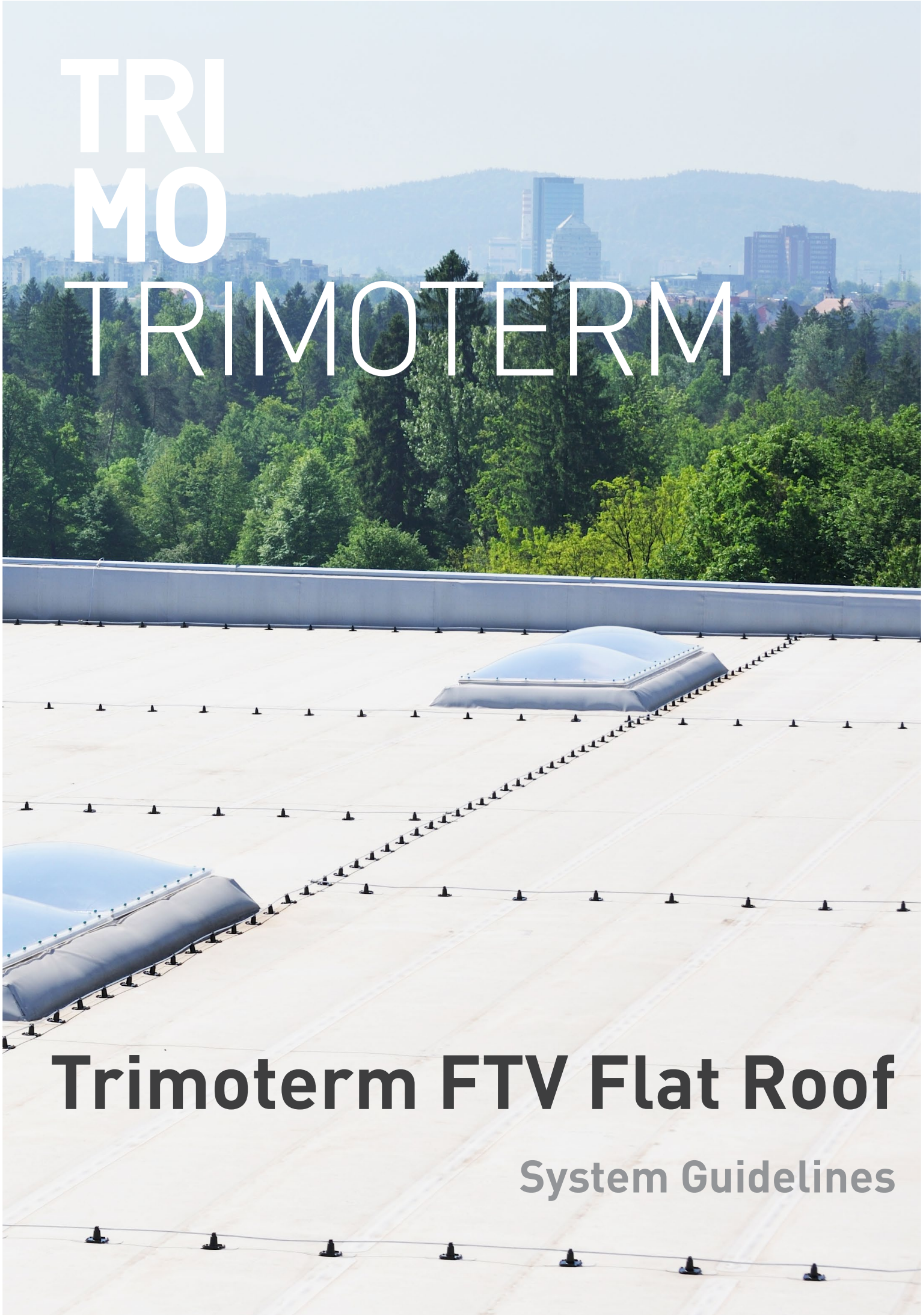

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Trimoterm FTV Flat Roof

System Guidelines

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For design and installation teams!

Trimoterm FTV flat roof System Guidelines

Descriptions of details and other information in this document are only provided to illustrate the system(s) of Trimoterm cladding products and applications. Each user of such information is fully responsible for the incorporation of this advisory information in their design.

Trimo accepts no responsibility for any incurred damages or failures resulting from omission or misinterpretation of the information included in this document.

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A
Product description

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A.1 Trimoterm FTV

Trimoterm FTV sandwich panels are used in a wide range of applications, for business, leisure, commercial, industrial, hygienic, and other kinds of facility. They are also suitable for new constructions and refurbishments. They offer the perfect combination of functionality and durability, while also supporting true architectural expression.

They offer excellent mechanical properties, fire resistance, airtightness, and excellent thermal and sound insulation, as well as excellent hygienic characteristics. Trimoterm FTV sandwich panels can also be successfully used in the most demanding environments, such as in the energy production and food-processing sectors and in the pharmaceutical industry.

The Trimoterm FTV sandwich panel has a standard joint and incorporates a basic fixing method with a through-panel fixing to substructure.

Download **Trimo Architectural details**

B System

B.1 Trimoterm FTV flat roof

Trimoterm FTV sandwich panels are self-supporting elements with high load-bearing capacity, that are fixed on top of a roof structure. The panels have to be with additional layers, which ensure the watertightness of the flat roof system.

FLAT ROOF SYSTEM COMPOSITION:
- Trimoterm FTV sandwich panels,
- geotextile + waterproof membrane,
- green roof system (optional)

FLAT ROOF SYSTEM COMPOSITION WITH ADDITIONAL THERMAL INSULATION LAYER:
- Trimoterm FTV sandwich panels,
- thermal insulation layer,
- waterproof membrane,
- green roof system (optional)

The correct waterproof membrane is selected in compliance with the inclination of the flat roof (≥ 0°) and building physics.

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TRIMO scope: Trimoterm FTV sandwich panels.
All other elements and services are not part of Trimo scope.

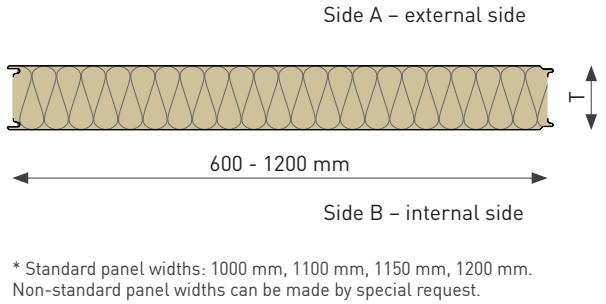

Fig. 1: Trimoterm FTV sandwich panel

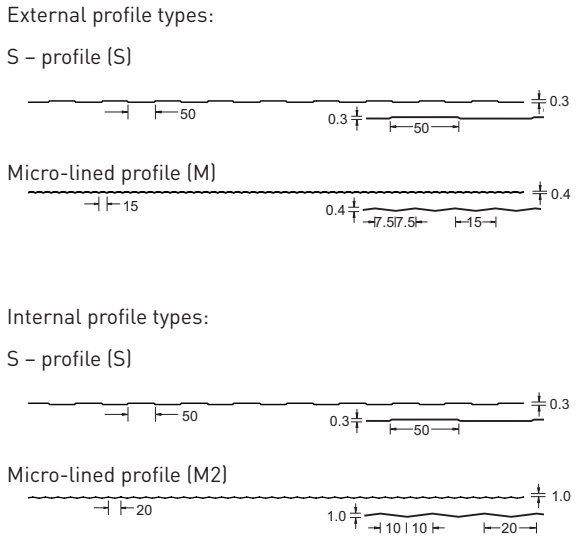

Fig. 2: Typical profile types

Profile type	A	B
S - profile	•	•
Micro-lined profile (M)	•	
Micro-lined profile (M2)		•

Table 1: Typical combinations of profile types

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B.2 Technical data

Technical data FTV		FTV 80	FTV 100	FTV 120	FTV 133	FTV 150	FTV 172	FTV 200	FTV 240
Panel thickness [mm]		80	100	120	133	150	172	200	240
Max. achiavable fire resistance (EN 14509)*		NPD	REI 60**						
U Thermal transmittance FTV [W/m2K]***	MW PS	0,65	0,50	0,41	0,34	0,31	0,28	0,24	0,21	0,17
Airborne sound insulation Rw (C;Ctr) [db] (EN 14509)		32 (-1;-2)							
Weight [kg/m²]	MW PS + Fe 0,7/0,55	18	20	23	25	27	29	32	35	40
Reaction to fire		A2-s1, d0							
External fire performance (EN 13501-5)		B_{ROOF}(t1), B_{ROOF}(t2), B_{ROOF}(t3)							
Air permeability (EN 14509)		n=1,5; C=0,00005							
Burglary resistance class		RC3							
Certificates		CE (EN 14509:2013)							
Combustibility of the material core (EN 13501-1)		Mineral wool non combustible Class A1							
Core type (MW)		Power S							
Width [mm]		600-1200 (1000, 1100, 1150, 1200 standard widths)							
Panel length [m]		Up to 14							
Span		Single-span and multi-span							
Colour range - External		Colour group I (very light colours)							
Colour range - Internal		Colour group I (very light colours), colour group II (medium colours), colour group III (dark colours)							
Steel sheet thickness - External [mm]		0,7							
Steel sheet thickness - Internal [mm]		0,5-0,7 mm							
Profile types - External		S, M							
Profile types - Internal		S, M2							

* REQUEST FOR FIRE RESISTANCE MUST BE CLEARLY SPECIFIED BY CUSTOMER.
** VALUES VALID ONLY FOR APPLICATION: TRIMOTERM FTV PANEL + GEOTEXTILE + WATERPROOF MEMBRANE
*** VALUES VALID ONLY FOR FEATURED APPLICATION IN THE CENTRE OF PANEL

Table 2: Technical data of Trimoterm FTV sandwich panels for flat roof application

C Instructions

C.1 Structure

Load-bearing steel structure, load-bearing timber structure and load-bearing concrete purlins with an integrated steel profile are suitable for installing Trimoterm FTV panels - when the required tolerances are met. If the main structure does not meet the tolerances, an adjustable levelling substructure must be used.

C.2 Structural tolerances

When installing the panels, the prescribed tolerances of the load-bearing structure must be observed (IFBS guideline PA 09 - Performance tolerance in light metal structures point 3.1.2):

- Deflection of the purlins under its own weight **(1)**:
  ± L / 500 according to EN 1090-4,
- Height difference of the purlins **(2)** in ridge-eaves direction:
  ± 1.0 mm / 1 m of purlin spacing, max. 5.0 mm,
- Deflection of the roof beam **(3)**:
  ± L / 500 according to EN 1090-4

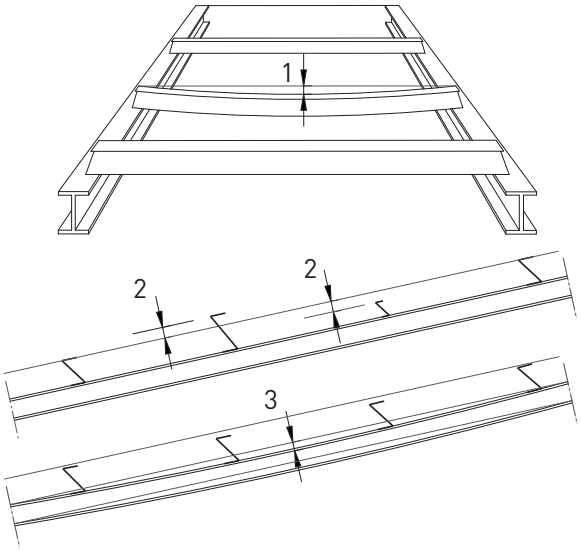

Fig. 3: Structural tolerances

C.3 Panel support width

The minimum support width is determined by the static calculation according to EN 14509 (Self-supporting double skin metal faced insulating panels - Factory made products – Specifications).

- Minimum required contact surfaces:
- End panel support: minimum 40 mm,
- Intermediate panel support: minimum 60 mm

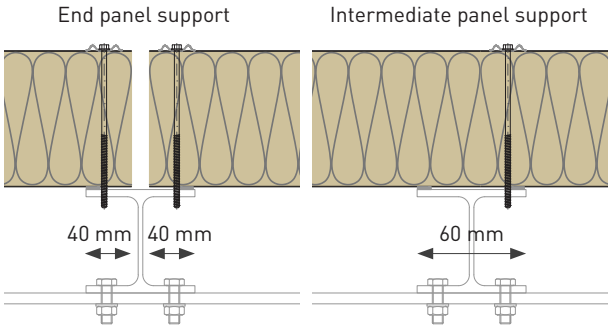

Fig. 4: Panel minimum support widths

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C.4 Panel static calculation

Static calculation of Trimoterm FTV sandwich panels and their fixings is required in accordance with applicable legislation EN 14509 and other national technical regulations for sandwich panel design. Selected panel dimensions, panel spans, the number of required fixing screws, and number of roof penetrations and roof openings must be checked for each individual building.

Panel static calculation requires the following input data:

Building location and data linked to location:
- Location and address,
- Wind zone or basic wind speed,
- Location category (categories 0, I, II, III, IV)

Geometry and type of building:
- Building shape and dimensions (height, length, width),
- Building parapet,
- Roof penetrations and roof openings,
- Building type (open / partially open / closed building),
- Building safety class

Panel data:
- Panel thickness, width and length,
- Panel spans (single-span, multi-span),
- Panel support distances,
- External and internal steel sheet colour,
- External and internal profile types

Permanent loads:
- Additional layers (such as thermal insulation layer or green roof system),
- PV modules

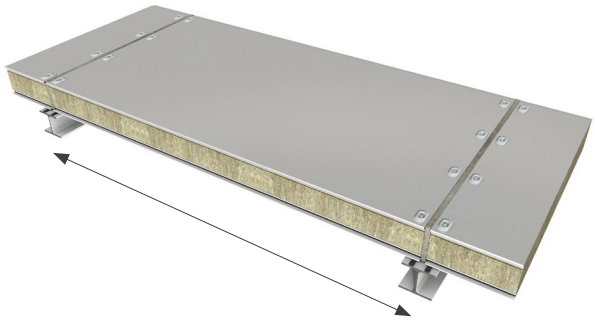


Fig. 5: Single-span panel

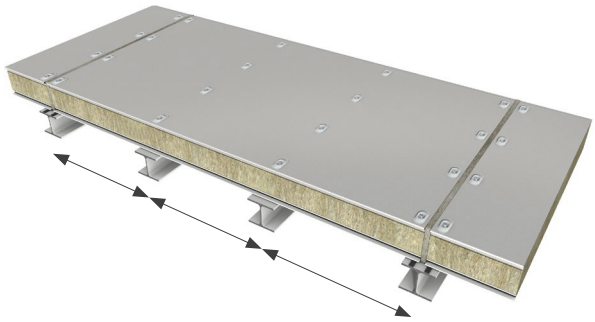


Fig. 6: Multi-span panel

!

- Panel static calculation is available at Trimo technical support.
- **Panel static calculation must be prepared for each project.**
- **Static calculations of supporting substructure and additional roof layers are not within Trimo scope.**

Fixing and/or hanging additional elements to the underside of roof panels is not anticipated. Any case of fixing and/or hanging small items such as services to the underside of roof panels must be clearly defined and verified in a static calculation that includes those additional loads.

C.5 Panel fixing

The panel fixing method must be selected in compliance with the selected flat roof system composition option in order to prevent the waterproof membrane from being punctured by screws.

When no additional thermal insulation layer is included (Fig. 7), panel fixing screws with washers are prohibited as they could damage the waterproof membrane. When no additional thermal insulation layer is included, only panel fixing screws without washers are allowed, and must be fixed to panels within stress plates.

When a thermal insulation layer is included (Fig. 8), screws with washers are allowed, as the additional thermal insulation layer protects the waterproof membrane from screw puncture.

Screw length depends on the thickness of the Trimoterm FTV sandwich panels and on the substructure type in accordance with the instructions of the fixing manufacturer.

!

The fixings of the additional layer of thermal insulation and the fixings of the waterproof membrane should be evenly distributed among the panels. The minimum permitted fixing distance between screws longitudinally is Lmin = 250 (nominal pull-out force Nrd = 0,8 kN).

If possible, the waterproof membrane should be laid transversally to the panels.

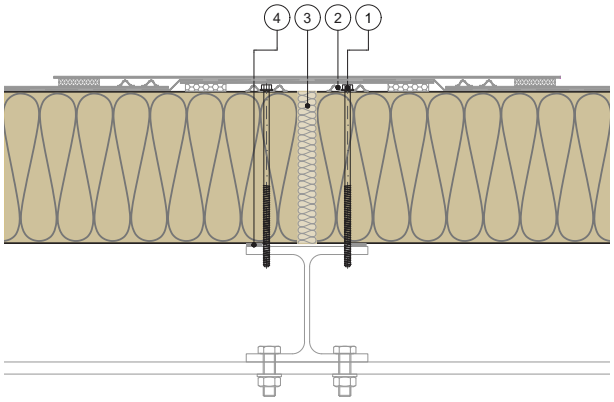
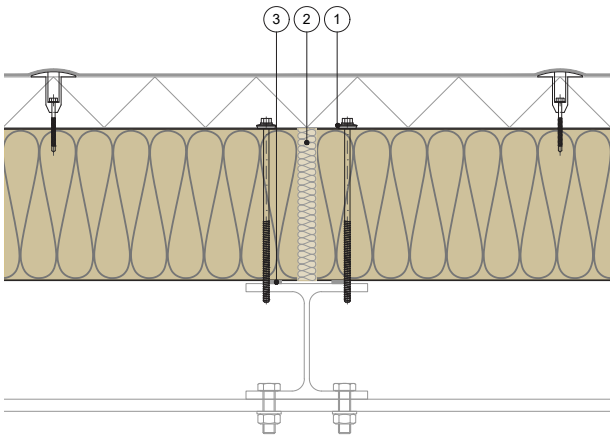


Fig. 7: Panel fixing

*A compatible fixing system (screw and washer) must be selected to ensure that the screw does not cause local damage to the waterproof membrane.

1: Fixing screw*
2: Stress plate*
3: Thermal insulation
4: Sealing tape



1: Fixing screw with washer
2: Thermal insulation
3: Sealing tape

Fig. 8: Additional thermal insulation layer – panel fixing

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C.6 Panel protective foil

Trimoterm FTV sandwich panels usually have a self-adhesive protective foil on the external side (and optionally on the internal side) to protect the coloured surfaces against minor scratches during transport, handling, and installation. The foil on the internal side must be removed before installation.

The foil on the external side must be completely removed from each panel every day after completing installation. At the time of installation, the foil must be removed from all panel joints, from under screws and flashings, and from other similar points.

If the panels are in storage for longer periods of time, the foil must be removed, at the latest, three months after production. When storing panels outside, they must be protected from direct sunlight, otherwise the foil cannot be removed completely.

For more, see **Packaging, transport, and storage for Trimo products.**

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C.7 Panel airtightening and diffusion tightening

Trimoterm FTV sandwich panels ensure a diffusion barrier and ensure airtightness. To provide a vapour barrier and to prevent condensation within the panels, an appropriate PE sealing tape must be installed continuously onto the flat contact surface of the substructure in such a way that it has a closed loop under the ends of the panels (Fig 9). Where airtightness demands are high, two strips of a self-adhesive sealing tape must be applied under the ends of the panels.

To ensure airtightness and diffusion tightening,, additional seals must be applied to the ends of the panels (Fig. 10). For sufficient sealing, two runs of a durable elastic mastic sealant (e.g. MS Polymer or PUR) must be applied transversally to the end of each panel during panel installation, positioned at the PE sealing tape.

Where airtightness demands are high, a durable elastic mastic sealant (e.g. MS Polymer or PUR) must also be applied longitudinally onto the full length of the internal panel joints during panel installation (Fig. 11).

When installing the panels, the joint sealing tubes must be compressed (Fig. 12, 13). The use of a seaming tool is advised in order to achieve the required compression.
Each space between the ends of the panels must be filled with soft mineral wool (Fig. 12). The inserted mineral wool must be compressed to the required density. Where no fire requirements apply, the inserted mineral wool must achieve a minimum density of 30 kg/m^3. Where fire requirements do apply, the inserted mineral wool must achieve a minimum density of 100 kg/m^3.

!

Panels on the perimeter of the flat roof must be continuously connected to the façade to ensure complete system airtightness and diffusion tightness.

All penetrations (e.g. openings, valley penetration, etc.) must be sealed appropriately to ensure roof airtightness and diffusion tightness.

Fig. 9: Continuous sealing tape on a structure

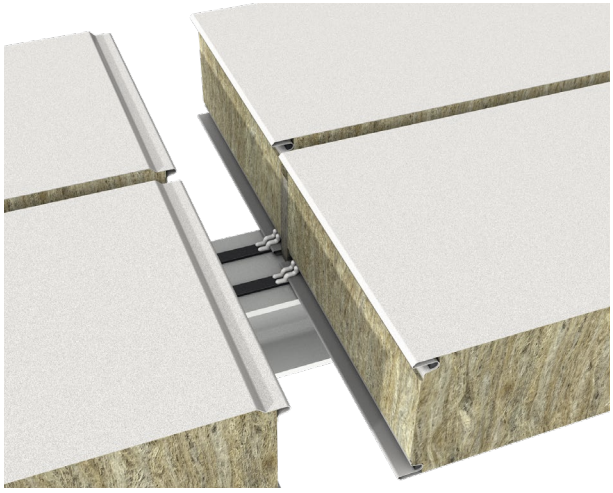

Fig. 10: Mandatory transversal sealing of the end of each panel

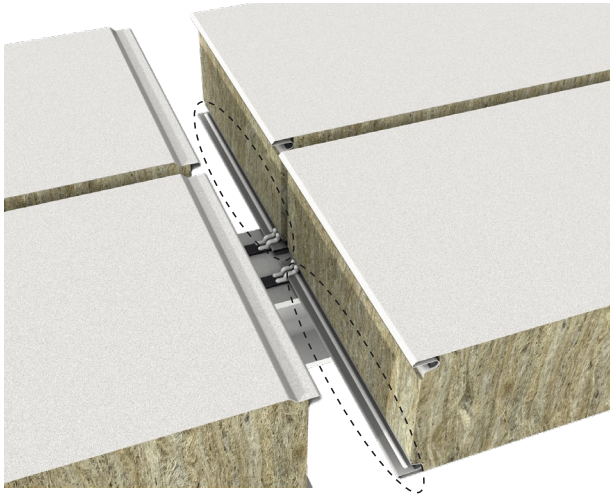

Fig. 11: Optional longitudinal sealing of the full length of the internal panel joints

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C.8 Panel water tightening

The watertightness of the flat roof system is achieved using secondary materials. A waterproof membrane with necessary corresponding layers should be installed immediately after the installation of Trimoterm FTV sandwich panels.

If a waterproof membrane is not installed immediately after the installation of Trimoterm FTV sandwich panels, then all joints (longitudinal and transversal) and each cut opening should be protected against water and humidity intrusion into the panel (Fig. 14). A vapour permeable, watertight sealing tape must be used.

!

Roof panels must be protected from water and other liquids seeping into the insulation during unloading and right through to the end of the installation. It is the installer's responsibility to ensure that the panels are protected until the end of the installation. Trapped water/moisture in the panels can cause unfavourable internal corrosion in the panels. Panels should not be installed during snow or rainfall, or during dense fog.

If the panels are installed during rain and/or snow, or if the panels are exposed to rain and/or snow before installation of a waterproof membrane, and the mineral wool core therefore becomes wet, then the panel properties will be affected.

Fig. 12: Tight fitting of panels

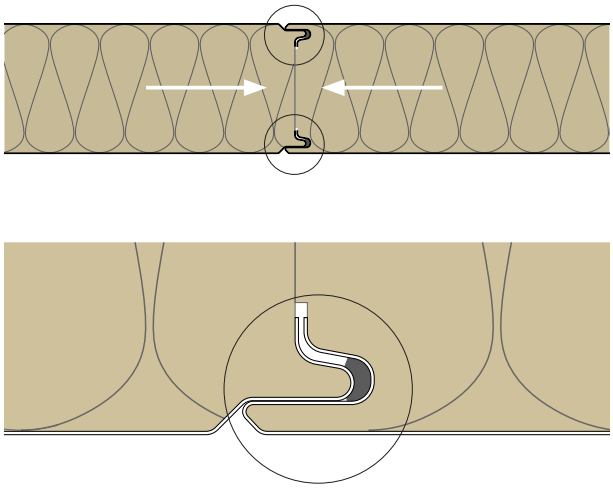

Fig. 13: Groove and tongue panel joint

Fig. 14: Application of a vapour permeable, watertight sealing tape

C.9 Walkability

The panels are suitable for occasional access onto the roof either during or after installation (EN 14509 A.9.1.).

If repeated foot traffic for access or maintenance of equipment on the roof is required both during and after installation (EN 14509 A.9.2.), then an additional layer of at least 40 mm of thermal insulation should be installed between the panels and the waterproof membrane. Mineral wool should have a compression strength of ≥ 70 kPa. Such a system is suitable for repeated foot traffic for access or maintenance without additional protection on the waterproof membrane.

An additional layer of thermal insulation can be installed on the whole surface of the roof or on dedicated pathways only.

!

Each roof access must have a walking resistant layer at the roof entering area (e.g. the landing area from access ladder).

See Trimo Architectural Details:
Architectural Details - Flat Roof System - TRIMOTERM FTV

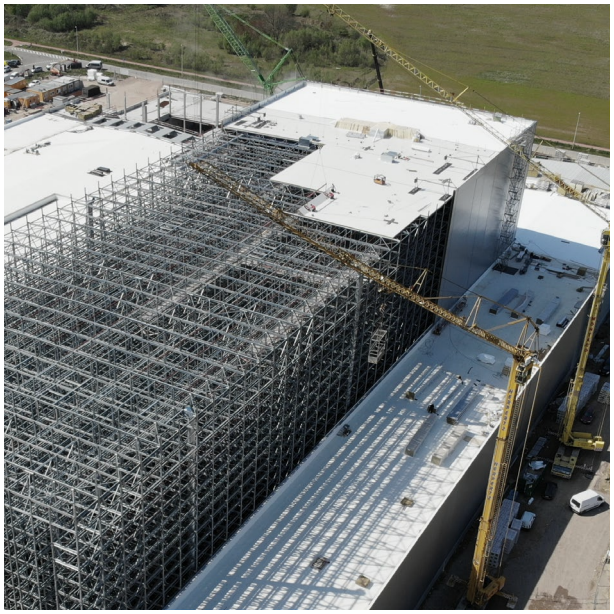

Fig. 15: Flat roof installation

D
Installation tools

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D.1 Panel cutting

The cutting and trimming of parts of Trimoterm FTV sandwich panels can be performed for various openings. In these cases, only metal shears and saws that do not overheat the metal at the cutting site may be used. A circular saw is recommended.

High temperatures can damage the anti-corrosive protection in the vicinity of a cut. The use of any grinding machine or welding device is prohibited near Trimoterm FTV sandwich panels.

Marking the panel surface with sharp objects that would damage the protective colour layer is prohibited.

Small metal particles that appear as a result of cutting and/or drilling must be immediately removed from the panel surfaces by completion of the day's work at the latest, because metal particles exposed to moisture cause corrosion.

Fig. 16: Panel cutting tools

D.2 Panel handling and lifting

In order to handle and lift Trimoterm FTV sandwich panels, vacuum grippers are required. Manipulation must be carried out only using certified vacuum grippers for sandwich panels. The maximum suction under pressure of vacuum suction cups is 30 kPa. For safe use, follow the manufacturer's instructions.

E
Checklist

Check the standard steps for evaluating whether the installation is performed according to the installation guide and to ensure quality installation.

CHECKLIST					
Steps	Step description	Correct	Incorrect	Chapter	Notes
1	Panels meet the panel structural calculation requirements.			C.4	
2	Panel fixing material meets the panel structural calculation requirements.			C.4 C.5	
3	Panel support widths meet the minimum requirements.			C.3	
4	Substructure meets the tolerance requirements (horizontally, vertically, dimensions, plains).			C.2	
5	Panels protected from water druring unloading and during installation.			C.8	
6	Sealing tapes installed onto the substructure.			C.7	
7	Protective foil fully removed from the panel internal side before the installation.			C.6	
8	Protective foil partially removed from the panel external side before the installation and fully everyday after panel installation.			C.6	
9	Panels installed within tolerances and sealed on the internal panel joints.			C.5 C.7	
10	Panels fixed with appropriate screws.			C.4 C.5	
11	Space between panel rows filled with mineral wool according to system requirements.			C.7	
12	Installed panels protected from water until waterproof membrane layer is installed.			C.8	
13	Additional layer of thermal insulation placed to achieve system walkability.			C.9	
14	Waterproof membrane and additional roof layers installed.			C.8	
15	Additional layer of thermal insulation placed to achieve system walkability.			C.9	
16	Waterproof membrane and additional roof layers installed.			C.8	

Table 3: Checklist for Trimoterm FTV flat roof installation

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GLOBAL PRESENCE

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