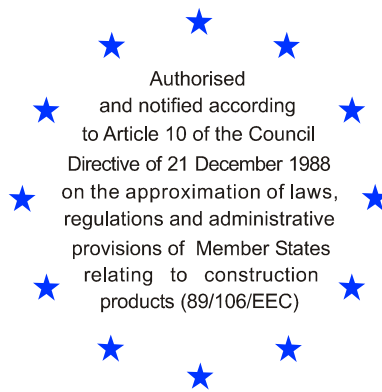


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# DIBt

Mitglied der EOTA  
*Member of EOTA*

## European Technical Approval ETA-10/0053

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung  
*Trade name*

SI-T2E 544 S  
SI-T2E 576 S

Zulassungsinhaber  
*Holder of approval*

Solar Integrated Technologies GmbH  
Robert-Koch-Straße 50  
55129 Mainz  
DEUTSCHLAND

Zulassungsgegenstand  
und Verwendungszweck  
*Generic type and use  
of construction product*

Mechanisch befestigtes Dachabdichtungssystem  
*Systems of Mechanical fastened flexible roof waterproofing membranes*

Geltungsdauer: vom  
*Validity: from*  
bis  
*to*

20 April 2010  
19 April 2015

Herstellwerk  
*Manufacturing plant*

Solar Integrated Technologies Inc.  
1837 E. Matrin Luther King jr. blvd.  
Los Angeles  
CA 90058  
USA

Diese Zulassung umfasst  
*This Approval contains*

16 Seiten einschließlich 6 Anhänge  
*16 pages including 6 annexes*



Europäische Organisation für Technische Zulassungen  
European Organisation for Technical Approvals

## 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<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - 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 (Bauprodukten-gesetz - BauPG) vom 28. April 1998<sup>4</sup>, as amended by law of 31 October 2006<sup>5</sup>;
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>;
  - 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.
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- 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.

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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 product and intended use

#### 1.1 Definition of the construction product

The mechanical fastened flexible roof waterproofing kits SI-T2E 544 S and SI-T2E 576 S consist of a flexible waterproofing sheet on the basis flexible polyolefine (FPO), clutched on bottom side with glassfibre/polyester fleece and sets of fastener and washer.

The kits with the components waterproofing sheet, fastener and washer can be assembled for creating the mechanically fastened one layer roof waterproofing system.

The insulation material is not a component of the kits.

##### 1.1.1 Waterproofing sheet

The waterproofing sheet of the kit consists of the waterproofing sheet Sarnafil TS 77-20E combined with photovoltaic modules. The PV modules are laminated entire on the surface of the waterproofing sheet Sarnafil TS 77-20E in the factory.

The waterproofing sheet Sarnafil TS 77-20E is CE-marked according EN 13956<sup>7</sup>. The manufacturer has given a declaration of conformity

The waterproofing sheets are delivered in rolls with a maximum length of 15 m meters. The waterproofing sheets have a width of 2 meters.

The manufacturers declared value (MDV) of the effective thickness of the waterproofing layer is 2,0 mm. The waterproofing layer is clad on the bottom side with glassfibre/polyester fleece.

PV modules sizes are 5486 mm/394 mm with a thickness of 4 mm. The PV-modules are placed on the waterproofing sheet in such a way that a circumferential border of sufficient width of 12,5 cm of the waterproofing sheet is free for overlap welding and fastening. The leading through of the cables are fully sealed by welding and covered by the PV modules<sup>8</sup>.

The roof waterproofing kits differ in the electric power of PV-modules.

The PV modules fulfil the requirements of the Electromagnetic Compatibility Directive and the Low Voltage Directive. The declaration of conformity of the manufacturer is on hand. The CE-marking comprises the provisions of implementing of all relevant council directives of the European Communities.

The joints overlap of the waterproofing sheet shall be welded with hot air with minimum width of 35 mm. The minimum overlap is 120 mm.

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

Table 1: Waterproofing sheet

Membrane	Cladding/Backing layer [g/m <sup>2</sup> ]	effective thickness of waterproofing layer without backing [mm]	Mass per unit area [g/m <sup>2</sup> ]
Sarnafil TS 77-20E	Non-woven glass fleece with polyester clutch approx. 105	2,0 (-5 / +10 %).	2,4 (-5 / +10 %).

<sup>7</sup> EN 13956:2007 "Flexible sheet for waterproofing - Plastic and rubber sheets for roof waterproofing - Definitions and characteristics

<sup>8</sup> The reliability and durability of electric energy production by the PV-modules have not been assessed in the approval procedure and are not covered by the ETA, for the reason that this aspect is not covered by the related guideline ETAG 006.

### 1.1.2 Fastener and washer

For fastening the waterproofing membrane to the substrate fasteners can be used from the manufacturer SFS intec according to ETA-08/0262 and ETA-08/321. The fasteners and one washer are CE-marked on the basis of the relevant approval. The washer (profil) is proved according ETAG 006.

The different fasteners are stated in table 2.

The different washers are stated in table 3.

Table 2: Fasteners

Trade name	Type	Nature	Geometry
SFS IR2-4.8 x L (ETA -08/0321)	screw	coated carbon steel	4,8 x L mm
Sarnafast SF 4,8 x L (SF 4,8 x L according to ETA-08/0262)	screw	coated carbon steel	4,8 x L mm

Table 3: Washers

Trade name	Type	Nature	Geometry
Sarnabar Typ 6	profil	hot dipped galvanized steel	30 x l x 7 mm
Sarnafast KT 82 x 40 (KT 82 x 40 according to ETA-08/0262)	plate	coated carbon steel	82 x 40 mm

## 1.2 Intended use

The mechanically fastened flexible roof waterproofing systems SI-T2E 544 S and SI-T2E 576 S are intended to create a roof waterproofing for non-utilized roofs.

The roof waterproofing system can be installed on flat roofs to resist the passage of water to the building's internal structure, where 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.

In the manufacturer's technical dossier<sup>9</sup> (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 possible substrates are steel decks or timber.

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 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. When this expected working life has elapsed, the product may, under normal use conditions, keep his functionality even for a longer period without major affecting the essential requirements.

"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.

<sup>9</sup> The manufacturer's technical dossier (MTD) comprises all information necessary for the production and the installation of the product as well as for the repair of the roof waterproofing 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.

## 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 composition and the characteristic values of durability of the sheets are confidential and deposited with DIBt.

The performance of the reaction to fire behavior of the waterproofing sheet leads to the classification in class E according to EN 13501-1<sup>10</sup> This is part of the CE-marking of the sheet.

The external fire performance of the roof waterproofing kit leads to the classification in the class B<sub>ROOF</sub>(t3) according to EN 13501-5<sup>11</sup>.

According to the manufacturer's declaration the mechanically fastened roof waterproofing system does not contain any dangerous substances taking account of the EU database<sup>12</sup>.

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.

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.

The characteristic values of the CE-marked waterproofing sheets in accordance with EN 13956 are given in annex 2.

The required characteristic values of the waterproofing sheet and the assembled kit according ETAG 006 are verified by the approval testing and are given in annex 2. They fulfil the requirements of the ETAG 006. 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 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 3.

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

### 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<sup>13</sup> 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.

<sup>10</sup> EN 13501-1:2007 "Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests"

<sup>11</sup> EN 13501-5:2005 "Fire classification of construction products and building elements - Part 5: Classification using data from external fire exposure to roofs tests"

<sup>12</sup> Notes are stated in Guidance Paper H: A harmonized approach relating to Dangerous substances under the construction product directive, Brussels, 18 February 2000

<sup>13</sup> Official Journal of the European Communities L 42, 14 February 1998

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 according ETAG 006, the laminating process of the PV-modules and to assemble the components to the kit according annex 3. 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<sup>14</sup>.

The factory production control is in conformity with ETAG 006.

The manufacturer may only use components according to this ETA. He shall inspect or control the initial materials on acceptance according to the control plan.

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.

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<sup>14</sup> The control plan is a confidential part of the MTD. It contains the required information on the factory production control and on the initial type-testing. The MTD is only handed over to the notified body involved in the procedure of attestation of conformity (see 3.2.2).

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 conform to ETAG 006.

If the verifications underlying this ETA have been furnished on sheets 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 manufacturer.

After changing the composition or the production process of the waterproofing sheets, which may have influence on the proved characteristic values of durability according ETAG 006 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. The declaration of conformity shall be accompanied by the factory production control certificate.

### 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.

#### 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 kits

The CE marking<sup>15</sup> shall be affixed by the manufacturer on the packaging of the kits of the roof waterproofing "SI-T2E 544 S" and "SI-T2E 576 S" 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-10/0053
- number of the European technical approval guideline: ETAG 006.

The approved components shall be specified as belonging to the mechanically fastened roof waterproofing kit "SI-T2E 544 S" and "SI-T2E 576 S".

CE marking and accompanying information:

	Letters "CE"
<i>nnnn</i>	Identification number of notified body (system 2 +)
Solar Integrated Technologies GmbH Robert-Koch-Straße 50 55129 Mainz Germany	Name and address of the producer
10 <i>nnnn-CPD-xxxx</i>	two last digits of year of affixing CE marking number of the EC certificate for the FPC
ETA-10/0053 ETAG 006	ETA number ETAG number
Mechanically fastened roof waterproofing system Declared values of the product and design values of the system see Annexes of ETA-10/0053	intended use classification and characteristics of the product

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

### 4.1 Manufacturing

The manufacturing of the kit is to assemble the components sheets and fasteners including washers according to the combinations given in annex 5 and 6 to the kit.

The ETA is issued for the kit on the basis of agreed data/information about the components deposited with DIBt. Changes to the components of the kit or in the production process of the components, which could result in this data 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/alterations to the ETA shall be necessary.

<sup>15</sup> Notes on the CE marking are stated in Guidance Paper D "CE marking under the Construction Products Directive", Brussels, 1 August 2002



## 4.2 Design and dimensioning

The fitness for the respective use of the mechanically fastened roof waterproofing results from the admissible design values for the wind loads ( $W_{adm}$ ) according annexes 3, if need be, taking account of national requirements.

Furthermore the details demonstrated according annexes 4 till 6 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 and if available the insulation onto which the waterproofing kit is to be laid should be able to carry the loads.

The compression behaviour of the insulation material shall be such that the insulation material on site has:

- a 10 % compression  $\geq 60$  kPa (EN 826<sup>16</sup>)
- a point load behaviour  $\geq 500$  Pa, deformation 5 mm (EN 12430<sup>17</sup>)

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,

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<sup>16</sup> EN 826:1996 "Thermal insulating products for building applications - Determination of compression behaviour"

<sup>17</sup> EN 12430:1998 + A1:2006 "Thermal insulating products for building applications - Determination of behaviour under point load"

- 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 longitudinal overlap between the sheets shall be always at least 120 mm and the joint can be welded with hot air and shall have at least 35 mm in width.
- inspections during installation and of the finished roof waterproofing system according TDM 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 who utilize the approved roof waterproofing system get all information about the components belonging to the kit and the installation instructions. So the user shall be appropriately informed about the specific conditions according to sections 1, 2, 4, and 5 including the annexes 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.

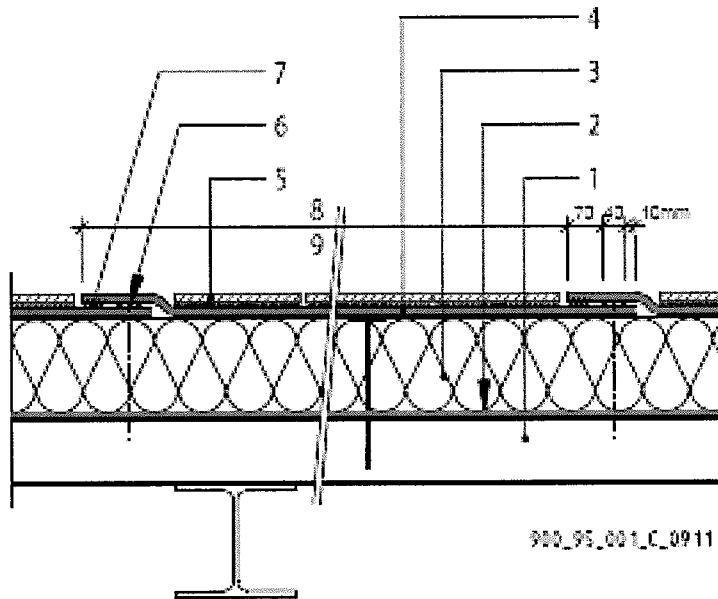
Dipl.-Ing. U. Bender  
Berlin, 20 April 2010

*beglaubigt:*  
Dipl.-Ing. B. Hemme

# DEUTSCHES INSTITUT FÜR BAUTECHNIK

## System build-up of the roof waterproofing

### SI-T2 E 576 S, SI-T2 E 576 S



- 1 Steel deck
- 2 Vapour control layer (not part of the kit)
- 3 Thermal insulation <sup>1)</sup> (not part of the kit)
- 4 Sarnafil TS 77-20E
- 5 Photo-voltaic cells laminated onto the Sarnafil TS 77-20E
- 6 Fastener
- 7 Hot-air welded
- 8 1,88 m free width of the membranes in the field
- 9 0,88 m free width of the membranes in perimeters and corners

Gen.:	Minimum fastener distance	≥ 25 mm
	Maximum fastener distance	≤ 500 mm
	Minimum number of fastener	2 piece/m <sup>2</sup>
	Maximum distance between fastener and edge of sheet	≥ 20 mm

- <sup>1)</sup> It shall be ensured that the insulation material on site has:
- a 10 % compression ≥ 60 kPa (EN 826)
  - a point load behaviour ≥ 500 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 option class B<sub>ROOF</sub> (t3) according to EN 13501-5

Information for users on external fire performance of roof decks:  
 The classification is only valid for supporting decks which are described in the classification documents according EN V 1187 and according EN 13501-5.

**Solar Integrated Technologies GmbH**  
 Robert-Koch-Str. 50  
 55129 Mainz  
 Germany

**SI-T2E 576 S, SI-T2E 576 S**  
**System build-up**

**Annex 1**  
 Mechanically fastened roof waterproofing system  
 European technical approval  
 N° ETA-10/0053  
 dated 20 April 2010

# DEUTSCHES INSTITUT FÜR BAUTECHNIK

## Sarnafil TS 77-20 E

backing layer [g/m <sup>2</sup> ]	effective thickness [mm]	mass per unit area [g/m <sup>2</sup> ]
Non-woven glass fleece with polyester clutch approx. 105	2,0	2400

Characteristic	test method	dimension	value	expression
thickness <sup>1)</sup>	EN 1849-2	mm	2,0 mm	MDV
reaction to fire <sup>1)</sup>	EN 11925-2		class E	EN 13501-1
water tightness <sup>1)</sup>	EN 1928	kPa		MLV
peel resistance of joints <sup>1)</sup>	EN 12316-2	N/50 mm	≥ 300	MLV
shear resistance of joints <sup>1)</sup>	EN 12317-2	N/50 mm	≥ 800	MLV
tensile strength <sup>1)</sup>	EN 12311-2	N/50 mm	≥ 800	MLV
tensile elongation <sup>1)</sup>	EN 12311-2	%	≥ 2	MLV
resistance against dynamic indentation <sup>1)</sup>	EN 12691 test A	mm	≥ 750	MLV
resistance against dynamic indentation <sup>1)</sup>	EN 12691 test B	mm	≥ 750	MLV
resistance against static indentation <sup>1)</sup>	EN 12730 test B	kg	≥ 20	MLV
resistance to tearing <sup>1)</sup>	EN 1310-2	N	≥ 250	MLV
dimensional stability <sup>1)</sup>	EN 1107-2	%	≤ 0,5	MLV
resistance to cold bending <sup>1)</sup>	EN 495-5	°C	≤ -20	MLV
resistance to UV radiation <sup>1)</sup>	EN 1297	visible		pass
resistance to hail <sup>1)</sup>	EN 13583	m/s	≥ 25	MLV
water vapour transmission <sup>1)</sup>	EN 1931	μ	ca. 10.000	MDV
exposure to bitumen	prEN 1584			pass
<b>Resistance to heat ageing, EN 1296 <sup>2)</sup></b>				
peel resistance of joints	EN 12316-2	%	Δ ≤ 20	pass
shear resistance of joints	EN 12317-2	%	Δ ≤ 20	pass
resistance to cold bending	EN 495-5	°C	Δ ≤ 15	pass
<b>Resistance after long term exposure to heat UV (EN 1297) <sup>2)</sup></b>				
resistance to cold bending	EN 495-5	°C	Δ ≤ 15	pass

<sup>1)</sup> These values are manufacturer values stated by the CE-marking according to EN 13956

<sup>2)</sup> These values are determined in accordance with ETAG 006

<b>Solar Integrated Technologies GmbH</b> Robert-Koch-Str. 50 55129 Mainz Germany	<b>SI-T2E 576 S, SI-T2E 576 S</b>  <b>Characteristics</b>	<b>Annex 2</b> Mechanically fastened roof waterproofing system  European technical approval N° ETA-10/00053 dated 20 April 2010
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# DEUTSCHES INSTITUT FÜR BAUTECHNIK

Wind load per fastener waterproofing sheet Sarnafil TS 77-20 E					
Screw	Washer	Metal sheet deck	Timber		
			1	2	3
			$W_{adm}$ [N]		
SFS IR2-4.8 x L	Sarnabar Typ 6	500	500	500	500
Sarnafast SF 4,8 x L (SF 4,8 x L according to ETA-08/0262)	Sarnafast KT 82 x 40 (KT 82 x 40 according to ETA-08/0262)	440	440	440	440

**Timber**

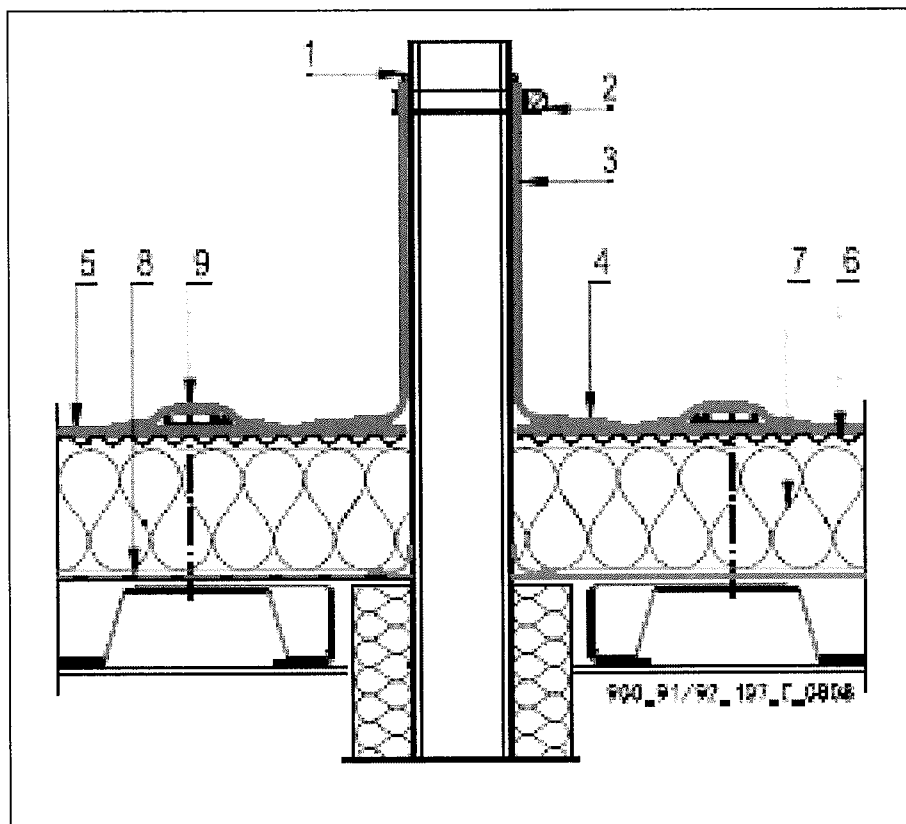
- |                     |             |  |
|---------------------|-------------|--|
| 1 OSB3              | EN 300,     | $t \geq 18$ mm, effective embedment depth $\geq 18$ mm |
| 2 structural timber | EN 338/C24, | $t \geq 22$ mm, effective embedment depth $\geq 22$ mm |
| 3 particle board    | EN 312/P5,  | $t \geq 19$ mm, effective embedment depth $\geq 19$ mm |

**Sheet Deck**

- 1 Steel S280GD – EN 10326,  $t \geq 0,75$  mm

<p><b>Solar Integrated Technologies GmbH</b>                  Robert-Koch-Str. 50                  55129 Mainz                  Germany</p>	<p style="text-align: center;"><b>SI-T2E 576 S, SI-T2E 576 S</b></p> <p style="text-align: center;"><b>Admissible load per fastener</b></p>	<p><b>Annex 3</b>                  Mechanically fastened                  roof waterproofing system</p> <p>European technical approval                  N° ETA-10/0053                  dated 20 April 2010</p>
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# DEUTSCHES INSTITUT FÜR BAUTECHNIK



- 1 Pipe
- 2 Stainless steel jubilee clip
- 3 pipe flashing
- 4 Hot-air weld
- 5 Membrane Sarnafil TS 77-20E, mechanically fastened
- 6 Separation / fire protection layer (if required)
- 7 Thermal insulation
- 8 Vapour control layer
- 9 Sarnabar with welding cord

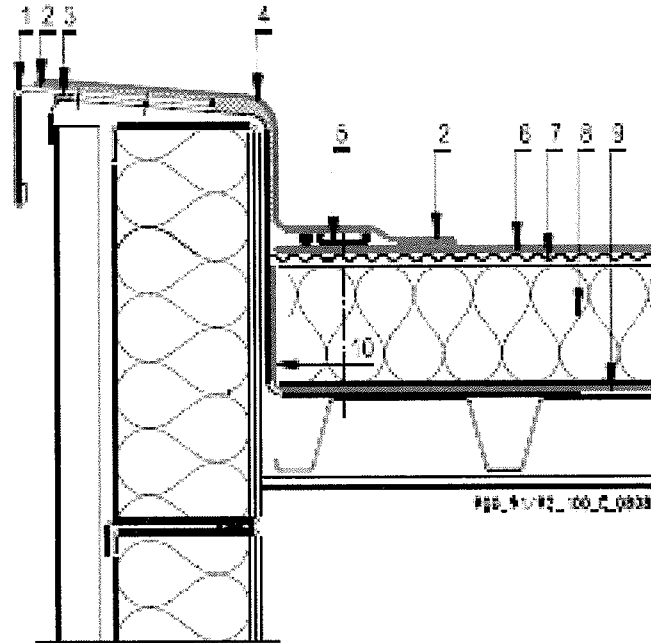
**Fig. 3: Penetration**

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**SI-T1 576 E, SI-T2 576**  
**Overlapping fixation**

**Annex 4**  
 Mechanically fastened roof waterproofing system  
 European technical approval  
 N° ETA-10/0053  
 dated 20 April 2010

# DEUTSCHES INSTITUT FÜR BAUTECHNIK



- 1 Laminated metal sheet
- 2 Hot-air weld
- 3 Sealing tape
- 4 Strip Sarnafil TS 77-20E, adhered
- 5 Fastener with welding cord
- 6 Membrane Sarnafil TS 77-20E, mechanically fastened
- 7 Separation layer, fire protection layer (if required)
- 8 Thermal insulation
- 9 Vapour control layer
- 10 Sealing tape

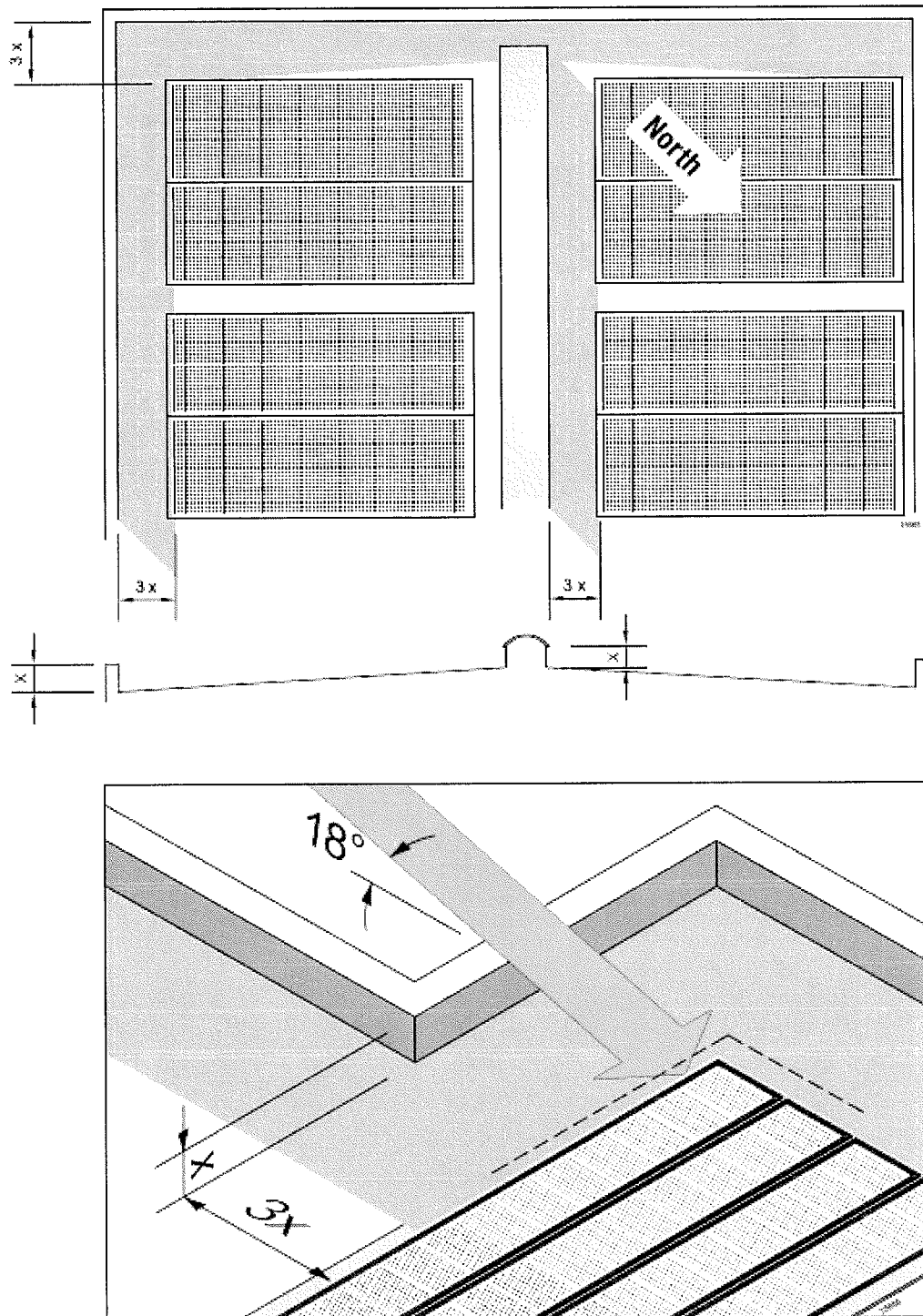
**Fig. 2: Roof edge / Wall capping**

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**SI-T1 576 E, SI-T2 576**  
**Fixing examples**

**Annex 5**  
 Mechanically fastened  
 roof waterproofing system  
 European technical approval  
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**Fig. 3:** Shading

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**SI-T1 576 E, SI-T2 576**  
**Fixing examples**

**Annex 6**  
 Mechanically fastened  
 roof waterproofing system  
 European technical approval  
 N° ETA-10/0053  
 dated 20 April 2010