

# FLEXTER TESTUDO EXTREME MINERAL FLEXTER TESTUDO EXTREME

ELASTOPLASTOMER POLYMER DISTILLED BITUMEN WATERPROOFING MEMBRANES BASED ON DISTILLED BITUMEN, POLYALPHAOLEFINS (APAO) AND THERMOPLASTIC OLEFINS (TPO), REINFORCED WITH SPUNBONDED NON-WOVEN POLYESTER FABRIC STABILIZED WITH GLASS FIBRES FOR WATERPROOFING IN EXTREME CLIMATES

GRANTS *LEED* CREDITS

CATEGORY	CHARACTERISTICS			ENVIRONMENTAL						METHOD OF USE				
 EP														
ELASTOPLASTOMERIC	WATERPROOF	REACTION TO FIRE	ECO GREEN	ASBESTOS FREE	TAR FREE	CHLORINE FREE	RECYCLABLE	NON DANGEROUS WASTE	EXHAUSTED OIL FREE	TORCH APPLICATION	HOT AIR APPLICATION	NAILING	COLD ADHESIVE BONDING	APPLICATION WITH MOLTEN BLOWN BITUMEN

\* For waterproofing membranes with TEXFLAMINA underface finish only



## 1 PROBLEM

### WATERPROOFING IN EXTREME CLIMATES

Apply the elastoplastomer polymer distilled bitumen membranes in extreme climates as an alternative to thermoplastic plastomer synthetic sheets either plasticized or with internal plastification.

## 2 SOLUTION

**FLEXTER TESTUDO EXTREME** are membranes designed to withstand and be applied in areas with extreme climates. They represent the evolution of the best long-durability, high-performance polymer distilled bitumen membranes produced to date.


The reliability of the performance and long durability of this new line is validated by the DVT certificates issued by ITC-CNR (former ICITE) and BBA, the British equivalent of the same institution which has verified the over-thirty-year durability of the FLEXTER TESTUDO POLIESTERE and FLEXTER FLEX TESTUDO POLIESTERE membranes, from which they derive.

Both can be directly exposed to atmospheric agents and have a cold flexibility of -35°C, which reaches and in many cases exceeds that of the most common synthetic sheets used for waterproofing roofs also considering that, compared to them, these membranes are two to three times thicker. Their +150°C heat resistance means they can also be applied in very hot climates without the risk of sliding.

They are reinforced with a non-woven polyester composite fabric stabilized with glass fibres and are able to associate good mechanical resistance with high ultimate elongation (about 45%), over that normally measured on polyester fabrics used as reinforcement

for synthetic sheets, which is around 15% but, above all, compared to fabric, non-woven fabric can guarantee higher and more uniformly distributed resistance to static and dynamic loading. The reinforcement stabilized with **FLEXTER TESTUDO EXTREME** glass fibres guarantees that the membrane has dimensional stability of less than 0.25% on an unbonded sheet, and half the shrinkage of synthetic membranes reinforced with polyester meshing, which is in the order of 0.3-0.50%. The membrane can also be fully bonded and in that case the dimensional shrinkage drops to values in the order of 0.02-0.05%. **FLEXTER TESTUDO EXTREME** membranes do not contain migrating plasticizers as the plasticizer of the polymers contained is bitumen, which is notoriously stable, so stable that it is still possible now to note their presence in Assyro-Babylonian architecture.

Instead, the issue of the migration of plasticizers generates the shrinkage problems which have always affected certain synthetic sheets and that are added to the shrinkage due to the "processing memory". Another important characteristic that differentiates **FLEXTER TESTUDO EXTREME** membranes from synthetic sheets is their high thickness, at least 4 mm for membranes applied in a single layer, which certainly makes them more compatible with building requirements where the unit of measurement is not 1/10 mm.



**INTENDED USE OF "CE" MARKING SPECIFIED ACCORDING TO THE AISPEC-MBP GUIDELINES**

**EN 13707 - REINFORCED BITUMEN SHEETS FOR ROOF WATERPROOFING**

- Under layer or intermediate layer in multi-layer systems without permanent heavy surface protection
  - FLEXTER TESTUDO EXTREME
- Upper layer in multi-layer systems without permanent heavy surface protection
  - FLEXTER TESTUDO EXTREME
  - MINERAL FLEXTER TESTUDO EXTREME
- Exposed single-layer
  - FLEXTER TESTUDO EXTREME
  - MINERAL FLEXTER TESTUDO EXTREME
- Single-layer under heavy protection
  - FLEXTER TESTUDO EXTREME
- Under heavy protection in multi-layer systems
  - FLEXTER TESTUDO EXTREME

**EN 13969 - BITUMEN DAMP PROOF SHEET INCLUDING BITUMEN BASEMENT TANKING SHEETS**

- Membranes for foundations
  - FLEXTER TESTUDO EXTREME

## DESCRIPTION

**FLEXTER TESTUDO EXTREME** are elastoplastomer waterproofing membranes based on a polymeric continuous phase alloy between distilled bitumen and a high level of polyalphaolefins (APAO) and thermoplastic olefins (TPO), obtained with the Catalloy process, polymerized with single-site metallocene catalysts based on zirconium.

**FLEXTER TESTUDO EXTREME** membranes do not become weaker or softer over time, maintaining their characteristics, mainly determined by the polymeric continuous phase, long-term.

The high-resistance spunbonded composite non-woven polyester fabric reinforcement is rot-proof and elastic and is previously stabilized with glass fibres to give the membrane greater dimensional stability.

The top face of the **FLEXTER TESTUDO EXTREME** membrane is covered with fine

## METHOD OF USE AND APPLICATION FIELDS

Although it still requires a certain degree of training, the application technique for **FLEXTER TESTUDO EXTREME** membranes is much more intuitive and easier than that used for synthetic sheets in general, plus there is no need for costly accessories and fixing devices; the latter are indeed often calculated separately in the metric estimation of synthetic coverings and have a significant economic impact on the cost of the roof, especially those with complex geometry and/or with numerous skylights or individual spots. The peculiarity of polymer bitumen membranes lies in the fact that the membrane itself becomes adhesive due to torch heating and in that to be bonded onto the application surface no adhesives or extra materials are required. The possibility to bond **FLEXTER TESTUDO EXTREME** membranes in total adherence limits water seepage in the case of leaks and facilitates traceability. The same technique is used to seal the overlaps and, by torch bonding both ends, a secure autogenic seal is obtained; considering such outstanding operational simplicity, no further inspections are necessarily required afterwards, as is the typical case for the operational techniques in which there are no obvious and definite signs of efficient execution right from the application phase; with **FLEXTER TESTUDO EXTREME** membranes, a clear continuous trickle of melted mix can be seen approximately 10 mm outside the overlap, thus guiding the operator and confirming the successful seal both for the operator and in a later inspection step, just like you would see when welding metals. Whereas, in order to prevent moisture getting trapped when bonding on the laying surface, application at temperatures less than +2°C is not recommended, in the event of low-adhesion application, the sealing of the overlaps alone can even be performed at less than 0°C.

If the overlaps need to be sealed without a naked flame, the joints can be sealed more quickly than synthetic sheets, also in hot air, using either manual welders or automatic ones, such as Leister BITUMAT B2. Again thanks to the fact that the membranes are torch-bonded, which is not the case

screen-printed talc, which is uniformly distributed. This is a patented treatment that makes the rolls easy to unwind and makes the sealing of the overlap joints quicker and more secure.

The top face of the **MINERAL FLEXTER TESTUDO EXTREME** is self-protected with slate granules, which are bonded and hot pressed, whereas the top face of **MINERAL REFLEX WHITE** is coated with white ultra-reflecting, high saturation and luminosity, ceramic-coated granules. For both versions, a lateral overlapping strip, 8 cm wide, is free from mineral protection and protected with a band of hot-melt film which needs to be melted using a torch or hot air for sealing the joint. The bottom face of both types is covered with Flamina, a plastic hot-melt film and is embossed to obtain both the pretension (consequently the excellent heat-shrinkage of the film) and to ensure a larger flame surface (consequently more secure and quicker laying).

for synthetic sheets, old polymer-bitumen coverings can easily be repaired without any special preparation in advance, if not a quick brushing to remove dirt that may have settled on the coverings, even those protected with mineral granules where the application methods are the same as those used to seal the ends of the new coverings (in the case of repair work on old coverings made up of synthetic membranes on the other hand, the latter have to be cleaned in advance with special solvents and in many cases combined with strenuous mechanical brushing work). Another just as important advantage that distinguishes polymer-bitumen membranes from synthetic membranes is yet again determined by the thermo-plastic characteristics of the material and by how simple patch repair work can be done just as easily without using adhesives. A covering can also be completely renewed simply by laying a new layer on top of the old one, bonding it using a torch in total adherence, consequently avoiding demolition expenses and transport costs to the tip. The result will not just be a new single-layer covering (which is what happens necessarily when renewing a synthetic covering where the new one cannot be bonded on top of the old one), because when the new polymer-bitumen membrane is bonded onto the old one, any imperfections will melt and merge together, actually creating a new multi-layer covering, which also exploits the old reinforcement because it is incorporated into the new layer. The wide stability range at high and low temperatures, over time, allows the membrane to be used both in cold and tropical climates. The excellent adhesion to the surfaces to be covered and the excellent seal of the joints guarantees durability and allows connection to be made either by torch bonding or mechanical fastening under the joint. The long-lasting mechanical resistance and elasticity of **FLEXTER TESTUDO EXTREME** membranes means they can be used as a single- or multi-layer sealing element either in building or civil engineering, for new jobs or for repairs:

- On all sloping surfaces, both flat and upright and on curved surfaces.
- On different types of application surfaces: cement, site-cast or prefabricated

## SPECIFICATION ITEMS

**FLEXTER TESTUDO EXTREME** - Elastoplastomer polymer distilled bitumen waterproofing membrane, for waterproofing in extreme climates, such as **FLEXTER TESTUDO EXTREME**, based on a polymeric continuous phase alloy between distilled bitumen and a high level of polyalphaolefins (APAO) and thermoplastic olefins (TPO), obtained with the Catalloy process, polymerized with single-site metallocene catalysts based on zirconium, with Spunbond non-woven polyester fabric composite reinforcement stabilized with glass fibres. The 4 mm thick membrane (EN 1849-1) will be classified in Euroclass E for reaction to fire (EN13501-1), will have tensile strength (EN 12311-1) L/T of 900/750 N/50 mm, ultimate elongation (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 200/200 N, resistance to impact (EN 12691 - method A) of 1,250 mm, resistance to static load (EN 12730 - method A) of 20 kg, hot dimensional stability (EN 1107-1), L/T of -0.3/+0.15%, cold flexibility (EN 1109) of -35°C and heat resistance (EN 1110) of 150°C.

### MINERAL FLEXTER TESTUDO EXTREME

- Elastoplastomer polymer distilled bitumen waterproofing membrane, self-protected with slate granules, for waterproofing in extreme climates, such as **MINERAL FLEXTER TESTUDO EXTREME**, based on a polymeric continuous phase alloy between distilled bitumen and a high level of polyalphaolefins (APAO) and thermoplastic olefins (TPO), obtained with the Catalloy process, polymerized with single-site metallocene catalysts based on zirconium, with Spunbond non-woven polyester fabric composite reinforcement stabilized with glass fibres. The 4 mm thick membrane (EN 1849-1), measured on the selvedge, will be classified in Euroclass E for reaction to fire (EN13501-1), will have tensile strength (EN 12311-1) L/T of 900/750 N/50 mm, ultimate elongation (EN 12311-1) L/T of 50/50 %, resistance to tearing (EN 12310-1) L/T of 200/200 N, resistance to impact (EN 12691 - method A) of 1,250 mm, resistance to static load (EN 12730 - method A) of 20 kg, hot dimensional stability (EN 1107-1), L/T of -0.3/+0.15%, cold flexibility (EN 1109) of -35°C and heat resistance (EN 1110) of 150°C.

**Self-protection MINERAL REFLEX WHITE** -(to be added to the items mentioned so far if it is a cool roof) - The **MINERAL REFLEX WHITE** version of the membrane features a self-protection with ultra-reflecting ceramic granules with high saturation and brightness that fulfils the criteria of solar reflectance above 0.65 as required for "cool roof" flat roofs in Annex 1 of the Interministerial Legislative Decree dated 26/06/2015 in force since 1/10/2015 and with a Solar Reflectance Index RSI = 80%, certified by the EELab of the University of Modena and Reggio Emilia, and meets the CAM minimum environmental criteria in the Ministerial Decree of 24 December 2015, in force since 2 February 2016 in point 2.2.3, and those provided for by the ITACA Protocol standard UNI/PdR 13.1:2015 CRITERION C.6.8.

surfaces; on metal or wooden roofing and on the most widely used thermal insulation systems for the building industry.

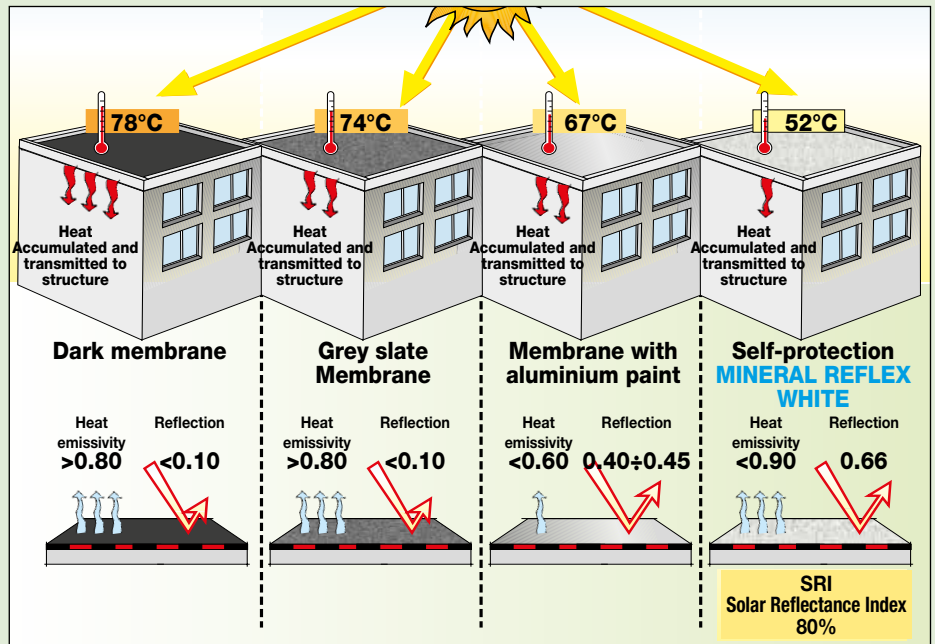
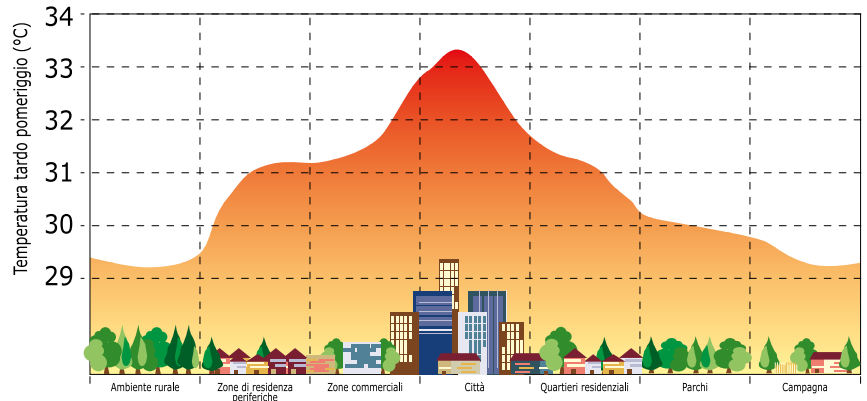
- For the most extensive range of uses: terraces, flat and sloping roofs, foundations including earthquake-resistant ones, rooftop car parks and waterproofing for civil engineering works.

# Environmental qualities

**FLEXTER TESTUDO EXTREME** membranes fulfil the criteria of the environmental protocols for sustainable building. Unlike synthetic sheets, the slate-coated surfaces of **MINERAL FLEXTER TESTUDO EXTREME** can be painted with ecological water-based paints and the most varied roof colours can be obtained. The slate-coated surface constitutes the ideal substrate for long-lasting paint, hence it is possible to further increase the reflectance of the roof with the special water-based paint **WHITE REFLEX** that reduces the temperature of the covering exposed to the sun from about 80°C to about 40°C and allows the roof to be cooled down and/or save on summer air conditioning costs. However it is also available on request with the self-protection made of **MINERAL REFLEX WHITE** ultra-reflecting, high saturation and luminosity, white ceramic-coated granules, the version of **MINERAL FLEXTER TESTUDO EXTREME** that already has a reflectance of over 0.65 allowing a cool roof to be provided, in compliance with the solar reflectance criteria required for flat cool roofs in Annex 1 of the Interministerial Decree of 26/06/2015 in force since 01/10/2015.

The **MINERAL WHITE REFLEX** protection, with a Solar Reflectance Index (SRI) higher than 80%, certified by the EELab of the University of Modena and Reggio Emilia, meets the CAM minimum environmental criteria for flat roofs in the Ministerial Decree of 24 December 2015 in force since 2 February 2016 in point 2.2.3 (SRI ≥ 78), those provided for by the ITACA Protocol standard UNI/PdR 13.1:2015 CRITERION C.6.8. (SRI ≥ 75) and those of the Protocol LEED GBC ITALY "To design, build and renovate institutional and commercial buildings" of 2009 updated on 9 February 2016 under the item SS CREDIT 7.2 - HEAT ISLAND EFFECT (SRI ≥ 78). As we know, the good environmental quality of a building product/system is denoted by its long durability, since the production of demolition waste is diluted over time. This is opposite to what happens for repairing a synthetic covering where the new one cannot be bonded onto the old one building a uniform and integral system. The peculiar characteristic of polymer distilled bitumen membranes is that they can be integrally superimposed. This provides the unique possibility in the field of prefabricated membranes of renewing an old covering by bonding a

## URBAN HEAT ISLANDS EFFECT



new membrane with total adhesion, thereby extending the durability of the new layer which will have even higher performance than the previous one since it is thicker. This property of polymer-bitumen membranes meets the criteria of sustainable building and adds a new concept of service life, which is no longer mere durability but rather the "typical service life" of the system; the coverings can indeed be renewed by laying the new membranes over the old covering with which they become integrally merged, without producing demolition waste, up to 1-2 times; based on the overlying protection system applied, the service life of the layered

arrangement is 60-90 years.

**FLEXTER TESTUDO EXTREME** membranes do not contain any plasticizers that are harmful to the environment or any halogenated substances and they widely comply with the limits on air and water pollutants envisaged by the environmental protocols.

The increase in the reflectance and emissivity provided by the **WHITE REFLEX** paint applied to the waterproof covering

Surface	Reflection	Emissivity
Dark membrane	<10% (<0.1)	>80% (>0.8)
Painted aluminium membrane	40÷45% (0.40±0.45)	<60% (<0.6)
<b>Self-protected membrane MINERAL REFLEX WHITE</b>	<b>66% (0.66)</b>	<b>&lt;90% (&lt;0.90)</b>

## Solar Reflectance Index

**MINERAL REFLEX WHITE**  
SRI\* >80%

\* SRI according to wind speed:  
low wind=79%, medium wind=80% and high wind=81%.

## The advantages of MINERAL REFLEX WHITE self-protection

- It increases the efficiency of photovoltaic panels.
- You avoid painting operations and it is more durable.
- It extends the life of the waterproof covering
- It improves comfort and you save on the costs of summer air conditioning.
- It reduces the temperature of urban heat islands and also power consumption and therefore emissions of CO<sub>2</sub>.



# TECHNICAL CHARACTERISTICS

	Standard	T	FLEXTER TESTUDO EXTREME	MINERAL FLEXTER TESTUDO EXTREME
Reinforcement			"Non-woven" Spunbond polyester fabric stabilized with fibreglass	"Non-woven" Spunbond polyester fabric stabilized with fibreglass
Thickness	EN 1849-1	±0.2	4 mm	4 mm
Roll size	EN 1848-1	-1%	1x10 m	1x10 m
Watertightness	EN 1928 - B	≥	60 kPa	60 kPa
• after ageing	EN 1926-1928	≥	60 kPa	60 kPa
Shear resistance L/T	EN 12317-1	-20%	800/700 N/50 mm	800/700 N/50 mm
Maximum tensile force L/T	EN 12311-1	-20%	900/700 N/50 mm	900/700 N/50 mm
Elongation L/T	EN 12311-1	-15% V.A.	50/50%	50/50%
Resistance to impact	EN 12691 - A		1 250 mm	1 250 mm
Resistance to static loading	EN 12730 - A		20 kg	20 kg
Resistance to tearing (nail shank) L/T	EN 12310-1	-30%	200/200 N	200/200 N
Dimensional stability L/T	EN 1107-1	≤	-0.30/+0.30%	-0.30/+0.30%
Flexibility to low temp.	EN 1109	≤	-35°C	-35°C
• after ageing	EN 1296-1109	+15°C	-35°C	-35°C
Flow resist. at high temp.	EN 1110	≥	150°C	150°C
• after ageing	EN 1296-1110	-10°C	150°C	150°C
UV ageing	EN 1297		Test passed	-
Reaction to fire Euroclass	EN 13501-1		E	E
External fire performance	EN 13501-5		F roof	F roof
Thermal specifications				
Thermal conductivity			0.2 W/mK	0.2 W/mK
Heat capacity			5.20 KJ/K	4.80 KJ/K

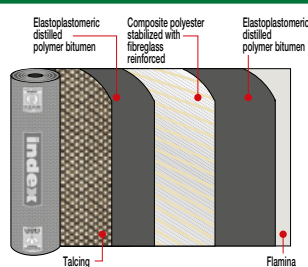
Compliant with EN 13707 in terms of the resistance factor to steam penetration for reinforced polymer-bitumen membranes, the value of  $\mu = 20\ 000$  may be considered, unless declared otherwise.

Stated membranes may change colour depending on the storage periods. The membrane goes away within 2-3 months from the colour given to their colour certificate. It is not a defect. The aspect of this type of membrane and cannot be the basis for a complaint. The same is true regarding the maintenance of colour and the different colourings that can occur among the variously exposed areas of the covering based on the types of artificial colouring.

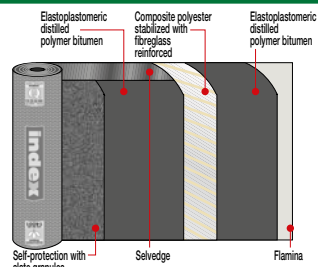
the numerous possible uses and the possible interference of conditions or elements beyond our control, we assume no responsibility regarding the results which are obtained. The purchasers, of their own accord and under their own responsibility, must establish the suitability of the product for the envisaged use.

## COMPOSITION OF THE MEMBRANE

### FLEXTER TESTUDO EXTREME



### MINERAL FLEXTER FLEX TESTUDO EXTREME



## PRODUCT FINISHING



**"FLAMINA" PE FOIL.** Plastic protection film helping prevent coils from sticking to the roll. As it withdraws under the action of the flame right during its installation, it signals the best melting point in order to correctly glue the membrane to the brackets and rises. When not heated, it can be used as a sliding layer.



**EMBOSSED FLAMINA.** The embossing on the lower surfaces of the membranes finished with Flamina film makes it possible to lay the product precisely and quickly; forming a smooth surface when melted with the torch. It indicates the correct melting temperature and lets the film retract faster. The embossing also enables optimal vapour diffusion; in spot bonded and loose laid installation, in the points where it remains intact, preventing blisters and swelling.



**SELF-PROTECTION WITH SLATE GRANULES.** On the visible face of the membrane, a protective coating made up of slate granules of various colours is hot bonded. This mineral shield protects the membrane from ageing caused by UV rays.



**MINERAL REFLEX WHITE SELF-PROTECTION.** A special high saturation and luminosity white mineral self-protection is applied to the face of the membrane to remain visible, which protects it from ageing due to UV rays, with high solar reflectance and very high heat emissivity. \* Surface treatment suitable for application under photovoltaic systems.

The figures shown are average indicative figures relevant to current production and may be changed or updated by INDEX at any time without previous warning. The advice and technical information provided, is what results from our best knowledge regarding the properties and the use of the product. Considering

• FOR ANY FURTHER INFORMATION OR ADVICE ON PARTICULAR APPLICATIONS, CONTACT OUR TECHNICAL OFFICE • IN ORDER TO CORRECTLY USE OUR PRODUCTS, REFER TO INDEX TECHNICAL SPECIFICATIONS •

**index**  
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