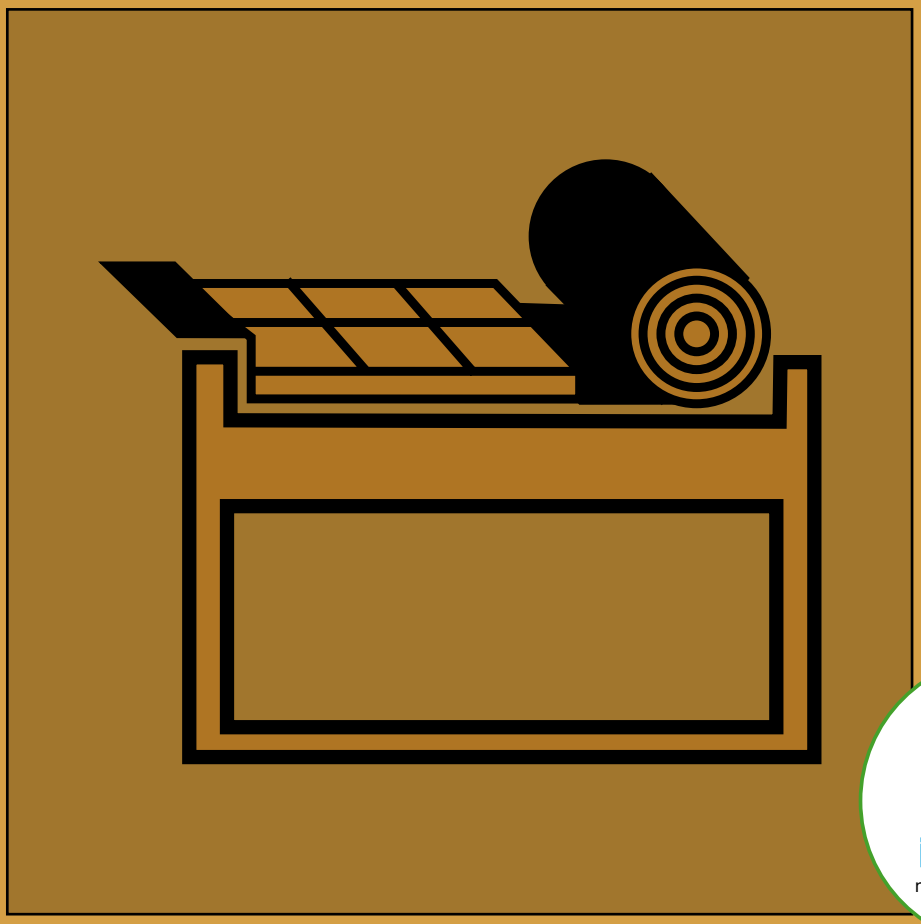
Technical specification 1

WALKABLE FLAT ROOF



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member of GBC Italia

Waterproofing and thermal insulation of concrete and masonry roofs, pre-compressed pre-fabricated reinforced concrete roofs or roofs cast on site

Walkable flat roofs (terraces) as a natural extension of the living space are increasingly common in building plans, but in order for this solution not to become an infinite source of problems, the design and implementation of the layers above the support structure of the flat roof must be tackled correctly, specifically: the thermal insulation, waterproofing and paving. On flat roofs the thermal insulation is used in combination with a continuous waterproof covering, which has high resistance to water vapour, therefore the lower surface of the insulating layer must be protected with a "vapour barrier" to prevent diffusion into the insulation, otherwise if the vapour has no means of escape through the waterproof covering, it could reach a high enough concentration to condense on the insulating layer. The thickness of the thermal insulation must be calculated in compliance with the laws in force and in such a way that the dew point does not drop below the vapour barrier. Stable compression-resistant materials must also be used. The waterproofing must be elastic and resistant both in order to absorb the mechanical strain generated by differential movements on the laying surface (roof slab, sloping screed, thermal insulation) and to withstand the strain generated by the paving above which, due to expansion caused by temperature change, tends to rip the covering through friction.
The floor must be split up by an appropriate network of expansion joints and must "float" on the waterproof covering in order to prevent cracks in the covering and to alleviate strain transmitted to the layers below. The environmental issue of fulfilling the criteria of sustainable building must also be tackled from an overall standpoint. A holistic view of sustainability implies design choices that do not only regard the energy containment of the building during its lifetime but also urban/landscape integration, the use of renewable sources of energy, the environmental impact of building products through the analysis of their life cycle LCA (Life Cycle Assessment), the impact of the building stage, as well as a forecast of the environmental impact during the management and maintenance/repair stages, partial or total modification of the intended use for parts/all of the building, during its partial or total demolition and, at the end of its lifetime, recycling of the building materials.
The waterproof systems FLEXTER TESTUDO, HELASTA POLYESTER and PROTEADUO are made up of long-lasting membranes with high mechanical resistance and excellent elasticity. They are resistant to fatigue, shear strain and tearing. They also have perforation resistance, are very thick and withstand building site traffic. The thermal insulation THERMOBASE is not subject to reductions in thickness and constitutes a solid and compact laying surface for the waterproof membranes and the paving above. With the arrival of the innovative vapour barrier membranes SELFTENE BIADESIVO, TECTENE BV STRIP and PROMINENT, the fruit of INDEX's research, which allow the layer of thermal insulation to be stuck without molten oxidised bitumen being spread onto it, the site is safer and the environmental pollution of the laying operations is reduced. Ceramic paving stuck using COVERCOL AB RAPID does not detach and is longer lasting.

FLAT ROOFS AND SUSTAINABLE BUILDING

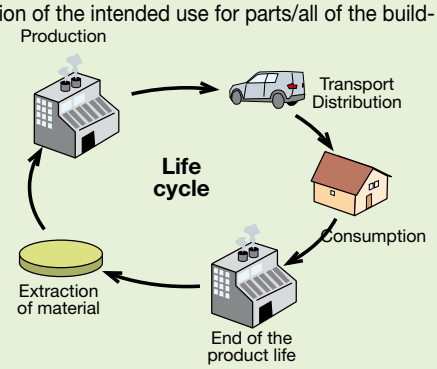
The use of flat roofs in buildings is a system used in architecture to make buildings located in urban environments more liveable and new architectural forms are now being invented such as buildings with flat roofs arranged on different levels, often combined with green roofs.
Not very commonly used in the past, flat roofs have developed in recent years with the arrival of concrete and the new architectural trends developed by Rationalism in the early 20th century, whose best known exponent was Le Corbusier.

ENERGY SAVING IN BUILDINGS

The building envelope closes off the living environment in which comfortable climatic and environmental conditions are to be maintained and therefore more stable than the external environment, which is marked by greater variability.
In order to obtain this, energy obtained from fossil fuels is consumed and the environment is polluted through the emission of harmful substances and carbon dioxide, leading to the greenhouse effect and heating up the planet.
Therefore, building, like other human and industrial activities, is involved in the reduction of energy consumption, an objective that governments all over the world are imposing through laws, technical regulations and incentives.
Flat roofs, which constitute the horizontal partition of the building's envelope, are also involved in the problem of energy saving.
Energy consumption in existing buildings is the first problem to be considered because it is ongoing, even if, as can be seen below, it is not the only one considered in the design principles of bio-architecture.
Although it has a warmer climate, due to the poor insulation in Italy the total energy requirement of buildings, mainly for heat energy, is 300 kWh/m^2/year, whereas in countries with better insulation, such as Sweden it is 60 kWh/m^2/year and in Germany 200 kWh/m^2/year. In Italy there are peaks of 500 kWh/m^2/year.
The legislative provisions for energy saving are concerned with reducing heat dispersion in buildings through issuing maximum thermal transmittance limits of the building envelope according to the climatic area in which they are located; this is fulfilled by increasing thermal insulation.

FLAT ROOFS AND BIO-ARCHITECTURE

Naturally, respecting the thermal transmittance limits during the design and building stages makes no sense if the design solution does not last over time, and the durability of the insulation does not only depend on the quality of the insulating material.
Therefore, as well as energy containment, the design principles of bio-architecture also consider urban/landscape integration, the use of renewable sources of energy, the environmental impact of building products through the analysis of their life cycle LCA (Life Cycle Assessment), the impact of the building process, as well as a forecast of the environmental impact during the management and maintenance/repair stages, partial or total modification of the intended use for parts/all of the building, during its partial or total demolition and, at the end of its lifetime, recycling of the building materials.



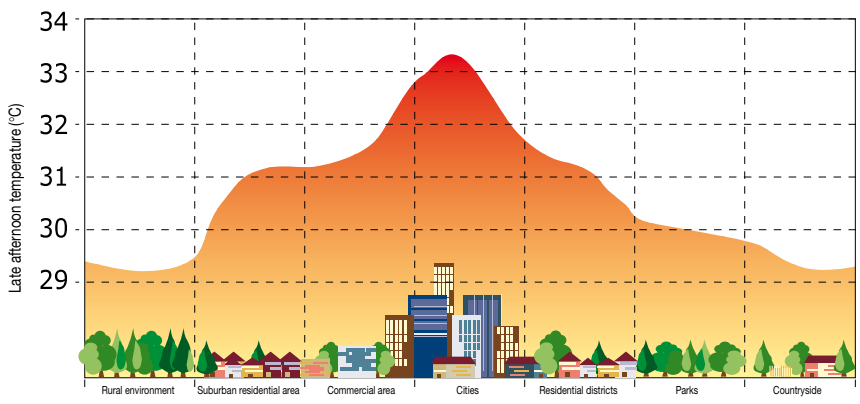
One of the main requirements for ***sustainable building*** is the durability of the technical solutions provided by the design and the fact that they are easy to dismantle, which both lead to a lower consumption of resources, therefore INDEX has not stopped at just producing high performance insulating materials but, in order to maintain the thermal insulation performance over time, it has produced specific technical publications suggesting the best protection systems that are safe and easy to maintain and repair.
An example of this is the flat "inverted roof" made up of a floating floor in squares of concrete laid dry on plastic HELASTORING supports, which rest on a layer of thermal insulation in extruded polystyrene panels laid without any constraints on a waterproof covering without adhesion.
An alternative to this is the configuration of multifunctional roofs illustrated in the following picture, made up of areas set up for different functions with prefabricated separating elements laid dry on a single waterproof covering, also applied without adhesion, almost always with a root inhibitor additive to allow the possible expansion of green areas without having to do any work on the waterproofing.

PAVING IN SQUARES ON HELASTORING SUPPORTS

FLAT ROOFS AND HEAT ISLANDS

Another important problem in which roof terraces are involved is the reduction of the effects of "heat islands".
The EPA (Environmental Protection Agency), the US agency for the protection of the environment, launched a campaign for the reduction of the "Heat Island Effect" a long time ago. This refers to the phenomenon of raised temperatures in urban areas compared to the temperature of rural areas, which can cause serious consequences in summer time. These are real "Heat Islands" that tower over the cities, where the temperature difference can range from 1 to 6°C.
In summer a dangerous peak of electrical absorption occurs due to air conditioning, hence the risk of blackouts, along with an increase in pollution levels, diseases and deaths.

PHENOMENON OF URBAN HEAT ISLANDS



The strategies identified by the EPA to reduce urban overheating are:
- Increasing green areas, including roofs (Green Roofs)
- Cooling the roofs of buildings with reflecting paints or membranes (Cool Roofs)
- Cooling urban paving, including terraces (Cool Pavements)

Hence the importance of the reflecting capacity of solar radiation along with the infrared emissivity of the paving on the flat roof that are expressed together by the SRI (Solar Reflectance Index) which must be high and in general refers to light coloured floors. As an example, the RSI values referring to concrete flat roofs are shown.

MATERIAL	Emissivity	Reflection	SRI
Classic grey concrete - New	0,9	0,35	35
Classic grey concrete - Aged	0,9	0,20	19
Classic white concrete - New	0,9	0,7	86
Classic white concrete - Aged	0,9	0,4	45

DESIGN CERTIFICATION

In Italy the legislation in force for the certification of the environmental quality of a construction is fragmentary and mainly refers to energy consumption, hence there is a lack of tools for a holistic evaluation of the building's environmental impact.
LEED (Leadership in Energy and Environmental Design) certification, which was devised in the USA, has now become widespread all over the world. It is promoted in Italy by the GBC, whose main aim is to encourage ***sustainable building*** on the Italian market through the LEED system, developed over more than 10 years' experience by USGBC. In this sense GBC Italia is aiming to make use of the result of the work carried out by USGBC in the USA and adapt the various aspects tackled by it to the Italian situation.

GBC ITALIA (Green Building Council) AND LEED CERTIFICATION

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socio del GBC Italia

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

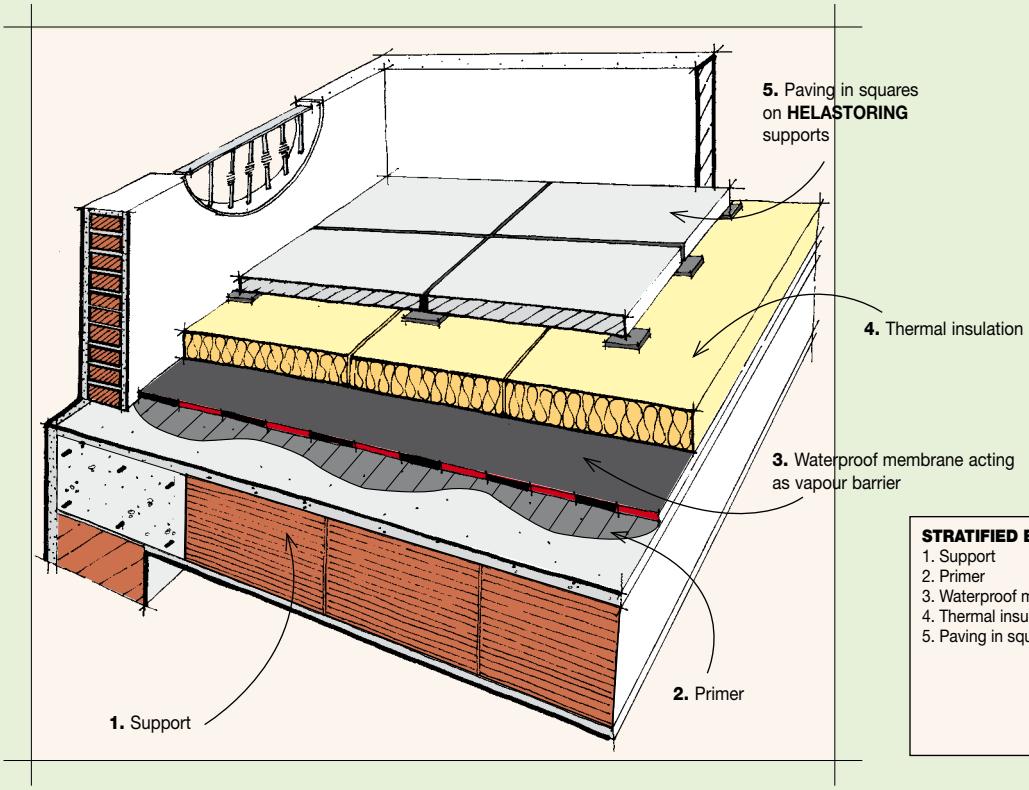
There are 4 rating levels:
- Certified: between 40 and 49 points
- Silver: between 50 and 59 points
- Gold: between 60 and 79 points
- Platinum: more than 80 points

The following point in the LEED regulations includes the solar reflectance index:

- ***SS Credit 7.2: Heat Island Effect - Roof***

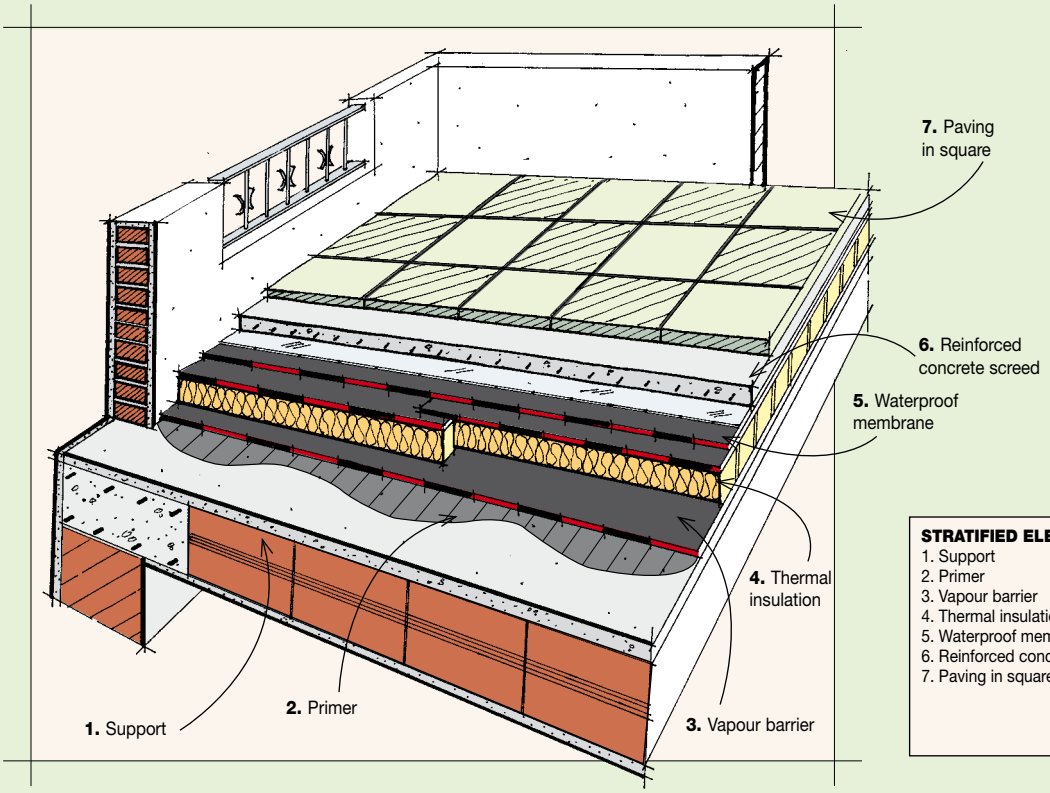
SRI (solar reflectance index) limits of the roofing materials

"INVERTED" ROOFS



STRATIFIED ELEMENTS
1. Support
2. Primer
3. Waterproof membrane acting as vapour barrier
4. Thermal insulation
5. Paving in squares on **HELASTORING** supports

WALKABLE FLAT ROOF



STRATIFIED ELEMENTS
1. Support
2. Primer
3. Vapour barrier
4. Thermal insulation
5. Waterproof membrane
6. Reinforced concrete screed
7. Paving in squares on **HELASTORING** supports

PRIMER

Il primer penetra nelle porosità delle superfici cementizie, ne blocca la polverosità e ha la funzione di favorire l'adesione sulle superfici su cui le membrane devono essere incollate. INDEVER è un primer bituminoso tradizionale a base di solventi; più innovativo e di minor impatto ambientale il primer ECOVER a base acqua. Tutta la superficie da rivestire e le parti verticali sulle quali il manto impermeabile dovrà essere incollato, saranno verniciate con una mano da 300 gr/m^2 ca. di primer bituminoso di adesione INDEVER, soluzione bituminosa a base di bitume ossidato, additivi e solventi con residuo secco (UNI EN ISO 3251) del 40% e viscosità (UNI EN ISO 2431) di 12÷17 s, oppure ECOVER, a base di un'emulsione bituminosa all'acqua con un residuo secco (UNI EN ISO 3251) del 37% steso in ragione di 250÷400 g/m^2.

VAPOUR BARRIER

The water vapour, which during the winter season migrates towards the outside of the heated building, meets with the opposition of the waterproof layer under which it could condense and therefore dampen the adjacent thermal insulation. Wet thermal insulation does not insulate any longer and can be deformed, hence damaging all the stratified elements. Therefore, it is necessary to stop the vapour before it reaches the thermal insulation in a sufficiently warm point of the stratified elements to make the amount of condensation that could form negligible. The layer that protects the insulation from the vapour is called the "vapour barrier". According to the different situations and requirements different technological solutions are identified for the vapour barrier.

	Traditional	**Innovative cold-bonded double-sided adhesive** (with cold bonding of the insulation incorporated)	**Innovative heat-bonded** (with heat bonding of the insulation incorporated)
Vapour barrier on roofs of rooms with low humidity (relative humidity <80% at 20°C)	caso **A** **DEFEND - 3 mm** heat-bonded adhesive under stuck insulation (1)	caso **C** **SELFTENE BV BIADESIVO POL. SELFTENE BV BIADESIVO/V** cold-bonded adhesive under stuck insulation (*) (2)	caso **E** **TECTENE BV STRIP POL. TECTENE BV STRIP/V PROMINENT POL.** heat-bonded adhesive under stuck insulation (3)
Vapour barrier on roofs of rooms with high humidity (relative humidity ≥80% at 20°C)	caso **B** **DEFEND ALU POL. - 3 mm** heat-bonded adhesive under stuck insulation (1)	caso **D** **SELFTENE BV BIADESIVO ALU POLYESTER** cold-bonded adhesive under stuck insulation (*) (2)	caso **F** **TECTENE BV STRIP ALU POL. PROMINENT ALU POL.** heat-bonded adhesive under stuck insulation (3)

(1) *Insulation stuck with molten oxidised bitumen*
(2) *Insulation cold-bonded onto the upper self-adhesive face of the vapour barrier*
(3) *Insulation stuck by heat bonding the strips or heat-adhesive embossings on the upper face of the vapour barrier*

A; B. *On DEFEND heat-resistant insulating panels and THERMOBASE PUR are chosen.*
C; D. *On SELFTENE BV BIADESIVO polystyrene or polyurethane panels can be stuck, and THERMOBASE PSE and THERMOBASE PUR*
E; F. *Heat bonding on PROMINENT is reserved for heat-resistant thermal insulation and THERMOBASE PUR, whereas on TECTENE BV STRIP polystyrene and polyurethane panels can be stuck, and THERMOBASE PSE and THERMOBASE PUR using suitably trained labour*

THERMAL INSULATION

This is required for containing energy consumption and limiting any expansion of the load-bearing structure; it also prevents internal condensation of water vapour on cold walls. Either fibrous or cellular, the most common insulators are: glass or rock mineral fibre panels, expanded polyurethane or polystyrene panels, perlite agglomerates and cellulose fibres, cellular glass, cork, etc. INDEX S.p.A. produces the THERMOBASE insulation in rolls, made up of strips of insulating material already stuck onto a polymer-bitumen membrane, a product that meets the specifications of ***sustainable building*** as membrane/insulation coupling in the factory reduces the laying operations on the roof and the consequent emission of fumes, smells and noise in the environment.

For flat roofs, the types envisaged in the event of using THERMOBASE are:

- THERMOBASE PUR/35-P4
- THERMOBASE PSE/120-P4
- THERMOBASE PSE/EX-P4

Except for in the system known as an "inverted roof", the insulation is always protected by the waterproof covering. The insulating materials are produced in different types, densities and dimensions, according to their destination. For flat roofs, it is important to choose materials that are resistant to compression in the type whose laying is expressly declared by the manufacturer as suitable for insulating roofs that are to be paved and compatible with the polymer-bitumen membranes and bituminous materials in general.

Cellular insulating materials are preferable because, in the event of leaks in the waterproof covering, they absorb less water.

Heat resistant insulating panels (perlite, expanded polyurethane, cork, mineral wools), such as THERMOBASE PUR can be stuck with molten oxidised bitumen or, for safer laying that reduces the risk of burns and the emission of fumes and smells, they can be heat-bonded on Prominent and TECTENE BV STRIP EP membranes (with the exception of cellular glass) and can be heat-bonded directly onto the waterproof covering suggested below. Expanded polystyrene insulating panels can be heat-bonded onto TECTENE BV STRIP EP or cold-bonded onto SELFTENE BV BIADESIVO and then, before laying the waterproof covering, they must be protected with the self-heat-adhesive membrane in the AUTOTENE BASE series, which is stuck alone onto the polystyrene panel using the heat transmitted from the heat bonding of the waterproof covering above; alternatively rolls of insulation pre-coupled to a membrane such as THERMOBASE PSE/120 or THERMOBASE PSE/EX can be used. The thickness of the insulation must be sufficiently high to prevent the dew point dropping below the vapour barrier and must comply with legislation in force on energy containment in buildings.

THERMOBASE PUR/35-P4					
Thickness	20	30	40	50	60
Thermal resistance R(m^2K/W)	0,686	1,025	1,362	1,695	2,029

THERMOBASE PSE/120-P4							
Thickness	20	30	40	50	60	70	80
Thermal resistance R(m^2K/W)	0,494	0,740	0,985	1,217	1,458	1,705	1,947

THERMOBASE PSE/EX-P4					
Thickness	20	25	30	40	50
Thermal resistance R(m^2K/W)	0,559	0,838	1,114	1,377	1,650

WATERPROOFING LAYER

This is the continuous layer that prevents water passing through the roof, protects and keeps the thermal insulation dry, conserving energy containment over time for which it was designed. It must have high mechanical resistance and elasticity and a sufficient resistance to impact and static load so as not to be perforated while the paving above is being laid. The high fatigue resistance of the materials, higher for elastomeric membranes even at low temperatures, allows the choice of the connection of the covering to the laying surface with complete adhesion. The completely stuck covering is more resistant to impact and static load and in the event of accidental tearing, unlike coverings laid dry or with semi-adhesion, not much water can pass through. On concrete surfaces it is recommended to lay with low adhesion, rather than with complete adhesion, in order to prevent the formation of vapour bubbles on the covering due to humidity trapped in damp supports before the screed is laid.

The envisaged membranes, certified with Agrément ITC-CNR (former ICITE) and compliant with relative EC marking, can also be laid in a single layer, 4 mm thick. However, it is better to reserve this arrangement for stratified elements that can be completely dismantled and easily inspected, such as inverted roofs under the paving in prefabricated concrete squares resting on HELASTORING feet. For paving on screeds cast on site, in order to guarantee increased safety and in relation to the fact that a defect on the covering of a flat roof implies costly demolition of the paving above, it has become common practice to lay a double layer.

The systems recommended in this publication are as follows:

- **Single layer on inverted roof under thermal insulation in extruded polystyrene ballasted with concrete squares on HELASTORING supports**
  - PROTEADUO TRIARMATO 4 mm
  - HELASTA POLYESTER 4 mm
  - FLEXTER TESTUDO SPUNBOND POL. 4 mm
- **Single layer on concrete laying surface under concrete squares on HELASTORING supports**
  - PROTEADUO TRIARMATO 4 mm
  - HELASTA POLYESTER 4 mm
  - FLEXTER TESTUDO SPUNBOND POL. 4 mm
- **Double layer on concrete laying surface and above traditional thermal insulation, under screed cast on site and under concrete squares on HELASTORING supports**
  - HELASTA POLYESTER 4 mm + PROTEADUO TRIARMATO 4 mm
  - HELASTA POLYESTER 4 mm applicato in doppio strato
  - FLEXTER TESTUDO SPUNBOND POL. 4 mm applicato in doppio strato

In the event of laying the aforementioned membranes on the THERMOBASE thermal insulation mentioned in the previous chapter, laying in a double layer is automatic because the insulation is pre-coupled with a membrane reinforced with non-woven polyester fabric. The use of membranes and durable systems certified with Agréments such as those suggested in this document meets the specifications of ***sustainable building*** as the primary requirement of the durability of the system is fulfilled, hence delaying the repair and/or demolition work timescales implies a lower consumption of raw materials, less energy consumption, less waste production and lower emissions of pollutants and greenhouse gases over time.

FLOORING

The paving layer performed on site must be correctly designed and carefully implemented. Particular attention must be paid to its insulation from the waterproof covering with a suitable sliding layer. The screed and the floor must have suitable expansion joints in order to prevent damage to the waterproof covering below due to thermal contraction in the upper layers.

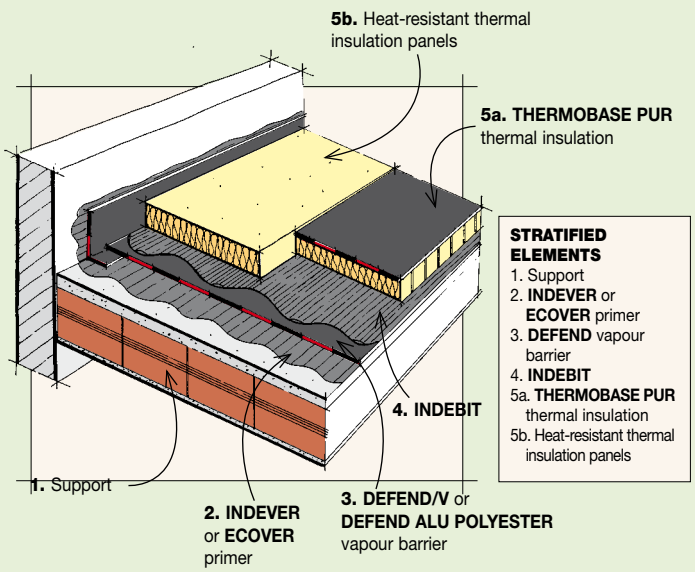
Information on this can be found in the chapter on technical details (page 16).

A special mention must be given to the dry paving system using concrete squares laid on HELASTORING supports, which meets the specifications of ***sustainable building***. This is a system with greater ecological, economic and practical value, performed dry without producing waste and allowing the repair of the covering without demolition or waste production and can be dismantled in the event that the intended use of the roof changes.

The paving system on HELASTORING is also compatible with the "inverted roof" system where the covering applied straight onto the concrete surface also acts as a vapour barrier for the extruded expanded polystyrene panel laid above and onto which the supports of the squares are resting. The stratified elements can be completely dismantled, inspected and repaired at a low cost and meet the requirements of ***sustainable building*** better.

A system for reducing foot traffic noise on terraces (page 25) has also been developed, based on the use of the FONOSTOPStrato insulation, which also acts as a sliding and protection layer for the waterproof covering at the same time. The use of light coloured paving with high reflectance is a precaution that meets the specifications of ***sustainable building*** as it reduces the surface temperature of the flat roof and contributes, in compliance with the Green Building Council LEED standards, to the reduction of the phenomenon of "urban heat islands".

STANDARD VAPOUR BARRIER AND BONDING WITH MOLTEN OXIDISED BITUMEN OF HEAT-RESISTANT INSULATING PANELS OR THERMOBASE PUR PANELS



MEMBRANES:
- DEFEND/V
- DEFEND ALU POLYESTER

case A case B

Reinforced elastoplastomeric polymer-bitumen vapour barrier membranes, resistant and impermeable to gases and water vapour, to be chosen according to the vapour permeability (lower for the ALU POLYESTER version).

• Application method on concrete laying surface

Primer. The entire surface to be coated and the vertical parts onto which the waterproof covering must be bonded, are painted with a coat of about 300 g/m^2 of INDEVER adhesion bituminous primer, or alternatively ECOVER water-based primer.

Vapour barrier. The vapour barrier sheets are overlapped longitudinally by about 6 cm, whereas the end overlap is about 10 cm.

The sheets of DEFEND/V are stuck to the laying surface with complete adhesion using a propane gas torch whereas DEFEND ALU POLYESTER is spot-bonded using the same technique.

The bonding of the overlaps of both types is also carried out using a torch.

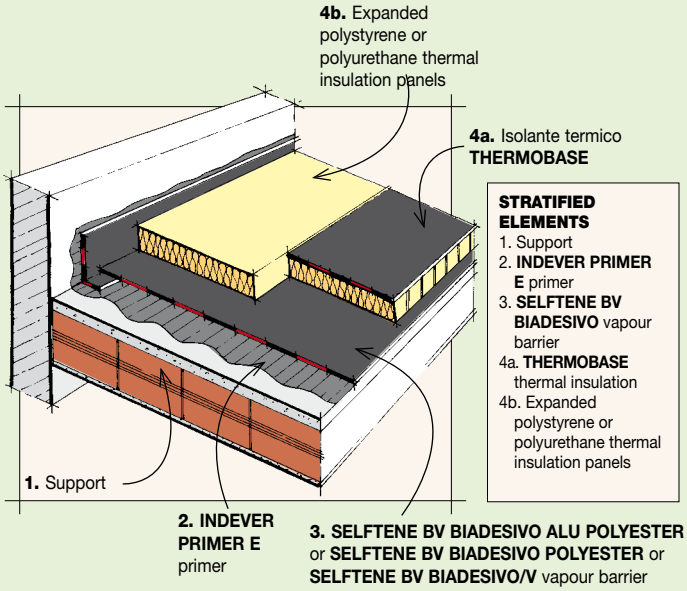
The continuity of the vapour barrier on the vertical parts is carried out by heat bonding, onto the edge of the bottom of the projecting parts, a band of membrane wide enough to cover the flat part by at least 10 cm and be turned up vertically by 5 cm more than the thickness of the envisaged insulation.

To fix the insulation panels or rolls of THERMOBASE insulation onto the vapour barrier, the insulating elements are heat-bonded with oxidised bitumen such as molten INDEBIT at a temperature of no more than 220°C, using 1.5÷2 kg/m^2. (For the purpose heat-resistant panels are chosen using appropriately trained labour).

Then the overlaps of the membrane coupled with THERMOBASE are heat-bonded.

The connections to the vertical parts are turned up and heat-bonded by at least 20 cm onto the maximum water level and are made up of bands of a polymer-bitumen waterproofing membrane reinforced with spunbond non-woven polyester fabric, stabilised with fibreglass, that is certified with the Agrément of the I.T.C. such as FLEXTER TESTUDO SPUNBOND POLYESTER, 4 mm thick.

DOUBLE-SIDED ADHESIVE VAPOUR BARRIER AND COLD-BONDING OF EXPANDED POLYSTYRENE OR POLYURETHANE, THERMOBASE PSE, THERMOBASE PSE/EX AND THERMOBASE PUR INSULATING PANELS



MEMBRANES:
- SELFTENE BV BIADESIVO ALU POLYESTER
- SELFTENE BV BIADESIVO POLYESTER
- SELFTENE BV BIADESIVO/V

case C case D

Reinforced elastomeric polymer-bitumen vapour barrier membranes, double-sided adhesive, multi-functional, resistant, elastic, impermeable to gases and water vapour, to be chosen according to the vapour permeability (lower for the POLYESTER ALU version) or the mechanical resistance (higher for POLYESTER).

The adhesive faces on both sides create the dual function of vapour barrier below the thermal insulation panels, to protect them from the humidity generated inside the building, and adhesive layer, for gluing them onto the roof.

These are products to be laid cold, which meet the specifications of ***sustainable building*** as by eliminating the melting pot for the oxidised bitumen, the risks of burns is also eliminated, the laying operations on the roof are reduced and therefore also the emission of fumes, smells and noise.

• Application method on concrete laying surface

Primer. The entire surface to be coated and the vertical parts onto which the waterproof covering must be bonded, are painted with a coat of about 350-500 g/m^2 of INDEVER PRIMER E adhesion bituminous primer.

Vapour barrier. Once you have aligned and overlapped the sheets along the special longitudinal overlap strip on the top face, remove the silicone-coated film on the bottom face of the membrane and glue in place.

The end overlap is approximately 10 cm and is sealed by simple cold pressure, likewise for the longitudinal overlaps.

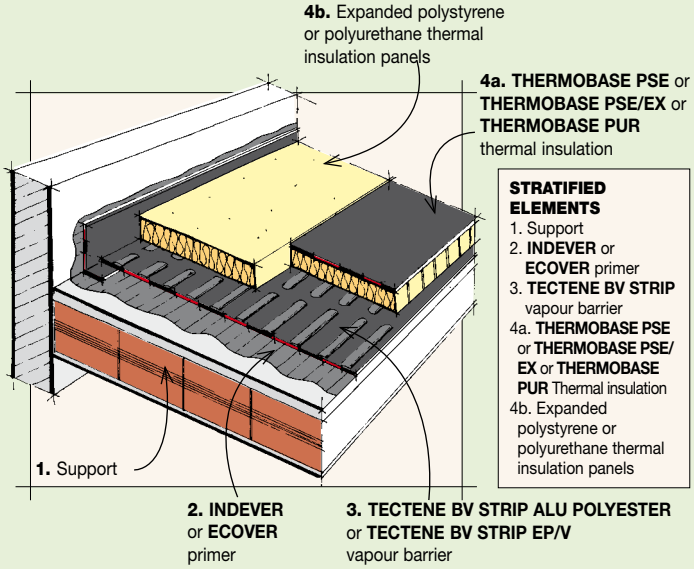
The membrane is turned up on the vertical parts by 5 cm more than the thickness of the envisaged insulation.

The rows of sheets are arranged in such a way as to offset the end overlaps to prevent 4 sheets crossing.

Adhesion to the laying surface is consolidated by pressing evenly using a metal roller, with particular care on the sheet overlaps.

To stick the insulation panels onto the vapour barrier, remove the silicone-coated film also from the top face and, to prevent the adhesive face from getting dirty and the operator from getting stuck on the glue, just remove the film gradually while sticking the panels in place. Adhesion is consolidated by pressing the adhesive surface of the panel carefully.

VAPOUR BARRIER WITH INCORPORATED HOT-MELT ADHESIVE FOR THE ADHESION OF THE LAYER OF THERMAL INSULATION AND HEAT BONDING OF EXPANDED POLYSTYRENE OR POLYURETHANE, THERMOBASE PSE, THERMOBASE PSE/EX AND THERMOBASE PUR PANELS



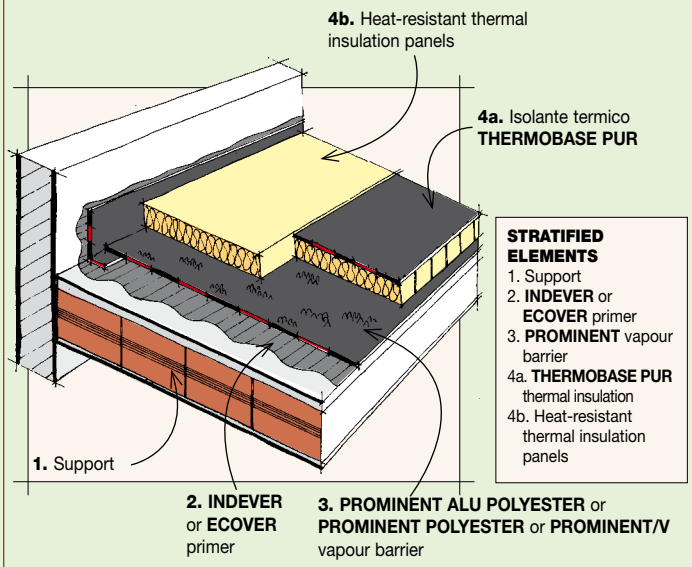
MEMBRANES:
• TECTENE BV STRIP ALU POLYESTER
• TECTENE BV STRIP EP/V

case E
case F

Reinforced elastoplastomeric polymer-bitumen vapour barrier membranes, with the upper face covered in hot-melt strips for heat-bonding to the insulating panels, resistant and impermeable to gases and water vapour, to be chosen according to the vapour permeability (lower for the ALU POLYESTER version).
These are products to be heat-bonded, which meet the specifications of ***sustainable building*** as by eliminating the melting pot for the oxidised bitumen, the risks of burns are notably reduced, the laying operations on the roof are reduced and therefore also the emission of fumes, smells and noise.

• Application method on concrete laying surface
Primer. The entire surface to be coated and the vertical parts onto which the waterproof covering must be bonded, are painted with a coat of about 300 g/m^2 of INDEVER adhesion bituminous primer, or alternatively ECOVER water-based primer.
Vapour barrier. The vapour barrier sheets are overlapped longitudinally by about 6 cm along the selvages with reduced thickness, especially provided on the edge of the sheet in order to allow overlapping without any protruding parts and to obtain a sufficiently flat laying surface for the insulating panels. The end overlap should be about 10 cm.
The sheets of TECTENE BV STRIP EP/V are stuck to the laying surface with complete adhesion using a propane gas torch whereas TECTENE BV STRIP EP ALU POLYESTER is spot-bonded using the same technique.
The bonding of the overlaps of both types is also performed using a torch.
The continuity of the vapour barrier on the vertical parts is carried out by heat bonding, onto the edge of the bottom of the projecting parts, a band of elastoplastomeric polymer-bitumen membrane reinforced with composite non-woven polyester fabric coupled to aluminium foil, such as DEFEND ALU POLYESTER, in the event of laying STRIP EP ALU POLYESTER, or reinforced with a fibreglass felt such as DEFEND/V, in the event of laying STRIP EP/V, wide enough to cover the flat part by at least 10 cm and be turned up vertically by 5 cm more than the thickness of the envisaged insulation.
For sticking the insulating panels or THERMOBASE rolls of insulation onto the vapour barrier, the heat-adhesive strips, which cover their upper face, must be heated with a propane gas torch activating adhesion, and the insulating layer that is pressed on top sticks to it perfectly.
For expanded polystyrene, to prevent melting, the torching must be carried out by appropriately trained staff.

VAPOUR BARRIER WITH INCORPORATED HOT-MELT ADHESIVE FOR THE ADHESION OF THE LAYER OF THERMAL INSULATION AND HEAT-BONDING OF HEAT-RESISTANT INSULATING PANELS OR THERMOBASE PUR PANELS



MEMBRANES:
• PROMINENT ALU POLYESTER
• PROMINENT POLYESTER
• PROMINENT/V

case E
case F

Reinforced elastoplastomeric polymer-bitumen vapour barrier membranes, with the upper face covered in heat-adhesive embossings for heat-bonding to the insulating panels, resistant and impermeable to gases and water vapour, to be chosen according to the vapour permeability (lower for the ALU POLYESTER version) or the mechanical resistance (higher for POLYESTER).
These are products to be heat-bonded, which meet the specifications of ***sustainable building*** as by eliminating the melting pot for the oxidised bitumen, the risks of burns are notably reduced, the laying operations on the roof are reduced and therefore also the emission of fumes, smells and noise.

• Application method on concrete laying surface
Primer. The entire surface to be coated and the vertical parts onto which the waterproof covering must be bonded, are painted with a coat of about 300 g/m^2 of INDEVER adhesion bituminous primer, or alternatively ECOVER water-based primer.
Vapour barrier. The vapour barrier sheets are overlapped longitudinally by about 6 cm along the two selvages with reduced thickness, especially provided on the edges of the sheet in order to allow overlapping without any protruding parts and to obtain a sufficiently flat laying surface for the insulating panels, whereas the tops of the sheets are laid opposite each other and heat-bonded onto strips of DEFEND or DEFEND ALU POLYESTER 3 mm thick and 14 cm wide, which have been previously stuck onto the laying surface.
The sheets of PROMINENT/V and PROMINENT POLYESTER are stuck to the laying surface with complete adhesion using a propane gas torch whereas PROMINENT ALU POLYESTER is spot-bonded using the same technique.
The bonding of the overlaps of both types is also performed using a torch.
The continuity of the vapour barrier on the vertical parts is carried out by heat-bonding, onto the edge of the bottom of the projecting parts, a band of elastoplastomeric polymer-bitumen membrane reinforced with composite non-woven polyester fabric coupled to aluminium foil, like DEFEND ALU POLYESTER, wide enough to cover the flat part by at least 10 cm and be turned up vertically by 5 cm more than the thickness of the envisaged insulation.
For sticking the heat-resistant insulating panels or THERMOBASE PUR rolls of insulation above the vapour barrier, the heat-adhesive embossings, which cover their upper face, must be heated with a propane gas torch, activating adhesion and the insulating layer that is pressed on top sticks to them perfectly.

THERMAL INSULATION AND FIRST LAYER OF THE WATERPROOF COVERING WITH • THERMOBASE PSE/120 • THERMOBASE PSE/EX

Thermal insulators in boards coupled to waterproofing membranes supplied in rolls.
The thickness of the insulation must be sufficiently high to prevent the dew point dropping below the vapour barrier and must comply with legislation in force on energy containment in buildings.

• Application method on TECTENE BV STRIP
By heating the heat-adhesive strips that cover the upper face of the vapour barrier using a propane gas torch, the adhesion is activated, and the roll of THERMOBASE insulation pressed on top sticks to it perfectly. Then the overlaps and connections to the vertical parts are turned up and heat-bonded by at least 20 cm onto the maximum water level and are made up of bands of a polymer-bitumen waterproofing membrane reinforced with spunbond non-woven polyester fabric, stabilised with fibreglass, that is certified with the Agrément of the I.T.C. such as FLEXTER TESTUDO SPUNBOND POLYESTER 4 mm thick.
The torching of the heat-adhesive strips and the bonding of the overlap of the elements must be carried out by appropriately trained staff and must take place with necessary caution in order to prevent the expanded polystyrene melting.

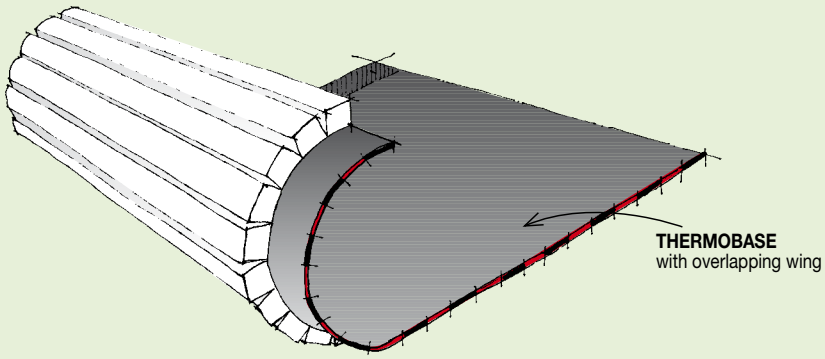
• Application method on SELFTENE BV BIADESIVO
To stick the insulation panels onto the vapour barrier, remove the silicone-coated film also from the top face of SELFTENE BIADESIVO and, to prevent the adhesive face from getting dirty and the operator from getting stuck on the glue, just remove the film gradually while unrolling the rolls of THERMOBASE. Adhesion is consolidated by pressing the adhesive surface of the insulation carefully.
Then the overlaps and connections to the vertical parts are turned up and heat-bonded by at least 20 cm onto the maximum water level and are made up of bands of a polymer-bitumen waterproofing membrane reinforced with spunbond non-woven polyester fabric, stabilised with fibreglass, that is certified with the Agrément of the I.T.C. such as FLEXTER TESTUDO SPUNBOND POLYESTER 4 mm thick.

THERMAL INSULATION AND FIRST LAYER OF THE WATERPROOF COVERING WITH • THERMOBASE PUR

Thermal insulators in boards coupled to waterproofing membranes supplied in rolls.
The thickness of the insulation must be sufficiently high to prevent the dew point dropping below the vapour barrier and must comply with legislation in force on energy containment in buildings.

• Application method on TECTENE BV STRIP or PROMINENT
By heating the embossings or heat-adhesive strips that cover the upper face of the vapour barrier using a propane torch, the adhesion is activated, and the roll of THERMOBASE insulation pressed on top sticks to it perfectly. Then the overlaps and connections to the vertical parts are turned up and heat-bonded by at least 20 cm onto the maximum water level and are made up of bands of a polymer-bitumen waterproofing membrane reinforced with spunbond non-woven polyester fabric, stabilised with fibreglass, that is certified with the Agrément of the I.T.C. such as FLEXTER TESTUDO SPUNBOND POLYESTER 4 mm thick.

• Application method on SELFTENE BV BIADESIVO
To stick the insulation panels onto the vapour barrier, remove the silicone-coated film also from the top face of SELFTENE BIADESIVO and, to prevent the adhesive face from getting dirty and the operator from getting stuck on the glue, just remove the film gradually while unrolling the rolls of THERMOBASE. Adhesion is consolidated by pressing the adhesive surface of the insulation carefully.
Then the overlaps and connections to the vertical parts are turned up and heat-bonded by at least 20 cm onto the maximum water level and are made up of bands of a polymer-bitumen waterproofing membrane reinforced with spunbond non-woven polyester fabric, stabilised with fibreglass, that is certified with the Agrément of the I.T.C. such as FLEXTER TESTUDO SPUNBOND POLYESTER 4 mm thick
.



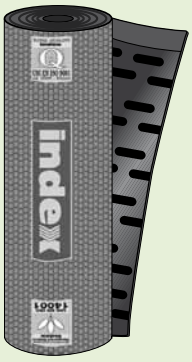
LAYING THERMOBASE ON MULTIFUNCTIONAL VAPOUR BARRIERS

SELFTENE BV BIADESIVO

Self-adhesive mixture

PROMINENT

Heat-adhesive embossings



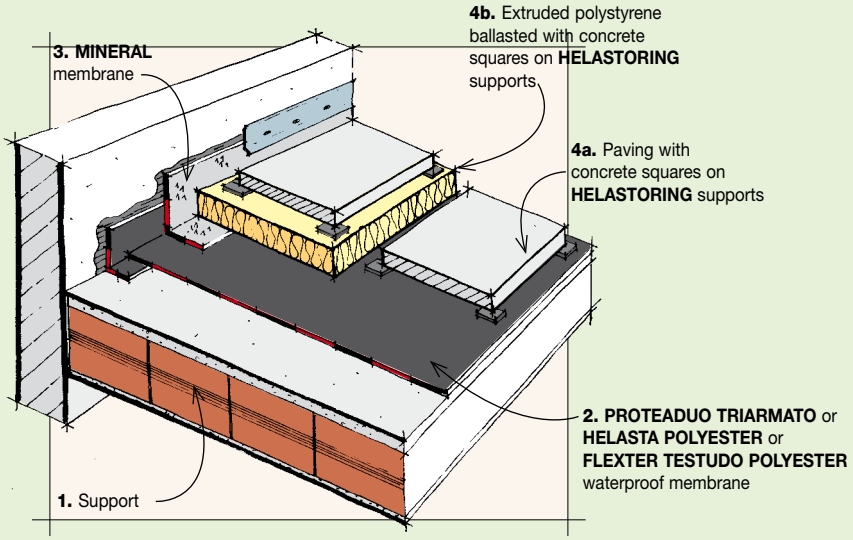
TECTENE BV STRIP

Heat-adhesive strips

Advantages of the system:

- Fire risk from the hot bitumen melting pot is eliminated
- No more burns
- No more fumes
- No more smells
- It can also be stuck safely on slopes

SINGLE-LAYER WATERPROOF COVERING ON CONCRETE LAYING SURFACE:
• UNDER CONCRETE SQUARES ON HELASTORING SUPPORTS
• UNDER EXTRUDED POLYSTYRENE BALLASTED WITH CONCRETE SQUARES ON HELASTORING SUPPORTS



STRATIFIED ELEMENTS
1. Support
2. **PROTEADUO** or **HELASTA** or **FLEXTER TESTUDO** waterproof membrane
3. **MINERAL** membrane
4a. Paving with concrete squares on **HELASTORING** supports
4b. Extruded polystyrene ballasted with concrete squares on **HELASTORING** supports

• Laying method

Primer. The vertical parts onto which the waterproof covering must be stuck, are painted with a coat of about 300 g/m^2 of INDEVER adhesion bituminous primer, or alternatively ECOVER water-based primer.

Single-layer waterproof covering. A polymer-bitumen waterproofing membrane, 4 mm thick, chosen from the types listed below, is laid with low adhesion 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 heat-bonded using a propane gas torch.

The turn-up of the waterproof covering on the vertical parts, which is turned up and stuck with complete heat-bonded adhesion on the protruding parts by 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 then protected by a layer of plaster. If, however, it remains exposed to the sunlight, it is protected by a layer of polymer-bitumen waterproofing membrane, self-protected with slate granules, 4 mm thick, of the same type as that used for the flat surface of the roof.

- **Single-layer waterproof covering with PROTEADUO TRIARMATO multi-layer composite membrane.** A multi-layer composite elastoplastomeric 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.

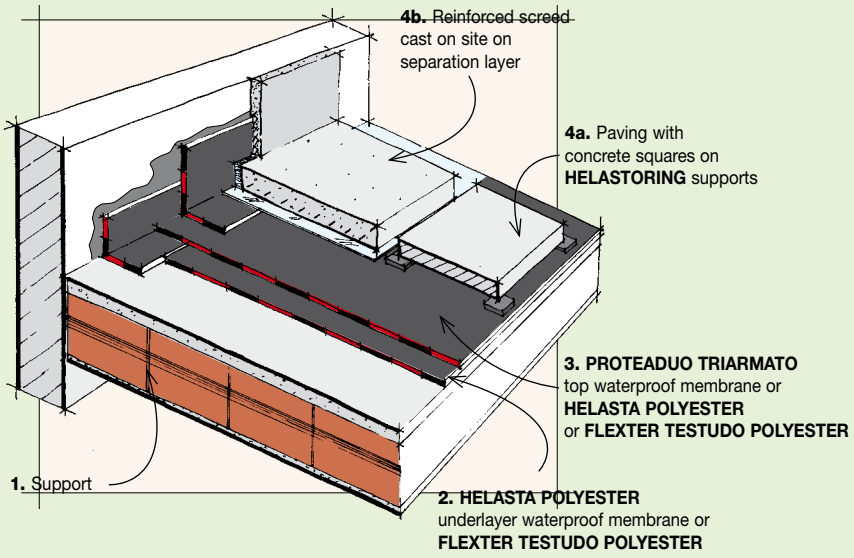
Or alternatively:

- **Single-layer waterproof covering with HELASTA POLYESTER elastomeric membrane.** An elastomeric polymer-bitumen waterproofing membrane is laid dry onto the concrete laying surface, self-protected with slate granules, 4 mm thick, reinforced with spunbond non-woven polyester fabric, such as HELASTA POLYESTER, 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 POLYESTER.

Or alternatively:

- **Single-layer waterproof covering with FLEXTER TESTUDO SPUNBOND POLYESTER elastoplastomeric membrane.** An elastoplastomeric polymer-bitumen waterproofing membrane is laid dry onto the concrete laying surface, 4 mm thick, with composite reinforcement in spunbond non-woven polyester fabric, stabilised with fibreglass, such as FLEXTER TESTUDO SPUNBOND POLYESTER 4, 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 POLYESTER.

DOUBLE-LAYER WATERPROOF COVERING ON CONCRETE LAYING SURFACE:
• UNDER SCREED CAST ON SITE
• UNDER CONCRETE SQUARES ON HELASTORING SUPPORTS



STRATIFIED ELEMENTS
1. Supporto
2. **HELASTA** underlayer waterproof membrane or **FLEXTER TESTUDO**
3. **PROTEADUO** top waterproof membrane or **HELASTA** or **FLEXTER TESTUDO**
4a. Paving with concrete squares on **HELASTORING** supports
4b. Reinforced screed cast on site on separation layer

• Laying method

Primer. The vertical parts onto which the waterproof covering must be stuck, are painted with a coat of about 300 g/m^2 of INDEVER adhesion bituminous primer, or alternatively ECOVER water-based primer.

• Double-layer waterproof covering with elastomeric membrane and multi-layer composite membrane made up of HELASTA POLYESTER + PROTEADUO TRIARMATO

- Underlayer membrane: An elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, with a radial butadiene-styrene thermoplastic rubber and distilled bitumen base, reinforced with spunbond non-woven polyester fabric, such as HELASTA POLYESTER 4, is stuck onto the laying surface with low adhesion.

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 heat-bonded using a propane gas torch. The waterproof covering is turned up and stuck with complete heat-bonded adhesion onto the vertical parts.

- Upperlayer membrane: The second layer of the waterproof covering is made up of a multi-layer composite polymer-bitumen waterproofing membrane, 4 mm thick, such as PROTEADUO TRIARMATO.

The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.

The waterproof covering is turned up and stuck onto the vertical parts at a height of least 10 cm above the level envisaged for the floor.

Or alternatively:

• Double-layer waterproof covering with HELASTA POLYESTER + HELASTA POLYESTER elastomeric membrane.

- Underlayer membrane: An elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, with a radial butadiene-styrene thermoplastic rubber and distilled bitumen base, reinforced with spunbond non-woven polyester fabric, such as HELASTA POLYESTER 4, is stuck onto the laying surface with low adhesion.

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 heat-bonded using a propane gas torch. The waterproof covering is turned up and stuck with complete heat-bonded adhesion onto the vertical parts.

- Upperlayer membrane: The second layer of the waterproof covering is made up of an elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, of the same type and with the same characteristics as the previous layer.

The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.

The waterproof covering is turned up on the vertical parts at a height of least 10 cm above the level envisaged for the floor.

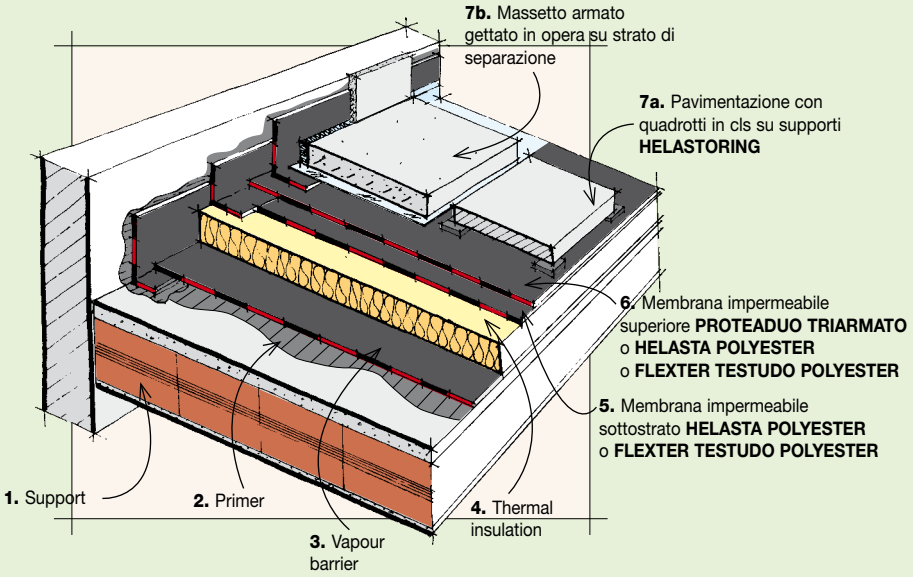
Or alternatively:

• Waterproof double-layer covering with FLEXTER TESTUDO SPUNBOND POLYESTER + FLEXTER TESTUDO SPUNBOND POLYESTER elastoplastomeric membrane.

- Underlayer membrane: An elastoplastomeric polymer-bitumen waterproofing membrane, 4 mm thick, with a distilled bitumen, plastomer and elastomer base, with composite spunbond “non-woven” polyester fabric reinforcement stabilized with fibreglass, FLEXTER TESTUDO SPUNBOND POLYESTER 4, is stuck onto the laying surface with low adhesion. 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 heat-bonded with a propane gas torch. The waterproof covering is turned up and stuck with complete heat-bonded adhesion onto the vertical parts.

- Upperlayer membrane: The second layer of the waterproof covering is made up of an elastoplastomeric polymer-bitumen waterproofing membrane, 4 mm thick, of the same type and with the same characteristics as the previous layer. The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps. The waterproof covering is turned up on the vertical parts at a height of least 10 cm above the level envisaged for the floor.

DOUBLE-LAYER WATERPROOF COVERING ON LAYER OF HEAT-RESISTANT THERMAL INSULATION:
• UNDER SCREED CAST ON SITE
• UNDER CONCRETE SQUARES ON HELASTORING SUPPORTS



STRATIFIED ELEMENTS
1. Support
2. Primer
3. Vapour barrier
4. Thermal insulation
5. **HELASTA** underlayer waterproof membrane or **FLEXTER TESTUDO**
6. **PROTEADUO** top waterproof membrane or **HELASTA** or **FLEXTER TESTUDO**

7a. Paving with concrete squares on **HELASTORING** supports
7b. Reinforced screed cast on site on separation layer

• LAYING WITH ADHESION

• Laying method

• Double-layer waterproof covering with elastomeric membrane and multi-layer composite membrane made up of HELASTA POLYESTER + PROTEADUO TRIARMATO.

- Underlayer membrane: An elastomeric polymer-bitumen waterproofing membrane, 4 cm thick, with a radial butadiene-styrene thermoplastic rubber and distilled bitumen base, reinforced with spunbond non-woven polyester fabric, such as HELASTA POLYESTER 4, is stuck onto the laying surface with complete heat-bonded adhesion. The sheets are laid onto the laying surface and overlapped by 10 cm in the longitudinal direction and 15 cm in the transversal direction; the insulating panels and the overlaps are heat-bonded with a propane gas torch. The waterproof covering is turned up and stuck with complete heat-bonded adhesion onto the vertical parts.

- Upperlayer membrane: The second layer of the waterproof covering is made up of a multi-layer composite polymer-bitumen waterproofing membrane, 4 mm thick, such as PROTEADUO TRIARMATO.

The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.

The waterproof covering is turned up and stuck onto the vertical parts at a height of least 10 cm above the level envisaged for the floor.

Or alternatively:

• Double-layer waterproof covering with HELASTA POLYESTER + HELASTA POLYESTER elastomeric membrane.

- Underlayer membrane: An elastomeric polymer-bitumen waterproofing membrane, 4 cm thick, with a radial butadiene-styrene thermoplastic rubber and distilled bitumen base, reinforced with spunbond non-woven polyester fabric, such as HELASTA POLYESTER 4, is stuck onto the laying surface with complete heat-bonded adhesion. The sheets are laid onto the laying surface and overlapped by 10 cm in the longitudinal direction and 15 cm in the transversal direction; the insulating panels and the overlaps are heat-bonded with a propane gas torch. The waterproof covering is turned up and stuck with complete heat-bonded adhesion onto the vertical parts.

- Upperlayer membrane: The second layer of the waterproof covering is made up of an elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, of the same type and with the same characteristics as the previous layer. The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps. The waterproof covering is turned up on the vertical parts at a height of least 10 cm above the level envisaged for the floor.

Or alternatively:

• Double-layer waterproof covering with FLEXTER TESTUDO SPUNBOND POLYESTER + FLEXTER TESTUDO SPUNBOND POLYESTER elastoplastomeric membrane.

- Underlayer membrane: An elastoplastomeric polymer-bitumen waterproofing membrane, 4 mm thick, with a distilled bitumen, plastomer and elastomer base, with composite spunbond non-woven polyester fabric reinforcement stabilized with fibreglass, FLEXTER TESTUDO SPUNBOND POLYESTER 4, is stuck onto the laying surface with complete heat-bonded adhesion. The sheets are laid on the laying surface and overlap by 10 cm in the longitudinal direction and by 15 cm in the transversal direction; the insulating panels and overlaps are heat-bonded with a propane gas torch. The waterproof covering is turned up and stuck with complete heat-bonded adhesion onto the vertical parts.

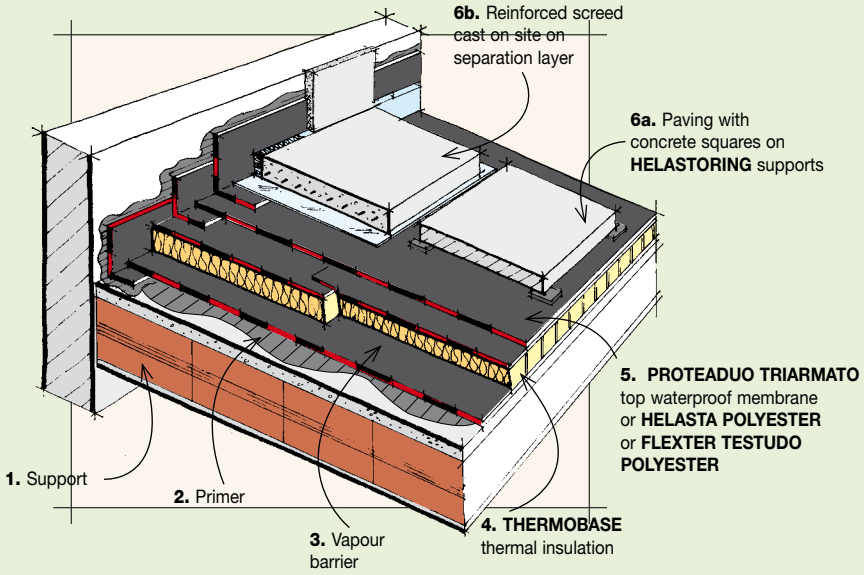
- Upperlayer membrane: The second layer of the waterproof covering is made up of an elastoplastomeric polymer-bitumen waterproofing membrane, 4 mm thick, of the same type and with the same characteristics as the previous layer. The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps. The waterproof covering is turned up on the vertical parts at a height of least 10 cm above the level envisaged for the floor.

Note.

• LAYING WITH LOW ADHESION ON PANELS

In the event of laying on insulating panels with low adhesion, the laying procedure on the insulating panels and stratified elements is the same as in the previous case on a concrete laying surface, page 11)

DOUBLE-LAYER WATERPROOF COVERING ON THERMOBASE THERMAL INSULATION
• UNDER SCREED CAST ON SITE
• UNDER CONCRETE SQUARES ON HELASTORING SUPPORTS



STRATIFIED ELEMENTS
1. Support
2. Primer
3. Vapour barrier
4. **THERMOBASE** thermal insulation
5. **PROTEADUO** top waterproof membrane or **HELASTA** or **FLEXTER TESTUDO**

6a. Paving with concrete squares on **HELASTORING** supports

6b. Reinforced screed cast on site on separation layer

THERMOBASE is coupled on the upper face with an underlayer membrane reinforced with non-woven polyester fabric. Therefore, laying just one top membrane layer will be sufficient to obtain a double-layer covering.
The membrane sheets on the upper layer are heat-bonded onto the underlayer membrane of THERMOBASE.

- **Laying method**
- **Upper layer with PROTEADUO TRIARMATO multi-layer composite membrane.**

The second layer of the waterproof covering is made up of a multi-layer composite polymer-bitumen waterproofing membrane, 4 mm thick, such as PROTEADUO TRIARMATO.
The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.
The waterproof covering is turned up and stuck onto the vertical parts at a height of least 10 cm above the level envisaged for the floor.

Or alternatively:

- **Upper layer with HELASTA POLYESTER elastomeric membrane.**

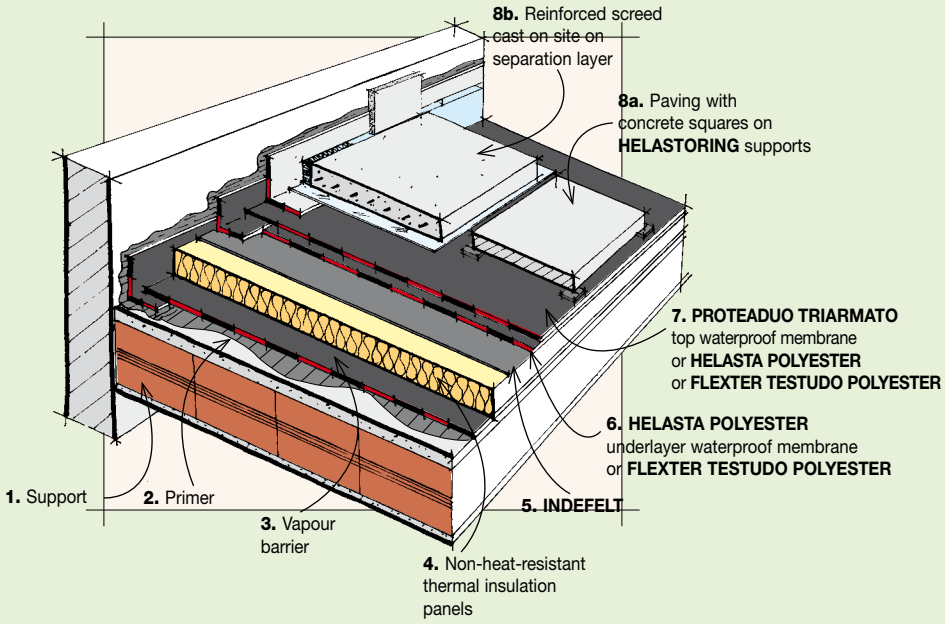
The second layer of the waterproof covering is made up of an elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, such as HELASTA POLYESTER.
The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.
The waterproof covering is turned up on the vertical parts at a height of least 10 cm above the level envisaged for the floor.

Or alternatively:

- **Upper layer with FLEXTER TESTUDO SPUNBOND POLYESTER elastoplastomeric membrane.**

The second layer of the waterproof covering is made up of an elastoplastomeric polymer-bitumen waterproofing membrane, 4 mm thick, of the same type and with the same characteristics as the previous layer.
The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.
The waterproof covering is turned up on the vertical parts at a height of least 10 cm above the level envisaged for the floor.

DOUBLE-LAYER WATERPROOF COVERING ON LAYER OF NON-HEAT-RESISTANT THERMAL INSULATION • WITH LOW ADHESION SYSTEM ON INDEFELT



STRATIFIED ELEMENTS
1. Support
2. Primer
3. Vapour barrier
4. Non-heat-resistant thermal insulation panels
5. **INDEFELT**
6. **HELASTA** underlayer waterproof membrane or **FLEXTER TESTUDO**
7. **PROTEADUO** top waterproof membrane or **HELASTA** or **FLEXTER TESTUDO**
8a. Paving with concrete squares on **HELASTORING** supports
8b. Reinforced screed cast on site on separation layer

For heat-bonding the membranes onto heat-sensitive insulating materials (expanded polystyrene either extruded or sintered) they must first be protected.

• Laying method

Protection layer. The layer of thermal insulation must be protected by bitumen felt of 1200 g/m², such as INDEFELT, laid dry with overlaps of 6 cm. Then the substrate of the double-layer waterproof covering is arranged across the overlaps of INDEFELT and heat-bonded only on the overlaps and vertical parts.

Waterproofing layer.

• Double-layer waterproof covering with elastomeric membrane and multi-layer composite membrane made up of HELASTA POLYESTER + PROTEADUO TRIARMATO.

- Underlayer membrane: An elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, with a radial butadiene-styrene thermoplastic rubber and distilled bitumen base, reinforced with spunbond non-woven polyester fabric, such as HELASTA POLYESTER 4, is laid dry onto the laying surface.
The sheets are laid onto the laying surface overlapping by 10 cm in the longitudinal direction and by 15 cm in the transversal direction; the overlaps are heat-bonded using a propane gas torch. The waterproof covering is turned up and stuck with complete heat-bonded adhesion onto the vertical parts.

- Upperlayer membrane: The second layer of the waterproof covering is made up of a multi-layer composite polymer-bitumen waterproofing membrane, 4 mm thick, such as PROTEADUO TRIARMATO.
The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.
The waterproof covering is turned up and stuck onto the vertical parts at a height of least 10 cm above the level envisaged for the floor.

Or alternatively:

• Double-layer waterproof covering with HELASTA POLYESTER + HELASTA POLYESTER elastomeric membrane.

- Underlayer membrane: An elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, with a radial butadiene-styrene thermoplastic rubber and distilled bitumen base, reinforced with spunbond non-woven polyester fabric, such as HELASTA POLYESTER 4, is laid dry onto the laying surface.
The sheets are laid onto the laying surface overlapping by 10 cm in the longitudinal direction and by 15 cm in the transversal direction; the overlaps are heat-bonded using a propane gas torch. The waterproof covering is turned up and stuck with complete heat-bonded adhesion onto the vertical parts.

- Upperlayer membrane: The second layer of the waterproof covering is made up of an elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, of the same type and with the same characteristics as the previous layer.
The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.
The waterproof covering is turned up on the vertical parts at a height of least 10 cm above the level envisaged for the floor.

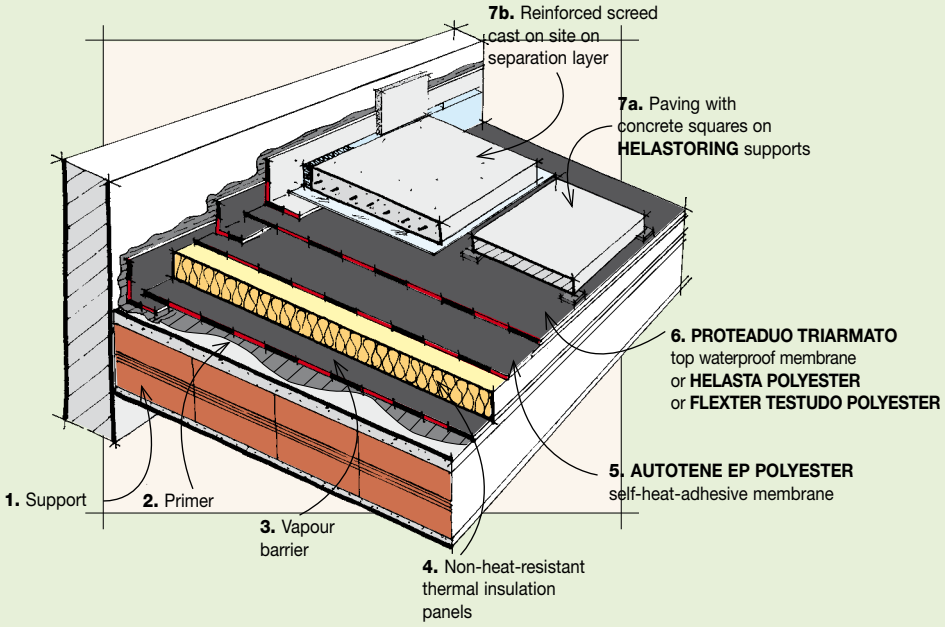
Or alternatively:

• Double-layer waterproof covering with FLEXTER TESTUDO SPUNBOND POLYESTER + FLEXTER TESTUDO SPUNBOND POLYESTER elastoplastomeric membrane.

- Underlayer membrane: An elastoplastomeric polymer-bitumen waterproofing membrane, 4 mm thick, with a distilled bitumen, plastomer and elastomer base, with composite reinforcement in spunbond non woven polyester fabric stabilised with fibreglass, such as FLEXTER TESTUDO SPUNBOND POLYESTER 4, is laid dry onto the laying surface.
The sheets are laid onto the laying surface overlapping by 10 cm in the longitudinal direction and by 15 cm in the transversal direction; the overlaps are heat-bonded using a propane gas torch. The waterproof covering is turned up and stuck with complete heat-bonded adhesion onto the vertical parts.

- Upperlayer membrane: The second layer of the waterproof covering is made up of an elastoplastomeric polymer-bitumen waterproofing membrane, 4 mm thick, of the same type and with the same characteristics as the previous layer.
The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.
The waterproof covering is turned up on the vertical parts at a height of least 10 cm above the level envisaged for the floor.

DOUBLE-LAYER WATERPROOF COVERING ON LAYER OF NON-HEAT-RESISTANT THERMAL INSULATION • WITH ADHESION SYSTEM ON AUTOTENE BASE EP POLYESTER



STRATIFIED ELEMENTS
1. Support
2. Primer
3. Vapour barrier
4. Non-heat-resistant thermal insulation panels
5. **AUTOTENE BASE EP POLYESTER** self-heat-adhesive membrane
6. **PROTEADUO** top waterproof membrane or **HELASTA** or **FLEXTER TESTUDO**
7a. Paving with concrete squares on **HELASTORING** supports
7b. Reinforced screed cast on site on separation layer

For heat-bonding the membranes onto heat-sensitive insulating materials (expanded polystyrene either extruded or sintered) they must first be protected. For laying the membranes with adhesion onto the expanded polystyrene, either extruded or sintered, a special self-heat-adhesive substrate of AUTOTENE BASE EP POLYESTER must be used, which is applied dry onto the insulation and subsequently adheres on its own due to the heat produced by the heat-bonding of the upper layer that is stuck on top.

• Laying method

Protection layer and substrate. The substrate of the double-layer waterproof covering is laid dry onto insulating panels with longitudinal overlaps of 6 cm and transversal overlaps of 10cm. It is made up of a self-heat-adhesive waterproofing base membrane, such as AUTOTENE BASE EP POLYESTER in elastoplastomeric polymer-bitumen, 3 mm thick, with the lower face and overlapping strip of the upper face coated with an adhesive mixture activated by the indirect heat generated by the heat bonding of the next layer. Only the end overlap is heat-bonded before laying the upper layer. Both self-heat-adhesive surfaces are protected by a silicone-coated film which is removed as the rolls used to cover the whole flat surface are unrolled and stopped at the bottom of the vertical parts. The vertical parts are covered with a strip of smooth membrane of the same type as that used for the upper layer.
The membrane of the second layer is chosen from those mentioned above for application on a concrete laying surface:

• Upper layer with PROTEADUO TRIARMATO multi-layer composite membrane.
The second layer of the waterproof covering is made up of a multi-layer composite polymer-bitumen waterproofing membrane, 4 mm thick, such as PROTEADUO TRIARMATO.
The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.
The waterproof covering is turned up and stuck onto the vertical parts at a height of least 10 cm above the level envisaged for the floor

Or alternatively:

• Upper layer with HELASTA POLYESTER elastomeric membrane.
The second layer of the waterproof covering is made up of an elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, of the same type and with the same characteristics as the previous layer.
The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.
The waterproof covering is turned up on the vertical parts at a height of least 10 cm above the level envisaged for the floor.

Or alternatively:

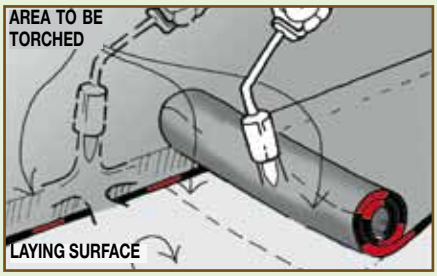
• Upper layer with FLEXTER TESTUDO SPUNBOND POLYESTER elastoplastomeric membrane.
The second layer of the waterproof covering is made up of an elastoplastomeric polymer-bitumen waterproofing membrane, 4 mm thick, of the same type and with the same characteristics as the previous layer.
The sheets on the second layer, overlapping by 10 cm longitudinally and 15 cm transversally, are arranged across the overlaps of the first layer and heat-bonded onto the whole surface and the overlaps.
The waterproof covering is turned up on the vertical parts at a height of least 10 cm above the level envisaged for the floor.

LAYING DETAILS

Connection methods of the membrane to the laying surface

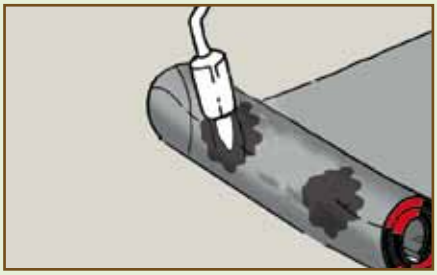
COMPLETE ADHESION APPLICATION

The torching of the mixture of the rolls must affect the membrane and the support at the same time, concentrating on the roll. The torch flame must also be directed onto the membrane already laid for overlapping.



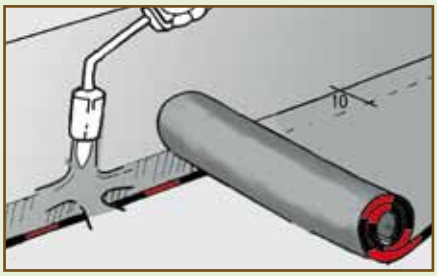
SEMI-ADHESION APPLICATION

PERFOBASE is the perforated sheet which, when laid dry on the laying surface previously treated with INDEVER or ECOVER primer, allows uniform spot-bonded adhesion of the next heat-bonded membrane. Alternatively, it is possible to unroll the membrane melting it in alternate spots only, uniformly distributing the adhesion areas.



LOW ADHESION APPLICATION

The torching of the mixture of the rolls must affect the membrane and the support at the same time, concentrating on the roll. The torch flame must also be directed onto the membrane already laid for overlapping.

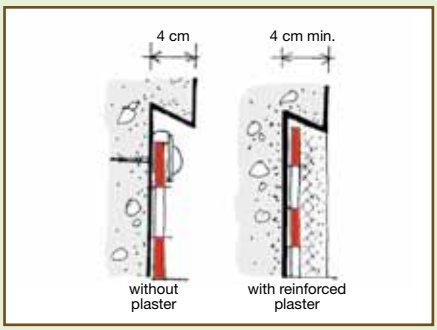


Preparyng the laying surface

On the suitably clean and wet slab, a sloping screed (1-5%) is created with good adhesion and smoothed with a trowel, made up of concrete prepared with 200-250 kg Portland cement (325 grade) per m3 of mixture; for the areas where a thickness of less than 3 cm is envisaged, the screed is made from mortar prepared with 350 kg of cement per m^3 of sand. The screed can be made of concrete with light mineral granules prepared with 250 kg of Portland cement per m^3 of mixture. The sloping screed may also be made of cellular concrete or light concrete with non-mineral granules as long as they are sufficiently cohesive to allow adhesion to the membranes. On roofs made of prefabricated reinforced concrete panels across the joining lines of the tiles, bands of 20 cm wide FLEXTER TESTUDO SPUNBOND POLYESTER 4 are heat-bonded either before laying the sloping screed or the waterproof covering or vapour barrier placed straight onto the prefabricated panels.
The laying surface must be smooth and flat. A concrete surface is defined as such if below a 2 m rule placed in all directions no gaps of over 10 mm appear, and under a 0.20 m rule, gaps of over 3 mm. The surface must be smoothed with a trowel and any cracks or dips must be filled in with mortar. Any roughness must be removed, as must any remains from building work, such as nails, metal sheets, wood, etc. Before application, the laying surface must be clean and dry; for concrete and cement and brick laying surfaces it is best to wait for a drying period of 8 days to 3 weeks according to the season.

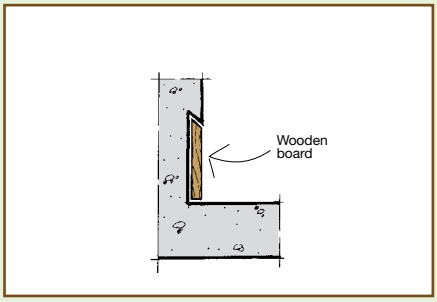
Preparing the protruding parts

At the bottom of all the protruding parts, external walls, brick chimneys and the parts sticking out from the roof, the special vertical housing is created for the waterproofing, min. 4 cm deep and 10 cm above the max. ground level and with the bottom covered in rough plaster.



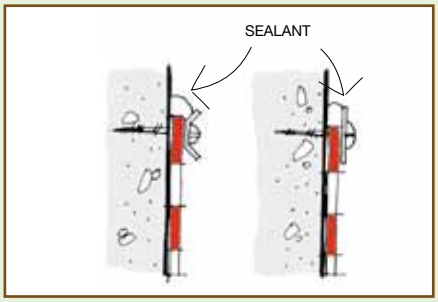
Preparing the cast protruding parts

The vertical housing of the waterproofing is created by inserting a wooden board, 4 cm thick and 10 cm higher than the max. level of the floor, in the formworks before casting, which is removed after the concrete has hardened.



Protruding parts with weather moulding

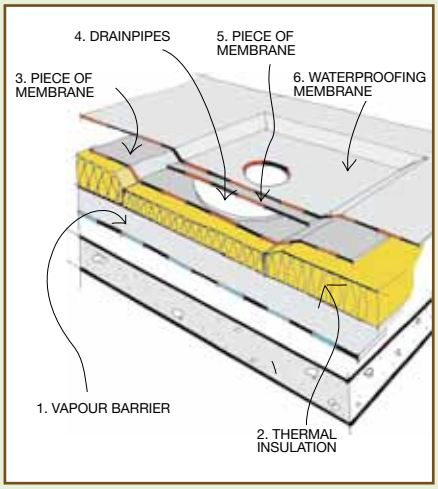
If it is not possible to create the vertical housing in the wall, the head of the waterproof covering is protected by a structural metal weather moulding fixed mechanically to the protruding part and sealed at the top.



Drainpipes

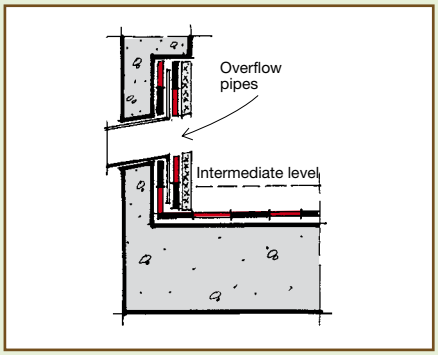
Around the drain hole a housing is created 10 cm wider than the pipe connector and 1-1.5 cm deep; for a terrace with thermal insulation this housing will be created in the insulation. Each drain must serve a maximum surface area of 500 m^2, must have a hole with a diameter suitable for the surface area and the stormwater must only travel a maximum distance of 30 m to reach the drain.
With a max. flow rate of 3 l/m per m^2:

Minimum diameter of discharge hole	Affected area
6 cm	28 m^2
8 cm	50 m^2
10 cm	80 m^2
12 cm	110 m^2
14 cm	150 m^2
16 cm	200 m^2
18 cm	250 m^2
20 cm	300 m^2
22 cm	380 m^2
25 cm	490 m^2



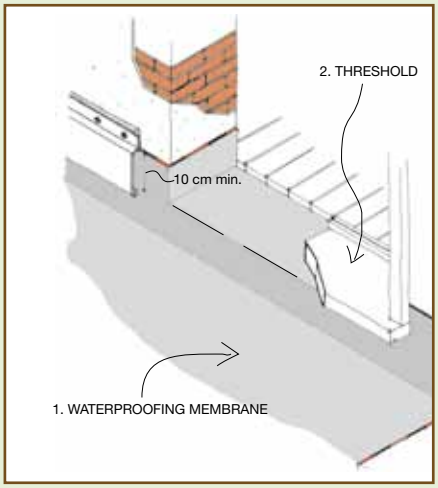
Overflow pipes

An overflow pipe is envisaged for terraces with only one drain, should the water not be able to flow out due to a blocked drain or in the event that the water overload due to the blocked drains compromises the roof's stability.
It is made up of a circular or rectangular conduit with the same cross-section as the drainpipe and provided with a connector to the waterproof covering; it is placed on the external part of the terrace at an intermediate level between the floor and the lowest part of the waterproof protruding parts.



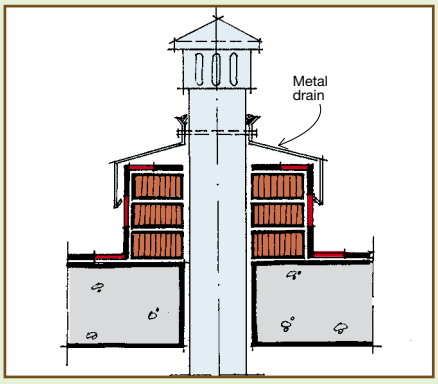
Threshold

The height of the access threshold to the terrace must be such that the waterproof covering lies across it by at least 10 cm above the ground level.



Protruding piping

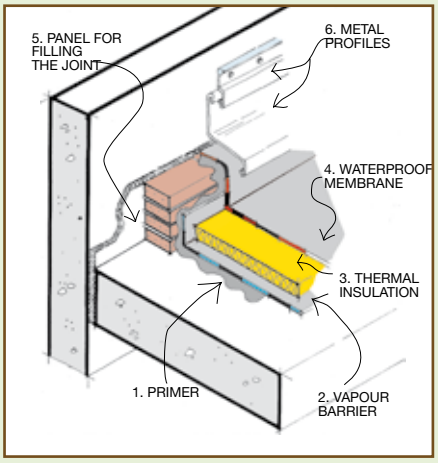
For metal, PVC or reinforced concrete pipes or insufficiently thick chimneys, a wall 10 cm above the ground level must be built around them, onto which the waterproof covering will be laid and protected by a metal weather moulding integral with the piping.



Preparing a joint next to a wall

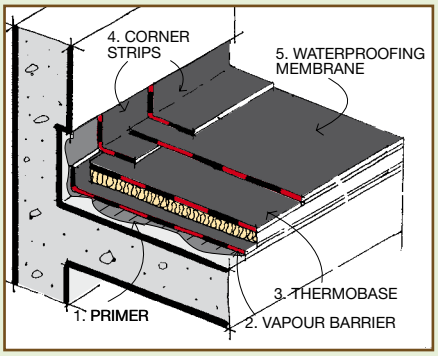
Any cracks in joints are filled with compressible insulating material.

Along the edge of the joint a wall is built 10 cm higher than ground level and about 15 cm wide, in which the housing for the waterproof covering will be created, as for the protruding parts. The waterproof protection of the joint is ensured using a metal sheet integral with the highest wall, to cover the entire wall.



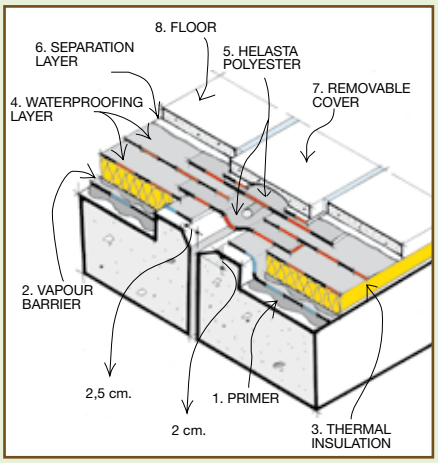
Waterproof covering of protruding parts, walls and vertical parts in general

All the vertical parts that the covering must lie across are painted with a coat of INDEVER or ECOVER bituminous primer.
A 20 cm high strip of membrane is heat-bonded across the corner created by the vertical part and the THERMOBASE panel.
Then the waterproof sheet on the flat part is overlapped and stuck into the horizontal piece of the strip, whereas a second strip doubles the protection of the protruding part and the corner.



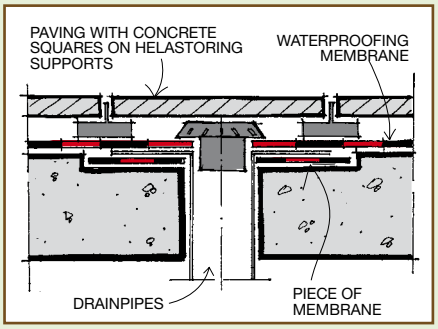
Waterproof covering of flat expansion joints

The vapour barrier is stuck onto the walls next to the joint up to 5 cm from the edge of the gap.
Across the joint, a sheet of HELASTA P4 33 cm high is laid, which forms an omega shape in the gap. The wings of the sheet are heat-bonded onto the vapour barrier.
The waterproof sheet of the flat part is heat-bonded onto the wings of the HELASTA P4 up to 5 cm from the edge of the joint.
The omega shape of HELASTA P4 is filled with a stringcourse of compressible material (e.g. expanded polyethylene, fibreglass plait, etc.) of a sufficient diameter to completely fill the crack and it is all protected by a sheet of HELASTA P4 33 cm high, heat-bonded across the joint.



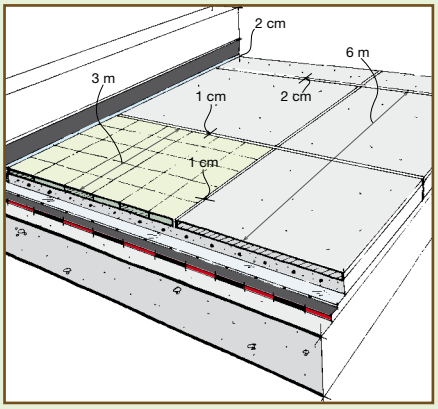
Waterproof covering of drainpipes

The drainpipe housing is painted with a coat of INDEVER and a piece of DEFEND of the same size is heat bonded onto it.
The drainpipe connector is then stuck onto the sheet tempered with the torch.
Then the waterproof covering is bonded onto the piece fixed to the laying surface and onto the pipe connector.



Laying a concrete floor cast on site

A sliding layer is laid onto the waterproof covering, made up of a sheet of polyethylene coupled with non-woven polyester fabric or bituminous paper felt of 300 g/m^2 onto which a concrete screed is cast.
The screed is made up of reinforced concrete, with 350 kg of Portland cement (325 grade) per m^3 of mixture laid with a minimum thickness of 5 cm. The reinforcement is interrupted near the joints.
The concrete cap is split up by joints in two directions; the joints are 1 cm wide every 3 m and 2 cm wide every 6 m.
Along all the protruding parts, walls and parts sticking out from the roof, there must also be a joint at least 2 cm wide and all the joints are filled with plastic or elastomeric sealants. Every metre, there must also be dry joints less than 1 cm wide.



Laying a floor in prefabricated concrete squares on HELASTORING supports

The floor is made up of prefabricated reinforced vibrated concrete squares, 3 cm thick and with max. dimensions of 50x50 cm. The squares are laid dry on plastic Helastoring supports resting straight on the waterproof covering. The gaps between the squares are not filled.

• When thermal insulation is envisaged under the waterproof layer, use panels such as Fesco-Board or Permalyte.

Protecting the protruding parts

The protruding vertical parts of the waterproofing are protected by filling the vertical housing of the covering with a cement mortar with 350-400 kg of Portland cement 325 per cubic metre of sand. Before spreading the mortar onto the waterproofing, a sheet of bituminous paper felt coated with sand on both sides must be laid for protection. The mortar is reinforced with a pre-welded metal mesh, mechanically fixed onto the end of the protruding part on at least 3 spots per linear metre. The mortar must also be split up every 2 m with a joint. For protruding parts taller than 40 cm, the metal reinforcement of the mortar is made up of an electrowelded mesh. Between the protection of the protruding part and the floor, a joint 2 cm wide must be left and filled with sealants.

Protecting the under-floor joint

Across the flat expansion joint the whole foot traffic surface is made up of concave plates that can be easily removed to allow inspection and any repairs without damaging the surrounding areas.

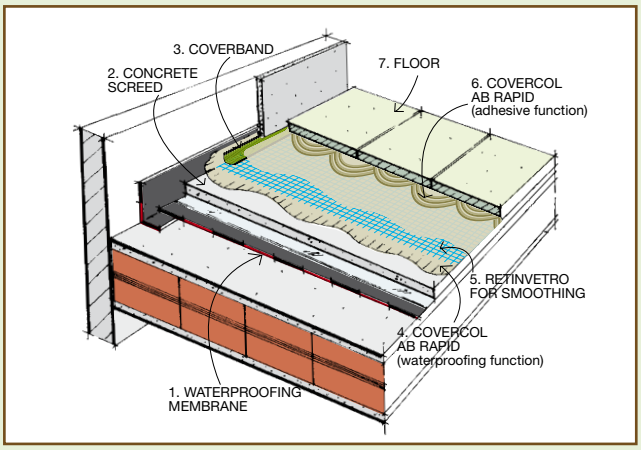
Railings

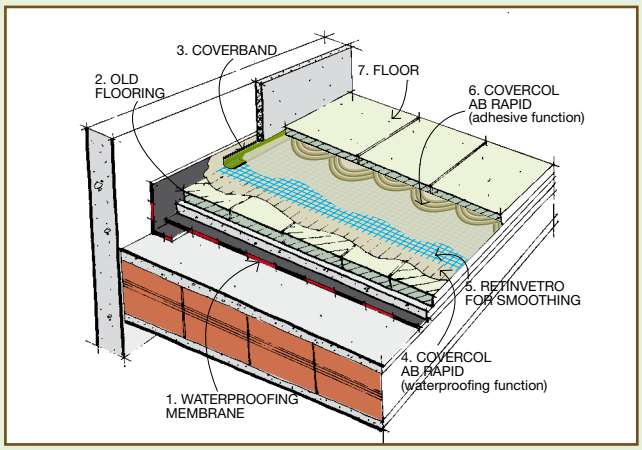
The railing supports rest on a concrete block protecting the waterproof covering and are fixed outside the terrace. The waterproof covering below the protection is made up of two layers of membrane protected by a non-woven polyester fabric filter of 200 g/m^2.

Equipped rails and planters

The rails used for planters rest on a concrete block, which protects the waterproof covering, made up of two layers of membrane protected by a non-woven polyester fabric filter of 200 g/m^2.

Protecting the screed and attaching paving materials to new flat roofs and overlaps on old flat roofs

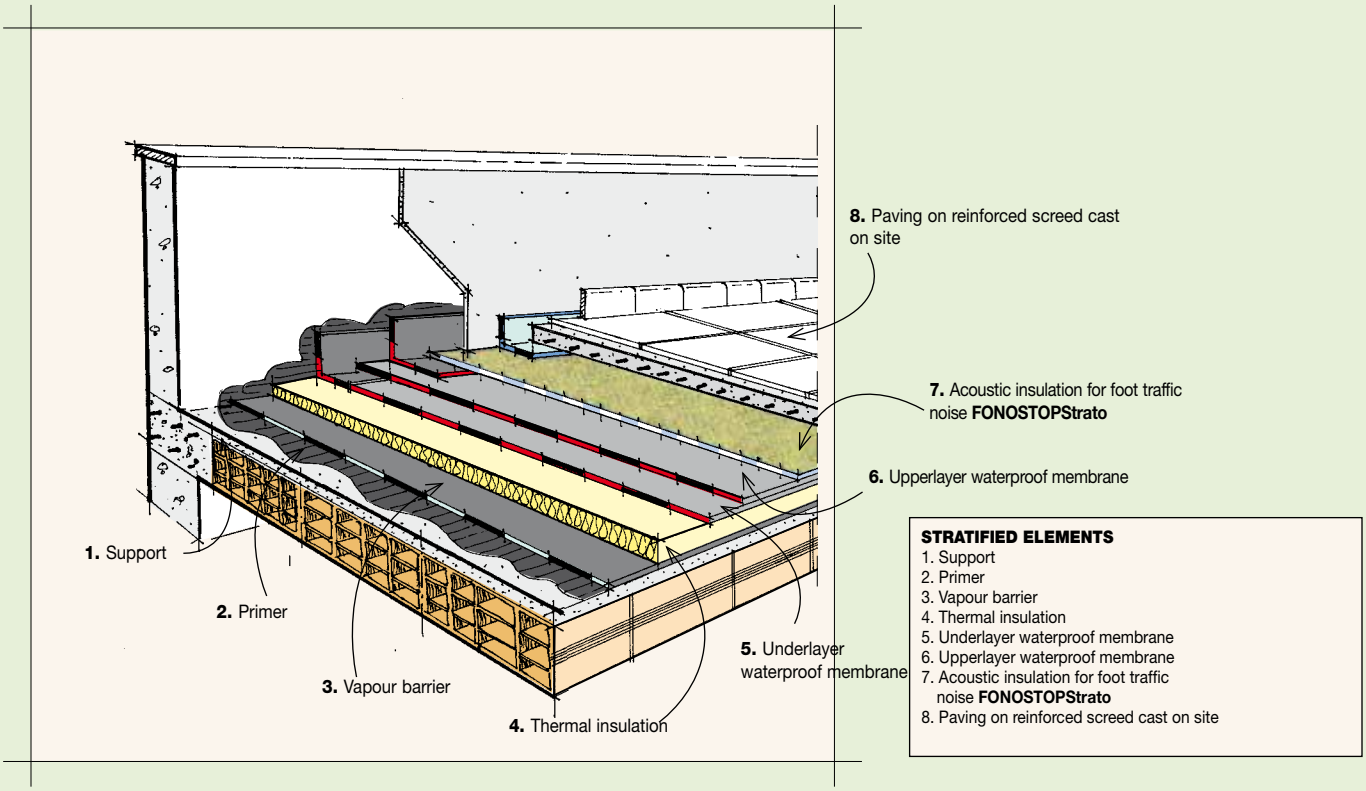




The supports must be smooth and free from dust, non-uniform parts, traces of oil, or dirt in general. Surfaces cleaned with water cleaners must be free from stagnated water. If working on an old floor, any tiles that have come loose or broken must be removed and levelled with the rest of the foundation. Any skirting boards must be totally removed in order to create the best possible waterproofing using the COVERBAND joint covering tape. In order to make the flat roof waterproof, the elastoplastic waterproofing agent **COVERCOL AB RAPID** must be used. This is a two-component product with a base of hydraulic bonding agents and acrylic elastomers capable of absorbing structural movements without damage, thanks to its excellent level of flexibility and elasticity. **COVERCOL AB RAPID** solves the problem of waterproofing and sticking new paving materials onto balconies, refurbishments and new builds all in one go with just one product. **COVERCOL AB RAPID** can also be used for repairing the waterproofing of an old terrace and can be laid on pre-existing floors without any need for demolition. On new terraces **COVERCOL AB RAPID** is used to protect the screed and to stick the paving in order to prevent the imbibition of the concrete screed above the actual waterproof covering causing unattractive surfacing salts and/or the detachment of the ceramic coating due to the alternating of freezing an thawing cycles. It is easy to apply, quick and free from demolition costs. In the event of repairs, work is carried out straight on the existing paving, hence solving the problem of waterproofing and sticking the new floor in just one day. **COVERCOL AB RAPID** gives concrete foundations excellent protection from atmospheric aggression as it is waterproof. It is also used in swimming pools, in overlaps of external and internal paving, waterproofing parts, etc. The strong adhesion guarantees safe sticking of almost any type of paving materials: ceramic, natural stone or composite floor tiles.

Laying method. 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. Spread **COVERCOL AB RAPID** with a stainless steel trowel smoothing uniformly. A consumption of 1.5-2 kg/m^2 is sufficient to create a waterproof layer. In areas subject to particular strain it is necessary to reinforce the **COVERCOL AB RAPID** coating with "RETINVETRO PER RASANTI", an alkali resistant reinforcement fibreglass mesh (mesh size 4×5 mm). RETINVETRO is to be sunk into the layer of **COVERCOL AB RAPID** while it is still wet. Also turn up the waterproof covering on the connections 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. After the waterproofing layer has hardened (5 hours are enough) it is possible to proceed with the direct laying of the paving with the same product **COVERCOL AB RAPID**. The double spreading method is the most recommended in laying outdoors in order to prevent any empty gaps. For sealing the joints it is recommended to use FUGOFLEX 2-12.

ACOUSTIC INSULATION OF WALKABLE FLAT ROOFS



STRATIFIED ELEMENTS
1. Support
2. Primer
3. Vapour barrier
4. Thermal insulation
5. Underlayer waterproof membrane
6. Upperlayer waterproof membrane
7. Acoustic insulation for foot traffic noise **FONOSTOPStrato**
8. Paving on reinforced screed cast on site

The load-bearing structure of terraces usually consists of floor slabs that are heavy enough to ensure observance of the legal limits specified for acoustic insulation against airborne noises.
The limits for insulation against foot-traffic noises are fulfilled through appropriate insulating stratified elements. They are based on two possible solutions: Solution 1- careful selection of a thermal insulation material, which also has acoustic insulation properties, e.g. panels in Perlite foam and cellulose fibres, and high density mineral fibre panels. Solution 2: by laying the terrace paving on a floating screed insulated from the waterproofing coat with FONOSTOP DUO, the same material used for the interiors, which, in many cases, can be advantageously replaced by a layer of FONOSTOPStrato, offering waterproofing mechanical protection. By separating the floor layers, the floating system further increases its soundproofing power $\mathbf{R'_w}$.
FONOSTOPStrato is a multi-purpose ready-to-use separation layer. It is laid to protect the waterproof covering which is to be paved. It consists of a waterproofing non-woven thermally sealed polyester foil, coupled to a resilient non-woven polyester fabric with “elastic needling”.
The foil that lines the top face prevents the liquid cement-based mortar - when the screed is laid - from encapsulating the fibres of the fabric, as this would annul the insulating properties.
FONOSTOPStrato is resistant to perforation and is thick enough to reduce friction between the screed and the waterproof coat, thus preventing the transmission of cracks.
LThe special “elastic needling”, an exclusive INDEX design of non-woven fabric, along with the correct laying of FONOSTOPStrato, in compliance with the “floating screed” principle, also fulfils the other important function of acoustic insulation, thus contributing to the observance of the passive acoustic requirements of buildings. The laying methods of FONOSTOPStrato are the same as those used for laying indoor flooring on FONOSTOPDuo. To ensure correct acoustic behaviour of the ‘floating screed’, it is necessary at the design stage to completely separate the screed from the floor, from the perimeter walls and from any body or pipe which vertically crosses the terrace, then to perform these details meticulously. The screed, which has a minimum thickness of 4 cm and is reinforced with an electro-welded metal mesh, must be free from any rigid constraints, which reduce its capacity to oscillate on the insulating mattress, and, therefore, no pipes must be buried inside it. The FONOSTOPStrato rolls should be unrolled and laid dry on the waterproof covering, overlapping the wing which projects from the fabric with the nearest sheet. The sheets should not be overlapped at their front end but should be carefully placed next to each other. The sheets should cover all the flat part of the terrace and are trimmed off at the foot of the vertical parts. Both the longitudinal overlaps and the crosswise joining lines are carefully sealed with extra-adhesive SIGILTAPE laid across them. To enable the screed to separate from the vertical parts, the latter should be covered with FONOCELL, corner self-adhesive elements in extruded polyethylene, also available in rolls. These elements descend to cover FONOSTOPStrato, already laid on the surface (*see drawing*). Make sure you only lay FONOCELL after the waterproof coat has been protected by a layer of plaster mortar reinforced with a metal mesh. The next step is to lay the screed, taking care not to damage the sheet overlaps. Only after the floor has been laid, trim the projecting part of the vertical cover, and, to avoid acoustic bridges, install the skirting board slightly detached from the paving. The acoustic performance of FONOSTOPStrato is lower than that of FONOSTOP DUO but the former is almost always used in combination with thermal insulation. If this insulation is suitably selected, it can contribute to the system’s acoustic insulation, and comes at a lower product price.
Below is the forecast calculation of the reduction ΔL_w in the level of foot traffic noise.

THEORETICAL ESTIMATE OF THE REDUCTION LEVEL IN FOOT TRAFFIC NOISE

Example of simplified calculation method TR UNI 11175 (Guide to the Standards of UNI EN 12354 series for predicting the acoustic performance of buildings) for SCREEDS WITH SURFACE DENSITY 100 kg/m²

Calcolo delle frequenze di ricorrenza **fo** del sistema massetto galleggiante, strato resiliente:

$$\mathbf{fo} = 160\sqrt{\frac{s'}{m'}} = 160\sqrt{\frac{57}{100}} = 120 \text{ Hz}$$

$$\Delta L_w = 30 \text{ Log } (\frac{f}{fo}) + 3 = \mathbf{21\ dB}$$

where **f** = 500 Hz (of reference)

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 of 50% and cup viscosity DIN/4 at 20°C (UNI EN ISO 2431) of 12÷17 s.

INDEVER PRIMER E
Quick drying solvent-based elastomeric adhesion bituminous primer suitable for preparing surfaces both for the heat bonding of standard polymer-bitumen membranes and for cold laying of self-adhesive and self-heat-adhesive polymer bitumen membranes such as INDEVER PRIMER E.
The primer will have a solid content of (UNI 8911) of 50% and cup viscosity DIN/4 at 20°C (UNI EN ISO 2431) of 20÷25 s.

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

COMPLEMENTARY PRODUCTS

PERFOBASE
Perforated fibreglass bitumen felt 800 g/m^2, with a perforation degree of about 15%.

VAPOUR BARRIER

STANDARD VAPOUR BARRIER MEMBRANES

DEFEND ALU POLYESTER
Elastoplastomeric polymer-bitumen vapour barrier membrane, 3-mm thick (EN1849-1), reinforced with aluminium foil coupled to a non-woven composite polyester fabric stabilised with fibreglass, with water vapour permeability (EN 1931) μ=1,500,000, tensile strength (EN 12311-1) L/T of 250/120 N/50 mm and ultimate elongation (EN 12311-1) L/T of 15/20%.

DEFEND/V
Elastoplastomeric polymer-bitumen vapour barrier membrane, 3-mm thick (EN1849-1), reinforced with fibreglass felt, with water vapour permeability (EN 1931) μ=100,000, tensile strength (EN 12311-1) L/T of 300/200 N/50 mm and ultimate elongation (EN 12311-1) L/T of 2/2%.

INNOVATIVE VAPOUR BARRIER MEMBRANES WITH INCORPORATED ADHESIVE FOR COLD-BONDING OF THE THERMAL INSULATION

SELFTENE BV BIADESIVO ALU POLYESTER
Double-sided adhesive elastomeric polymer-bitumen vapour barrier membrane of 3 kg/m^2 (EN1849-1), reinforced with aluminium foil, coupled to a non-woven composite polyester fabric stabilised with fibreglass, with water vapour permeability (EN 1931) μ=1,500,000, tensile strength (EN 12311-1) L/T of 250/120 N/50 mm and ultimate elongation (EN 12311-1) L/T of 15/20%.

SELFTENE BV BIADESIVO POLYESTER
Double-sided adhesive elastomeric polymer-bitumen vapour barrier membrane of 3 kg/m^2 (EN1849-1), reinforced with non-woven composite polyester fabric stabilised with fibreglass, with water vapour permeability (EN 1931) μ=100,000, tensile strength (EN 12311-1) L/T of 400/300 N/50 mm and ultimate elongation (EN 12311-1) L/T of 40/40%.

SELFTENE BV BIADESIVO ALU POLYESTER
Double-sided adhesive elastomeric polymer-bitumen vapour barrier membrane of 3 kg/m^2 (EN1849-1), reinforced with fibreglass felt, with water vapour permeability (EN 1931) μ=100,000, tensile strength (EN 12311-1) L/T of 300/200 N/50 mm and ultimate elongation (EN 12311-1) L/T of 2/2%.

INNOVATIVE VAPOUR BARRIER MEMBRANES WITH INCORPORATED HEAT ACTIVATED ADHESIVE FOR STICKING NON-HEAT-RESISTANT THERMAL INSULATION

TECTENE BV STRIP ALU POLYESTER
Elastoplastomeric polymer-bitumen vapour barrier membrane with incorporated adhesive for sticking insulating panels, made up of heat-adhesive strips distributed across 40% of the upper face of the sheet, 3 mm thick (EN1849-1) reinforced with aluminium foil coupled to a non-woven composite polyester fabric stabilised with fibreglass, with water vapour permeability (EN 1931) μ=1,500,000, tensile strength (EN 12311-1) L/T of 250/120 N/50 mm and ultimate elongation (EN 12311-1) L/T of 15/20%.

TECTENE BV STRIP EP/V
Elastoplastomeric polymer-bitumen vapour barrier membrane with incorporated adhesive for sticking insulating panels, made up of heat-adhesive strips distributed across 40% of the upper face of the sheet, 3 mm thick (EN1849 -1), reinforced with fibreglass felt, with water vapour permeability (EN 1931) μ=100,000, tensile strength (EN 12311-1) L/T of 300/200 N/50 mm and ultimate elongation (EN 12311-1) L/T of 2/2%.

VAPOUR BARRIER

INNOVATIVE VAPOUR BARRIER MEMBRANES
WITH INCORPORATED HEAT ACTIVATED ADHESIVE FOR STICKING HEAT-RESISTANT THERMAL INSULATION

PROMINENT ALU POLYESTER

Elastoplastomeric polymer-bitumen vapour barrier membrane of 4 kg/m² (EN1849-1), with incorporated adhesive for sticking insulating panels, made up of heat-adhesive embossings, 5 mm thick, distributed across 40% of the upper face of the sheet, reinforced with aluminium foil coupled to a non-woven composite polyester fabric stabilised with fibreglass, with water vapour permeability (EN 1931) μ=1,500,000, tensile strength (EN 12311-1) L/T of 250/120 N/50 mm and ultimate elongation (EN 12311-1) L/T of 15/20%.

PROMINENT POLYESTER

Elastoplastomeric polymer-bitumen vapour barrier membrane of 4 kg/m² (EN1849-1), with incorporated adhesive for sticking insulating panels, made up of heat-adhesive embossings, 5 mm thick, distributed across 40% of the upper face of the sheet, reinforced with non-woven composite polyester fabric stabilised with fibreglass, with water vapour permeability (EN 1931) μ=100,000, tensile strength (EN 12311-1) L/T of 450/400 N/50 mm and ultimate elongation (EN 12311-1) L/T of 40/40%.

PROMINENT/V

Elastoplastomeric polymer-bitumen vapour barrier membrane of 4 kg/m² (EN1849-1), with incorporated adhesive for sticking insulating panels, made up of heat-adhesive embossings, 5 mm thick, distributed across 40% of the upper face of the sheet, reinforced with fibreglass felt, with water vapour permeability (EN 1931) μ=100,000, tensile strength (EN 12311-1) L/T of 300/200 N/50 mm and ultimate elongation (EN 12311-1) L/T of 2/2%.

THERMAL INSULATION

INSULATORS PRE-COUPLED WITH MEMBRANES

THERMOBASE PSE/120

Thermal insulation supplied in rolls with overlapping selvage such as THERMOBASE PSE/120 made up of insulating strips 5 cm wide and 100 cm long in sintered expanded polystyrene with a compression resistance of 10% (EN 826) ≥120 KPa [CS(10)120] heat-bonded continuously to a polymer-bitumen membrane P4 110 cm wide to allow the elements to be overlapped longitudinally.
The membrane is reinforced with non-woven composite polyester fabric stabilised with fibreglass and has a hot stability (EN 1110) of 120°C, flexibility (EN 1109) of -15∞C, ultimate tensile strength (EN 12311-1) L/T of 600/400 N/5 cm and ultimate elongation (EN 12311-1) L/T of 40/40%.

THERMOBASE PSE/EX

Thermal insulation supplied in rolls with overlapping selvage such as THERMOBASE PSE/EX made up of insulating strips 5 cm wide and 100 cm long in extruded expanded polystyrene with a 10% compression resistance (EN 826) ≥200 KPa [CS(10/Y)200] heat-bonded continuously to a polymer-bitumen membrane P4 110 cm wide to allow the elements to be overlapped longitudinally.
The membrane is reinforced with non-woven composite polyester fabric stabilised with fibreglass and has a hot stability (EN 1110) of 120°C, flexibility (EN 1109) of -15°C, ultimate tensile strength (EN 12311-1) L/T of 600/400 N/5 cm and ultimate elongation (EN 12311-1) L/T of 40/40%.

THERMOBASE PSE/PUR

Thermal insulation supplied in rolls with overlapping selvage such as THERMOBASE PUR made up of 5 cm wide and 100 cm long insulating strips of expanded polyurethane rolled continuously between two sheets of fibreglass felt or two sheets of bituminous paper felt which are continuously heat-bonded to a polymer-bitumen membrane P4 110 cm wide to allow the longitudinal overlap of the elements, with a 10% compression resistance (EN 826) ≥100 KPa [CS(10/Y)100].
The membrane is reinforced with non-woven composite polyester fabric stabilised with fibreglass and has a hot stability (EN 1110) of 120°C, flexibility (EN 1109) of -15°C, ultimate tensile strength (EN 12311-1) L/T of 600/400 N/5 cm and ultimate elongation (EN 12311-1) L/T of 40/40%.

WATERPROOF LAYER

AUTOTENE BASE EP POLYESTER

Self-heat-adhesive waterproofing base membrane, such as AUTOTENE BASE EP POLYESTER, in elastoplastomeric polymer bitumen, 3 mm thick (EN 1849-1), with the bottom face and the overlapping strip of the top face coated with an adhesive mix, which is activated by the indirect heat generated by the heat bonding of the next layer, both protected by a silicone-coated film which is removed as the roll is unrolled. The membrane reinforced with stabilised composite polyester non-woven fabric, has a tensile strength L/T (EN 12311/1) of 450/400 N/50 mm, ultimate elongation (EN 12311-1) L./T. of 40/40%, resistance to impact (EN 12691 method A) of 800 mm, resistance to static load (EN 12730) of 10 kg and cold flexibility (EN 1109) of -15°C.

PROTEADUO TRIARMATO

Multi-layer composite polymer-bitumen waterproofing membrane, 4 mm thick, such as PROTEADUO TRIARMATO, certified with the EuroAgrément 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 elastomeric polymer bitumen with elastic recovery (NF XP 84-360) of 300% and a stabilised three-layer composite reinforcement with fibreglass between two spunbond polyester “non-woven fabrics”, impregnated with elastomeric polymer bitumen. The membrane has a tensile strength (EN 12311-1) L/T of 750/650 N/50 mm, ultimate elongation (EN 12311-1) L/T of 50/50%, resistance to tearing (EN 12310-1) L/T of 250/250 N and cold flexibility (EN 1109) of the upper layer of -15°C and of the lower layer of -25°C.

MINERAL PROTEADUO TRIARMATO

Multi-layer composite polymer-bitumen waterproofing membrane, covered with slate granules, 4 mm thick measured on the selvage, such as MINERAL PROTEADUO TRIARMATO, certified with the EuroAgrément 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 elastomeric polymer bitumen with elastic recovery (NF XP 84-360) of 300% and a stabilised three-layer composite reinforcement with fibreglass between two spunbond non-woven polyester fabrics, impregnated with elastomeric polymer bitumen. The membrane has a tensile strength (EN 12311-1) L/T of 750/650 N/50 mm, ultimate elongation (EN 12311-1) L/T of 50/50%, resistance to tearing (EN 12310-1) L/T of 250/250 N and cold flexibility (EN 1109) of the upper layer of -15°C and of the lower layer of -25°C.

WATERPROOF LAYER

HELASTA POLYESTER

Elastomeric polymer-bitumen waterproofing membrane, 4 mm thick, with a radial butadiene-styrene thermoplastic rubber base and distilled bitumen base, with ultimate elongation of 2000% and elastic recovery (NF-XP 84-360) of 300%, reinforced with spunbond polyester non-woven fabric, such as HELASTA POLYESTER 4, certified with the Agrément I.T.C-CNR (former I.C.I.T.E.). The membrane has a tensile strength (EN 12311-1) L/T of 900/700 N/50mm, ultimate elongation (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 200/200 N, fatigue resistance (UEAtc) of over 1,000 cycles on new material and over 500 cycles on artificially aged material, cold flexibility (EN1109) of -25°C and hot stability (EN1110) of 100°C.

MINERAL HELASTA POLYESTER

Elastomeric polymer-bitumen waterproofing membrane, covered with slate granules, 4 mm thick measured on the selvage, with a radial butadiene-styrene thermoplastic rubber base and distilled bitumen base, with ultimate elongation of 2000% and elastic recovery (NF-XP 84-360) of 300%, reinforced with spunbond polyester non-woven fabric, such as MINERAL HELASTA POLYESTER 4, certified with the Agrément I.T.C-CNR (former I.C.I.T.E.). The membrane has a tensile strength (EN 12311-1) L/T of 900/700 N/50mm, ultimate elongation (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 200/200 N, fatigue resistance (UEAtc) of over 1,000 cycles on new material and over 500 cycles on artificially aged material, cold flexibility (EN1109) of -25°C and hot stability (EN1110) of 100°C.

FLEXTER TESTUDO SPUNBOND POLYESTER

Elastoplastomeric polymer-bitumen waterproofing membrane, 4-mm thick, based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polyester fabric stabilised with fibreglass, FLEXTER TESTUDO SPUNBOND POLYESTER 4, certified with the Agrément ITC-CNR (former ICITE). The membrane has a tensile strength (EN 12311-1) L/T of 850/700 N/50mm, ultimate elongation (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, hot dimensional stability (EN 1107-1), L/T of ±0,3/±0,3%, cold flexibility (EN1109) of -20°C and heat resistance (EN1110) of 140°C.

MINERAL FLEXTER TESTUDO SPUNBOND POLYESTER

Elastoplastomeric polymer-bitumen waterproofing membrane, self-protected with slate granules, 4 mm thick measured on the selvage, based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polyester fabric stabilised with fibreglass, MINERAL FLEXTER TESTUDO SPUNBOND POLYESTER 4 type, certified with the Agrément ITC-CNR (former ICITE). The membrane has a tensile strength (EN 12311-1) L/T of 850/700 N/50mm, ultimate elongation (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 150/150 N, hot dimensional stability (EN 1107-1), L/T of ±0,3/±0,2%, cold flexibility (EN1109) of -20°C and heat resistance (EN1110) of 140°C.

FOOT TRAFFIC NOISE ACOUSTIC INSULATION

FONOSTOPStrato

Foot traffic noise acoustic insulation, in rolls, 4 mm thick, such as FONOSTOPStrato, with its upper face made up of a non-woven thermally sealed polyester fabric, projecting by 5 cm from the sound resilient non-woven fabric on the lower face, made up of a resilient layer of non-woven polyester fabric with elastic needling to guarantee the maintenance of the thickness when loaded.

The insulation has a dynamic rigidity **s'** = 57 MN/m^3, a tensile strength (UNI-EN 12311-1) L/T of 500/500 N/50 mm and an ultimate elongation (UNI-EN 12311-1) L/T of 50/100%.

CONCRETE WATERPROOFING PRODUCTS

COVERCOL AB RAPID

This is a two-component product with a base of hydraulic bonding agents and acrylic elastomers capable of absorbing structural movements without damage, thanks to its excellent level of flexibility and elasticity. With the same product it is possible to waterproof and then stick paving or a ceramic, mosaic coating, etc. Ultimate elongation: 40%±5%; cold-state flexibility : –30°C; crack bridging: 1mm.

Capitolato tecnico

e le utilizzazioni del prodotto. Considerate le numerose possibilità d'impiego e la possibile interferenza di elementi da noi non dipendenti, non ci assumiamo responsabilità in ordine ai risultati. L'Acquirente è tenuto a stabilire sotto la propria responsabilità l'idoneità del prodotto all'impiego previsto.

I dati esposti sono dati medi indicativi relativi alla produzione attuale e possono essere cambiati e aggiornati dalla INDEX S.p.A. in qualsiasi momento senza preavviso e a sua disposizione. I suggerimenti e le informazioni tecniche fornite rappresentano le nostre migliori conoscenze riguardo le proprietà

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