The procedures used in a renovation job are influenced by many factors. This publication cannot cover all the cases that can arise, also because each job has its own history, but it is possible to summarise the most frequent situation, providing indications of a general nature. Furthermore, this publication is focused primarily on roof renovation with a bituminous waterproof covering.

The layer structure of a roof can be degraded by:
• the natural aging process of the waterproof covering.
• the use of unsuitable materials, or poor execution of the installation work.
• design errors regarding the choice of materials and the links between layers and/or the order in which the layers are applied, in relation to the climate conditions, the internal microclimate, the mechanical stresses, etc.

The renovation wall as far as possible be directed towards recovering existing roofing layers, and so first of all it is important to establish what the causes of the degradation are, since an incorrect assessment of the problem may have further unpleasant consequences.

Intervention procedures. The principal factors that determine the choice of type of intervention are:
• the sequence and nature of the layers that make up the roof package, particularly regarding:
  – the presence of thermal insulators;
  – the type of roof that constitutes the substructure of the thermo-waterproofing system in the broadest possible sense: the pitch, the use to which the roof is put, the mechanical stresses generated by dilations, etc;
  – the hygrothermal implications, especially when an incorrect assessment of these situations has caused the disruption.
• the external climate: chemical aggressions due to industrial environments, wind, areas subject to hail, etc.
• the protections applied on top of the waterproof covering, floor, protections in gravel, paint, self-protected coverings with slate granules or metal foil.
• the type of degradation that the waterproof covering has suffered.
The conservative renovation and consequent prolongation of the useful life of the waterproof covering is a fundamental criterion of sustainable building.

This publication applies to cases of renovation without demolition, when the old layer structure can be maintained in situ.

- Demolition of the existing layer structure, should, for both economic and environmental reasons, be the last solution to be considered!!
- Full demolition should only be considered in the presence of a layer structure that includes fibrous thermal insulation which is disintegrating and heavily impregnated with water. Deferring demolition works and the consequent reduction in waste over time that results from this is a fundamental criterion of sustainable building. The disposal of waste, and the costs of this, are increasingly problematic, and so it makes sense to avoid the full demolition of the old layer structure.

The technical, economic and environmental advantages of avoiding demolition of the existing covering:

- INDEX polymer bituminous membranes allow the life of old bituminous coverings to be extended (TLE) by “complete overlay” of the new membrane without demolition and consequent accreditation of LEED credits in accordance with the GREEN BUILDING COUNCIL criteria.
- The great advantage of bituminous coverings is that they can be regenerated with membranes of the same nature, increasing their “useful life” 2 or 3 wrinkle, reducing the costs of demolition and waste disposal, over time.
- With a renewal layer that adheres to the old covering, the waterproof function of the existing roof is recovered, and the covering is more resistant.
- The layer structures described below all roofs to be renovated, eliminating the environmental impact of waste in accordance with the criteria of sustainable building.

GBC ITALIA (Green Building Council) AND LEED CERTIFICATION

GBC Italia, which INDEX belongs to, has the task of using the common guidelines to everyone in the LEED international community to develop the characteristics of the LEED Italia system, which must take into consideration the specific climatic, building and legislative conditions in Italy.

LEED opts for a view of sustainability by making the most of all possibilities to reduce the various kinds of environmental impacts and harmful emissions of the buildings being built.

The LEED standards are parameters for sustainable building developed in the USA and applied in 40 countries throughout the world. They indicate the requirements for eco-compatible buildings, able to “work” sustainably and self-sufficiently energy-wise. It is essentially a rating system for the development of “green” buildings.

LEED is a certification, which may be obtained on a voluntary basis, where the actual designer deals with collecting the data for the assessment. The system is based on the award of credits for each of the requirements that characterise the sustainability of the building.

The certification level obtained comes from the sum of the credits.

The assessment criteria used by LEED (2009 version) are grouped into six categories (+1 only valid in the USA), which envisage one or more compulsory prerequisites and a number of environmental performances that attribute the building’s final score:

- Sustainable sites (1 prerequisite, 26 points)
- Efficient water consumption (1 prerequisite, 10 points)
- Energy and atmosphere (3 prerequisites, 35 points)
- Materials and resources (1 prerequisite, 14 points)
- Indoor environmental quality (2 prerequisites, 15 points)
- Innovation and design process (6 points)
- Regional priority (4 points) only applicable in the USA

There are 4 rating levels:
- basic certification between 40 and 49 points
- Silver: between 50 and 59 points
- Gold: between 60 and 79 points
- Platinum: more than 80 points

In the following point of the LEED regulations:

- LEED- MR Credit 1.1: Building Reuse
  Maintain Existing Walls, Floors and Roof

The removable layers recommended in INDEX technical publications arrow roofs to be renovated with the minimum environmental impact and less waste: multifunctional green terraces, walkways and carriageways with prefabricated separation walls, paving on HELASTORING, load-bearing roofs with self-locking blocks, “inverted roofs”, “complete overlay” of new membranes on old coverings without demolition, etc.
Sequence and nature of the layers that make up the old system, and their influence on work procedures and procedures

- Presence of thermal insulation in panels
  Firstly, whether or not the insulation can continue to fulfill its functions without compromising the result of the repair works must be established. Fibrous insulation materials that are thoroughly soaked, or by nature susceptible to great dimensional change or disintegration in the presence of damp definitely have to be removed. The same applies to insulation materials that present warping phenomena that prejudice the seal of the waterproof layer, while a cellular insulation material that absorbs little water and does not deform may be left in place, promoting drying by the insertion of a FUGATOR extractor every 40 50 m² (see figure).

- Thermo-hygrometric implications
  Renovation works must very often solve problems caused by insufficient attention having been paid to the hygrothermy of the roof. Insufficient thermal resistance of the roof, with consequent discomfort for occupants, and condensation, often mistaken for leaks in the waterproof covering, incorrect stratification or the absence of certain layers, the vapour barrier, can require the insertion of an insulation layer as solution, in the renovation works. The general tendency is to use the old covering as "vapour barrier" (after rewatertproofing it), followed by an insulating layer and its waterproof protection. It is also necessary to take account of the resistance to vapour diffusion of both the existing layers and the materials used in the renovation. It is always advisable to remove the foil of an old covering with metal self-protection, before starting renovation, to allow the water trapped underneath it to diffuse without difficulty, and coverings with metal foils should not be used in the renovation work for the same reason.

The climate: an element for consideration in renovation work

Areas subject to strong winds and violent hailstorms presuppose adequate roofing systems. Not paying attention to these issues causes considerable damage, so repair of the waterproofing and insulation systems should take them into account. In the case of windy areas, effective fixing must be ensured, obtained by mechanically attaching the old covering, after the necessary repairs, with nails fitted with large washers. The new covering may then be laid on top of this. In areas subject to violent hail storms, the new covering may be protected by a layer of gravel, or reinforced with an impact-resistant multilayer composite membrane MINERAL PROTEADUO POLIESTERE 25/5.

Reptation of exposed waterproof coverings.

Bituminous waterproof coverings, like all materials, shrink when cold and dilate when warm. When cold, the bituminous membrane contracts with strength that can be measured with the impeded thermal contract test, conducted on a dynamometer equipped with a climate chamber, in which a sample of material held in the jaws of the machine without force is then cooled to -25°C. As it shrinks, the sample pulls the jaws, and the force it exerts can be measured. Depending on the reinforcement material, and the thickness and characteristics of the bituminous mixture, this force can reach values of up to 500 kg per meter. See the figure below.

Now, if the roof membranes are thought of as having bonded together to form a single membrane that covers the whole surface of the roof, which contracts with the cold towards its geometric centre, the force is exerted on the area where it is bonded, for example, at the raised perimeter edges. If not bonded homogeneously, wrinkles can form.

Coverings laid on slabs made up of modular elements, or insulating panels of various sizes, show signs of fatigue phenomena along the panel joint lines, which causes cracking. So it is important to use the partial independence joint technique and fatigue resistant materials in the renovation of the covering. The same applies in the case of incorrect stratification of the elements that make up the roof package, the case of a sloping screed laid on thermal insulation, the screed breaks because of the great changes in temperature, and the cracks propagate to the waterproof covering; in renovating this, the same considerations as the previous case should apply.

The absence of a vapour barrier and insufficient insulation may be correct by overlaying a new layer of higher performing insulation, but only after a careful thermo-hygrometric examination by a technician has confirmed that condensation will not develop in the new layer structure.

- Roof type
  In analysing the type of work, the type of roof to be covered also needs to be taken into account. Concrete-cement slabs, especially predalles, retain a lot of water, and so it is often necessary to pierce the intrados of the slab to allow water trapped in the slap to exit. The water will continue to percolate for a long time, even after water trapped in the slap to exit. The water will percolate for a long time, even after water trapped in the slap to exit. The water will continue to percolate for a long time, even after

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**Technical specifications**

**CONSERVATIVE RENOVATION**

**PRE-EXISTING SITUATION**

**ROOFS WITH EXPOSED WATERPROOF COVERING**

**MINERAL PROTEADUO POLIESTERE 25/5.**
This phenomenon is typical of exposed waterproof membranes without heavy protections, which are directly subject to great changes in temperature. Consider that in the winter, during clear starry nights the surface of the covering darkens visibly, and quickly loses heat through radiation to the sky, reaching temperatures that are lower than the surrounding air. In warmer climates with mild winter temperatures, the phenomenon is almost negligible. As shown in the figure below, in the contraction movement towards the centre of the roof, the waterproof covering tends to drag the insulating panels to which it is bonded along with it. Naturally, if these panels are well bonded, and properly laid, they will not move, but the weaker and more uneven the bonding and, if the panels are also not well laid, the more strongly will the waterproof covering drag them with it towards the centre of the roof, detaching them from the raised perimeter edges, forming wrinkles along the lines between the insulating panels. The progressive movement of the covering, similar to the way reptiles move, towards the centre of the roof, and other similar phenomena generated by the different insulation of the covering, is defined with the term **reptation**. The phenomenon is progressive, because each lowering of the temperature centres the waterproof covering more and more. The problem is that when the waterproof covering warms up again, the bituminous mixtures softens, and no longer has the strength to drag the covering back into its initial position, so it remains deformed. The engine of the phenomenon is the bituminous component of the covering, which contracts strongly when cold, and dilates much less strongly when warm.

In the materials selection phase, the fact that the thicker the waterproof covering the greater the force exerted when it is cold should be born in mind. Synthetic reinforcements POLIESTERE are not able to combat this phenomenon, which is only limited by glass-fibre reinforcement. In the design and execution phase, it should be recalled that:

- The more layers of covering above the vapour barrier are bonded together and to the support, the less deformation there will be.

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**REPTATION BETWEEN INSULATION AND SUPPORT**

- Areas of covering under tension
- Joining of loose insulating panels
- Gap between the panel and the perimeter walls

**PROGRESSIVE CENTRING OF THE COVERING AFTER CHANGES IN TEMPERATURE**

- Sudden changes in temperature
- Progressive centring of the verticals of the covering towards their respective geometric centres

**WRINKLES CAUSED BY CENTRING OF THE COVERING**

- Wrinkles
- Wrinkles
- Areas of covering under tension
- Wrinkles
- Wrinkles
- Joining of loose insulating panels
- Wrinkles
- Wrinkles
- Wrinkles
- Wrinkles
- Gap between the panel and the perimeter walls
The centring of the covering causes wrinkles across the joins of poorly aligned panels.

Large roofs are more subject to the phenomenon, which manifests itself with wrinkles at the corners of the roof and at the foot of all fixed bodies emerging from the roof, skylights, chimneys, pipes, etc.

Sudden changes in temperature.
PROTECTIONS, SPECIFIC OPERATIONS OF THE PROTECTIONS

Protection is the last layer of the roof. Its task is to protect the underlying elements against atmospheric agents, mechanical stresses, etc. It can consist of a simple paint layer applied to the waterproof covering, bituminous sheets coated in granules of slate or other minerals, or bituminous sheets coated with metal foils (copper, aluminium). The types listed above are defined as light protections, while protections composed of layers of gravel or floor are defined as heavy protections. The presence of these layers, and their conditions, require preliminary operations to be carried out before the new covering is laid.

• Bituminous coverings without protection
  INDEX thermoadhesive TECTENE membranes for renovations adhere with light torch-bonding to old black bituminous coverings without protection that are clean and dry. Without the application of the prior application of primer. The same applies to FLEXTER TEX series membranes applied with MASTIPOL cold adhesive.

• Bituminous coverings protected with paint
  After brushing the painted surfaces to remove flaking parts, check that the old paint applied to the bituminous layer is, although peeling, properly adherent, and if it is, innovative membranes for renovations MINERAL TECTENE RINOVA, MINERAL TECTENE REROOF STRIP, TECTENE REROOF BASE STRIP E VAPORDIFFUSER STRIP will adhere by light torch-bonding without surface treatment with primer, after applying a layer of a special thermoadhesive mixture to the lower face of the membrane. In general, old aluminium paints do not cause problems, while in the presence of thick recent coats of resin-based paints, the resin film of the paint can swell and become detached when the flame is applied. In this case the resistance of the paint to the light torch-bonding used for the membranes mentioned above should be checked in advance, and if not then the surface must be treated with the prior application of INDEVER PRIMER E at a thickness of approximately 300 g/m². If the paint is extremely sensitive to heat, even when protected by the primer FLEXTER TEX series membranes may be used, applied with MASTIPOL cold adhesive, and with the lower face of the membrane bonded to a special non-woven fabric, Texflamina, which guarantees maximum grip of the adhesive.

• Bituminous coverings protected with metal foils
  The metal foil must be removed by heating it gently with a gas flame to melt the underlying bitumen, enabling the foil to be peeled off easily.

MEMBRANE WITH ALUMINIUM FOIL
REMOVAL OF THE ALUMINIUM FOIL

• Bituminous coverings protected with floor
  In the case of small terraces, it is almost always better to cover the old floor with a new waterproof layer, bonded to the old floor, with tiles applied directly to this structure. In this case, liquid products COVERCOL AB RAPID or UNOLASTIC, or self adhesive SELFTENETIME membrane can be used. For larger areas, and if there is a sufficient thickness, the old floor is waterproofed with membranes, on which a floating floor with prefabricated HELASTORING squares on plastic support, are installed unsealed, to maintain the level of runoff of rainwater on the waterproof covering.
- Bituminous coverings protected with layers of gravel

It is expensive to transport and dispose of the gravel layer. Gravel; not only acts as ballast, in unbonded coverings, it also protects them from solar radiation, changes in temperature, and hail, and act as hydraulic flywheels when there is heavy rain. So it is always better to maintain them in situ. In this case the old covering will be renovated in sections, temporarily moving the gravel and then replacing it as soon as the uncovered area has been renovated.

Gravel protection is typical of roofs waterproofed with synthetic sheets laid without adhesive, which are often used with revere roof thermal insulation. In all cases, since the systems are not glued, the work procedure described above can be used, provided that, in the case of a synthetic covering, it is removed from the vertical parts to a height of at least 50 cm above the plane at the foot of the parts, and cut every 3 – 4 m, with the insertion of a layer of ROLLBASE HOLLAND laid without adhesive between the synthetic sheet and the new covering of distilled bitumen polymer membrane. The new covering will be left loose, and glued only at the protruding edges and at the foot of the vertical parts. The old extruded polystyrene insulation may be recovered and re-ballasted with the gravel already on the roof.

**Preliminary Works to Restore the Old Waterproof Covering**

Before proceeding with the restoration work, firstly, the bituminous covering that has reached the end of its life but is still waterproof, flat and adhering to the support with a few defects limited to the odd bubble and a few small cracks with no damp trapped between the layers of which it is composed, on which the new covering can be bonded in full adhesion, must be distinguished from covering that adheres poorly, with leaks and significant creasing, and which is considered capable of retaining damp between the layers.

In the first case, after repairing the cracks with a torch-bonded strip of membrane, and flattening the bubbles with crossed slashes covered with a patch of membrane bonded in the same way, MINERAL TECTENE RINOVA can be torch-bonded on with full adhesion, or a FLEXTER TEX series membrane can be glued with Mastipol adhesive, without the prior application of primer.

However, the traditional system of torch-bonding standard membranes to the old covering, after treatment with INDEVER **primer remains valid.** In the case of a covering that is wrinkled because it is not well bonded, it is likely that water has penetrated between the layers, through the opening of an overlap with wrinkles, and that water remains trapped that can generate bubbles of steam in the sun, if the new covering is bonded with full adhesion (see figure).
The same thing can happen when the finishing layer of the old covering is a slated membrane reinforced with glass-fibre and bonded to a membrane reinforced with non-woven Polyester fabric. The old covering may well not leak, but the top slated later is cracked, and water has penetrated between the layers. In this case, too, a new covering bonded in full adhesion may generate steam bubbles (see figure to side).

In the cases mentioned above, the new covering must be bonded in semi adhesion, so that the water vapour that develops can diffuse without creating bubbles.

At the same time, the bond, even though partial, must be able to resist the action of the wind, and for this Index has developed specific membranes that are bonded in semi adhesion to the old covering even without the use of primer, and which are wind resistant.

These are membranes whose lower surfaces are coated with a special thermoadhesive elastomer mixture that guarantees strong and elastic adhesion for 40% of the surface.

The strip bonding of a membrane to a nailed insulation panel has successfully resisted the maximum level of 10kPa of the wind resistance test specified in standard EN 16002.

The test is transferable to all the types produced with the same strip configuration of the lower face, and the exceeding of the maximum level of the new covering means that, to obtain a renovation with the maximum wind resistance, all the attention should be focussed on the safe and effective stabilisation of the old covering. Briefly, the wind resistance of the renovation work is entirely dependent on how the old covering is attached.
STABILISATION OF THE OLD CORRUGATED COVERING

A covering that is corrugated because it is badly bonded can be maintained on the roof, avoiding demolition, by stabilising it using mechanical fixings with the operations illustrated to the side. The parts of the membrane under tension at the base of the protruding parts are cut, and the unbonded covering of the vertical parts is removed. All the corrugations of the covering are flattened and the covering is rebounded to the support. During the wrinkle-cutting and flattening operations, avoid trapping water between the layers, and dry the support before bonding the layers.

1. Cutting the wrinkles and bonding the layers

2. Nailing the covering at the edges and cross-wise in 4 or more sectors.

3A

3B. Nailing – in groups of 5 across the whole surface of the covering.
Renovation in full adhesion is applied to old coverings that are near the end of their life, but still waterproof and damp-free.

With thermahesive membrane, without primer coat

After repairing the old covering, the distilled bitumen polymer membrane MINERAL TECTENE RINOVA EP POLIESTERE, self-protected with slate granules, based on distilled bitumen, elastomers and polyolefin copolymers, with composite reinforcement composed of non-woven Polyester fabric stabilised with glass-fibre, with a thermahesive elastomer mix spread on the lower face, will be torch-bonded in full adhesion without the prior application of primer. The sheets of membrane unrolled along in parallel the line of maximum pitch, should be overlapped 10 cm longitudinally and 15 cm at the top, and continuously torch-bonded to the substructure and along the overlaps. The waterproof covering will be turned up and torch-bonded onto the vertical parts to a height of least 20 cm above the expected water level.
Renovation in full adhesion is applied to old coverings that are near the end of their life, but still waterproof and damp-free.

After repairing the old covering, the clean and dry substructure will be painted with a coat of approximately 300 g/m² of INDEVER bituminous adhesion primer, or alternatively ECOVER water-based primer. The distilled bitumen polymer membrane will then be torch-bonded in full adhesion. The sheets of membrane unrolled along in parallel the line of maximum pitch, should be overlapped 10 cm longitudinally and 15 cm at the top, and continuously torch-bonded to the substructure and along the overlaps. The waterproof covering will be turned up and torch-bonded onto the vertical parts to a height of least 20 cm above the expected water level. The following materials may be used:

- multi-layer composite distilled bitumen-polymer waterproofing membrane, self-protected with slate granules, made up of an upper layer in elastomeric polymer bitumen, a lower layer in elastomeric polymer bitumen and a stabilised three-layer composite reinforcement with fibreglass between two spunbond non-woven Polyester fabrics, impregnated with elastomeric polymer bitumen MINERAL PROTEADUO TRIARMATO, or a MINERAL PROTEADUO POLIESTERE HP 25 membrane with stabilised composite reinforcement with high perforation resistance in spunbond non-woven Polyester fabric, impregnated with elastomeric polymer bitumen.

Alternatively:

Alternatively:
- MINERAL FLEXTER TESTUDO SPUNBOND POLIESTERE elastomeric polymer distilled bitumen waterproofing membrane, self-protected with slate granules, on a distilled bitumen, elastoplastomer base, with composite reinforcement in spunbond continuous filament non-woven polyesther fabric stabilised with glass-fibre.

Alternatively:
- multifunctional MINERAL DESIGN 15 POLIESTERE elastoplastomer polymer distilled bitumen waterproofing membrane to decorate and develop the “design” of roofs with exposed coverings, self-protected with ceramised mineral granules in various designs obtained by combining two types of granules of different colours, with composite reinforcement in spunbond continuous filament non-woven fabric stabilised with glass-fibre.

Pitch 40 - 100%
For pitches of 40 to 100%, the bonding of the waterproof membrane should be supplemented by mechanical fixing using nails with 5 cm diameter washers every 20 cm, under the overlaps at the top of the last sheet. The body of the nail should be at least 5 cm from the edge of the lower sheet and at least 6 cm from the edge of the upper sheet.

Pitch 100%
The single layer membrane will be attached mechanically at the top, as previously indicated. The length of the sheets should not exceed 7 m.
Renovation in full adhesion is applied to old coverings that are near the end of their life, but still waterproof and damp-free.

After repairing the old covering, the following membrane will be cold-bonded in full adhesion with bituminous MASTIPOL solvent adhesive to the clean and dry substructure:

- **MINERAL FLEXTER TEX POLIESTERE** elastomeric polymer distilled bitumen waterproofing membrane, self-protected with slate granules, on a distilled bitumen, polyolefin elastomer and plastomer base, with composite reinforcement in spunbond continuous filament non-woven polyester fabric stabilised with glass-fibre, with the lower surface coated with a fine layer of polypropylene fibres bonded at high temperature. The sheets of membrane unrolled along in parallel the line of maximum pitch, should be overlapped 10 cm longitudinally and 15 cm at the top, and cold-bonded to the to flat parts with 1.0-1.2 kg/m² of cold adhesive applied without the prior application of primer. The membrane overlaps will be torch-bonded and the sheets will be turned up and torch-bonded to the vertical parts to a height of least 20 cm above the expected water level.

Alternatively, the following membrane may be applied with the same procedure:

- **fire resistant MINERAL FLEXTER FR TRIATEX POLIESTERE** polymer waterproofing membrane, self-protected with slate granules, on a base of selected distilled bitumen and polyolefin elastomer and plastomer polymers, self-extinguishing mineral additives with triple reinforcement of glass-fibre between two layers of spunbond continuous filament non-woven polyester fabric, with the lower surface coated with a fine layer of polypropylene fibres bonded at high temperature.
CONSERVATIVE RENOVATION

Renovation in full adhesion is applied to old coverings that are near the end of their life, but still waterproof and damp-free.

TWO-LAYER TORCH-BONDED IN FULL ADHESION

After repairing the old covering, the clean and dry substructure will be painted with a coat of approximately 300 g/m² of INDEVER bituminous adhesion primer, or alternatively ECOVER water-based primer.

The distilled bitumen polymer membrane will then be torch-bonded to the laying surface in full adhesion. The sheets of membrane unrolled along in parallel the line of maximum pitch, should be overlapped 10 cm longitudinally and 15 cm at the top, and continuously torch-bonded to the substructure and along the overlaps. They will also be turned up and torch bonded to the vertical parts.

The upper layer of the waterproof covering will be composed of a distilled bitumen-polymer waterproofing membrane, self-protected with slate granules. The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be turned up on the vertical parts to at least 20 cm above the water runoff plane.

The double layer systems provided are:

- **Double-layer waterproof covering with elastomeric membrane and multi-layer composite membrane made up of HELASTA POLIESTERE + MINERAL PROTEA DUO TRIARMATO or PROTEA DUO POLIESTERE HP25.**

  Alternatively:

  - **Double-layer waterproof covering with MINERAL HELASTA POLIESTERE elastomeric membrane + HELASTA POLIESTERE.**

    Alternatively:

    - **Single-layer waterproof covering with FLEXTER TESTUDO SPUNBOND POLIESTERE elastoplastomeric membrane. POLIESTERE + MINERAL FLEXTER TESTUDO SP.**

    Alternatively, the upper layer of MINERAL FLEXTER may be replaced by MINERAL DESIGN 15 POLIESTERE elastoplastomeric membrane.

- **Waterproof double-layer covering with FLEXTER FLEX TESTUDO SPUNBOND POLIESTERE elastoplastomeric membrane + MINERAL FLEXTER FLEX TESTUDO SPUNBOND POLIESTERE.**

**Pitch 40 - 100%**

For pitches of 40 to 100%, the bonding of the waterproof membrane should be supplemented by mechanical fixing using nails with 5 cm diameter washers every 20 cm, under the overlaps at the top of the last sheet. The body of the nail should be at least 5 cm from the edge of the lower sheet and at least 6 cm from the edge of the upper sheet.

**Pitch 100%**

For pitches of more than 100%, only the upper single layer membrane will be laid, attached mechanically at the top, as previously indicated. The length of the sheets should not exceed 7 m.

**PITCH**

- $P \leq 40\%$

  - 1. Old covering
  - 2. INDEVER or ECOVER primer
  - 3. HELASTA or FLEXTER TESTUDO or FLEXTER FLEX TESTUDO waterproof under layer.
  - 4. MINERAL PROTEA DUO TRIARMATO upper waterproof covering or MINERAL PROTEA DUO POLIESTERE HP 25 or MINERAL HELASTA or MINERAL FLEXTER TESTUDO or MINERAL DESIGN 15 or MINERAL FLEXTER FLEX TESTUDO waterproof under layer.

- $P \geq 100\%$

  - 1. Old covering
  - 2. INDEVER or ECOVER primer
  - 3. HELASTA or FLEXTER TESTUDO or FLEXTER FLEX TESTUDO waterproof under layer.
  - 4. MINERAL PROTEA DUO TRIARMATO upper waterproof covering or MINERAL PROTEA DUO POLIESTERE HP 25 or MINERAL HELASTA or MINERAL FLEXTER TESTUDO or MINERAL DESIGN 15 or MINERAL FLEXTER FLEX TESTUDO waterproof under layer.
A semibonded renovation is carried out on old waterproof coverings that adhere poorly to the support, where damp is possibly still trapped, especially between the layers of the old covering, causing the formation of bubbles if the new covering is bonded in full adhesion.

**WITH THERMOADHESIVE MEMBRANE IN PARTIAL ADHESION, WITHOUT A PRIOR APPLICATION OF PRIMER**

After cutting the parts of the old covering stretched at the base of the protruding parts, remove the covering that does not adhere to the vertical parts, cut and flatten all creases in the covering, re-attaching them to the support and, after stabilising the old waterproofing with mechanical fixing, torch-bonding to the clean and dry substructure without the prior application of primer.

- the thermoadhesive waterproofing membrane, self-protected with slate granules, in distilled bitumen elastoplastomeric polymer TECTENE REROOF EP STRIP POLIESTERE, based on distilled bitumen, plastomers and elastomers, with composite reinforcement in non-woven polyester fabric stabilised with fibreglass, self-protected with slate granules, with 40% of the lower face coated with bands of special elastomer thermoadhesive which, adhering only partially by torch-bonding, will allow the damp trapped in the old covering to diffuse, avoiding bubbles and condensation. The sheets will be turned and overlapped 10 cm longitudinally covering the slate-free overlap strip provided on the top surface of the membrane, with an overlap of approximately 15 cm transversally at the top. After aligning and rearranging the sheets, they will be bonded by heating the lower face of the sheet with a propane gas torch, activating the adhesive properties of the bands of thermoadhesive. The overlaps of the sheets will be torch-bonded at the same time. The vertical parts, previously treated with a coat of INDEVER bituminous solvent primer to at least 20 cm higher than the maximum expected water level, will be covered with a torch-bonded bitumen elastoplastomeric polymer waterproofing membrane, with reinforcement in spunbond continuous filament non-woven polyester, self-protected with slate granules, MINERAL TESTUDO SPUNBOND POLIESTERE of 4.5 Kg/m². The angle between the flat and vertical part will be reinforced by torch-bonding across the corner a 20 cm wide 4 mm thick strip of smooth membrane of the same type as the previous TESTUDO SPUNBOND POLIESTERE 16 membrane to be applied before the vertical parts are covered.

Alternatively, the following may be used as an alternative to MINERAL TECTENE REROOF EP STRIP POLIESTERE, applied using the same procedure:

- thermoadhesive waterproofing membrane, self-protected with slate granules TECTENE REROOF EP STRIP POLIESTERE in distilled bitumen elastoplastomeric polymer, based on distilled bitumen, plastomers and elastomers, with composite reinforcement in non-woven polyester fabric stabilised with fibreglass, self-protected with slate granules, with 40% of the lower face coated with bands of special elastomer thermoadhesive. In this case, the vertical parts will be covered with a 4.5 Kg/m² MINERAL HELASTA POLIESTERE elastomeric polymer-distilled bitumen waterproofing membrane, with a radial butadiene-styrene thermoplastic rubber and distilled bitumen base, reinforced with spunbond non-woven polyester fabric, self-protected with slate granules, while the angle between the flat and vertical parts will be reinforced by torch-bonding across the corner a 20 cm wide 4 mm thick strip of HELASTA POLIESTERE membrane of the same elastomeric nature.

**Pitch 15-40 %**

For pitches of 15 to 40%, the bonding of the waterproof membrane should be supplemented by mechanical fixing using nails with 5 cm diameter washers every 20 cm, under the overlaps at the top of the last sheet. The body of the nail should be at least 5 cm from the edge of the lower sheet and at least 6 cm from the edge of the upper sheet.
A semibonded renovation is carried out on old waterproof coverings that adhere poorly to the support, where damp is possibly still trapped, especially between the layers of the old covering, causing the formation of bubbles if the new covering is bonded in full adhesion.

After cutting the parts of the old covering stretched at the base of the protruding parts, remove the covering that does not adhere to the vertical parts, cut and flatten all creases in the covering, re-attaching them to the support and, after stabilising the old waterproofing with mechanical fixing, torch-bonding to the clean and dry substructure without the prior application of primer.

- the TECTENE REROOF BASE STRIP EP POLIESTERE thermoadhesive waterproofing membrane in distilled bitumen elastoplastomeric polymer, based on distilled bitumen, plastomers and elastomers, with composite reinforcement in non-woven polyester fabric stabilised with fibreglass, with 40% of the lower face coated with bands of special elastomer thermoadhesive which, adhering only partially by torch-bonding, will allow the damp trapped in the old covering to diffuse, avoiding bubbles and condensation.

Alternatively, the same procedures may be used to apply:
- the distilled bitumen elastoplastomeric polymer waterproofing membrane VAPORDIFFUSER STRIP/V, reinforced with glass-fibre, with 40% of the lower face coated with bands of elastomer thermoadhesive.

The sheets will be turned and overlapped 10 cm longitudinally and 15 cm transversally at the top. After aligning and rearranging the sheets, they will be bonded by heating the lower face of the sheet with a propane gas torch, activating the adhesive properties of the bands of thermoadhesive. The overlaps of the sheets will be torch-bonded at the same time.

The angle between the flat and vertical part will be reinforced by torch-bonding across the corner a 20 cm wide 4 mm thick strip of smooth membrane of the same type as the slated membrane to be used as the upper layer, reinforced with non-woven polyester fabric to be applied before the vertical parts are covered.

The upper layer of the waterproof covering will be composed of a distilled bitumen-polymer waterproofing membrane, self-protected with slate granules. The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be turned up on the vertical parts to at least 20 cm above the water runoff plane.

The following membranes can be used as the upper layer of the two-layer system:
- MINERAL PROTEADUO TRIARMATO multilayer composite membrane or, alternatively, MINERAL PROTEADUO POLIESTERE HP25.
  Alternatively:
- MINERAL HELASTA POLIESTERE elastomeric membrane;
  Alternatively:
- MINERAL FLEXTER FLEX TESTUDO SPUNBOND POLIESTERE elastoplastomeric membrane.
  Alternatively:
- MINERAL FLEXTER TESTUDO SPUNBOND POLIESTERE elastoplastomeric membrane.
  Alternatively:
- MINERAL DESIGN 15 POLIESTERE elastoplastomeric membrane.
Renovation of roofs with exposed covering destined for the installation of photovoltaic systems

Introduction

Roofs are particularly suitable for use for the production of electrical energy from the sun, primarily flat roofs, since it is easier to orient the system in the most favourable position for the highest coverage from the photovoltaic panel. A photovoltaic system must last at least 20 years, and subsequent renovation of the photovoltaic system may be limited to only the replacement of the photovoltaic module, leaving the metal frame to which it is hooked in place. The frame itself may be fixed to the roof through the layers of waterproofing. For this reason it is important to use a two layer system, and a long lasting membrane. After careful analysis of the existing covering, which may be in poor condition, or close to expiry in terms of its guarantee, complete renewal of the covering may be opted for, or in the case of bituminous coverings, simple renovation by “complete overlay” on top of the existing waterproofing.

Constitution of the layers of waterproofing of roofs destined for the installation of photovoltaic systems with exposed covering resistant to external fire.

Exposed roof coverings are more stressed, because they are directly exposed to the weather, and if it is fitted under a photovoltaic system that must last more than 20 years it is important to choose long lasting membranes. The PRO-TEADUO, HELASTA and FLEXTER FLEX TESTUDO membranes proposed in this publication are all covered by the Agrément ITC-CNR (former ICITE) which certifies their durability and related constant periodic inspections. Although the proposed membranes can be laid in a single layer 4 mm thick in compliance with their CE marking, it has become common practice to lay a double layer to achieve a higher degree of safety, required by the installation of photovoltaic panels, and in relation to the fact that repair work in the event of defect in the covering under the photovoltaic system is increasingly expensive. A further reason to apply a double layer is to achieve the higher resistance to fire from outside the waterproof covering required by the Guide for the installation of photovoltaic systems annexed to the circular on the fire prevention requisites of photovoltaic systems installed on the roofs of buildings in which active fire fighting equipment and fire prevention control take place, issued by the Fire Brigade Department of the Italian Ministry of the Interior on 07/02/2012 and subsequent updated issued on 04/05/2012. In this case a membrane classified as B2 (t2) according to UNI EN 13501-5:2009 should be used as the top layer of the new waterproof system, base don the results of the tests of roofs exposed to external fire in accordance with UNI ENV 1187:2007. In this way, in accordance with the fire brigade clarification circular of 04/05/2012, class 2 fire reaction photovoltaic panels can be used without the need for further tests of the reaction to fire of the roof to at least EI 30. The FIRESTOP POLIESTERE membrane is applied as top layer. This gives B2 (t2) classification to the underlying layers, practically to any laying surface. FIRESTOP POLIESTERE membrane is classified B(t2) in accordance with UNI EN 13501-5:2009 on both combustible and incombustible laying surfaces. The Broof (t2) classification is the only one with the most developed rules for the extension of the field of application of the membrane tested on different substrates, while the other classifications B(t1), B(t3) e B(t4) do not provide any possibility of extension of the certificate to systems other than those tested (even just changing the thickness of the insulate can invalidate the certificate). FIRESTOP POLIESTERE is the fire resistant membrane with the broadest field of application. In fact, the certification applies:

• to any pitch of roof;
• on any laying surface, combustible or non-combustible, provided its density is >16 kg/m².

From the above, it may be deduced that the certification of FIRESTOP POLIESTERE applies for both flat and sloping roofs.

Renovation with transformation into a green roof

When the load-bearing capacity of the structure permits, the transformation of a roof into a green roof is an operation that is undertaken increasingly often, both to reduce the environmental impact of a building and to lower and the irrigation system simpler. An “extensive green roof” always requires thermal insulation, so

Green Roofs

Renovation of roofs with exposed covering destined for the installation of photovoltaic systems

Introduction

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**TERRACES**

Renovation of terraces without demolition

In new buildings it often happens that, when construction has finished, there is insufficient depth on balconies and terraces for a slab to be laid. The same applies to renovations, when attempting to avoid demolition of the old floor, often with the additional problem of application to small surface areas, and in situations where it is not practical to use a torch, or when use of a torch could damage the existing surface.

- With COVERCOL AB RAPID
  - Page 22
- With SELFTENETile
  - Page 24
- With UNOLASTIC
  - Page 23
- With floating floor on HELASTORING.
  - Page 25

**TRAPEZOIDAL SHEET AND WOOD**

Renovation on supports in trapezoidal sheets and in wood

On roods in trapezoidal sheeting and in wood, supports that can be nailed, it is best to stabilise the old layers by mechanical fixing ROLLBASE POLIESTERE/V to the whole surface. This is a membrane with high resistance to nail damage and characterised by the fact that there lower face is covered with a bare non-woven polyester fabric that creates a microcavity between the membrane and the substructure, through which the damp trapped in the old layers may diffuse without causing bubbles. Once the membrane has been nailed down, it constitutes a safe and stable base to which the new renovation layer can be bonded, since this will preferably be composed of elastomeric membrane with a higher elastic return, given the higher deformability of the supports considered.

- Single layer on ROLLBASE
  - Page 26
- Two layer on ROLLBASE
  - Page 27

**PARKING**

Conservative renovation

Also in case of renovation of parking roofs, when the level of the protrusions and access thresholds permits, it is always advisable to avoid demolition work and the cost of waste disposal by laying a new waterproof membrane directly on the old floor in asphalt or concrete. If laying on old concrete floor, it is preferable to choose to lay the membrane in partial adhesion to avoid the formation of bubbles that might develop before the new floor has been laid, because of damp trapped in the foundation, while if laying on old asphalt that is sufficiently porous, the membrane can be laid in full adhesion, and this type of bonding will always be used if renovating parking access ramps.

- Two layer in partial adhesion under new concrete paving.
  - Page 28
- Two layer in partial adhesion under new concrete paving.
  - Page 29
- Single layer in full adhesion under new paving in bituminous conglomerate.
  - Page 30
After repairing the old covering, the clean and dry substructure will be painted with a coat of approximately 300 g/m² of INDEVER bituminous adhesion primer, or alternatively ECOVER water-based primer.

The following will then be torch-bonded in full adhesion:

- the 4 mm thick distilled bitumen polymer waterproof membrane, reinforced with non-woven polyester fabric, certified with Agrement/DVT of the ITC-CNR (former ICITE). The sheets of membrane unrolled along in parallel the line of maximum pitch, should be overlapped 10 cm longitudinally and 15 cm at the top, and continuously torch-bonded to the substructure and along the overlaps. They will also be turned up and torch bonded to the vertical parts. The following membranes may be used as alternatives:
  - MINERAL PROTEADUO TRIARMATO multilayer composite membrane or alternatively MINERAL PROTEADUO POLIESTERE HP25.
  - HELASTA POLIESTERE distilled bitumen elastomeric polymer membrane.
  - FLEXTER FLEX TESTUDO SPUNBOND POLIESTERE distilled bitumen elastoplastomeric polymer membrane.

The upper layer of the waterproof covering will be composed of a FIRESTOP POLIESTERE distilled bitumen polymer waterproofing membrane, self-protected with slate granules, with Broof (T2) classification of resistance to external roof fires on both combustible and non-combustible laying surfaces (according to UNI EN 13501-5:2009 fire classification of construction elements and products - part 5: classification based on the results of tests exposing roofs to external fire according to UNI ENV 1187:2007). The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be turned up on the vertical parts to at least 20 cm above the water runoff plane.

Pitch 40% – 100%

For pitches of 40 to 100%, the bonding of the waterproof membrane should be supplemented by mechanical fixing using nails with 5 cm diameter washers every 20 cm, under the overlaps at the top of the last sheet.
After cutting the parts of the old covering stretched at the base of the protruding parts, remove the covering that does not adhere to the vertical parts, cut and flatten all creases in the covering, re-attaching them to the support and, after stabilising the old waterproofing with mechanical fixing. The angle between the flat and vertical part will be reinforced by torch-bonding across the corner a 20 cm wide 4 mm strip of smooth membrane of the same type to be used as the next layer which will be applied before the flat area is covered.

The thermoadhesive waterproofing membrane in distilled bitumen elastoplastomeric polymer VAPORDIFFUSER STRIP/V, based on distilled bitumen, plastomers and elastomers, reinforced with fibreglass, with 40% of the lower face coated with bands of thermoadhesive which, adhering only partially by torch-bonding, will allow the damp trapped in the old covering to diffuse, avoiding bubbles and condensation, will be torch-bonded to the clean and dry laying surface without a prior application of primer. The sheets will be unrolled on the flat part until the connect with the reinforcement strip previously arranged on the corner between the flat and vertical surfaces, and will be turned and overlapped 10 cm longitudinally with a 15% overlap transversally at the top. After aligning and rearranging the sheets, they will be bonded by heating the lower face of the sheet with a propane gas torch, activating the adhesive properties of the bands of thermoadhesive. The overlaps of the sheets will be torch-bonded at the same time. The following will then be torch-bonded in full adhesion:

- the 4 mm thick distilled bitumen polymer waterproof membrane, reinforced with non-woven polyester fabric, certified with Agrement/DVT of the ITC-CNR (former ICITE). The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be anchored at the foot of the vertical parts. The following membranes may be used as alternatives:
  - MINERAL PROTEADUO TRIARMATO multilayer composite membrane or alternatively MINERAL PROTEADUO POLIESTERE HP25.
  - HELASTA POLIESTERE distilled bitumen elastomeric polymer membrane.
  - FLEXTER FLEX TESTUDO SPUNBOND POLIESTERE distilled bitumen elastoplastomeric polymer membrane.

The upper layer of the waterproof covering will be composed of a FIRESTOP POLIESTERE distilled bitumen polymer waterproofing membrane, self-protected with slate granules, with Broof (2) classification of resistance to external roof fires on both combustible and non-combustible laying surfaces (according to UNI EN 13501-5:2009 fire classification of construction elements and products - part 5: classification based on the results of tests exposing roofs to external fire according to UNI ENV 1187:2007). The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be turned up on the vertical parts to at least 20 cm above the water runoff plane.

**Pitch 15-40 %**

For pitches of 15 to 40%, the bonding of the waterproof membrane should be supplemented by mechanical fixing using nails with 5 cm diameter washers every 20 cm, under the overlaps at the top of the last sheet.
Renovation in full adhesion is applied to old coverings that are near the end of their life, but still waterproof and damp-free.

After repairing the old covering, the clean and dry substructure will be painted with a coat of approximately 300 g/m² of INDEVER bituminous adhesion primer, or alternatively ECOVER water-based primer.

The following will then be torch-bonded in full adhesion:

- **FLEXTER TESTUDO SPUNBOND** 4 mm thick distilled bitumen elastoplastic polymer waterproofing laying surface membrane

The sheets of membrane unrolled along in parallel the line of maximum pitch, should be overlapped 10 cm longitudinally and 15 cm at the top, and continuously torch-bonded to the substructure and along the overlaps. They will also be turned up and torch bonded to the vertical parts.

The upper layer of the waterproof covering will be composed of a **4 mm thick DEFEND ANTIRADICE POLIESTERE** distilled bitumen elastoplastic polymer waterproofing membrane, with antirroot agent additives.

The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be turned up on the vertical parts to at least 20 cm above the water runoff plane.
A semibonded renovation is carried out on old waterproof coverings that adhere poorly to the support, where damp is possibly still trapped, especially between the layers of the old covering, causing the formation of bubbles if the new covering is bonded in full adhesion.

After cutting the parts of the old covering stretched at the base of the protruding parts, remove the covering that does not adhere to the vertical parts, cut and flatten all creases in the covering, re-attaching them to the support and, after stabilising the old waterproofing with mechanical fixing. The angle between the flat and vertical part will be reinforced by torch-bonding across the corner a 20 cm wide 4 mm strip of smooth membrane of the same type to be used as the finishing layer which will be applied before the first layer is applied to the flat area.

It will be torch-bonded to the clean and dry laying surface, without the prior application of primer.

- the TECTENE REROOF BASE STRIP EP POLIESTERE thermoadhesive waterproofing membrane in distilled bitumen elastoplastomeric polymer, based on distilled bitumen, plastomers and elastomers, with composite reinforcement in non-woven polyester fabric stabilised with fibreglass, with 40% of the lower face coated with bands of special elastomer thermoadhesive which, adhering only partially by torch-bonding, will allow the damp trapped in the old covering to diffuse, avoiding bubbles and condensation.

The sheets will be unrolled on the flat part until the connect with the reinforcement strip previously arranged on the corner between the flat and vertical surfaces, and will be turned and overlapped 10 cm longitudinally with a 15% overlap transversally at the top. After aligning and rearranging the sheets, they will be bonded by heating the lower face of the sheet with a propane gas torch, activating the adhesive properties of the bands of thermoadhesive. The overlaps of the sheets will be torch-bonded at the same time. The upper layer of the waterproof covering will be composed of a 4 mm thick DEFEND ANTIRADICE POLIESTERE distilled bitumen elastoplastomeric waterproofing membrane, with antiroot agent additives. The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be turned up on the vertical parts to at least 20 cm above the water runoff plane.
The supports must be smooth and free from dust, non-uniform parts, traces of oil, or dirt in general. Surfaces cleaned with water cleaners must be free from stagnated water.

If working on old floors, loose or broken tiles must be removed and levelled with the rest of the foundation. Any skirting will be totally removed to achieve the best waterproofing using COVERBAND joint covering tape.

**Preparation of the mix** Pour the latex (component B), into the container, and gradually add component A, in powder, mixing with a low speed mechanical stirrer until a smooth mixture is obtained without any lumps, with excellent plasticity.

**Application** Spread COVERCOL AB RAPID with a stainless steel spatula, smoothing evenly. 1.5-2 kg/m² is sufficient to create a waterproof layer. In areas subject to particular stress, the COVERCOL AB RAPID coating must be reinforced with RETINVETRO PER RASANTI (FIBREGLASS MESH FOR RENDER), an alkali-resistant 4×5 mm glass-fibre mesh. The RETINVETRO will be sunk into the still fresh layer of COVERCOL AB RAPID. Extend the waterproof covering onto the joins between the horizontal and vertical surfaces by the height envisaged for any skirting board applying the joint covering sealing tape COVERBAND on the external joint. Hardening of the waterproofing layer takes just 5-6 hours, after which the floor can be laid directly, with the same product, COVERCOL AB RAPID. The two layer method is recommended when laying outside to avoid gaps. To seal the joints, FUGOCOLOR range products should be used, with added Fugoseal latex or FUGOFLEX 2-12.

**Coverage.** As waterproofing layer with RETINVETRO: 2 kg/m². As adhesive layer (dependent on the type of spatula and tile): 3-5 kg/m².
If applying over old floor, its solidity must be checked; any loose tiles must be removed and the cavity filled with fast-setting cement mortar. If the surfaces are crumbling, apply PRIMER FIX water-based primer at approximately 300 g/m².

**Waterproofing the wall-floor joins.** Structural expansion joints must be incorporated, depending on the dimensions and the stresses. Fraction and perimeter joints must be sealed using COVERBAND tape fixed with UNOLASTIC or ELASTOCOL AB adhesive. Waterproofing with UNOLASTIC. If primer is used, wait 24 hours and then apply UNOLASTIC single component bituminous elastomer waterproofing. Mix the product if necessary and apply with a smooth spatula, brush or roller to a thickness of approximately 1 – 1.5 mm, pressing to obtain maximum adhesion to the foundation. When the product has hardened, remove any surface condensation, and apply a second coat of UNOLASTIC to achieve a full continuous and uniform thickness of approximately 2 – 3 mm (2 mm without reinforcement and 3 mm if reinforced with RINFOTEX PLUS). For surface areas of more than 10 m² or supports under stress, the product should be reinforced with RINFOTEX PLUS, burying the RINFOTEX PLUS reinforcement in the first coat while fresh. The reinforcement overlaps should be approximately 10 cm.

The overlaps on the wall should not extend beyond the level of the skirting board, or beyond the maximum water contact level. The internal and external corners will be prepared by cutting shaped pieces of reinforcement. The reinforcement should always be turned up onto verticals, ensuring that the fabric adheres well in the corners and angles, taking particular care to ensure impregnation. The second coat can be applied straight away if the first coat has been reinforced, the next day if it has not been reinforced.

UNOLASTIC is applied by brush, roller, spatula or suitable spraying equipment, both horizontally and vertically. To achieve a uniform thickness when applying by brush, a toothed spatula with 4 mm teeth should be used and then brushed with the smooth part of the spatula to obtain a uniform thickness of approximately 2 mm. After 4 days at 20°C, the material is dry (in winter, with low temperatures, use ACCELERATOR hardening accelerator) and ready for seal tests, if performed, or to be covered with cement-based adhesives for tiles.

**Coverage.** 1.5 Kg/m² × mm of thickness.
If applying over old floor, its solidity must be checked; any loose tiles must be removed and the cavity filled with fast-setting cement mortar; the old skirting board will also be removed to obtain a channel for the covering approximately 4 cm deep in the wall. The laying surface must be smooth and flat; porous surfaces such as concrete or brick, or an old bituminous covering, should be prepared with a coat of INDEVER PRIMER E at 250 to 500 g/m².

Waterproofing. Unroll the SELFTENETile membrane on the laying surface, aligning it with the bottom of one of the walls, cut to size. Remove half the silicone film from the lower face facing the masonry, taking care not to move the sheet and lose the alignment. Exert sufficient pressure on the half of the roll with the silicon film removed to achieve adhesion to the support. Then remove the other half of the silicone film from the lower face and press the whole sheet adequately. Lay the second sheet alongside, ensuring it does not overlap the first sheet, and repeat the operations described above. The longitudinal join lines will be sealed with UNOLASTIC, spreading a first coat in a 15 cm strip, reinforcing with a strip of RINFOTEX PLUS of the same width across the joined sheets, and then covering this with a second coat of UNOLASTIC. Repeat this operation with the joins at the tops of sheets, ensuring that the UNOLASTIC reinforced with RINFOTEX PLUS extends 8-10 cm on either side of the join line.

A channel at least 4 cm deep must be created on the perimeter walls to house the covering, smoothed with plaster and painted with primer. The vertical parts will be created spreading a coat of UNOLASTIC reinforced with RINFOTEX PLUS then covered with a second coat of UNOLASTIC on a 10 cm horizontal strip of the covering, and vertically to above skirting board level. The vertical parts will then be protected with plaster reinforced with RETINVETRO PER INTONACI (FIBREGLASS MESH FOR PLASTER).

If it is not possible to create the vertical housing in the wall, the top of the waterproof covering is protected by a structural metal drip moulding fixed mechanically to the protruding part and sealed at the top. The structural metal will be equipped with a metal wing that must protect the vertical part of the covering completely, down to the pavement. Ceramic and porcelain tiles are laid directly on SELFTENETile and UNOLASTIC, preferably using cement-based adhesives modified with class C2 resins according to the floor to be laid.
Note. This system only applies when the difference in level between the threshold and the old floor is at least 6 cm.

If applying over old floor, its solidity must be checked; any loose tiles must be removed and the cavity filled with fast-setting cement mortar. After removing the old skirting board, a channel at least 4 cm deep must be created on the perimeter walls to house the covering, smoothed with plaster and painted with a coat of approximately 300 g/m² of INDEVER bituminous adhesion primer, or alternatively ECOVER water-based primer. A coat of primer will also be applied in a 20 cm band along the foot of the vertical overlaps of the waterproof covering.

If it is not possible to create the vertical housing in the wall, the top of the waterproof covering is protected by a structural metal drip moulding fixed mechanically to the protruding part and sealed at the top. The structural metal will be equipped with a metal wing that must protect the vertical part of the covering completely, down to the pavement.

Single-layer waterproof covering. A polymer-bitumen waterproofing membrane, 4 mm thick, chosen from the types listed below, is laid dry onto the laying surface. The sheets are laid dry onto the laying surface overlapping by 10 cm in the longitudinal direction and by 15 cm in the transversal direction; the overlaps are torch-bonded using a propane gas torch.

The turn-up of the waterproof covering on the vertical parts, which will be torch-bonded with full adhesion on the protruding parts to at least 10 cm above the level envisaged for the paving, is carried out with the same membrane laid onto the surface, if it is to be protected by a layer of plaster. If, however, it remains exposed to sunlight, it is protected by a layer of bitumen–polymer waterproofing membrane, self-protected with slate granules, 4 mm thick, of the same type as that used for the flat surface of the roof. A 20 cm wide band of the sheets at the foot of the protruding parts will also be torched onto the laying surface.

Alternatively, the following membranes may be used:

• **Single-layer waterproof covering with PROTEADUO TRIARMATO multi-layer composite membrane.** A multi-layer composite elastoplasmatic and elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, with prefabricated stabilised three-layer composite reinforcement consisting of a fibreglass felt between two spunbond non-woven polyester fabrics, such as PROTEADUO TRIARMATO is laid dry onto the flat concrete laying surface, whereas the covering of the vertical parts without protection is performed with the self-protected version with slate granules of the same membrane, such as MINERAL PROTEADUO TRIARMATO.

Alternatively:

• **Single-layer waterproof covering with HELASTA POLIESTERE elastomeric membrane.** An elastomeric polymer-bitumen waterproofing membrane, self-protected with slate granules, 4 mm thick, reinforced with spunbond non-woven polyester fabric, such as HELASTA POLIESTERE is laid dry onto the concrete laying surface, whereas the covering of the vertical parts without protection is performed with the self-protected version with slate granules of the same membrane, such as MINERAL HELASTA POLIESTERE.

Alternatively:

• **Single-layer waterproof covering with FLEXTER TESTUDO SPUNBOND POLIESTERE elastoplastomeric membrane.** An elastoplastomeric polymer-bitumen waterproofing membrane, 4 mm thick, with composite reinforcement in spunbond polyester non-woven fabric, stabilised with fibreglass, such as FLEXTER TESTUDO SPUNBOND POLIESTERE 4 is laid dry onto the concrete laying surface, whereas the covering of the vertical parts without protection is performed with the self-protected version with slate granules of the same membrane, such as MINERAL FLEXTER TESTUDO SPUNBOND POLIESTERE.

Floating floor on HELASTORING. With the HELASTORING floor system the stratified elements can be completely dismantled, inspected and repaired at a low cost and better meet the requirements of sustainable building.

In general, 4 cm thick 40×40 cm or 50×50 cm squares are used, but squares of exterior grade wood are also used, and it is better to avoid finishing squares that adjoin the vertical parts, but simply use gravel around the perimeter areas between the wall and the floor.
After cutting the parts of the old covering stretched at the base of the protruding areas, removed the covering not adhering to the vertical parts, cut and flattened all creases in the covering and reattaching them to the support, a ROLLBASE POLIESTERE/V vapour diffusion elastoplastomeric membrane in distilled bitumen polymer reinforced with glass-fibre will be laid on the clean dry laying surface, with the non-woven polyester fabric-covered lower face down with the overlap selvedge on the lower face. The membrane will have a mass-to-area ratio of 2 kg/m², tear resistance EN 12310-1 L/T of 200/200 N, resistance to traction EN 12311-1 L/T of 500/350 N/5 cm and elongation EN 12311-1 L/T of 50/80%. The sheets, laid dry along the line of maximum pitch, will stop at the foot of the protruding parts, and be overlapped by 10 cm along the selvedge on each side and at the top, and fixed with nails or staples every 20 cm on the overlaps with nails or screws with smooth washers at least 5 cm in diameter. The overlaps will then be torch-bonded. Depending on the local climate, and near to the perimeter areas where higher wind resistance is required, a further row of fixings will be applied along the centre lines of the sheets, or using two parallel lines of nails 33 and 66 cm from the edges of the sheet, respectively, at intervals that produce a distribution of a minimum of 5 nails per m² to a maximum of 10 nails per m². The angle between the flat and vertical part will be reinforced by torch-bonding across the corner a 20 cm wide 4 mm thick strip of smooth membrane of the same type as the slated membrane to be used as the upper layer, reinforced with non-woven polyester fabric to be applied before the vertical parts are covered. The upper layer of the waterproof covering will be composed of a distilled bitumen-polymer waterproofing membrane, self-protected with slate granules. The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be turned up on the vertical parts to at least 20 cm above the water runoff plane.

The following membranes can be used as the upper layer of the two-layer system:
- MINERAL PROTEADUO TRIARMATO multilayer composite membrane or, alternatively, MINERAL PROTEADUO POLIESTERE HP25.
- MINERAL HELASTA elastomeric membrane;
- Alternatively:
- MINERAL FLEXTER FLEX TESTUDO elastoplastomeric membrane.
- Alternatively:
- MINERAL FLEXTER TESTUDO SPUNBOND POLIESTERE elastoplastomeric membrane.
- Alternatively:
- MINERAL DESIGN 15 POLIESTERE elastoplastomeric membrane.

### Pitch 40 - 100%

For pitches of 40 to 100%, the bonding of the waterproof membrane should be supplemented by mechanical fixing using nails with 5 cm diameter washers every 20 cm, under the overlaps at the top of the last sheet. The body of the nail should be at least 5 cm from the edge of the lower sheet and at least 6 cm from the edge of the upper sheet.

### Pitch 100%

The single layer membrane will be attached mechanically at the top, as previously indicated. The length of the sheets should not exceed 7 m.
After cutting the parts of the old covering stretched at the base of the protruding areas, removed the covering not adhering to the vertical parts, cut and flattened all creases in the covering and reattaching them to the support, a ROLLBASE POLIESTERE/V vapour diffusion elastoplastomeric membrane in distilled bitumen polymer reinforced with glass-fibre will be laid on the clean dry laying surface, with the non-woven polyester fabric-covered lower face down with the overlap selvedge on the lower face. The membrane will have a mass-to-area ratio of 2 kg/m², tear resistance EN 12310-1 L/T of 200/200 N, resistance to traction EN 12311-1 L/T of 500/350 N/5 cm and elongation EN 12311-1 L/T of 50/80%. The sheets, laid dry along the line of maximum pitch, will stop at the foot of the protruding parts, and be overlapped by 10 cm along the selvedge on each side and at the top, and fixed with nails or staples every 20 cm on the overlaps with nails or screws with smooth washers at least 5 cm in diameter. The overlaps will then be torch-bonded. Depending on the local climate, and near to the perimeter areas where higher wind resistance is required, a further row of fixings will be applied along the centre lines of the sheets, or using two parallel lines of nails 33 and 66 cm from the edges of the sheet, respectively, at intervals that produce a distribution of a minimum of 5 nails per m² to a maximum of 10 nails per m². The distilled bitumen polymer membrane will then be torch-bonded to the laying surface in full adhesion. The sheets of membrane unrolled along in parallel the line of maximum pitch, should be overlapped 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. They will also be turned up and torch bonded to the vertical parts.

The upper layer of the waterproof covering will be composed of a distilled bitumen-polymer waterproofing membrane, self-protected with slate granules. The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be turned up on the vertical parts to at least 20 cm above the water runoff plane.

The double layer systems provided are:

- **Double-layer waterproof covering with elastomeric membrane and multi-layer composite membrane made up of HELASTA POLIESTERE + MINERAL PROTEADUO TRIARMA** or **MINERAL PROTEADUO POLIESTERE HP25**.

Alternatively:

- **Double-layer waterproof covering with MINERAL HELASTA POLIESTERE elastomeric membrane + HELASTA POLIESTERE**.

Alternatively:

- **Waterproof double-layer covering with FLEXTER FLEX TESTUDO SPUNBOND POLIESTERE elastoplastomeric membrane + MINERAL FLEXTER FLEX TESTUDO SPUNBOND POLIESTERE**.

- **Two layer waterproof covering with FLEXTER TESTUDO SPUNBOND POLIESTERE elastoplastomeric membrane + MINERAL FLEXTOR TESTUDO SPUNBOND POLIESTERE**. Alternatively, the upper layer of MINERAL FLEXTOR may be replaced by **MINERAL DESIGN 15 POLIESTERE elastoplastomeric membrane**.

**Pitch 40 - 100%**

For pitches of 40 to 100%, the bonding of the waterproof membrane should be supplemented by mechanical fixing using nails with 5 cm diameter washers every 20 cm, under the overlaps at the top of the last sheet. The body of the nail should be at least 5 cm from the edge of the lower sheet and at least 6 cm from the edge of the upper sheet. **Pitch 100%**

For pitches of more than 100%, only the slated upper membrane will be laid in a single layer, attached mechanically at the top, as previously indicated. The length of the sheets should not exceed 7 m.
Preparation of the concrete foundation. The old concrete floor must be dry, clean and dust-free, with no holes or crumbling parts. The cavities will be filled with fast-setting cement mortar. A coat of INDEVER bituminous primer will be applied to the surface to be covered, at 0.2 – 0.4 kg/m², or, alternatively water-based ECOVER primer.

The angle between the flat and vertical part will be reinforced by torch-bonding across the corner a 20 cm wide 4 mm thick strip of smooth membrane of the same type as the membrane to be used as the upper layer, to be applied before the vertical parts are covered.

Subsequently a TECTENE REROOF BASE STRIP EP POLIESTERE waterproofing membrane in distilled bitumen elastoplasticomeric polymer, reinforced with non-woven polyester fabric composite stabilised with glass-fibre, with 40% of the lower face coated with bands of elastomeric thermoadhesive.

The sheets will be turned and overlapped 8 cm longitudinally and 15 cm transversally at the top. After aligning and rearranging the sheets, they will be bonded by heating the lower face of the sheet with a propane gas torch, activating the adhesive properties of the bands of thermoadhesive. The overlaps of the sheets will be torch-bonded at the same time.

The upper layer of the waterproof covering will be composed of a distilled bitumen-polymer waterproofing membrane, self-protected with slate granules. The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be turned up on the vertical parts to at least 20 cm above the water runoff plane.

The following membranes can be used as the upper layer of the two-layer system:

- PROTEADUO TRIARMATO multi-layer composite membrane;
- MINERAL HELASTA POLIESTERE elastomeric membrane;
- MINERAL FLEXTER FLEX TESTUDO SPUNBOND POLIESTERE elastoplastomeric membrane.

Subsequently, before creating the concrete floor slab, the waterproof membrane will be protected by the application of a protective layer composed of a non-woven fabric of at least 500 g/m² which is in turn protected by a film polythene at least 100 μm thick. If self-locking concrete elements are used to create the floor, a 5 cm layer of sand will be spread on the non-woven fabric.
Preparation of the asphalt foundation. The old asphalt floor should be clean and dry, and holes should be filled with INDERIP cold-application bituminous conglomerate to re-establish the flatness of the laying surface. A coat of INDEVER bituminous primer, or ECOVER water-based primer will be applied to the vertical parts only, up to the planned level of the waterproof covering, at 0.2 – 0.4 kg/m².

The angle between the flat and vertical part will be reinforced by torch-bonding across the corner a 20 cm wide 4 mm thick strip of smooth membrane of the same type as the membrane to be used as the upper layer, to be applied before the vertical parts are covered.

Subsequently a TECTENE REROOF BASE STRIP EP POLIESTERE waterproofing membrane in distilled bitumen elastoplastomeric polymer, reinforced with non-woven polyester fabric composite stabilised with glass-fibre, with 40% of the lower face coated with bands of elastomeric thermoadhesive.

The sheets will be turned and overlapped 8 cm longitudinally and 15 cm transversally at the top. After aligning and rearranging the sheets, they will be bonded by heating the lower face of the sheet with a propane gas torch, activating the adhesive properties of the bands of thermoadhesive. The overlaps of the sheets will be torch-bonded at the same time.

The upper layer of the waterproof covering will be composed of a distilled bitumen-polymer waterproofing membrane, self-protected with slate granules, with CE marking in accordance with UN EN 14695 for laying under asphalt, chosen from the types listed below. The sheets on the second layer will be laid overlapping by 10 cm longitudinally and 15 cm transversally, across the overlaps of the first layer, and torch-bonded onto the whole surface and the overlaps. The waterproof covering will be turned up on the vertical parts to at least 20 cm above the water runoff plane. The following membranes can be used as the upper layer of the two-layer system:

• PROTEADUO TRIARMATO 4, multi-layer composite membrane;
  Alternatively:
  • MINERAL HELASTA POLIESTERE 25/4 elastomeric membrane;
  Alternatively:
  • FLEXTER TESTUDO SPUNBOND POLIESTERE 25/4 elastoplastomeric membrane.

A layer of hot bituminous conglomerate will then be spread on the waterproof membrane at a minimum thickness of 5 cm.
Preparation of the asphalt foundation. The old asphalt floor should be clean and dry, and holes should be filled with INDERIP cold-application bituminous conglomerate to re-establish the flatness of the laying surface. A coat of INDEVER bituminous primer will be applied to the vertical parts only, up to the planned level of the waterproof covering, at 0.2 – 0.4 kg/m².

The angle between the flat and vertical parts will be reinforced by torch-bonding across the corner a 20 cm wide 4 mm thick strip of smooth membrane of the same type as the membrane to be used to cover the flat areas, to be applied before the vertical parts are covered.

A 5 mm thick distilled bitumen-polymer waterproofing membrane, with CE marking in accordance with UNI EN 14695 for laying under asphalt, chosen from the types listed below will then be torch-bonded in full adhesion: The sheets of membrane unrolled along in parallel the line of maximum pitch, should be overlapped 10 cm longitudinally and 15 cm at the top, and continuously torch-bonded to the substructure and along the overlaps. The sheets will be turned up and torch-bonded onto the vertical parts to a height of least 20 cm above the expected water level.

The following materials may be used:

- PROTEADUO POLIESTERE 25/5 or FLEXTER TESTUDO 25/5 waterproof covering.
- PROTEADUO POLIESTERE 25/5 or FLEXTER TESTUDO 25/5 multi-layer composite membrane.
- FLEXTER TESTUDO SPUNBOND POLIESTERE 25/5 elastoplastomeric membrane.

A layer of hot bituminous conglomerate will then be spread on the waterproof membrane at a minimum thickness of 5 cm.
The renovation system is often applied on a roof impregnated with damp. This not only reduces the thermal resistance of the materials, but can also cause bubbles on the new waterproof covering. To avoid these problems FUGATOR extractors should be installed on the renovation system every 30 - 40 m².

**Adherent vapour barrier or covering on old waterproofing.**

A circular hole equal to the diameter of the FUGATOR plate is made in the old covering with a knife. After placing the extractor in the housing created in the old covering, the new covering will be torch-bonded onto it.

**Semi-independent or independent covering on old waterproofing**

A circular hole equal to the diameter of the FUGATOR plate is made in the old covering with a knife. In this way, the water vapour from under both the old and the new covering can diffuse when the extractor is in operation. The new covering will be flame-bonded to the FUGATOR, taking care not to close the gap created by the plate feet.
## TECHNICAL SPECIFICATIONS

### PRIMER

**INDEVER**
Quick drying adhesion bituminous primer suitable for preparing surfaces for the heat bonding of polymer bitumen membranes, such as INDEVER, with a base of oxidised bitumen, additives and solvents with solid content (UNI EN ISO 3251) of 40% and cup viscosity of DIN/4 at 23°C (UNI EN ISO 2431) of 12 - 17 s.

**INDEVER PRIMER E**
INDEVER PRIMER E quick drying bituminous adhesion primer suitable for preparing surfaces for torch bonding of polymer-bitumen membranes, and cold laying of self-adhesive and self-thermoadhesive distilled bitumen polymer membrane. The primer will have solid content (UNI EN ISO 3251) of 50% and cup viscosity of DIN/4 at 23°C (UNI EN ISO 2431) of 20 - 25 s.

**ECOVER**
Adhesion bituminous primer, suitable for preparing surfaces for the heat bonding of bitumen polymer membranes, such as ECOVER, with a water bituminous emulsion base, with solid content (UNI EN ISO 3251) of 37%.

### COMPLEMENTARY PRODUCTS

**ROLLBASE POLIESTERE/V**
ROLLBASE POLIESTERE/V membrane reinforced with glass-fibre, with lower face bonded to bare non-woven polyester fabric. The membrane will have a mass-to-air ratio (EN 1849-1) of 2 Kg/m², maximum tensile force L/T (EN 12311-1) of 500/350 N/5 cm, elongation at max. tensile force L/T (EN 12311-1) del 50/80%, tear resistance L/T (EN 12310-1) of 200/200 N and cold bend (EN 1109) of -10°C.

**INDEVER**
Quick drying adhesion bituminous primer suitable for preparing surfaces for the heat bonding of polymer bitumen membranes, such as INDEVER, with a base of oxidised bitumen, additives and solvents with solid content (UNI EN ISO 3251) of 40% and cup viscosity of DIN/4 at 23°C (UNI EN ISO 2431) of 12 - 17 s.

**INDEVER PRIMER E**
INDEVER PRIMER E quick drying bituminous adhesion primer suitable for preparing surfaces for torch bonding of polymer-bitumen membranes, and cold laying of self-adhesive and self-thermoadhesive distilled bitumen polymer membrane. The primer will have solid content (UNI EN ISO 3251) of 50% and cup viscosity of DIN/4 at 23°C (UNI EN ISO 2431) of 20 - 25 s.

**ECOVER**
Adhesion bituminous primer, suitable for preparing surfaces for the heat bonding of bitumen polymer membranes, such as ECOVER, with a water bituminous emulsion base, with solid content (UNI EN ISO 3251) of 37%.

### WATERPROOF COVERING

**PROTEADUO TRIARMATO**
PROTEADUO TRIARMATO multi-layer composite polymer-bitumen waterproofing membrane, 4 mm thick (EN 1849-1), certified with the Agrément/DVT of I.T.C-CNR (former I.C.I.T.E.), made up of an upper layer in elastoplastomeric polymer bitumen with ring and ball softening point (EN 1427) of 150°C, a lower layer in elastoplastomeric polymer bitumen with elastic recovery (NF XP 84-360) of 300% and a stabilised three-layer composite reinforcement with fiberglass between two spunbond polyester “non-woven fabrics”, impregnated with elastoplastomeric polymer bitumen. The membrane will have Euroclass E reaction to fire (EN 13501-1), have a maximum tensile force (EN 12311-1) L/T of 750/650 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 250/250 N, resistance to impact (EN 12691 - method A) of 1,000 mm, resistance to static load (EN 12730) of 15 kg, heat dimensional stability (EN 1107-1), L/T of -0.3/+0.3%, cold bend (EN 1109) of -15°C for the upper layer and -25°C for the lower layer.

**MINERAL PROTEADUO TRIARMATO**
MINERAL PROTEADUO TRIARMATO multi-layer composite polymer-bitumen waterproofing membrane, 4 mm thick measured on the selvedge, self-protected with slate granules, certified with the Agrément/DVT della I.T.C-CNR (former I.C.I.T.E.), made up of an upper layer in elastoplastomeric polymer bitumen with ring and ball softening point (EN 1427) of 150°C, a lower layer in elastoplastomeric polymer bitumen with elastic recovery (NF XP 84-360) of 300% and a stabilised three-layer composite reinforcement with fiberglass between two spunbond polyester “non-woven fabrics”, impregnated with elastoplastomeric polymer bitumen. The membrane will have Euroclass E reaction to fire (EN 13501-1), have a maximum tensile force (EN 12311-1) L/T of 750/650 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 250/250 N, resistance to impact (EN 12691 - method A) of 1,000 mm, resistance to static load (EN 12730) of 15 kg, heat dimensional stability (EN 1107-1), L/T of -0.3/+0.3%, cold bend (EN 1109) of -15°C for the upper layer and -25°C for the lower layer.

**MINERAL PROTEADUO POLIESTERE HP 25**
MINERAL PROTEADUO POLIESTERE HP 25 multi-layer composite polymer-bitumen waterproofing membrane, 5 mm thick (EN 1849-1), self-protected with slate granules, certified with the Agrément/DVT of I.T.C-CNR (former I.C.I.T.E.), made up of an upper layer in elastoplastomeric polymer bitumen with ring and ball softening point (EN 1427) of 150°C, a lower layer in elastoplastomeric polymer bitumen with elastic recovery (NF XP 84-360) of 300% and a stabilised three-layer composite reinforcement with high perforation resistance in spunbond polyester non-woven fabric impregnated with elastoplastomeric polymer bitumen. The membrane will have level RG 5 hail resistance measured with EMPA test protocol no. 7 of the Swiss association of public building insurers, AP BIT and Euroclass E reaction to fire (EN 13501-1), maximum tensile force (EN 12311-1) L/T of 1000/900 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 250/250 N, resistance to impact (EN 12691 - method A) of 1,500 mm, resistance to static load (EN 12730) of 25 mm, heat dimensional stability (EN 1107-1), L/T of -0.3/+0.3%, cold bend (EN 1109) of -15°C for the upper layer and -25°C for the lower layer.
HELASTA POLIESTERE distillate bitumen elastomeric polymer waterproofing membrane, 4 mm thick (EN 18491), certified with the Agrément/DVT of I.T.C-CNR, based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polyester fabric stabilised with glass-fibre. The membrane will have Euroclass E fire resistant (EN 13501-1), with maximum tensile force (EN 12311-1) L/T of 850/700 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 850/700 N/50 mm, resistance to tearing (EN 12310-1) L/T of 200/200 N, resistance to static load (EN 12730) of 20 kg, heat dimensional stability (EN 1107-1) L/T of -0.3%/+0.3%, cold bend (EN 1109) of -25°C and hot stability (EN 1110) of 100°C.

MINERAL HELASTA POLIESTERE distillate bitumen elastomeric polymer waterproofing membrane, 4 mm thick (EN 18491), measured on the selvedge, self-protected with slate granules, certified with the Agrément/DVT of I.T.C-CNR, based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polyester fabric stabilised with glass-fibre. The membrane will have Euroclass E fire resistant (EN 13501-1), with maximum tensile force (EN 12311-1) L/T of 850/700 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 850/700 N/50 mm, resistance to tearing (EN 12310-1) L/T of 200/200 N, resistance to static load (EN 12730) of 20 kg, heat dimensional stability (EN 1107-1) L/T of -0.3%/+0.3%, cold bend (EN 1109) of -25°C and hot stability (EN 1110) of 100°C.

FLEXTER FLEX TESTUDO SPUNBOND POLIESTERE elastolastomeric polymer-bitumen waterproofing membrane, 4 mm thick (EN 18491), based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polymer fabric stabilised with fibreglass, certified with the Agrément ICITE, Euroclass E reaction to fire classification (EN 13501-1). The membrane will have a maximum tensile force (EN 12311-1) L/T of 850/700 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 850/700 N/50 mm, resistance to tearing (EN 12310-1) L/T of 200/200 N, resistance to static load (EN 12730) of 20 kg, heat dimensional stability (EN 1107-1), L/T of -0.3%/+0.3%, cold bend (EN 1109) of -25°C and shape stability to heat (EN 1110) of 140°C.

MINERAL FLEXTER FLEX TESTUDO SPUNBOND POLIESTERE elastolastomeric polymer-bitumen waterproofing membrane, 4 mm thick (EN 18491), measured on the selvedge, self-protected with slate granules, based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polymer fabric stabilised with fibreglass, certified with the Agrément ICITE, Euroclass E reaction to fire classification (EN 13501-1). The membrane will have a maximum tensile force (EN 12311-1) L/T of 850/700 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 850/700 N/50 mm, resistance to tearing (EN 12310-1) L/T of 200/200 N, resistance to static load (EN 12730) of 20 kg, heat dimensional stability (EN 1107-1), L/T of -0.3%/+0.3%, cold bend (EN 1109) of -25°C and shape stability to heat (EN 1110) of 140°C.

FLEXTER TESTUDO SPUNBOND POLIESTERE elastolastomeric polymer-bitumen waterproofing membrane, 4 mm thick (EN 18491), certified with the Agrément/ICIT-CNR (former ICITE), based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polymer fabric stabilised with glass-fibre. The membrane will have Euroclass E reaction to fire (EN 13501-1), have a maximum tensile force (EN 12311-1) L/T of 850/750 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 850/750 N/50 mm, resistance to tearing (EN 12310-1) L/T of 200/200 N, resistance to static load (EN 12730) of 20 kg, heat dimensional stability (EN 1107-1), L/T of -0.3%/+0.3%, cold bend (EN 1109) of -20°C and shape stability to heat (EN 1110) of 140°C.

MINERAL FLEXTER TESTUDO SPUNBOND POLIESTERE elastolastomeric polymer-bitumen waterproofing membrane, 4 mm thick (EN 18491), measured on theselvedge, self-protected with slate granules, certified with the Agrément/ICIT-CNR (former ICITE), based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polyester fabric stabilised with fibreglass. The membrane will have Euroclass E reaction to fire (EN 13501-1), have a maximum tensile force (EN 12311-1) L/T of 850/750 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 850/750 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 850/750 N/50 mm, resistance to tearing (EN 12310-1) L/T of 200/200 N, resistance to static load (EN 12730) of 20 kg, heat dimensional stability (EN 1107-1), L/T of -0.3%/+0.3%, cold bend (EN 1109) of -20°C and shape stability to heat (EN 1110) of 140°C.

MINERAL FLEXTER TESTUDO SPUNBOND POLIESTERE 16 elastolastomeric polymer-bitumen waterproofing membrane, 4 mm thick (EN 18491), measured on the selvedge, self-protected with slate granules, based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polyester fabric. The membrane will have Euroclass E reaction to fire (EN 13501-1), with maximum tensile force (EN12311-1) of 750/800 N/50 mm, elongation at max. tensile force (EN 12311-1) of 50/50%, tear resistance (EN12310-1) of 140/140 N, heat dimensional stability (EN 1107-1) -0.3%/+0.5%, cold bend (EN 1109) of -15°C and shape stability to heat (EN 1110) of 120°C.
WATERPROOF COVERING

**FIRESTOP POLIESTERE**
Fire resistant FIRESTOP POLIESTERE elastoplastomeric polymer-bitumen waterproofing membrane, self-protected with slate granules, with mass-to-air ratio (EN 1849-1) of 4.5 kg/m², based on distilled bitumen, plastomers and elastomers, and harmless inorganic flame retardant additives with reinforcement consisting of spunbond non-woven polyester fabric. The membrane will have Euroclass E reaction to fire (EN 13501-1), with Broof (S) classification of resistance to external roof fires on both combustible and non-combustible laying surfaces (according to UNI EN 13501-5:2009 fire classification of construction elements and products - part 5: classification based on the results of tests exposing roofs to external fire according to UNI ENV 1187:2007). The membrane will have a maximum tensile force (EN 12311-1) L/T of 750/600 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 150/150 N, heat dimensional stability (EN 1107-1), L/T of ±0.3/±-0.5%, cold bend (EN 1109) of -10°C and shape stability to heat (EN 1110) of 120°C.

**MINERAL REFLEX WHITE TREATMENT**
To reduce energy consumption and limit the effects of “urban heat islands”, the membrane will have high solar reflectance of R = 45%, and a very high thermal emissivity of E = 94%, which results in a Solar Reflectance Index SRI of 52 – 54%, obtained with a MINERAL REFLEX WHITE special white mineral protection with high saturation and luminosity.

**MINERAL DESIGN 15 POLIESTERE**
Multifunctional MINERAL DESIGN 15 POLIESTERE elastoplastomer polymer distilled bitumen waterproofing membrane to decorate and develop the “design” of roofs with exposed coverings, self-protected with ceramised mineral granules in various designs obtained by combining two types of granules of different colours, with composite reinforcement in spunbond continuous filament non-woven fabric stabilised with glass-fibre.

The membrane will have Euroclass E reaction to fire (EN 13501-1), with a mass-to-area ratio (EN 1849-1) of 4.5 Kg/m², L/T maximum tensile force (EN12311-1) of 600/500 N/50 mm, L/T elongation at max. tensile force (EN 12311-1) of 35/40%, L/T resistance to tearing (EN12310-1) of 200N, heat dimensional stability (EN 1107-1), L/T of ±0.3/±-0.1%, and cold bend (EN 1109) of -15°C and shape stability to heat (EN 1110) of 120°C.

**MINERAL DESIGN decoration table**

| 1. CHECKERBOARD | 2. ROOF TILE | 3. CANADIAN SHINGLES | 4. OVAL CANADIAN SHINGLES | 5. EXPOSED SURFACE BRICKS | 6. RHOMBUS | 7. MILITARY CAMOUFLAGE |

**DEFEND ANTIRADICE POLIESTERE**
DEFEND ANTIRADICE POLIESTERE Elastoplastomeric polymer-distilled bitumen waterproofing membrane, 4 mm thick, with a phenoxy fatty acid ester root inhibitor additive, reinforced with spunbond non-woven polyester fabric with EC marking and certified root-resistant by the FORSCHUNGSANSTALT GEISENHEIM according to the FLL-Verfahren. The membrane will be classified Euroclass E reaction to fire (EN 13501-1), and have a maximum tensile force (EN 12311-1) L/T of 650/400 N/50 mm, elongation at max. tensile force (EN 12311-1) of 35/40%, L/T resistance to tearing (EN12310-1) of 200N, heat dimensional stability (EN 1107-1), L/T of ±0.3/±-0.1%, and cold bend (EN 1109) of -15°C and must pass the resistance to root penetration test in compliance with European standard EN 13948.

**VAPORDIFFUSER STRIP/V**
VAPORDIFFUSER STRIP/V distilled bitumen elastoplastomeric polymer waterproofing membrane for laying the waterproof coating in partial adhesion, damp diffusion and distribution of movements on the laying surface, with 40% of the lower face coated with bands of elastomer thermoadhesive. The membrane will have Euroclass E reaction to fire (EN 13501-1), with a mass-to-area ratio (EN 1849-1) of 2 Kg/m², L/T maximum tensile force (EN12311-1) of 300/200 N/50 mm, L/T elongation at max. tensile force (EN 12311-1) of 2/2%, and cold bend (EN 1109) of -15°C.
MINERAL TECTENE RINOVA EP POLIESTERE
Thermoadhesive waterproofing membrane, based on distilled bitumen, elastomers and polyolefin copolymers, self-protected with slate granules for the renovation in full adhesion of old bituminous coverings, which will have composite reinforcement in non-woven polyester fabric stabilised with glass-fibre, and with the lower face coated with a special thermoadhesive mixture with adhesive strength measured by peel test on steel sheet of 200 N/50 mm (UEAtc). The membrane will have Euroclass E reaction to fire (EN 13501-1), with a mass-to-area ratio (EN 1849-1) of 4.5 Kg/m², L/T maximum tensile force (EN12311-1) of 400/300 N/50 mm, L/T elongation at max. tensile force (EN 12311-1) of 35/40%, L/T resistance to tearing (EN12310-1) of 140/140 N and cold bend (EN 1109) of -15°C.

MINERAL TECTENE REROOF HE POLIESTERE
Thermoadhesive waterproofing membrane in distilled bitumen elastoplastomeric polymer, based on distilled bitumen, plastomers and elastomers, self-protected with slate granules, with composite reinforcement in non-woven polyester fabric stabilised with fibreglass, with 40% of the lower face coated with bands of special elastomer thermoadhesive approximately 1 mm thick which, adhering only partially by torch-bonding, will allow the damp trapped in the old covering to diffuse, avoiding bubbles and condensation. The membrane will have Euroclass E reaction to fire (EN 13501-1), with a mass-to-area ratio (EN 1849-1) of 5 Kg/m², L/T maximum tensile force (EN12311-1) of 700/500 N/50 mm, L/T elongation at max. tensile force (EN 12311-1) of 40/45%, L/T resistance to tearing (EN12310-1) of 250/250 N and cold bend (EN 1109) of -25 °C.

TECTENE REROOF BASE EP POLIESTERE
Thermoadhesive waterproofing membrane in distilled bitumen elastoplastomeric polymer, with composite reinforcement in non-woven polyester fabric stabilised with fibreglass, with 40% of the lower face coated with bands of special elastomer thermoadhesive approximately 1 mm thick which, adhering only partially by torch-bonding, will allow the damp trapped in the old covering to diffuse, avoiding bubbles and condensation. The membrane will have Euroclass E reaction to fire (EN 13501-1), with thickness (EN 1849-1) of 4 mm, L/T maximum tensile force (EN12311-1) of 700/500 N/50 mm, L/T elongation at max. tensile force (EN 12311-1) of 40/45%, L/T resistance to tearing (EN12310-1) of 160/200 N and cold bend (EN 1109) of -15°C.

MINERAL TECTENE REROOF HE POLIESTERE
Thermoadhesive waterproofing membrane in distilled bitumen elastoplastomeric polymer, self-protected with slate granules, based on distilled bitumen, plastomers and elastomers, with composite reinforcement in non-woven polyester fabric stabilised with fibreglass, with 40% of the lower face coated with bands of special elastomer thermoadhesive approximately 1 mm thick which, adhering only partially by torch-bonding, will allow the damp trapped in the old covering to diffuse, avoiding bubbles and condensation. The membrane will have Euroclass E reaction to fire (EN 13501-1), with a mass-to-area ratio (EN 1849-1) of 5 Kg/m², L/T maximum tensile force (EN12311-1) of 700/500 N/50 mm, L/T elongation at max. tensile force (EN 12311-1) of 40/45%, L/T resistance to tearing (EN12310-1) of 160/200 N and cold bend (EN 1109) of -15 °C.
WATERPROOF COVERING UNDER BITUMINOUS CONGLOMERATE

PROTEADUO POLIESTERE 25/5
PROTEADUO POLIESTERE 25/5 multi-layer composite polymer-bitumen waterproofing membrane, 5 mm thick (EN 1849-1), certified with the Agrément/DVT of I.T.C-CNR (former I.C.I.T.E.), made up of an upper layer in elastoplastomeric polymer distilled bitumen with ring and ball softening point (EN 1427) of 150°C, a lower layer in elastoplastomeric polymer distilled bitumen with elastic recovery (NF XP 84-360) of 300% and a stabilised composite reinforcement in spun bond polyester non-woven fabric stabilised with glass-fibre impregnated with elastoplastomeric polymer distilled bitumen.

The membrane will have Euroclass E reaction to fire (EN 13501-1), have a maximum tensile force (EN 12311-1) L/T of 1,000/900 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 250/250 N, resistance to impact (EN 12691 method A) of 1,500 mm, resistance to static load (EN 12730) of 20 kg, heat dimensional stability (EN 1107-1), L/T of -0.025%/-+0.10%, cold bend (EN 1109) of -15°C and shape stability to heat (EN 1110) of -25°C. The membrane, EN 14695 certified for laying under bituminous conglomerate or poured asphalt on concrete surfaces subject to traffic, will be resistant to compacting of the conglomerate in conformity with EN 14692, and resistant to poured asphalt in conformity with 14693, resistant to dynamic water pressure to 500 kPa (EN 14694). It will have adhesion strength (EN 13596) of 0.4 N/mm², shear strain of 0.15 N/mm² and compatibility for thermal conditioning (EN 14691) of over 80%.

FLEX TESTUDO POLIESTERE 25/5
FLEX TESTUDO POLIESTERE 25/5 elastoplastomeric polymer-bitumen waterproofing membrane, 5 mm thick (EN 1849-1), certified with the Agrément ITC-CNR, based on distilled bitumen, plastomers and elastomers, with reinforcement of non-woven polyester fabric stabilised with fibre-glass. The membrane will have Euroclass E reaction to fire (EN 13501-1), have a maximum tensile force (EN 12311-1) L/T of 1000/900 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 250/250 N, resistance to impact (EN 12691 method A) of 1,500 mm, resistance to static load (EN 12730) of 20 kg, heat dimensional stability (EN 1107-1), L/T of -0.030%/-+0.30%, cold bend (EN 1109) of -20°C and shape stability to heat (EN 1110) of 140°C.

The membrane, EN 14695 certified for laying under bituminous conglomerate on concrete surfaces subject to traffic, will have adhesion strength (EN 13596) of 0.4 N/mm², shear strain of 0.15 N/mm² and compatibility for thermal conditioning (EN 14691) of over 80%.

PROTEADUO POLIESTERE 25/4
PROTEADUO POLIESTERE 25/4 multi-layer composite polymer-bitumen waterproofing membrane, 4 mm thick (EN 1849-1), certified with the Agrément/DVT of I.T.C-CNR (former I.C.I.T.E.), made up of an upper layer in elastoplastomeric polymer distilled bitumen with ring and ball softening point (EN 1427) of 150°C, a lower layer in elastoplastomeric polymer distilled bitumen with elastic recovery (NF XP 84-360) of 300% and a stabilised composite reinforcement in spun bond polyester non-woven fabric stabilised with glass-fibre impregnated with elastoplastomeric polymer distilled bitumen.

The membrane will have Euroclass E reaction to fire (EN 13501-1), have a maximum tensile force (EN 12311-1) L/T of 1,000/900 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 250/250 N, resistance to impact (EN 12691 method A) of 1,500 mm, resistance to static load (EN 12730) of 20 kg, heat dimensional stability (EN 1107-1), L/T of -0.025%/-+0.10%, and cold bend (EN 1109) of -15°C for the upper layer and -25°C for the lower layer.

The membrane, EN 14695 certified for laying under bituminous conglomerate or under poured asphalt on concrete surfaces subject to traffic, will be resistant to compacting of the conglomerate in conformity with EN 14692, resistant to the spreading of molten asphalt in conformity with EN 14693, resistant to dynamic water pressure to 500 kPa (EN 14694). It will have adhesion strength (EN 13596) of 0.4 N/mm², shear strain of 0.15 N/mm² and compatibility for thermal conditioning (EN 14691) of over 80%.

FLEX TESTUDO POLIESTERE 25/4
FLEX TESTUDO POLIESTERE 25/4 elastoplastomeric polymer-bitumen waterproofing membrane, 4 mm thick (EN 1849-1), certified with the Agrément ITC-CNR, based on distilled bitumen, plastomers and elastomers, with reinforcement of non-woven polyester fabric stabilised with fibre-glass. The membrane will have Euroclass E reaction to fire (EN 13501-1), have a maximum tensile force (EN 12311-1) L/T of 1000/900 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 250/250 N, resistance to impact (EN 12691 method A) of 1,500 mm, resistance to static load (EN 12730) of 25 kg, heat dimensional stability (EN 1107-1), L/T of -0.030%/-+0.30%, cold bend (EN 1109) of -20°C and shape stability to heat (EN 1110) of 140°C.

The membrane, EN 14695 certified for laying under bituminous conglomerate on concrete surfaces subject to traffic, will have adhesion strength (EN 13596) of 0.4 N/mm², shear strain of 0.15 N/mm² and compatibility for thermal conditioning (EN 14691) of over 80%.
COLD ADHERSIVE LAYING SYSTEM

**MASTIPOL**

MASTIPOL solvent-based bituminous adhesive for cold bonding bituminous polymer membranes, based on special bitumens, elastomers, solvents and minerals with dry residue (UNI-EN-ISO 3251) of 80±4%, volume mass of 1.30±0.10 kg/litre at 23°C (UNI-EN-ISO 2811-1) and Ford no 6 cup viscosity at 23°C of 20±3 (UNI-EN-ISO 2431).

**MINERAL FLEXTER TEX**

MINERAL FLEXTER TEX POLIESTERE elastomeric polymer distilled bitumen waterproofing membrane, 4 mm thick (EN 1849-1) measured on the selvedge, certified with Agrement UBAtc, self-protected with slate granules, on a distilled bitumen, polyolefin elastomer and plasteromer base, with composite reinforcement in non-woven polyester fabric stabilised with glass-fibre, with the lower surface coated with a fine layer of polypropylene fibres bonded at high temperature. The membrane will have Euroclass E reaction to fire (EN 13501-1), a maximum tensile force (EN 12311-1) L/T of 850/700 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 150/150 N, resistance to impact (EN 12691 - method A) of 1,250 mm, resistance to static load (EN 12730) of 15 kg, heat dimensional stability (EN 1107-1), L/T of -0.3/+0.3%, cold bend (EN 1109) of -15°C.

**MINERAL FLEXTER FR TRIATEX**

MINERAL FLEXTER FR TRIATEX elastomeric polymer distilled bitumen waterproofing membrane, 4 mm thick (EN 1849-1) measured on the selvedge, certified with Agrement UBAtc, self-protected with slate granules, on a distilled bitumen, polyolefin elastomer and plasteromer base, with triple reinforcement with glass-fibre sandwiched between two layers of non-woven polyester fabric, with the lower surface coated with a fine layer of polypropylene fibres bonded at high temperature. The membrane will be of Euroclass E reaction to fire (EN 13501-1), with Broof (t1)(t3)(t4) classification resistance to external roof fires (according to UNI EN 13501-5:2009 fire classification of construction elements and products - part 5: classification based on the results of tests exposing roofs to external fire according to UNI ENV 1187:2007). The membrane will have a maximum tensile force (EN 12311-1) L/T of 750/650 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 250/250 N, resistance to impact (EN 12691 - method A) of 1,000 mm, resistance to static load (EN 12730) of 15 kg, heat dimensional stability (EN 1107-1), L/T of -0.3/+0.1% and cold bend (EN 1109) of -15°C.

UNDERFLOOR WATERPROOFING

**SELFNETRAIN**

Self-adhesive waterproofing membrane in elastomeric polymer distilled bitumen, on a radial butadiene-styrene thermoplastic rubber and distilled bitumen base, reinforced with non-woven polyester fabric stabilised with glass-fibre, with the upper face coated with slate microgranules and the lower face with a self-adhesive elastomeric mixture. The membrane will have a mass-to-area ratio (EN 1849-1) of 3 kg/m² and Euroclass E reaction to fire (EN 13501-1), a maximum tensile force (EN 12311-1) L/T of 600/500 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 35/40%, resistance to tearing (EN 12310-1) L/T of 200/200 N, resistance to impact (EN 12691 - method A) of 1,000 mm, resistance to static load (EN 12730) of 10 kg, heat dimensional stability (EN 1107-1), L/T of -0.3/+0.30%, and cold bend (EN 1109) of -25°C.

CONCRETE WATERPROOFING PRODUCTS

**COVERCOL AB RAPID WATERTIGHT INSULATION**

Waterproofing carried out by applying two coats of COVERCOL AB RAPID two component elastomer-concrete mortar with a trowel or spray gun for a final thickness of at least 2 mm. The product must meet the requirements of EN 1504-1, according to the PI-MC-CR principles for the protection of concrete, and the requirements of standard EN 14891 as a waterproofing base under tiled surfaces. If the foundation is more than 10 m² in size, a RINFOTEX PLUS reinforcement in 100% stabilised non-woven polypropylene fabric must be laid between the first and second coats of the product.

LAYING: COVERCOL AB RAPID two-component elastomer-concrete waterproof adhesive with elongation at max. tensile force of 40±5% according to NFT 46002 for ceramic, stone or mosaic floor and wall tiles. The product must meet the requirements of EN 12004 class C2 and EN 12002 class S2.

BITUMINOUS-ELASTOMER WATERPROOFING PRODUCTS

**UNOLASTIC**

UNOLASTIC waterproofing carried out by applying a ready to use single component bituminous elastomer paste with elongation at max. Tensile force of 240±40% according to NFT-46002 and crack bridging ability ≥3.0 mm according to EN 14891 with a brush, roller, trowel or spray gun, for a final thickness of at least 2 mm, (if applied with reinforcement the final thickness will be no less than 3 mm). The product must meet the requirements of EN 1504-1, according to the PI-MC-CR principles for the protection of concrete, and the requirements of standard EN 14891 as a waterproofing base under tiled surfaces. If the foundation is more than 10 m² in size, a RINFOTEX PLUS reinforcement in 100% stabilised non-woven polypropylene fabric must be laid between the first and second coats of the product.
The data provided are indicative mean data for current production and may be changed and updated by INDEX S.p.A. at any time, without notice. The technical information and suggestions provided represent our best knowledge of the properties of the product in use. Considering the many possible uses and the possible interference of elements not under our control, we take no responsibility for the results. The Purchaser is responsible for establishing the suitability of the product for the use envisaged.