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Authorised and notified according to Article 10 of the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products (89/106/EEC)

Deutsches Institut für Bautechnik

DIBt

Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-11/0482

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung *Trade name*		Sarnafil T
Zulassungsinhaber *Holder of approval*		Sika Supply Center AG Industriestraße 6060 SARNEN SCHWEIZ
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*		Mechanisch befestigte Dachabdichtungssysteme *Mechanically fixed roof waterproofing system*
Geltungsdauer: *Validity:*	vom *from* bis *to*	4 January 2012 4 January 2017
Herstellwerk *Manufacturing plant*		Sika Supply Center AG Industriestraße 6060 SARNEN SCHWEIZ

Diese Zulassung umfasst *This Approval contains*	25 Seiten einschließlich 14 Anhänge *25 pages including 14 annexes*

I LEGAL BASES AND GENERAL CONDITIONS

1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by Council Directive 93/68/EEC[2] and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council[3];
- Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998[4], as amended by law of 31 October 2006[5];
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC[6];
- Guideline for European technical approval of "Systems of mechanically fastened flexible roof waterproofing membranes", ETAG 006.

2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.

3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.

4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.

5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.

6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities L 40, 11 February 1989, p. 12
2 Official Journal of the European Communities L 220, 30 August 1993, p. 1
3 Official Journal of the European Union L 284, 31 October 2003, p. 25
4 *Bundesgesetzblatt Teil I 1998*, p. 812
5 *Bundesgesetzblatt Teil I 2006*, p. 2407, 2416
6 Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the construction product

The mechanical fastened flexible roof waterproofing kit "Sarnafil T" consists of different flexible waterproofing sheets on the basis of flexible polyolefine (FPO) reinforced with an inlay of nonwoven glass fibre and polyester fleece and sets of fasteners and washers.

The waterproofing sheets are compatible with bitumen.

The kits with the components waterproofing sheet, fastener and washer can be assembled for creating the mechanically fastened one layer roof waterproofing system. Cover stripes and cover pieces are cut from sheet material.

The insulation material is not a component of the kit.

The system build-up is given in Annex 1.

1.1.1 Waterproofing sheet

The waterproofing sheets SARNAFIL TS 77, SARNAFIL TS 77E, SARNAFIL TS 77ER and SARNAFIL TCS are CE-marked according EN 13956.

The waterproofing sheets are delivered in rolls with a maximum length of 15 m resp. 25 m and a width of 2.05 m.

The manufacturers declared value (MDV) of the effective thicknesses of the waterproofing layer are 1,25; 1,5; 1,8; 2,0 or 2,5 mm. The waterproofing layer is reinforced with an inlay of nonwoven glass fibre and polyester fleece.

The joints overlap of the waterproofing sheet shall be welded with hot air with minimum width of 20 mm.

The minimum of the joint overlap is 120 mm.

Table 1 gives the general description of the flexible waterproofing sheets. The accompanying mechanical characteristics are stated in the annexes 2 to 5.

Table 1: Waterproofing sheets

Membrane	**Cladding/Backing layer [g/m²]**	**effective thickness[3] of waterproofing layer without backing [mm]**	**Mass per unit area[3] [g/m²]**
Sarnafil TS 77 -12/ -15/ -18/ -20 -25	nonwoven glass fibre/ Polyester fleece approx. 70	1,25	1320
		1,5	1650
	nonwoven glass fibre/ Polyester fleece approx. 54	1,8	1980
		2,0	2200
		2,5	2750
Sarnafil TS 77 E[1] -12/ -15/ -18/ -20	nonwoven glass fibre/ Polyester fleece approx. 70	1,25	1440
	nonwoven glass fibre/ Polyester fleece approx. 54	1,5	1650
		1,8	2160
		2,0	2400
Sarnafil TS 77 ER[2] -15/ -20	nonwoven glass fibre/ Polyester fleece approx. 54	1,5	1800
		2,0	2400
Sarnafil TCS -15/ -18/ -20	nonwoven glass fibre/ Polyester fleece approx. 54	1,5	1650
		1,8	1980
		2,0	2200

1 E = formulation for a specified external fire performance

2 ER = formulation for a specified external fire performance and profile surface for reduced slipperiness

3 Range of tolerances -5% / + 10%

1.1.2 Fasteners and washers

For fastening the waterproofing membrane to the substrate fasteners can be used from the manufacturer SFS intec approved by ETA-07/0170, ETA-08/0262 or ETA-08/0321. The fasteners and washers are CE-marked on the basis of the relevant ETAs. One washer (profil) is approved with this ETA. The different fasteners and washers are stated in table 2 and 3.

Table 2: Fasteners

Trade name	**Type**	**Nature**	**Geometry**
(Sarnafast) SF 4,8 x L (ETA -08/0262)	screw	coated carbon steel	4,8 x L mm
ISO-TAK BS 48 (ETA -06/0170)	screw	coated carbon steel	4,8 x L mm
IR2-4.8 x L (ETA -08/0321)	screw	coated carbon steel	4,8 x L mm
IR2-S-4.8 x L (ETA -08/0321)	screw	stainless steel	4,8 x L mm
IR3-4.8 x L (ETA -08/0321)	screw	coated carbon steel	4,8 x L mm
IR3-S-4.8 x L (ETA -08/0321)	screw	stainless steel	4,8 x L mm
IR2-C-4.8 x L (ETA -08/0321)	screw	coated carbon steel	4,8 x L mm
TPR-L (ETA -08/0321)	rivet	Aluminium	6,3 x L mm
IG-6 (ETA -08/0321)	screw	coated carbon steel	6,0 x L mm
IW-T-5 (ETA -08/0321)	screw	coated carbon steel	5,0 x L mm
IW-S-5 (ETA -08/0321)	screw	stainless steel	5,0 x L mm

Trade name	Type	Nature	Geometry
TI-6,3 (ETA -08/0262)	screw	coated carbon steel	6,3 x L mm
DT-4,8 (ETA -08/0321)	anchor	coated carbon steel	4,8 x L mm
DT-S-4,8 (ETA -08/0321)	anchor	stainless steel	4,8 x L mm
DT-6,3 (ETA -08/0321)	anchor	coated carbon steel	6,3 x L mm
DT-S-6,3 (ETA -08/0321)	anchor	stainless steel	6,3 x L mm
IE/15-6,3 (ETA -08/0321)	anchor	coated carbon steel	6,3 x L mm
IGR-S-T25-8,0 (ETA -08/0321)	screw	stainless steel	8,0 x L mm

Table 3: Washers

Trade name	Type	Nature	Geometry
(Sarnafast) KT 82 x 40 (ETA -08/0262)	plate	zinc plated steel	82 x 40 mm
IR 82 x 40 (ETA -08/0321)	washer	zinc plated steel	82 x 40 mm
IRC/W-82/40 (ETA -08/0321)	washer	zinc plated steel	82 x 40 mm
IRD-82x40 (ETA -08/0321)	washer	zinc plated steel	82 x 40 mm
IF/IG-C-82x40 (ETA -08/0321)	washer	zinc plated steel	ø 50 mm
IE-C-82/40 (ETA -08/0321)	washer	zinc plated steel	82 x 40 mm
IG8-C-82x40 (ETA -08/0321)	washer	zinc plated steel	82 x 40 mm
Sarnabar S6/10	profil	hot dipped galvanized steel	30 x l x 7 mm

1.2 Intended use

The mechanically fastened flexible roof waterproofing system "Sarnafil T" is intended to create a roof waterproofing for non-utilized roofs.

The roof waterproofing system can be installed on flat or sloped roofs to resist the passage of water to the building's internal structure. The possible substrates are specified sheet decks, concrete, aerated concrete or timber (see Annex 6 to 11).

In the manufacturer's technical dossier[7] (MTD) to this European technical approval (ETA) the manufacturer gives information concerning the substrates which the mechanically waterproofing system is suitable for and how these substrates shall be pretreated.

The insulation material must be CE marked according to the relevant harmonized European standards and shall have a minimum stiffness as stated in clause 4.2.

The provisions made in this ETA are based on an assumed intended working life[8] of the mechanically fastened waterproofing system of 10 years, provided that the roof waterproofing kit is subjected to appropriate installation, use and maintenance. These provisions are based upon the current state of the art and the available knowledge and experience.

[7] The manufacturer's technical dossier (MTD) comprises all information necessary for the production ad the installation of the product as well as for the repair of the waterproofing system made from that and it is deposited with DIBt. It was checked by DIBt and it was found to be in accordance with the conditions stated in the approval and the characteristic values determined during the approval testing.

[8] "Assumed intended working life" means that it is expected that, when this working life has elapsed, the real working life may be, under normal use conditions, considerably longer without major degradation affecting the essential requirements.

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.

2 Characteristics of product and methods of verification

2.1 Characteristics of the roof waterproofing system

The components of the mechanically fastened roof waterproofing system show the characteristic values with respect to the permissible tolerances which are stated in the MTD to this ETA.

The permissible tolerances do not affect the characteristics of the products and the assembled system negatively.

The chemical composition and the characteristic values of the components of the kit and the manufacturing methods are confidential and deposited with DIBt.

Requirements concerning safety in case of fire, hygiene, health and the environment and safety in use as well as the durability in the sense of the essential requirements N° 2 to N° 4 of the Directive 89/106/EEC shall be satisfied.

The property values of the waterproofing sheets and the assembled systems, which are verified by the approval testing, fulfil the requirements of the ETAG 006 as far as they are given. An evaluation for the intended use of the waterproofing system can be carried out with them by the user taking account of national requirements of member states where the product shall be used.

The performance of the reaction to fire behavior of the waterproofing sheets lead to the classification in class E according to EN 13501-1[9]. This is part of the CE-marking of the sheets.

The classification of the external fire performance of the roof waterproofing system for the waterproofing of roofs according to EN 13501-5[10] is in class F_{ROOF}.

Remark: For different roofing systems classification documents for the classification in class BROOF (t1) and BROOF (t3) according to EN 13501-5 are available.

According to the manufacturer's declaration the mechanically fastened roof waterproofing system does not contain any dangerous substances taking account of the EU database[11]. Within the scope of this approval there may be other requirements applicable to dangerous substances resulting from transposed European legislation or applicable national laws, regulations and administrative provisions.

The characteristic values of the waterproofing sheets which are CE-marked in accordance with EN 13956 are given in the annexes 2 to 5.

The admissible combinations of sheets and fasteners including washer and the admissible design values for wind loading (w_{adm}) of the assembled system are given in annex 6 to 11.

There may be other requirements applicable to the products resulting from other applicable national laws, regulations and administrative provisions and transposed European legislation.

These requirements need also to be complied with, when and where they apply.

9 EN 13501-1:2007 "Fire classification of construction products and building elements – Part 5: Classification using data from reaction to fire tests"

10 EN 13501-5:2005 "Fire classification of construction products and building elements – Part 1: Classification using data from external fire exposure to roofs tests"

11 Notes are stated in Guidance Paper H: A harmonized approach relating to Dangerous substances under the construction product directive, Brussels, 18 February 2000

2.2 Methods of verification

Assessment of the fitness of the roof waterproofing system for the intended use with regard to the essential requirements N° 2 to N° 4 was performed following the ETAG 006.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the Decision 98/143/EC of the European Commission[12] system 2+ for the procedure of attestation of conformity (Annex III, clause 2(ii) first possibility of Directive 89/106/EEC) applies for mechanically fastened roof waterproofing system.

The system 2+ of attestation of conformity is defined as follows:

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

(a) Tasks for the manufacturer:
  (1) initial type–testing of the product;
  (2) factory production control;
  (3) testing of samples taken at the factory in accordance with a prescribed test plan.

(b) Tasks for the notified body:
  (4) certification of factory production control on the basis of:
    – initial inspection of factory and of factory production control;
    – continuous surveillance, assessment and approval of factory production control.

3.2 Responsibilities

For the components sheet and fastener are provided that the attestation of conformity processes according to EN 13956 respectively to the relevant ETAs are verified on basis of these technical specifications. The attestation of conformity is only related to the additional to EN 13956 required characteristics of the sheet according ETAG 006, to a single washer and to assemble the components to the kit according annexes 6 to 11. It shall be done by the declaration of conformity and the CE marking of the kit by the manufacturer according to clause 3.3 respectively 3.2.1.3.

3.2.1 Task of the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this ETA.

The factory production control shall be in accordance with the appropriate part of the control plan[13] which is a confidential part of the MTD and is deposited with DIBt.

The factory production controlplan is in conformity with ETAG 006.

The manufacturer may only use products according to the MTD. He shall inspect or control the initial materials on acceptance according to the control plan.

[12] Official Journal of the European Communities L 42, 14 February 1998

[13] The "control plan" is a confidential part of the MTD to this ETA and deposited with DIBt. It contains the required information on the factory production control, on the initial type-testing and the initial inspection of the factory and the continuous surveillance, assessment and approval of factory production control. As far as this is relevant to the tasks of the notified body involved in the procedure of attestation of conformity the control plan will be handed over to the notified body.

The results of the factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

The records shall include at least the following information:

- Name of the product,
- type of inspection or control,
- date of manufacture of the product, batch N° if needed, and date of inspection or control of the product,
- result of inspections or controls and, as far as applicable, comparison with the requirements,
- signature of the person responsible for the factory production control.

The records shall be kept for at least five years. On request they shall be presented to DIBt.

Details concerning extent, type and frequency of the tests or inspections to be performed within the scope of the factory production control shall correspond to the control plan which is part of the MTD to this ETA.

3.2.1.2 Initial type-testing of the product

The initial type-testing refers to the product properties stated in the appropriate part of the control plan to this ETA. The initial type-testing is in conformity with ETAG 006.

If the verifications underlying this ETA have been furnished on samples from the current production, these will replace the initial type-testing.

Otherwise the necessary initial type-testing shall be carried out according to the provisions of the control plan and observance of the required property values shall be ascertained by the notified body.

After changing the production process or starting the production in another manufacturing plant the initial type-testing shall be repeated.

3.2.1.3 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is notified for the tasks referred to in section 3.1 in the field of the product in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in section 3.2.2 shall be handed over by the manufacturer to the notified body involved.

The manufacturer shall make a declaration of conformity, stating that the product is in conformity with the provisions of this ETA.

3.2.2 Task of the notified body

3.2.2.1 Initial inspection of factory and factory production control

The appropriate part of the control plan states the information on the properties which have to be controlled by the notified body involved for initial inspection of factory and factory production control. The notified body has to control the devices and equipments and the documentation of the factory production control of the manufacturer when starting the production or starting a new production line.

The notified body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The notified certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provisions of this ETA.

After changing the production process or starting the production in another manufacturing plant the initial inspection of factory and factory production control shall be repeated. The notified body shall issue an new EC certificate of conformity of the factory control stating the conformity with the provisions of this ETA.

3.2.2.2 Continuous surveillance, judgment and assessment of factory production control

The appropriate part of the control plan states the information on the properties which have to be checked by the notified body involved. The frequency of this tasks shall be twice a year.

The notified body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

In cases where the provisions of this ETA and its control plan are no longer fulfilled the certification body involved shall withdraw the certification of conformity and inform DIBt without delay.

3.3 CE marking of the kit

The CE marking[14] shall be affixed by the manufacturer on the packaging of the kit of the roof waterproofing "Sarnafil T" or its accompanying documents.

The letters "CE" shall be followed by the identification number of the notified body, and be accompanied by the following additional information:

- name and address or identifying mark of the manufacturer,
- last two digits of the year in which the CE marking was affixed,
- number of the EC certificate for the factory production control,
- number of the European technical approval: ETA 11/0482
- number of the European technical approval guideline: ETAG 006.

The approved components shall be specified as belonging to the mechanically fastened roof waterproofing kit "Sarnafil T".

CE marking and accompanying information:

CE	Letters "CE"
nnnn	Identification number of notified body (system 2 +)
Sika Supply Center AG Industriestraße 6060 Sarnen Switzerland	Name and address of the producer
11	two last digits of year of affixing CE marking
nnnn-CPD-*xxxx*	number of the EC certificate for the FPC
ETA-11/0482	ETA number
ETAG 006	ETAG number
Mechanically fastened roof waterproofing system	intended use
Declared values of the product and the system see Annexes of ETA-11/0482	classification and characteristics of the product

[14] Notes on the CE marking are stated in Guidance Paper D "CE marking under the Construction Products Directive", Brussels, 1 August 2002

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The components of the kit of the mechanically fastened roof waterproofing kit are factory-made according to the procedure laid down in the MTD.

The ETA is issued for the kit on the basis of the product of agreed data/information, deposited with DIBt, which identifies the kit that has been assessed and judged. Changes to the components of the kit or in the production process of the components, which could result in the production process and/or the properties of the product deposited being incorrect should be notified to DIBt before the changes are introduced. DIBt will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

4.2 Design and dimensioning

The fitness for the respective use of the mechanically fastened roof waterproofing results from the characteristic values stated in the annexes and the design values for the wind loads according annexes 6 to 11, if need be, taking account of national requirements.

Furthermore the details demonstrated according annexes 12 to 14 shall be considered.

The supplementing statements of the manufacturer stated in the MTD for design and application of the waterproofing system shall be considered.

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 substrate onto which the waterproofing kit is to be laid should be sufficiently rigid, dense and dimensionally stable to support the system (sheet and insulation).

Insulation material

The compression behaviour of the insulation material:

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

- a 10 % compression ≥ 70 kPa (EN 826)
- a point load behaviour ≥ 800 Pa, deformation 5 mm (EN 12430)

The insulation material must be CE marked according to the relevant harmonized European standard. The durability shall be assessed in accordance with these standards.

The thickness of the insulation material should be designed in accordance with national regulations.

4.3 Installation

The fitness for use 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 MTD by 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,
- overlap: the overlap between the sheets must be always at least 120 mm and the joint can be welded with hot air and must have at least 20 mm in width.
- inspections during installation and of the finished roof waterproofing system and documentation of the results.

The information as to the

- method of repair on site,
- handling of waste products

shall be observed.

4.4 Manufacturer's responsibilities

It is the manufacturer's responsibility to make sure that all those who utilize the approved roof waterproofing system will be appropriately informed about the specific conditions according to sections 1, 2, 4, and 5 including the annexes to this ETA and the not confidential parts of the MTD deposited to this ETA.

5 Indications of the manufacturer

5.1 Packaging, transport and storage

Information on:

- Packaging
- transport and
- storage
- are given in the MTD.

5.2 Use, maintenance and repair

Information on:

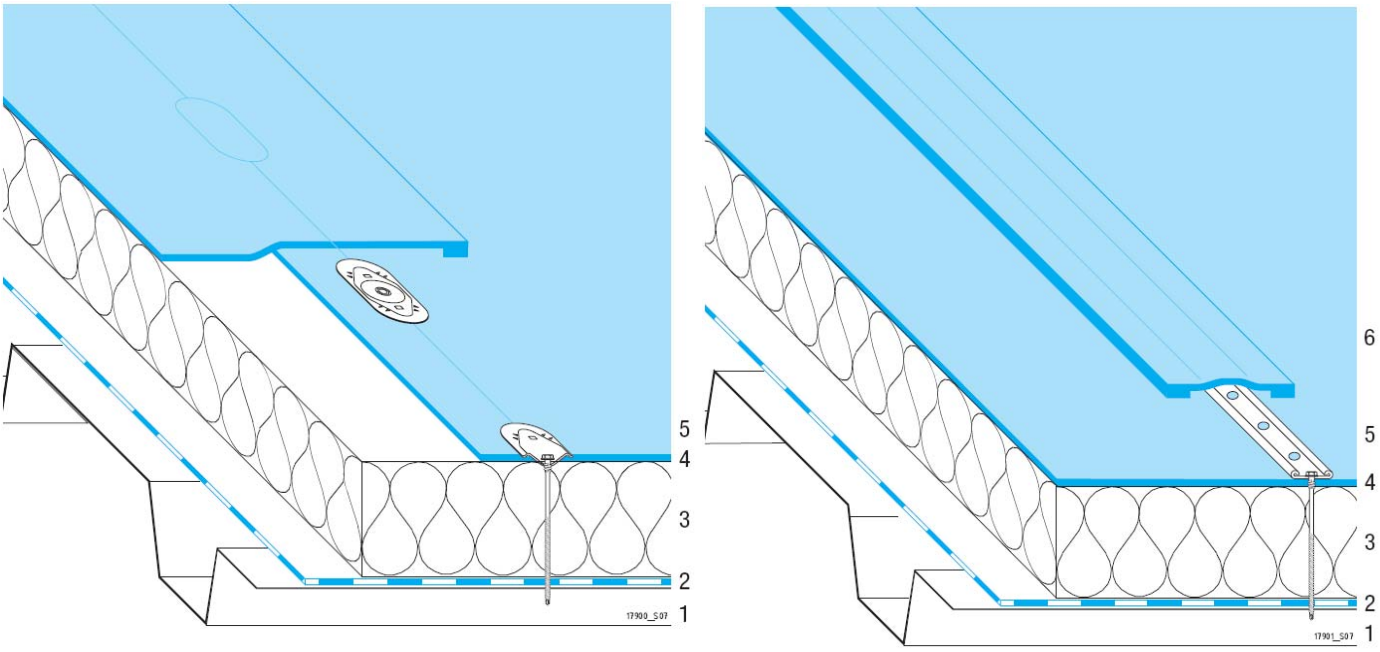
- Use
- maintenance
- repair

are given in the MTD.

Uwe Bender
Head of Department

beglaubigt:
Hemme

Deutsches Institut für Bautechnik DIBt



1	Substrate (not part of the kit)
2	Vapour control layer (optional. not part of the kit)
3	Thermal insulation [1] (not part of the kit)
4	Sarnafil T (waterproofing sheet according to EN 13956)
5	Fastener (according to relevant ETAs)
6	Cover strip

[1] It shall be ensured that the insulation material on site has:
- a 10 % compression ≥ 70 kPa (EN 826)
- a point load behaviour ≥ 800 Pa, deformation 5mm (EN 12430)

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

Reaction to fire:	class E according to EN 13501-1
External fire performance of roofs	class F_{ROOF} according to EN 13501-5

Information for users on external fire performance of roof decks:
According to declaration of conformity of the sheets the classification B_{ROOF}(t1), (t2) or (t3) is only valid for supporting decks which are described in the classification documents according EN V 1187 and according EN 13501-5.

Sarnafil T Sika Supply Center AG	Annex 1
System build-up of the roof waterproofing	

Characteristic	test method	Dimen-sion	value	value	value	value	value	expression
thickness [1)]	EN 1849-2	mm	1,25	1,5	1,8	2,0	2,5	MDV
Mass per unit area		g/m²	1320	1650	1980	2200	2750	MDV
reaction to fire [1)]	EN 11925-2		class E	class E	class E	class E	class E	EN 13501-1
water tightness [1)]	EN 1928 test B	kPa						pass
peel resistance of joints [1)]	EN 12316-2	N/50 mm	≥ 200	≥ 300	≥ 300	≥ 300	≥ 200	MLV
shear resistance of joints [1)]	EN 12317-2	N/50 mm	≥ 500	≥ 500	≥ 500	≥ 500	≥ 500	MLV
tensile strength [1)]	EN 12311-2	N/50 mm	≥ 900	≥ 900	≥ 900	≥ 900	≥ 1000	MLV
tensile elongation [1)]	EN 12311-2	%	≥ 13	≥ 13	≥ 13	≥ 13	≥ 13	MLV
resistance against dynamic indentation [1)]	EN 12691 test A	mm	≥ 600	≥ 700	≥ 1000	≥ 1250	≥ 1500	MLV
resistance against dynamic indentation [1)]	EN 12691 test A	mm	≥ 800	≥ 900	≥ 1250	≥ 1500	≥ 2000	MLV
resistance against static indentation [1)]	EN 12730 test B	kg	≥ 20	≥ 20	≥ 20	≥ 20	≥ 20	MLV
resistance to tearing [1)]	EN 1310-2	N	≥ 300	≥ 300	≥ 300	≥ 300	≥ 300	MLV
dimensional stability [1)]	EN 1107-2	%	≤ 0,2	≤ 0,2	≤ 0,2	≤ 0,2	≤ 0,2	MLV
resistance to cold bending [1)]	EN 495-5	°C	≤ -35	≤ -35	≤ -40	≤ -40	≤ -40	MLV
resistance to UV radiation [1)]	EN 1297	visible						pass
resistance to hail [1)]	EN 13583	m/s	≥ 17	≥ 22	≥ 25	≥ 28	≥ 30	MLV
water vapour transmission [1)]	EN 1931	µ	ca. 150.000	ca. 150.000	ca. 150.000	ca. 150.000	ca. 150.000	MDV
resistance to liquid chemicals including water [1)]	EN 1847	-						npd
root resistance [1)]	prEN 13948	-						npd
Exposure to bitumen [1)]	EN 1548	-						pass
Resistance to heat ageing, EN 1296 [2)]								
peel resistance of joint	EN 12316-2	%						pass
shear resistance of joints	EN 12317-2	%	Δ ≤ 20	Δ ≤ 20	Δ ≤ 20	Δ ≤ 20	Δ ≤ 20	pass
resistance to tearing	EN 1310-2	---				---	---	---
resistance to cold bending	EN 495-5	°C	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	pass
Resistance after long term exposure to heat UV (EN 1297)[2)]								
resistance to cold bending	EN 495-5	°C	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	pass

[1)] These values are manufacturer values stated by the CE-marking according to EN 13956
[2)] These values are determined in accordance with ETAG 006

Sarnafil T

Characteristics of the waterproofing sheet Sarnafil TS 77

Annex 2

Characteristic	test method	Dimen-sion	value	value	value	value	expression
thickness [1)]	EN 1849-2	mm	1,25	1,5	1,8	2,0	MDV
Mass per unit area		g/m²	1440	1650	2160	2400	MDV
reaction to fire [1)]	EN 11925-2		class E	class E	class E	class E	EN 13501-1
water tightness [1)]	EN 1928 test B	kPa					pass
peel resistance of joints [1)]	EN 12316-2	N/50 mm	≥ 200	≥ 300	≥ 300	≥ 300	MLV
shear resistance of joints [1)]	EN 12317-2	N/50 mm	≥ 500	≥ 500	≥ 500	≥ 500	MLV
tensile strength [1)]	EN 12311-2	N/50 mm	≥ 800	≥ 800	≥ 800	≥ 800	MLV
tensile elongation [1)]	EN 12311-2	%	≥ 12	≥ 12	≥ 12	≥ 12	MLV
resistance against dynamic indentation [1)]	EN 12691 test A	mm	≥ 500	≥ 600	≥ 700	≥ 9000	MLV
resistance against dynamic indentation [1)]	EN 12691 test A	mm	≥ 800	≥ 900	≥ 1000	≥ 1250	MLV
resistance against static indentation [1)]	EN 12730 test B	kg	≥ 20	≥ 20	≥ 20	≥ 20	MLV
resistance to tearing [1)]	EN 1310-2	N	≥ 300	≥ 300	≥ 300	≥ 300	MLV
dimensional stability [1)]	EN 1107-2	%	≤ 0,2	≤ 0,2	≤ 0,2	≤ 0,2	MLV
resistance to cold bending [1)]	EN 495-5	°C	≤ -20	≤ -20	≤ -20	≤ -20	MLV
resistance to UV radiation [1)]	EN 1297	visible					pass
resistance to hail [1)]	EN 13583	m/s	≥ 17	≥ 22	≥ 25	≥ 28	MLV
water vapour transmission [1)]	EN 1931	µ	ca. 200.000	ca. 200.000	Ca. 200.000	ca. 200.000	MDV
resistance to liquid chemicals including water [1)]	EN 1847	-					npd
root resistance [1)]	prEN 13948	-					npd
Exposure to bitumen [1)]	EN 1548	-					pass
Resistance to heat ageing, EN 1296 [2)]							
peel resistance of joint	EN 12316-2	%					pass
shear resistance of joints	EN 12317-2	%	Δ ≤ 20	Δ ≤ 20	Δ ≤ 20	Δ ≤ 20	pass
resistance to tearing	EN 1310-2	---				---	---
resistance to cold bending	EN 495-5	°C	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	pass
Resistance after long term exposure to heat UV (EN 1297)[2)]							
resistance to cold bending	EN 495-5	°C	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	pass

[1)] These values are manufacturer values stated by the CE-marking according to EN 13956
[2)] These values are determined in accordance with ETAG 006

Sarnafil T

Characteristics of the waterproofing sheet Sarnafil TS 77E

Annex 3

Characteristic	test method	Dimen-sion	value	value	expression
thickness [1)]	EN 1849-2	mm	1,5	2,0	MDV
Mass per unit area		g/m²	1800	2400	MDV
reaction to fire [1)]	EN 11925-2		class E	class E	EN 13501-1
water tightness [1)]	EN 1928 test B	kPa			pass
peel resistance of joints [1)]	EN 12316-2	N/50 mm	≥ 300	≥ 300	MLV
shear resistance of joints [1)]	EN 12317-2	N/50 mm	≥ 500	≥ 500	MLV
tensile strength [1)]	EN 12311-2	N/50 mm	≥ 800	≥ 800	MLV
tensile elongation [1)]	EN 12311-2	%	≥ 12	≥ 12	MLV
resistance against dynamic indentation [1)]	EN 12691 test A	mm	≥ 600	≥ 900	MLV
resistance against dynamic indentation [1)]	EN 12691 test A	mm	≥ 900	≥ 1250	MLV
resistance against static indentation [1)]	EN 12730 test B	kg	≥ 20	≥ 20	MLV
resistance to tearing [1)]	EN 1310-2	N	≥ 300	≥ 300	MLV
dimensional stability [1)]	EN 1107-2	%	≤ 0,2	≤ 0,2	MLV
resistance to cold bending [1)]	EN 495-5	°C	≤ -20	≤ -20	MLV
resistance to UV radiation [1)]	EN 1297	visible			pass
resistance to hail [1)]	EN 13583	m/s	≥ 22	≥ 28	MLV
water vapour transmission [1)]	EN 1931	µ	ca. 200.000	ca. 200.000	MDV
resistance to liquid chemicals including water [1)]	EN 1847	-			npd
root resistance [1)]	prEN 13948	-			npd
Exposure to bitumen [1)]	EN 1548	-			pass
Resistance to heat ageing, EN 1296 [2)]					
peel resistance of joint	EN 12316-2	%			pass
shear resistance of joints	EN 12317-2	%	Δ ≤ 20	Δ ≤ 20	pass
resistance to tearing	EN 1310-2	---			---
resistance to cold bending	EN 495-5	°C	Δ ≤ 15	Δ ≤ 15	pass
Resistance after long term exposure to heat UV (EN 1297)[2)]					
resistance to cold bending	EN 495-5	°C	Δ ≤ 15	Δ ≤ 15	pass

[1)] These values are manufacturer values stated by the CE-marking according to EN 13956
[2)] These values are determined in accordance with ETAG 006

Sarnafil T

Characteristics of the waterproofing sheet Sarnafil TS 77ER

Annex 4

Characteristic	test method	Dimen-sion	value	value	value	expression
thickness [1)]	EN 1849-2	mm	1,5	1,8	2,0	MDV
Mass per unit area		g/m²	1650	1980	2200	MDV
reaction to fire [1)]	EN 11925-2		class E	class E	class E	EN 13501-1
water tightness [1)]	EN 1928 test B	kPa				pass
peel resistance of joints [1)]	EN 12316-2	N/50 mm	≥ 200	≥ 200	≥ 200	MLV
shear resistance of joints [1)]	EN 12317-2	N/50 mm	≥ 500	≥ 500	≥ 500	MLV
tensile strength [1)]	EN 12311-2	N/50 mm	≥ 800	≥ 900	≥ 900	MLV
tensile elongation [1)]	EN 12311-2	%	≥ 13	≥ 13	≥ 13	MLV
resistance against dynamic indentation [1)]	EN 12691 test A	mm	≥ 600	≥ 800	≥ 900	MLV
resistance against dynamic indentation [1)]	EN 12691 test A	mm	≥ 800	≥ 1000	≥ 1250	MLV
resistance against static indentation [1)]	EN 12730 test B	kg	≥ 20	≥ 20	≥ 20	MLV
resistance to tearing [1)]	EN 1310-2	N	≥ 250	≥ 250	≥ 250	MLV
dimensional stability [1)]	EN 1107-2	%	≤ 0,3	≤ 0,3	≤ 0,2	MLV
resistance to cold bending [1)]	EN 495-5	°C	≤ -35	≤ -40	≤ -40	MLV
resistance to UV radiation [1)]	EN 1297	visible				pass
resistance to hail [1)]	EN 13583	m/s	≥ 20	≥ 22	≥ 25	MLV
water vapour transmission [1)]	EN 1931	µ	ca. 150.000	Ca. 150.000	Ca. 150.000	MDV
resistance to liquid chemicals including water [1)]	EN 1847	-				npd
root resistance [1)]	prEN 13948	-				npd
Exposure to bitumen [1)]	EN 1548	-				pass
Resistance to heat ageing, EN 1296 [2)]						
peel resistance of joint	EN 12316-2	%				pass
shear resistance of joints	EN 12317-2	%	Δ ≤ 20	Δ ≤ 20	Δ ≤ 20	pass
resistance to tearing	EN 1310-2	---				---
resistance to cold bending	EN 495-5	°C	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	pass
Resistance after long term exposure to heat UV (EN 1297)[2)]						
resistance to cold bending	EN 495-5	°C	Δ ≤ 15	Δ ≤ 15	Δ ≤ 15	pass

[1)] These values are manufacturer values stated by the CE-marking according to EN 13956
[2)] These values are determined in accordance with ETAG 006

Sarnafil T

Characteristics of the waterproofing sheet Sarnafil TCS

Annex 5

Deutsches Institut für Bautechnik DIBt

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TS 77 for point fixation on different types of substrates								
Screw	**Washer**	**Sheet deck**		**Timber**			**Concrete**	**Aerated concrete**
		1	**2**	**1**	**2**	**3**	**EN 206-1**	**EN 12602 EN 1520**
		W_{adm} [N]						
Sarnafast SF-4,8	Sarnafast KT-82x40	**780**		780				
IR2-4,8xL	IR 82x40	780		780				
IR2-S-4,8xL	IR 82x40	780		780				
IR3-4,8xL	IR 82x40	780						
IR3-S-4,8xL	IR 82x40	780						
IR2-C-4,8xL	IRC/W 82x40	780		780				
TPR-L	IRD-82x40		430					
IG-6	IRD-82x40					780		
IW-T-5 x35	IRC/W 82x40					780		
IW-S-5 x35	IRC/W 82x40					780		
TI-6,	IRD-82x40						780[2)]	
TI-6,	IF/IG-C-82*40						780[2)]	
DT-4,8xL	IF/IG-C 82x40						780[1)]	
DT-4,8xL	IRD-82x40						780[1)]	
DT-S-4,8xL	IF/IG-C 82x40						780[1)]	
DT-S-4,8xL	IRD-82x40						780[1)]	
DT-6,3xL	IF/IG-C 82x40						780[3)]	
DT-6,3xL	IRD-82x40						780[3)]	
DT-S-6,3xL	IF/IG-C 82x40						780[3)]	
DT-S-6,3xL	IRD-82x40						780[3)]	
IE/15-6,3 x L	IRD-82x40						600[4)]	
IE/15-6,3 x L	IE-C-82x40						600[4)]	
IGR-S-T25-8,0x65	IG8-C-82x40							740[5)]

Sheet Deck
1 Steel S280GD – EN 10326, t ≥0,75 mm
2 Aluminium, R_m ≥ 195 N/mm², t ≥ 1,0 mm

Timber
1 structural timber EN 338/C24, t ≥ 22mm, effective embedment depth ≥ 22 mm
2 OSB3 EN 300, t ≥ 18 mm, effective embedment depth ≥ 18mm
3 particle board EN 312/P5, t ≥ 19 mm, effective embedment depth ≥ 19 mm

Concrete and aerated concrete
[1)] effective anchorage depth ≥ 25 mm
[2)] effective anchorage depth ≥ 30 mm
[3)] effective anchorage depth ≥ 32 mm
[4)] effective anchorage depth ≥ 35 mm
[5)] effective anchorage depth ≥ 60 mm

Sarnafil T

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TS 77 for point fixation on different types of substrates

Annex 6

Deutsches Institut für Bautechnik DIBt

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TS 77 for linear fixation on different types of substrates								
Screw	**Washer**	**Sheet deck**		**Timber**			**Concrete**	**Aerated concrete**
		1	**2**	**1**	**2**	**3**	**EN 206-1**	**EN 12602 EN 1520**
		W_{adm} [N]						
Sarnafast SF-4,8	Sarnabar S6/10	**765**		765				
IR2-4,8xL	Sarnabar S6/10	765		765				
IR2-S-4,8xL	Sarnabar S6/10	765		765				
IR3-4,8xL	Sarnabar S6/10	765						
IR3-S-4,8xL	Sarnabar S6/10	765						
IR2-C-4,8xL	Sarnabar S6/10	765		765				
ISO-TAK BS 48	Sarnabar S6/10	765						
TPR-L	Sarnabar S6/10		430					
IG-6	Sarnabar S6/10					765		
IW-T-5 x35	Sarnabar S6/10					765		
IW-S-5 x35	Sarnabar S6/10					765		
TI-6,	Sarnabar S6/10						765[2)]	
DT-4,8xL	Sarnabar S6/10						765[1)]	
DT-S-4,8xL	Sarnabar S6/10						765[1)]	
DT-6,3xL	Sarnabar S6/10						765[3)]	
DT-S-6,3xL	Sarnabar S6/10						765[3)]	
IE/15-6,3 x L	Sarnabar S6/10						600[3)]	
IGR-S-T25-8,0x65	Sarnabar S6/10							690[5)]

Sheet Deck
1 Steel S280GD – EN 10326, t ≥0,75 mm
2 Aluminium, R_m ≥ 195 N/mm², t ≥ 1,0 mm

Timber
1 structural timber EN 338/C24, t ≥ 22mm, effective embedment depth ≥ 22 mm
2 OSB3 EN 300, t ≥ 18 mm, effective embedment depth ≥ 18mm
3 particle board EN 312/P5, t ≥ 19 mm, effective embedment depth ≥ 19 mm

Concrete and aerated concrete
[1)] effective anchorage depth ≥ 25 mm
[2)] effective anchorage depth ≥ 30 mm
[3)] effective anchorage depth ≥ 32 mm
[4)] effective anchorage depth ≥ 35 mm
[5)] effective anchorage depth ≥ 60 mm

Sarnafil T

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TS 77 for linear fixation on different types of substrates

Annex 7

Deutsches Institut für Bautechnik DIBt

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TS 77E and Sarnafil TS 77ER for point fixation on different types of substrates								
Screw	**Washer**	**Sheet deck**		**Timber**			**Concrete**	**Aerated concrete**
		1	**2**	**1**	**2**	**3**	**EN 206-1**	**EN 12602 EN 1520**
		W_{adm} [N]						
Sarnafast SF-4,8	Sarnafast KT-82x40	690		690				
IR2-4,8xL	IR 82x40	690		690				
IR2-S-4,8xL	IR 82x40	690		690				
IR3-4,8xL	IR 82x40	690						
IR3-S-4,8xL	IR 82x40	690						
IR2-C-4,8xL	IRC/W 82x40	690		690				
TPR-L	IRD-82x40		430					
IG-6	IRD-82x40					690		
IW-T-5 x35	IRC/W 82x40					690		
IW-S-5 x35	IRC/W 82x40					690		
TI-6,	IRD-82x40						690[2)]	
TI-6,	IF/IG-C-82*40						690[2)]	
DT-4,8xL	IF/IG-C 82x40						690[1)]	
DT-4,8xL	IRD-82x40						690[1)]	
DT-S-4,8xL	IF/IG-C 82x40						690[1)]	
DT-S-4,8xL	IRD-82x40						690[1)]	
DT-6,3xL	IF/IG-C 82x40						690[3)]	
DT-6,3xL	IRD-82x40						690[3)]	
DT-S-6,3xL	IF/IG-C 82x40						690[3)]	
DT-S-6,3xL	IRD-82x40						690[3)]	
IE/15-6,3 x L	IRD-82x40						600[4)]	
IE/15-6,3 x L	IE-C-82x40						600[4)]	
IGR-S-T25-8,0x65	IG8-C-82x40							690[5)]

Sheet Deck
1 Steel S280GD – EN 10326, t ≥0,75 mm
2 Aluminium, R_m ≥ 195 N/mm², t ≥ 1,0 mm

Timber
1 structural timber EN 338/C24, t ≥ 22mm, effective embedment depth ≥ 22 mm
2 OSB3 EN 300, t ≥ 18 mm, effective embedment depth ≥ 18mm
3 particle board EN 312/P5, t ≥ 19 mm, effective embedment depth ≥ 19 mm

Concrete and aerated concrete
[1)] effective anchorage depth ≥ 25 mm
[2)] effective anchorage depth ≥ 30 mm
[3)] effective anchorage depth ≥ 32 mm
[4)] effective anchorage depth ≥ 35 mm
[5)] effective anchorage depth ≥ 60 mm

Sarnafil T

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TS 77E and Sarnafil TS 77ER for point fixation on different types of substrates

Annex 8

Deutsches Institut für Bautechnik DIBt

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TS 77E and Sarnafil TS 77ER for linear fixation on different types of substrates								
Screw	**Washer**	**Sheet deck**		**Timber**			**Concrete**	**Aerated concrete**
		1	**2**	**1**	**2**	**3**	**EN 206-1**	**EN 12602 EN 1520**
		W_{adm} [N]						
Sarnafast SF-4,8	Sarnabar S6/10	**765**		765				
IR2-4,8xL	Sarnabar S6/10	765		765				
IR2-S-4,8xL	Sarnabar S6/10	765		765				
IR3-4,8xL	Sarnabar S6/10	765						
IR3-S-4,8xL	Sarnabar S6/10	765						
IR2-C-4,8xL	Sarnabar S6/10	765		765				
ISO-TAK BS 48	Sarnabar S6/10	765						
TPR-L	Sarnabar S6/10		430					
IG-6	Sarnabar S6/10					765		
IW-T-5 x35	Sarnabar S6/10					765		
IW-S-5 x35	Sarnabar S6/10					765		
TI-6,	Sarnabar S6/10						765[2)]	
DT-4,8xL	Sarnabar S6/10						765[1)]	
DT-S-4,8xL	Sarnabar S6/10						765[1)]	
DT-6,3xL	Sarnabar S6/10						765[3)]	
DT-S-6,3xL	Sarnabar S6/10						765[3)]	
IE/15-6,3 x L	Sarnabar S6/10						600[3)]	
IGR-S-T25-8,0x65	Sarnabar S6/10							690[5)]

Sheet Deck
1 Steel S280GD – EN 10326, t ≥0,75 mm
2 Aluminium, R_m ≥ 195 N/mm², t ≥ 1,0 mm

Timber
1 structural timber EN 338/C24, t ≥ 22mm, effective embedment depth ≥ 22 mm
2 OSB3 EN 300, t ≥ 18 mm, effective embedment depth ≥ 18mm
3 particle board EN 312/P5, t ≥ 19 mm, effective embedment depth ≥ 19 mm

Concrete and aerated concrete
[1)] effective anchorage depth ≥ 25 mm
[2)] effective anchorage depth ≥ 30 mm
[3)] effective anchorage depth ≥ 32 mm
[4)] effective anchorage depth ≥ 35 mm
[5)] effective anchorage depth ≥ 60 mm

Sarnafil T

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TS 77E and TS 77ER for linear fixation on different types of substrates

Annex 9

Deutsches Institut für Bautechnik DIBt

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TCS for point fixation on different types of substrates								
Screw	**Washer**	**Sheet deck**		**Timber**			**Concrete**	**Aerated concrete**
		1	**2**	**1**	**2**	**3**	**EN 206-1**	**EN 12602 EN 1520**
		W_{adm} [N]						
Sarnafast SF-4,8	Sarnafast KT-82x40	580		580				
IR2-4,8xL	IR 82x40	580		580				
IR2-S-4,8xL	IR 82x40	580		580				
IR3-4,8xL	IR 82x40	580						
IR3-S-4,8xL	IR 82x40	580						
IR2-C-4,8xL	IRC/W 82x40	580		580				
TPR-L	IRD-82x40		430					
IG-6	IRD-82x40					580		
IW-T-5 x35	IRC/W 82x40					580		
IW-S-5 x35	IRC/W 82x40					580		
TI-6,	IRD-82x40						580[2)]	
TI-6,	IF/IG-C-82*40						580[2)]	
DT-4,8xL	IF/IG-C 82x40						580[1)]	
DT-4,8xL	IRD-82x40						580[1)]	
DT-S-4,8xL	IF/IG-C 82x40						580[1)]	
DT-S-4,8xL	IRD-82x40						580[1)]	
DT-6,3xL	IF/IG-C 82x40						580[3)]	
DT-6,3xL	IRD-82x40						580[3)]	
DT-S-6,3xL	IF/IG-C 82x40						580[3)]	
DT-S-6,3xL	IRD-82x40						580[3)]	
IE/15-6,3 x L	IRD-82x40						580[4)]	
IE/15-6,3 x L	IE-C-82x40						580[4)]	
IGR-S-T25-8,0x65	IG8-C-82x40							580[5)]

Sheet Deck
1 Steel S280GD – EN 10326, t ≥0,75 mm
2 Aluminium, R_m ≥ 195 N/mm², t ≥ 1,0 mm

Timber
1 structural timber EN 338/C24, t ≥ 22mm, effective embedment depth ≥ 22 mm
2 OSB3 EN 300, t ≥ 18 mm, effective embedment depth ≥ 18mm
3 particle board EN 312/P5, t ≥ 19 mm, effective embedment depth ≥ 19 mm

Concrete and aerated concrete
[1)] effective anchorage depth ≥ 25 mm
[2)] effective anchorage depth ≥ 30 mm
[3)] effective anchorage depth ≥ 32 mm
[4)] effective anchorage depth ≥ 35 mm
[5)] effective anchorage depth ≥ 60 mm

Sarnafil T

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TCS for point fixation on different types of substrates

Annex 10

Deutsches Institut für Bautechnik DIBt

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TCS for linear fixation on different types of substrates								
Screw	**Washer**	**Sheet deck**		**Timber**			**Concrete**	**Aerated concrete**
		1	**2**	**1**	**2**	**3**	**EN 206-1**	**EN 12602 EN 1520**
		W_{adm} [N]						
Sarnafast SF-4,8	Sarnabar S6/10	640		640				
IR2-4,8xL	Sarnabar S6/10	640		640				
IR2-S-4,8xL	Sarnabar S6/10	640		640				
IR3-4,8xL	Sarnabar S6/10	640						
IR3-S-4,8xL	Sarnabar S6/10	640						
IR2-C-4,8xL	Sarnabar S6/10	640		640				
ISO-TAK BS 48	Sarnabar S6/10	640						
TPR-L	Sarnabar S6/10		440					
IG-6	Sarnabar S6/10					640		
IW-T-5 x35	Sarnabar S6/10					640		
IW-S-5 x35	Sarnabar S6/10					640		
TI-6,	Sarnabar S6/10						640[2)]	
DT-4,8xL	Sarnabar S6/10						640[1)]	
DT-S-4,8xL	Sarnabar S6/10						640[1)]	
DT-6,3xL	Sarnabar S6/10						640[3)]	
DT-S-6,3xL	Sarnabar S6/10						640[3)]	
IE/15-6,3 x L	Sarnabar S6/10						600[3)]	
IGR-S-T25-8,0x65	Sarnabar S6/10							640[5)]

Sheet Deck
1 Steel S280GD – EN 10326, t ≥0,75 mm
2 Aluminium, R_m ≥ 195 N/mm², t ≥ 1,0 mm

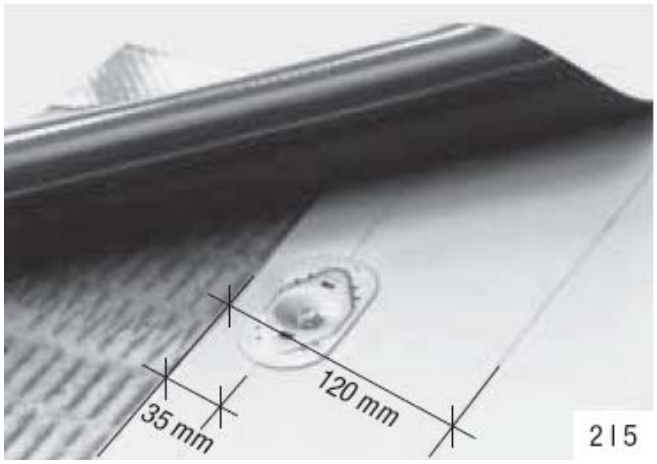
Timber
1 structural timber EN 338/C24, t ≥ 22mm, effective embedment depth ≥ 22 mm
2 OSB3 EN 300, t ≥ 18 mm, effective embedment depth ≥ 18mm
3 particle board EN 312/P5, t ≥ 19 mm, effective embedment depth ≥ 19 mm

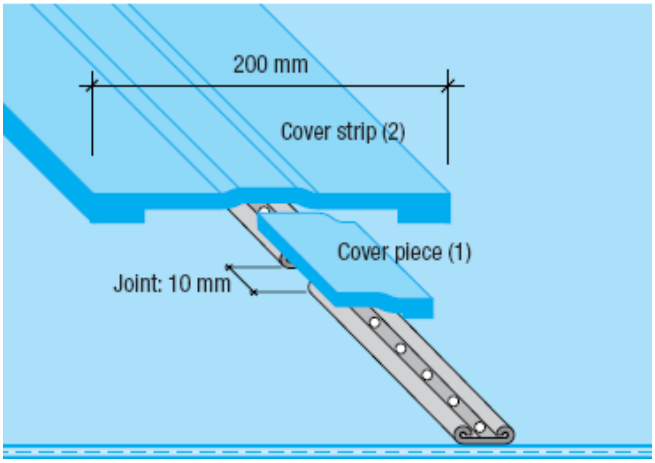
Concrete and aerated concrete
[1)] effective anchorage depth ≥ 25 mm
[2)] effective anchorage depth ≥ 30 mm
[3)] effective anchorage depth ≥ 32 mm
[4)] effective anchorage depth ≥ 35 mm
[5)] effective anchorage depth ≥ 60 mm

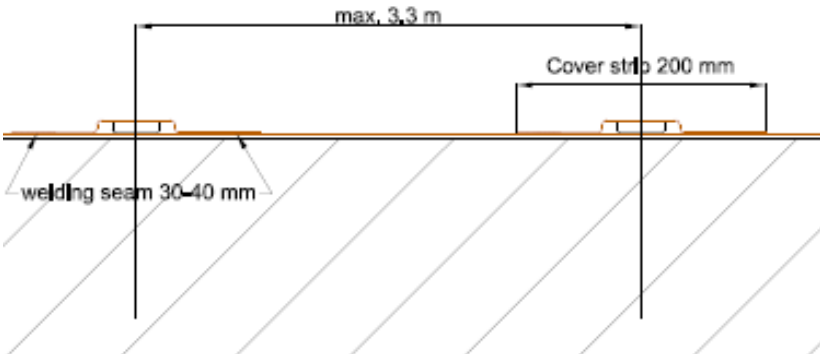
Sarnafil T

Admissible wind load per fastener/washer combination with waterproofing sheet Sarnafil TCS for linear fixation on different types of substrates

Annex 11

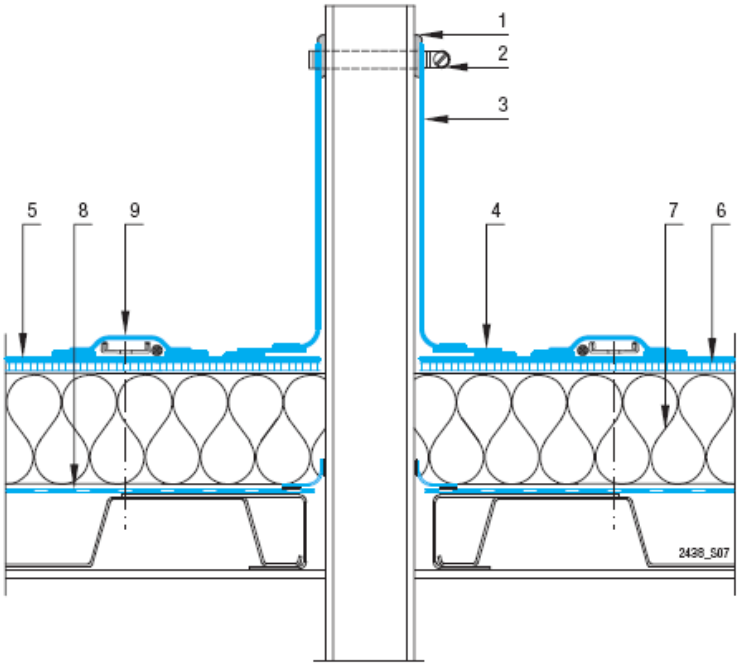






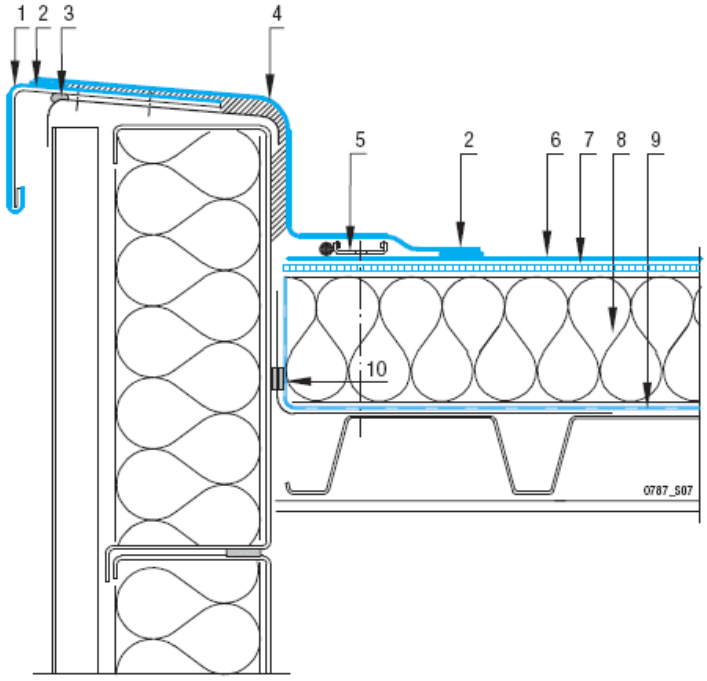
Minimum fastener distance	≥ 25 mm
Maximum fastener distance	≤ 500 mm
Minimum number of fastener	2 piece/m²
Maximum distance between fastener and edge of sheet	≥ 20 mm

Sarnafil T	Annex 12
Dimensions of fixation and overlapping	



Penetration:

1 Sarnaplast sealant
2 Stainless steel jubilee clip
3 Sarnafil® membrane
4 Hot-air weld
5 Sarnafil® membrane, mechanically fastened
6 Separation / fire protection layer
7 Thermal insulation
8 Sarnavap vapour control layer
9 Sarnabar with welding cord



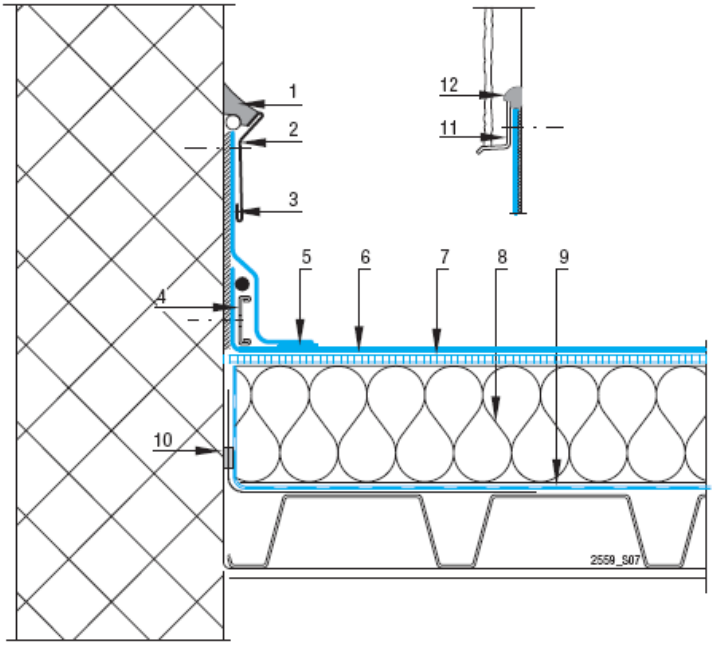
Perimeter Flashing:

1 Laminated metal sheet
2 Hot-air weld
3 Sealing tape
4 Sarnafil® membrane, adhered
5 Sarnabar with welding cord
6 Sarnafil® membrane, mechanically fastened
7 Separation layer / fire protection layer
8 Thermal insulation
9 Sarnavap vapour control layer
10 Sarnavap jointing tape

Sarnafil T

Examples for Details

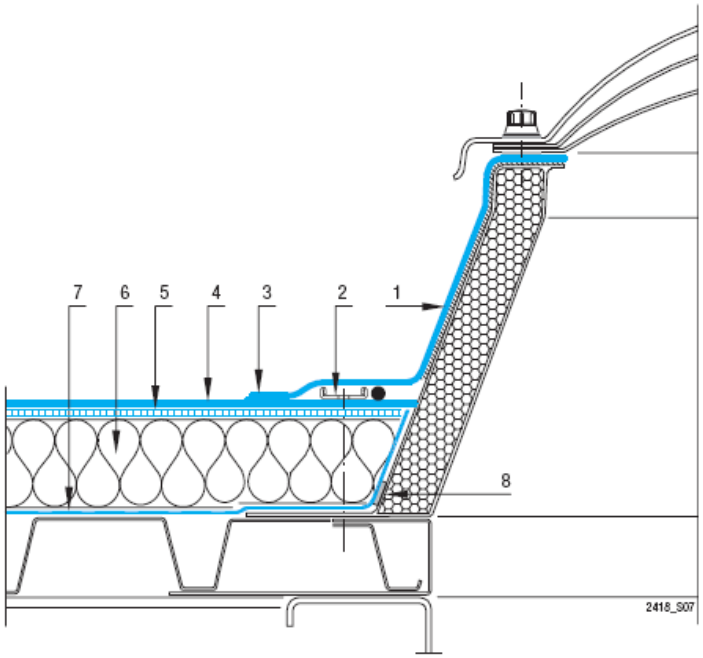
Annex 13



Upstand:

1 Sarnaplast sealant
2 Counter-flashing
3 Sarnafil® membrane, adhered
4 Sarnabar with welding cord
5 Hot-air weld
6 Sarnafil® membrane, mechanically fastened
7 Separation / fire protection layer
8 Thermal insulation
9 Sarnavap vapour control layer
10 Sarnavap jointing tape

Alternate termination:
11 Render stop profile
12 Sarnaplast sealant



Skylight

1 Sarnafil® membrane, adhered
2 Sarnabar with welding cord
3 Hot-air weld
4 Sarnafil® membrane, mechanically fastened
5 Separation / fire protection layer
6 Thermal insulation
7 Sarnavap vapour control layer
8 Sarnavap jointing tape

Sarnafil T	Annex 14
Examples for Details	