

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-20/0723
of 26 July 2024

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

BMI InnoGrip System

Product family
to which the construction product belongs

Systems of mechanically fastened flexible roof
waterproofing sheets

Manufacturer

BMI Deutschland GmbH
Technical Center
Rembrücker Straße 50
63150 Heusenstamm
Germany

Manufacturing plant

Monarflex s.r.o.
Továrenská 1
943 03 STÚROVO
Slovakia

This European Technical Assessment
contains

13 pages including 7 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 030351-00-0402

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Specific part

1 Technical description of the product

1.1 Definition of the construction product

The system of mechanically fastened flexible roof waterproofing sheets "BMI InnoGrip System" is a kit which consists of the following components:

- flexible waterproofing sheet "Monarplan GF V (EM)" on the basis of polyvinylchloride (PVC-P), backed with a polyester fleece (nonwoven);
- hook-and-loop tape "BMI InnoGrip Strip";
- fasteners and washers.

The waterproofing sheet is compatible with bitumen. It does not contain any substances that are intended to inhibit or prevent root penetration (root protection agents).

The components of the system, waterproofing sheet, hook-and-loop tape, fasteners and washers are assembled for creating a mechanically fastened one-layer roof waterproofing system.

The insulation material and the sandwich panels are not components of this system. The system build-up is given in Annex A1.

1.2 Waterproofing sheet

The waterproofing sheet "Monarplan GF V (EM)" is backed with (nonwoven) and CE-marked according to EN 13956.

The waterproofing sheet "Monarplan GF V (EM)" is produced in rolls with a standard length of 15 m and a maximum width of 2.12 m.

The effective thickness of the waterproofing layer is 1.5 mm.

The joint overlap of "Monarplan GF V (EM)" is welded with hot air. The width of the weld is at least 40 mm. The minimum joint overlap is 55 mm.

Table 1 gives the general description of the flexible waterproofing sheets. The accompanying mechanical characteristics are stated in Annex A2.

Table 1: Waterproofing sheets

Sheet	Backing layer [g/m ²]	Effective thickness of waterproofing layer without backing [mm]	Mass per unit area (Fg) [g/m ²]
Monarplan GF V (EM)	Polyester fleece approx. 190	1.5	1950 ≤ Fg ≤ 2200

The waterproofing sheets are fastened to the substrate with the hook-and-loop tape "BMI InnoGrip Strip" (width 125 mm).

The hook-and-loop tape "BMI InnoGrip Strip" is fastened to the roof mechanically with the fasteners and washers (see section 1.3). The waterproofing sheet is attached with the polyester-fleece laminated side on the hook-and-loop tape "BMI InnoGrip Strip" and rolled on at least twice using the "BMI InnoGrip Pressure Roller".

1.3 Fasteners and washers

The following fasteners can be used and are CE-marked on the basis of the relevant ETA:

- "SFS IR2" and "SFS IG" with the declared performances according to ETA-08/0262,
- "Guardian BS" and "Guardian TS" with the declared performances according to ETA-08/0285.

The different fasteners and washers are stated in tables 2 and 3.

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Table 2: Fasteners

Trade name	Type	Nature	Geometry
SFS IR2 - 4.8 x L (ETA-08/0262)	screw	coated carbon steel	4.8 x L mm
SFS IG - 6.0 x L (ETA-08/0262)	screw	coated carbon steel	6.0 x L mm
Guardian BS 6.8 x L (ETA-08/0285)	screw	coated carbon steel	6.8 x L mm
Guardian TS - 5.2 x L (ETA-08/0285)	screw	coated carbon steel	5.2 x L mm

Table 3: Washers

Trade name	Type	Nature	Geometry
SFS IR - 82 x 40 (ETA -08/0262)	washer	galvanized steel	82 x 40 mm
SFS IRD - 82 x 40 (ETA -08/0262)	washer	galvanized steel	82 x 40 mm
Guardian SP 50 (ETA-08/0285)	washer	galvanized steel	50 mm, (∅)
Guardian SP - 40 - FD (ETA-08/0285)	washer	galvanized steel	40 mm, (∅)

2 Specification of the intended use in accordance with the applicable European assessment Document

The mechanically fastened waterproofing system "BMI InnoGrip System" is used for waterproofing roofs to prevent the passage of water from one plane to another.

The roof waterproofing system can be used on new roofs or to upgrade existing roofs, also on horizontal surfaces. The possible roof substrates are specified sheet decks or timber (see Annex A3).

The insulation material must be CE marked according to the relevant harmonized European standards and shall have a minimum stiffness as stated in Annex A1.

The sandwich panels must satisfy the requirements according to the relevant harmonized European standard EN 14509 as stated in Annex A1.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of working life of the mechanically fastened waterproofing system of 10 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

The performances given in Section 3 are only valid if the mechanically fastened flexible roof waterproofing membrane is used in compliance with the specifications and conditions given in Annex B.

3 Performance of the product and references to the methods used for its assessment

3.1 Safety in case of fire (BWR 2)

Essential characteristic		Performance
External fire performance of roofs	System	See Annex A2
Reaction to fire	Sheet	See Annex A3

3.2 Hygiene, health and the environment (BWR 3)

Essential characteristic		Performance
Content, emission and/or release of dangerous substances	System	No performance assessed
Resistance to peel (joint)	Sheet / Sheet & Hook-and-loop-tape	See Annexes A3 / A4
Resistance to shear (joint)	Sheet / Sheet & Hook-and-loop-tape	See Annexes A3 / A4
Resistance to tear	Sheet	See Annex A3
Resistance to cold bending/folding	Sheet	See Annex A3
Resistance to water pressure	Sheet	See Annex A3
Resistance to water vapour permeability	Sheet	See Annex A3
Tensile properties	Sheet / Hook-and-loop-tape	See Annexes A3 / A4
Resistance to static and impact loading	Sheet	See Annex A3
Dimensional stability	Sheet / Hook-and-loop-tape	See Annexes A3 / A4
Thickness	Sheet / Hook-and-loop-tape	See Annexes A3 / A4
Flow resistance at elevated temperature for bituminous sheets	Sheet	No performance assessed (not applicable)
Resistance to ageing media	Sheet / Sheet & Hook-and-loop-tape	See Annexes A3 / A4

3.3 Safety and accessibility (BWR 4)

Essential characteristic		Performance
Resistance to wind loads (Wind uplift test: W_{adm})	System	See Annex A2
Slipperiness	Sheet	No performance assessed
Fastener axial load	Fastener	See corresponding ETA
Resistance to fastener unwinding	Fastener	See corresponding ETA
Mechanical resistance/brittleness of plastic fastener	Fastener	See corresponding ETA
Resistance to corrosion of metallic fastener	Fastener	See corresponding ETA
Mechanical resistance after heat ageing of plastic fasteners	Fastener	See corresponding ETA

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4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD 030351-00-0402, the applicable European legal act is: 98/143/EC.
The system to be applied is: 2+

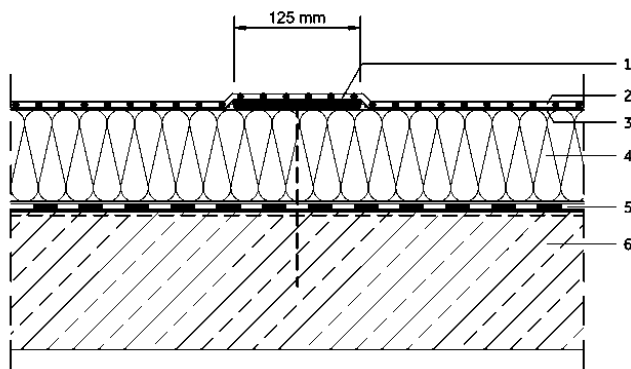
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 26 July 2024 by Deutsches Institut für Bautechnik

Bettina Hemme
Head of Section

beglaubigt:
Hannoun



System build-up

(Example of fixing with "BMI InnoGrip Strip" on construction with insulation layer)

- | | |
|-----------------------------------------------------------------------|-----------------------------------------------------------|
| 1. "BMI InnoGrip Strip"
(mechanically fixed with screw and washer) | 4. Thermal insulation ¹⁾ (not part of the kit) |
| 2. "Monarplan GF V (EM)" | 5. Vapour control layer (optional, not part of the kit) |
| 3. Special fleece backing of the "Monarplan GF V (EM)" | 6. Construction (not part of the kit) |

¹⁾ It shall be ensured that the insulation material on site has:

- 10 % compression at ≥ 50 kPa (EN 826)
- point load behaviour at ≥ 500 Pa, deformation 5 mm (EN 12430)

The insulation material must be CE marked according to the relevant harmonized European standard.

Substrates

(a) Timber (with/without insulation layer)

plywood EN 636, $t \geq 18$ mm, effective embedment depth ≥ 18 mm

(b) Steel sheets (with insulation layer)

Trapezoidal steel sheets VD 106R/750 – EN 1993-1-3 (Eurocode 3), $t \geq 0,75$ mm

(c) Sandwich panels

Sandwich panels ²⁾, type TR+ 130

²⁾ The sandwich panels shall satisfy the following requirements according to the relevant harmonized European standard EN 14509 or are equivalent thereto:

Properties		Unit	Values	
Metal facings	Yield strength	MPa	≥ 280	
	Apparent core density	kg/m ³	38	
Core materials	Shear modulus	MPa	3.4	
	Shear strength	MPa	0.13	
	Long term shear strength	MPa	0.05	
	Shear strength after long-term loading	MPa	0.10	
	Tensile strength with the face	MPa	0.06	
	Creep coefficients	φ 2.000		2.2
		φ 100.000		4.0

BMI InnoGrip System
BMI Deutschland GmbH

System build-up of the roof waterproofing

Annex A1

Table 1/A2: Characteristics of the mechanically fastened waterproofing system "BMI InnoGrip System"

Characteristic	Performance
External fire performance of roofs ^{3) 4)} EN 13501-5	Class B _{ROOF} (t1)
Content, emission and/or release of dangerous substances ⁴⁾	No performance assessed
Resistance to wind loads (Wind uplift test: W _{adm}) ⁴⁾	See Table 2/A2 "Admissible wind loads"

³⁾ These values are declared by Declaration of Performance (DoP) according to EN 13956 by manufacturer.

⁴⁾ These values are assessed in accordance with EAD 030351-00-0402.

Information for users on external fire performance of roof decks:

The classification B_{ROOF} (t1) in the declaration of performance of the sheets is only valid for supporting decks which are described in the classification document according to CEN/TS 1187 and EN 13501-5.

Table 2/A2: Admissible wind loads

Admissible wind load per fastener/washer in combination with waterproofing sheets on different types of substrates					
Fastener	Washer	Timber		Steel sheet	Sandwich-panel
		with insulation layer	without insulation layer	with insulation layer	-
		(a)		(b)	(c)
		W _{adm} [N]			
Guardian BS-6.8x35	Guardian SP 50	-	-	-	860
SFS IR2-4.8x120	SFS IR-82x40	-	-	660	-
Guardian TS-5.2x35	Guardian SP-40-FD	-	930	-	-
SFS IG-6.0x140	SFS IRD-82x40	700	-	-	-

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Characteristics of mechanically fastened waterproofing system "BMI InnoGrip System"

Annex A2

Table 1/A3: Characteristics of the waterproofing sheets "Monarplan GF V (EM)"

Characteristic	Test method	Unit	Performance
Thickness (effective thickness) ³⁾	EN 1849-2	mm	1.5
Mass per unit area (without fleece backing) ³⁾	EN 1849-2	g/m ²	2200
Length ³⁾	EN 1848-2	m	15
Width ³⁾	EN 1848-2	m	1.06; 2.12
Resistance to water pressure (watertightness) ³⁾	EN 1928 (B)	-	passed
Reaction to fire ^{3) 4)} EN 13501-1	EN 11925-2	-	Class E
Tensile properties ³⁾			
Tensile strength (longitudinal/transverse)	EN 12311-2	N/50 mm	≥ 600
Tensile elongation (longitudinal/transverse)	EN 12311-2	%	≥ 30
Resistance to static and impact loading ³⁾			
Resistance to static loading	EN 12730 (A/B)	kg	≥ 20
Resistance to impact	EN 12691 (A/B)	mm	≥ 500
Resistance to tear (longitudinal/transverse) ³⁾	EN 12310-2	N	≥ 100
Resistance to root penetration ³⁾	EN 13948	-	NPA
Dimensional stability (longitudinal/transverse) ³⁾	EN 1107-2	%	NPA
Resistance to cold bending ^{3) 4)} (Foldability at low temperature)	EN 495-5	°C	≤ - 25
Behaviour following exposure to UV radiation ³⁾	EN 1297 (1000 h)	-	passed
Effects of liquid chemicals including water ³⁾	EN 1847	-	NPA
Hail resistance (hard/soft support) ³⁾	EN 13583	m/s	v _d ≥ 17
Resistance to water vapour permeability ³⁾	EN 1931	-	NPA
Exposure to contact with bitumen ³⁾	fleece backing ≥ 150 g/m ²	-	compatible with bitumen (polyester-fleece backing: 190 g/m ²)
Resistance to peel (joint) ^{3) 4)}	EN 12316-2	N/50 mm	≥ 200
Resistance to shear (joint) ^{3) 4)}	EN 12317-2	N/50 mm	≥ 400
Flow resistance at elevated temperature for bituminous sheets ^{3) 4)}	EN 1110	°C	NPA (not applicable)
Resistance to ageing media ⁴⁾			
<i>Heat ageing</i> (EN 1296)			
Peel resistance of sheets joints	EN 12316-2	%	Δ ≤ 20
shear resistance of sheets joints	EN 12317-2	%	Δ ≤ 20
Resistance to cold bending	EN 495-5	°C	Δ ≤ 15
<i>Water ageing</i> (EN 1847)			
Peel resistance of sheets joints	EN 12316-2	%	Δ ≤ 20
shear resistance of sheets joints	EN 12317-2	%	Δ ≤ 20
<i>Ultra violet (UV) ageing</i> (EN 1297)			
Resistance to cold bending	EN 495-5	°C	Δ ≤ 15
Slipperiness ⁴⁾	EN 13893	-	NPA

³⁾ These values are declared by Declaration of Performance (DoP) according to EN 13956 by manufacturer.

⁴⁾ These values are assessed in accordance with EAD 030351-00-0402.

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Characteristics of waterproofing sheet "Monarplan GF V (EM)"

Annex A3

Table 1/A4: Characteristics of the hook-and-loop-tape "BMI InnoGrip Strip"

Characteristic	Test method	Unit	Performance
Thickness ⁵⁾		mm	1.6 ± 0,2
Width ⁵⁾		mm	125 ± 5
Mass per unit area ⁵⁾		g/m ²	310 (± 20%)
Tensile strength ⁵⁾	EN 12311-2 (A)	N/cm	≥ 250/200
Tensile elongation ⁵⁾	EN 12311-2 (A)	%	≥ 25/20
Peel resistance of joints between "Monarplan GF V (EM)" / "BMI Innogrip Strip" ⁴⁾	EN 12316-2	N/50 mm	≥ 60
Shear resistance of joints between "Monarplan GF V (EM)" / "BMI Innogrip Strip" ⁴⁾	EN 12317-2	N/50 mm	≥ 600
Resistance to ageing media ⁴⁾			
<i>Heat ageing (EN 1296)</i>			
Peel resistance of joints between "Monarplan GF V (EM)" / "BMI Innogrip Strip"	EN 12316-2	%	Δ ≤ 20
Shear resistance of joints between "Monarplan GF V (EM)" / "BMI Innogrip Strip"	EN 12317-2	%	Δ ≤ 20
<i>Water ageing (EN 1847)</i>			
Peel resistance of joints between "Monarplan GF V (EM)" / "BMI Innogrip Strip"	EN 12316-2	%	Δ ≤ 20
Shear resistance of joints between "Monarplan GF V (EM)" / "BMI Innogrip Strip"	EN 12317-2	%	Δ ≤ 20

⁴⁾ These values are determined in accordance with EAD 030351-00-0402.

⁵⁾ Manufacturer's specifications.

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Characteristics of the hook-and-loop-tape "BMI InnoGrip Strip"

Annex A4

Design and dimensioning

The dimensioning shall be carried out with the values for the admissible wind loads according to Annex A2, Table 2/A2: "Admissible wind loads", taking into account the national requirements.

Especially the following factors should be taken into account:

- dead and imposed loads;
- design with respect to the decisive wind pressure on roof areas;
- structural strength, stiffness and deflection limits;
- attachment of the roof deck to the structural framing;
- provision of insulation;
- assessment of condensation risk and provisions of vapour control layers;
- sound insulation;
- fire precaution;
- roof attachments, fixture and penetrations;
- falls and drainage;
- means of access for inspection and maintenance.

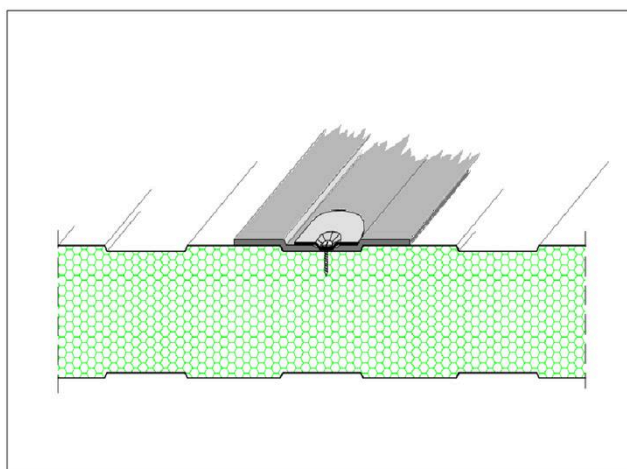
The details according to Annex B2 and B3 shall be considered.

Installation

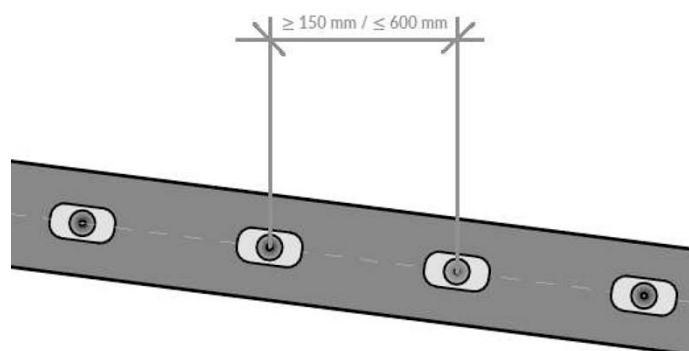
The performance of the mechanically fastened roof waterproofing system can be assumed only, if the installation is carried out according to the installation instructions stated in the technical file of the manufacturer, in particular taking account of the following points:

- installation by appropriately trained personnel;
- installation of only those components which are marked as components of the system;
- installation with the required tools and adjuvants;
- precautions during installation;
- inspecting the substrate surface for cleanliness and correct preparation;
- inspecting compliance with suitable weather conditions, avoid installation when temperature falls under 5 °C and the following weather conditions: high humidity, rain, snow or fog. By preheating the seam areas, welding is also possible at lower ambient temperatures;
- inspections during installation and of the finished roof waterproofing system and documentation of the results.

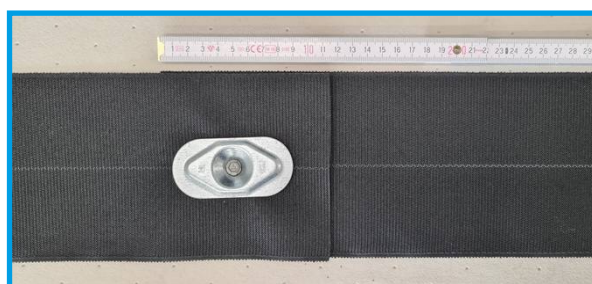
BMI InnoGrip System BMI Deutschland GmbH	Annex B1
Intended use Specifications	



Fastening of "BMI InnoGrip Strip" to sandwich panels in the deep bead



Fastening template: constant distance between fasteners, positioning in the center of the tape/white central marking



Overlapping of the "BMI InnoGrip Strip" ($\geq 100 \text{ mm}$)

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Fixation of the hook-and-loop-tape "BMI InnoGrip Strip"

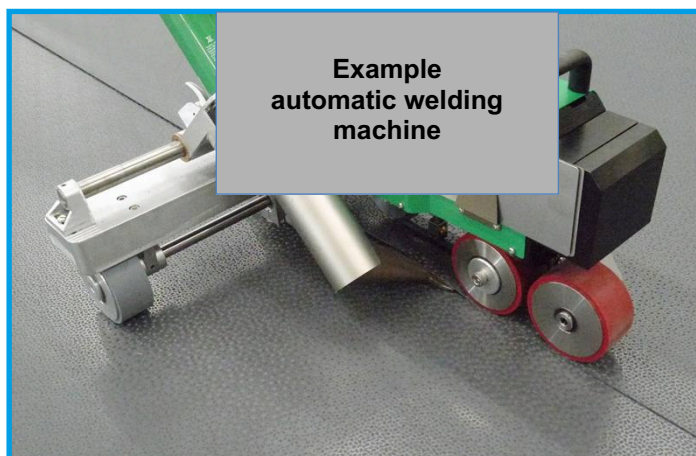
Annex B2



"BMI InnoGrip strips" are temporary protected with "BMI InnoGrip installation sheets" prior to laying the membranes



Rolling on the "Monarplan GF V (EM)" membranes using the "BMI InnoGrip pressure roller"



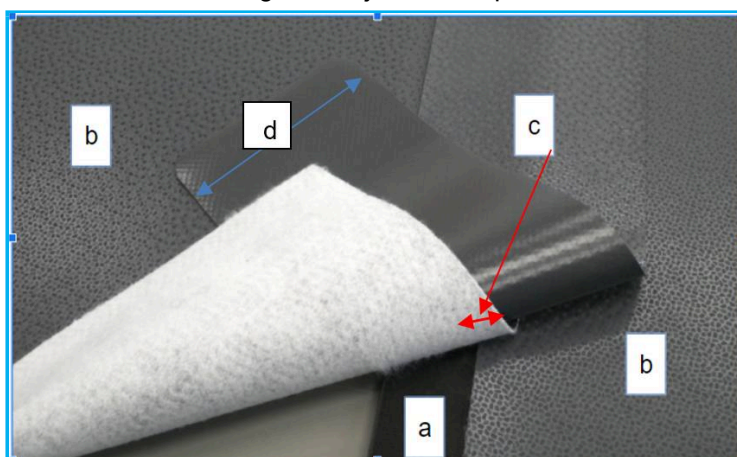
Example
automatic welding
machine

Longitudinal joint/overlap



Example
hand-held welding
device

Longitudinal joint/overlap



Lateral joints

- a. non mechanically fixed "BMI InnoGrip Strip"
- b. waterproofing sheets
- c. overlap of approx. 2 cm
- d. welded sheet strip (without baking; width min. 15 cm)

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Laying und jointing of the waterproofing sheets "Monarplan GF V (EM)"

Annex B3