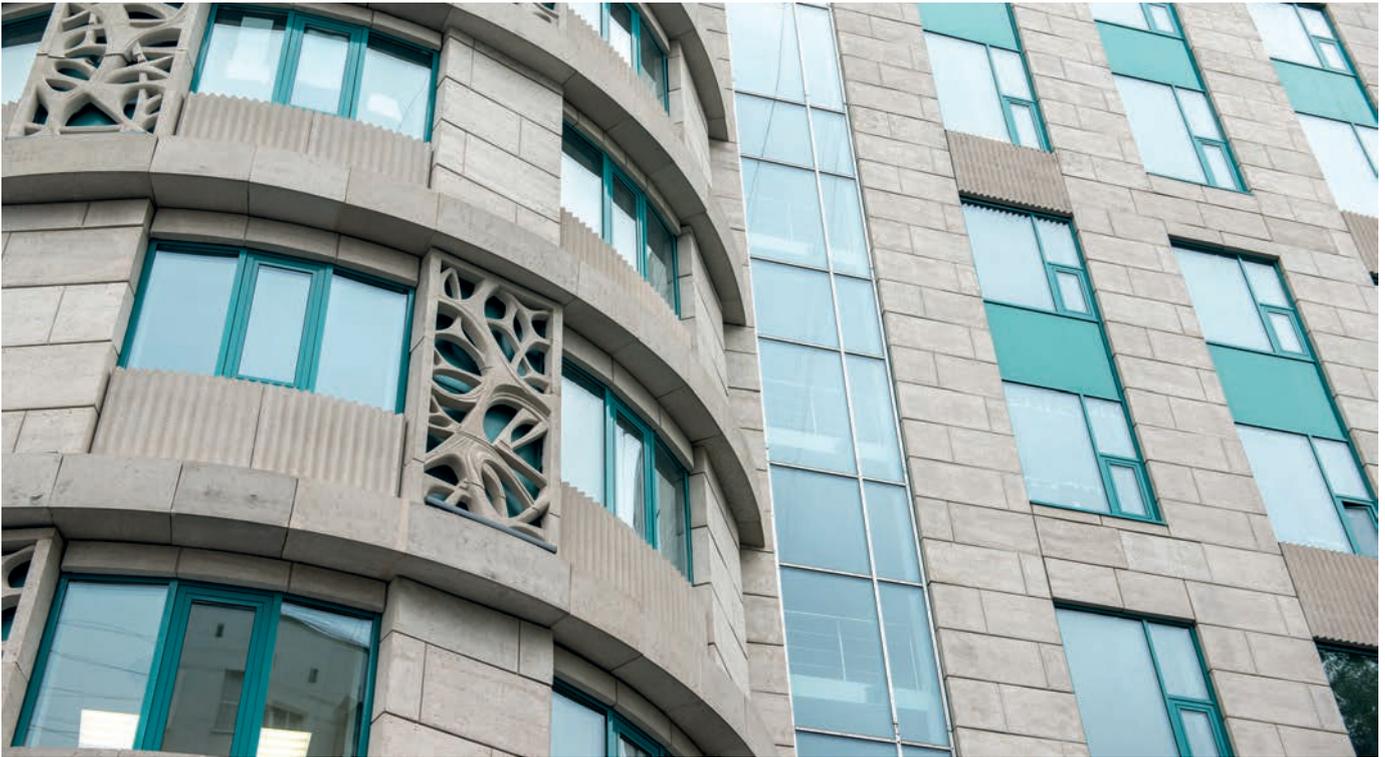
Concrete,
masonry,
steel support,
timber

Product line

MFI System
FOX VT System

STONE

Stone panels are made from natural stone.



STONE – PANEL FASTENING

Visible



Concealed



Undercut anchors



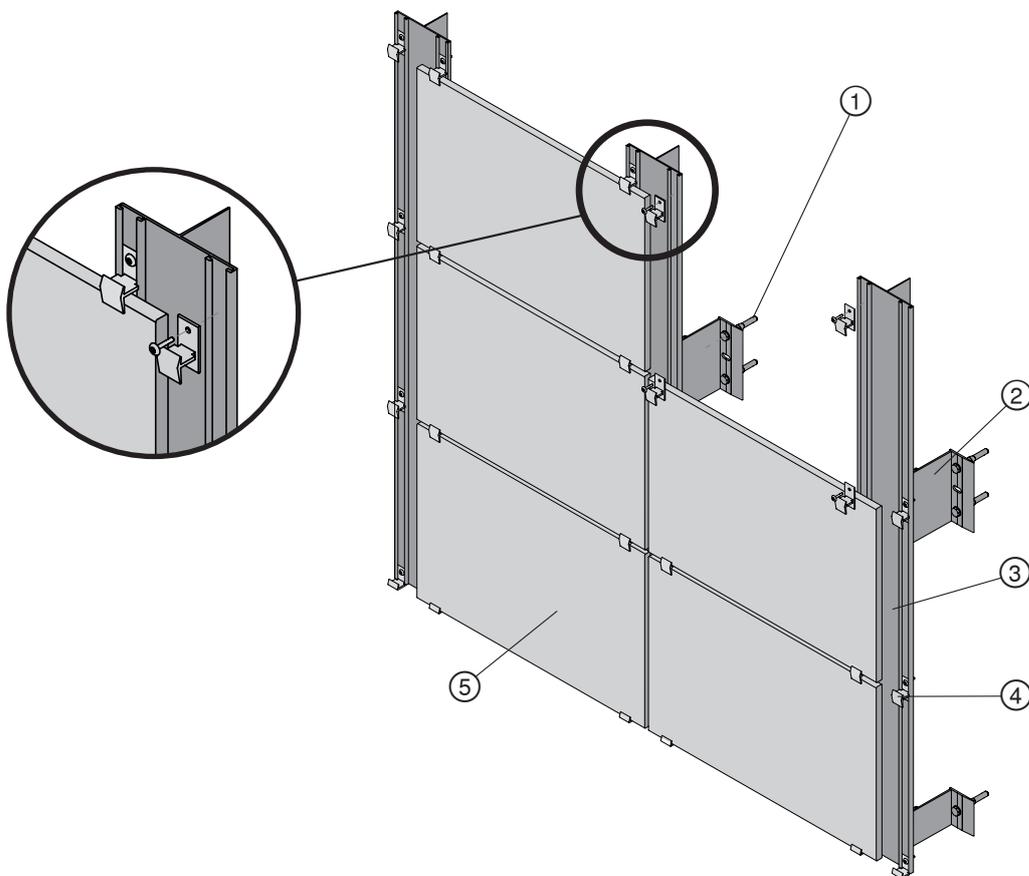
Clamps





Stone

STONE - VISIBLE CLAMPS



MFI-bracket



FOX VT-bracket



S2S-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Clamp	Hilti
⑤	Stone panel	Others

Application



Application/system description

- 1 MFT-MFI 1L clamps-aluminum
- 2 MFT-FOX VT 1L clamps-aluminum

Base material

Concrete,
masonry,
steel support,
timber

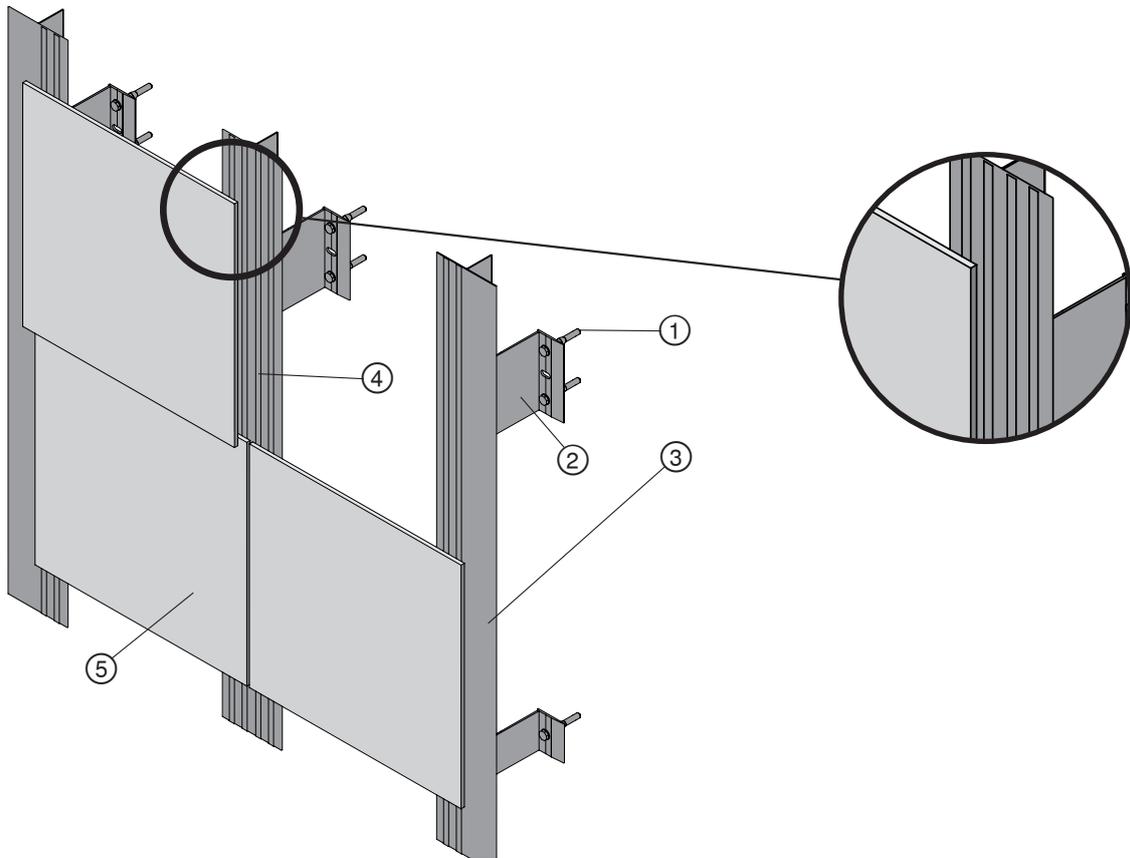
Product line

MFI System
FOX VT System

STONE – CONCEALED ADHESIVE BONDING

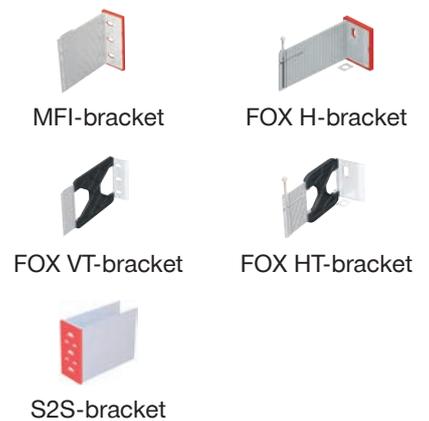


Stone



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Adhesive bonding material	Others
⑤	Stone panel	Others



Application



Application/system description

- 1 MFT-MFI 1L adhesive-rivets-screws
- 2 MFT-FOX VT 1L adhesive-rivets-screws
- 3 MFT-S2S 1L adhesive-rivets-screws
- 4 MFT-FOX H 2L adhesive rivets-screws
- 5 MFT-FOX HT 2L adhesive-rivets-screws

Base material

Concrete,
masonry,
steel support,
timber

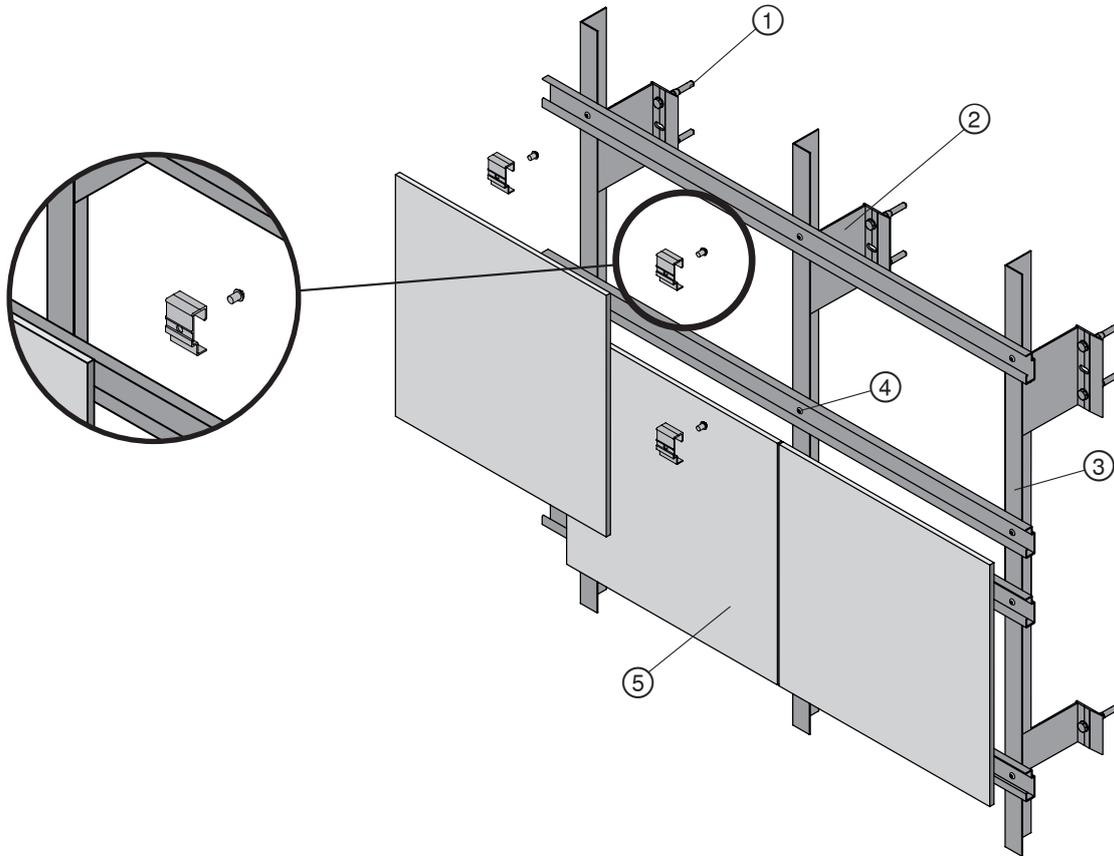
Product line

MFI System
FOX VT System
S2S System
FOX H System



Stone

STONE - CONCEALED UNDERCUT ANCHORS



MFI-bracket



FOX VT-bracket



S2S-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Hanger and undercut anchor	Hilti
⑤	Stone panel	Others

Application



Application/system description

- 1 MFT-MFI 2L hanger-undercut-anchor
- 2 MFT-FOX VT 2L hanger-undercut-anchor
- 3 MFT-S2S 2L hanger-undercut-anchor

Base material

Concrete,
masonry,
steel support,
timber

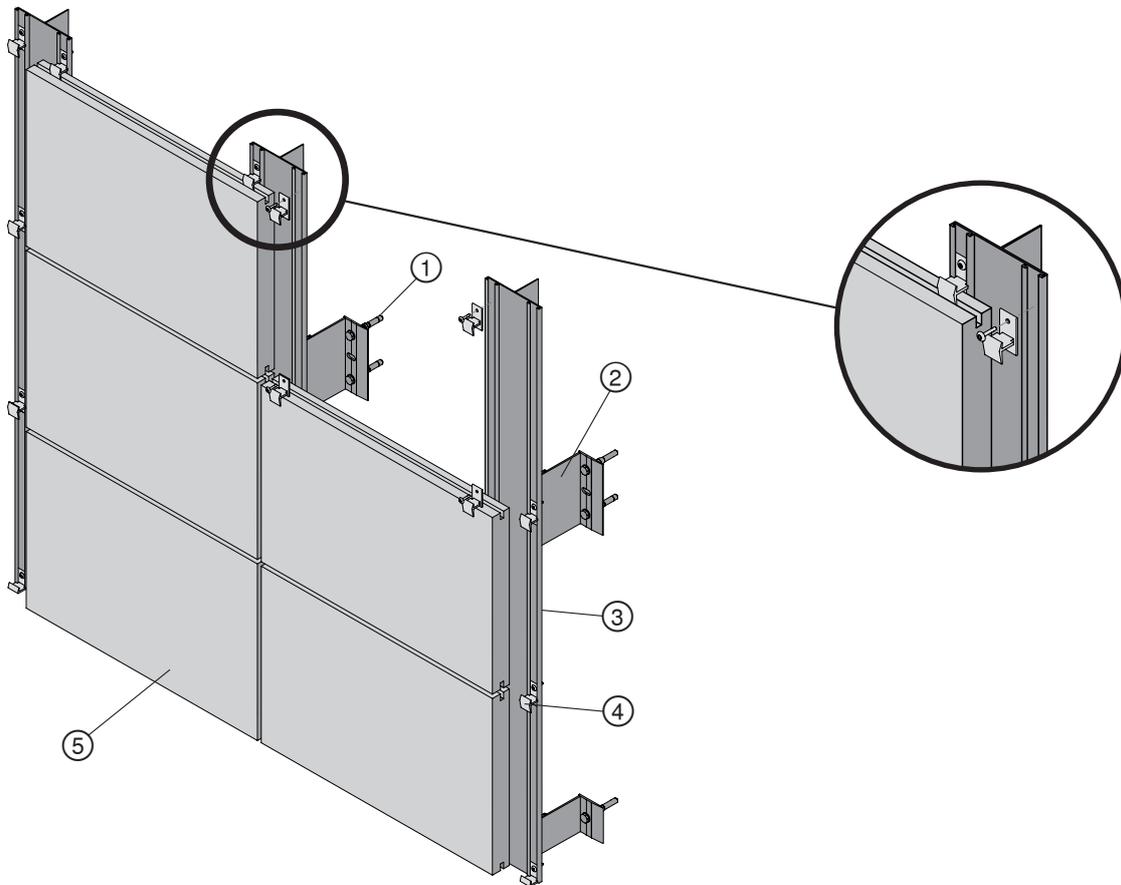
Product line

MFI System
FOX VT System
S2S System

STONE – CONCEALED CLAMPS



Stone



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Clamps	Hilti
⑤	Stone panel	Others



MFI-bracket



FOX VT-bracket



S2S-bracket

Application



Application/system description

- 1 MFT-MFI 1L clamps-aluminum
- 2 MFT-FOX VT 1L clamps-aluminum

Base material

Concrete,
masonry,
steel support,
timber

Product line

MFI System
FOX VT System

COMPOSITE

Composite cladding materials consist of two aluminum layers and a mineral or plastic core.



Fiber-cement



HPL



Metal



Render



Ceramic



Terracotta



Stone



Composite



COMPOSITE – PANEL FASTENING

Visible

Concealed

Rivets



Bolt system



Screws



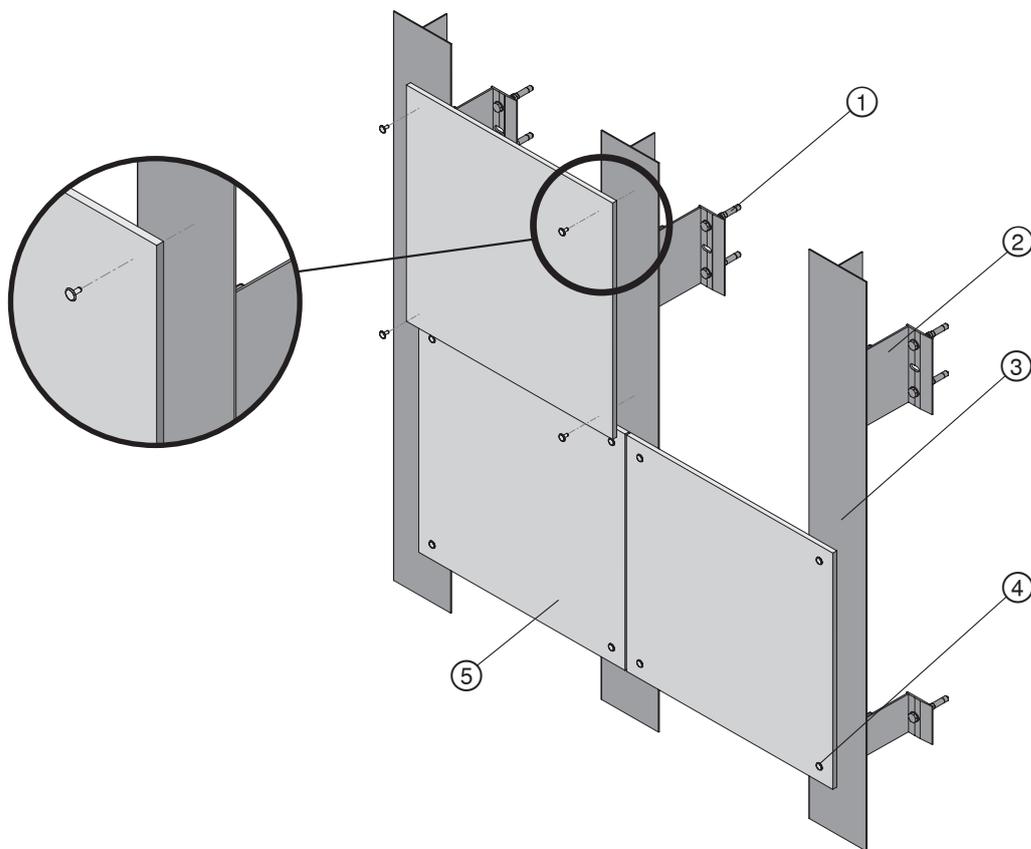
SZ 20 system





Composite

COMPOSITE - VISIBLE RIVETS



MFI-bracket



FOX H-bracket



FOX VT-bracket



FOX HT-bracket



S2S-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Rivet	Others
⑤	Composite sheet	Others

Application



Application/system description

- | | |
|--|--|
| 1 MFT-MFI 1L adhesive-rivets-screws | 5 MFT-FOX H 2L adhesive-rivets-screws |
| 2 MFT-FOX VT 1L adhesive-rivets-screws | 6 MFT-FOX HT 1L rivets-screws |
| 3 MFT-S2S 1L adhesive-rivets-screws | 7 MFT-FOX HT 2L adhesive-rivets-screws |
| 4 MFT-FOX H 1L rivets-screws | 8 MFT-MFI 2L stulp |

Base material

Concerte,
masonry,
steel support,
timber

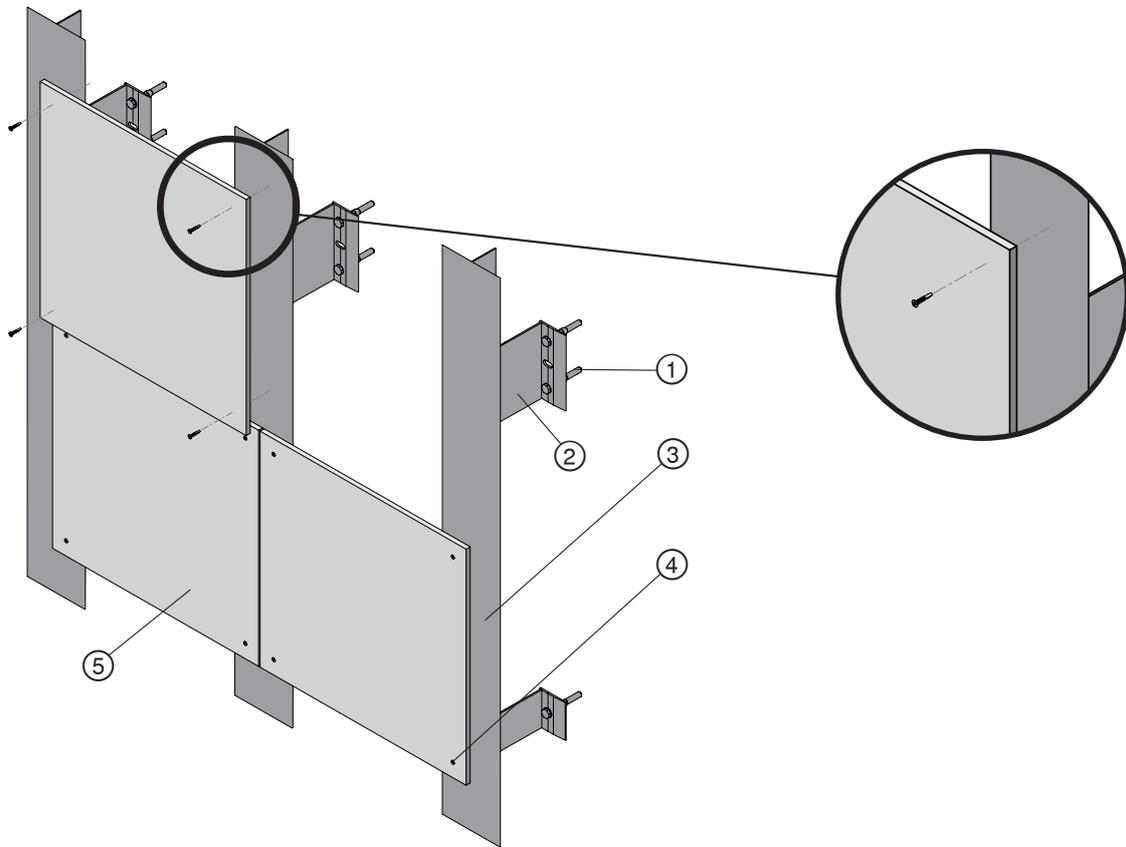
Product line

MFI System
FOX VT System
S2S System
FOX H System

COMPOSITE – VISIBLE SCREWS

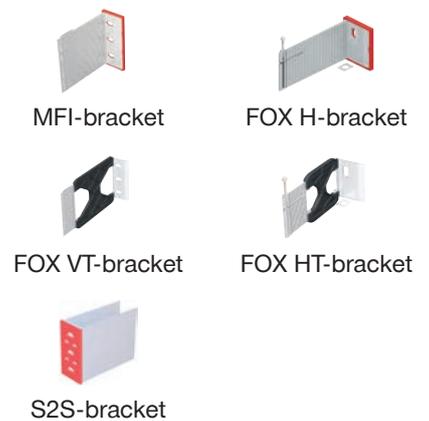


Composite



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Screw	Others
⑤	Composite sheet	Others



Application



Application/system description

- | | |
|--|--|
| 1 MFT-MFI 1L adhesive-rivets-screws | 5 MFT-FOX H 2L adhesive-rivets-screws |
| 2 MFT-FOX VT 1L adhesive-rivets-screws | 6 MFT-FOX HT 1L rivets-screws |
| 3 MFT-S2S 1L adhesive-rivets-screws | 7 MFT-FOX HT 2L adhesive-rivets-screws |
| 4 MFT-FOX H 1L rivets-screws | 8 MFT-MFI 2L stulp |

Base material

Concerte,
masonry,
steel support,
timber

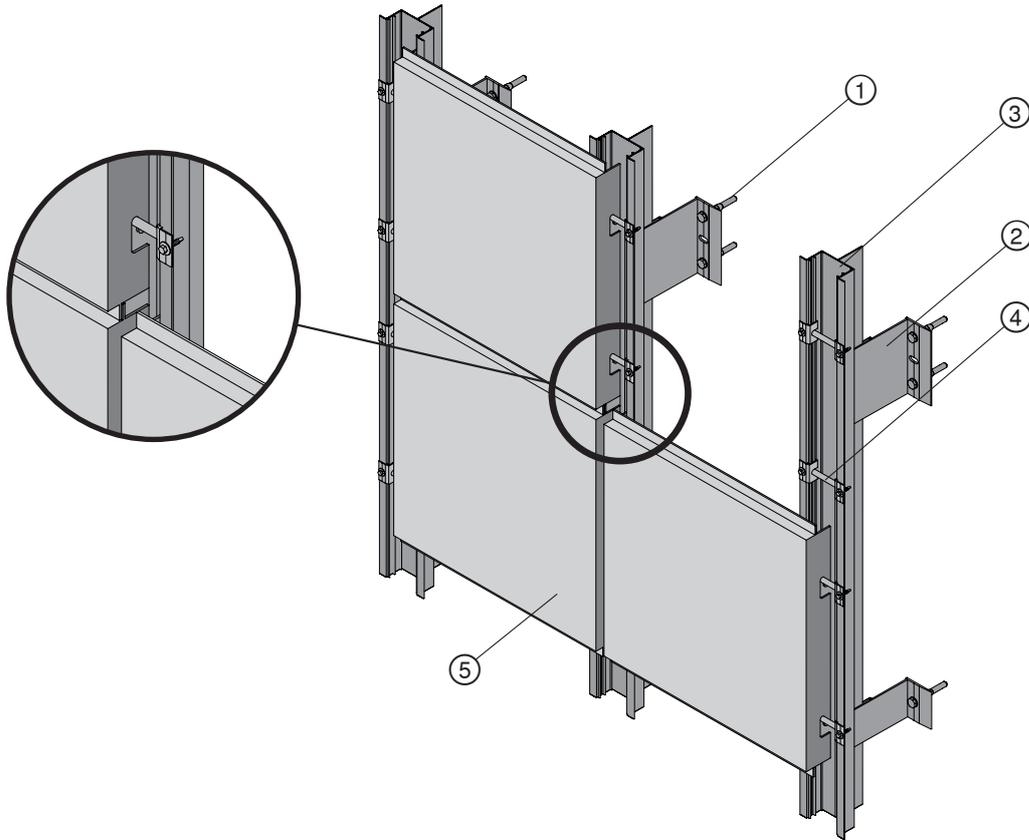
Product line

MFI System
FOX VT System
S2S System
FOX H System



Composite

COMPOSITE - CONCEALED BOLT SYSTEM



MFI-bracket

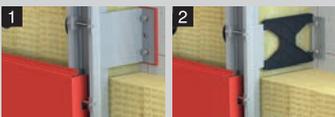


FOX VT-bracket

Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	Bolt system	Hilti
⑤	Composite sheet	Others

Application



Application/system description

- 1 MFT-MFI 1L bolts
- 2 MFT-FOX VT 1L bolts

Base material

Concrete,
masonry,
steel support,
timber

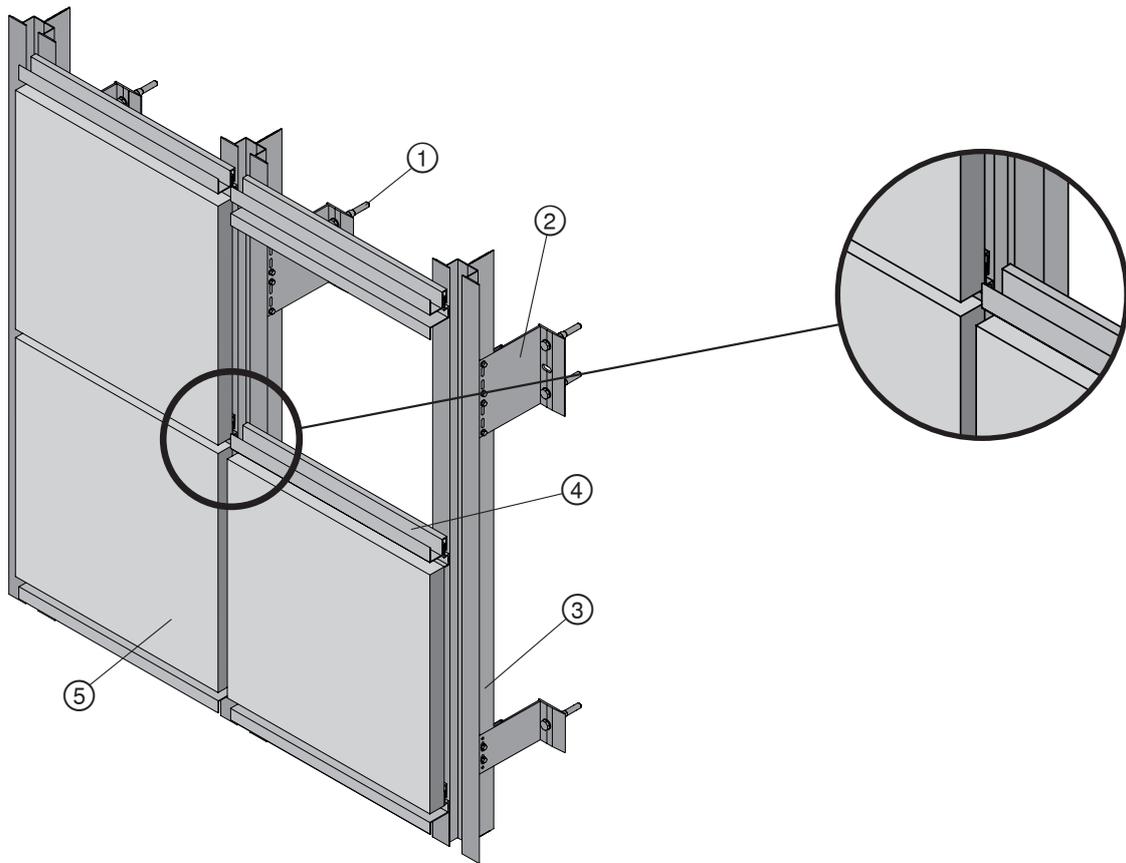
Product line

MFI System
FOX VT System

COMPOSITE – CONCEALED SZ20 SYSTEM



Composite



Bill of materials

Reference	Description	Supplier
①	Bracket fastening	Hilti
②	Bracket	Hilti
③	Profile	Hilti
④	SZ20 system	Hilti
⑤	Composite sheet	Others



MFI-bracket



FOX VT-bracket

Application



Application / system description

- 1 MFT-MFI 2L SZ20 system
- 2 MFT-FOX VT 2L SZ20 system

Base material

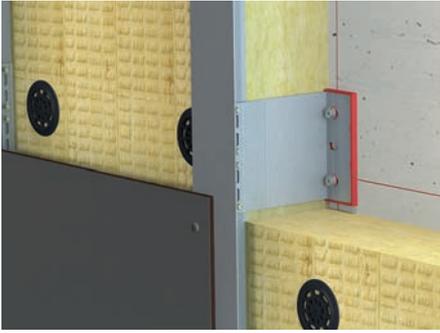
Concrete,
masonry,
steel support,
timber

Product line

MFI System
FOX VT System

CONTENTS AND OVERVIEW OF THIS SECTION

Section	Page
4 System description	
MFT-MFI-1L-adhesive-rivets-screws	2
MFT-MFI-1L-bolts	3
MFT-MFI-1L-clamps-aluminum	4
MFT-MFI-1L-clamps-stainless steel	5
MFT-MFI-1L-wood	6
MFT-MFI-2L-hangers-undercut anchor	7
MFT-MFI-2L-stulp	8
MFT-MFI-2L-SZ-20	9
MFT-FOX H-1L-rivets-screws	10
MFT-FOX-H-2L-adhesive-rivets-screws	11
MFT-FOX H-2L-adhesive-rivets-screws-wind membrane	12
MFT-FOX-H-2L-hoesch	13
MFT-FOX VT-1L-adhesive-rivets-screws	14
MFT-FOX VT-1L-bolts	15
MFT-FOX VT-1L-clamps-aluminium	16
MFT-FOX VT-1L-clamps-stainless steel	17
MFT-FOX VT-1L-wood	18
MFT-FOX VT-2L-hangers-undercut anchor	19
MFT-FOX VT-2L-stulp	20
MFT-FOX VT-2L-SZ-20	21
MFT-FOX HT-1L-rivets-screws	22
MFT-FOX HT-2L-adhesive-rivets-screws	23
MFT-FOX HT-2L-hoesch	24



MFT-MFI-1L-ADHESIVE-RIVETS-SCREWS

The system consists of aluminum wall brackets and profiles, and is specifically designed for vertical substructures in ventilated facades. Wall brackets are supplied with pre-assembled isolators and, according to the method of installation on the base material – anchors, screws or direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog or on the following pages).

Wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless sliding of the profiles against the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that there are no additional loads applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles on the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fixed with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in sizes from 40 mm to 270 mm or with isolators from 45 to 275 mm in 30 mm increments each in two different sizes (large and medium). The isolator separates the substructure from the base material to reduce thermal bridging. Bracket lengths over 65 mm come with the isolator pre-assembled, thus saving valuable time.

Advantages

- Flexible design using fixed and flexible points
- Two different sizes of brackets (large and medium)
- 40 mm adjustment capability of the profiles in the wall brackets
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Pre-assembled isolator from 65 mm bracket length
- The isolator separates the substructure from the base material to reduce thermal bridging
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials

MFT-MFI-1L-BOLTS

The system consists of aluminum wall brackets and profiles, and is specifically designed for vertical substructures in ventilated facades by using cassettes as cladding material. Wall brackets are supplied with pre-assembled isolators and, according to the method of installation on the base material – anchors, screws or direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog or on the following pages).

Wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

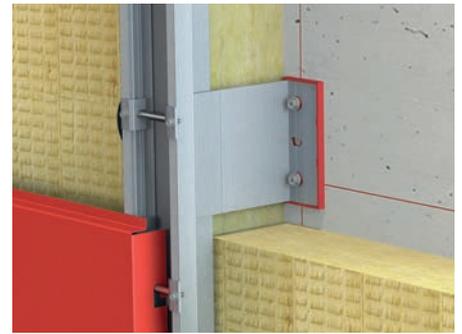
Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless sliding of the profiles against the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that there are no additional loads applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles on the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fixed with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 40 mm to 270 mm or with isolators from 45 to 275 mm in 30 mm increments, each in two different sizes (large and medium). The isolator separates the substructure from the base material to reduce thermal bridging. Bracket lengths over 65 mm come with the isolator pre-assembled, thus saving valuable time.

The vertical profiles are specially designed for use with cassettes as cladding material. The aluminum bolt supports the cassette and transfers the load to the substructure. The aluminum bolt can be fitted at any time, and it is not necessary to pre-assemble the bolt in the profile. The bolt is fixed to the profile by two clamps. The position of the bolt is adjustable and not fixed by preset grids.

Advantages

- Flexible design using fixed and flexible points
- Two different sizes of brackets (large and medium)
- 40 mm adjustment capability of the profiles in the wall brackets
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Pre-assembled isolator from 65 mm bracket length
- The isolator separates the substructure from the base material to reduce thermal bridging
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials





MFT-MFI-1L-CLAMPS-ALUMINUM

The system consists of aluminum wall brackets and profiles, and is specifically designed for vertical substructures in ventilated facades using terracotta, natural stone or ceramic panels as cladding material.

Wall brackets are supplied with pre-assembled isolators and, according to the method of installation to the base material – anchors, screws or direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalogue or on the following pages).



The wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless sliding of the profiles against the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles against the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fixed with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 40 mm to 270 mm or with isolators from 45 to 275 mm in 30 mm increments, each in two different sizes (large and medium). The isolator separates the substructure from the base material to reduce thermal bridging. Bracket lengths over 65 mm come with the isolator pre-assembled, thus saving valuable time. The vertical profiles are specially designed to allow use of aluminum clamps to fasten the cladding material. The clamps can be slotted into the profiles so they cannot move or twist. The clamps are fastened to the vertical profile with screws or rivets.

Advantages

- Flexible design using fixed and flexible points
- Two different sizes of brackets (large and medium)
- 40 mm adjustment capability of the profiles in the wall brackets
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Pre-assembled isolator from 65 mm bracket length
- The isolator separates the substructure from the base material to reduce thermal bridging
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Clamps cannot twist and thus ensure high quality and safety

MFT-MFI-1L-CLAMPS-STAINLESS STEEL

The system consists of aluminum wall brackets and profiles, and is specifically designed for vertical substructures in ventilated facades. Wall brackets are supplied with pre-assembled isolators and, according to the method of installation on the base material – anchors, screws or direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog or on the following pages).

Wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless sliding of the profiles against the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that there are no additional loads applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles on the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fixed with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in sizes from 40 mm to 270 mm or with isolators from 45 to 275 mm in 30 mm increments each in two different sizes (large and medium). The isolator separates the substructure from the base material to reduce thermal bridging. Bracket lengths over 65 mm come with the isolator pre-assembled, thus saving valuable time.

Advantages

- Flexible design using fixed and flexible points
- Two different sizes of brackets (large and medium)
- 40 mm adjustment capability of the profiles in the wall brackets
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Pre-assembled isolator from 65 mm bracket length
- The isolator separates the substructure from the base material to reduce thermal bridging
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials





MFT-MFI-1L-WOOD

The system consists of aluminum wall brackets and profiles, and is specifically designed for vertical substructures in ventilated facades in combination with timber battens. Wall brackets are supplied with pre-assembled isolators and, according to the method of installation on the base material – anchors, screws or direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog or on the following pages). In addition to the wall brackets the system consists of bracket extensions to connect the timber battens to the brackets.



Wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

Adjustment of the bracket extensions against the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 40 mm to 270 mm or with isolators from 45 to 275 mm in 30 mm increments each in two different sizes (large and medium). The isolator separates the substructure from the base material to reduce thermal bridging. Bracket lengths over 65 mm come with the isolator pre-assembled, thus saving valuable time. The timber battens are fastened to the bracket extensions with stainless steel screws.

Advantages

- Flexible design using fixed and flexible points
- Two different sizes of brackets (large and medium)
- 40 mm adjustment capability of the profiles in the wall brackets
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Pre-assembled isolator from 65 mm bracket length
- The isolator separates the substructure from the base material to reduce thermal bridging
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials

MFT-MFI-2L-HANGERS-UNDERCUT ANCHORS

The system consists of wall brackets and profiles, and is specifically designed for vertical/horizontal substructures with undercut anchors for concealed fastening in ventilated facades. Wall brackets are supplied with pre-assembled isolators and, according to the method of installation on the base material – anchors, screws or direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog or on the following pages).

Wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

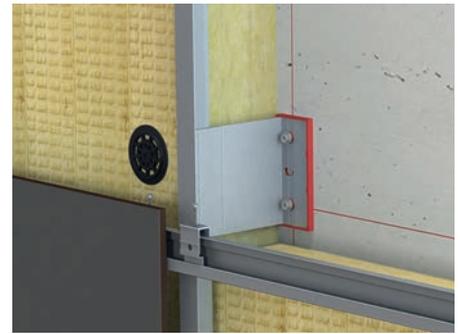
Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles against the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 40 mm to 270 mm or with isolators from 45 to 275 mm in 30 mm increments each in two different sizes (large and medium). The isolator separates the substructure from the base material to reduce thermal bridging. Bracket lengths over 65 mm come with the isolator pre-assembled, thus saving valuable time.

The horizontal hanger profiles are fastened to the vertical profiles for the elongated application. Fixed points are created by positioning 2 screws at the ends of the elongated holes, while flexible points use only 1 screw in the middle of the elongated hole. Hangers are available in three different versions – fixed hangers, leveling hangers and leveling hangers with a hole for fastening to the hanger profile.

Advantages

- Flexible design using fixed and flexible points
- Two different sizes of brackets (large and medium)
- 40 mm adjustment capability of the profiles in the wall brackets
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Pre-assembled isolator from 65 mm bracket length
- The isolator separates the substructure from the base material to reduce thermal bridging
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials





MFT-MFI-2L-STULP

The system consists of wall brackets and profiles, and is specifically designed for vertical/horizontal substructures with an additional horizontal profile for overlapping fastening of the panels in ventilated facades.

Wall brackets are supplied with pre-assembled isolators and, according to the method of installation on the base material – anchors, screws or direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog or on the following pages).

Wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.



Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles relative to the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths of 40 mm to 270 mm or with isolators from 45 to 275 mm in 30 mm increments each in two different sizes (large and medium). The isolator separates the substructure from the base material to reduce thermal bridging. Bracket lengths over 65 mm come with the isolator pre-assembled, thus saving valuable time.

The profile for overlapping fastening is supplied with elongated holes. Fixed points are created by positioning 2 screws at the ends of the elongated holes, while flexible points use only 1 screw in the middle of the elongated hole.

Advantages

- Flexible design using fixed and flexible points
- Two different sizes of brackets (large and medium)
- 40 mm adjustment capability of the profiles in the wall brackets
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Pre-assembled isolator from 65 mm bracket length
- The isolator separates the substructure from the base material to reduce thermal bridging
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials
- Overlapping fastening of the panels is possible

MFT-MFI-2L-SZ-20

The system consists of wall brackets and profiles, and is specifically designed for vertical/horizontal substructures with an additional horizontal system profile for fastening ACM cassettes in ventilated facades.

Wall brackets are supplied with pre-assembled isolators and, according to the method of installation on the base material – anchors, screws or direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog or on the following pages).

Wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles relative to the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths of 40 mm to 270 mm or with isolators from 45 to 275 mm in 30 mm increments each in two different sizes (large and medium). The isolator separates the substructure from the base material to reduce thermal bridging. Bracket lengths over 65 mm come with the isolator pre-assembled, thus saving valuable time.

The horizontal system profiles (Start, S and Z) are fastened to the vertical substructure with stainless steel screws. The system profile allows the cassettes to be installed with a shadow gap.

Advantages

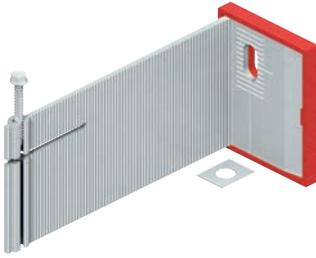
- Flexible design using fixed and flexible points
- Two different sizes of brackets (large and medium)
- 40 mm adjustment capability of the profiles in the wall brackets
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Pre-assembled isolator from 65 mm bracket length
- The isolator separates the substructure from the base material to reduce thermal bridging
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials





MFT-FOX H-1L-RIVETS-SCREWS

The aluminum MFT-FOX H/HL bracket is specially designed for use in horizontal substructures for rain screen facades. The vertically aligned bracket is easy to install in single-layer horizontal solutions as well as in double-layer systems. Fixed and flexible points are no longer required with this bracket as thermal expansion of the profiles is absorbed by the bracket. Installation of the bracket is therefore not only easier but also more reliable. Incorrectly installed fixed and flexible points thus become a thing of the past.



Advantages

- No need for fixed and flexible points
- No different bracket sizes
- Bracket lengths from 55 mm to 300 mm in increments of 20 mm ensure that the right bracket length is always available for your facade project
- Thermal separation thanks to pre-assembled isolator (FOX HI)
- Up to 40 mm profile adjustment flexibility
- Pre-assembled A4 screw for fastening the profile
- Full installation method flexibility – anchors, direct fastening an screw fastening are possible
- Suitable for all common base materials
- Individual design using the PROFIS Facade PC application guarantees a technically sound, cost-efficient solution
- Use of all common cladding materials possible
- Easy to use with wind foil

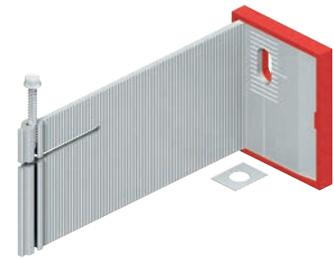
MFT-FOX-H-2L-ADHESIVE-RIVETS-SCREWS

The aluminum MFT-FOX H/HI bracket is specially designed for use in horizontal substructures for rain screen facades. The vertically aligned bracket is easy to install in single-layer horizontal solutions as well as in double-layer systems. Fixed and flexible points are no longer required with this bracket as thermal expansion of the profiles is absorbed by the bracket. Installation of the bracket is therefore not only easier but also more reliable. Incorrectly installed fixed and flexible points thus become a thing of the past.



Advantages

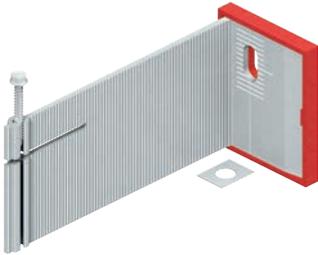
- No need for fixed and flexible points
- No different bracket sizes
- Bracket lengths from 55 mm to 300 mm in increments of 20 mm ensure that the right bracket length is always available for your facade project
- Thermal separation thanks to pre-assembled isolator (FOX HI)
- Up to 40 mm profile adjustment flexibility
- Pre-assembled A4 screw for fastening the profile
- Full installation method flexibility – anchors, direct fastening an screw fastening are possible
- Suitable for all common base materials
- Individual design using the PROFIS Facade PC application guarantees a technically sound, cost-efficient solution
- Use of all common cladding materials possible
- Easy to use with wind foil





MFT-FOX H-2L-ADHESIVE-RIVETS-SCREWS-WIND MEMBRANE

The aluminum MFT-FOX H/HI bracket is specially designed for use in horizontal substructures for rain screen facades. The vertically aligned bracket is easy to install in single-layer horizontal solutions as well as in double-layer systems. Fixed and flexible points are no longer required with this bracket as thermal expansion of the profiles is absorbed by the bracket. Installation of the bracket is therefore not only easier but also more reliable. Incorrectly installed fixed and flexible points thus become a thing of the past.



Advantages

- No need for fixed and flexible points
- No different bracket sizes
- Bracket lengths from 55 mm to 300 mm in increments of 20 mm ensure that the right bracket length is always available for your facade project
- Thermal separation thanks to pre-assembled isolator (FOX HI)
- Up to 40 mm profile adjustment flexibility
- Pre-assembled A4 screw for fastening the profile
- Full installation method flexibility – anchors, direct fastening and screw fastening are possible
- Suitable for all common base materials
- Individual design using the PROFIS Facade PC application guarantees a technically sound, cost-efficient solution
- Use of all common cladding materials possible
- Easy to use with wind foil

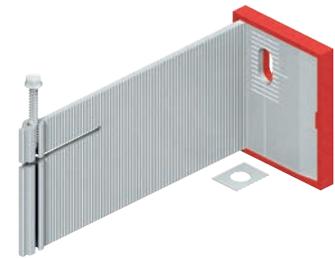
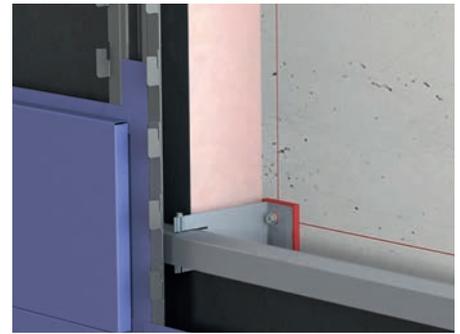
MFT-FOX-H-2L-HOESCH

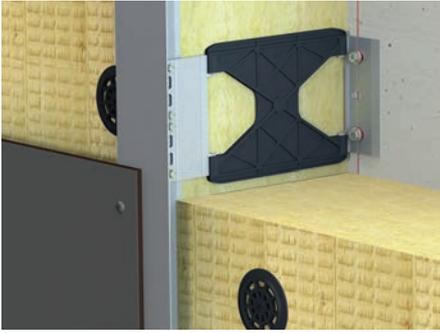
System for use in curtain wall facades with cladding consisting of Hoesch sidings. The MFT-FOX H/HI bracket is specially designed for use in horizontal/vertical substructures for ventilated curtain wall facades. Vertical alignment of the bracket guarantees optimal load transfer to the supporting material. The brackets are supplied with preassembled isolators. Various base plate hole geometries are available depending on the type of fastening to be used (please refer to the geometries available in the catalog at Hilti Online or on the following pages). In addition, the preassembled connecting screw allows easy, efficient installation of the bracket. Fixed or sliding points are not necessary as thermal expansion of the profile is taken up by the bracket. Installation is thus not only quicker but also more reliable. Incorrectly installed fastening points are therefore a thing of the past. An additional ribbed washer makes it possible to fasten the brackets in compliance with Eurocode requirements while allowing vertical adjustability (anchor and direct fastening).

A specially designed toothed strip is used as the vertical profile (second layer) for the purpose of fastening the sidings. The strip supplied features perforations to ensure that the profile can be installed free of forces of constraint relative to the first layer. The fixed points are formed by two stainless steel screws each positioned at the ends of the oblong hole and the sliding points are formed by a stainless steel screw positioned in the middle of the oblong hole.

Advantages

- No longer any need for fixed or sliding points in the first layer
- No need for brackets of different sizes
- Bracket lengths of 55 mm to 300 mm in increments of 20 mm always ensure the right length for your facade project
- Thermal isolation thanks to preassembled isolators (FOX-HI)
- Up to 40 mm profile adjustment flexibility
- Preassembled A4 stainless steel screw for fastening the load-bearing profile
- Complete flexibility with regard to wall mounting – fastening with anchors, screws or direct fastening is possible
- Can be used with all common cladding materials
- Individual design using the Hilti PROFIS Facade PC application guarantees technically optimized, cost-efficient solutions in accordance with Eurocode





MFT-FOX VT-1L-ADHESIVE-RIVETS-SCREWS

The system consists of profiles plus wall brackets that eliminate thermal bridging and is specifically designed for vertical substructures in ventilated facades. The wall brackets are supplied with a powder-coated base plate, according to the method of installation on the base material – anchors, screws and direct fastening – with the appropriate hole geometries in the base plate (available hole geometries are shown in the catalog, on HOL or on the following pages).

The wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.



Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles relative to the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fixed with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 140 mm to 320 mm. To avoid corrosion, the bracket base plate is powder coated.

Advantages

- Flexible design using fixed and flexible points
- 40 mm adjustment capability of the profiles on the wall brackets
- Bracket length from 140 mm to 320 mm
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Powder-coated base plate for corrosion resistance
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials

MFT-FOX VT-1L-BOLTS

The system consists of profiles plus wall brackets that eliminate thermal bridging and is specifically designed for fastening metal cassettes with bolts in ventilated facades. The wall brackets are supplied with a powder-coated base plate, according to the method of installation on the base material – anchors, screws and direct fastening – with the appropriate hole geometries in the base plate (available hole geometries are shown in the catalog, on HOL or on the following pages).

The wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually-frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles relative to the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 140 mm to 320 mm.

The base plate of the bracket is powder coated for corrosion resistance. The vertical cassette support profiles have been specially developed for fastening metal cassettes. An aluminum bolt is fastened by 2 clamps and used to support the cassettes. Its position can be moved along the profile.

Advantages

- Flexible design using fixed and flexible points
- 40 mm adjustment capability of the profiles on the wall brackets
- Bracket length from 140 mm to 320 mm
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Powder-coated base plate for corrosion resistance
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Additional fastening and adjustment of the bolt is possible
- Can be used with all common cladding materials





MFT-FOX VT-1L-CLAMPS-ALUMINIUM

The system consists of profiles plus wall brackets that eliminate thermal bridging and is specifically designed for vertical substructures for fastening terracotta, ceramic or natural stone panels with clamps on ventilated facades. The wall brackets are supplied with a powder-coated base plate, according to the method of installation on the base material – anchors, screws and direct fastening – with the appropriate hole geometries in the base plate (available hole geometries are shown in the catalog, on HOL or on the following pages).

The wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.



Vertical profiles are connected to the wall brackets with specially-designed screws for fixed and flexible points. This allows virtually frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles relative to the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 140 mm to 320 mm.

The base plate of the bracket is powder coated for corrosion resistance.

The vertical profiles are specially designed for fastening the cladding with aluminum clamps which are secured to the profile by screws or rivets. The clamps cannot be twisted so security during the panel fastening operation is much higher.

Advantages

- Flexible design using fixed and flexible points
- 40 mm adjustment capability of the profiles on the wall brackets
- Bracket length from 140 mm to 320 mm
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Powder-coated base plate for resistance to contact corrosion
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Anti-twist security of the clamps during installation of the panels

MFT-FOX VT-1L-CLAMPS-STAINLESS STEEL

The system consists of profiles plus wall brackets that eliminate thermal bridging and is specifically designed for vertical substructures and systems that use visible stainless steel clamps on ventilated facades. The wall brackets are supplied with a powder-coated base plate, according to the method of installation to the base material – anchors, screws and direct fastening – with the appropriate hole geometries in the base plate (available hole geometries are shown in the catalog, on HOL or on the following pages).

The wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles relative to the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 140 mm to 320 mm.

The base plate of the bracket is powder coated for corrosion resistance.

The stainless steel clamps are fastened to the vertical profile by rivets or screws.



Advantages

- Flexible design using fixed and flexible points
- 40 mm adjustment capability of the profiles on the wall brackets
- Bracket length from 140 mm to 320 mm
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Powder-coated base plate for resistance to contact corrosion
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Visible clamp fastening system



MFT-FOX VT-1L-WOOD

The system consists of profiles plus wall brackets that eliminate thermal bridging and is specifically designed for vertical substructures in combination with wooden battens in ventilated facades. The wall brackets are supplied with a powder-coated base plate, according to the method of installation on the base material – anchors, screws and direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog, on HOL or on the following pages).

The wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles relative to the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 140 mm to 320 mm.

The base plate of the bracket is powder coated for corrosion resistance.

Wooden battens are fastened to the mounting element with stainless steel screws.



Advantages

- Flexible design using fixed and flexible points
- 40 mm adjustment capability of the profiles on the wall brackets
- Bracket length from 140 mm to 320 mm
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Powder-coated base plate for corrosion resistance
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials

MFT-FOX VT-2L-HANGERS-UNDERCUT ANCHORS

The system consists of profiles plus wall brackets that eliminate thermal bridging and is specifically designed for vertical/horizontal substructures employing undercut anchors for concealed fastening in ventilated facades. The wall brackets are supplied with a powder-coated base plate, according to the method of installation on the base material – anchors, screws and direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog, on HOL or on the following pages).

The wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

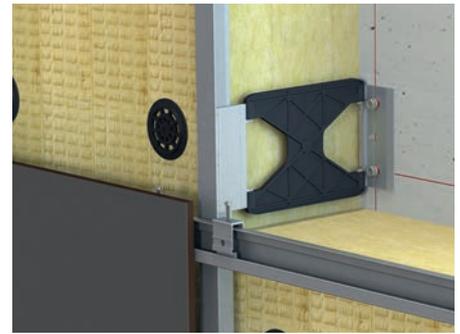
Adjustment of the profiles relative to the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 140 mm to 320 mm.

The base plate of the bracket is powder coated for corrosion resistance.

The horizontal hanger profiles for this lengthways application are fastened to the vertical profiles. Fixed points are created by placing 2 screws in the elongated holes while flexible points consist of 1 screw. Hangers are differentiated according to their function, i.e. fixed, leveling and leveling plus fastening.

Advantages

- Flexible design using fixed and flexible points
- 40 mm adjustment capability of the profiles on the wall brackets
- Bracket length from 140 mm to 320 mm
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Powder-coated base plate for corrosion resistance
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all panels with approval for the undercut fastening





MFT-FOX VT-2L-STULP

The system consists of profiles plus wall brackets that eliminate thermal bridging and is specifically designed for vertical/horizontal substructures with additional horizontal profiles for overlapping fastening of the panels in ventilated facades. The wall brackets are supplied with a powder-coated base plate, according to the method of installation to the base material – anchors, screws and direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog, on HOL or on the following pages).

The wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.



Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles against the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 140 mm to 320 mm.

The base plate of the bracket is powder coated for corrosion resistance.

The profile for overlapping fastening is supplied with elongated holes. Fixed points are created by placing 2 screws in the elongated holes while flexible points consist of 1 screw.

Advantages

- Flexible design using fixed and flexible points
- 40 mm adjustment capability of the profiles on the wall brackets
- Bracket length from 140 mm to 320 mm
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Powder-coated base plate for corrosion resistance
- Easy to fasten panels with a shadow gap
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Overlapping fastening of the panels

MFT-FOX VT-2L-SZ-20

The system consists of profiles plus wall brackets that eliminate thermal bridging and is specifically designed for vertical/horizontal substructures with additional horizontal system profiles for fastening ACM cassettes in ventilated facades. The wall brackets are supplied with a powder-coated base plate, according to the method of installation on the base material – anchors, screws and direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog, on HOL or on the following pages).

The wall brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

Vertical profiles are connected to the wall brackets with specially designed screws for fixed and flexible points. This allows virtually frictionless movement of the profiles relative to the wall brackets and keeps the profile connected by the fixed point in place. The flexible point makes sure that no additional loads are applied to the substructure by expansion forces exerted by the profile.

Adjustment of the profiles against the wall brackets is assisted by a “helping hand”. The helping hand keeps the profile in position whilst the profile is being fastened with screws, allowing fast connection to the bracket. With this system, wall tolerances of up to 40 mm can be perfectly compensated. The wall brackets are available in lengths from 140 mm to 320 mm.

The base plate of the bracket is powder coated for corrosion resistance.

The horizontal system profiles (Start, S and Z) are fastened to the vertical substructure with stainless steel screws. The system profiles allow the cassettes to be fastened with a shadow gap.



Advantages

- Flexible design using fixed and flexible points
- 40 mm adjustment capability of the profiles on the wall brackets
- Bracket length from 140 mm to 320 mm
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Powder-coated base plate for corrosion resistance
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all panels with approval for the undercut fastening



MFT-FOX HT-1L-RIVETS-SCREWS

The system consists of profiles plus wall brackets that eliminate thermal bridging and is specifically designed for horizontal substructures in ventilated facades. Due to the vertical fastening of the brackets, optimal load transfer to the base material can be realized. The wall brackets are supplied with a powder-coated base plate, according to the method of installation to the base material – anchors, screws and direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog, on HOL or on the following pages).

In addition to the pre-assembled connection screw, the bracket offers an easy and efficient installation method. Fixed and flexible points are not required as thermal expansion of the profile is taken up by the flexibility of the bracket. The bracket offers a quick and safe method of fastening – incorrectly installed brackets become a thing of the past.

An additional washer allows fastening in accordance with Eurocode with vertical adjustment of the bracket (anchor and direct fastening).



Advantages

- Flexible design using fixed and flexible points is no longer required
- Bracket length from 140 mm to 320 mm
- Powder-coated base plate for resistance to contact corrosion
- 40 mm adjustment capability of the profiles on the wall brackets
- Pre-assembled fastening screw in A4 material
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials

MFT-FOX HT-2L-ADHESIVE-RIVETS-SCREWS

The system consists of profiles plus wall brackets that eliminate thermal bridging and is specifically designed for horizontal/vertical substructures in ventilated facades. Thanks to the vertical fastening of the brackets, optimal load transfer to the base material can be realized. The wall brackets are supplied with a powder-coated base plate, according to the method of installation to the base material – anchors, screws and direct fastening – with different hole geometries in the base plate (available hole geometries are shown in the catalog, on HOL or on the following pages).



In addition to the pre-assembled connecting screw, the bracket offers an easy and efficient method of installation. Fixed and flexible points are not required as the thermal expansion of the profile is taken up by the flexibility of the bracket. The bracket offers a quick and safe means of fastening – incorrectly installed brackets become a thing of the past.

An additional washer allows fastening in accordance with Eurocode with vertical adjustment of the bracket (anchor and direct fastening).

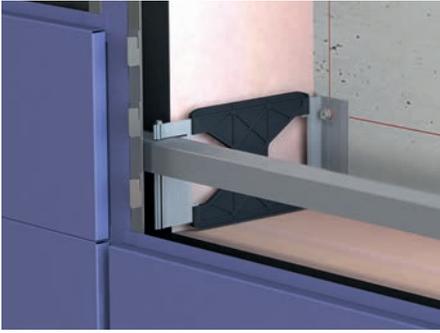
For double-layer systems the vertical profiles (2nd layer) are supplied with elongated holes to allow the vertical profiles to be fastened to the horizontal profiles (1st layer) free of forces of constraint.

Fixed points are created by placing 2 screws in the elongated holes while flexible points consist of 1 screw.



Advantages

- Flexible design using fixed and flexible points is no longer required
- Bracket length from 140 mm to 320 mm
- Powder-coated base plate for resistance to contact corrosion
- 40 mm adjustment capability of the profiles on the wall brackets
- Pre-assembled fastening screw in A4 material
- Brackets can be installed using a range of methods – anchors, screws or direct fastening
- Substructures can be designed with PROFIS Facade to create technically sound, cost-efficient solutions
- Can be used with all common cladding materials



MFT-FOX HT-2L-HOESCH

The MFT-FOX H/HI bracket eliminates thermal bridging and is specially designed for use in horizontal/vertical aluminium substructures for ventilated curtain wall facades. Vertical alignment of the bracket guarantees optimal load transfer to the supporting material. The brackets are supplied with a coated base plate in order to avoid contact corrosion. Various base plate hole geometries are available depending on the type of fastening to be used (please refer to the geometries available in the catalog at Hilti Online or on the following pages). In addition, the preassembled connecting screw allows easy, efficient installation of the bracket. Fixed or sliding points are not necessary as thermal expansion of the profile is taken up by the bracket. Installation is thus not only quicker but also more reliable. Incorrectly installed fastening points are therefore a thing of the past. An additional ribbed washer makes it possible to fasten the brackets in compliance with Eurocode requirements while allowing vertical adjustability (anchor and direct fastening). In double-layer systems, Hoesch toothed strips, to which the Hoesch sidings are attached, are used as the vertical profiles (second layer). The fixed points are formed by two stainless steel screws each positioned at the ends of the oblong hole and the sliding points are formed by a stainless steel screw positioned in the middle of the oblong hole.

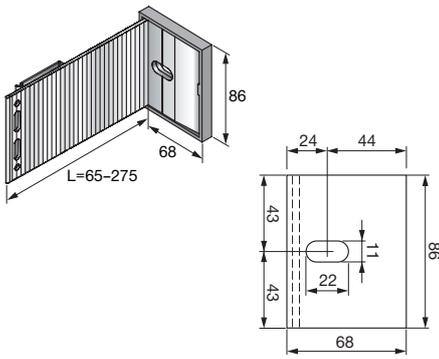


Advantages

- No longer any need for fixed or sliding points in the first layer
- No need for brackets of different sizes
- Bracket lengths of 140 mm to 320 mm in increments of 20 mm always ensure the right length for your facade project
- Coated base plates avoid contact corrosion
- Up to 40 mm profile adjustment flexibility
- Preassembled A4 stainless steel screw for fastening the load-bearing profile
- Complete flexibility with regard to wall mounting – fastening with anchors, screws or direct fastening is possible
- Can be installed on all common supporting materials
- Individual design using the Hilti PROFIS Facade PC application guarantees technically optimized, cost-efficient solutions in accordance with Eurocode

CONTENTS AND OVERVIEW OF THIS SECTION

Section	Page
5 Load tables	
Brackets	2
Profiles	12



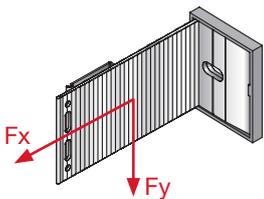
BRACKET LOAD TABLE: MFT-MFI MEDIUM

Technical data:

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylen	0.117 W/mK
Thermal conductivity aluminum	160 W/mK

MFT-MFI Medium Brackets		MF 040 M11 2029626	MFI 065 M11 2084361	MFI 095 M11 2029344	MFI 125 M11 2029347	MFI 155 M11 2029750
Bracket height	h [mm]	80	86	86	86	86
Bracket length	L [mm]	40	65	95	125	155
Bracket width	w [mm]	62	68	68	68	68
Hole diameter	D [mm]	11	11	11	11	11

MFT-MFI Medium Brackets		MFI 185 M11 2029352	MFI 215 M11 2029355	MFI 245 M11 2029358	MFI 275 M11 2029361	-
Bracket height	h [mm]	86	86	86	86	
Bracket length	L [mm]	185	215	245	275	
Bracket width	w [mm]	68	68	68	68	
Hole diameter	D [mm]	11	11	11	11	



Design resistance

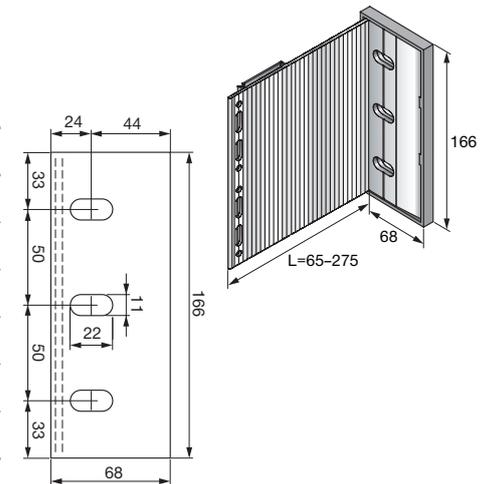
All loading capacity limits in this manual are to be considered as design values. Recommended values are calculated from the elastic limit equal to yield strength, with applied material safety factor of 1.1 and an applied additional safety factor of 1.4

MFT-MFI Medium Brackets		MF 040 M11 2029626	MFI 065 M11 2084361	MFI 095 M11 2029344	MFI 125 M11 2029347	MFI 155 M11 2029750
Vertical (dead load)	Fy [kN]	5.28	3.17	1.98	1.44	1.13
Horizontal (wind load)	Fx [kN]	2.26	2.26	2.26	2.26	2.26

MFT-MFI Medium Brackets		MFI 185 M11 2029352	MFI 215 M11 2029355	MFI 245 M11 2029358	MFI 275 M11 2029361	-
Vertical (dead load)	Fy [kN]	0.93	0.79	0.69	0.61	
Horizontal (wind load)	Fx [kN]	2.26	2.26	2.26	2.26	

BRACKET LOAD TABLE: MFT-MFI LARGE

Technical data:	
Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylen	0.117 W/mK
Thermal conductivity aluminum	160 W/mK

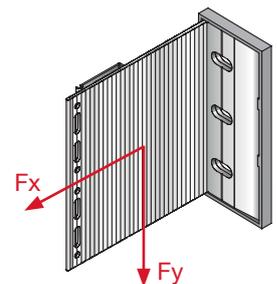


MFT-MFI Large Brackets		MF 040 L11 2029623	MFI 065 L11 2029249	MFI 095 L11 2029343	MFI 125 L11 2029346	MFI 155 L11 2029349
Bracket height	h [mm]	160	166	166	166	166
Bracket length	L [mm]	40	65	95	125	155
Bracket width	w [mm]	62	68	68	68	68
Hole diameter	D [mm]	11	11	11	11	11

MFT-MFI Large Brackets		MFI 185 L11 2029351	MFI 215 L11 2029354	MFI 245 L11 2029357	MFI 275 L11 2029360	–
Bracket height	h [mm]	166	166	166	166	
Bracket length	L [mm]	185	215	245	275	
Bracket width	w [mm]	68	68	68	68	
Hole diameter	D [mm]	11	11	11	11	

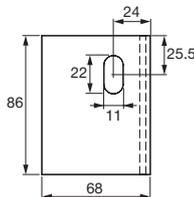
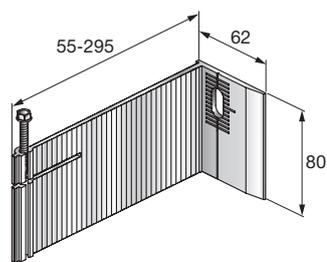
Design resistance

All loading capacity limits in this manual are to be considered as design values. Recommended values are calculated from the elastic limit equal to yield strength, with applied material safety factor of 1.1 and an applied additional safety factor of 1.4



MFT-MFI Medium Brackets		MF 040 L11 2029623	MFI 065 L11 2029249	MFI 095 L11 2029343	MFI 125 L11 2029346	MFI 155 L11 2029349
Vertical (dead load)	Fy [kN]	15.97	9.58	5.99	4.35	3.42
Horizontal (wind load)	Fx [kN]	4.17	4.17	4.17	4.17	4.17

MFT-MFI Medium Brackets		MFI 185 L11 2029351	MFI 215 L11 2029354	MFI 245 L11 2029357	MFI 275 L11 2029360	–
Vertical (dead load)	Fy [kN]	2.82	2.39	2.08	1.84	
Horizontal (wind load)	Fx [kN]	4.17	4.17	4.17	4.17	



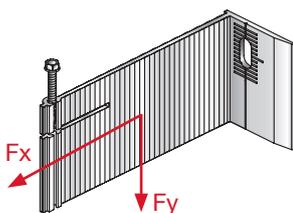
BRACKET LOAD TABLE: MFT-FOX H 55-235 11

Technical data:

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylen	0.117 W/mK
Thermal conductivity aluminum	160 W/mK

MFT-FOX H Brackets		FOX H 55 M11 2084098	FOX H 75 M11 2084361	FOX H 95 M11 2084364	FOX H 115 M11 2084367	FOX H 135 M11 2084370
Bracket height	h [mm]	80	80	80	80	80
Bracket length	L [mm]	55	75	95	115	135
Bracket width	w [mm]	62	62	62	62	62
Hole diameter	D [mm]	11	11	11	11	11

MFT-FOX H Brackets		FOX H 155 M11 2084373	FOX H 175 M11 2084376	FOX H 195 M11 2084379	FOX H 215 M11 2084382	FOX H 235 M11 2084385
Bracket height	h [mm]	80	80	80	80	80
Bracket length	L [mm]	155	175	195	215	235
Bracket width	w [mm]	62	62	62	62	62
Hole diameter	D [mm]	11	11	11	11	11



Design resistance

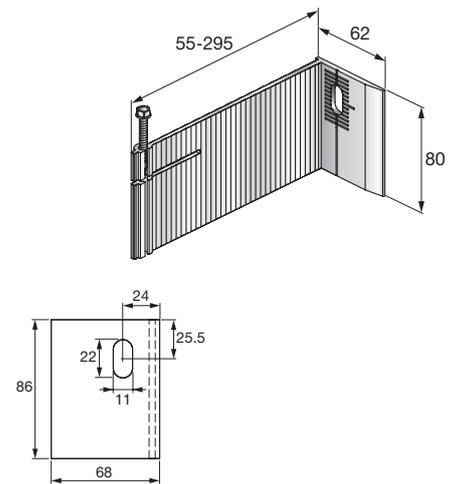
All loading capacity limits in this manual are to be considered as design values. Recommended values are calculated from the elastic limit equal to yield strength, with applied material safety factor of 1.1 and an applied additional safety factor of 1.4

MFT-FOX H Brackets		FOX H 55 M11 2084098	FOX H 75 M11 2084361	FOX H 95 M11 2084364	FOX H 115 M11 2084367	FOX H 135 M11 2084370
Vertical (dead load)	Fy [kN]	2.98	2.07	1.58	1.27	1.07
Horizontal (wind load)	Fx [kN]	2.43	2.43	2.43	2.43	2.43

MFT-FOX H Brackets		FOX H 155 M11 2084373	FOX H 175 M11 2084376	FOX H 195 M11 2084379	FOX H 215 M11 2084382	FOX H 235 M11 2084385
Vertical (dead load)	Fy [kN]	0.92	0.81	0.72	0.65	0.59
Horizontal (wind load)	Fx [kN]	2.43	2.43	2.43	2.43	2.43

BRACKET LOAD TABLE: MFT-FOX H 255-295 11

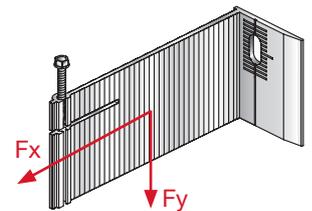
Technical data:	
Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylen	0.117 W/mK
Thermal conductivity aluminum	160 W/mK



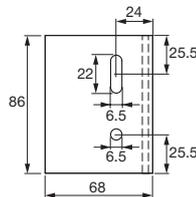
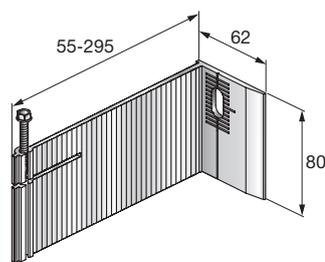
MFT-FOX H Brackets		FOX H 255 M11	FOX H 275 M11	FOX H 295 M11	-	-
		2084388	2084391	2084394		
Bracket height	h [mm]	80	80	80		
Bracket length	L [mm]	255	275	295		
Bracket width	w [mm]	62	62	62		
Hole diameter	D [mm]	11	11	11		

Design resistance

All loading capacity limits in this manual are to be considered as design values. Recommended values are calculated from the elastic limit equal to yield strength, with applied material safety factor of 1.1 and an applied additional safety factor of 1.4



MFT-FOX H Brackets		FOX H 255 M11	FOX H 275 M11	FOX H 295 M11	-	-
		2084388	2084391	2084394		
Vertical (dead load)	Fy [kN]	0.54	0.5	0.46		
Horizontal (wind load)	Fx [kN]	2.43	2.43	2.43		



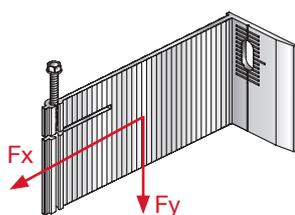
BRACKET LOAD TABLE: MFT-FOX H 55-235 6.5

Technical data:

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylen	0.117 W/mK
Thermal conductivity aluminum	160 W/mK

MFT-FOX H Brackets		FOX H 55 M6.5 2084097	FOX H 75 M6.5 2084360	FOX H 95 M6.5 2084363	FOX H 115 M6.5 2084366	FOX H 135 M6.5 2084369
Bracket height	h [mm]	80	80	80	80	80
Bracket length	L [mm]	55	75	95	115	135
Bracket width	w [mm]	62	62	62	62	62
Hole diameter	D [mm]	6.5	6.5	6.5	6.5	6.5

MFT-FOX H Brackets		FOX H 155 M6.5 2084372	FOX H 175 M6.5 2084375	FOX H 195 M6.5 2084378	FOX H 215 M6.5 2084381	FOX H 235 M6.5 2084384
Bracket height	h [mm]	80	80	80	80	80
Bracket length	L [mm]	155	175	195	215	235
Bracket width	w [mm]	62	62	62	62	62
Hole diameter	D [mm]	6.5	6.5	6.5	6.5	6.5



Design resistance

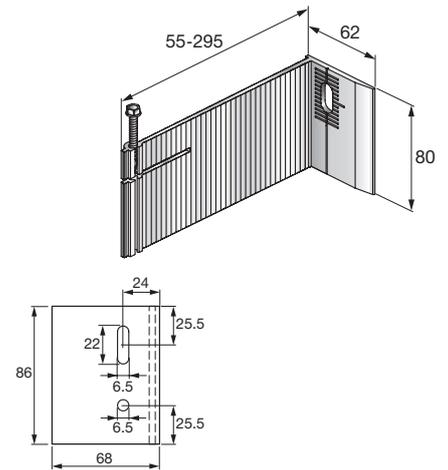
All loading capacity limits in this manual are to be considered as design values. Recommended values are calculated from the elastic limit equal to yield strength, with applied material safety factor of 1.1 and an applied additional safety factor of 1.4

MFT-FOX H Brackets		FOX H 55 M6.5 2084097	FOX H 75 M6.5 2084360	FOX H 95 M6.5 2084363	FOX H 115 M6.5 2084366	FOX H 135 M6.5 2084369
Vertical (dead load)	Fy [kN]	2.55	1.77	1.35	1.09	0.92
Horizontal (wind load)	Fx [kN]	2.07	2.07	2.07	2.07	2.07

MFT-FOX H Brackets		FOX H 155 M6.5 2084372	FOX H 175 M6.5 2084375	FOX H 195 M6.5 2084378	FOX H 215 M6.5 2084381	FOX H 235 M6.5 2084384
Vertical (dead load)	Fy [kN]	0.78	0.69	0.62	0.55	0.50
Horizontal (wind load)	Fx [kN]	2.07	2.07	2.07	2.07	2.07

BRACKET LOAD TABLE: MFT-FOX H 255-295 6.5

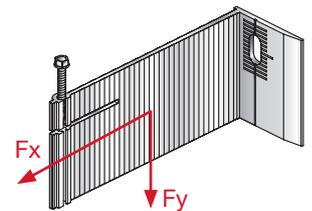
Technical data:	
Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylen	0.117 W/mK
Thermal conductivity aluminum	160 W/mK



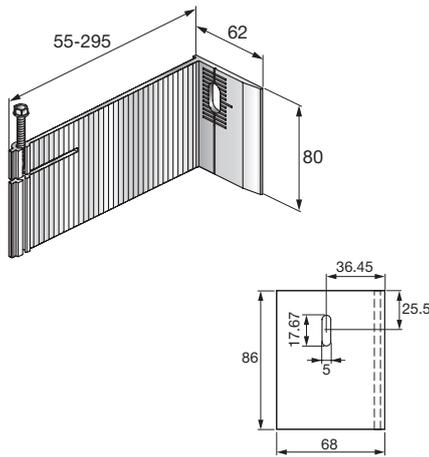
MFT-FOX H Brackets		FOX H 255 M6.5	FOX H 275 M6.5	FOX H 295 M6.5	-	-
		2084387	2084390	2084393		
Bracket height	h [mm]	80	80	80		
Bracket length	L [mm]	255	275	295		
Bracket width	w [mm]	62	62	62		
Hole diameter	D [mm]	6.5	6.5	6.5		

Design resistance

All loading capacity limits in this manual are to be considered as design values. Recommended values are calculated from the elastic limit equal to yield strength, with applied material safety factor of 1.1 and an applied additional safety factor of 1.4



MFT-FOX H Brackets		FOX H 255 M6.5	FOX H 275 M6.5	FOX H 295 M6.5	-	-
		2084387	2084390	2084393		
Vertical (dead load)	Fy [kN]	0.46	0.43	0.39		
Horizontal (wind load)	Fx [kN]	2.07	2.07	2.07		



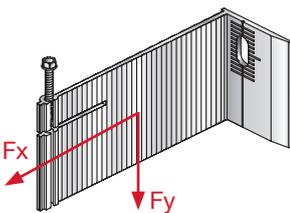
BRACKET LOAD TABLE: MFT-FOX H 55-235 5

Technical data:

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylen	0.117 W/mK
Thermal conductivity aluminum	160 W/mK

MFT-FOX H Brackets		FOX H 55 M5 2084096	FOX H 75 M5 2084099	FOX H 95 M5 2084362	FOX H 115 M5 2084365	FOX H 135 M5 2084368
Bracket height	h [mm]	80	80	80	80	80
Bracket length	L [mm]	55	75	95	115	135
Bracket width	w [mm]	62	62	62	62	62
Hole diameter	D [mm]	5	5	5	5	5

MFT-FOX H Brackets		FOX H 155 M5 2084371	FOX H 175 M5 2084374	FOX H 195 M5 2084377	FOX H 215 M5 2084380	FOX H 235 M5 2084383
Bracket height	h [mm]	80	80	80	80	80
Bracket length	L [mm]	155	175	195	215	235
Bracket width	w [mm]	62	62	62	62	62
Hole diameter	D [mm]	5	5	5	5	5



Design resistance

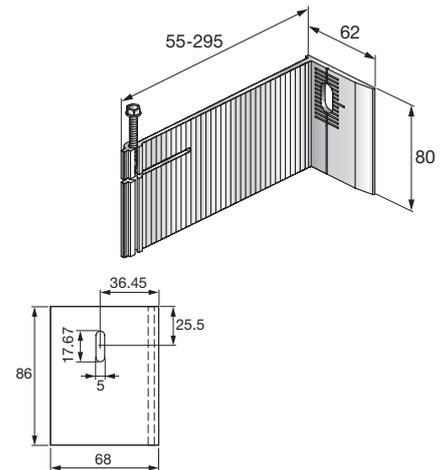
All loading capacity limits in this manual are to be considered as design values. Recommended values are calculated from the elastic limit equal to yield strength, with applied material safety factor of 1.1 and an applied additional safety factor of 1.4

MFT-FOX H Brackets		FOX H 55 M5 2084096	FOX H 75 M5 2084099	FOX H 95 M5 2084362	FOX H 115 M5 2084365	FOX H 135 M5 2084368
Vertical (dead load)	Fy [kN]	1.43	0.99	0.76	0.61	0.51
Horizontal (wind load)	Fx [kN]	1.16	1.16	1.16	1.16	1.16

MFT-FOX H Brackets		FOX H 155 M5 2084371	FOX H 175 M5 2084374	FOX H 195 M5 2084377	FOX H 215 M5 2084380	FOX H 235 M5 2084383
Vertical (dead load)	Fy [kN]	0.43	0.38	0.34	0.31	0.28
Horizontal (wind load)	Fx [kN]	1.16	1.16	1.16	1.16	1.16

BRACKET LOAD TABLE: MFT-FOX H 255-295 5

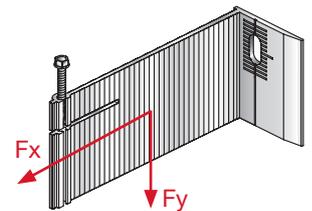
Technical data:	
Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylen	0.117 W/mK
Thermal conductivity aluminum	160 W/mK



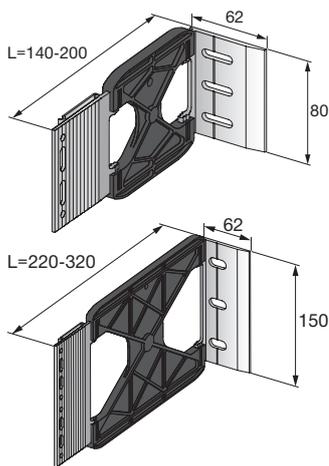
MFT-FOX H Brackets		FOX H 255 M5 2084386	FOX H 275 M5 2084389	FOX H 295 M5 2084392	-	-
Bracket height	h [mm]	80	80	80		
Bracket length	L [mm]	255	275	295		
Bracket width	w [mm]	62	62	62		
Hole diameter	D [mm]	5	5	5		

Design resistance

All loading capacity limits in this manual are to be considered as design values. Recommended values are calculated from the elastic limit equal to yield strength, with applied material safety factor of 1.1 and an applied additional safety factor of 1.4



MFT-FOX H Brackets		FOX H 255 M5 2084386	FOX H 275 M5 2084389	FOX H 295 M5 2084392	-	-
Vertical (dead load)	Fy [kN]	0.26	0.24	0.22		
Horizontal (wind load)	Fx [kN]	1.16	1.16	1.16		



BRACKET LOAD TABLE: MFT-FOX VT MEDIUM/LARGE

Technical data:

Material (aluminum part)	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Material (polyamide part)	Ultramid A3WG10
Thermal conductivity polyamid	0.37 W/mK
Thermal conductivity aluminum	160 W/mK

MFT-FOX VT Brackets		FOX VT 140 M6.5/M11 2096973, 2096974	FOX VT 160 M6.5/M11 2096975, 2096976	FOX VT 180 M6.5/M11 2096977, 2096978	FOX VT 200 M6.5/M11 2096979, 2096980	FOX VT 220 L6.5/L11 2096981, 2096982
Bracket height	h [mm]	80	80	80	80	150
Bracket length	L [mm]	140	160	180	200	220
Bracket width	w [mm]	62	62	62	62	62
Hole diameter	D [mm]	6.5/11	6.5/11	6.5/11	6.5/11	6.5/11

MFT-FOX VT Brackets		FOX VT 240 L6.5/L11 2096983,2096984	FOX VT 260 L6.5/L11 2096985,2096986	FOX VT 280 L6.5/L11 2096987,2096988	FOX VT 300 L6.5/L11 2096989,2096990	FOX VT320 L6.5/L11 2096991,2096992
Bracket height	h [mm]	150	150	150	150	150
Bracket length	L [mm]	240	260	280	300	320
Bracket width	w [mm]	62	62	62	62	62
Hole diameter	D [mm]	6.5/11	6.5/11	6.5/11	6.5/11	6.5/11

Design resistance

All loading capacity limits in this manual are based on the German technical Approval Z-10.9-623 (Allgemeine bauaufsichtliche Zulassung). For more detailed capacity limits, please refer to the German Technical Approval.

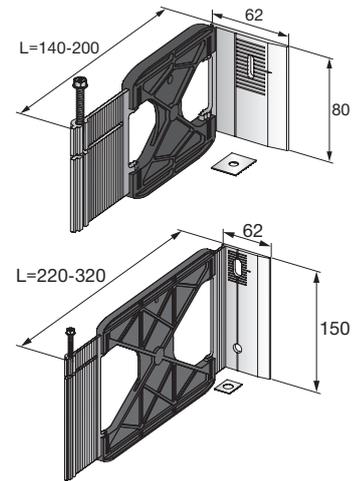
MFT-FOX VT Brackets		FOX VT 140 M6.5/M11 2096973, 2096974	FOX VT 160 M6.5/M11 2096975, 2096976	FOX VT 180 M6.5/M11 2096977, 2096978	FOX VT 200 M6.5/M11 2096979, 2096980	FOX VT 220 L6.5/L11 2096981, 2096982
Modification factor		$\gamma_m \times A_{mod}$				
Vertical (dead load)	F_y [kN]	2.91 5.4	2.91 5.4	2.55 5.4	2.91 5.4	2.21 5.4
Horizon. (wind pressure)*	F_x [kN]	3.2 2.4	3.2 2.4	2.57 2.4	3.2 2.4	2.52 2.4
Horizon. (wind suction)*	F_x [kN]	7.26 2.2	7.26 2.2	7.26 2.2	7.26 2.2	11.85** 3.4**

MFT-FOX VT Brackets		FOX VT 240 L6.5/L11 2096983, 2096984	FOX VT 260 L6.5/L11 2096985, 2096986	FOX VT 280 L6.5/L11 2096987, 2096988	FOX VT 300 L6.5/L11 2096989, 2096990	FOX VT320 L6.5/L11 2096991, 2096992
Modification factor		$\gamma_m \times A_{mod}$	$\gamma_m \times A_{mod}$	$\gamma_m \times A_{mod}$	$\gamma_m \times A_{mod}$	$\gamma_m \times A_{mod}$
Vertical (dead load)	F_y [kN]	2.21 5.4	1.62 5.4	1.62 5.4	1.42 5.4	1.42 5.4
Horizon. (wind pressure)*	F_x [kN]	2.52 2.4	2.09 2.4	2.09 2.4	1.66 2.4	1.66 2.4
Horizon. (wind suction)*	F_x [kN]	11.85** 3.4**	11.85** 3.4**	11.85** 3.4**	11.85** 3.4**	11.85** 3.4**

*Characteristic resistance and modification factors for single axial loads from DIBt-approval

** Only baseplate L11 with 2 anchors

BRACKET LOAD TABLE: MFT-FOX HT MEDIUM/LARGE



Technical data:	
Material (aluminum part)	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Material (polyamide part)	Ultramid A3WG10
Thermal conductivity polyamid	0.37 W/mK
Thermal conductivity aluminum	160 W/mK

MFT-FOX HT Brackets		FOX HT 140 M5/M6.5/M11 2096993, 2096994, 2096995	FOX HT 160 M5/M6.5/M11 2096993, 2096994, 2096995	FOX HT 180 M5/M6.5/M11 2096993, 2096994, 2096995	FOX HT 200 M5/M6.5/M11 2096993, 2096994, 2096995	FOX HT 220 L5/L6.5/L11 2097005, 2097006, 2097007
Bracket height	h [mm]	80	80	80	80	150
Bracket length	L [mm]	140	160	180	200	220
Bracket width	w [mm]	62	62	62	62	62
Hole diameter	D [mm]	5/6.5/11	5/6.5/11	5/6.5/11	5/6.5/11	5/6.5/11

MFT-FOX HT Brackets		FOX HT 240 L5/L6.5/L11 2097008, 2097009, 2097010	FOX HT 260 L5/L6.5/L11 2097011, 2097012, 2097013	FOX HT 280 L5/L6.5/L11 2097014, 2097015, 2097016	FOX HT 300 L5/L6.5/L11 2097017, 2097018, 2097019	FOX HT320 L5/L6.5/L11 2097020, 2097021, 2097022
Bracket height	h [mm]	150	150	150	150	150
Bracket length	L [mm]	240	260	280	300	320
Bracket width	w [mm]	62	62	62	62	62
Hole diameter	D [mm]	5/6.5/11	5/6.5/11	5/6.5/11	5/6.5/11	5/6.5/11

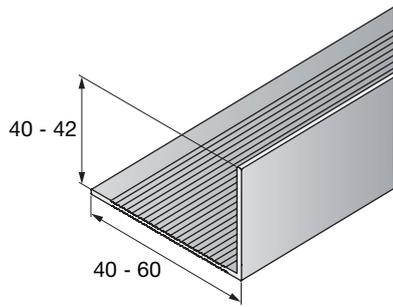
Design resistance

All loading capacity limits in this manual are based on the German technical Approval Z-10.9-623 (Allgemeine bauaufsichtliche Zulassung). For more detailed capacity limits, please refer to the German Technical Approval.

MFT-FOX HT Brackets		FOX HT 140 M5/M6.5/M11 2096993, 2096994, 2096995	FOX HT 160 M5/M6.5/M11 2096993, 2096994, 2096995	FOX HT 180 M5/M6.5/M11 2096993, 2096994, 2096995	FOX HT 200 M5/M6.5/M11 2096993, 2096994, 2096995	FOX HT 220 L5/L6.5/L11 2097005, 2097006, 2097007
Modification factor		$\gamma_m \times A_{mod}$				
Vertical (dead load)	F_y [kN]	1.93 5.4	1.93 5.4	1.2 5.4	1.2 5.4	1.52 5.4
Horizon. (wind pressure)*	F_x [kN]	3.51 2.4	3.51 2.4	2.88 2.4	2.88 2.4	2.76 2.4
Horizon. (wind suction)*	F_x [kN]	7.09 2.2	7.09 2.2	7.09 2.2	7.09 2.2	7.09 2.2

MFT-FOX HT Brackets		FOX HT 240 L5/L6.5/L11 2097008, 2097009, 2097010	FOX HT 260 L5/L6.5/L11 2097011, 2097012, 2097013	FOX HT 280 L5/L6.5/L11 2097014, 2097015, 2097016	FOX HT 300 L5/L6.5/L11 2097017, 2097018, 2097019	FOX HT320 L5/L6.5/L11 2097020, 2097021, 2097022
Modification factor		$\gamma_m \times A_{mod}$	$\gamma_m \times A_{mod}$	$\gamma_m \times A_{mod}$	$\gamma_m \times A_{mod}$	$\gamma_m \times A_{mod}$
Vertical (dead load)	F_y [kN]	1.52 5.4	1.2 5.4	1.2 5.4	0.87 5.4	0.87 5.4
Horizon. (wind pressure)*	F_x [kN]	2.76 2.4	2.03 2.4	2.03 2.4	1.67 2.4	1.67 2.4
Horizon. (wind suction)*	F_x [kN]	7.09 2.2	7.09 2.2	7.09 2.2	7.09 2.2	7.09 2.2

*Characteristic resistance and modification factors for single axial loads from DIBt-approval. All loads are valid only for 11 and 6.5



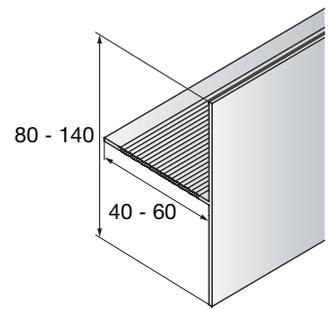
PROFILE LOAD TABLE: L-PROFILE

Technical data:

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Thermal conductivity aluminum	160 W/mK

MFT-L Profile		40x40x1.8 R 2029794	60x40x1.8 2029370	60x40x2 2029372	60x40x2.2 R 2029785	60x50x2 R 2029786
Material thickness	s [mm]	1.8	1.8	2	2.2	2
Cross-sectional area	A [mm ²]	122.9	154	174.36	186.6	234.99
Channel height	h [mm]	40	40	40	40	50
Channel width	w [mm]	40	60	60	60	60
Surface finish		fluted	flat	flat	fluted	fluted
Moment of inertia	I_x [mm ⁴]	19986	61245	66922	71413	78201
Moment of inertia	I_y [mm ⁴]	19986	22226	25515	26364	73928.16
Moment of deviation	I_{xy} [mm ⁴]	11726	21380	24527	25519	41168.13
Moment of inertia on main axis	[°]	-45	-24.4	-24.4	-24.4	-

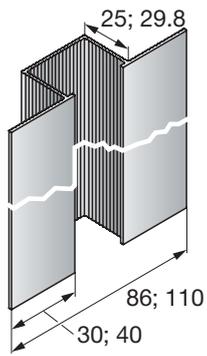
PROFILE LOAD TABLE: T-PROFILE



Technical data:	
Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Thermal conductivity aluminum	160 W/mK

MFT-T Profile		40x80x1.8 R 2029787	60x80x1.8 R 2029788	60x100x1.8 2029374	60x100x2 2029375	60x100x2.2 R 2029789
Material thickness	s [mm]	1.8	1.8	1.8	2	2.2
Cross-sectional area	A [mm ²]	122.9	224.7	258.5	288.3	304.0
Channel height	h [mm]	40	60	60	60	60
Channel width	w [mm]	80	80	100	100	100
Surface finish		fluted	fluted	flat	flat	fluted
Moment of inertia	I _x [mm ⁴]	22957	83098	81427	86846	93674
Moment of inertia	I _y [mm ⁴]	64792	71268	138193	155591	158156
Moment of deviation	I _{xy} [mm ⁴]	-16.35	-15.4	-2.4	-47.4	-52.1
Moment of inertia on main axis	[°]	-	-	-	-	-

MFT-T Profile		40x120x2 2050268	60x120x1.8 2029377	60x120x2 2029378	60x140x2 R 2029791	60x140x2.2 2029792
Material thickness	s [mm]	2	1.8	2	2	2.2
Cross-sectional area	A [mm ²]	289.1842	276.1	325.5	288.3	397.0
Channel height	h [mm]	40	60	60	60	60
Channel width	w [mm]	120	120	120	140	140
Surface finish		flat	flat	flat	fluted	flat
Moment of inertia	I _x [mm ⁴]	28033	83090	90398	96012	102200
Moment of inertia	I _y [mm ⁴]	266114	225040	268597	400174	465342
Moment of deviation	I _{xy} [mm ⁴]	2.2925	-2.4	-50.2	-2.84	3.3
Moment of inertia on main axis	[°]	-	-	-	-	-



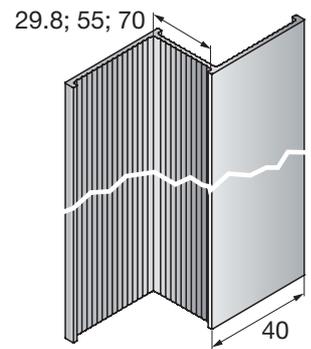
PROFILE LOAD TABLE: O-PROFILE

Technical data:

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Thermal conductivity aluminum	160 W/mK

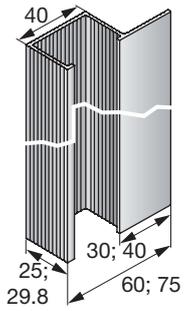
MFT-O Profile		86x25x1.9 2029794	40x29.8x1.9 perf 2029380	40x29.8x1.9 2029379
Material thickness	s [mm]	1.9	1.9	1.9
Cross-sectional area	A [mm ²]	244.11	293.48	389.66
Channel height	h [mm]	25	29.8	29.8
Channel width	w [mm]	86	110	110
Perforation		no	yes	no
Moment of inertia	I _x [mm ⁴]	25133	41580	53143
Moment of inertia	I _y [mm ⁴]	117908	232964	307854
Moment of deviation	I _{xy} [mm ⁴]	0.00	0.00	-291.12
Moment of inertia on main axis	[°]	0.00	-0.00	0.0

PROFILE LOAD TABLE: Z-PROFILE



Technical data:	
Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Thermal conductivity aluminum	160 W/mK

MFT-Z Profile		40x29.8x1.9 2029382	40x55x2.2 2029796	40x70x2.2 2029797
Material thickness	s [mm]	1.9	2.2	2.2
Cross-sectional area	A [mm ²]	200.21	280.65	310.08
Channel height	h [mm]	29.8	55	70
Channel width	w [mm]	77.7	78	78
Perforation		no	no	no
Moment of inertia	I _x [mm ⁴]	33044	142764	257262
Moment of inertia	I _y [mm ⁴]	81179	93971	93985
Moment of deviation	I _{xy} [mm ⁴]	41104	91113	116522
Moment of inertia on main axis	[°]	-60.17	-37.5	-27.49



PROFILE LOAD TABLE: UZ-PROFILE

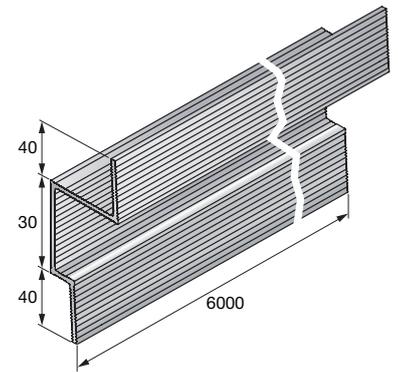
Technical data:

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Thermal conductivity aluminum	160 W/mK

MFT-UZ Profile		60x25x1.9 2029793	40x29.8x1.9 perf. 2029381
Material thickness	s [mm]	1.9	1.9
Cross-sectional area	A [mm ²]	198.33	276.1
Channel height	h [mm]	25	29.8
Channel width	w [mm]	60.4	74.9
Perforation		NO	YES
Moment of inertia	I _x [mm ⁴]	19931	83090
Moment of inertia	I _y [mm ⁴]	64047	225040
Moment of deviation	I _{xy} [mm ⁴]	-16393	-2.4
Moment of inertia on main axis	[°]	71.69	-

PROFILE LOAD TABLE: STULP-PROFILE

Technical data:	
Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Thermal conductivity aluminum	160 W/mK

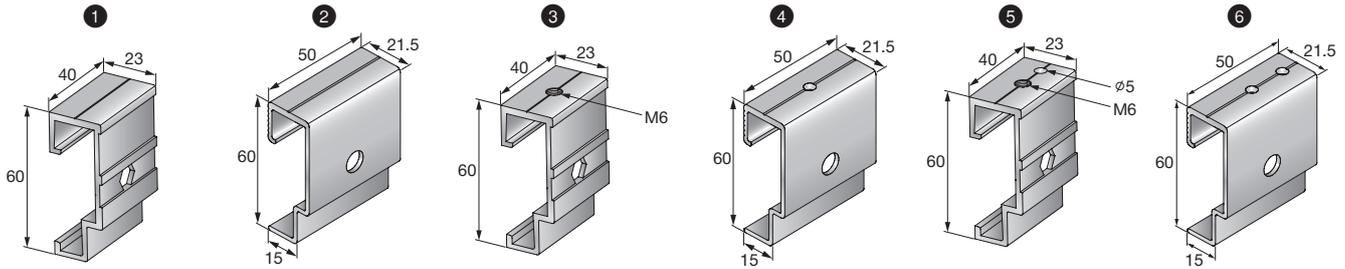


MFT-STULP Profile		25x30 2030901
Material thickness	s [mm]	-
Cross-sectional area	A [mm ²]	264.5
Channel height	h [mm]	110
Channel width	w [mm]	25
Perforation		NO
Moment of inertia	I_x [mm ⁴]	12965
Moment of inertia	I_y [mm ⁴]	208326
Moment of deviation	I_{xy} [mm ⁴]	26216
Moment of inertia on main axis	[°]	-7.51

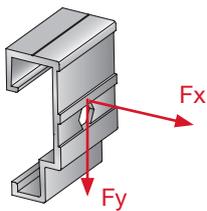
ACCESSORIES LOAD TABLE: MFT-H 200 HANGERS

Technical data:

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Thermal conductivity aluminum	160 W/mK



MFT-H 200 Hanger		H 200/40 K 2030643	H 200/50 2030640	HA 200/40 K 2030643	HA 200/50 2030638	HAF 200/40 K 2030643	HAF 200/50 2030639
		1	2	3	4	5	6
Material thickness:	s [mm]	2	2	2	2	2	2
Cross-sectional area:	A [mm ²]	-	-	-	-	-	-
Clamp height:	h [mm]	60	60	60	60	60	60
Clamp width:	w [mm]	22.5	21.5	22.5	21.5	22.5	22.5
Clamp length	l [mm]	40	50	40	50	40	50



Design resistance

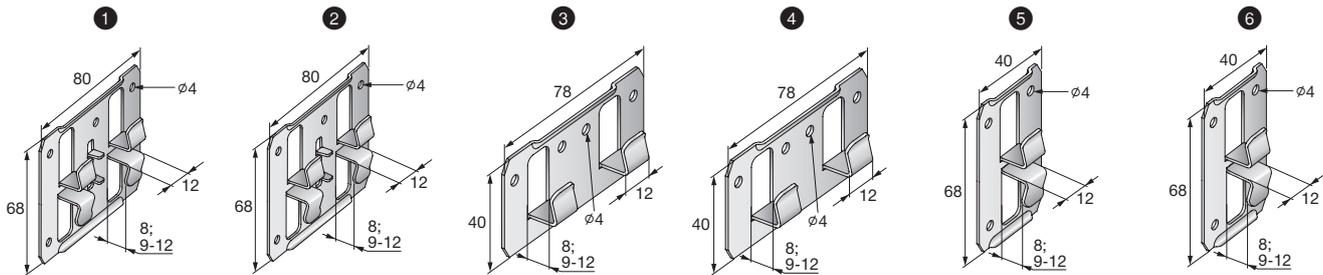
All loading capacity limits in this manual are to be considered as design values. Recommended values are calculated from the elastic limit equal to yield strength, with applied material safety factor of 1.1 and an applied additional safety factor of 1.4

MFT-H 200 Hanger		H 200/40 K 2030643	HA 200/40 K 2030643	HAF 200/40 K 2030643	H 200/50 2030640	HA 200/50 2030638	HAF 200/50 2030639
Vertical (dead load)	Fy [kN]	2.1	2.1	2.1	2.1	2.1	2.1
Horizontal (wind load)	Fx [kN]	2.967	2.967	2.967	2.967	2.967	2.967

ACCESSORIES LOAD TABLE: MFT-CV CLAMPS

Technical data:

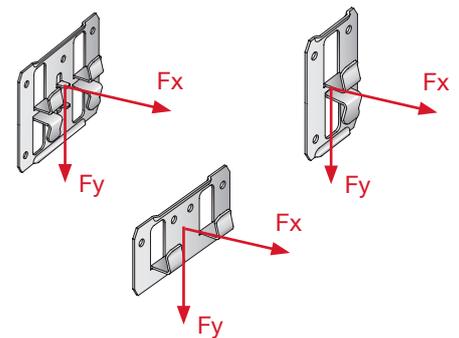
Material	A2 1.4301
Yield strength	$\geq 190 \text{ N/mm}^2$
Modulus of elasticity	200.000 N/mm^2
Thermal conductivity aluminum	21 W/mK



MFT-CV Clamp		CVM 8 A2 2096769	CVM 9-12 A2 2096910	CVB 8 A2 2096913	CVB 9-12 A2 2096914	CVE 8 A2 2096911	CVE 9-12 A2 2096912
		1	2	3	4	5	6
Material thickness:	s [mm]	1.2	1.2	1.2	1.2	1.2	1.2
Cross-sectional area:	A [mm ²]	-	-	-	-	-	-
Clamp height:	h [mm]	68	68	40	40	68	68
Clamp width:	w [mm]	80	80	78	78	40	40
Clamp length	l [mm]	8	9-12	8	9-12	8	9-12

Design resistance

All loading capacity limits in this manual are to be considered as design values. Recommended values are calculated from the elastic limit equal to yield strength, with applied material safety factor of 1.1 and an applied additional safety factor of 1.4



MFT-CV Clamp		CVM 8 A2 2096769	CVB 8 A2 2096913	CVE 8 A2 2096911	CVE 9-12 A2 2096912	CVM 9-12 A2 2096910	CVB 9-12 A2 2096914
Vertical (dead load)	Fy [kN]	0.13	0.14	0.1	0.1	0.1	0.14
Horizontal (wind load)	Fx [kN]	0.17	0.17	0.14	0.14	0.14	0.17

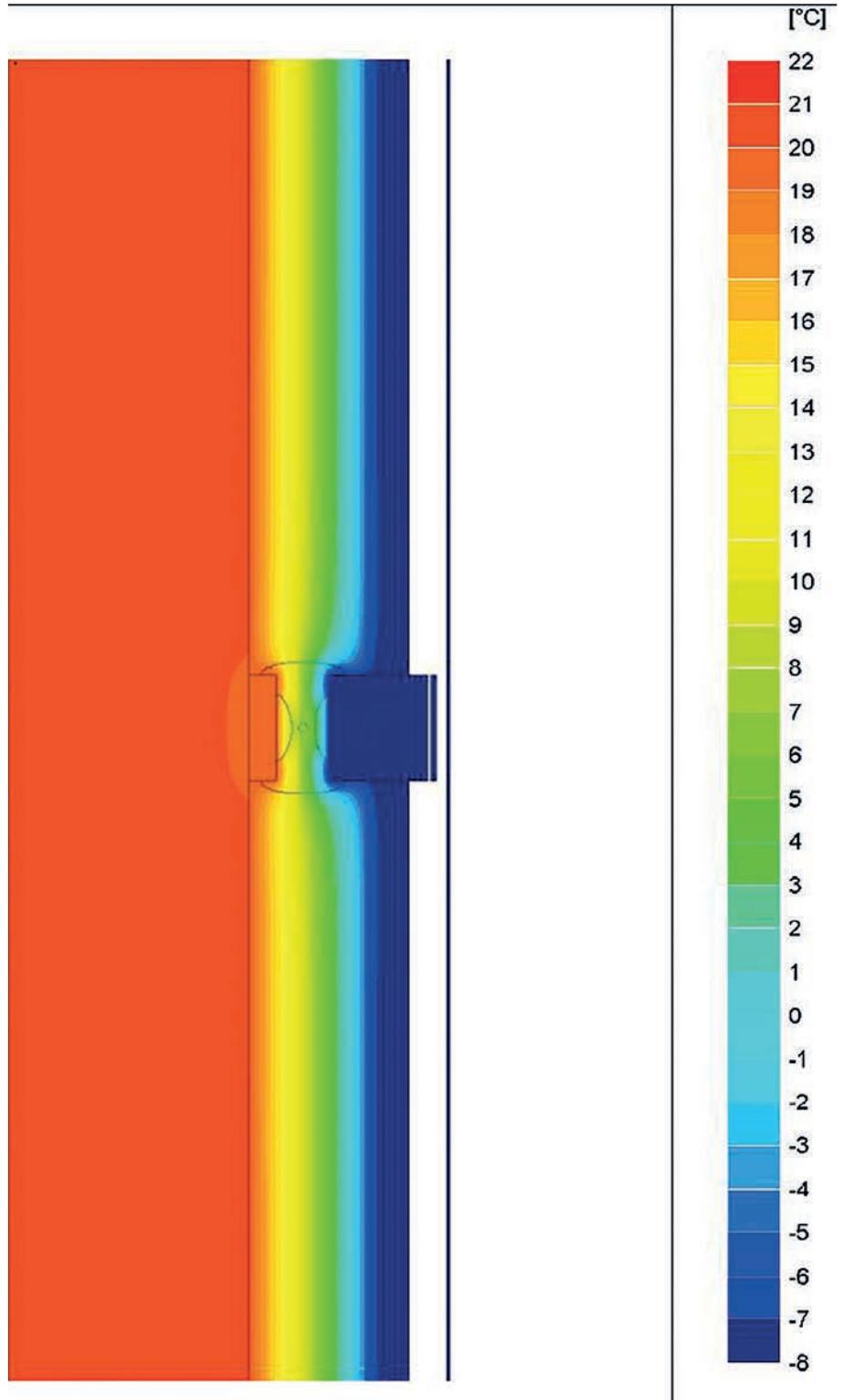
CONTENTS AND OVERVIEW OF THIS SECTION

Section	Page
6 U-Value	
U-Value – description	2
U-Value – impact due to the substructure	3
U-Value – calculation method	4
U-Value – calculation method	5
U-Value: MFT-MFI medium – concrete 18 cm	6
U-Value: MFT-MFI medium – perforated brick 30 cm	7
U-Value: MFT-MFI large – concrete 18 cm	8
U-Value: MFT-MFI large – concrete 18 cm	9
U-Value: MFT-FOX VT – concrete 20/25 cm	10
U-Value: MFT-FOX VT – perforated brick 30 cm	11
U-Value: MFT-FOX HT – concrete 20/25 cm	12
U-Value: MFT-FOX HT – perforated brick 18 cm	13

DESCRIPTION

The U-factor or U-value is the overall heat transfer coefficient that describes how well a building element conducts heat or the rate of heat transfer (in watts) through one square metre of a structure divided by the difference in temperature across the structure.

The elements are commonly assemblies of many layers of components such as those that make up walls/floors/roofs etc. These values measure the rate of heat transfer through a building element over a given area under standardised conditions. The usual standard is at a temperature gradient of 24° C (75° F) at 50% humidity with no wind. It is expressed in watts per meter squared kelvin (W/m^2K). A lower U-factor/value indicates a greater reduction of heat transfer.



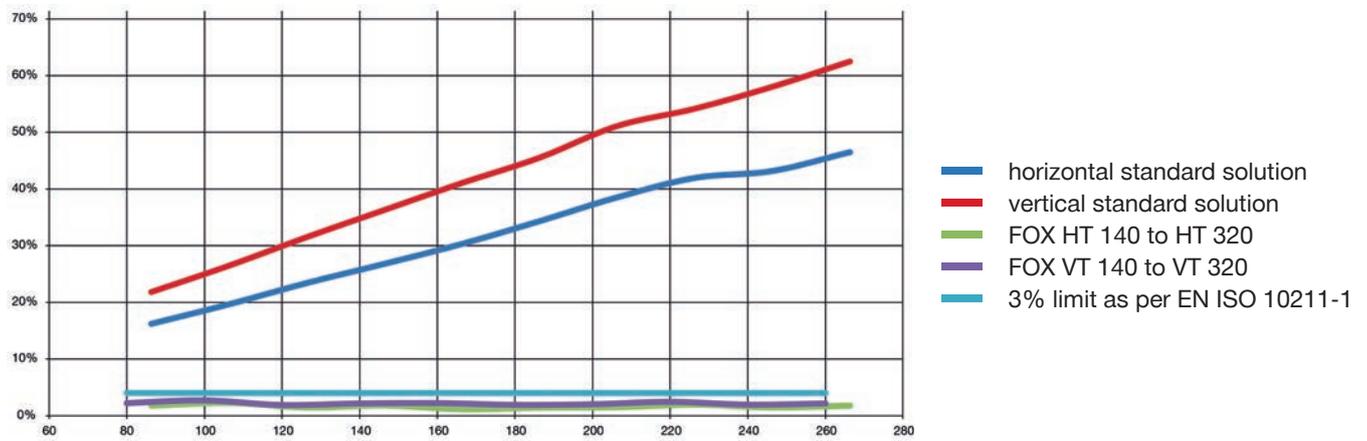
IMPACT DUE TO THE SUBSTRUCTURE

Today’s targets, requirements and standards relating to the efficiency and sustainability of buildings inevitably demand new, innovative solutions, also for facades.

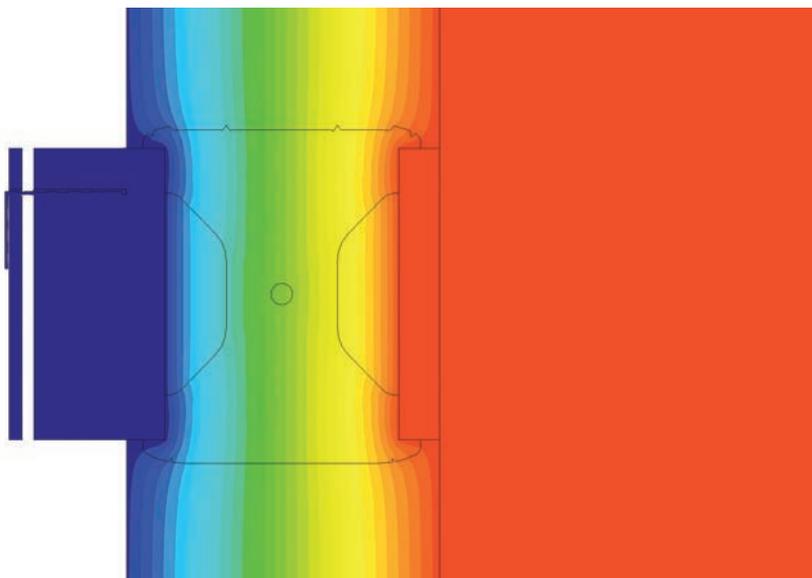
Various studies, including tests carried out by the Swiss Federal Laboratories for Materials Science and Technology (EMPA – Eidgenössische Materialprüfanstalt) have shown, for example, that the requirements of the “Passivhaus” standards can no longer be met by facade substructures constructed only from aluminum.

Through use of brackets such as the Hilti MFT-FOX VT/HT, designed to eliminate thermal bridging, not only can the thickness of the insulating layer be reduced, but an up to 40% better U-value can be achieved compared to metal structures.

The diagram compares standard aluminum substructures to substructures designed to reduce thermal bridging.



The isothermal image clearly shows the uniform heat distribution. The result is a facade with virtually no losses due to thermal bridging.



CALCULATION METHOD

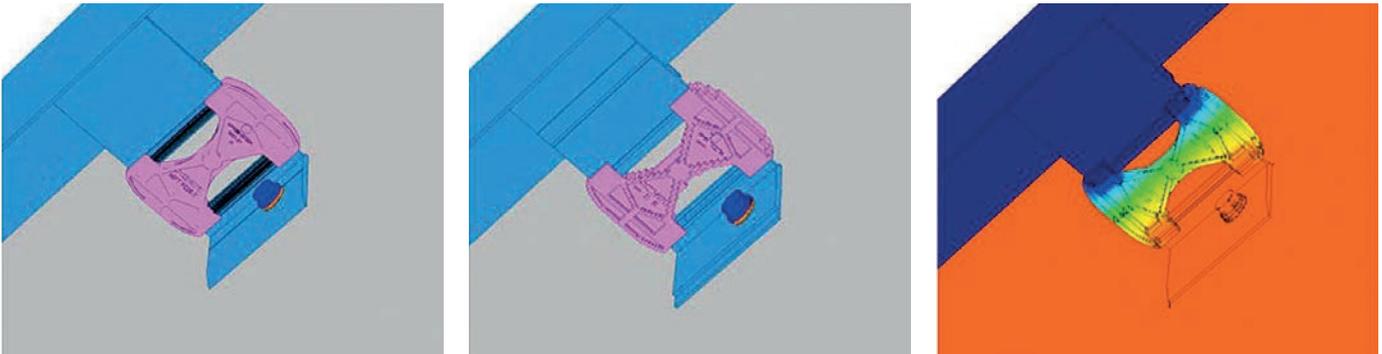
The numerical calculations were performed in accordance with EN ISO 10211.

Simplified models

The test object is a wall (made of concrete, sand-lime block or standard brickwork in two thicknesses) on which a framework for supporting a ventilated facade is mounted using anchor bolts. The following simplifications were made in order to model the inputs for the calculation program:

The bolt is shown as a solid cylinder; the frame anchor is shown as a hollow cylinder.

The modeling method and the definition of grid points conform to the requirements of the EN ISO 10211-1 standard. A detailed listing of the input data for the calculated cases is given in the appendix.



Calculations

Thermal conduction was evaluated for a one square meter section of the wall clad with various thicknesses of insulation. A single bracket was mounted in the center of the test wall area, anchored to the base material.

CALCULATION METHOD

Standard for thermal bridge calculation as per EN ISO 10211-1

Thermal bridges present in the facade were taken into account as follows:

$$U = \frac{U_0 \cdot A + \sum \Psi \cdot l + \sum \chi}{A} = U_0 + \Delta U$$

with:

• Area-dependent additional term for the total thermal bridge:

$$\Delta U = \frac{L^{3D}}{A} - U_0$$

• Linear thermal transmittance:

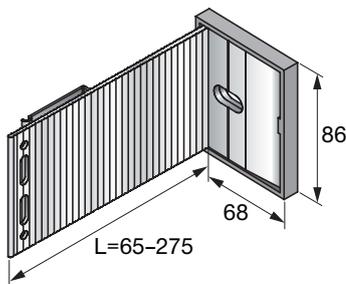
$$\Psi = L^{2D} - U_0 \cdot l$$

• Point thermal transmittance:

$$\chi = L^{3D} - \Psi \cdot l - U_0 \cdot A$$

$$U_0 = \frac{1}{\left(\frac{1}{h_i} + \frac{d_v}{\lambda_v} + \frac{d_D}{\lambda_D} + \frac{1}{h_e}\right)} = \frac{1}{\left(\frac{1}{h_i} + R_v + R_D + \frac{1}{h_e}\right)}$$

U_0	Heat transmittance of the unmodified wall in W/(m ² K)
ΔU	Additional term due to thermal bridges W/(m ² K)
A	Wall area in m ²
l	Length of the linear thermal bridge in m
L^{2D}	Thermal coupling coefficient for a 2D-calculation in W/(m ² K)
L^{3D}	Thermal coupling coefficient for a 3D-calculation in W/K
h_i	Heat transfer coefficient on warm side 8 W/(m ² K)
h_e	Heat transfer coefficient on cold side 8 W/(m ² K)
d_v	Thickness of underlying wall structure m
d_D	Thickness of insulation layer m
λ_w	Thermal conductivity of underlying wall structure W/(m ² K)
λ_D	Thermal conductivity of insulation layer 0.035 W/(m ² K)
R_v	Thermal resistance of underlying wall structure (m ² K)/W
R_D	Thermal resistance of insulation layer (m ² K)/W



MFT-MFI MEDIUM – CONCRETE 18 CM

Technical data:

Bracket

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylene	0.117 W/mK
Thermal conductivity aluminium	160 W/mK

Substrate

Material	Concrete
Thickness d_v	180 mm
Thermal conductivity λ_w	1.8 W/mK
Thermal resistance R_v	0.1 W/mK

Insulation

Material	Mineral wool
Thickness d_D	100-280 mm
Thermal conductivity λ_D	0.035 W/mK

MFT-MFI Medium Brackets			MFI 125 M	MFI 125 M	MFI 155 M	MFI 185 M	MFI 215 M	MFI 245 M	MFI 275 M	MFI 275 M	MFI 275 M	MFI 275 M
Insulation thickness	d_D [mm]		100	120	140	160	180	200	220	240	260	280
Thermal transmission coefficient of the undisturbed wall	U_0 [W/m ² K]		0.3118	0.2647	0.2299	0.2032	0.1857*	0.1682*	0.1507	0.1396*	0.1286	0.1175*
Punctual thermal bridge loss coefficient of the bracket	X [W/K]		0.0638	0.0639*	0.0641*	0.0642	0.0638*	0.0634*	0.0630*	0.0627*	0.0623*	0.0620*

*value interpolated

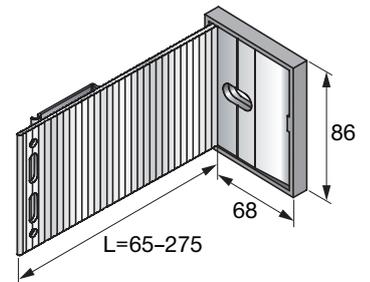
U-Value**

(surface A=1.0 m², profile length 1.0 m, profile 30 mm air side)

Number of brackets		MFI 125 M	MFI 125 M	MFI 155 M	MFI 185 M	MFI 215 M	MFI 245 M	MFI 275 M	MFI 275 M	MFI 275 M	MFI 275 M
Number of brackets	1	0.3756	0.3286	0.294	0.2674	0.2495	0.2316	0.2137	0.2023	0.1909	0.1795
Number of brackets	2	0.4394	0.3925	0.3581	0.3316	0.3133	0.295	0.2767	0.265	0.2532	0.2415
Number of brackets	3	0.5032	0.4564	0.4222	0.3958	0.3771	0.3584	0.3397	0.3277	0.3155	0.3035
Number of brackets	4	0.567	0.5203	0.4863	0.46	0.4409	0.4218	0.4027	0.3904	0.3778	0.3655
Number of brackets	5	0.6308	0.5842	0.5504	0.5242	0.5047	0.4852	0.4657	0.4531	0.4401	0.4275

**MFT-MFI M and profile T 120x60x1.8 30 inside the insulation

MFT-MFI MEDIUM – PERFORATED BRICK 30 CM



Technical data:	
Bracket	
Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylene	0.117 W/mK
Thermal conductivity aluminium	160 W/mK
Substrate	
Material	Perforated brick
Thickness d_v	300 mm
Thermal conductivity λ_w	0.44 W/mK
Thermal resistance R_v	0.682 W/mK
Insulation	
Material	Mineral wool
Thickness d_D	100-280 mm
Thermal conductivity λ_D	0.035 W/mK

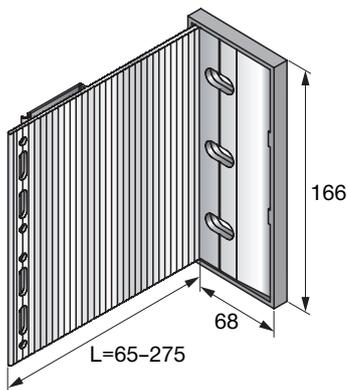
MFT-MFI Medium Brackets			MFI 125 M	MFI 125 M	MFI 155 M	MFI 185 M	MFI 215 M	MFI 245 M	MFI 275 M	MFI 275 M	MFI 275 M	MFI 275 M
Insulation thickness	d_D	[mm]	100	120	140	160	180	200	220	240	260	280
Thermal transmission coefficient of the undisturbed wall	U_0	[W/m ² K]	0.2639	0.2293	0.2028	0.1817	0.1673*	0.1529*	0.1386	0.1287*	0.1196	0.1112*
Punctual thermal bridge loss coefficient of the bracket	X	[W/K]	0.0296	0.0312*	0.0328*	0.0344	0.0350*	0.0357*	0.0364*	0.0370*	0.0377*	0.0384*

*value interpolated

U-Value**(surface A=1.0 m², profile length 1.0 m, profile 30 mm air side)

Number of brackets	1	0.2935	0.2605	0.2356	0.2161	0.2023	0.1886	0.175	0.1657	0.1573	0.1496
Number of brackets	2	0.3231	0.2917	0.2684	0.2505	0.2373	0.2243	0.2114	0.2027	0.195	0.188
Number of brackets	3	0.3527	0.3229	0.3012	0.2849	0.2723	0.26	0.2478	0.2397	0.2327	0.2264
Number of brackets	4	0.3823	0.3541	0.334	0.3193	0.3073	0.2957	0.2842	0.2767	0.2704	0.2648
Number of brackets	5	0.4119	0.3853	0.3668	0.3537	0.3423	0.3314	0.3206	0.3137	0.3081	0.3032

**MFT-MFI M and profile T 120x60x1.8 30 inside the insulation



MFT-MFI LARGE – CONCRETE 18 CM

Technical data:

Bracket

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylene	0.117 W/mK
Thermal conductivity aluminium	160 W/mK

Substrate

Material	Concrete
Thickness d_v	180 mm
Thermal conductivity λ_w	1.8 W/mK
Thermal resistance R_v	0.1 W/mK

Insulation

Material	Mineral wool
Thickness d_D	100-280 mm
Thermal conductivity λ_D	0.035 W/mK

MFT-MFI Large Brackets			MFI 125 L	MFI 125 L	MFI 155 L	MFI 185 L	MFI 215 L	MFI 245 L	MFI 275 L	MFI 275 L	MFI 275 L	MFI 275 L
Insulation thickness	d_D [mm]		100	120	140	160	180	200	220	240	260	280
Thermal transmission coefficient of the undisturbed wall	U_0 [W/m ² K]		0.3118	0.2647	0.2299	0.2032	0.1857*	0.1682*	0.1507	0.1396*	0.1286	0.1175*
Punctual thermal bridge loss coefficient of the bracket	X [W/K]		0.1082	0.1087*	0.1092*	0.1097	0.1092*	0.1086*	0.1081*	0.1076*	0.1070*	0.1065*

*value interpolated

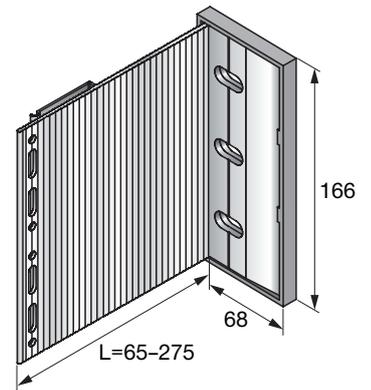
U-Value**

(surface A=1.0 m², profile length 1.0 m, profile 30 mm air side)

Number of brackets	1	0.42	0.3734	0.3391	0.3129	0.2949	0.2768	0.2588	0.2472	0.2356	0.224
Number of brackets	2	0.5282	0.4821	0.4483	0.4226	0.4041	0.3854	0.3669	0.3548	0.3426	0.3305
Number of brackets	3	0.6364	0.5908	0.5575	0.5323	0.5133	0.494	0.475	0.4624	0.4496	0.437
Number of brackets	4	0.7446	0.6995	0.6667	0.642	0.6225	0.6026	0.5831	0.57	0.5566	0.5435
Number of brackets	5	0.8528	0.8082	0.7759	0.7517	0.7317	0.7112	0.6912	0.6776	0.6636	0.65

**MFT-MFI L and profile T 120x60x1.8 30 inside the insulation

MFT-MFI LARGE – PERFORATED BRICK 30 CM



Technical data:

Bracket

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Isolator material	Polypropylen
Thermal conductivity polypropylene	0.117 W/mK
Thermal conductivity aluminium	160 W/mK

Substrate

Material	Perforated brick
Thickness d_v	300 mm
Thermal conductivity λ_w	0.44 W/mK
Thermal resistance R_v	0.682 W/mK

Insulation

Material	Mineral wool
Thickness d_D	100-280 mm
Thermal conductivity λ_D	0.035 W/mK

MFT-MFI Large Brackets			MFI 125 L	MFI 125 L	MFI 155 L	MFI 185 L	MFI 215 L	MFI 245 L	MFI 275 L	MFI 275 L	MFI 275 L	MFI 275 L
Insulation thickness	d_D	[mm]	100	120	140	160	180	200	220	240	260	280
Thermal transmission coefficient of the undisturbed wall	U_0	[W/m ² K]	0.2639	0.2293	0.2028	0.1817	0.1673*	0.1529*	0.1386	0.1287*	0.1196	0.1112*
Punctual thermal bridge loss coefficient of the bracket	X	[W/K]	0.0478	0.0503*	0.0529*	0.0554	0.0564*	0.0575*	0.0586*	0.0597*	0.0607*	0.0618*

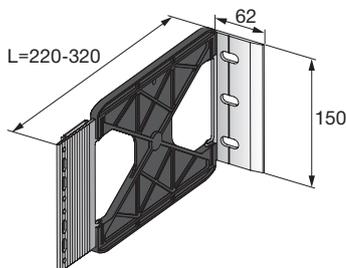
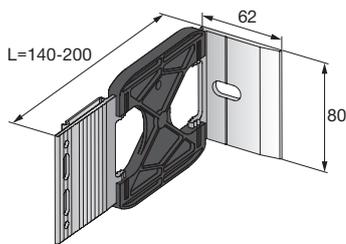
*value interpolated

U-Value**

(surface A=1.0 m², profile length 1.0 m, profile 30 mm air side)

Number of brackets	1	0.3117	0.2796	0.2557	0.2371	0.2237	0.2104	0.1972	0.1884	0.1803	0.173
Number of brackets	2	0.3595	0.3299	0.3086	0.2925	0.2801	0.2679	0.2558	0.2481	0.241	0.2348
Number of brackets	3	0.4073	0.3802	0.3615	0.3479	0.3365	0.3254	0.3144	0.3078	0.3017	0.2966
Number of brackets	4	0.4551	0.4305	0.4144	0.4033	0.3929	0.3829	0.373	0.3675	0.3624	0.3584
Number of brackets	5	0.5029	0.4808	0.4673	0.4587	0.4493	0.4404	0.4316	0.4272	0.4231	0.4202

**MFT-MFI L and profile T 120x60x1.8 30 inside the insulation



MFT-FOX VT – CONCRETE 20/25 CM

Technical data:

Bracket

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Material (polyamide part)	Ultramid A3WG10
Thermal conductivity polyamide	0.37 W/mK
Thermal conductivity aluminium	160 W/mK

Substrate

Material	Concrete
Thickness d_v	200/250 mm
Thermal conductivity λ_w	1.8 W/mK
Thermal resistance R_v	0.1 W/mK

Insulation

Material	Mineral wool
Thickness d_D	120-300 mm
Thermal conductivity λ_D	0.035 W/mK

MFT-FOX VT Brackets			FOX VT 140	FOX VT 160	FOX VT 180	FOX VT 200	FOX VT 220	FOX VT 240	FOX VT 260	FOX VT 280	FOX VT 300	FOX VT 320
Insulation thickness	d_D [mm]		120	140	160	180	200	220	240	260	280	300
Thermal transmission coefficient of the undisturbed wall	U_0 [W/m ² K]		0.2647	0.2299	0.2032	0.1821	0.1649	0.1639	0.1634	0.1628	0.159	0.1569
Punctual thermal bridge loss coefficient of the bracket	X [W/K]		0.0034	0.0035	0.0018	0.0018	0.002	0.0019	0.0019	0.0019	0.0018	0.0018

*value interpolated

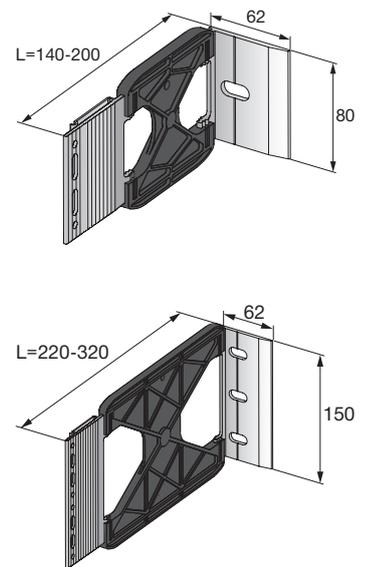
U-Value**

(surface A=1.0 m², profile length 1.0 m, profile 30 mm air side)

Number of brackets		FOX VT 140	FOX VT 160	FOX VT 180	FOX VT 200	FOX VT 220	FOX VT 240	FOX VT 260	FOX VT 280	FOX VT 300	FOX VT 320
Number of brackets	1	0.2681	0.2334	0.205	0.1839	0.1669	0.1658	0.1653	0.1647	0.1608	0.1587
Number of brackets	2	0.2715	0.2369	0.2068	0.1857	0.1689	0.1677	0.1672	0.1666	0.1626	0.1605
Number of brackets	3	0.2749	0.2404	0.2086	0.1875	0.1709	0.1696	0.1691	0.1685	0.1644	0.1623
Number of brackets	4	0.2783	0.2439	0.2104	0.1893	0.1729	0.1715	0.171	0.1704	0.1662	0.1641
Number of brackets	5	0.2817	0.2474	0.2122	0.1911	0.1749	0.1734	0.1729	0.1723	0.168	0.1659

**MFT-FOX VT and profile T 120x60x1.8 30 inside the insulation

MFT-FOX VT – PERFORATED BRICK 30 CM



Technical data:	
Bracket	
Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Material (polyamide part)	Ultramid A3WG10
Thermal conductivity polyamide	0.37 W/mK
Thermal conductivity aluminium	160 W/mK
Substrate	
Material	Perforated brick
Thickness d_v	300 mm
Thermal conductivity λ_w	0.44 W/mK
Thermal resistance R_v	0.682 W/mK
Insulation	
Material	Mineral wool
Thickness d_b	120-300 mm
Thermal conductivity λ_b	0.035 W/mK

MFT-FOX VT Brackets			FOX VT 140	FOX VT 160	FOX VT 180	FOX VT 200	FOX VT 220	FOX VT 240	FOX VT 260	FOX VT 280	FOX VT 300	FOX VT 320
Insulation thickness	d_b	[mm]	120	140	160	180	200	220	240	260	280	300
Thermal transmission coefficient of the undisturbed wall	U_0	[W/m ² K]	0.2647	0.2299	0.2032	0.1821	0.111	0.11	0.109	0.1083	0.1068	0.106
Punctual thermal bridge loss coefficient of the bracket	X	[W/K]	0.0025	0.0026	0.0014	0.0015	0.0012	0.0011	0.001	0.001	0.001	0.001

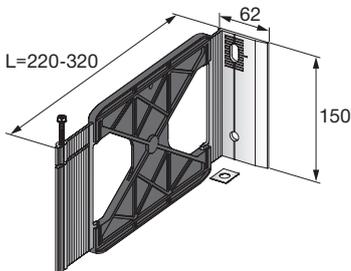
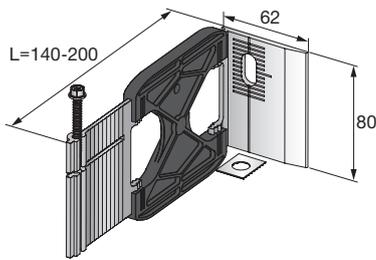
*value interpolated

U-Value**

(surface A=1.0 m², profile length 1.0 m, profile 30 mm air side)

Number of brackets	1	0.2672	0.2325	0.2046	0.1836	0.1122	0.1111	0.11	0.1093	0.1078	0.107
Number of brackets	2	0.2697	0.2351	0.206	0.1851	0.1134	0.1122	0.111	0.1103	0.1088	0.108
Number of brackets	3	0.2722	0.2377	0.2074	0.1866	0.1146	0.1133	0.112	0.1113	0.1098	0.109
Number of brackets	4	0.2747	0.2403	0.2088	0.1881	0.1158	0.1144	0.113	0.1123	0.1108	0.11
Number of brackets	5	0.2772	0.2429	0.2102	0.1896	0.117	0.1155	0.114	0.1133	0.1118	0.111

**MFT-FOX VT and profile T 120x60x1.8 30 inside the insulation



MFT-FOX HT – CONCRETE 20/25 CM

Technical data:

Bracket

Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Material (polyamide part)	Ultramid A3WG10
Thermal conductivity polyamide	0.37 W/mK
Thermal conductivity aluminium	160 W/mK

Substrate

Material	Concrete
Thickness d_v	200/250 mm
Thermal conductivity λ_w	1.8 W/mK
Thermal resistance R_v	0.1 W/mK

Insulation

Material	Mineral wool
Thickness d_D	120-300 mm
Thermal conductivity λ_D	0.035 W/mK

MFT-FOX HT Brackets			FOX HT 140	FOX HT 160	FOX HT 180	FOX HT 200	FOX HT 220	FOX HT 240	FOX HT 260	FOX HT 280	FOX HT 300	FOX HT 320
Insulation thickness	d_D [mm]		120	140	160	180	200	220	240	260	280	300
Thermal transmission coefficient of the undisturbed wall	U_0 [W/m ² K]		0.3794	0.3118	0.2647	0.2299	0.2032	0.1821	0.1649	0.1519	0.1388	0.1286
Punctual thermal bridge loss coefficient of the bracket	X [W/K]		0.0027	0.0032	0.0014	0.0017	0.0014	0.0018	0.001	0.0012	0.0008	0.0009

*value interpolated

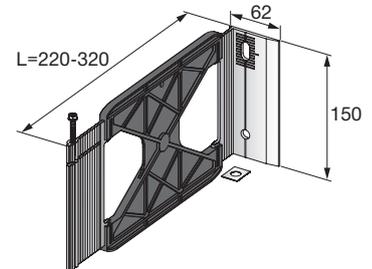
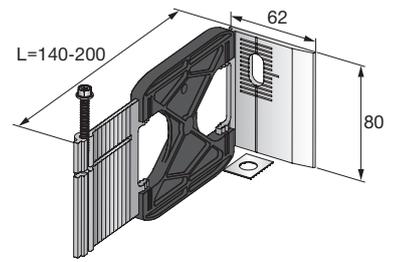
U-Value**

(surface A=1.0 m², profile length 1.0 m, profile 30 mm air side)

Number of brackets		FOX HT 140	FOX HT 160	FOX HT 180	FOX HT 200	FOX HT 220	FOX HT 240	FOX HT 260	FOX HT 280	FOX HT 300	FOX HT 320
1		0.3821	0.315	0.2661	0.2316	0.2048	0.1839	0.1704	0.1519	0.1396	0.1295
2		0.3848	0.3182	0.2675	0.2333	0.2064	0.1857	0.1714	0.1531	0.1404	0.1304
3		0.3875	0.3214	0.2689	0.235	0.208	0.1875	0.1724	0.1543	0.1412	0.1313
4		0.3902	0.3246	0.2703	0.2367	0.2096	0.1893	0.1734	0.1555	0.142	0.1322
5		0.3929	0.3278	0.2717	0.2384	0.2112	0.1911	0.1744	0.1567	0.1428	0.1331

**MFT-FOX HT and profile T 120x60x1.8 30 inside the insulation

MFT-FOX HT – PERFORATED BRICK 18 CM



Technical data:	
Bracket	
Material	EN-AW-6063 T66
Yield strength	200 N/mm ²
Modulus of elasticity	70.000 N/mm ²
Material (polyamide part)	Ultramid A3WG10
Thermal conductivity polyamide	0.37 W/mK
Thermal conductivity aluminium	160 W/mK
Substrate	
Material	Perforated brick
Thickness d_v	180 mm
Thermal conductivity λ_w	0.44 W/mK
Thermal resistance R_v	0.409 W/mK
Insulation	
Material	Mineral wool
Thickness d_D	80-260 mm
Thermal conductivity λ_D	0.035 W/mK

MFT-FOX HT Brackets			FOX HT 140	FOX HT 160	FOX HT 180	FOX HT 200	FOX HT 220	FOX HT 240	FOX HT 260	FOX HT 280	FOX HT 300	FOX HT 320
Insulation thickness	d_D	[mm]	80	100	120	140	160	180	200	220	240	260
Thermal transmission coefficient of the undisturbed wall	U_0	[W/m ² K]	0.3417	0.2844	0.2446	0.2146	0.1912	0.1724	0.1569	0.1440	0.1330	0.1236
Punctual thermal bridge loss coefficient of the bracket	X	[W/K]	0.0021	0.0026	0.0012	0.0014	0.0013	0.0015	0.0009	0.0011	0.0007	0.0009

*value interpolated

U-Value**

(surface A=1.0 m², profile length 1.0 m, profile 30 mm air side)

Number of brackets	1	0.3417	0.287	0.2458	0.2158	0.1925	0.1739	0.1575	0.1451	0.1337	0.1245
Number of brackets	2	0.3438	0.2896	0.247	0.217	0.1938	0.1754	0.1581	0.1462	0.1344	0.1254
Number of brackets	3	0.3459	0.2922	0.2482	0.2182	0.1951	0.1769	0.1587	0.1473	0.1351	0.1263
Number of brackets	4	0.348	0.2948	0.2494	0.2194	0.1964	0.1784	0.1593	0.1484	0.1358	0.1272
Number of brackets	5	0.3501	0.2974	0.2506	0.2206	0.1977	0.1799	0.1599	0.1495	0.1365	0.1281

**MFT-MFI L and profile T 120x60x1.8 30 inside the insulation

