The waterproof covering of road decks is aimed at protecting the concrete work from the chemical attack of carbon dioxide which, due to the carbonation of cement, alters its mechanical characteristics, and from the disgregation action of water which penetrates the cracks in the concrete and disgregates it during the freeze and thawing cycles. The waterproof covering is used to protect the metal reinforcements of concrete from both the corrosion caused by carbonation, which alters its basic protective environment, and the corrosive action of antifreeze salt spread in the winter. The indications above highlight the fundamental role played by the waterproof covering with regard to the duration of the work and the importance for it to remain unaltered over time.

INDEX offers a waterproofing system to the industry that is based on the use of TESTUDO SPUNBOND POLIESTERE or PROTEADUO TRIARMATO and PROTEADUO POLIESTERE 25 membranes for cold climates, which are completely heat-bonded to the deck, after applying a coat of primer, or the AUTOTENE ASFALTICO EP POLIESTERE self-thermoadhesive membrane, which instead is bonded onto the surface through the indirect heat of the bituminous conglomerate or of poured asphalt laid above.

The membranes consist of polymer distilled bitumen reinforced with spunbond non-woven polyester fibre, comply with standard UNI EN 14695 and resist to the laying temperature for both the bituminous conglomerate and the poured asphalt.

The waterproofing system with polymer-bitumen membranes has been tried and tested for more than forty years and the first experimental tracks in Italy were made in Pomezia at the end of the 60s by Società Autostrade S.p.A., to which tribute must be paid for introducing reinforcements made of non-woven polyester, which is more resistant to perforation than the reinforcements used until then, made of fibreglass.

This system is mentioned in Italian (contract specifications of Società Autostrade S.p.A. - Rome, January 1976) and foreign regulations (tests of the Section des Liants Routiers of the LCPC-Laboratoire Central Des Ponts et Chaussées-Paris) and the Prague Institute. The single layer systems mentioned above are supplemented by the two-layer system composed of TESTUDO AGREMENT “A” and TESTUDO AGREMENT “C” used to protect the railway decks of the HSR line of the Italian state railway.
The new UNI EN 14695 standard for the mandatory EC marking of the membranes for the waterproofing of concrete surfaces laid under paved asphalt

Concerning the sheets for the waterproofing of pre-fabricated units, the great advantage of the polymer-bitumen membranes TESTUDO, PROTEADUO and AUTOTENE ASFALTICO is that they can be asphalted directly not only with the bituminous conglomerate but also with poured asphalt.

Since 1 October 2011 the EC marking is mandatory for the membranes for the waterproofing of concrete surfaces destined to be covered with paved asphalt. The marking is governed by standard UNI EN 14695, which provides for specific tests for this field of application.

In addition to the classic identification tests: weight, thickness, resistance to traction, hot and cold behaviour, the new European testing methods are aimed at measuring the performance of the membrane once it has been directly asphalted; thus many tests are carried out on the concrete+membrane+asphalt system by measuring its adhesion on concrete and asphalt, the resistance to the thermal shocks from asphalting operations, the fatigue on the crack under the asphalt and the resistance to the tangential strain between the asphalt and the concrete that generates when vehicles brake, etc.

Only the membranes conforming to UNI EN 14695 can be applied under the asphalt.

The most common contract specifications still recall the technical characteristics of the membranes that do not comply with European standards and even though the proposed membranes comply with the old specifications since, starting from 01/10/2011 the EC marking of “Reinforced bituminous membranes for the waterproofing of decks of concrete bridges and other concrete surfaces subject to traffic” conforming to UNI EN 14695 has become mandatory, it has consequently become mandatory by law also the expression of the characteristics of the membranes measured in compliance with the European testing methods UNI EN and therefore the technical sheets of the materials report the measured characteristics in compliance with the new EN standards.
WATERPROOFING
RAILWAY DECKS - HIGH SPEED RAIL (HSR)

- Two-layer waterproofing system for the railway deck of the high speed rail line - Italferr Specifications
- System endorsed by the companies Italferr-Iricav-Cavet
- Membranes tested by Istituto Sperimentale delle F.S., Rome
- TESTUDO AGREMENT A and TESTUDO AGREMENT C are membranes qualified as “Category 1” by the High Speed Consortium, the company Italferr and the consortia entrusted with the various sections on the national territory.

- Conforming to Annex VII of Italferr specifications.

Laying of the two-layered waterproof covering on the central area of the deck between the ballast retaining walls. The laying surface must be smooth, clean and dry. Any works to create an evenly laid surface must be conducted in compliance with the provisions of ANNEX VII of the Italferr specifications; different solutions must be accepted by it in advance.

The entire surface to be covered will be treated with a 300-500 g/m² coat of INDEVER WET CONCRETE adhesion bituminous primer, a solution based on bitumen, additives and solvents, also suitable for damp bases and adhering to concrete with a force of ≥0.2 N/mm², to be applied with a roller or sprayed on.

The membrane will be applied in compliance with the methods stated in ANNEX VII of Italferr specifications, the sheets of the first layer, consisting of the TESTUDO AGREMENT “C” membrane, placed transversely to the deck and overlapping by approximately 10 cm with another, must be completely and carefully bonded to the laying surface and on the overlaps with complete head-bonded adhesion and turned up by 20 cm onto the ballast retaining walls. Across the overlaps of the first layer, the sheets of TESTUDO AGREMENT “A” will be subsequently bonded with the same method and turned up by 25 cm onto the ballast retaining walls.

Laying of the single layer waterproof covering on the lateral walking areas of the deck between the ballast retaining walls and the rail cords. The preparation of the laying surface and the application of the coat of primer must take place with the same methods established for the central area according to ANNEX VII of Italferr specifications.

The membrane will be applied in compliance with the methods stated in ANNEX VII of Italferr specifications, the sheets of the TESTUDO AGREMENT “A” membrane will be laid longitudinally to the deck, treated with the primer, with lateral and longitudinal overlaps of 15 cm, and must be completely and carefully bonded to the laying surface and on the overlaps with complete head-bonded adhesion. The overlaps of the membrane onto the ballast retaining walls must be 20 cm while the overlaps on the cords of the rails must be 8 cm.

Special attention must be paid near the drain holes obtained on the ballast retaining walls and near the drainpipes and the anchor holes of T.E. piles placed on the foot platforms. The surfaces to be covered must be perfectly dry and no waterproofing operation must take place on rainy days, when it is snowing or when the ambient temperature in the laying phase is lower than +5°C. The functional tests, which will imply the tearing test for the membranes already laid, shall be carried out in compliance with the methods set in ANNEX VII of Italferr specifications and the areas subject to the tests must be restored with patches of the TESTUDO AGREMENT “A” membrane sized 40×40 cm, torch bonded in compliance with the methods stated in the same ANNEX.
**WATERPROOFING**

**MOTORWAY DECKS**

1. Motorway deck
2. Pontage
3. INDEVER WET CONCRETE
4. TESTUDO SPUNBOND 30 or TESTUDO SPUNBOND 25 or TESTUDO SPUNBOND 20 or PROTEADUO TRIARMATO or PROTEADUO POLIESTERE 25 or AUTOTENE ASFALTICO EP POLIESTERE
5. Road asphalt

**LAYERS**

1. Motorway deck
2. Pontage
3. INDEVER WET CONCRETE
4. TESTUDO SPUNBOND 30 or TESTUDO SPUNBOND 25 or TESTUDO SPUNBOND 20 or PROTEADUO TRIARMATO or PROTEADUO POLIESTERE 25 or AUTOTENE ASFALTICO EP POLIESTERE
5. Road asphalt

• **SOLUTION WITH ELASTOPLASTOMERIC MEMBRANE for concrete bridges**
  - The entire surface to be coated will be treated with a coat of bituminous adhesion primer type INDEVER WET CONCRETE, at 350-500 gr/m².
  - After at least 24 hours from applying the primer, an elastoplastomeric polymer distilled bitumen waterproofing membrane, with EC marking, conforming to UNI EN 14695, type TESTUDO SPUNBOND 30, based on distilled bitumen, plastomers and elastomers, reinforced with spunbond “non-woven” isotropic polyester fibre positioned asymmetrically with respect to the thickness of the sheet will be heat-bonded onto the entire surface and on the projecting parts. The reinforcement will be covered with about 0.5 mm of bituminous mass in the upper part and 2-3 mm in the part that is in contact with the laying surface for a total of 4 or 5 mm of thickness, to be decided based on the roughness of the surface to be waterproofed. The sheets, to be laid in parallel to the road deck, shall be entirely and carefully flame-bonded to the laying surface by using a propane gas torch, providing for torch-bonded 10 cm overlaps. These will be subsequently turned and bonded to the vertical parts for at least 10 cm above the level set for the paving conglomerate.

Alternatively:

• **SOLUTION WITH ELASTOPLASTOMERIC MEMBRANE for concrete bridges**
  - Conforming to ANAS Specifications Art. 25
  - Conforming to tests run by the French central laboratory of bridges and roads and the Test laboratory of the Belgian Civil Engineering Department.
  - The entire surface to be coated will be treated with a coat of bituminous adhesion primer type INDEVER WET CONCRETE, at 350-500 gr/m².
  - After at least 24 hours from applying the primer, an elastoplastomeric polymer distilled bitumen waterproofing membrane, with EC marking, conforming to UNI EN 14695, type TESTUDO SPUNBOND 25, based on distilled bitumen, plastomers and elastomers, reinforced with spunbond “non-woven” isotropic polyester fibre positioned asymmetrically with respect to the thickness of the sheet will be heat-bonded onto the entire surface and on the projecting parts. The reinforcement will be covered with about 0.5 mm of bituminous mass in the upper part and 2-3 mm in the part that is in contact with the laying surface for a total of 4 or 5 mm of thickness, to be decided based on the roughness of the surface to be waterproofed. The sheets, to be laid in parallel to the road deck, shall be entirely and carefully flame-bonded to the laying surface by using a propane gas torch, providing for torch-bonded 10 cm overlaps. These will be subsequently turned and bonded to the vertical parts for at least 10 cm above the level set for the paving conglomerate.

Alternatively:

• **SOLUTION WITH ELASTOPLASTOMERIC MEMBRANE for concrete bridges**
  - Certified by the Laboratory Lspec d’AIX- CETE Méditerranée
  - The entire surface to be coated will be treated with a coat of bituminous adhesion primer type INDEVER WET CONCRETE, at 350-500 gr/m².
  - After at least 24 hours from applying the primer, an elastoplastomeric polymer distilled bitumen waterproofing membrane, with EC marking, conforming to UNI EN 14695, type TESTUDO SPUNBOND 20, based on distilled bitumen, plastomers and elastomers, reinforced with spunbond “non-woven” isotropic polyester fibre positioned asymmetrically with respect to the thickness of the sheet will be heat-bonded onto the entire surface and on the projecting parts. The reinforcement will be covered with about 0.5 mm of bituminous mass in the upper part and 2-3 mm in the part that is in contact with the laying surface for a total of 4 or 5 mm of thickness, to be decided based on the roughness of the surface to be waterproofed. The sheets, to be laid in parallel to the road deck, shall be entirely and carefully flame-bonded to the laying surface by using a propane gas torch, providing for torch-bonded 10 cm overlaps. These will be subsequently turned and bonded to the vertical parts for at least 10 cm above the level set for the paving conglomerate.

Alternatively:

• **SOLUTION WITH COMPOSITE MEMBRANE for concrete and steel bridges**
  - Approved by the French Railway SNCF for road and railway bridges
  - Certified by the Laboratory Lspec d’AIX- CETE Méditerranée
  - The entire surface to be coated will be treated with a coat of bituminous adhesion primer type INDEVER WET CONCRETE, at 350-500 gr/m².
  - After at least 24 hours from applying the primer, an elastoplastomeric polymer distilled bitumen waterproofing membrane, with EC marking, conforming to UNI EN 14695, type TESTUDO SPUNBOND 20, based on distilled bitumen, plastomers and elastomers, reinforced with spunbond “non-woven” isotropic polyester fibre positioned asymmetrically with respect to the thickness of the sheet will be heat-bonded onto the entire surface and on the projecting parts. The reinforcement will be covered with about 0.5 mm of bituminous mass in the upper part and 2-3 mm in the part that is in contact with the laying surface for a total of 4 or 5 mm of thickness, to be decided based on the roughness of the surface to be waterproofed. The sheets, to be laid in parallel to the road deck, shall be entirely and carefully flame-bonded to the laying surface by using a propane gas torch, providing for torch-bonded 10 cm overlaps. These will be subsequently turned and bonded to the vertical parts for at least 10 cm above the level set for the paving conglomerate.
WATERPROOFING
MOTORWAY DECKS

(See previous)

• Conforming to the approval by the Institute ZuS TECHNICKÝ A ZKUSEBNÍ ÚSTAV STAVEBNí OF Prague (Czech Republic)

The entire surface to be coated will be treated with a coat of bituminous adhesion primer type INDEVER WET CONCRETE, at 350-500 gr/m². After at least 24 hours from applying the primer, a composite polymer distilled bitumen waterproofing membrane, with EC marking, conforming to UNI EN 14695, type PROTEADUO TRIARMATO made up of an upper layer in elastoplastomeric APP bitumen, resistant to thermal shocks and with a softening point of 150°C, to coat and protect the lower elastomeric layer, based on distilled bitumen and SBS copolymer with radial styrene-butadiene block, with an ultimate elongation of 2.000% and a cold bend of -25°C will be heat-bonded onto the entire surface and on the projecting parts. The prefabricated stabilised three-layer composite membrane reinforcement consisting of fibreglass mat sandwiched between two spunbond “non-woven” polyester fabrics will be completely impregnated and coated with SBS bitumen. The thickness of the membrane of 4 or 5 mm will be chosen on the basis of the roughness of the surface to be waterproofed. The sheets, to be laid in parallel to the road deck, shall be entirely and carefully flame-bonded to the laying surface by using a propane gas torch, providing for torch-bonded 10 cm overlaps. These will be subsequently turned and bonded to the vertical parts for at least 10 cm above the level set for the paving conglomerate. 

Note. In case of steel decks, as an alternative to INDEVER WET CONCRETE, an elastomeric adhesion bituminous primer of the INDEVER PRIMER E type will be used, applied at 200÷300 g/m².

Alternatively:

• SOLUTION WITH COMPOSITE MEMBRANE for concrete and steel bridges
• Conforming to the approval by the Institute ZuS TECHNICKÝ A ZKUSEBNÍ ÚSTAV STAVEBNí OF Prague (Czech Republic)

The entire surface to be coated will be treated with a coat of bituminous adhesion primer type INDEVER WET CONCRETE, at 350-500 gr/m². After at least 24 hours from applying the primer, a composite polymer distilled bitumen waterproofing membrane, with EC marking, conforming to UNI EN 14695, type PROTEADUO POLIESTERE 25 made up of an upper layer in elastoplastomeric APP bitumen, resistant to thermal shocks and with a softening point of 150°C, to coat and protect the lower elastomeric layer, based on distilled bitumen and SBS copolymer with radial styrene-butadiene block, with an ultimate elongation of 2.000% and a cold bend of -25°C will be heat-bonded onto the entire surface and on the projecting parts. The reinforcement made of “non-woven” composite polyester stabilised with fibreglass impregnated with elastomeric polymer-distilled bitumen, will be completely impregnated and coated with SBS bitumen. The thickness of the membrane of 4 or 5 mm will be chosen on the basis of the roughness of the surface to be waterproofed. The sheets, to be laid in parallel to the road deck, shall be entirely and carefully flame-bonded to the laying surface by using a propane gas torch, providing for torch-bonded 10 cm overlaps. These will be subsequently turned and bonded to the vertical parts for at least 10 cm above the level set for the paving conglomerate. 

Note. In case of steel decks, as an alternative to INDEVER WET CONCRETE, an elastomeric adhesion bituminous primer of the INDEVER PRIMER E type will be used, applied at 200÷300 g/m².

Alternatively:

• SOLUTION WITH SELF-THERMOADHESIVE MEMBRANE for concrete and steel bridges

The laying surface must be smooth, clean and dry and the cement surfaces must be free from residues from evaporation-inhibiting treatments and cured for at least 3 weeks. Too rough surfaces do not allow the membrane to adhere completely. Before applying the membrane, the entire surface must be treated with a coat of quick drying solvent-based elastomeric adhesion bituminous primer, applied at 0.2 ± 0.4 Kg/m², suitable for preparing surfaces for the heat bonding of standard polymer distilled bitumen membranes and the cold bonding of self-adhesive and self-thermoadhesive polymer distilled bitumen membranes type INDEVER PRIMER E. 

After at least 2 hours from applying the primer, a self-thermoadhesive waterproofing membrane with EC marking conforming to UNI EN 14695, type AUTOTENE ASFALTO EP POLIESTERE, in elastoplastomeric polymer-bitumen, 4 mm thick (EN 1849-1), reinforced with spunbond non-woven polyester fabric, with the bottom face and the overlapping strip of the top face coated with a self-thermoadhesive mix, based on elastomers and tackifying resins, which can be activated by the indirect heat generated by the bituminous conglomerate layer or by the heat bonding of the layer of poured asphalt, both protected by a silicone-coated film which is removed as the roll is unrolled, will be laid dry on the entire flat part of the deck. The membrane rolls must be laid in parallel to the carriage ways, starting by removing the silicone-coated film from beneath the sheet of the first roll and pressing it carefully on the laying surface. The next roll, without removing the silicone-coated film, is unwound and aligned to the side of the membrane laid previously, overlapping on it laterally for about 6 cm. The silicone-coated film is subsequently removed from below the second roll, making sure to press it down with your feet. The lateral overlap can now be bonded by pressing the overlap after having removed the silicone-coated strip that covers it. The front overlaps instead must be torch bonded. The definitive bonding, together with the gluing of the laying surface, will be done with the indirect heat from laying the bituminous paving. 

The vertical parts are coated with a torch bonded strip of membrane of the TESTUDIO SPUNBOND POLIESTERE 25 - 4 mm type, which will exceed the height of the paving by at least 20 cm and will drop by at least 20 cm on the membrane that covers the horizontal surface.

Technical Specifications
BRIDGES, VIADUCTS AND RAILWAY DECKS - HIGH SPEED RAIL (HSR)
5
Preparing the laying surface

The laying surface will have to be sufficiently cured and set, free from oils, grease and dust and, if necessary, a pressurised water jet can be used to ensure the surface is properly cleaned. The surface of the concrete must be even and any mortar residues that do not adhere properly must be removed with a bush hammer as well as any too sharp edges. Major uneven areas must be filled with epoxy mortar and where the membrane is laid directly onto prefabricated rafters, any uneven area between the rafters must be rounded with epoxy mortar. The surfaces of steel decks will be cleaned through sanding (SSPC-SP 6-63) of a commercial type. A coat of INDEVER PRIMER E must be applied immediately afterwards. The coat of primer and the membrane must be applied on the dry deck, in good weather conditions and with an air temperature not lower than 10°C. The INDEVER primer must be applied preferably with a large brush to ensure a good impregnation of the concrete. A reinforce screed is usually applied on prefabricated bridge rafters, but if these are not present, 33÷50 cm wide TESTUDO SPUNBOND or PROTEADUO strips must be bonded across the joining lines of the tiles and leveled with epoxy mortar. To ensure blistering does not take place, the membrane must bond perfectly to the laying surface. To ensure perfect adhesion it is necessary to heat the lower part of the sheet and the deck at the same time with a flame so that, as the sheet is unrolled, a rivulet of molten bitumen mass is always present.

Protruding parts, pavements, etc.

The projecting parts must have a housing for the waterproofing at least 4 cm deep and 10 cm higher than the level reached by the paving. The waterproof covering will be bonded after applying a coat of primer.

Drainpipes

The housing that will host the drain hole will be designed in a way to be able to dispose also of the water absorbed by the bituminous conglomerate; it will then discharge the water from both the waterproofing level and the paving level.

Innumerable types of joint are available on the market, making a common exemplification impossible. In any case it is important to connect the membrane to the joint to ensure the continuity of the waterproof covering. The joint must be fitted with a drainage system for rainwater and the water absorbed by the paving. In the subsequent phase of laying the joint cover, when the paving is cut and demolished near the joint, after the conglomerate settles, the continuity of the covering must be restored with waterproof epoxy mortar before applying the definitive joint cover.

Laying the conglomerate

It is important for the conglomerate to bond with the covering; thus the laying temperature must be high and the compaction must be carried out immediately, having the rubberised roll follow the finishing machine.
The membranes may be asphalted directly with the bituminous conglomerate or with a waterproof and protective layer of poured asphalt.

**Applying the poured asphalt**

The membranes suggested in this technical document resist to the laying temperature of poured asphalt.

The protection of membranes for bridges with poured asphalt is a widely used method in northern European countries where asphalt centres are very common for the preparation of this type of material that, in addition to providing mechanical protection, also ensures water seal as it is completely waterproof. This is a mix of bitumen, sand, calcareous filler, containing a considerable percentage of fine gravel. A 25 mm thick layer of asphalt is usually laid. With a lower thickness, the overlaps of the membranes would be reflected in the thickness of the asphalt. Asphalt is laid manually with large wooden spatulas or with special machines at a temperature higher than 230 °C and only recently, to limit the emission of fumes, mixes have been devised that can be laid at a temperature lower than 200°C. In bridges poured asphalt is always covered with a layer of bituminous conglomerate.

**Laying the conglomerate**

To prevent steam bubbles from forming under the membranes exposed to sunlight for too long, it is advisable for the conglomerate to be laid in the shortest time possible after applying the membranes or the poured asphalt.

The membranes suggested in this technical document resist to the laying temperature of the bituminous conglomerate. It is important for the conglomerate to bond together with the waterproofing.

Thus the laying temperature must be high (above 130°C) and the compaction must be carried out immediately, having the rubberised roll follow the finishing machine.

To prevent the overlaps of the membranes from being reflected on the thickness of the conglomerate, this must be lower than 5 cm, to be increased to maximum 7 cm in case the membranes are protected with poured asphalt.

In any case it is appropriate for the thickness of the conglomerate to be greater than the set minimum limit to avoid that also the waterproof layer becomes damaged during the periodical remaking of the worn layer.
### PRIMER

**INDEVER WET CONCRETE**
Quick drying adhesion bituminous primer suitable for preparing surfaces for the heat bonding of polymer bitumen membranes, such as INDEVER WET CONCRETE, with a base of bitumen, additives and solvents with solid content (UNI EN ISO 3251) of 50% and cup viscosity of DIN/4 at 23°C (UNI EN ISO 2431) of 20÷25 s.

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

### WATERPROOF COVERING

**PROTEADUO TRIARMATO**
PROTEADUO TRIARMATO multi-layer composite polymer distilled bitumen waterproofing membrane, 4 mm thick (EN 14695), certified with the Agrément/DVT of I.T.C-CNR, made up of an upper layer in elastoplastomeric polymer distilled bitumen with ring and ball softening point (EN 1427) of 150°C, a lower layer in elastoplastomeric polymer distilled bitumen with elastic recovery (NF XP 84-360) of 300% and a stabilised three-layer composite reinforcement with fibreglass between two spunbond polyester “non-woven fabrics”, impregnated with elastoplastomeric polymer distilled bitumen. The membrane will have Euroclass E reaction to fire (EN 13501-1), have a maximum tensile force (EN 12311-1) L/T of 750/650 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50%, resistance to tearing (EN 12310-1) L/T of 250/250 N, resistance to static load (EN 12730) of 15 kg, heat dimensional stability (EN 1107-1), L/T of -0.3%/+0.1%, cold bend (EN 1109) of 1,000 mm, of -15°C and -25°C for the lower layer. The membrane, EN 14695 certified for laying under bituminous conglomerate or poured asphalt on concrete surfaces subject to traffic, will be resistant to compacting of the conglomerate in conformity with EN 14692, and resistant to poured asphalt in conformity with 14693, resistant to dynamic water pressure to 500 kPa (EN 14694). It will have adhesion strength (EN 13596) of 0.4 N/mm², shear strain of 0.15 N/mm² and compatibility for thermal conditioning (EN 14691) of over 80%.

**PROTEADUO POLIESTERE 25**
PROTEADUO POLIESTERE 25 multi-layer composite polymer distilled bitumen waterproofing membrane, 5 mm thick (EN 1849-1), with EC marking conforming to UNI EN 14695, made up of an upper layer in elastoplastomeric polymer distilled bitumen with ring and ball softening point (EN 1427) of 150°C, a lower layer in elastoplastomeric polymer distilled bitumen with elastic recovery (NF XP 84-360) of 300% and a stabilised composite reinforcement in polyester non-woven fabric stabilised with glass-fibre impregnated with elastoplastomeric polymer distilled bitumen. The membrane will have Euroclass E reaction to fire (EN 13501-1), have a maximum tensile force (EN 12311-1) L/T of 1,000/900 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50%, resistance to tearing (EN 12310-1) L/T of 250/250 N, resistance to impact (EN 12691 method A) of 20 mm, resistance to static load (EN 12730) of -0.25%/+0.10%, cold bend (EN 1109) of the upper layer of -15°C and of -25°C for the lower layer. The membrane, EN 14695 certified for laying under bituminous conglomerate or poured asphalt on concrete surfaces subject to traffic, will be resistant to compacting of the conglomerate in conformity with EN 14692, and resistant to poured asphalt in conformity with 14693, resistant to dynamic water pressure to 500 kPa (EN 14694). It will have adhesion strength (EN 13596) of 0.4 N/mm², shear strain of 0.15 N/mm² and compatibility for thermal conditioning (EN 14691) of over 80%.

**TESTUDO SPUNBOND POLIESTERE 20**
TESTUDO SPUNBOND POLIESTERE 20 elastoplastomeric polymer distilled bitumen waterproofing membrane, 5-mm thick (EN 1849-1), measured on the selvedge, with EC marking conforming to EN 13707 and UNI EN 14695, based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polyester fabric. The membrane will have Euroclass E reaction to fire (EN 13501-1), with maximum tensile force (EN12311-1) L/T of 850/700 N/50 mm, elongation at max. tensile force (EN 12311-1) L/T of 50/50%, tear resistance (EN12316-1) L/T of 200/200 N, heat dimensional stability (EN 1107-1) L/T -0.3%/+0.3%, cold bend (EN 1109) of -15°C and shape stability to heat (EN 1110) of 120°C.

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

TESTUDO SPUNBOND POLIESTERE 25
TESTUDO SPUNBOND POLIESTERE 25 elastoplastic polymer distilled bitumen waterproofing membrane, 5 mm thick (EN 1849-1), measured on the selvage, with EC marking conforming to UNI EN 13707 and UNI EN 14695, based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polyester fabric. The membrane will have Euroclass E reaction to fire (EN 13501-1), with maximum tensile force (EN12311-1) L/T of 1,000 to 900 N/mm², elongation at max. tensile force (EN 12311-1) L/T of 50 to 50%, tear resistance (EN12310-1) L/T of 250 to 250 N, heat dimensional stability (EN 1107-1) L/T -0.5 to +0.3%, cold bend (EN 1109) of -15°C and shape stability to heat (EN 1110) of 120°C.

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

TESTUDO SPUNBOND POLIESTERE 30
TESTUDO SPUNBOND POLIESTERE 30 elastoplastic polymer distilled bitumen waterproofing membrane, 5 mm thick (EN 1849-1), measured on the selvage, with EC marking conforming to UNI EN 13707 and UNI EN 14695, based on distilled bitumen, plastomers and elastomers, with composite reinforcement consisting of spunbond non-woven polyester fabric. The membrane will have Euroclass E reaction to fire (EN 13501-1), with maximum tensile force (EN12311-1) L/T of 1,100 to 1,000 N/mm², elongation at max. tensile force (EN 12311-1) L/T of 50 to 50%, tear resistance (EN12310-1) L/T of 250 to 250 N, heat dimensional stability (EN 1107-1) L/T -0.5 to +0.3%, cold bend (EN 1109) of -15°C and shape stability to heat (EN 1110) of 120°C.

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

AUTOTENE ASFALTICO EP POLIESTERE
AUTOTENE ASFALTICO EP POLIESTERE self-thermoadhesive waterproofing membrane, 4 mm thick (EN 1849-1), with EC marking conforming to EN 13707 and EN 14695, in elastoplastic polymer bitumen, reinforced with spunbond “non-woven” polyester fabric; the bottom face and the overlapping strip of the top face are coated with a self-thermoadhesive mix based on elastomers and tackifying resins, which can be activated by the indirect heat generated by the bituminous conglomerate layer or by the heat bonding of the layer of poured asphalt, 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 maximum tensile strength L/T (EN 12311-1) of 850 to 700 N/mm², an ultimate elongation (EN 12311-1) L/T of 50 to 50%, a resistance to impact (EN 12691-A) of 1,250 mm, a resistance to static load (EN 12730) of 20 kg and a cold bend (EN 1109) of -15°C.

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

TESTUDO AGREMENT “A”
Elastoplastic membrane in polymer distilled bitumen MDBP 4 mm thick conforming to EN 1849-1/ UNI 8202/6, reinforced with spunbond “non woven” polyester fabric stabilised with fibreglass of 250 g/m², with EC marking conforming to EN 13707 and EN 14695, TESTUDO AGREMENT “A” type. The membrane has a maximum tensile strength (EN 12311-1 / UNI 8202/8) L/T of 1100/1000 N/mm², ultimate elongation (EN 12311-1 / UNI 8202/8) L/T of 50/50%, slippage resistance/shape stability (EN 1110 / UNI 8202/18) at 140°C and cold bend (EN 1109 / UNI 8202/15) of -15°C. Resistant to compacting EN 14692, will be compliant with standard EN 14695 for waterproofing under hot-spread asphalt and qualified as “Category 1” by the High Speed Consortium of the company Italferr and the consortia entrusted with the various sections on the national territory for single layer applications and as upper layer of a two-layer system.

TESTUDO AGREMENT “C”
Elastoplastic membrane in polymer distilled bitumen MDBP 3 mm thick conforming to EN 1849-1/ UNI 8202/6, reinforced with spunbond “non woven” polyester fabric stabilised with fibreglass of 140 g/m², with EC marking conforming to EN 13707 and EN 14695, TESTUDO AGREMENT “C” type. The membrane has a maximum tensile strength (EN 12311-1 / UNI 8202/8) L/T of 750/600 N/mm², ultimate elongation (EN 12311-1 / UNI 8202/8) L/T of 50/50%, slippage resistance/shape stability (EN 1110 / UNI 8202/18) at 140°C and cold bend (EN 1109 / UNI 8202/15) of -10°C. Resistant to compacting EN 14692, will be compliant with standard EN 14695 for waterproofing under hot-spread asphalt and qualified as “Category 1” by the High Speed Consortium of the company Italferr and the consortia entrusted with the various sections on the national territory for applications as the lower layer of a two-layer system.
The data provided is indicative mean data for the current production and may be changed and updated by INDEX S.p.A. at any time, without notice. The technical information and suggestions provided represent our best knowledge of the properties of the product in use. Considering the many possible uses and the possible interference of elements not under our control, we take no responsibility for the results. The Purchaser is responsible for establishing the suitability of the product for the use envisaged.

- For the correct use of our products, consult the INDEX technical specifications
- For further information or special uses, consult our technical office

Socio del GBC Italia

Internet: www.indexspa.it
Technical & Sales Information tecom@indexspa.it
Management and Administration index@indexspa.it
Index Export Dept. index.export@indexspa.it

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