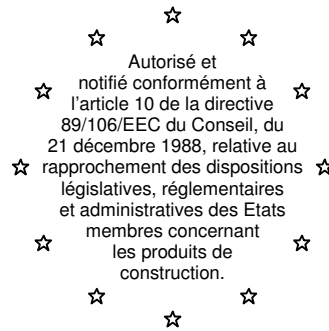


Centre Scientifique et Technique du Bâtiment

84, avenue Jean Jaurès
Champs-sur-Marne
F-77447 Marne La Vallée Cedex 2
Tél. : (33) 01 64 68 82 82
Fax : (33) 01 60 05 70 37



CSTB
le futur en construction

MEMBRE DE L'EOTA

European Technical Approval **ETA-06/0163**

(English language translation, the original version is in French language)

Trade name:

Nom commercial:

SOPRAGUM OPTIMA

Holder of approval:

Titulaire:

SOPREMA

14, rue de Saint Nazaire

BP 121

67025 STRASBOURG CEDEX 1

Generic type and use of construction product:

Type générique et utilisation prévue du
produit de construction:

**Systems of mechanically fastened flexible roof
waterproofing membranes**

Systèmes de feuilles souples d'étanchéité de toitures fixés
mécaniquement

Validity from:

to:

Valide du/au :

24/11/2006

23/11/2011

Manufacturing plant:

Usine de fabrication:

SOPREMA Plant

Bouwelen 5 B - 2280 Grobbendonk – Belgium

This European Technical Approval contains:

Le présent Agrément Technique Européen
contient:

**22 pages including 10 annexes which form an integral part
of the document.**

22 pages incluant 10 annexes faisant partie intégrante du document.



European Organisation for Technical Approvals
Organisation pour l'Agrément Technique Européen

I LEGAL BASES AND GENERAL CONDITIONS

- 1 - This European Technical Approval is issued by the Centre Scientifique et Technique du Bâtiment (CSTB) 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 products¹, modified by the Council Directive 93/68/EEC of 22 July 1993²;
 - Décret no. 92-647 du 8 juillet 1992³ concernant l'aptitude à l'usage des produits de construction;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC⁴;
 - Guide d'Agrément Technique Européen "Systèmes de feuilles souples d'étanchéités de toitures fixés mécaniquement" n°006, Mai 2002, french version of the ETAG 006, March 2000.
- 2 - The Centre Scientifique et Technique du Bâtiment is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant (for example concerning the fulfilment of assumptions made in this European Technical Approval with regard to manufacturing). Nevertheless, the responsibility for the conformity of the products with 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 manufacturer 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 the Centre Scientifique et Technique du Bâtiment pursuant to Article 5 of the 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 the Centre Scientifique et Technique du Bâtiment. 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 to the version circulated within EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities no. L 40, 11.2.1989, p. 12

² Official Journal of the European Communities no. L 220, 30.8.1993, p. 1

³ Journal Officiel de la République française du 14 juillet 1992

⁴ Official Journal of the European Communities no. L 17, 20.1.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL**1 Definition of product and intended use**

1.1 Definition of product

The systems of mechanically fastened flexible roof waterproofing membrane, subject of this ETA and called MEFAWAME in the text, are waterproofing kits composed of a single layer flexible roof waterproofing systems fastened mechanically with point fasteners to the structure, with a slope $\geq 1\%$.

The MEFAWAME are composed of flexible APP modified bituminous membranes manufactured by the holder of the approval and mechanical fasteners manufactured by others manufacturers.

1.1.1 Membranes

- SOPRAGUM OPTIMA 4 TF C1 / 470 K 14
- SOPRAGUM OPTIMA 4 AF C1 / 470 K 24

Composition of the membranes

Membrane	Bitumen	Thickness (mm) EN 1849-1	Reinforcement (g/m ²)	Finition
SOPRAGUM OPTIMA 4 TF C1/470 K 14	plastomer 3600 g/m ² (-5%)	4.0 (-5%)	180 SNWP	T/F
SOPRAGUM OPTIMA 4 AF C1/470 K 24	Plastomer 3600 g/m ² (-5%)	4.0 (-5%)	180 SNWP	AR/F

SNWP : Stabilized Non Woven Polyester
F: thermofusible film; T : Talc ; AR : Slates

1.1.2 Fastener and substrate

The different fasteners, manufactured by different manufacturers (SFS INTEC, LR ETANCO and HILTI), depend on the substrate :

Profiled metal decking substrate (standard)

- screw EVF 2C + plate Ø40 (manufacturer LR ETANCO)
- screw EVBDF2C 4.8xL + plate Ø40 (manufacturer LR ETANCO)
- screw EVDF2C 4.8xL + plate Ø40 (manufacturer LR ETANCO)
- screw ISODRILL TT + plate Ø40 (manufacturer LR ETANCO)
- screw VMS 2C + plate Ø40 (manufacturer LR ETANCO)
- screw IR2S 4.8xL + plate IR 82x40 (manufacturer SFS INTEC)
- screw IR2C 4.8xL + plate PR Ø40 (manufacturer SFS INTEC)
- screw IT2C 4.8xL + plate PR Ø40 (manufacturer SFS INTEC)
- screw S-IT 01C 4.8xL + plate S-IW 4.9 AZ 80x40 (manufacturer HILTI)
- screw S-IS 01C 4.8xL + plate S-IW 5.6 AZ 40 (manufacturer HILTI)

Profiled metal decking substrate (acoustic)

- screw FASTOVIS 3036 TF + plate Ø40 (manufacturer LR ETANCO)
- screw FASTOVIS 3036 TF DF + plate Ø40 (manufacturer LR ETANCO)
- screw IFP2 6.7xL + plate PI Ø40 (manufacturer SFS INTEC)
- rivet RER + plate Ø40 (manufacturer LR ETANCO)

Concrete substrate

- screw TI 6.3xL + plate IRD 82x40 (manufacturer SFS INTEC)
- screw BETOFAST TH 3C + plate 82x40R (manufacturer ETANCO)
- screw BETOFAST TH DF 3C + plate 82x40R (manufacturer ETANCO)
- screw BETOFAST TT 2C + plate ETANCOPLAST 50 (manufacturer ETANCO)
- nail NAILFIX CH + plate Ø40 (manufacturer LR ETANCO)
- nail DT 6.3xL + plate IRD 82x40 (manufacturer SFS INTEC)
- screw TI 6.3xL + plate IF/IG C 82x40 (manufacturer SFS INTEC)

Lightweight concrete substrate

- screw IGR-S 8.0.xL + plate IG8-C 82x40 (manufacturer SFS INTEC)
- screw MULTIFAST TB INOX A2 + Ø40 (manufacturer LR ETANCO)

Wood substrate

- screw IG 6.0xL + plate IRD 82x40 (manufacturer SFS INTEC)
- screw EVF 2C 4.8xL + plate 82x40 R SC (manufacturer LR ETANCO)
- screw EVDF2C 4.8xL + plate Ø40 (manufacturer LR ETANCO)
- screw IWT 5.0xL + plate IRC/W 82x40 (manufacturer SFS INTEC)

Composition of the fasteners**Screws**

- EVDF 2C: hardened carbon steel screw with double-thread under head, with a diameter of 4,8 mm, length L and with a 12 mm circular head. Supracoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- EVF 2C: hardened carbon steel screw, with a diameter of 4,8 mm, length L and with a 12 mm circular head. Supracoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- EVBDF 2C: hardened carbon steel screw with double-thread under head, with a diameter of 4,8 mm, length L and with a 12 mm circular head. Supracoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- VMS 2C 4.8xL: hardened carbon steel screw. Diameter of 4,8 mm, length L and with a 8.5 mm circular head. Supracoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- IR2S 4.8xL: Austenitic stainless steel A4 screw, double thread. Diameter of 4.8 mm with a 8 mm hexagon head.
- ISODRILL TT: stainless steel screw. Diameter of 4,8 mm, length L and with a 8,5 mm circular head. A4 (1.4404) Stainless steel.
- FASTOVIS 3036 TF 2C : hardened carbon steel screw. Diameter of 6,5 mm, length L and with a 11 mm countersunk head. Supracoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- FASTOVIS 3036 TF DF 2C : hardened carbon steel screw with double-thread under head, with a diameter of 6,5 mm, length L and with a 11 mm countersunk head. Supracoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- RER : Aluminium rivet. Diameter of 4,8 mm, length L and with a 10 mm circular head.

- BETOFAST TH 3C : hardened carbon steel screw, with a diameter of 6,6 mm, length L and with a 8 mm hexagonal head. Supracoat corrosion protection. Resistance at 30 Kesternich cycles (EN ISO 6988).
- BETOFAST TH DF 3C : hardened carbon steel screw with double-thread under head, with a diameter of 6,6 mm, length L and with a 8 mm hexagonal head. Supracoat corrosion protection. Resistance at 30 Kesternich cycles (EN ISO 6988).
- BETOFAST TT 2C: hardened carbon steel screw. Diameter of 4,8 mm, length L and with a 8,5 mm circular head. Supracoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- NAILFIX CH: carbon steel nail diameter 4,8 mm, length L with a 10 circular head. Hot deep galvanized corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- DT 6.3xL: Hardened carbon steel nail with a diameter of 6.3 mm, length L.
- MULTIFAST TB INOX A2 : Stainless steel screw. Diameter of 6 mm, length L and with a 12 mm circular head. A2 (1.4301) stainless steel.
- IR2 4.8xL: hardened carbon steel screw. Double-thread, with a diameter of 4,8 mm, length L and with a 8 mm hexagonal head. Durocoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- IR2C 4.8xL: hardened carbon steel screw. Double thread, with a diameter of 4.8 mm, length L and with a 7.8 mm diameter head. Durocoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- IT2C 4.8xL: hardened carbon steel screw. Double thread, with a diameter of 4.8 mm, length L and with a 9.5 mm diameter head. Durocoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- TI 6.3xL: hardened carbon steel screw. Diameter of 6,3 mm, length L and with a 8 mm hexagonal head. Durocoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- IG 6.0xL: hardened carbon steel screw. Diameter of 6 mm, length L and with a 8 mm diameter flat head. Durocoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- IFP2 6.7xL: hardened carbon steel screw. Double-thread, with a diameter of 6.7 mm, length L and with a 11 mm diameter flat head. Durocoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
- IGR-S 8.0xL: austenitic stainless steel A2 screw. Diameter of 8 mm, length L with a 12 mm diameter countersunk head.
- S-IT 01C 4.8xL: hardened carbon steel screw. Double thread, diameter of 4.8 mm, length L and with a 8.5 mm diameter head.
- S-IS 01C 4.8xL: hardened carbon steel screw. Diameter of 4.8 mm, length L and with a 8.5 mm diameter head.

Plates

- Ø40: steel plate Ø40 mm, thickness 0,8 mm. Hole Ø 4,5 mm Aluzinc AZ 150 protection.
- 82x40 R DF: reinforced steel plate 82x40 mm, thickness 1.0 mm with punched inside cone. Hole Ø 5,1 mm. Aluzinc AZ 150 protection
- 82x40 R: reinforced steel plate 82x40 mm, thickness 1.0 mm with punched inside cone. Hole Ø 6 mm. Aluzinc AZ 150 protection
- 82x40 R SC: reinforced steel plate 82x40 mm, thickness 1.0 mm with punched inside cone. Hole Ø 6.4 mm. Aluzinc AZ 150 protection
- S-IW 4.9 AZ 80x40: steel plate with aluzinc protection, dimension 80x40 mm, thickness 0.8 mm. Hole Ø 4.9 mm.
- S-IW 5.6 AZ 40: steel plate with aluzinc protection, dimension Ø 40mm, thickness 0.8 mm. Hole Ø 5.6 mm.
- IR 82x40, IRD 82x40, IRP 82x40, IG8 C 82x40, IRC/W 82x40: steel plates with aluzinc protection, dimension 82x40 mm, thickness 1.00 mm

The fasteners are conform to the specifications of the ETAG 006. They own a *FASTENER PASS FOR MEFAWAME ETA "Intermediate evaluation in compliance with the European Technical Approval Guideline n°006"* delivered by CSTB.

The flexible membranes and the fasteners are commercialised in separate transactions and assembled on site.

The holder of the ETA is fundamentally responsible of the kit.

1.2 Intended use

The kits for the waterproofing of roof surfaces against penetration of atmospheric water are intended for uses 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.

The bearing elements are metallic, in concrete, in lightweight concrete or in wood. The bearing elements can be direct substrates of the MEFAWAME. In the case where the insulation is the direct substrate of the MEFAWAME, it shall be conform with the requirements of § 4.2. The insulation is not a part of the kit.

In the manufacturer's technical dossier (MTD) to this European technical approval (ETA) the manufacturer gave information concerning the substrate which the roof waterproofing is suitable for and how these substrates shall be pre-treated.

The verifications which are based on this ETA give reason for the assumption of an intended working life of the roof waterproofing of at least 10 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

The part of the MTD to this ETA to be treated confidentially is deposited with CSTB and, as far as this is relevant to the tasks of the notified body involved in the procedure of attestation of conformity, shall be handed over to the notified body.

2 Characteristics of product and methods of verification

2.1 Characteristics of products and systems

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

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

The ETA is issued for the kit on the basis of the product composition deposited with CSTB. 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 CSTB before the changes are introduced. CSTB 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.

The performances of the bituminous membranes, the fasteners and the kits are presented in Annexes 1 to 4.

2.2 Methods of verification

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

"Guideline for European Technical Approval of systems of mechanically fastened flexible roof waterproofing membranes" (ETAG 006).

According to the manufacturer's declaration the roof waterproofing taking account of the EU database⁵ does not contain any dangerous or forbidden substances.

Within the scope of this approval there may be other requirements applicable to dangerous substances resulting from transposed European legislation or applicable national regulations and administrative provisions.

These requirements need also to be complied with.

3 Evaluation of Conformity and CE marking

3.1 Attestation of conformity system

The European Commission according to the decision (98/143/EC of February 1998, Official Journal of the European Communities No. L 42, 14.02.1998) on the Procedures of Attestation of Conformity has laid down a: **System 2+**, for the procedure of attestation of conformity (Annex III, clause 2(ii) first possibility of Directive 89/106/EEC) for Systems of mechanically fastened flexible roof waterproofing membranes. The system of attestation of conformity 2+ (referred to as system 2+) provides:

- a) Tasks of the manufacturers:
 - 1. Initial type testing of the product
 - 2. Factory production control
- b) Tasks of the Notified Body:
 - 3. initial inspection of factory and of factory production control (FPC)
 - 4. continuous surveillance, assessment and approval of factory production control

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1 Factory production control

The manufacturer of flexible membranes and the manufacturers of fasteners have different factory production control (FPC) systems.

The manufacturer of flexible membranes has a factory production control (FPC) system in its plant and exercises permanent internal control of production. This FPC is conform to the EN 13707. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control system ensures that the product is in conformity with the European Technical Approval.

The manufacturers of fasteners have a factory production control system in their plant and exercise permanent internal control of production. This FPC is conform to the ETAG 006. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control system ensures that the product is in conformity with the European Technical Approval.

The manufacturer of flexible membranes and the manufacturers of fasteners shall use raw materials or components that comply with the indications of the MTD.

⁵ Database "Dangerous substances" consulted on the website
<http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm>, version 17 march 2003.

The results of the factory production control shall be recorded and evaluated. The records shall include at least the following information :

- Name of the product and the raw materials,
- Type of inspection or control,
- Date of manufacture of the product, batch number, and date of inspection or control of the product,
- Results of inspections or controls and, as far as applicable, comparison with requirements,
- Signature of the person responsible for factory production control.

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

The control plan is a confidential part of the MTD and is deposited with CSTB.

3.2.1.2 Initial type-testing of the product

The initial type-testing refers to the product properties stated in the test plan to this ETA.

The verifications underlying this ETA have been furnished on samples (flexible membranes and fasteners) from the current production. These will replace the initial type-testing.

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 of the manufacturers

The manufacturer of flexible membranes and the manufacturers of fasteners shall, on the basis of a contract, involve a body which is notified for the tasks referred to in section 3. For this purpose, the control plans referred to in section 3.2.2 shall be handed over by the manufacturers to the notified body involved.

3.2.2 Tasks of the Notified Bodies

3.2.2.1 Initial inspection of factory and production control.

The notified body ascertains that, in accordance with the MTD, factory conditions and production control allow the manufacturer to ensure the consistency and homogeneity of the manufactured product and its traceability, thus guaranteeing that the final characteristics of the product are those indicated in chapter 2.

3.2.2.2 Continuous surveillance, assessment and approval of Factory Production Control

The Notified Body shall visit the factory of flexible membranes and the factories of fasteners at least once a year.

Surveillance of the manufacturing processes shall include:

- Checking the documentation of factory production control, to ensure continuing compliance with the provisions of the ETA,
- Identification of changes by comparing data obtained during the initial inspection or during the last inspection.

In the event the ETA provisions are not complied with, the certificate of conformity shall be withdrawn and CSTB will be informed without delay.

3.3 CE Marking

The CE marking shall be affixed on the kit, components itself/themselves, an attached label, the packaging, or the accompanying commercial document.

The required information to accompany the symbol "CE" is :

- name or identifying name of the producer,
- number of the notified body involved (system 2+),
- number of the certificate of conformity of the Factory Production Control (system 2+)
- last two digits of the year in which the CE marking was affixed,
- number of the ETA,
- number of the ETAG.

The components shall be marked as belonging to the kit.

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

4.1 Installation and design

Information concerning installation and design is part of the non confidential part of the MTD.

➤ Principle sketches :

Type of mechanical fastening of membranes :

See figure n°2 in Annex 6.

Type of arranging of fasteners at upstands and flashings :

The upstands and flashings are made according to the principle of figure n° 3 in Annex 7.

➤ Membrane :

The membrane is mechanically fastened and applied according to the principle shown in figure 2. The details of overlaps are given in figures 1 and 1bis.

➤ Fastening

Design of fastener spacing

The E spacing between fasteners is determined by the formula :

$$E \leq 1 / (D \cdot Lu)$$

with in complementary conditions to respect :

- * minimal distance in the row = 120 mm
- * maximal distance in the row = according to national requirements
- * distance of the side of the plate at edge of roofing ≥ 10 mm

With :

D = minimal density of fasteners = D_p / W_{adm} of the KIT

Lu = spacing between lines of fasteners (width of the membrane fixed mechanically - width of the area of overlapping)

D_p = Depression owed to wind (to conditions limits) in the zone of roofing to consider (current part, edge of the terrace, angles...). D_p is determined according to national regulation.

Design of perimeter and edge fasteners

The fasteners are aligned according to the principle indicated on figure n°3 in foot of upstand and figure n°2 in ordinary parts. On the row of fixings, the E spacing between fasteners is determined according to the indicated principle here-before, however in foot of upstand, the maximal spacing between fasteners is 33 cm.

Special provisions :

Regardless of the required density, the space between fasteners must not be less than 120 mm. To that end, particularly in areas with a high density of fasteners, e.g. roofing ridges or angles, provisions that reduce the value of L_u are applicable, such as:

- The sealed overlap of sheets is increased (see figure 1bis type 2).
- The width of the sheets fastened mechanically is smaller (e.g. they are cut in two, in sheets that are 0.50-m wide) and they are fastened mechanically with a minimum overlap of 100 mm according to the figure (see figure 1bis type 3).
- Additional lines of fasteners are placed in the middle of sheets. The fasteners are covered by pieces or strips that are 0.15-m wide, of the same nature as the sheets fastened mechanically. They are fully sealed.

➤ Insulation. - fixation of the insulation

The possible layer of thermal insulation is constituted of capable panels to this use (cf. Guideline ETAG 006, chapters 5.4 and 6.4).

They are put freely on the possible vapour control layer.

The mechanical fastener of the waterproofing system blocks the displacement of the whole.

The insulating layer and vapour control layer are made in accordance with the national requirements.

➤ Design principles of upstands and flashing

The figure n° 3 represents the principle of upstand treatment. The detail of realization as well as the protection in head for the tightness to air and water (flashing) must respect the national requirements.

➤ Design principles of penetrations fastening of installed parts/units

The treatment of the outlet is indicated in figure n° 5 in Annex 9.

The limited penetration treatment in figure n° 4 in annex 8.

The design of the roof intended to be covered by the mechanically fastened roof waterproofing system should take account of the following factors :

- Dead and imposed loads
- Design wind pressure
- Structural strength, stiffness and deflection limits
- Attachment of the roof deck to the structural framing
- Provision of insulation
- Assessment of condensation risk and provision of vapour control layers
- Sound insulation
- Fire precautions
- Roof attachments, fixtures and penetrations
- Falls and drainage
- Means of access for inspection and maintenance

4.2 Substrates

The substrate onto which the waterproofing kit is to be laid should be sufficiently rigid, dense, and dimensionally stable to support the system (membrane +

insulation). Its nature will depend on the type of roof selected (warm deck, cold deck or inverted) and in turn will have a direct influence on the method of attachment.

In order to support the loads imposed by traffic, insulation materials for use in warm decks should be capable of resisting permanent deformation or damage when subjected to concentrated loads. They should have a dust-free surface and sufficient laminar strength to resist with a margin of safety and stress imposed by wind uplift forces.

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

- a 10% compression $\geq 60\text{kPa}$ (EN 826)
- a point load behaviour $\geq 500\text{ Pa}$, deformation 5 mm (EN 12430)

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

4.3 Flexible membranes manufacturer's responsibilities

It is the flexible membranes manufacturer's responsibility (holder of the ETA) to make sure that all those who use the kit are 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 to this ETA.

5 Informations by the manufacturer

Information about packaging, transport, storage, maintenance and repair are part of the non confidential part of the MTD.

5.1 Packaging, transport and storage

This product is not toxic, so it is not necessary to follow any safety instructions for transport and handling.

Storage must be in dry and protected against direct sunlight.

Rolls must always be stored vertically.

The product must keep away from any source of heat, sparks, flame, etc.

5.2 Maintenance and repair of the works

The assessment of the fitness for use is based on the assumption that a normal maintenance of the system is performed.

This maintenance shall include :

- inspections of the roof at regular interval, e.g. twice a year
- this inspection should include :
 - cleaning of downpipes and leaf filters
 - removal of stones, branches and leaves...
 - inspection of flashings along the edge of the roof, chimneys, drains and roof lights
 - removal of organic growths such as vines
- Elastic joints around cover strips should be inspected every 5 years and replaced if necessary

- Flashings to caps, drains etc. should be inspected every 5 years and replaced if necessary
- Abrasion and minor impact damage shall be repaired.

**The original version is signed by
H. BERRIER**

Technical Director of CSTB

Property		Référentiel	VLF	VDF
Peel resistance of joints (LxT) (N/50mm)	Before heat ageing	EN 12316-1	80 x 80	100 x 100
	After heat ageing EN 1296		50 x 50	70 x 70
Shear resistance of joints (LxT) (N/50mm)	Before heat ageing	EN 12317-1	700 x 550	750 x 650
	After heat ageing EN 1296		600 x 500	700 x 600
Resistance to tear LxT (N)		EN 12310-1	130 x 150	160 x 180
Resistance to cold bending (°C)	Before heat ageing	EN 1109	-10	-16
	After heat ageing (168j à 70°C)		0	-6
Resistance to water pressure		EN 1928	CONFORM	
Water vapour permeability		EN 1931	$\mu = 20000$	
Tensile properties	Maximal strenght LxT (N/50mm)	EN 12311-1	750 x 500	850 x 700
	Elongation LxT (%)	EN 12311-1	25 x 25	35 x 35
Resistance to static loading (Kg)		EN 12730	20	
Resistance to dynamic loading (mm)		EN 12691	10	
Dimensional stability (%)		EN 1107	-0.4	-0.2
Fire reaction		EN 13501-1	Euroclass F	

MEFAWAME "SOPRAGUM OPTIMA"*System of mechanically fastened flexible roof waterproofing membranes***Characteristics of SOPRAGUM OPTIMA 4 TF C1 / 470 K 14****Annex 1**of European
Technical Approval
ETA-06/0163

Property		Référentiel	VLF	VDF
Peel resistance of joints (LxT) (N/50mm)	Before heat ageing	EN 12316-1	80 x 80	100 x 100
	After heat ageing EN 1296		50 x 50	70 x 70
Shear resistance of joints (LxT) (N/50mm)	Before heat ageing	EN 12317-1	700 x 550	750 x 650
	After heat ageing EN 1296		600 x 500	700 x 600
Resistance to tear LxT (N)		EN 12310-1	150 x 150	200 X 240
Resistance to cold bending (°C)	Before heat ageing	EN 1109	-10	-16
	After heat ageing EN 1296		0	-6
Resistance to water pressure		EN 1928	CONFORM	
Water vapour permeability		EN 1931	$\mu = 20000$	
Tensile properties	Maximal strenght LxT (N/50mm)	EN 12311-1	850 X 550	900 X 750
	Elongation LxT (%)	EN 12311-1	35 X 35	45 X 45
Resistance to static loading (Kg)		EN 12730	20	
Resistance to dynamic loading (mm)		EN 12691	10	
Dimensional stability (%)		EN 1107	-0.4	-0.2
Fire reaction		EN 13501-1	Euroclass F	

MEFAWAME "SOPRAGUM OPTIMA"*System of mechanically fastened flexible roof waterproofing membranes***Characteristics of SOPRAGUM OPTIMA 4 AF C1 / 470 K 24****Annex 2**of European
Technical Approval
ETA-06/0163

Name of the fastener Producer	Axial load ⁽²⁾ (N)	Resistance to corrosion : OK ⁽¹⁾ or not relevant	Resistance to unwinding	Mechanical resistance before and after heat ageing
<i>Profiled metal decking substrate</i>				
IR2C 4.8xI + PR Ø 40 SFS INTEC	1600	OK	OK	not relevant
IT2C 4.8xI + PR Ø 40 SFS INTEC	1500	OK	OK	not relevant
EVDF2C 4.8xL + Ø 40 LR ETANCO	2000	OK	OK	not relevant
EVBDF2C 4.8xL + Ø 40 LR ETANCO	1700	OK	OK	not relevant
ISODRILL TT + Ø 40 LR ETANCO	1600	not relevant	OK	not relevant
EVF 2C 4.8xL + Ø 40 LR ETANCO	2000	OK	OK	not relevant
VMS 2C 4.8xL + Ø 40 LR ETANCO	2000	OK	OK	not relevant
S-IT 01C 4.8 + S-IW 4.9 AZ 80x40 HILTI	1700	OK	OK	not relevant
S-IS 01C 4.8 + S-IW 5.6 AZ 40 HILTI	1700	OK	OK	not relevant
IR2S 4.8xI + IR 82x40 SFS INTEC	1450	not relevant	OK	not relevant
<i>Profiled metal decking substrate</i>				
FASTOVIS 3036 TF + Ø 40 LR ETANCO	2300	OK	OK	not relevant
FASTOVIS 3036 TF DF + Ø 40 LR ETANCO	2300	OK	OK	not relevant
Rivet RER + Ø 40 LR ETANCO	1600	not relevant	not relevant	not relevant
IFP 2 + PI Ø 40 SFS INTEC	2600	OK	OK	not relevant
<i>Concrete substrate</i>				
TI 6.3xL + IRD 82x40 SFS INTEC	6250	OK	not relevant	not relevant
BETOFAST TH DF 3C + 82x40R LR ETANCO	7200	OK	not relevant	not relevant
BETOFAST TH 3C + 82x40R LR ETANCO	7200	OK	not relevant	not relevant
NAILFIX CH + Ø 40 LR ETANCO	3000	OK	not relevant	not relevant
TI 6.3xL + IF/IG C 82x40 SFS INTEC	6900	OK	not relevant	not relevant
DT 6.3xL + IRD 82x40 SFS INTEC	3050	OK	not relevant	not relevant
<i>Lightweight concrete substrate</i>				
IGR-S 8.0.xL + IG8-C 82x40 SFS INTEC	1550	not relevant	not relevant	not relevant
MULTIFAST TB INOX A2 + Ø 40 LR ETANCO	1500	not relevant	not relevant	not relevant
<i>Wood substrate</i>				
IG 6.0xL + IRD 82x40 SFS INTEC	2100	OK	not relevant	not relevant
EVDF2C 4.8xL + 82x40R DF LR ETANCO	2200	OK	not relevant	not relevant
EVDF 2C 4.8xL + Ø 40 LR ETANCO	2200	OK	not relevant	not relevant
EVF 2C 4.8xL + 82x40 R SC LR ETANCO	2200	OK	not relevant	not relevant
IWT 5.0xL + IRC/W 82x40 SFS INTEC	1950	OK	not relevant	not relevant

⁽¹⁾OK = less than 15% surface corrosion after the test in accordance of the § 5.3.7.1 of the ETAG 006
not relevant = stainless steel

⁽²⁾Declared values

MEFAWAME "SOPRAGUM OPTIMA"

System of mechanically fastened flexible roof waterproofing membranes

Characteristics of the fasteners

Annex 3

of European
Technical Approval
ETA-06/0163

Kit	W admissible	External fire performance
Kits with SOPRAGUM OPTIMA 4 TF C1/470 K14 in fastened layer	700 N/fastener ⁽¹⁾	npd
Kits with SOPRAGUM OPTIMA 4 AF C1/470 K24 in fastened layer	580 N/fastener ⁽²⁾	npd

⁽¹⁾Determined with a full scale wind uplift test with steel substrate. Axial loading resistance of the fastener used in the full scale concept is : $R_{oc} = 2110 \text{ N}$

⁽²⁾Determined with a full scale wind uplift test with steel substrate. Axial loading resistance of the fastener used in the full scale concept is : $R_{oc} = 1780 \text{ N}$

In order to determine the W_{adm} of systems with other fasteners (R_{nc}) and/or substrates according to Annex 3 or separate ETA issued on the basis of ETAG006 or *Fastener PASS FOR MEFAWAME ETA "Intermediate evaluation in compliance with the European Technical Approval Guideline n°006"* issued on the basis of ETAG006, the following applies :

- if $R_{nc} \geq R_{oc} \Rightarrow W_{adm} (nc) = W_{adm} (oc)$
- if $R_{nc} < R_{oc} \Rightarrow W_{adm} (nc) = (R_{nc} / R_{oc}) * W_{adm} (oc)$

The adaptation of the full scale test results for systems with other fasteners (R_{nc}) and/or substrates according to Annex 3 or separate ETA or *Fastener PASS* issued on the basis of ETAG 006, is possible if:

- the plates are protected against corrosion;
- the minimal thickness of the metallic plates is:
0,75 mm, if they are ribbed,
1,00 mm, if they are flat.

In the new system, the use of plates that are different from those in the reference system is possible under the following conditions:

- The steel plates are permitted with their resistance R determined in the whole system,
- The metal grades and thicknesses are \geq those of reference ones,
- The dimensions comply with the conditions in the following Table.

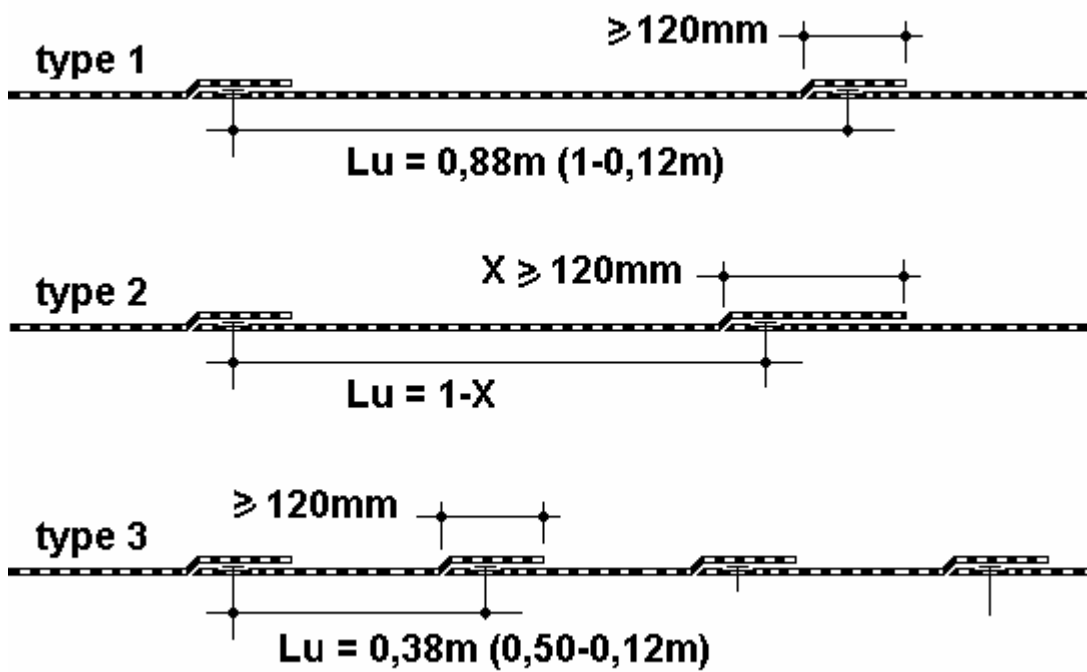
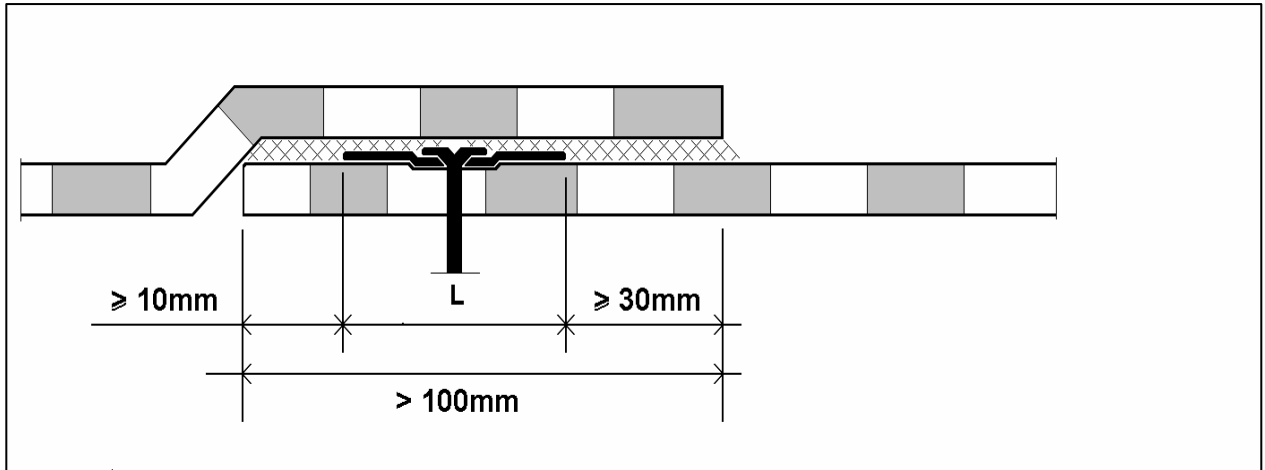
plates "oc"	plates "nc"	
	Round washers	Square, rectangular or oblong washers
Rounds: \varnothing test	$\varnothing \geq \varnothing$ test	Width and length $\geq \varnothing$ test
Square, rectangular or oblong	$\varnothing \geq$ diagonal of the washer tested	Dimensions \geq those tested and positioned in the same direction

oc = original combination (tested)

nc = new combination

The fasteners have to be in conformity with the specifications given in section 1.1.2 and Annex 3 of this ETA or an ETA delivered on the basis on the ETAG 006 or a *FASTENER PASS FOR MEFAWAME ETA "Intermediate evaluation in compliance with the European Technical Approval Guideline n°006"*.

MEFAWAME "SOPRAGUM OPTIMA" <i>System of mechanically fastened flexible roof waterproofing membranes</i>	Annex 4 of European Technical Approval ETA-06/0163
Characteristics of kits	



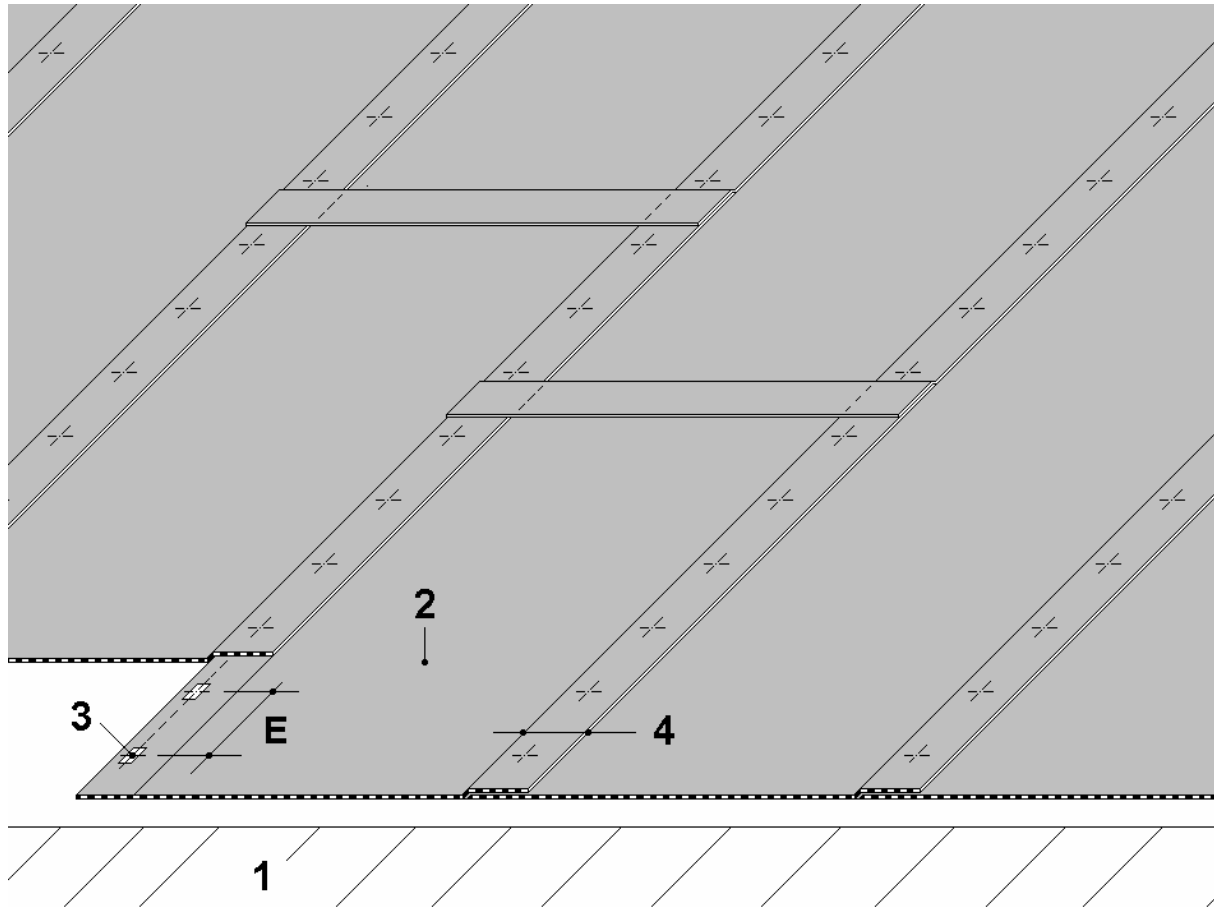
MEFAWAME "SOPRAGUM OPTIMA"

System of mechanically fastened flexible roof waterproofing membranes

Figures n°1 and 1bis: overlappings

Annex 5

of European
 Technical Approval
ETA-06/0163



Key to figure 2
1 - Substrate of covering
2 - Waterproofing sheet fastened mechanically
3 - Mechanical fastening of the waterproofing sheet
4 - Longitudinal overlap, 100 mm mini
E - Space E between mechanical fastenings

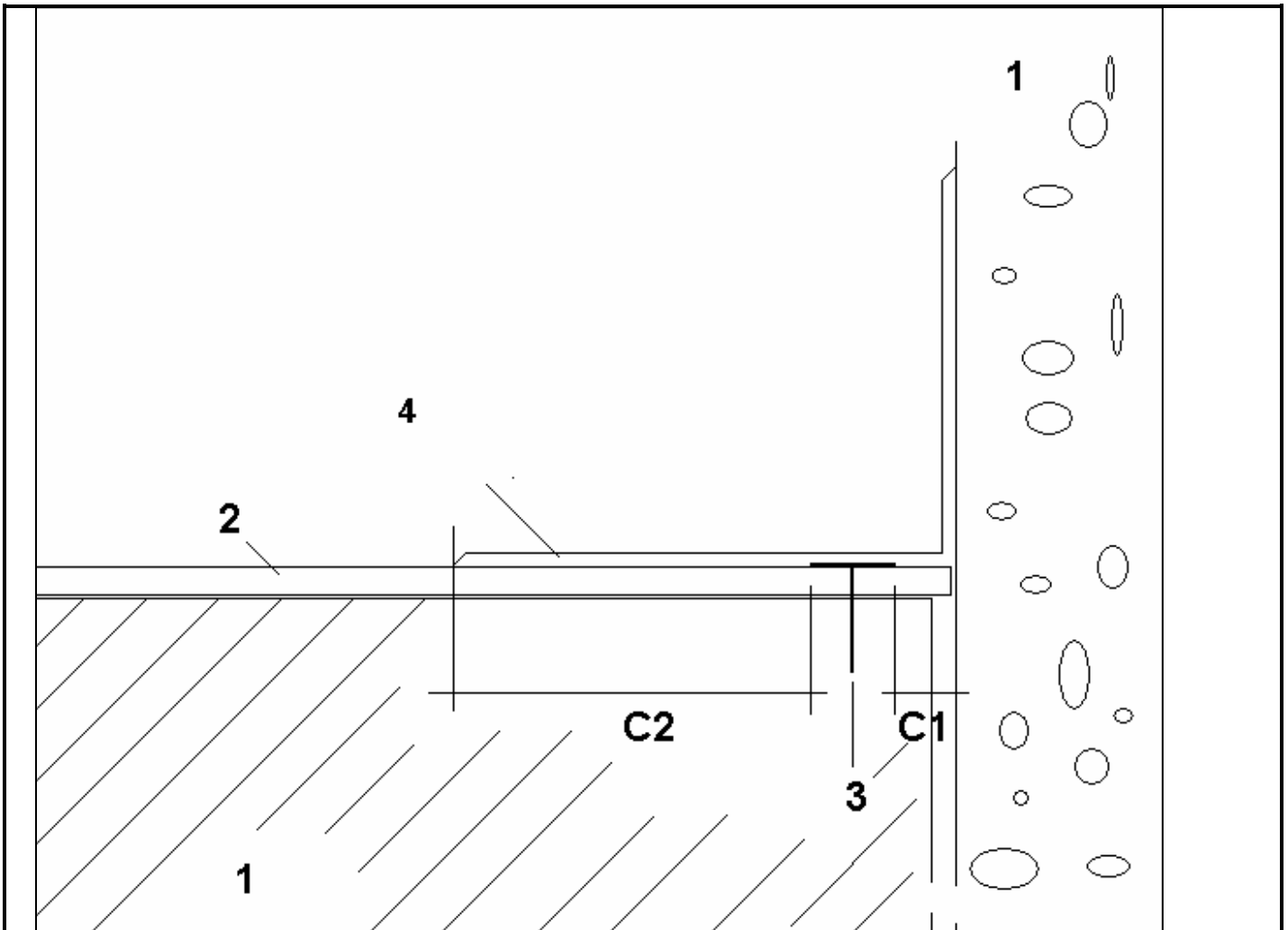
MEFAWAME "SOPRAGUM OPTIMA"

System of mechanically fastened flexible roof waterproofing membranes

Figure n°2 : type of mechanical fastening of membranes

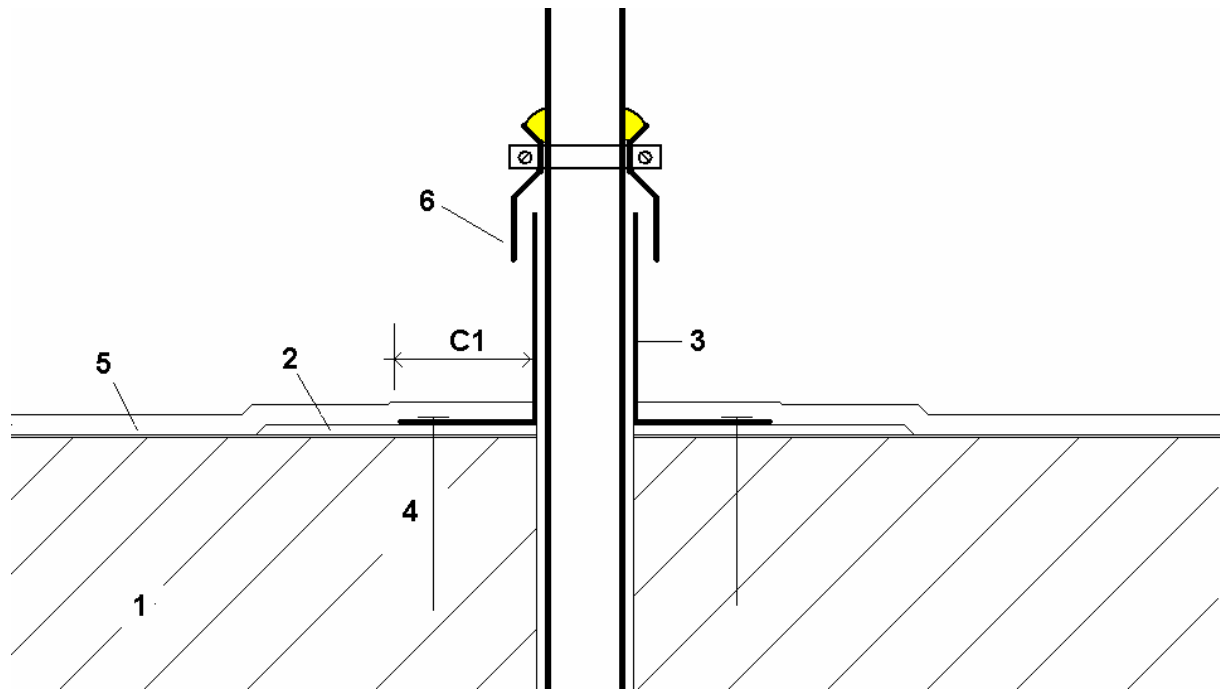
Annex 6

of European
Technical Approval
ETA-06/0163



Key to figure 3
1 - Horizontal and vertical substrate of the covering
2 - Waterproofing sheet, fastened mechanically
3 - Mechanical fastening of the waterproofing sheet
4 - Upstand
C1 ≥ 10mm
C2 ≥ 30mm

<p>MEFAWAME "SOPRAGUM OPTIMA" <i>System of mechanically fastened flexible roof waterproofing membranes</i></p>	<p>Annex 7 of European Technical Approval ETA-06/0163</p>
<p>Figure n°3 : Upstand treatment</p>	



Key to figure 4
1 - Substrate of covering
2 - Reinforcement of the same nature as the mechanically fastened waterproofing sheet
3 - Plate and lead spitter
4 - Mechanical fastening at the angles of the plate
5 - Mechanically fastened waterproofing sheet
6 - Flashing
C1 - Plate width

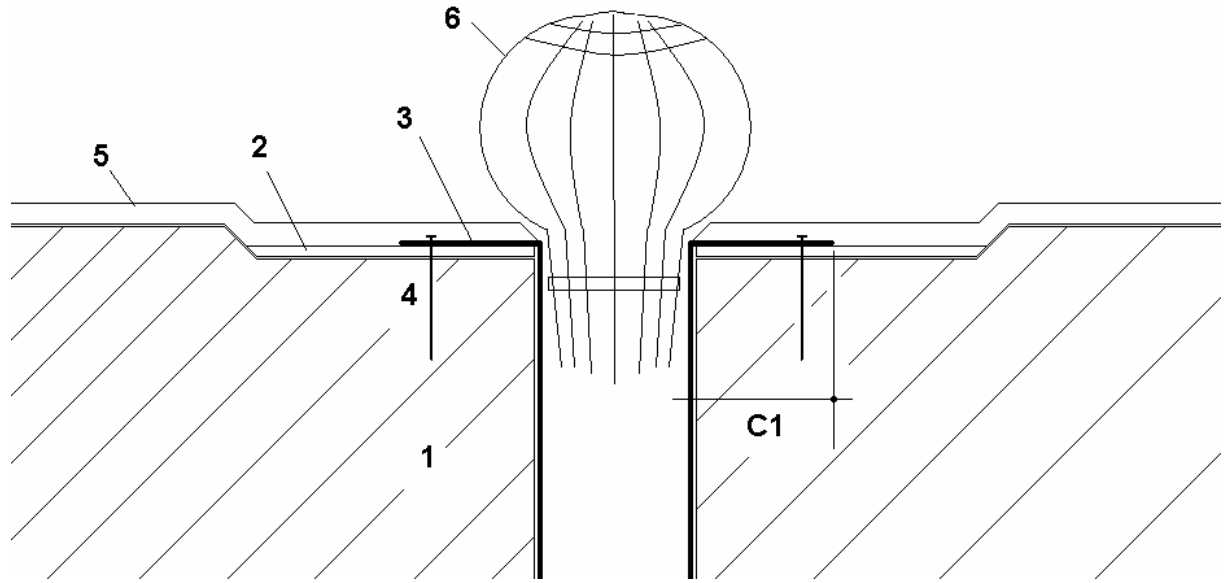
MEFAWAME "SOPRAGUM OPTIMA"

System of mechanically fastened flexible roof waterproofing membranes

Figure n°4 : Treatment of penetration

Annex 8

of European
 Technical Approval
ETA-06/0163



Key to figure 5
1 - Substrate of covering
2 - Reinforcement of the same type as the mechanically fastened waterproofing sheet
3 - Rain water pipe with plate and lead spitter
4 - Mechanical fastening at the angles of the rain water pipe plate
5 - Mechanically fastened waterproofing sheet
6 - Strainer
C1 – Plate width

MEFAWAME "SOPRAGUM OPTIMA"

System of mechanically fastened flexible roof waterproofing membranes

Figure n°5 : Treatment of outlet

Annex 9

of European
 Technical Approval
ETA-06/0163

General trade name	Other trade name
SOPRAGUM OPTIMA 4 TF C1/470 K14	STARGUM 470 K14 DUWOGUM 470 K14 ROYALGUM 470 K14 FIELFLEX 470 K14
SOPRAGUM OPTIMA 4 AF C1/470 K24	STARGUM 470 K24 DUWOGUM 470 K24 ROYALGUM 470 K24 FIELFLEX 470 K24

MEFAWAME "SOPRAGUM OPTIMA"*System of mechanically fastened flexible roof waterproofing membranes***Different trade names of waterproofing membranes****Annex 10**of European
Technical Approval
ETA-06/0163