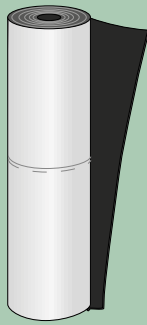


# ECOTENE HDPE ANTIROOT

SELF-ADHESIVE WATERPROOFING ROOT-INHIBITING MEMBRANE FOR WATERPROOFING OF EXTENSIVE AND INTENSIVE ROOF GARDENS AND WALLS IN CONTACT WITH THE GROUND, REINFORCED WITH FIBREGLASS AND SELF-PROTECTED BY A FOIL OF HIGH-DENSITY POLYETHYLENE WHICH AVOID THE CONTACT BETWEEN WATER OR SOIL AND ROOT-INHIBITING AGENTS

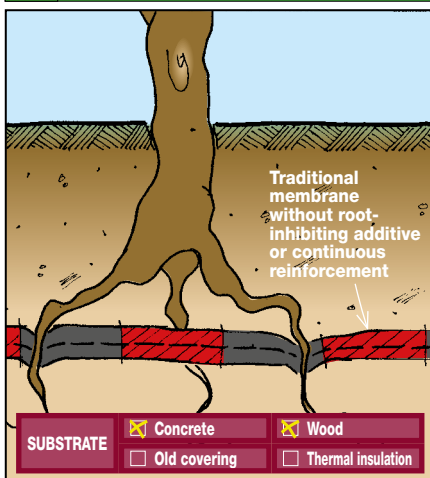
Packaging



GRANTS **LEED** CREDITS

CATEGORY	CHARACTERISTICS		ENVIRONMENTAL						METHOD OF USE		
SPECIAL ELASTOMERIC FOR SPECIFIC USES	WATERPROOF	SUPERADHESIVE	ECO GREEN	ASBESTOS FREE	TAR FREE	CHLORINE FREE	RECYCLABLE	NON DANGEROUS WASTE	EXHAUSTED OIL FREE	APPLICATION BY PRESSURE	NAILING

## 1 PROBLEM



## HOW TO FORM A WATERPROOF COVERING IN DIRECT CONTACT WITH THE SOIL, RESISTANT TO PENETRATION BY THE ROOTS OF PLANTS, EVEN AT THE JOINTS, WHILE PREVENTING ROOT-INHIBITING AGENTS COMING INTO CONTACT WITH THE SOIL

The increasing need to reduce the concreting-over of urban land and even design the light roofs of new buildings for intensive green planting has posed the problem of the resistance of waterproof membranes to roots without the protection of a cement screed, both because of the excessive weight of such a screed and the difficulty of laying it on sloping roofs. Direct contact of the covering with the soil requires the membranes which make it up, and which generally contain specific root-inhibiting agents as additives, to possess intrinsic resistance to perforation by roots. The use of chemical additives in the mixes making up the membranes may raise questions from the environmental point of view, but the use of membranes reinforced with metal foil or polyester films but without root-inhibiting additives has often been shown to be disastrous because continuity of mechanical protection at the overlaps of the sheets is not guaranteed. Notwithstanding having passed the tests for resistance to roots specified by the standards, on waterproof membranes for roof gardens which have been in place for a number of years, consisting of two overlapping layers with the joints staggered, both layers being reinforced with PET polyester film, where no root-inhibiting additives were used, cases have been observed in which the roots have passed through the overlaps of both layers, especially at points of the roof where there is only a single covering layer.

## 2 SOLUTION



ECOTENE HDPE ANTIROOT is thicker than similar types of product on the market and, unlike these, the self-adhesive mix coating its lower face is strengthened with reinforced glass fibre mat which gives the sheet greater strength and dimensional stability. This high mechanical strength HDPE laminate resists penetration by roots, provides a seal against water and determines the mechanical characteristics of the sheet. The self-adhesive mix provides adhesion to the substrate and resists water and root penetration at the joints. The increased thickness which is its distinguishing feature contributes to its puncture resistance, while the glass fibre matting has the function

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

**EN 13707 - REINFORCED BITUMINOUS MEMBRANES FOR ROOF WATERPROOFING**

- Antiroot in multi-layer systems
- ECOTENE HDPE ANTIROOT

**EN 13969 - BITUMINOUS MEMBRANES INTENDED TO PREVENT DAMP RISING FROM THE SOIL**

- Membranes for foundations
- ECOTENE HDPE ANTIROOT

ECOTENE HDPE ANTIROOT is a self-adhesive waterproofing membrane which is laid cold without the use of flame, melted bitumen or adhesives containing solvents. ECOTENE HDPE ANTIROOT consists of a sheet of high-density cross-linked laminated polyethylene, of HDPE type, free from anti-root additives, whose lower face is spread with an elastomeric distilled bitumen polymer mix, with very high adhesion even at ambient temperature, with the addition of a specific anti-root agent, phenoxi-fatty acid ester, whose already extremely low release rate into water has been reduced by 20 times.

## ADVANTAGES

- Resists roots including at joints
- Prevents the release of root-inhibiting agents into the water and the soil
- Adapts easily to the conformation of the substrate.
- Can be laid cold without professional equipment.
- The joints are more secure because it has an overlapping selvedge.
- the glass fibre reinforcement maintains the shape of the roll during laying.

of stabilising the sheet against temperature variations and maintaining the shape of the roll during laying operations. The self-adhesive mix of the lower face contains root inhibitor additives, but the HDPE foil on the upper face of the membrane does not contain chemical root inhibitors that could be released in soil or water. Once the sheet overlaps have been sealed, the only point of contact with the mix containing root inhibitor additives is the 1-mm overlap line, which for

(See following)

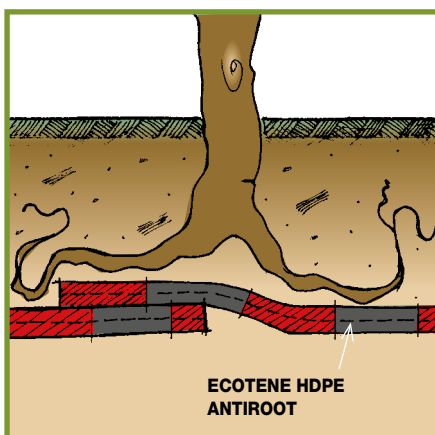
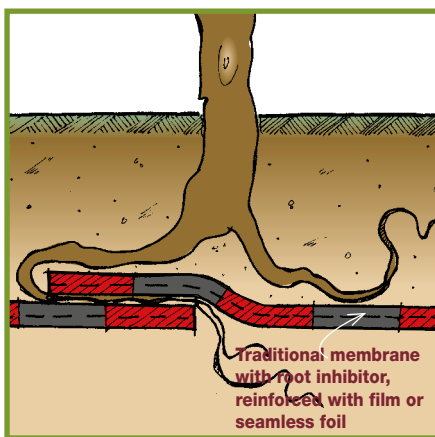
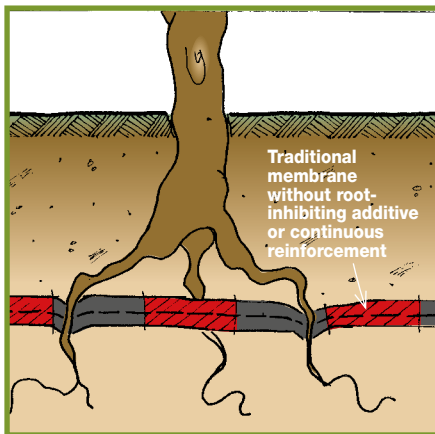
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all practical purposes reduces the release of additives into the soil or water to zero and at the same time guarantees resistance against roots, including at the overlapped joints; thus the waterproof membrane is safe from an environmental point of view and is also secure against roots. The self-adhesive face is protected with a film of siliconized polyethylene, cut and laid over the centreline of the sheet, and the rolls are protected by a sheet of silk-screened paper.

On the upper face of **ECOTENE HDPE ANTIROOT**, by contrast with other similar types of product, there is an overlap strip at the side, 5 cm wide, without the HDPE film and protected by a siliconized film, corresponding to another overlap strip opposite to it on the lower face, so that double security is obtained by overlapping adjacent sheets by 10 cm: 5 cm of foil-adhesive bonding added to 5 cm of adhesive-adhesive bonding.

## APPLICATION FIELDS

The laying process does not involve the use of adhesives or flames, or even melted bitumen.



**ECOTENE HDPE ANTIROOT** adheres cold to the most common building materials and is therefore laid in a single layer both to cover walls in contact with the soil and for small jobs such as waterproofing planters, in restricted spaces, on substrates sensitive to heat etc., where flame-bonding would be dangerous or awkward.

**ECOTENE HDPE ANTIROOT** is used to great advantage together with DEFEND ANTIROOT POLYESTER for multiple-layer root inhibitor waterproofing systems on extensive and intensive green roofs, where contact of the root inhibitors with soil and water has to be avoided, by bonding it directly without a primer, as the last layer, onto the DEFEND ANTIROOT POLYESTER membrane which is produced with its upper face protected by the Flamina film specially designed for the purpose.

To avoid trapping air bubbles when laying over DEFEND ANTIROOT POLYESTER, **ECOTENE HDPE ANTIROOT** should be laid by walking along it as it unrolls, removing its siliconized film and pressing it with a broad brush to promote adhesion to the membrane below. This should be followed by careful pressure with a metal roller.

## METHOD OF USE

After removing the siliconized film, the membrane is cold-bonded by simple pressure, taking special care on the overlapping area. The lateral overlaps of the **ECOTENE HDPE ANTIROOT** must be 10 cm wide, while the end-to-end overlaps must be at least 15 cm wide.

To ensure a perfect bond, the substrate must be absolutely clean and dry. **ECOTENE HDPE ANTIROOT** adheres to the most common building materials.

On porous surfaces such as cement, brick, old bitumen coverings, old timber boarding etc., the surface being covered should be prepared with a priming coat of INDEVER PRIMER E at a rate of 250 to 500 g/m<sup>2</sup>.

Store the rolls in a dry place indoors and take them to the laying location only when they are about to be applied.

Open the package just before laying.

**ECOTENE HDPE ANTIROOT** is a thermoplastic product, so during the hottest hours of a summer day it softens, while cold weather on the other hand stiffens it and reduces the product's adhesion.

The excellent cold performance of **ECOTENE HDPE ANTIROOT**, however, does not justify laying this self-adhesive membrane without taking precautions.

Below +10°C, and depending on the humidity conditions of the air and the surface, special attention must be paid during laying, if necessary using heating appliances or a "gentle flame".

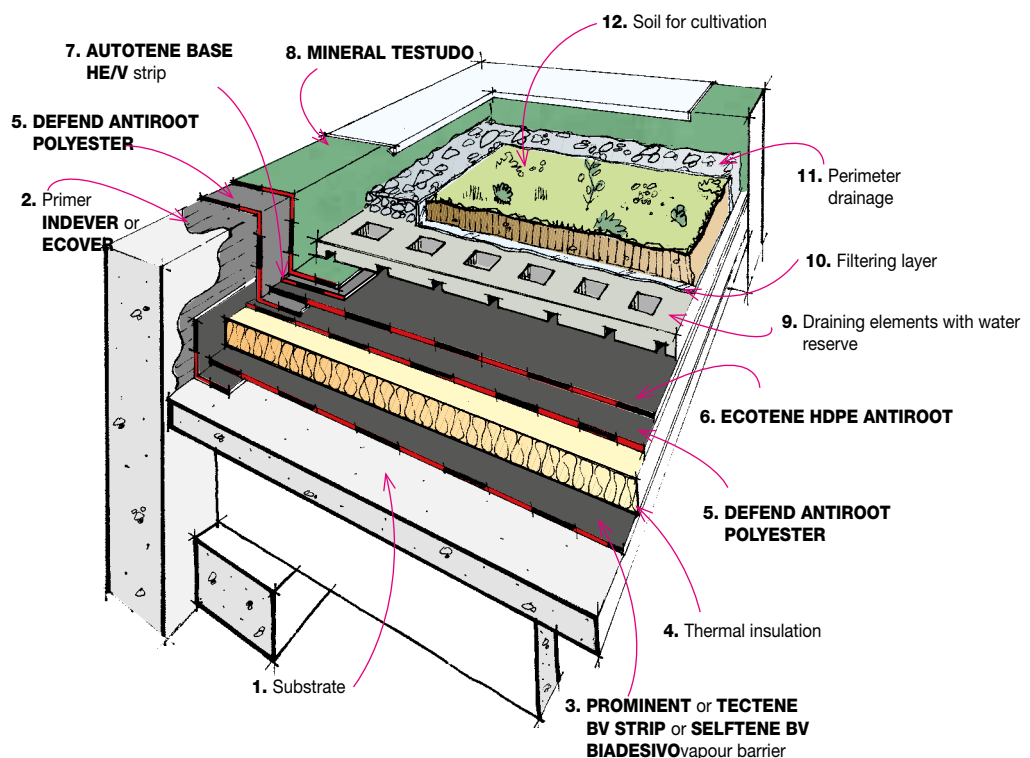
In any event the temperature of +5°C remains the threshold below which the product must not be laid.

The HDPE foil is not resistant to UV rays, therefore **ECOTENE HDPE ANTIROOT** must not be left exposed for long, and after application it must be covered quickly. For this reason on the raised parts of green roofs **ECOTENE HDPE ANTIROOT** should be replaced by MINERAL TESTUDO, flame-bonded onto DEFEND ANTIROOT which will run down onto the flat part where it will be flame-bonded onto **ECOTENE HDPE ANTIROOT**, previously protected with a strip of AUTOTENE BASE HE/V.

Sheets applied vertically to walls in contact with the ground must be mechanically fixed at the top.

### LAYERS

1. Substrate
2. INDEVER or ECOVER primer
3. PROMINENT or TECTENE BV STRIP or SELFTENE BV BIADESIVO vapour barrier
4. Thermal insulation
5. DEFEND ANTIROOT POLYESTER
6. **ECOTENE HDPE ANTIROOT**
7. AUTOTENE BASE HE/V strip
8. MINERAL TESTUDO
9. Draining elements with water reserve
10. Filtering layer
11. Perimeter drainage
12. Soil for cultivation





## LAYING PROCEDURE

### Laying ECOTENE HDPE ANTIROOT on a flat surface



1. When laying ECOTENE HDPE ANTIROOT, move along it, trying to exert sufficient pressure to prevent the formation of bubbles (using a large brush, for example).



2. Remove the siliconized film from the lateral selvedge and bond the self-adhesive lateral overlap.



3. To ensure the best possible adhesion, finally press the entire surface with a roller.

### Laying ECOTENE HDPE ANTIROOT on a vertical surface



Laying on a vertical surface and detail of fixing method

## GBC ITALIA (Green Building Council) and LEED CERTIFICATION



GBC Italia, which INDEX belongs to, has the task of using the common guidelines to everyone in the **LEED** international community to develop the characteristics of the **LEED** Italy 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 characterize the sustainability of the building.

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

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

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

There are 4 rating levels:

- basic certification between 40 and 49 points
- Silver: between 50 and 59 points
- Gold: between 60 and 79 points
- Platinum: more than 80 points

In the **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 maintenance 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 paving, with collection for non-drinkable purposes (grey water)
- **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

### Warning

EN 13707 legislation on CE marking states that membranes for waterproofing green roofs must pass the resistance to ROOT penetration test following the FLL procedure approved by the CEN (European Committee for Standardisation) for establishing the suitability for use of membranes intended for green roofs in accordance with the European method EN 13948 specifying exposure to the roots of *PYRACANTHA COCCINEA*. The FLL test which was carried out over 2 years on the INDEX membrane with added Phenoxy-Fatty Acid Ester established not only that the membrane is resistant to *PYRACANTHA COCCINEA* (Orange Charmer, Agazzino) roots in accordance with the EN 13948 test, but also to *AGROPYRON REPENS* (Couch grass) rhizomes, defining the membrane: root-proof and rhizome-proof in accordance with the FLL procedure. The report including the test is available on request. It is emphasized, however, that, as indicated in the test report, the test results do not extend to plants with strong and rapid root development by rhizomes, such as 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 according to the DIN 4062 method (UNI 8202 p24). Passing the EN 13948 test means that the membrane can be CE marked for use as a waterproof membrane for green roofs and in the current state of knowledge constitutes the most recent investigation method known by INDEX on a European level; however, this does not exempt the user of the product from taking suitable precautions for specific planting schemes that are not represented by the tests mentioned above.

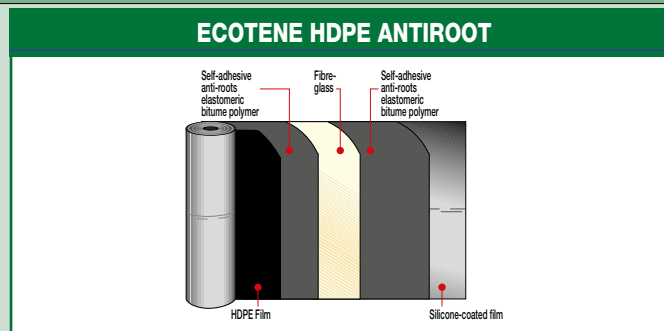
## TECHNICAL CHARACTERISTICS

	Standard	T	<b>ECOTENE HDPE ANTIROOT</b>
Reinforcement			Glass fibre
Thickness	EN 1849-1	±0,2	2.0 mm
Roll dimensions	EN 1848-1	-1%	1.05x15 m
Watertightness	EN 1928 - B	≥	60 kPa
Peel resistance L/T	EN 12316-1	-20 N	80 N/50 mm
Shear resistance L/T	EN 12317-1	-20%	350/300 N/50 mm
Maximum tensile force L/T	EN 12311-1	-20%	500/300 N/50 mm
Elongation L/T	EN 12311-1	-15% V.A.	90/180%
Resistance to impact	EN 12691 - A		300 mm
Resistance to static loading	EN 12730 - A		10 kg
Resistance to tearing (nail shank) L/T	EN 12310-1	-30%	200/200 N
Dimensional stability L/T	EN 1107-1	≤	-0.10/+0.10
Flexibility to low temperature	EN 1109	≤	-25
Flow resist. at high temperature	EN 1110	≥	90
Root resistance	EN 13948		Passes test (*)
Reaction to fire Euroclass	EN 13501-1		F
External fire performance	EN 13501-5		F roof
<b>Thermal characteristics</b>			
Thermal conductivity			0.2 W/mK
Thermal capacity			2.60 KJ/K

(\*) On DEFEND ANTIROOT POLYESTER + **ECOTENE HDPE ANTIROOT** system

In compliance with EN 13707 as a resistance factor to the passage of vapour across reinforced distilled bitumen polymer membranes, the value  $\mu = 20000$  can be assumed where not declared.

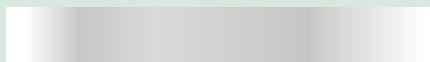
### COMPOSITION OF THE MEMBRANE



### PRODUCT FINISHING



**HDPE POLYETHYLENE FILM.**



**REMOVABLE SILICONE-COATED FILM.** The lower face of the membrane is covered in a silicone-coated film which preserves the adhesive mix.

• 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 •

<p><b>Construction Systems and Products</b></p> <p>Via G. Rossini, 22 - 37060 Castel D'Azzano (VR) - Italy - C.P.67 T. +39 045 8546201 - F. +39 045 518390</p>	<p>Internet: <a href="http://www.index-spa.com">www.index-spa.com</a>                  Informazioni Tecniche Commerciali  <a href="mailto:tecom@indexspa.it">tecom@indexspa.it</a>                  Amministrazione e Segreteria  <a href="mailto:index@indexspa.it">index@indexspa.it</a>                  Index Export Dept.  <a href="mailto:index.export@indexspa.it">index.export@indexspa.it</a></p>		<p>UNI EN ISO 9001</p>	<p>UNI EN ISO 14001</p>	<p>socio del GBC Italia</p>
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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.

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