tecnocoat

ROOFTOP GARDENS
WATERPROOFING SYSTEM

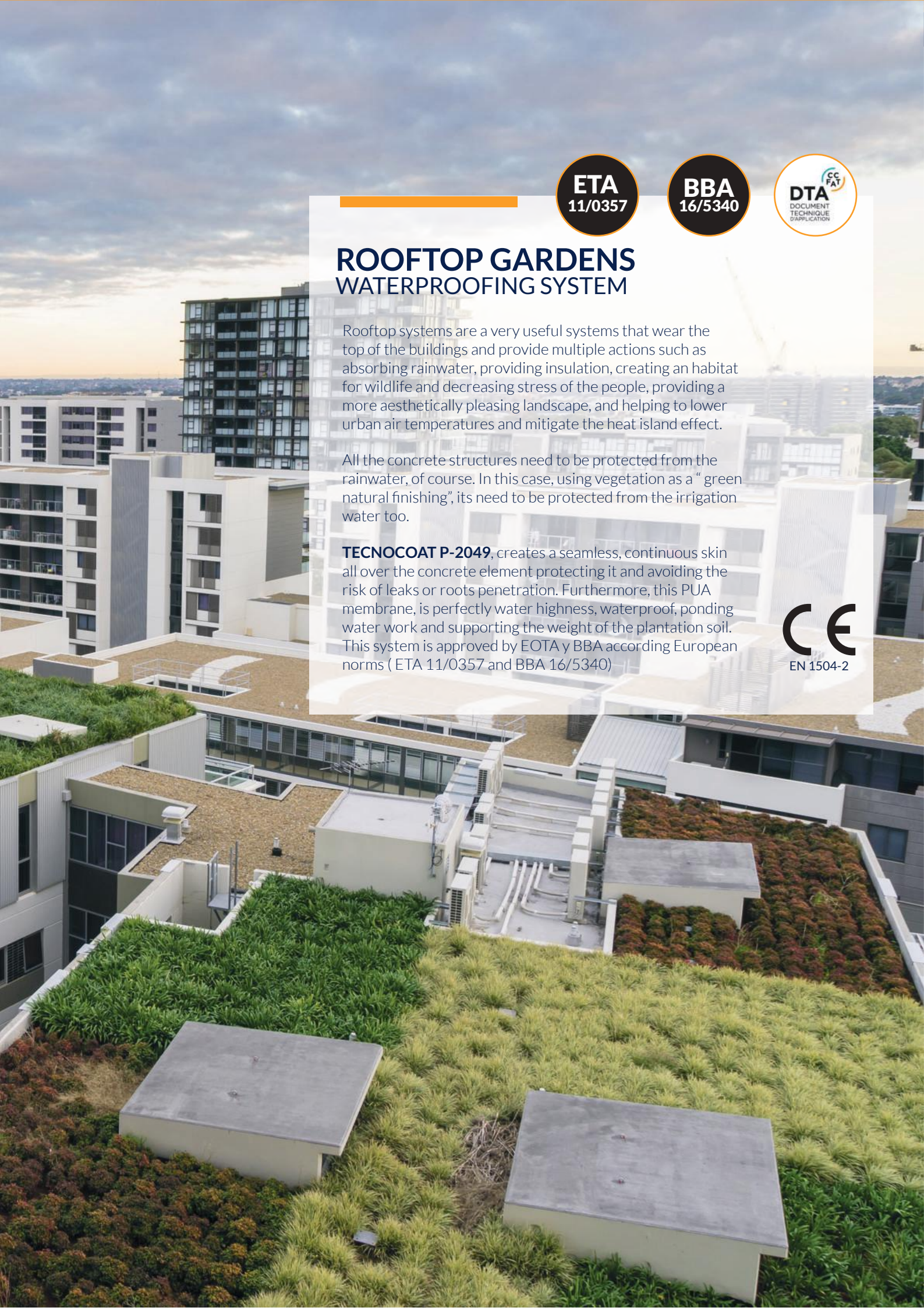
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TECHNICAL GUIDELINE



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ETA 11/0357

BBA 16/5340

DTA DOCUMENT TECHNIQUE D'APPLICATION

ROOFTOP GARDENS
WATERPROOFING SYSTEM

Rooftop systems are a very useful systems that wear the top of the buildings and provide multiple actions such as absorbing rainwater, providing insulation, creating an habitat for wildlife and decreasing stress of the people, providing a more aesthetically pleasing landscape, and helping to lower urban air temperatures and mitigate the heat island effect.

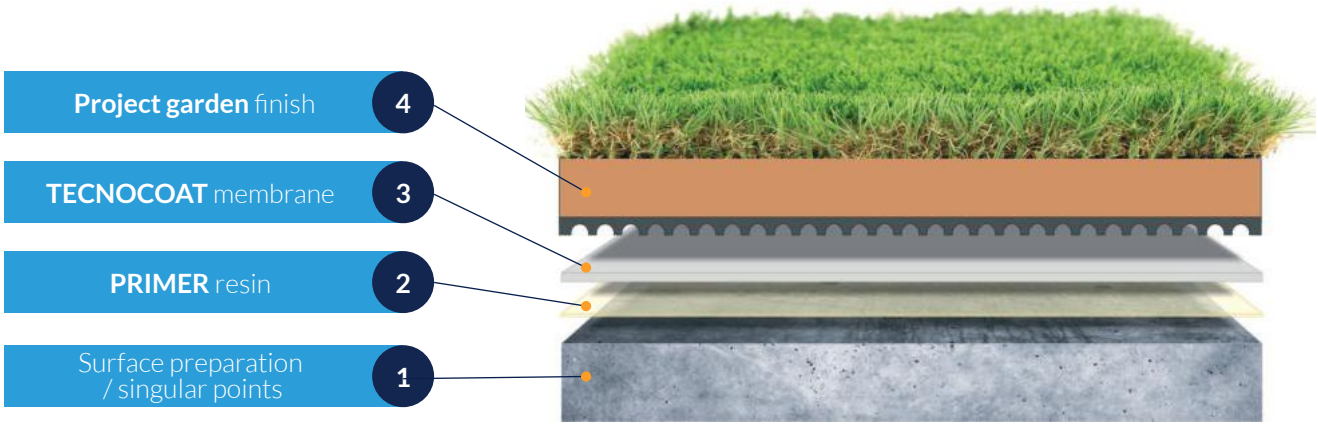
All the concrete structures need to be protected from the rainwater, of course. In this case, using vegetation as a " green natural finishing", its need to be protected from the irrigation water too.

TECNOCOAT P-2049, creates a seamless, continuous skin all over the concrete element protecting it and avoiding the risk of leaks or roots penetration. Furthermore, this PUA membrane, is perfectly water highness, waterproof, ponding water work and supporting the weight of the plantation soil. This system is approved by EOTA y BBA according European norms (ETA 11/0357 and BBA 16/5340)

CE
EN 1504-2



Rooftop gardens
General outline



BENEFITS

1. **Plant root penetration approval** (ETA 11/0357, BBA 16/5340 and DTA 19/2665).
2. **Fully adhered systems:** protection of the structural support element. (CE marking under EN-1504-2)
3. **Complete and absolute protection** of the construction element.
4. **Zero slope application,** it works under the ponding water (ETE 11/0357 y BBA 16/5340).
5. **Direct application to the existing substrate:** waste generations limited, which contributes to an improvement in the construction sustainability.
6. **Faster setting:** labor time reduction, cost optimization.
7. **No extra weight on existing structure** (only ±2.5-3 kg/sqm).
8. **Cost reduction:** not need to apply mortar coats to protect it.
9. **Several finishing** (colors and surface textures), according to the existing slippery international approvals and regulations.
10. **High resistance to the temperature:** no collapse of the membrane due to environmental causes.
11. **Working life (W3:25 years):** high quality of the applied system+ maximum durability warranties.

Application parameters
Preliminary considerations

For optimum application of the **TECNOCOAT** system (adherence, required use, decorative finish and/or applicable regulations) conditioning aspects, such as weather and physical properties of the substrate, need to be identified.

SURFACE HUMIDITY/WATER

Humidity on the substrate can affect the membrane's adherence. Humidity or the presence of water in/on the substrate hamper adherence, which will have a negative effect on their final result of the system. It is recommended that they system is not applied before the concrete curing process has finalized (28 days)

It is essentially the application of the product is aware of and takes into consideration this aspect, carrying out the corresponding verifications in all areas of the substrate in order to decide on the type of primer to be used, or whether or not other treatment is required. (vapor barrier)

The different types of humidity or presence of water in/or the substrate or their characteristics may be as follows:

- **Liquid water/moisture:** There must not be any water present, whatever the type of substrate, as the will completely annul the membrane's adherence (in some cases, use **PRIMER WET**, please, check our technical department)
- **Hydrostatic water:** The existence of rising damp, (water coming up through the element), is not compatible with continuous membrane WATERPROOFING SYSTEM and, therefore, this situation will have to be resolved via on-site application of water-vapor permeable hydraulic materials or the installation of floating floors, etc.
- **Dew point:** This is a factor to take into consideration at the start of applying systems such as ours, which for the most part are used outside and deepened, as mentioned, on a level of control of the substrate humidity. The appearance of humidity from dew depends on the air and substrate temperature and the relative ambient humidity. To prevent this, the substrate's temperature should be 3 degrees Celsius above that corresponding to the dew point (see the universal dew point charts).

SUBSTRATE AND AMBIENCE TEMPERATURES

These are two conditioning aspects that could affect the membrane curing process, along with that of the ambient temperature.

- Ambience range of temperatures: 3ºC to 45ºC
- Substrate range of temperatures: 5ºC to 40ºC

Although, based on our experience and due to the chemical nature of some of the products that make up the system, we do not recommend working at ambient temperatures below 3ºC.

SUPPORT'S PHYSICAL CONDITIONS

Coating performance is dependent on adequate surface preparation and application.

The optimal surface preparation will increase the bonding on the surface, and this is essential for three reasons:

- Good bond allows the structure and coating to work as one and maintain stability.
- Prevents salt and contaminated water from leaking through the concrete (extremely important in steel, to protect from rust and corrosion).
- Avoid the formation of pinholes on membrane in the moment of the application.



The system does not allow the presence of water on the back of the substrate.

1a. Surface Preparation

CONCRETE

The concrete surface, where we go to apply our waterproofing system, needs to be prepared, as follows:

- Remove oils, greases, silicones or other contaminants.
- Fill the depressions on the surface (caused during the concrete pouring process), using **PRIMER EP-1010** epoxy mortar.
- Fill fissures and cracks using **MASTIC PU**.

Finally, a mechanical preparation is needed, to get a uniform roughened surface and to remove the laitances, using one of these systems, thus achieving a flat surface with a continuous roughness (CSP 4 to 6), following the ICRI recommendations.

People applying the system must decide in each case the most suitable method, depending on the conditions of the substrate or surface or the desired result (always in combination with the primer to be used). To complete these processes prior to application, the substrate must be cleaned using dry systems (vacuum cleaner).





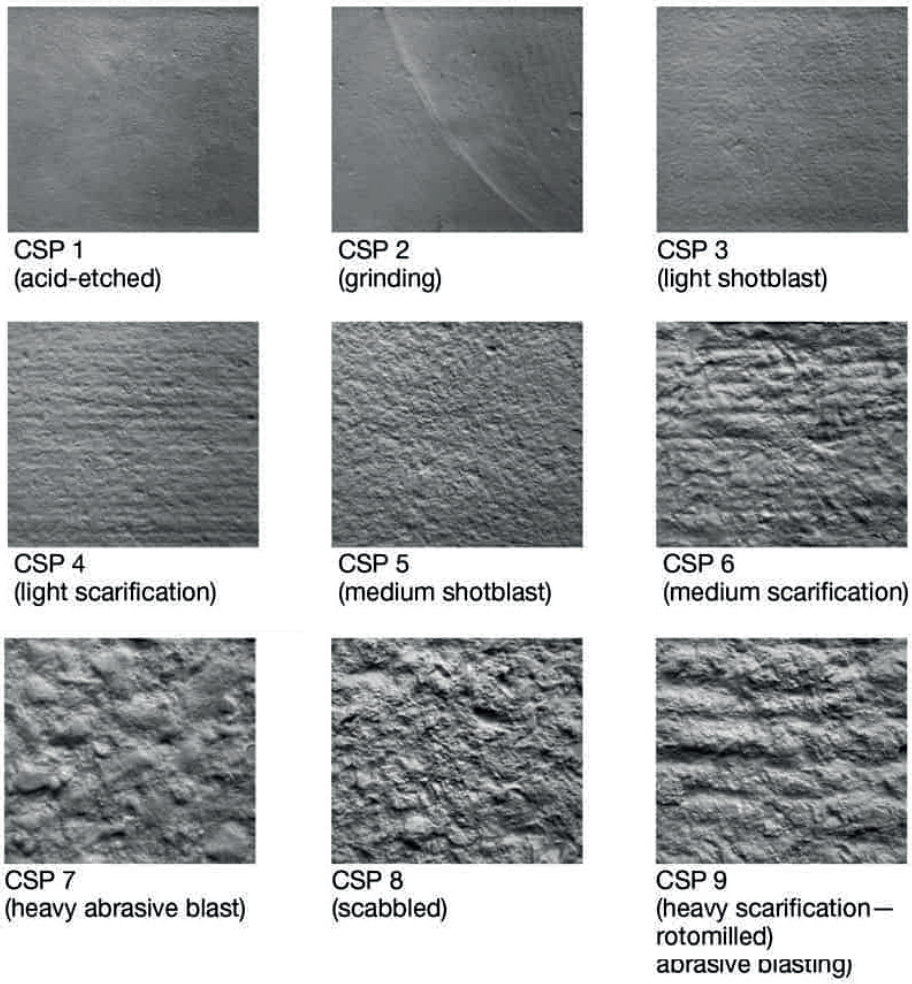
PROCESSES TO ELIMINATE THE LAITANCE ON THE CONCRETE

Grinding/Milling:
Using a rotary machine with specialty grinding wheels with tungsten carbide; this method is suitable for removing concrete paste and other hard substances. It causes surface erosion by rubbing with stones or hard sanding discs. This removes the softest parts of the surface, for example surface laitance, which sometimes occurs during concrete pouring or curing. But is not suitable for soft existing coatings or when the friction caused heat meets this product.

Sandblasting:
Generally employs sand or a sand type of abrasive shot by compressed air through a nozzle. Sandblasting is recommended for horizontal, vertical, and overhead use. This method is recommended for removal of the surface of concrete, existing sealers, and hard coatings. Creation of dust may be prohibited by environmental regulation. Vacuum mechanisms are available to remove dust from the air. Wet sandblasting is available that complies with environmental regulations. Remove shot material, dust, and mud residues according to environmental regulations. This method of surface preparation, while highly effective, has lost utility where environmental regulation has restricted its use.

Scarifying:
Generally employs a rotary or drum machine. This method utilizes specialty blades or impact devices to break the surface of concrete or coatings. Several passes over the same area may be required to remove existing surface completely. In the case of elastomeric surface coatings, blade shaving may be the only effective method of removal where water use is a problem. Most sealers and coatings will not allow removal by acid etching. Most elastomeric coatings have a tendency to "bounce" shot blasting.

Shot blasting:
It involves the projection or direct impact of steel grit of different sizes on the concrete's surface. This process produces very little dust. Shot is generally recoverable. Some water cleaning or vacuuming may be required after use of this method. This is effective for removal of concrete surface paste, sealers, and hard coatings. Speed over an area and number of passes over an area determine depth of removal. Edging and small spaces are not susceptible to this type of removal without small specially designed equipment.

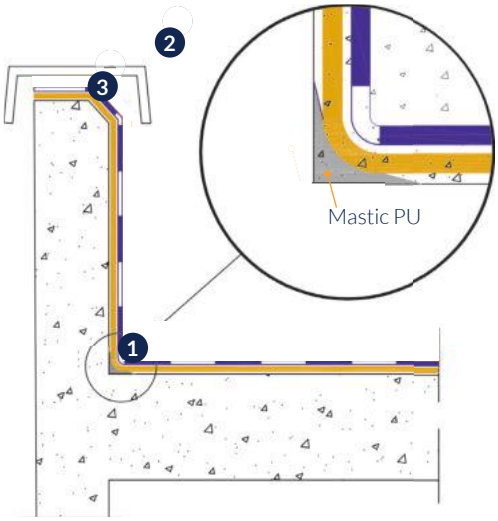


Finishing profiles according to ICRI

Ensure that there isn't the presence of contaminants such as oils, greases, silicones... (as additives used in the pouring process of the concrete).



1b. Singular points

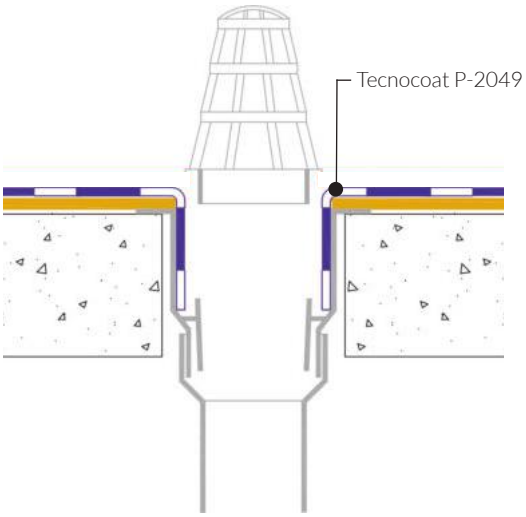


VERTICAL SURFACES
(FLASHING, UPSTANDS, SHARP EDGES)

1. Coving at the point of contact, to provide a good surface for the vertical rotation of the membrane, using **MASTIC PU**, or common mortar.

2. Final membrane's edge, to ensure that not water, rain filter out within the membrane and the wall.

3. In turns or sharp edges on the top of the wall, it should cut them about 45 ° to avoid breakage due to an internal punching.

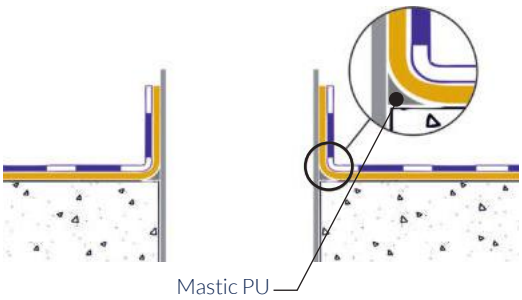


DRAINS

Drains and vertical water drainage should be given a generous coating of the membrane over their entire surface up to the mouth of the drainpipe. To aid in this operation, our **MASTIC PU** may be used to fill in the edges of the drainpipe at its point of contact with the slab.

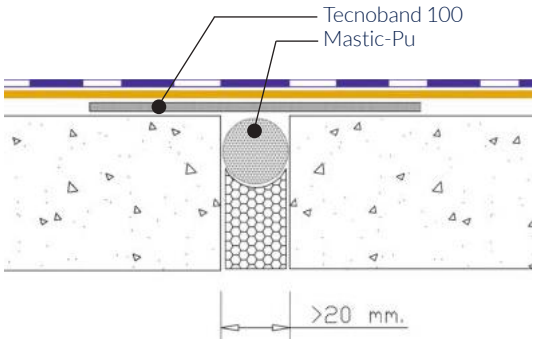
In the case of metal drainpipes, the membrane will be applied in a continuous layer extended inside the drainpipe.





INTERNAL OUTLETS

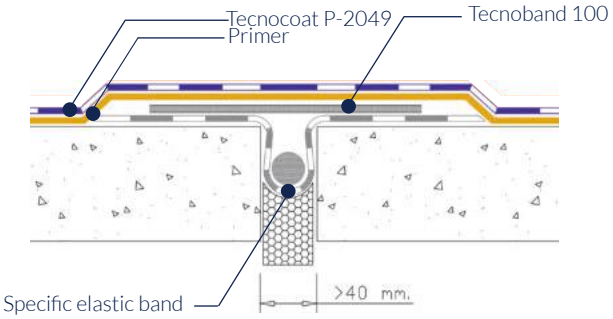
Smooth any encounter with pipes or any other element that crosses the support with **MASTIC PU**. This provides a good surface for vertical rotation of the membrane.



JOINTS

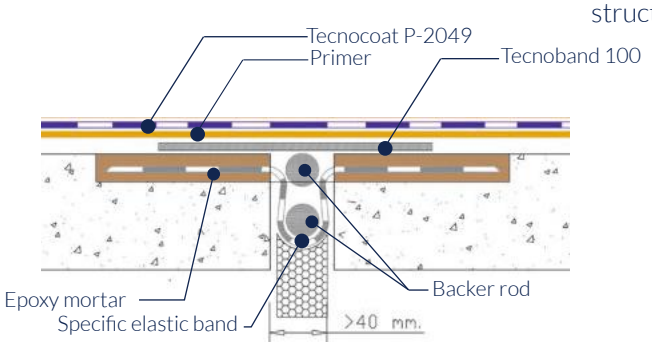
Width size ≤ 20mm: the gap should be opened up sufficiently, cleaned and filled in with **MASTIC PU** (never use silicones) elastic polyurethane **MASTIC**.

Width size >20mm: cleaned and filled in with **MASTIC PU** (never use silicones) elastic polyurethane as well as applying a top seal with **TECNOBAND 100** butyl self-adhesive perimeter band and an upper protection of a geotextile layer in order absorb movements in the joint.



EXPANSION JOINTS

In the case of expansion joints, the stress to be absorbed is greater and, therefore, this element should be treated as a structural element and using a **specific elastic band**. They should be applied and installed in the areas subject to structural movements according to the TDS.





2. Primer resin

The use of primers when applying the complete **TECNOCOAT** membrane system is important and essential and it is indicated in the approval and certification documentation available of **TECNOCOAT P-2049** (ETA, DTA and BBA).

MAIN PERFORMANCES

- Seal the Surface
- Increase bonding
- Fill irregularities to the existing surface
- Surface moisture absorption, present in the surface during the application process

APPLICATION METHODOLOGY

1. Check expiry time (existing on the pail label).
2. Open the pails and check visually the product.
3. Prior to mixing, stir component A separately to homogenize it.
4. Add the component B into the component A pail (make sure the component B is fully emptied into the component A).
5. Mix both components using a low speed electric mixer (300 to 400 r.p.m.).
6. Apply by short nap roller, brush or squeegee. The number of coats depends on the physical surface conditions; in most of cases is necessary to apply 2 crossed coats. Wait for the tack free time between coats. You can use airless equipment too, but the pot- life time must be checked to clean the equipment within the indicated time.You can use airless equipment too, but the pot-life time must be checked in order to clean the equipment within the indicated time.



This process requires a flat, clean and dry substrate and as hard as possible.



In the tables below you can see the main properties of available primers to use in this system. Pay attention to the “accepted surfaces” and “maximum surface dampness” to make the best choice of primer resin.

	primer EP-1010	primer EP-1020	primer EP-1040	primer EPw-1070
Main use	Surfaces in low-damp conditions	Surfaces in low-damp conditions	Metal surfaces	Surfaces in medium-damp conditions
Accepted surface	Concrete / Ceramic Tiles	Concrete / Ceramic Tiles	Metal / Ceramic tiles / Concrete	Concrete, asphalt
Components No.	2	2	2	2
Product base	Epoxy 100% solids	Epoxy 100% solids	Epoxy 100% solids	Epoxy water based
Density	± 1.50g/cm^3	± 1.05 g/cm^3	± 1.05 g/cm^3	± 1.00 g/cm^3
Solids content	100 %	100 %	100 %	> 60 %
Concrete adherence	> 2 MPa	> 2 MPa	> 2 MPa	> 2 MPa
Yield per coat	± 250 g/sqm	± 150 g/sqm	± 150 g/sqm	± 100 g/sqm
Initial drying time	50 minutes	60 minutes	60 minutes	5 ~ 6 hours
Recoat time	3 ~ 24 hours	3 ~ 24 hours	4 ~ 48 hours	6 ~ 48 hours
Temperature of use	5 ~ 35 °C	5 ~ 35°C	5 ~ 35°C	5 ~ 35°C
Maximum surface dampness	4%	4 %	4 %	± 10 %
Dilution on water	NO	NO	NO	5 ~ 20 %

	primer PU-1000	primer PU-1050	primer PUc-1050	primer WET
Main use	Surfaces in low-damp conditions	The best option for concrete	For concrete in cold environments	Concrete subject to maximum damp
Accepted surface	Repair and overlaps membranes	Concrete	Concrete	Concrete / Ceramic tiles
Components No.	1	2	2	2
Product base	Polyurethane solvent based	Polyurethane 100% solids	Polyurethane 100% solids	Epoxy 100% solids
Density	± 1.11 g/cm^3	± 1.11 g/cm^3	± 1.11 g/cm^3	± 1.50 g/cm^3
Solids content	> 80 %	100 %	100 %	100 %
Concrete adherence	> 2 MPa	> 2 MPa	> 2 MPa	> 2 MPa
Yield per coat	± 100 g/sqm	± 150 g/sqm	± 150 g/sqm	± 450 g/sqm
Initial drying time	60 minutes	60 minutes	60 minutes*	3 hours
Recoat time	3 ~ 24 hours	3 ~ 24 hours	3 ~ 24 hours*	3 ~ 6 hours
Temperature of use	5 ~ 35 °C	5 ~ 35 °C	5 ~ 15 °C	5 ~ 35 °C
Maximum surface dampness	4%	± 4 %	± 4 %	± 98 %
Dilution on water	NO	NO	NO	NO

*Yield can vary depending on the substrate condition.

3. Polyurea membrane

TECNOCOAT is an extremely durable, solid and hard-wearing product that, once applied, offers great stability and long-life. Thanks to its versatility and its drying time of between 3 and 5 seconds **TECNOCOAT P-2049** adapts to any surface, making it in the ideal product for application in uneven areas of any shape, whether curved or square.

TECNOCOAT P-2049 has certification ETA 11/0357, BBA 16/5340 and DTA 19/2665 including anti-roots penetration, at 25 years working life, minimum thickness of 1.4 mm (recommended thickness around 2 mm., consumption ±2.1 kg/sqm). This thickness can vary depending on the final use of the waterproofing system. There are other certificates and tests (abrasion, tear…), you can ask for them to the Technical Department.

The packaging of the two products of the pure polyurea **TECNOCOAT** is served through two drums:

- SIDE A(ISOCYANATES): RED DRUM
- SIDE B(AMINES): BLUE DRUM (pigmented product)

TECNOCOAT P-2049 has certification ETA 11/0357, BBA 16/5340 including anti-roots penetration, at 25 years working life, a minimum thickness of 1.4 mm (recommended thickness around 2 mm, consumption ±2.1 kg/sqm). It holds a DTA 19/2665 Avis Technique certification for the French market intended for walkable roofs.

Shelf life is12 months at temperatures between 5°C to 35°C (41 to 95 ªF), provided it is stored in a dry place, keep away from direct sunlight, extreme heat, cold or moisture. Once the tin has been opened, the product must be used immediately. Once opening drum, B side must be agitated mechanically before inserting the transfer pumps and use.



For the repair and overlaps processes, please see the TDS.



APPLICATION METHODOLOGY

- Open both drums.
- Side (blue drum, amines): Stir/mix to homogenize the pigment inside because in most of the cases, pigment has settled. If you don't do this, previous action of mixing, it could happen color variances, foaming and sticky coating, so poor performance.
- Side A (red drum, isocyanates): prevents exposing to moisture once opened.
- Put the pumps into the drums and connect the hoses to the equipment.
- Start the equipment following the manufacturer's instructions.
- Set up the hoses and machine temperatures (check the correct ones in the TDS).

The membrane is applied using spray equipment that takes the two components and it will form the final solid membrane (isocyanates and amines).

Spray gun application should be carried out applying the product always perpendicular to the substrate regardless of whether the surface is horizontal or vertical. This is extremely important as, otherwise, it will not be possible to apply the product completely and continuously, thus causing gaps in the layer and, therefore, incomplete seal. Apply crossed coat continuously as needed to achieve the desired thickness according to the final use or technical requirements. Do not apply more than 3-4 mm thickness in one single coat; there is a risk of cracks in the solid membrane because the high temperature.

tecnocoat P-2049

Recommended for...	 Concrete
Component No.	2
Density	± 1.10 g/cm³
Elongation	> 350%
Tensile strength	> 20 MPa
Concrete adherence	> 2 MPa
Hardness (shore A)	> 93
Hardness (shore D)	> 55
Initial drying time	3 ~ 5 seconds
Recoat time	max. 12 hours
Thickness (Yield)	2 mm (± 2.1 kg/sqm)
Fire reaction	Euroclass E
External fire behavior	Broof (t1) (t2) (t3) (t4)
Anti-root	Si (EN13948)
Solids content	100%
Ponding water works	YES

	MACHINE SETTINGS
Heater isocyanate temperature	± 70-75 °C
Heater amines temperature	± 70-75 °C
Hose temperature	±70°C
Pressure	2500-3000 psi
Recommended mixing chamber	GU-07008-1 or GU-07008-2



After applying **TECNOCOAT P-2049** wash gently with neutral soap after 2 days and wait a minimum of 7 days before filling the tank.

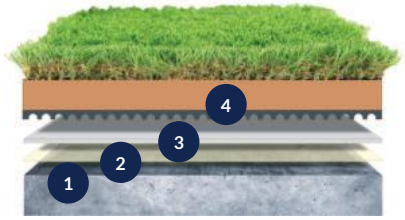
TECNOCOAT P-2049 is an aromatic polyurea so it must be protected from the UV rays.

Tecnopol





Application summary



GARDEN1 · TECNOCOAT P-2049

	PRODUCT	TYPE OF SURFACE	EXISTING SURFACE HUMIDITY	APPLICATION METHOD	YIELD	THICKNESS
1	**Surface preparation**					
2*	**PRIMER EPw-1070**	Concrete	± 10 %	• Apply by roller or electrical equipment.	150 ~ 250 g/sqm	90 µ ~ 150 µ
	PRIMER EP-1020	Concrete/ Ceramic	± 4%	• Apply by roller.	200 g/sqm	190 µ
	PRIMER EP-1010	Concrete/ Ceramic	± 4%	• One coat application by squeegee.	± 300 g/ sqm	200 µ
	PRIMER PU-1050	Concrete	± 4%	• Apply by roller.	150 ~ 300 g/ sqm	135 ~270 µ
	PRIMER PUc-1050	Concrete cold weather	± 4%	• Apply by roller.	150 ~ 300 g/ sqm	135 ~270 µ
	PRIMER WET	Concrete/ Ceramic	± 98%	• One coat application by trowel.	450 ~ 500 g/ sqm	290 ~325 µ
3	**TECNOCOAT P-2049**	-		• Apply using TC-2049 spray equipment	2.1 kg/ sqm	2 mm
4	**Project garden finish**					

*Choose primer according surface type and humidity.



Approved by official certification agencies

- **EOTA CERTIFICATES**
  EUROPEAN TECHNICAL ASSESSMENT (ETA 11/0357)
  TECNOCOAT P-2049 holds an ETA certificate (W3 25 working life years). This approval is based on a European technical approval guideline (EAD 030350-00-0402) which approves the suitability of the product for its specified use, based on compliance with the essential requirements as "Liquid Applied Roof Waterproofing Kit, based on pure Polyurea". Including plant roots penetration according to EN-13948 for use in green-roofs.

  European TECHNICAL ASSESSMENT (ETA 21/0942)
  This approval is based on a European technical approval guideline EAD 030675-00-0107 which approves the suitability of the product how "Liquid Applied Bridge Deck Waterproofing Kits" (under asphalt).

- **DTA "Avis Technique" for roofing**
  DTA 5.2/19.2665
  TECNOCOAT P-2049 holds the AVIS TECHNIQUE, technical certification for in situ resin-based liquid waterproofing system for inaccessible roofs, technical roofs and roofs accessible to pedestrians.

- **BBA CERTIFICATE**
  UK TECHNICAL ASSESSMENT (BBA 16/5340)
  TECNOCOAT P-2049 holds a BBA certificate for the British market (w3 25 working life years) and regulates aspects as weather resistance, reaction to fire, adherence to substrates, pedestrian and road traffic resistance to plant roots penetration and working life for over 25 years.

- **NSF INTERNATIONAL LABORATORIES APPROVAL and WRAS APPROVAL**
  APPROVED FOR CONTACT WITH WATER INTENDED FOR HUMAN CONSUMPTION (BS6920) and WRAS
  TECNOCOAT P-2049 passed all the tests conducted by the NSF laboratories and is now officially classified as safe and suitable for use in contact with water destined for human consumption, and holds the WRAS APPROVAL (Water Regulations Advisory Scheme) nº 1708543.

- **ASTM APPROVALS**
  Tested under various ASTM standards according to US regulations.

- **CE MARKING UNDER EN 1504-2 APPROVAL**
  PROTECTION AND REPAIR OF CONCRETE STRUCTURES
  TECNOCOAT P-2049 holds an EN 1504-2 certificate, the official European approval for products and systems designed for the protection and repair of concrete structures.

- **CONTACT WITH FOOD PRODUCTS CERTIFICATE**
  NO MIGRATION IN CONTACT WITH ETHANOL (UE REGULATION No. 10/2011 based on EN 1186.1:2002 and EN 1186.3:2002)
  The **TECNOCOAT P-2049** membrane holds a certificate issued by Applus declaring that migration in contact with ethanol is lower than the global limit permitted.





Legal Notes

- Check TDS and MSDS of all the materials before use.
- Technical data and any other information are true and accurate to the best of our knowledge.
- The use of these products is beyond the control of
- Consumptions can vary due surfaces, machine maintenance status or weather conditions
- This is a technical document, without legal value
- Proper application is the responsibility of the buyer
- The product properties may be changed without notice
- No liability, warranty of product performance is created by this document
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NOTES

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