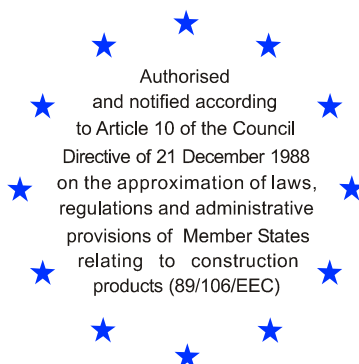


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Member of EOTA

European Technical Approval No. ETA-08/0379

Handelsnaam <i>Trade Name</i>	Monarplan FM / Monarplan FMX
Houder van de goedkeuring <i>Holder of approval</i>	Siplast Icopal SAS 12, rue de la Renaissance 93184 Antony cedex France
Algemeen type en gebruik van het bouwproduct Generic type and use of construction product:	System of mechanically fastened flexible roof waterproofing membrane
Geldigheid Validity	van tot from: to: 08-12-2008 18-11-2013
Productielocatie Manufacturing plant	plant "work 10"
Dit document bestaat uit: This European Technical Approval contains:	15 pages including 3 annexes which form an integral part of the document.



I LEGAL BASES AND GENERAL CONDITIONS

1 This European technical approval is issued by INTRON Certificatie B.V. 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 Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
- Regulation of the Minister of Housing (VROM) of 19 November 2002, nr MJZ20020858861 on settlement of further prescriptions for works (Regulation Building Decree), published in Staatscourant 2002, 241, with amendments published in Staatscourant 2003, 101, Staatscourant 2005, 163 and Staatscourant 2005, 249;
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁴;
- ETA Guideline Nr. 006 "Systems of mechanically fastened flexible roof waterproofing membranes"⁵.

2 INTRON Certificatie B.V. 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 INTRON Certificatie B.V., in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.

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

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

1 Official Journal of the European Communities L 40, 11.2.1989, p. 12
2 Official Journal of the European Communities L 220, 30.8.1993, p. 1
3 Official Journal of the European Union L 284, 31.10.2003, p. 25
4 Official Journal of the European Communities L 17, 20.1.1994, p. 34
5 ETAG006, March 2000, Ammended april 2007.

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the product and intended use

1.1 General description of the kit

Monarplan FM / Monarplan FMX roofing membrane kits are mechanically fastened roof waterproofing membranes, composed of a single-ply PVC-P membrane and SFS, HILTI or ETANCO fasteners. Insulation materials are not part of the kit.

Roofing membrane

The kits may include a Monarplan membrane in effective thickness 1.2 mm, 1.5 mm, 1.8 mm or 2.0 mm (manufacturer declared value). The difference between the Monarplan FM type and FMX type is that with the FMX type additional fire retardants are added. The roofing membrane is delivered in lengths of 10 m, 15 m or 20 m. Standard widths are 1.06 m, 1.5 m and 2.12 m. The membrane is made of a pliable PVC with a carrier (core) of polyester. The PVC membrane is not compatible with bitumen. Welding of the materials shall be done by hot air. The roofing membrane is CE marked based on the product standard EN 13956.

The membranes are manufactured in various surface colors. The color of the underside does vary.

Standard dimensions of the membrane and characteristics of the membrane are given in [Annex 1](#) of this document.

Mechanical fasteners and washers

For fastening of the waterproofing membrane to the substrate fasteners can be used from the manufacturer SFS, HILTI and ETANCO. [Annex 2](#) of this document is giving detailed information about types of fasteners / washers that may be used, depending of the kind of substrate the roofing membranes has to be fixed to.

1.2 Intended use

Monarplan membranes are used on flat roofs and roofs with a slope until 20 % in order to create a roof waterproofing layer. A roof made with the Monarplan system is not accessible for vehicles.

The roofing membrane may be installed directly on the insulation material as underlay. For other surfaces the supplier of the Monarplan membrane should be consulted in order to decide if a separation layer of polyester or glass-fleece may be necessary in order to protect the membrane against mechanical or chemical influences.

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.

2 Characteristics of the system and methods of verification

2.1 Mechanical resistance and stability (ER1)

Not relevant.

2.2 Safety in case of fire (ER2)

External fire performance Monarplan FM and FMX. Testing is performed on the Monarplan FM being the most critical type of membrane (= worst case scenario).

Class B_{ROOF}(t1) is valid for the following conditions:

- a) roof pitches $\geq 1^\circ$
- b) decks of profiled and non-profiled steel decks and any non-combustible continuous decks with a minimum thickness of 10 mm
- c) insulation materials of EPS, PUR/PIR and mineral wool with a minimum thickness of 100 mm

Class B_{ROOF}(t3) is valid for the following conditions:

- a) roof pitches $\leq 10^\circ$
- b) decks of profiled and non-profiled steel decks and any non-combustible continuous decks with a minimum thickness of 10 mm
- c) insulation materials of mineral wool with a minimum thickness of 100 mm

2.3 Hygiene, health and the environment (ER3)

The products mentioned in this kit do not contain any dangerous substances according to the EU's database. Within the scope of this approval there may also be additional national legislation, regulations and/or administrative provisions applicable that have to be complied with.

2.4 Safety in use (ER4)

The following table shows the maximum design load value (N/fastener) determined according to ETAG 006 for various combinations of the Monarplan membrane and fasteners.

Type of screw + washer	Width of membrane	Substrate used for test	Max. design load [N/fastener]
SFS Intec IR2 4.8 / SFS Intec IR 82 x 40	1000 mm	0.75 mm steel deck	600
SFS Intec IR 2 4.8 / SFS Intec IR 82 x 40	1500 mm	0.75 mm steel deck	780
SFS Intec TK 2 4.8 / SFS Intec TK 60	1000 mm	0.75 mm steel deck	600
SFS Intec TK 2 4.8 / SFS Intec TK 50	1500 mm	0.75 mm steel deck	660

Axial pull out load and k-factors for other types of SFS, HILTI and/or ETANCO fasteners in various substrates is given in Annex 2 of this document.

The kit components, as mentioned in this document, are tested for their durability properties. Results are given in Annex 1 for the membrane and Annex 2 for the fastening system.

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 system 2+ for the procedure of attestation of conformity (Annex III, clause 2(ii) first possibility of Directive 89/106/EEC) has been assigned for systems of mechanically fastened flexible roof waterproofing membranes.

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

- (a) Tasks of the manufacturer:
 - initial type-testing of the product;
 - factory production control;
 - testing of samples taken at the factory in accordance with a prescribed test plan.
- (b) Tasks of the notified (approved) body:
 - 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

3.2.1 Task of the manufacturer

Factory production control

The manufacturer of the membrane has a factory production control system in its plant and exercises permanent internal control of the production. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies, procedures and a control plan, including records of results performed. This production control system does ensure that the product is in conformity with this European Technical approval.

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 of the raw materials
- type of inspection or control
- date of manufacture, 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 the factory production control.

The records shall be kept for at least five years. These records have to be presented, if requested, to the notified body in charge with the continuous surveillance. On request these records shall be presented to INTRON Certificatie B.V. Detailed information concerning tests, their frequencies and tolerances assigned, are included in a test plan and deposited with INTRON Certificatie B.V.

Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body/bodies which is/are 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/bodies involved. The manufacturer shall make a declaration of conformity, stating that the product is in conformity with the provisions of this ETA.

3.2.2 Task of the notified body

Initial inspection of factory and factory production control

The notified body ascertains that, in accordance with the manufacturer's technical file, production control and general factory conditions do allow the manufacturer to ensure the a consistent quality of the roofing membrane kit.

Continuous surveillance, judgment and assessment of factory production control

The notified body shall perform continuous surveillance and assessment of the manufacturer's factory production control and confirm the controls are made in conformity with the established control plans approved by INTRON Certificatie B.V.

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 should be twice a year. If the results of the first inspection are satisfactory, the inspection frequency can be reduced to once per 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. If the results from the continuous surveillances do show, over a certain period, no deviations, the frequency can be brought back to one surveillance audit per year.

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

CE marking


The CE marking shall be affixed by the manufacturer on the packaging of the kit / component or accompanying documents.

The symbol "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
- number of the European technical approval guideline (ETAG 006)

The components shall be marked as belonging to the mechanically fastened roof waterproofing kit.

CE marking and accompanying information:


<i>0958</i>
Siplast Icopal SAS 12, rue de la Renaissance 93184 Antony cedex France 08 0958-CPD-046
ETA-08/0379 ETAG 006 Mechanically fastened roof waterproofing system Declared values of the product and the system: see Annexes of ETA-08/0379

Symbol "CE"

Identification number of notified body (system 2 +)

Name and address of the holder of ETA

two last digits of year of affixing CE marking
 number of the EC certificate for the FPC

ETA number

ETAG number

intended use

classification and characteristics of the product

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

4.1 Manufacturing

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

4.2 Installation and design

The joints of the Monarplan membrane are hot air welded; overlaps of at least 100 mm to be considered. Principle of installation and detailed information with regard to up stands are given in Annex 3 of this European technical approval.

The fitness for use of the mechanically fastened roof waterproofing system can only be assumed to be fulfilled if the installation is carried out with the utmost care and according to the instructions as given by the supplier of the membrane. In addition local requirements can apply that have to be followed at any time.

The insulation material used in the total roofing system whereof the Monarplan membrane is part must be CE marked according to the relevant harmonized European standard. The durability shall be assessed in accordance with these standards. A minimum resistance to compression at 10 % of ≥ 60 kPa should be considered.

When expected roof traffic may exceed what is required for normal inspection visits and maintenance, special measures should be taken to protect the roofing membrane against damages of any kind.

4.3 Substrates

The substrates 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 roof, cold roof or inverted roof) and in consequence will have a direct influence on the method of attachment.

4.4 Manufacturer's responsibilities

It is the manufacturer's responsibility to make sure that all those who utilize the approved roof waterproofing system will be appropriately informed about the specific conditions as mentioned in this ETA and the not confidential parts of the MTD deposited to this ETA.

5 Indications by the manufacturer**5.1 Packaging, transport and storage**

The membranes is neither toxic nor inflammable thus no special care to be taken with regard to these issues during packaging, transport or storage.

Storage of the materials has to be in a dry area, protected against direct sunlight, any kind of heat, sparks or flames. The rolls have to be placed on pallets and protected by a covering at the building site. Rolls must always be stored horizontally. The fasteners shall be handled and stored with care and be protected from accidental damage.

5.2 Use, maintenance and repair

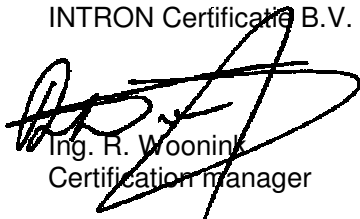
It is the responsibility of the manufacturer to ensure that proper information for the use of the Monarplan membrane and SFS, HILTI / ETANCO fasteners are made available to the party applying the membrane and fasteners. General guidance has to be given based on this ETA.

The assessment of the fitness for use is based on the assumption that a normal maintenance is performed on a regular basis meaning that the roof and membrane applied is inspected for example twice a year including the following handlings:

- cleaning of downpipes and leaf filters
- removal of stones, branches and leaves
- inspection of flashings along the edges of the roof, chimneys, drains and roof lights
- removal of organic growths such as vines

Abrasion and minor impact damage shall be repaired immediately after detection.

On behalf of
INTRON Certificate B.V.



Ing. R. Woonink
Certification manager

Culemborg, 2008-12-08

Annex 1

Dimensions and specifications of the Monarplan membrane

Measures of the Monarplan membrane

	Monarplan type FM / FMX			
Thickness (mm)	1.2	1.5	1.8	2.0
Width (m)	1.06 / 1.50 / 2.12			
Roll length (m)	10 m / 15 m / 20 m			
Weight of polyester carrier	84 g/m ²			

Product properties of the Monarplan membrane

Characteristic	Test method	Dimension	Value
Reaction to fire	EN 11925-2	-	E
Water tightness	EN 1928 / B	kPa	tight
Peel resistance of joints	EN 12316-2	N/50 mm	≥ 185
Shear resistance of joints	EN 12317-2	N/50 mm	≥ 800
Tensile properties - strength - elongation	EN 12311-2	N/50 mm %	≥ 1150 ≥ 15
Resistance to static loading	EN 12730	kg	≥ 20
Resistance to impact	EN 12691	mm	200 (EPS) 800 (MWR)
Resistance to tearing	EN 12310-2	N	≥ 200
Dimensional stability	EN 1107-2	%	≤ 0,5
Resistance to cold bending	EN 495-5	°C	≤ - 35
Water vapour permeability	EN 1931	μ	22.000

Testing of durability of product properties of the Monarplan membrane

Characteristic	Method of artificial ageing	Test method	Dimension	Value
Testing of peel resistance	EN 1296 + EN 1847	EN 12316-2	%	Δ ≤ 20
Testing of shear resistance	EN 1296	EN 12317-2	%	Δ ≤ 20
Testing of resistance of tearing	EN 1296	EN 12310-2	%	Δ ≤ 10
Resistance of cold bending	EN 1296	EN 495-5	%	¹⁾
Resistance of cold bending	EN 1297 (1.000 hours)	EN 495-5	°C	¹⁾

¹⁾ cold bending after ageing is tested at temperature of - 35 °C; material shows pass result. No further testing performed on lower temperatures.

Annex 2
Description / properties SFS and ETANCO fasteners and washers

Type of fastener / washer	Axial load (daN)	k factor	Resistance to unwinding	Mechanical resistance before and after ageing
Profiled metal decking substrate (standard)				
IR2 Ø 4.8 + IR 82 x 40	145	1	OK	not relevant
IR2S Ø 4.8 + IR 82 x 40	145	1	OK	not relevant
TPR 6.3xL + IRD 82 x 40	195	1	OK	not relevant
TK2 Ø 4.8 + TK 60	140	1	OK	OK
EVF 2C Ø 4.8 + 82 x 40 R	200	1	OK	not relevant
EVF 2C Ø 4.8 + 82 x 40 R SC	200	1	OK	not relevant
EVDF 2C Ø 4.8 + 82 x 40 R	200	1	OK	not relevant
EVDF 2C Ø 4.8 + 82 x 40 R SC	200	1	OK	not relevant
EVBDF 2C Ø 4.8 + 82 x 40 R	170	1	OK	not relevant
EVBDF 2C Ø 4.8 + 82 x 40 R SC	170	1	OK	not relevant
EHBDF 2C Ø 4.8 + 82 x 40 R	170	1	OK	not relevant
VMS 2C Ø 4.8 + 82 x 40 R DF	200	1	OK	not relevant
EGB 2C 4.8xL + Etancoplast T 80x40	175	1	OK	OK
ISODRILL TH DF + 82 x 40R	160	1	OK	not relevant
ISODRILL TT + 82 x 40R	160	1	OK	not relevant
ISODRILL TT + Etancoplast T 80 x 40	160	1	OK	OK
S-IT 01C 4.8xL + S-IW 4.9 AZ 80x40	175	1	OK	not relevant
S-IS 01 C 4.8xL + S-IW 5.6 AZ 80 x 40	170	1	OK	not relevant
Profiled metal decking substrate (acoustic)				
FASTOVIS 3036 TF Ø 6.5 + 82 x 40R DF	230	1	OK	not relevant
FASTOVIS 3036 TF 2C + 82x40 R	230	1	OK	not relevant
FASTOVIS 3036 TF DF 2C + 82x40R	230	1	OK	not relevant
FASTOVIS 3036 TF DF Ø 6.5 + 82 x 40 R DF	230	1	OK	not relevant
PER + 82 x 40 R	160	1	not relevant	not relevant
PER / PER + 82 x 40 R DF	160	1	not relevant	not relevant
IFP 2 6.7xL+ IRP 82x40	260	1	OK	not relevant
IFP 2 + IRP 82 x 40	260	1	OK	not relevant
Concrete substrate				
TI 6.3xL + IRD 82 x 40	625	1	not relevant	not relevant
TI 6.3xL + IF/IG-C 82 x 40	690	1	not relevant	not relevant
DT 6.3xL + IRD 82x40	305	1	not relevant	not relevant
BETOFAST TH 3C Ø 6.6 + 82x40R	720	1	not relevant	not relevant
BETOFAST THDF 3C Ø 6.6 + 82x40R	720	1	not relevant	not relevant
BETOFAST TT 2 C Ø 5.2 x T 80x40	300	1	not relevant	OK
NAILFIX CH Ø 4.5 + 82 x 40 R SC	330	1	not relevant	not relevant
Lightweight concrete substrate				
IGR-S Ø 8 + IG8-C 82 x 40	155	1	not relevant	not relevant
MULTIFAST TB TX + 82x40 R	150	1	not relevant	not relevant
MULTIFAST TB inox Ø 6 + 82 x 40 R	125	1	not relevant	not relevant

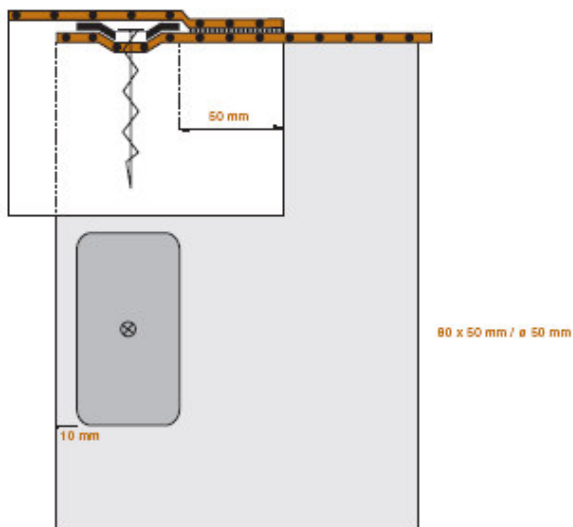
Type of fastener / washer	Axial load (daN)	k factor	Resistance to unwinding	Mechanical resistance before and after ageing
Wood substrate				
IG Ø 6.0xL+IRD 82x40	210	1	not relevant	not relevant
IWT Ø 5 + IRC/W 82 x 40	195	1	not relevant	not relevant
EVF 2 C Ø 4.8 + 82 x 40 R	220	1	not relevant	not relevant
EVF 2 C Ø 4.8 + 82 x 40 R SC	220	1	not relevant	not relevant
EVDF 2C Ø 4.8 + 82 x 40 R	220	1	not relevant	not relevant
EVDF 2C Ø 4.8 + 82 x 40 R SC	220	1	not relevant	not relevant
MULTIFAST TF Ø 6 + 82 x 40 R	230	1	not relevant	not relevant

Remark: Detailed information with regard to extrapolation is given in chapter 5.1.4.1. of ETAG006.

Annex 3

Installation of membrane / design principles

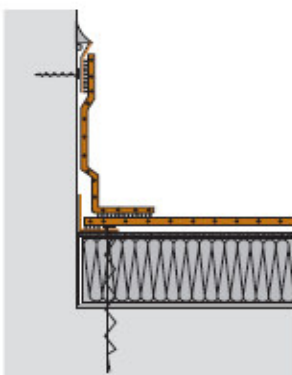
Monarplan is applied according to the principles of loosely laid single ply membranes. Overlap on cross-joints and all detail is min. 50 mm, on longitudinal joints where the sheets are mechanically fastened, the overlap is 100 mm (if the width / diameter of the washers is more than 40 mm). If washers are wider, the overlap is increased accordingly.



The minimal continuous width of the joint is 30 mm when welded with hot air, 40 mm using THF solvent.

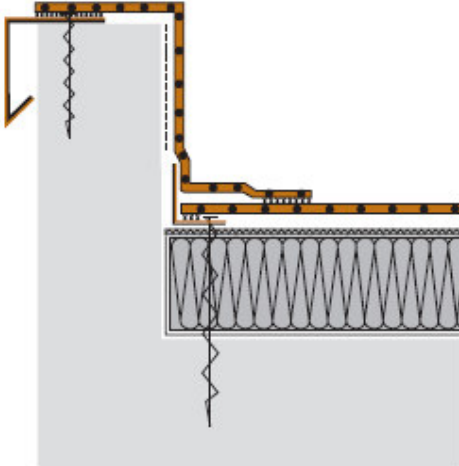
The up-stands are always covered by separate flashing strips achieving a vertical girth of min. 150 mm over the field sheet (or the ballast where applicable). Flashing strips can be left loose up to a height of 500 mm. On heights in excess of 500 mm an intermediary fixing has to be installed.

For lower up-stands or wall flashings an aluminum rail with a mastic seal is the most appropriate finish.

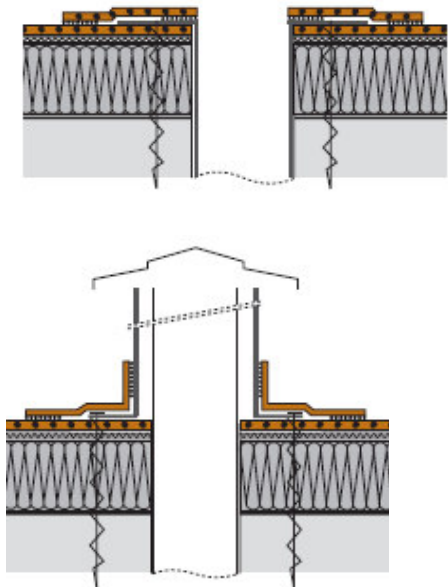


Minimum distance between fasteners is 120 mm / maximum distance between fasteners is 250 mm.

The best way of finishing the parapet flashing is the installation of an L-shaped profile with a dripping edge made to measure from PVC-coated metal.

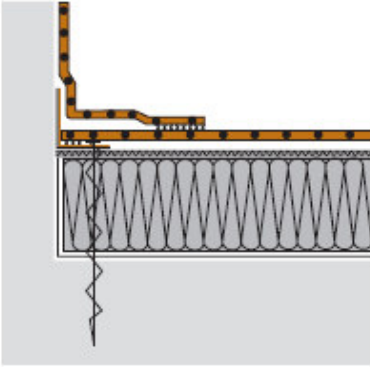


The use of prefabricated corners and integrated Monarplan collars at rainwater outlets and other detail elements is strongly recommended.



In mechanically fastened system a continuous perimeter fixing has to be installed using either a profile of PVC coated metal or with regular roofing fasteners placed in the same pattern as in the adjacent zone of the roof (corner or external perimeter zone) according to the wind up-lift calculation.

PVC coated metal profile



Single fixings

