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**ETA 06/ 0062
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European Technical Assessment

English translation prepared by IETcc. Original version in Spanish language

General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) Nº305/2011:

Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)

Trade name of the construction product

ESTERDAN PLUS FM BICAPA

Product family to which the construction product belongs

Multi-layer systems of mechanically fastened flexible polymers bitumen modified roof waterproofing membranes

Manufacturer

DERIVADOS ASFALTICOS NORMALIZADOS, S.A (DANOSA)
C/ La Granja nº 3. 28108 ALCOBENDAS
MADRID, Spain

Manufacturing plant(s)

Sector 9, Polígono Industrial. 19290. FONTANAR GUADALAJARA. Spain

This European Technical Assessment contains

15 pages including 2 Annexes which form an integral part of this assessment.
Annex 3. Contain confidential information and is not included in the ETA when that assessment is publicly available

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

Guideline for European Technical Approval (ETAG) nº 006, used as European Assessment Document (EAD)

This version replaces

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SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of the product

ESTERDAN PLUS FM BICAPA is a multi-layer flexible (bitumen modified with styrene-butadiene-styrene SBS) and APP (Polypropylene Atactic) waterproofing roof Kit fastened mechanically, with a slope exceeding 1%. The base membrane is fastened with metallic point fasteners in area of overlapping at edge of membrane to metal deck structures, before it is welded with the following membrane. The finishing membrane is fully welded over the base membrane by heating, without using mechanically fasteners. The Kit is composed of flexible bituminous membranes manufactured by the holder of the approval and mechanical fasteners manufactured by others manufacturers.

Base membrane. ESTERDAN FM 30 P ELAST, ESTERDAN FM 30 P ELAST S, POLYDAN 180-35 AP ELAST and ESTERDAN FM 30 P POL.

Finishing membranes. ESTERDAN PLUS 40/GP ELAST, GLASDAN 40/GP ERF ELAST, GLASDAN 40/GP ERF SPECIAL ELAST, ESTERDAN PLUS 50/GP ELAST and POLYDAN 180-50/GP ELAST, POLYDAN 180-50/GP ELAST SK, POLYDAN PLUS FM 50/GP ELAST RF, POLYDAN 180-50/GP FRBR ELAST, ESTERDAN 40/GP POL, GLASDAN 40/GP POL and ESTERDAN 50/GP POL.

Auxiliary membranes (these membranes are used in singular details): BANDA DE REFUERZO E 30 P (0,32) and ESTERDAN EQUERRE 25 or BANDA DE REFUERZO E 30 P POL (0,32).

Mechanical fasteners. Fasteners EVDF/ZBJ 2C or 3C with 40 x 40 mm DF -washers by L.R. ETANCO (Annex 1) are used for steel deck. Other fasteners are possible if these have the same or higher performance characteristics than the fasteners indicated above. For these fasteners verification according to 5.1.4.1 and Annex C of ETAG 006 is necessary. The annex 2 includes a list of fasteners for different kinds of supports, which comply with the requirements of this ETA.

The kit supplier is also responsible that only fasteners are used which fulfil the requirements of the AoC procedure. The assessment of this Kit does not include the thermal insulation. The thermal insulation often used with this kit are Panel of mineral wool, of Polyisocyanurate, of polyurethane or of cellulose. The supports often used with this kit are: Corrugated steel plates, corrugated steel of punched or bursted surface, Concrete, Aerated concrete, Wood and wooden boards.

2 Specification of the intended use in accordance with the applicable EAD

The intended use of this product is the waterproofing of roofs with slopes exceeding 1%, preventing the passage of water pass into the interior of the building, both in liquid or vapour form. This assembled system complies with Essential Requirements 2, 3 and 4: Safety in the case of fire, Hygiene, health and environment, and Safety in use, of European Regulation 305/2011.

The provisions made in this ETA are based on an assumed intended working life of the assembled system at least of 10 years. The indication given on the assumed intended working life cannot be interpreted as a guarantee given by the manufacturer, but are only to be regarded as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

"Assumed intended working life" means that, when an assessment following the ETAG provisions is made, and when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the Essential Requirements.

Installation. The fitness for use of this ESTERDAN PLUS FM BICAPA system can only be assumed if installation is carried out according to the manufacturer's instructions. It is the responsibility of the manufacturer to guarantee that the information on the application of its products is correctly given to the users. Particularly, it is recommended to consider:

Overlap. The longitudinal and transversal overlap between base membranes must always be 10 ± 1 cm. The longitudinal and transversal overlap between terminal membranes must always be 8 ± 1 cm.

Fasteners. Mechanical fastening of the Systems is carried out on the overlaps, using the aforementioned fasteners, and the washers must be applied at a distance between 2-3 cm from the edge of the membrane, as indicated in figure 1. Minimum distance between fasteners must be 18 cm, and maximum 36 cm. Maximum distance between rows of fasteners is 88 ± 1 cm.

The number of fasteners per square metre is determined by the varying air pressure on the roof, which depends on the geographic area, area of the roof and height of the building. For the number of fasteners/m² the wind uplift resistance of the fastener and the national regulations and administrative provisions of the member state of destination shall be taken into account.

Intersection at protruding elements. At the intersections with protruding elements (duct for utility installations, etc.) the waterproofing is finished off on a smooth metal profile. This support/profile is anchored mechanically to the steel sheet.

Structural joint. Prior to installation of the membrane and insulation, the structural joint formation profiles must be made available according to the drawing (fig. 2), i.e. plate anchored on one side (flat metal sheet) over the steel sheet as carrier of the joint insulation, anchoring of the joint formation base profiles (the separation of which will depend on foreseen movement) and insulation of the joint centre, which must be installed prior to closing the second profile.

As a reinforcement strip can be used the ESTERDAN FM 30 P ELAST, ESTERDAN FM 30 P ELAST S, POLYDAN 180-35 AP ELAST or ESTERDAN FM 30 P POL (cut to the appropriate dimensions) or the strip BANDA DE REFUERZO E 30 P (0,32) or ESTERDAN EQUERRE 25.

As a termination membrane can be used ESTERDAN PLUS 40/GP ELAST, ESTERDAN PLUS 50/GP ELAST, POLYDAN 180- 50/GP ELAST, POLYDAN 180- 50/GP ELAST SK, POLYDAN PLUS FM 50/GP ELAST RF, POLYDAN 180-50/GP FRBR ELAST, ESTERDAN 40/GP POL or ESTERDAN 50/GP POL cut to the appropriate dimensions.

Intersection at vertical facing. Intersection at vertical facings is carried out by following the drawing in figure 3. Regarding to the reinforcement and termination membranes see point 4.

Gutter catch basins. The installation of the waterproof system is performed with an auxiliary membrane (ESTERDAN FM 30 P ELAST, ESTERDAN FM 30 P ELAST S, POLYDAN 180-35 AP ELAST or ESTERDAN FM 30 P POL), the base membrane ESTERDAN FM 30 P ELAST, ESTERDAN FM 30 P ELAST S, POLYDAN 180-35 AP ELAST or ESTERDAN FM 30 P POL and with ESTERDAN PLUS 40/GP ELAST, ESTERDAN PLUS 50/GP ELAST, POLYDAN 180-50/GP ELAST, POLYDAN 180- 50/GP ELAST SK, POLYDAN PLUS FM 50/GP ELAST RF, POLYDAN 180-50/GP FRBR ELAST, GLASDAN 40/GP ERF ELAST, GLASDAN 40/GP ERF SPECIAL ELAST, ESTERDAN 40/GP POL, ESTERDAN 50/GP POL or GLASDAN 40/GP POL as finishing membrane (fig.4).

Reinforced areas. In areas with side angles (corners), in the event a greater number of fasteners is required, a reinforcing membrane ESTERDAN FM 30 P ELAST, ESTERDAN FM 30 P ELAST S, POLYDAN 180-35 AP ELAST or ESTERDAN FM 30 P POL will have to be installed throughout the area, which will allow us to apply one or more rows of fasteners. The new row of fasteners must be situated in the central area of the upper membrane (fig. 5). The main membrane will be welded on the reinforcing membrane.

Valley gutters. Valley gutters are carried out following the drawing in figure 6.

Traffic areas. The traffic areas will be correctly protected (light tiles, etc..) to avoid damages in the waterproof membrane.

Use, maintenance and repair of the works. Assessment of the fitness for use is based on the assumption that periodical maintenance of the roof is carried out. Maintenance must include:

- Inspection of the roof at regular intervals.
- Cleaning of downpipes and filters.
- Removal of stones, branches and leaves, etc.
- Inspection of flashing along the edges of the roof, chimneys, drains, skylights, etc.

If the Waterproofing System has been damaged, and is causing leakage, qualified installers must repair it immediately. Maintenance, preservation or remedial work personnel must wear footwear with a suitable sole. Further details are laid down in the MTD located at IETcc.

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

Assessment of the fitness of the ESTERDAN PLUS FM BICAPA Kit for the intended use, with regard to Essential Requirements 2, 3 and 4, was performed in compliance with the "Guideline of Systems of mechanically fastened flexible roof waterproofing membranes" (ETAG 006).

The characteristics of this Kit show values, which are within the requirements and tolerances established in the Manufacturer's Technical Dossier (MTD), and which are shown below. This assessment could be extended with other requirements applicable to dangerous substances resulting from transposed European legislation or national regulations and administrative provisions. Moreover, this assessment could be extended with other requirements applicable to the products, resulting from the application of other national regulations and administrative provisions.

3.1 Characteristics of the Kit

Safety in the case of fire (BWR 2)

External fire performance (EN 13501-5).

Classification	System
Broof(t1)	The systems installed on non-combustible support (A1-A2) enclosed in point 1 with slope roof < 20°.
Broof(t2)	The system POLYDAN 180-35 AP ELAST as base membrane and POLYDAN 180-50/GP ELAST SK or POLYDAN PLUS FM 50/GP ELAST RF or POLYDAN 180-50/GP FRBR ELAST as finishing membrane, installed on combustible or non-combustible support having a density greater than or equal to 472,5 kg/m ² with all pitches
Broof(t3)	The system ESTERDAN FM 30 P ELAST as base membrane and GLASDAN 40/GP ERF SPECIAL ELAST as finishing membrane, installed on non-combustible support (A1-A2) having a density greater than or equal to 110 kg/m ² kg/m ² with pitches <10°.

Hygiene, health and environment (BWR 3)

Release of dangerous substances. According to the manufacture's statement, the product does not contain any dangerous substance according to the EU database.

ER.4 Safety in use (BWR 4)

Wind uplift resistance. The test was performed with the fasteners indicated in point 1 and the kit constituted:

Base membrane	Finishing membrane	Maximun load (Pa)	Wadm (N/fastener)
ESTERDAN FM 30 P ELAST	ESTERDAN PLUS 40/GP ELAST	3000	405
ESTERDAN FM 30 P ELAST S	ESTERDAN PLUS 40/GP ELAST	3000	405
POLYDAN 180-35 AP ELAST	ESTERDAN PLUS 40/GP ELAST	3000	405
ESTERDAN FM 30 P POL	GLASDAN 40/GP POL	4000	506

3.2 Membrane Performance

Safety in case of fire (BWR 2). **Fire reaction** (EN 13501-1). Classification: E.

Hygiene, health and environment (BWR 3)

Low temperature bending/folding (EN 1109)

Membrane	Upper /Down face
ESTERDAN FM 30 P ELAST / ESTERDAN FM 30 P ELAST S	- 20°C
POLYDAN 180-35 AP ELAST	
ESTERDAN PLUS 40/GP ELAST	
ESTERDAN PLUS 50/GP ELAST	
POLYDAN 180-50/GP ELAST	
POLYDAN 180-50/GP ELAST SK	
POLYDAN PLUS FM 50/GP ELAST RF	
POLYDAN 180-50/GP FRBR ELAST	
ESTERDAN FM 30 P POL	
ESTERDAN 40/GP POL	
GLASDAN 40/GP ERF ELAST	
GLASDAN 40/GP ERF SPECIAL ELAST	
GLASDAN 40/GP POL	
ESTERDAN 50/GP POL	

Watertightness (EN 1928). The test was performed separately on each membrane, all are watertight.

Water vapour permeability (EN 1931). The water vapour resistance factor (μ) for this membrane is 20.000.

Tear resistance (nail) (EN 12310-1)

Membrane	N
ESTERDAN FM 30 P ELAST / ESTERDAN FM 30 P ELAST S (L/T)	164 / 215
POLYDAN 180-35 AP ELAST (L/T)	164 / 215
ESTERDAN FM 30 P POL (L/T)	164/361

Tensile properties (EN 12311-1).

Membrane	T. strength (N/5cm) (L/T)	Elongation (%) (L/T)
ESTERDAN FM 30 P ELAST / ESTERDAN FM 30 P ELAST S	668 / 447	42 / 52
POLYDAN 180-35 AP ELAST	733 / 538	40 / 51
ESTERDAN PLUS 40/GP ELAST	702 / 380	46 / 37
GLASDAN 40/GP ERF ELAST	363 / 242	3 / 2
GLASDAN 40/GP ERF SPECIAL ELAST	482/216	3 / 3
ESTERDAN PLUS 50/GP ELAST	719 / 579	44 / 47
POLYDAN 180-50/GP ELAST	774 / 587	41 / 47
POLYDAN 180-50/GP ELAST SK	819 / 576	40 / 47
POLYDAN PLUS FM 50/GP ELAST RF	1042 / 921	31 / 24
POLYDAN 180-50/GP FRBR ELAST	801/566	41/44
ESTERDAN FM 30 P POL	794 / 444	34 / 51
ESTERDAN 40/GP POL	629 / 402	34 / 43
GLASDAN 40/GP POL	490 / 266	3 / 2
ESTERDAN 50/GP POL	797 / 619	41 / 44

Static and dynamic loading resistance (EN 12730 y EN 12691). The base membrane with any of the finishing membranes withstands the maximum values established in the standards (EN 12730 and EN 12691). Dynamic loads (ϕ) 10 mm (2.000 mm).and Static loads 20 kg

Safety in use (BWR 4)

Slipperiness. In accordance with item 5.2.4.1 of EOTA 006 Guideline, the bituminous membranes comply satisfactorily with this characteristic and it is not necessary to run the test.

Aspects related to durability, serviceability and identification

Heat exposure resistance (EN 1296). The samples are exposed to a temperature of $70 \pm 2^\circ\text{C}$ during 168 days, after which the test "Low temperature bending/folding" was carried out.

Membrane	Upper /Down face	
ESTERDAN FM 30 P ELAST / ESTERDAN FM 30 P ELAST S	- 20°C	
POLYDAN 180-35 AP ELAST		
ESTERDAN PLUS 40/GP ELAST		
ESTERDAN PLUS 50/GP ELAST		
POLYDAN 180-50/GP ELAST		
POLYDAN 180-50/GP ELAST SK		
POLYDAN PLUS FM 50/GP ELAST RF		
POLYDAN 180-50/GP FRBR ELAST		
ESTERDAN FM 30 P POL		
ESTERDAN 40/GP POL		
GLASDAN 40/GP ERF ELAST		
GLASDAN 40/GP ERF SPECIAL ELAST		
GLASDAN 40/GP POL		- 15°C
ESTERDAN 50/GP POL		

The results obtained show acceptable behaviour of the membranes, as this resistances are $\leq -15^\circ\text{C}$.

Resistance to UV-radiation in the presence of moisture. In accordance with EOTA 006 Guideline, it is not necessary to perform this test, as adherence of the mineral granule protection is higher than 70% (EN 12039).

Dimensional stability (EN 1107)

Membrane	Variation (%)
ESTERDAN FM 30 P ELAST / ESTERDAN FM 30 P ELAST S	0.2
POLYDAN 180-35 AP ELAST	0.2
ESTERDAN PLUS 40/GP ELAST	0.1
GLASDAN 40/GP ERF ELAST	0.1
GLASDAN 40/GP ERF SPECIAL ELAST	0.1
ESTERDAN PLUS 50/GP ELAST	0.2
POLYDAN 180-50/GP ELAST	0.2
POLYDAN 180-50/GP ELAST SK	0.5
POLYDAN PLUS FM 50/GP ELAST RF	0.3
POLYDAN 180-50/GP FRBR ELAST	0.4
ESTERDAN FM 30 P POL	0.3
ESTERDAN 40/GP POL	0.2
GLASDAN 40/GP POL	0
ESTERDAN 50/GP POL	0.2

Results obtained show acceptable behaviour of the membrane, as its dimensional stability is less than 0.6%.

3.3 Performances of mechanical fasteners

Safety in use (BWR4)

Axial load (ETAG 006, 5.3.4.1). According to the ETA 08/0239 of the fastener with the fastener, the value is 1640N.

Resistance to unwinding. Apt, according ETA 08/0239.

Aspects related to durability, serviceability and identification

Resistance to corrosion. The screws and washers used offer good corrosion resistance (ETA 08/0239).

3.4 Identification of components

Base membranes

ESTERDAN FM 30 P ELAST. SBS bitumen-modified reinforcement membrane of 3 Kg/m², with 160 g/m² reinforced polyester felt reinforcement

ESTERDAN FM 30 P ELAST S. It is the same membrane that ESTERDAN FM 30 P ELAST but in the upper face has an adhesive band of 3 cm width to improve its installation.

POLYDAN 180-35 AP ELAST. SBS bitumen-modified reinforcement membrane of 3.5 Kg/m², with 180 g/m² polyester felt reinforcement

ESTERDAN FM 30 P POL. APP bitumen-modified reinforcement membrane of 3 Kg/m², with 160 g/m² reinforced polyester felt reinforcement -

The main characteristics of these membranes are:

Characteristics	ESTERDAN FM 30 P ELAST / S	ESTERDAN FM 30 P POL	POLYDAN 180-35 AP ELAST
Reinforcement (g/m ²)	Polyester felt 160 (± 15%)	Polyester felt 160 (± 15%)	Polyester 180 (±15%)
Weight (g/m ²)	2800-3300 (average value 3000)	2800-3300 (average value 3000)	3300-3800 (average value 3000)
Bitumen compound (g/m ²)	2900 (± 10 %)	2900 (± 10 %)	3000 (± 10 %)
Protection film (g/m ²)	< 24	< 24	<12
Nominal thickness (mm)	2,5 (- 0 %)	2,5 (- 0 %)	2,8 (- 0 %)
Roll dimensions (x m x 1m)	> 12	> 12	> 11
Roll weight (kg)	34 - 39	34 - 39	36.5- 41.5

Finishing membrane

ESTERDAN PLUS 40/GP ELAST. SBS bitumen-modified reinforcement membrane of 4 kg/m², with a mineral finish and 150 g/m² non-woven polyester felt reinforcement and stabilised.

GLASDAN 40/GP ERF SPECIAL ELAST. SBS bitumen-modified (with fire retardant treatment) reinforcement membrane of 4 kg/m², with a mineral finish and 60-g/m² reinforcement made up glass fibre mesh.

GLASDAN 40/GP ERF ELAST. SBS bitumen-modified reinforcement membrane of 4 kg/m², with a mineral finish and 60-g/m² reinforcement made up glass fibre mesh

ESTERDAN PLUS 50/GP ELAST. SBS bitumen-modified reinforcement membrane of 5 kg/m², with a mineral finish and 150 g/m² non-woven polyester felt reinforcement and stabilised.

POLYDAN 180-50/GP ELAST. SBS bitumen-modified reinforcement membrane of 5 kg/m², with a mineral finish and 180 g/m² non-woven polyester felt.

POLYDAN 180-50/GP ELAST. SK. SBS bitumen-modified reinforcement membrane of 5 kg/m², with a mineral finish and 180 g/m² non-woven polyester felt

POLYDAN PLUS FM 50/GP ELAST. RF. SBS bitumen-modified reinforcement membrane of 5 Kg/m², with a mineral finish and 180 g/m² non-woven polyester felt reinforced with fibre glass.

POLYDAN 180 50/GP FRBR ELAST. SBS bitumen-modified (with fire retardant treatment) reinforcement membrane of 5 Kg/m², with a mineral finish and 180 g/m² non-woven polyester felt reinforced with fibre glass.

ESTERDAN 40/GP POL. APP bitumen-modified reinforcement membrane of 4 kg/m², with a mineral finish and 150 g/m² non-woven polyester felt reinforcement and stabilised.

GLASDAN 40/GP POL. APP bitumen-modified reinforcement membrane of 4 kg/m², with a mineral finish and 60 g/m² glass fibre mesh reinforcement.

ESTERDAN 50/GP POL. APP bitumen-modified reinforcement membrane of 5 kg/m², with a mineral finish and 150 g/m² non-woven polyester felt reinforcement and stabilised.

Characteristic	G.40/GP ERF ELAST	G 40/GP ERF SPECIAL ELAST	E.PLUS 40/GP ELAST	E.PLUS 50/GP ELAST	P.180- 50/GP ELAST	P.180- 50/GP ELAST SK	P. 180- 50/GP FRBR ELAST	P. PLUS FM 50/GP ELAST RF	GLASDAN 40/GP POL	ESTERD AN 40/GP POL	ESTERDAN 50/GP POL	
Reinforcement (g/m ²)	Glass fibre 60 (±15%)		Polyester felt/glass fibre 150 (±15%)		Polyester. 180 (±15%)			Polyester felt/glass fibre 180 (±15%)	Glass fibre 60 (± 15%)	Polyester felt/glass fibre 150 (±15%)		
Weight (g/m ²)	3800-4300 (4000)				4800 - 5500 (5000)				3800-4300 (4000)		4800 - 5500 (5000)	
Bitumen (g/m ²)	2900 (± 10 %)			3900 (± 10%)	3900 (± 10%)			2900 (± 10 %)		3900 (± 10%)		
Protection film(g/m ²)	< 12											
Mineral finish (g/m ²)	> 900 (1100)											
Thickness (mm)	3,2 (±10%) / 2,5 (- 0%)			4,1 (±10%) / 3,5 (±10%)		4,2 (-0%) / 3,5 (-0%)			3,2 (±10%) / 2,5 (- 0%)		4,1(±10%)/3,5(±10%)	
Roll dimensions (Xx1m)	> 10	> 10	> 10	> 8				> 10	> 10	> 8		
Roll weight (kg)	38 - 44	38 - 44	38 - 44	38 - 45	38 - 45	38 - 45	38 - 45	38 - 45	38 - 44	38 - 44	38 - 45	
Overlap width (mm)	70 - 90				70 - 90				110 - 130	70 - 90	70 - 90	70 - 90

Auxiliary membranes

BANDA DE REFUERZO E 30 P (0,32). SBS bitumen-modified reinforcement strip of 3 kg/m², with a mineral finish and 140 g/m² non-woven polyester felt reinforcement, with a width of 32 cm.

ESTERDAN EQUERRE 25. SBS bitumen-modified reinforcement strip of 4 kg/m², with a mineral finish and 140 g/m² non-woven polyester felt reinforcement, with a width of 25 cm.

BANDA DE REFUERZO E 30 P POL (0,32): APP bitumen-modified reinforcement strip of 3 kg/m², with a mineral finish and 140 g/m² non-woven polyester felt reinforcement, width of 32 cm.

Characteristics	Banda de refuerzo E 30 P (0,32)	EQUERRE ESTERDAN 25	Banda de refuerzo E 30 P POL (0,32)
Reinforcement (g/m ²)	Polyester felt/glass fibre 140 (± 15%)		
Weight (g/m ²)	2800-3200 (3000)	3800-4200 (4000)	2800-3200 (3000)
Bitumen compound (g/m ²)	2900 (± 10%)	3900 (± 10%)	2900 (± 10%)
Protection film (g/m ²)	< 24		
Mineral finish (g/m ²)	--	--	--
Nominal thickness (mm)	2.5 (± 10 %)	3.2 (± 10 %)	2.5 (± 10 %)
Roll dimensions (m)	12 x 0,32	10 x 0,25	12 x 0,32
Use	Inferior reinforcement of the waterproof in emergent elements		

Fasteners

EVDF/ZBJ 2C screw. Double-thread, self-drilling screw, with a diameter of 4.8 mm, lengths of 65-75-90-110-140 mm and with a 12-mm diameter flat head. Supracoat 2C-treated zinc-coated steel, with a corrosion resistance of 15 Kesternich cycles.

40 x 40-mm DF washer, with a thickness of 8/10 mm and with a 4,8-mm diameter hole, made of steel with aluminium-zinc alloy (AZ 150) protection, with a corrosion resistance of 15 Kesternich Cycles.

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

System of Attestation of Conformity. 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 (Annex III, clause 2(ii) first possibility of EU Regulation 305/2011) for Systems of mechanically fastened flexible roof waterproofing membranes.

Product	Intended uses	Level or Classes	System
ESTERDAN PLUS FM BICAPA	Systems of mechanically fastened flexible SBS roof waterproofing membranes	Any	+2

According to this decision, system +2 establishes: *Tasks of the manufacturer:* Factory production control and Initial type-testing of the product and *Tasks of the notified body:* Initial inspection of the factory and production control and Continuous surveillance, assessment and approval of factory production control.

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

The ETA is issued for this kit on the basis of agreed data/information, deposited at IETcc, which identifies the product that has been assessed and judged. It is the manufacturer's responsibility to make sure that all those who use the kit are appropriately informed of specific conditions according to sections 1, 2, 4 and 5 including the annexes of this ETA. Changes to the membrane or the components or their production process, which could result in this deposited data/information being incorrect should be notified to the IETcc before the changes are introduced. IETcc will decide whether or not such changes affect the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

5.1 Tasks of the manufacturer

Factory production control. The manufacturer shall exercise permanent internal control of production and ensure that the results obtained comply with the quality level required. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written procedures and regulations. This control production system documentation ensures a common understanding of quality assurance and enables the achievement of the required product characteristics according to ETA.

The manufacturer may only use components stated in the technical documentation of this ETA including Control Plan. The incoming raw materials are subjected to verifications by the manufacturer before acceptance.

The factory production control shall be in accordance with the Control Plan⁽¹⁾ which is part of the Technical Documentation of this ETA. The Control Plan has been agreed between the manufacturer and the IETcc and is laid down in the context of the factory production control system operated by the manufacturer and deposited at the IETcc. The results of factory production control shall be recorded and evaluated in accordance with the provisions of the Control Plan.

Initial type-testing of the product. Initial type-testing carried out by the IETcc is that set out in chapter 5 of the guideline for Systems of mechanically fastened flexible roof waterproofing membranes (ETAG 006). The IETcc assessed the results of these tests in accordance with chapter 6 of this Guide, as part of the ETA issuing procedure.

The verifications underlying this ETA have been furnished on samples from the current production, these will replace the initial type-testing carried. After changing the production process or starting the production in another manufacturing plant the initial type-test shall be repeated.

Other tasks of the manufacturer. Other tasks of manufacturer. The manufacturer shall, on the basis of a contract, involve a body which is notified for the tasks referred to in section 4 in order to undertake the actions laid down in this clause. For this purpose, the control plan shall be handed over by the manufacturer to the notified bodies involved.

For initial type – testing, the results of the tests performed as part of the assessment for the ETA shall be used unless there are changes in the production line or plant. In such cases the necessary initial type- testing has to be agreed with the IETcc.

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

5.2 Tasks of the Notified body

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 point 2.

Continuous surveillance, assessment and approval of Factory Production Control. The Notified body shall visit the factory at least twice a year. Surveillance of the manufacturing process shall include:

- Checking the documentation of factory production control, to ensure continuing compliance with the provisions of the ETA,

⁽¹⁾ The control plan is a confidential part of this European Technical Assessment and only handed over to the notified body involved in the procedure of attestation of conformity.

- 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.

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by



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On behalf of the Instituto de Ciencias de la Construcción Eduardo Torroja

A handwritten signature in blue ink, appearing to read 'Castellote', with a long horizontal line extending to the left.

Marta Mº Castellote
Director

Fig. 1 Detail of membrane overlap.

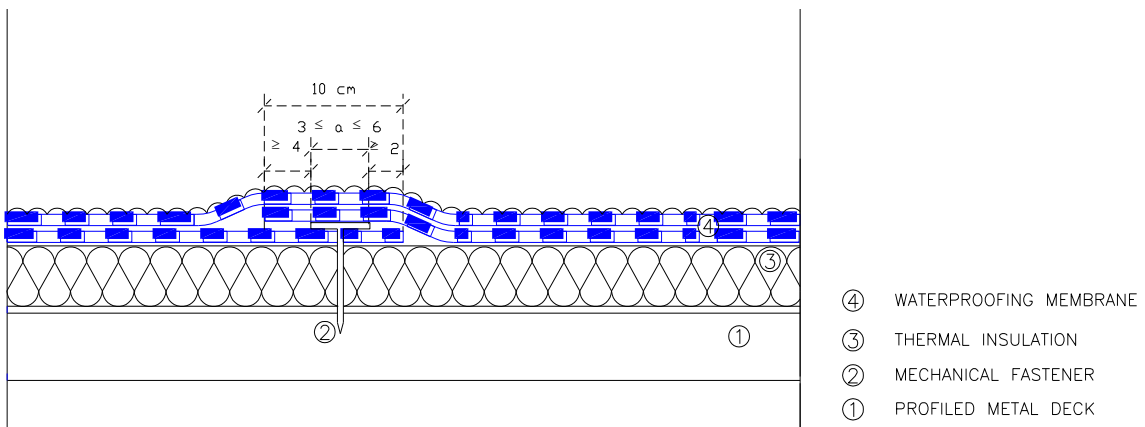
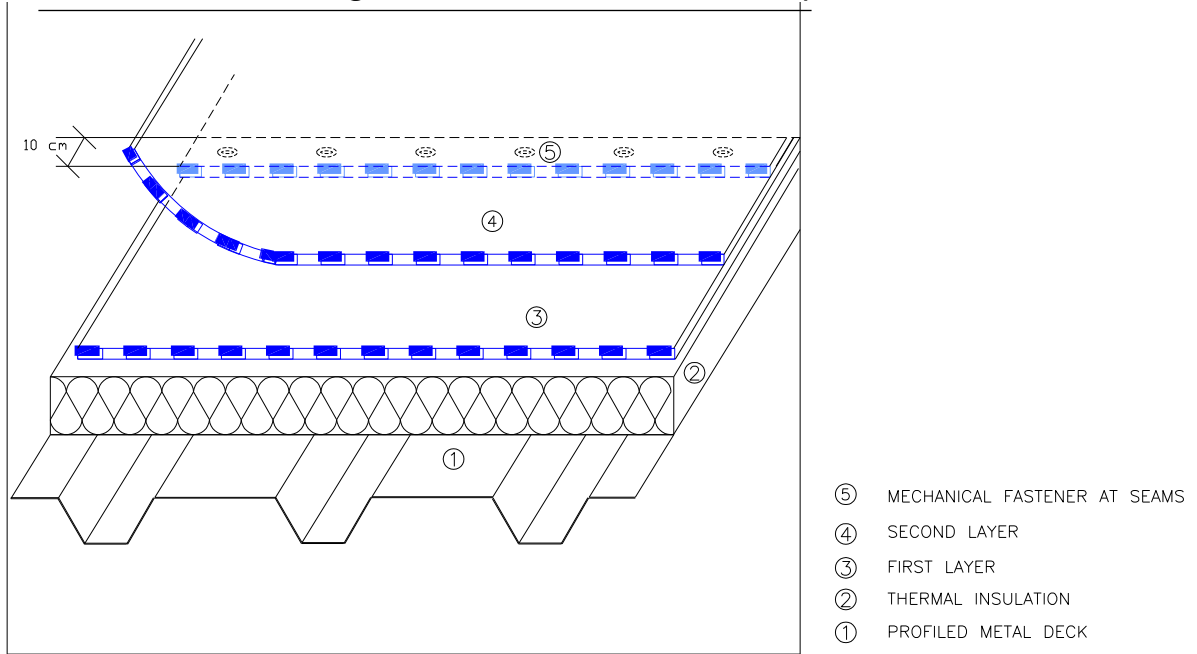


Fig. 2 Detail of a structural joint

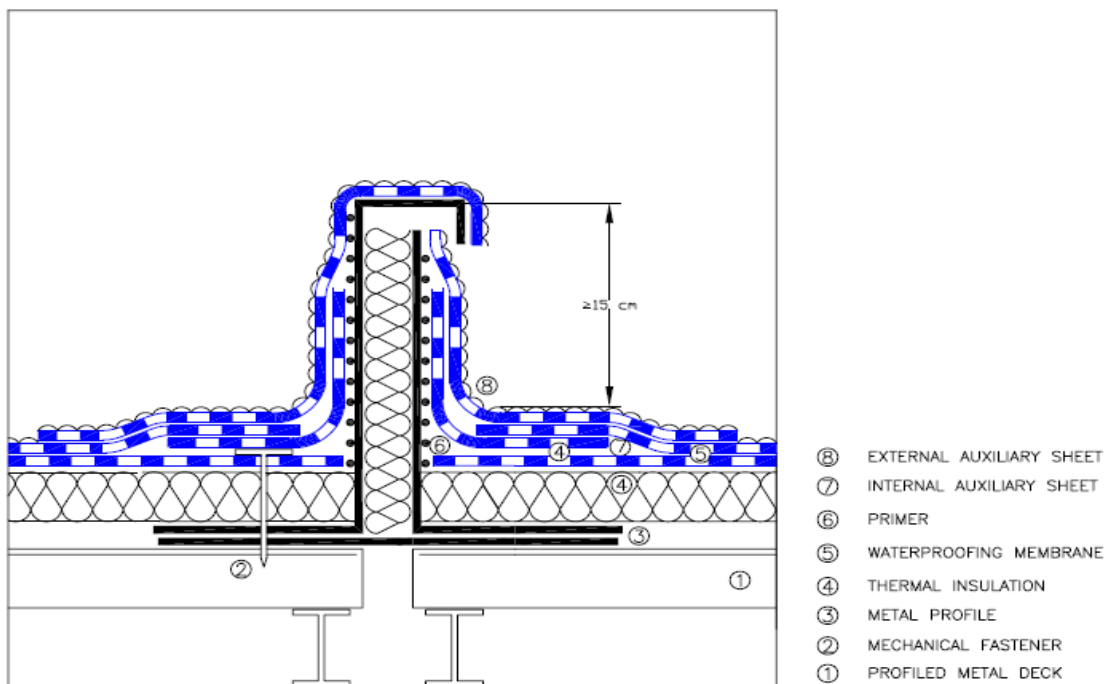
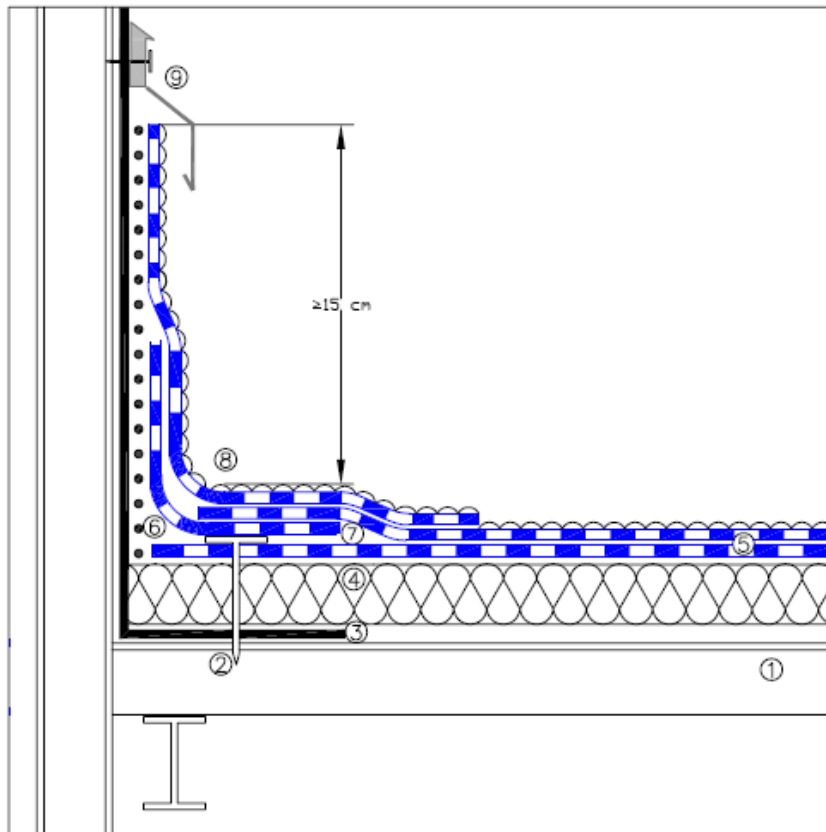
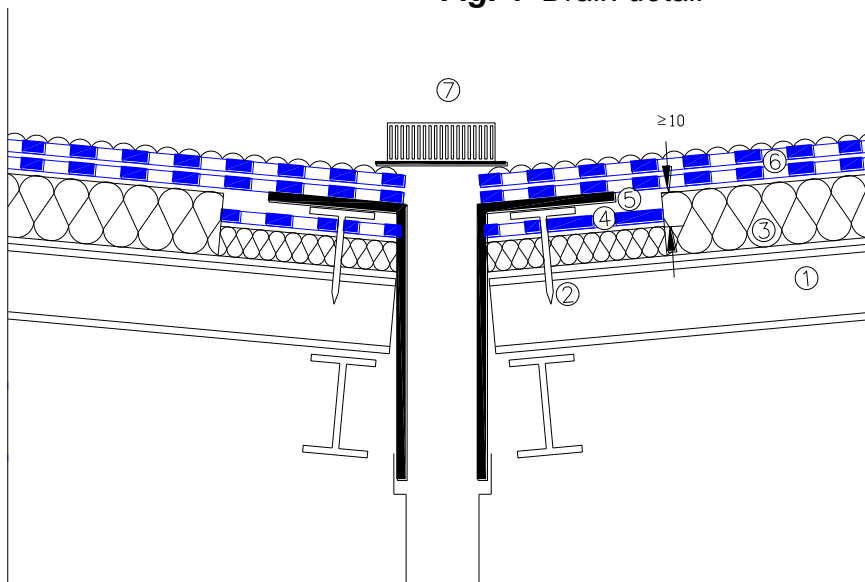


Fig. 3 Insertion with a vertical wall



- ⑨ SEALED PROFILE
- ⑧ EXTERNAL AUXILIARY SHEET
- ⑦ INTERNAL AUXILIARY SHEET
- ⑥ PRIMER
- ⑤ WATERPROOFING MEMBRANE
- ④ THERMAL INSULATION
- ③ METAL PROFILE
- ② MECHANICAL FASTENER
- ① PROFILED METAL DECK

Fig. 4 Drain detail



- ⑦ GRATING
- ⑥ WATERPROOFING MEMBRANE
- ⑤ OUTLET
- ④ ADHERENCE FLASHING
- ③ THERMAL ISULATION
- ② MECHANICAL FASTENER
- ① PROFILED METAL DECK

Fig. 5 Corner Detail

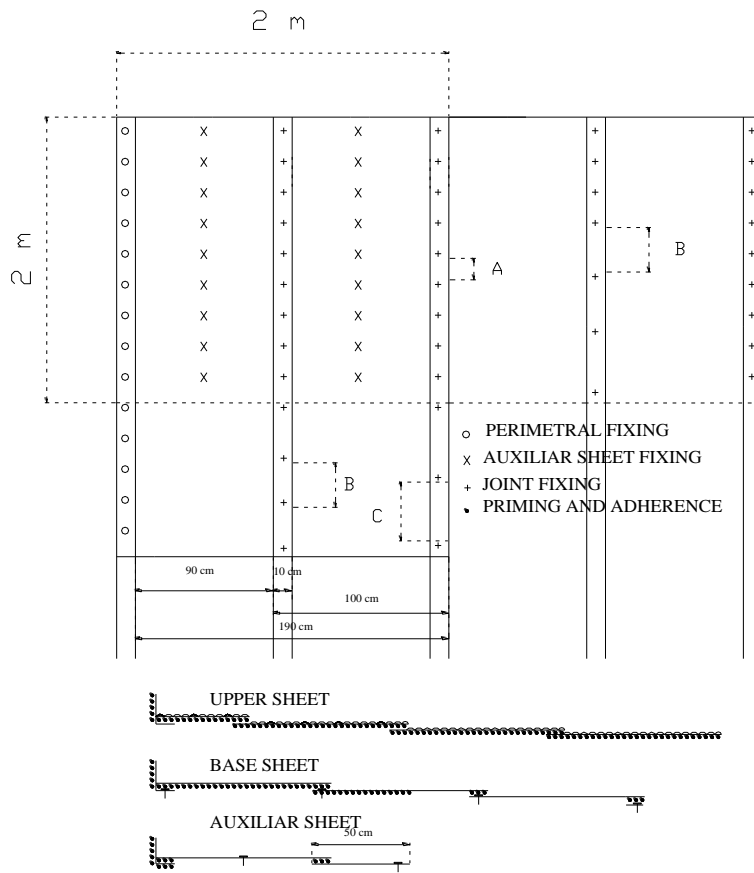
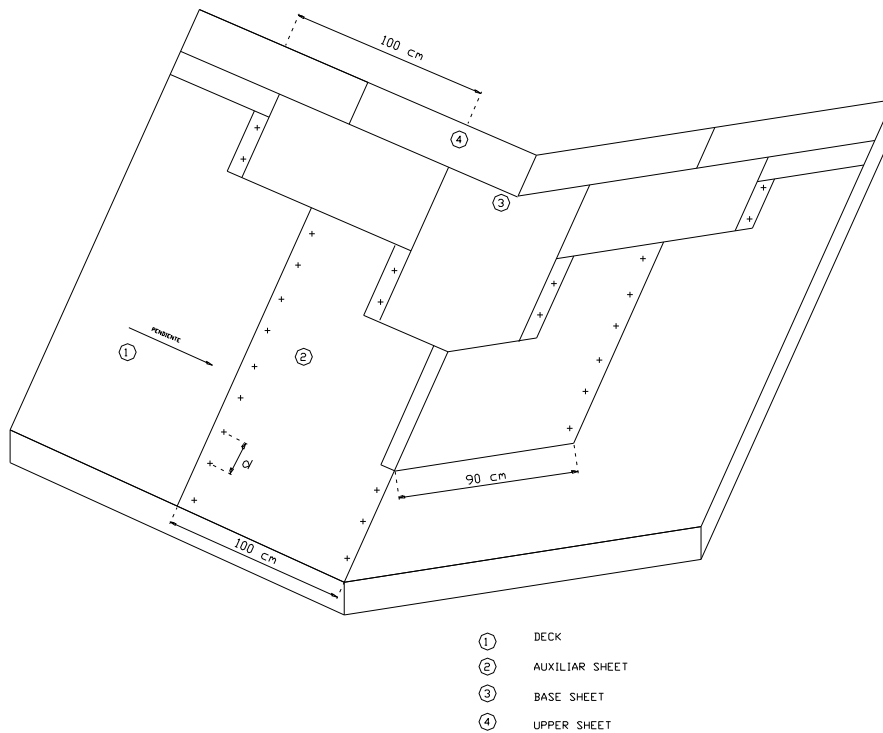
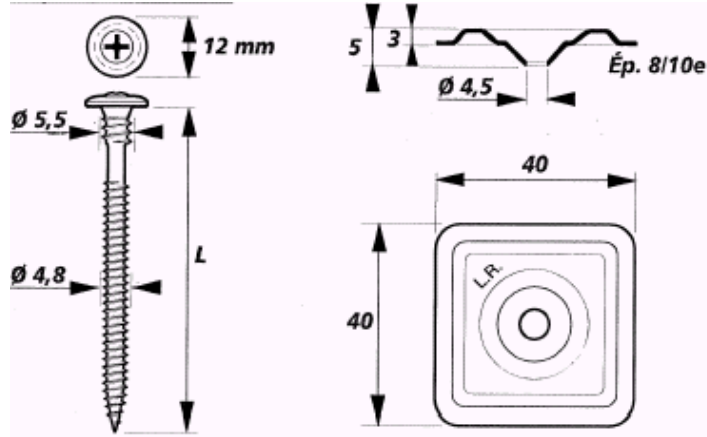


Fig. 6 Reinforcement membrane on valley gutter



Annex 1. Essential dimensions of the fasteners



The length (L) of the fastener can be 65, 75, 90, 100, 110, 120, 140, 160 and 180 mm.
 The fastener is made by Steel with an anticorrosion coat 2C. The washer is made by steel with aluminium-zinc alloy protection, 8/10e (mm).

Annex 2. This annex includes a different kind of fasteners, which comply with the requirement of this ETA.

Corrugated steel plates		Axial load (N)	W adm (N / fastener) E FM 30 P ELAST / P 180-35 P ELAST	W adm (N / fastener) E FM 30 P POL	Nº ETA
1	EV DF 2C + 40 x 40	1.640	405	506	08/0239
2	EV DF 2C + 82x40 R DF	1.740	405	506	08/0239
3	EVB DF 2C + 40x40	1.380	341	426	08/0239
4	EVB DF 2C + 82x40 R DF	1.400	345	432	08/0239
5	ISODRILL TT + 40x40	1.340	331	413	08/0239
6	ISODRILL TT + 82 x40 R DF	1.340	331	413	08/0239
7	IR 2 4.8+ IR 82X40 R DF	1.460	354	450	08/0321
Corrugated steel of punched or bursted surface					
8	FASTOVIS TF 3036 DF 2C + 40x40	1.870	405	506	08/0239
9	FASTOVIS TF 3036 DF 2C + 82x40 R DF	1.900	405	506	08/0239
Concrete					
10	BETOFAST TH DF 3C + 82X40 R	6.860	405	506	08/0239
11	TI 6.3 + IRD 82X40	6.270	405	506	08/0239
12	TI 6.3 + IF/IGC 82X40	6.270	405	506	08/0239
Aerated concrete					
13	MUULTIFAST TB INOX A2 + 82X40 R	1.540	380	475	08/0239
14	MUULTIFAST TB INOX A2 + 40X40	1.570	388	484	08/0239
15	IGR-T-T25-8.0+ IG8-C 82 X40	1.600	395	494	08/0262
Wood and wooden boards					
16	MUULTIFAST TF + 82X40 R	1.950	405	506	08/0239
17	EV DF 2C + 82x40 R DF	1.880	405	506	08/0239
18	IG 6 + IRD 82X40	2.100	405	506	08/0321
19	IWT 5 + IRC/W 82X40	1.950	405	506	08/0321
20	IR 2 C 4.8 + IRC/W 82X40	2.000	405	506	08/0321

The Wadm determined with the full scale wind uplift with the fastener EV DF 2C + 40 x 40 (Roc) was 405 and 506 N/fastener. In order to determine the Wadm of systems with other fasteners (Rnc) on the basis of ETAG 006, it is applied:
 If $Rnc \geq Roc$: $Wadm(nc) = Wadm(oc)$
 If $Rnc \leq Roc$: $Wadm(nc) = (Rnc/Roc) * Wadm(oc)$

Description of the screws

Screws	Characteristics
EV DF 2C (L.R ETANCO)	Hardened carbon steel screws with double-thread under head, with a diameter of 4,8 mm, length L and with a 12 mm flat circular head. Supracoat corrosion protection Resistance at 15 Kesternich cycles (EN ISO 6988)..
EVB DF 2C (L.R ETANCO)	Hardened carbon steel screws 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).
ISODRILL TT (L.R ETANCO)	Stainless steel screw. Diameter of 4,8 mm, length L and with a 8,5 mm circular trumpet head. A4 (1.4404) Stainless steel.
IR 2 4.8 (SFS intec)	Hardened carbon steel screws with double-thread under head, with a diameter of 4.8 mm, length L and with a 8 mm hexagonal flat head. Durocoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
FASTOVIS TF 3036 2C (L.R ETANCO)	Hardened carbon steel screw. Diameter of 6,5 mm, length L and with a 11 mm circular trumpet head. Supracoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).
TI 6.3 (SFS intec)	Hardened carbon steel screw. Diameter of 6,3 mm, length L and with a 8 mm hexagonal flat head. Durocoat corrosion protection. Resistance at 15 Kesternich cycles(EN ISO 6988).
BETOFAST TH DF 3C (L.R ETANCO)	Hardened carbon steel screw with double-thread under head, with a diameter of 6,6 mm, length L and with a 8 mm hexagonal flat head. Supracoat corrosion protection. Resistance at 30 Kesternich cycles (EN ISO 6988).
MULTIFAST TB INOX (L.R ETANCO)	Stainless steel screw. Diameter of 6 mm, length L and with a 12 mm circular head. A2 (1.4301) stainless steel.
IGR-S 8 (SFS INTEC)	Austenitic stainless steel A2 screw. Diameter of 8 mm, length L with a 12 mm diameter circular trumpet head.
MULTIFAST TB INOX A2 (L.R ETANCO)	Stainless steel screw. Diameter of 6 mm, length L and with a 11 mm circular trumpet head. A2 (1.4301) stainless steel.
MULTIFAST TF (L.R ETANCO)	Stainless steel screw. Diameter of 6 mm, length L and with a 11 mm circular trumpet head. A2 (1.4301) stainless steel.
IG 6 (SFS INTEC)	Hardened carbon steel screw. Diameter of 6 mm, length L and with a 8 mm hexagonal flat head. Durocoat corrosion protection. Resistance at 15 Kesternich cycles(EN ISO 6988).
IWT 5 (SFS INTEC)	Hardened carbon steel screws, with a diameter of 5 mm, length L and with a 9,5 mm circular Trumpet head. Durocoat corrosion protection. Resistance at 15 Kesternich cycles (EN ISO 6988).

Description of the washers

Washers	Characteristics
40 X 40 mm DF (L.R ETANCO)	Steel plate with aluzinc protection. Thickness 0.8 mm
82 X 40 mm R (L.R ETANCO)	Steel plate with aluzinc protection. Thickness 1 mm
82 X 40 mm DF (L.R ETANCO)	Steel plate with aluzinc protection. Thickness 1 mm
IR 82 x 40 mm (SFS intec)	Steel plate with aluzinc protection.Thickness 0,8 mm
IRP 82 x 40 mm (SFS intec)	Steel plate with aluzinc protection.Thickness 1 mm
IF/IGC 82 x 40 mm (SFS intec)	Steel plate with aluzinc protection.Thickness 1 mm
IG C 82 X 40 mm (SFS intec)	Steel plate with aluzinc protection.Thickness 1 mm
IRD 82 X 40 mm (SFS intec)	Steel plate with aluzinc protection.Thickness 1 mm
IRC/W 82X40 mm (SFS intec)	Steel plate with aluzinc protection.Thickness 1 mm