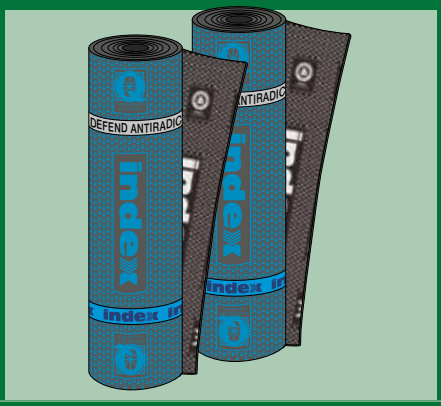


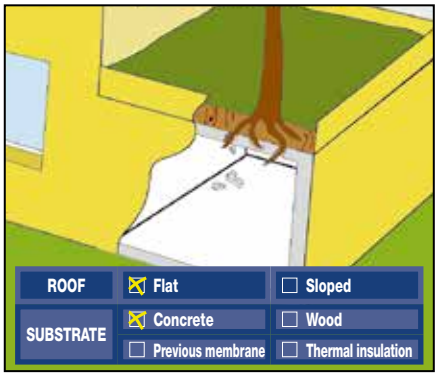
DEFEND ANTIROOT 15 POLYESTER
DEFEND ANTIROOT 10 POLYESTER

ELASTOPLASTOMERIC DISTILLED POLYMER-BITUMEN WATERPROOFING MEMBRANE, WITH AN ANTIROOT ADDITIVE, FOR PROTECTING ROOF GARDENS, SUNKEN WORKS AND GRAVEL COVERED ROOFS

GRANTS *LEED* CREDITS

CATEGORY	CHARACTERISTICS			ENVIRONRMENTAL							METHOD OF USE		
EP S			Reazione al fuoco		ASBESTOS FREE	TAR FREE	CHLORINE FREE						
SPECIAL ELASTOPLASTOMERIC FOR SPECIFIC USES	WATERPROOF	ROOT RESISTANCE	REACTION TO FIRE	ECO GREEN	ASBESTOS FREE	TAR FREE	CHLORINE FREE	RECYCLABLE	NON DANGEROUS WASTE	EXHAUSTED OIL FREE	TORCH APPLICATION	HOT AIR APPLICATION	NAILING

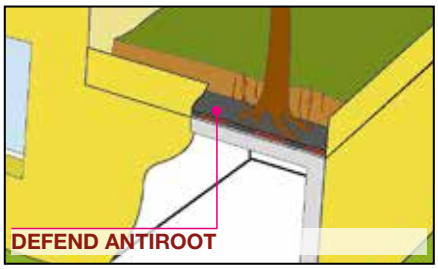
1 PROBLEMA



HOW TO REALISE A WATERPROOFING LAYER IN DIRECT CONTACT WITH THE GROUND THAT IS RESISTANT TO THE PENETRATION OF ROOTS ALSO AT THE JOINTS

The more and more widespread need to reduce cement in towns, with intense greenery planted also to the light roofs of new estates, has brought with it the problem of the root resistance of waterproofing layers not protected with cement screed.
The reason for its absence is due to its excessive weight, and the difficulty of applying it to pitched roofs.
Direct contact of the layer with the soil implies intrinsic resistance of its membranes against the perforating action of roots.
The use of membranes reinforced with metal foils or polyester film has often turned out to be a failure because the continuity of the mechanical protection on the sheet overlaps is not guaranteed.
In some cases of waterproof coverings of roof gardens, which have been in place for some years, made up of two overlapped and offset layers, both reinforced with PET polyester film, the roots manage to get through the overlaps of both layers.

2 SOLUTION



DEFEND ANTIROOT POLYESTER is a root resistant waterproofing membrane. The antiroot properties are obtained by adding phenoxi-fatty acid ester, a specific antiroot agent, to the polymer-bitumen compound.
Once applied, **DEFEND ANTIROOT** forms a continuous barrier against roots. As it does not contain film or double-reinforced foils, **DEFEND ANTIROOT** is more flexible and malleable during application. The additive has been developed specifically as a root inhibitor, for both hot-laid bitumen and for torch-laid bitumen membranes. The product comes from thirty years of German experience in the waterproofing industry.
DEFEND ANTIROOT POLYESTER is made up of distilled and selected bitumen for industrial use containing a high quantity of elastoplastomeric polymers such as to obtain a "phase inversion" alloy. The continuous phase of this alloy consists of the polymer in which the bitumen is dispersed, where the characteristics are determined by the polymer matrix and not by the bitumen, even if it is the largest ingredient. The performance of bitumen is therefore increased, durability and resistance to high and low temperatures are improved, thus maintaining the bitumen's already excellent qualities of adhesion and waterproofing. The reinforcement of the membrane consists of a single strand Spunbond non-woven polyester fabric, with high basic weight (grammage). This fabric is isotropic, rot-proof, thermally fixed and boasts: high mechanical resistance, considerable ultimate elongation, excellent resistance to punching and laceration.
DEFEND ANTI-ROOT is produced in 2 versions:
- **DEFEND ANTIROOT 15 POLYESTER**
- **DEFEND ANTIROOT 10 POLYESTER**

The first has a cold flexibility of –15°C and additionally resistant reinforcement, for which it is preferred in colder climates, whereas the second, with a cold flexibility of –10°C is for warmer climates.
DEFEND ANTIROOT POLYESTER has both faces coated with Flamina, the hot-melt film,

(See following)

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

EN 13707 - REINFORCED BITUMEN SHEETS FOR ROOF WATERPROOFING
- **Antiroot**
- DEFEND ANTIROOT 15 POLYESTER
- DEFEND ANTIROOT 10 POLYESTER

EN 13969 - BITUMEN DAMP PROOF SHEET INCLUDING BITUMEN BASEMENT TANKING SHEETS
- **Membranes for foundations**
- DEFEND ANTIROOT 15 POLYESTER
- DEFEND ANTIROOT 10 POLYESTER

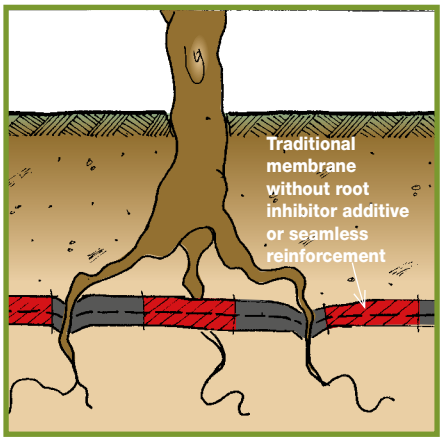
CERTIFICATION

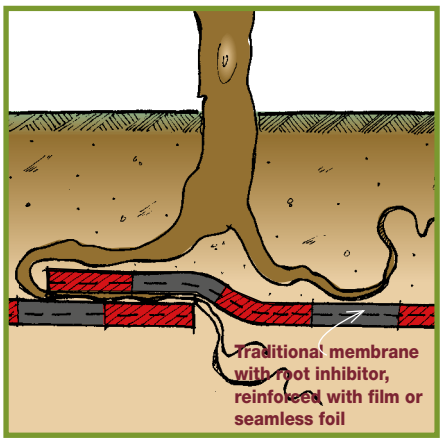
FORSCHUNGSANSTALT GEISENHEIM
to guarantee the resistance to roots conforms to the European test method EN-13948.

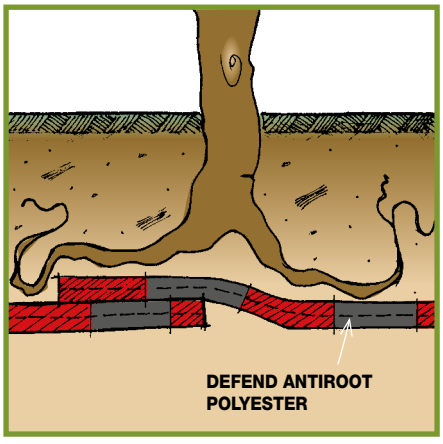
(sigue)
which stops the rolls of material from sticking together. The light blue INDEX mark on the film that covers the lower face, outside the roll, distinguishes the root inhibitor membrane from the other membranes produced by INDEX, so that it is recognizable even for sections of rolls in which the packaging tapes with the description have been removed. The reinforcement and the waterproofing mass are resistant to chemical effects of humic acids and fertilizers.
DEFEND ANTIROOT is used in all waterproofing systems in contact with the ground or where there is the risk of the system being attacked by roots.

APPLICATION FIELDS

It is always applied as the last waterproofing layer in contact with the earth for gardens.
When waterproofing roof gardens for instance, it is used as the top layer of a system, the first layer being a polymer-bitumen membrane reinforced with "non-woven" polyester fabric and the second being **DEFEND ANTIROOT POLYESTER** which is placed astride the overlaps of the previous layer and full bonded with the torch, (see technical specifications n 10, Roof Gardens).







CERTIFICATION EN 13948 OF DEFEND ANTIROOT POLYESTER


1. Application of DEFEND ANTIROOT in test device


2. Test containers waterproofed with DEFEND ANTIROOT


3. Reference test


4. Laying of planting soil


5. Vegetation implantation

6. Vegetation development after 2 years


7. Roots' development


8. Unchanged upper face of DEFEND ANTIROOT after the test


9. Unchanged under face of DEFEND ANTIROOT after the test

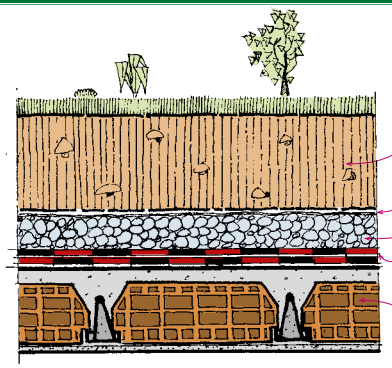
Certification
FORSCHUNGSANSTALT GEISENHEIM
to guarantee the resistance to roots conforms to the European test method EN-13948.

Precautions.
EN 13707 legislation on EC marking states that membranes for waterproofing green roofs must pass the resistance test to the penetration of roots in compliance with the FLL procedure that was considered appropriate by the CEN (European Committee for Standardisation) for establishing the suitability use of the membranes for green roofs in compliance with the European method EN 13948 envisaging the exposure to the roots of PYRACANTHA COCCINEA.
The FLL test conducted for 2 years on the INDEX membrane with added Phenoxy-Fatty Acid Ester states not only that the membrane is resistant to PYRACANTHA COCCINEA (Orange Charmer, Agazzino) roots in compliance with the EN 13948 test, but also to AGROPYRON REPENS (Couch grass) rhizomes, defining the membrane: (root-proof and rhizome-proof) in compliance with the FLL procedure.
The report including the test is available on request. It is underlined, however, that, as indicated in the test report, the test results do not extend to plants with strong and rapid root development to rhizomes, like some species of bamboo, Chinese reed or zebra grass (Miscanthus Sinensis), for which it is necessary to take further precautionary measures compared to the general green roof context (the speed of growth of bamboo rhizomes can reach 100 cm/24h). The membrane with added Phenoxy-Fatty Acid Ester is also resistant to lupin roots in compliance with the DIN 4062 method (UNI 8202 p24). Passing the EN 13948 test means that the membrane can have EC marking for the use of waterproof membranes for green roofs and according to the current state of knowledge constitutes the most recent investigation method known by INDEX on a European level; however, that does not exempt the user of the product from taking suitable precautions for specific plantations that are not represented by the tests mentioned above.

PROJECT CERTIFICATION

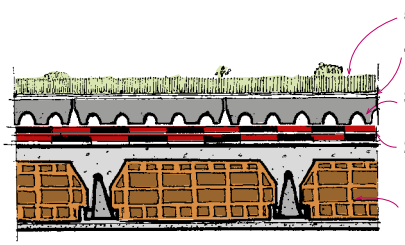
In Italy, laws currently in force for the certification of the environmental quality of a building are fragmentary and mainly refer to energy consumption, hence there are no tools for a holistic evaluation of the building's environmental impact. ***LEED*** certification, which was devised in the USA, has now become widespread all over the world. It is promoted in our country by the Green Building Council Italia (GBC Italia), whose main aim is to encourage sustainable building on the Italian market through the ***LEED*** system, developed over more than 10 years' experience by the U.S. Green Building Council (USGBC). In this sense, GBC Italia is aiming to make use of the result of the work carried out by the USGBC in the USA and to adapt the various aspects it tackles to the Italian situation.

INTENSIVE GREEN ROOFS

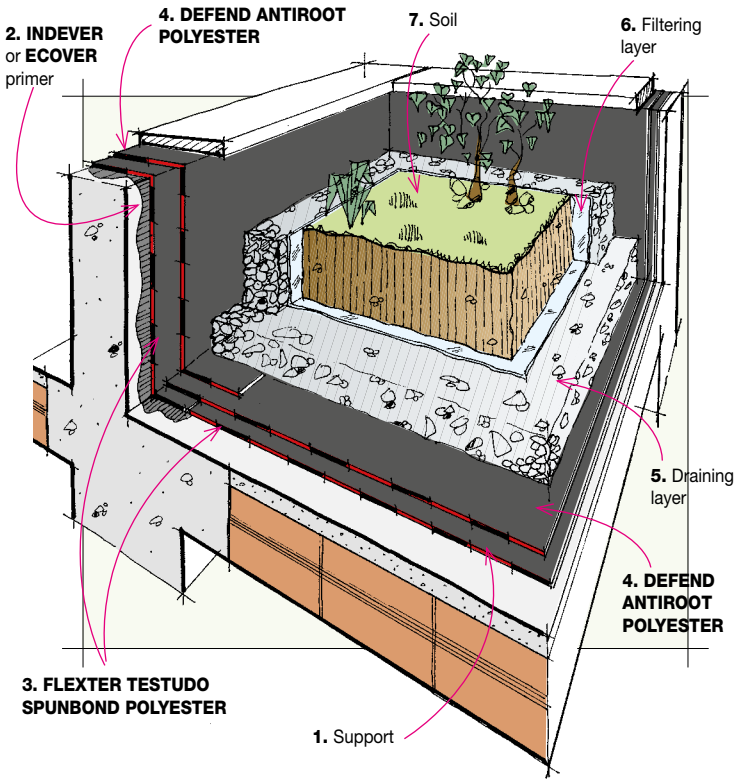


STRATIFIED ELEMENTS
1. Floor slab
2. Root inhibitor waterproofing
3. Draining layer
4. Filtering layer
5. Planting soil

EXTENSIVE GREEN ROOFS



STRATIFIED ELEMENTS
1. Floor slab
2. Root inhibitor waterproofing
3. Rainwater drainage and storage element
4. Filtering layer
5. Planting soil



STRATIFIED ELEMENTS
1. Support
2. **INDEVER** or **ECOVER** primer
3. **FLEXTER TESTUDO SPUNBOND POLYESTER**
4. **DEFEND ANTIROOT POLYESTER**
5. Draining layer
6. Filtering layer
7. Soil

GBC ITALIA (Green Building Council) and *LEED* certification

index
"GBC Italia" Associated

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 valid in the USA only), 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

In the ***LEED*** regulations, the use of green roofs is envisaged in the following points:

- ***SS Credit 5.1: Site Development - Protect or Restore Habitat***

Green roof with INDEX materials and systems planted with local vegetation, avoiding monoculture and promoting biodiversity, with minimum maintainance and irrigation, which does not require the use of fertilisers, pesticides or weed killers.

- ***SS Credit 6.1: Stormwater Design - Quantity Control***

Quantity control of stormwater with green roofs and permeable flooring, with collection for non-drinkable purposes (greywater)

- ***SS Credit 6.2: Stormwater Design - Quality Control***

Quality control of stormwater with green roofs and collection in phyto-purification tanks

- ***SS Credit 7.1: Heat Island Effect - Nonroof OPTION 2***

Reduction of heat island effects of roofs in parking areas with green roofs

- ***SS Credit 7.2: Heat Island Effect - Roof OPTION 2***

Reduction of heat island effects of roofs in buildings with extensive or intensive roof gardens

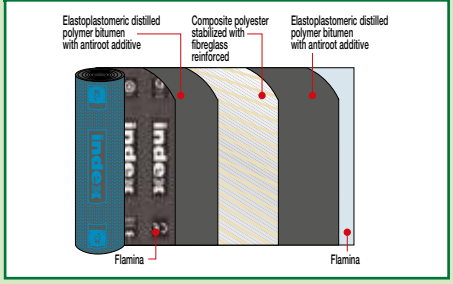
TECHNICAL CHARACTERISTICS

	Standard	T	DEFEND ANTI-ROOT 15 POLYESTER	DEFEND ANTI-ROOT 10 POLYESTER
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
Shear resistance L/T	EN 12317-1	-20%	600/400 N/50mm	350/250 N/50mm
Maximum tensile force L/T	EN 12311-1	-20%	700/500 N 50 mm	400/300 N 50 mm
Elongation L/T	EN 12311-1	-15% V.A.	40/40%	40/40%
Resistance to impact	EN 12691 – A		1 250 mm	1 250 mm
Resistance to static loading	EN 12730 - A EN 12730 - B		15 kg 20 kg	15 kg 20 kg
Dimensional stability L/T	EN 1107-1	≤	–0.30/+0.10%	–0.30/+0.10%
Flexibility to low temperature	EN 1109	≤	–15°C	–10°C
Flow resistance at high temperature	EN 1110	≥	120°C	120°C
Resistance to root	EN 13948		Test passed	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	5.20 KJ/K

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

COMPOSITION OF THE MEMBRANE

DEFEND ANTIROOT POLYESTER



PRODUCT FINISHING

EMBOSSING 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.

"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.

• 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 •

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TOTAL QUALITY index UNI EN ISO 9001

Environmental Management Systems index UNI EN ISO 14001

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