

tecnocoat

BRIDGE DECK
WATERPROOFING SYSTEM

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TECHNICAL GUIDELINE


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ETA
16/0680

ETAG
033

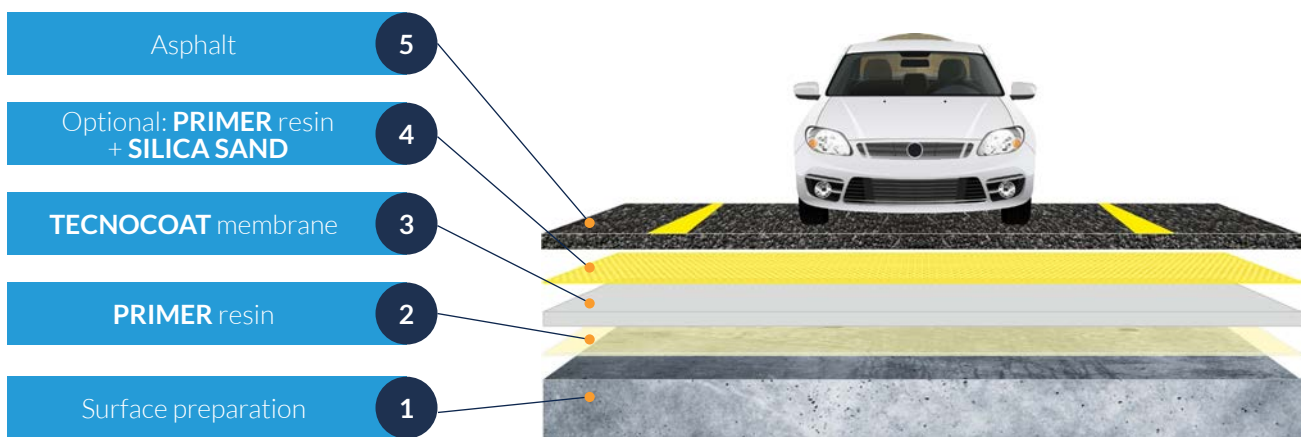
BRIDGE DECK WATERPROOFING SYSTEM

The perfect waterproofing and protection of concrete structures for civil engineering works is offered through Tecnocoat P-2049. In addition to being certified by the European Standard EN-1504.2 for the "Products and systems for the protection and repair of concrete structures", it has recently obtained the ETE according to the EOTA's "Liquid Applied Bridge Deck Waterproofing" (16/0680).

Therefore, using our pure polyurea system, total protection of concrete structures in bridge decks is achieved, as well as the putting into use of the wearing coat (asphalt), avoiding the risk of damage, in a fast, effective way and so, reducing execution costs..



Bridge deck General outline



BENEFITS

1. **Full adhered systems:** protection of the structural support element
2. **Complete and absolute protection** of the construction element
3. **Zero slope application,** it works under ponding water
4. **Direct application to the existing substrate:** waste generations limited, which contributes to an improvement in the construction sustainability
5. **Faster setting:** labor time reduction, cost optimization
6. **No extra weight on existing structure** (only $\pm 2,5-3 \text{ kg/m}^2$)
7. **Cost reduction:** not need to apply concrete coats to protect it
8. **High resistance to the coarse bitumen poured temperature:** no collapse of the membrane due to environmental causes

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 hampers adherence, which will have a negative effect on the final result of the system. It is recommended that the system is not applied before the concrete curing process has finalized (28 days)

It is essential 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/on 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 this 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 systems and, therefore, this situation will have to be resolved via onsite application of water-vapour 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 depend, 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

This is a conditioning aspect that could affect the membrane's curing speed, together with the ambient temperature

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 ambience temperatures below 3°C.

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

1. Surface Preparation

CONCRETE

The concrete surface on which the system is to be applied needs to be prepared, as follows:

- Special purpose admixtures, such as water-immiscible (capable of being mixed) chemicals intended to retard evaporation of water during curing, may create adhesion problems.
- It is necessary to remove oils, greases, silicones and other such contaminants. This is generally a first step in the whole preparation process. Other methods of preparation should follow detergent washing. Scrubbing in a detergent solution is required to force solution as deeply as possible into concrete pour structure. Complete removal of the detergent solution is required. Detergent residue may create a bond breaker to application of sealers and coatings to follow. Disposal of detergent wash residue should follow environmental guidelines.
- Any depressions on the surface caused during pouring of the slabs need to be eliminated as they produce small pinholes caused by the escaping air trapped during application. The depressions are filled using high resistance cement or our special epoxy mortar mixing PRIMER EP-1020 epoxy resin with calcium carbonate CO_3Ca (ratio $\pm 1:2$), or SILICA SAND

(ratio $\pm 1:4$). This achieves an extremely hard, retraction free infill volume that is also quick drying. Use Mastic PU depending on the size of the infill.

- In general, concrete must be structurally sound, dry and clean for successful applications of polyurea systems. Coating systems require a uniformly roughened surface for proper application. Use of preparation specialists may be required. It's recommended eliminate the laitance on the surface area of the concrete using the most appropriate method in every case (grinding/milling, sandblasting, scarifying or shot blasting), thus achieving a flat surface with a minimum continuous roughness (recommended CSP 3 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 aspiration equipment, thus avoiding the need to use water as this could hamper adherence of the membrane



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



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).

MAIN PERFORMANCES

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



APPLICATION METHODOLOGY

- Check expiry time and stir each one
- Open the buckets
- Mix both components
- Stir using a low speed electrical mixer.
- Apply by roller or brush. 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 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 table below you can see the main properties of available primers to use in this system. Pay attention at the “accepted surfaces” and “maximum surface dampness” to do the best choice of primer resin.

	primer PU-1050	primer PUc-1050	primer WET
Main use	The best option for concrete	For concrete in cold environments	Concrete subject to maximum damp
Accepted surface	Concrete	Concrete	Concrete
Components No.	2	2	2
Product base	Polyurethane 100% solids	Polyurethane 100% solids	Epoxy 100% solids
Density	1.110 kg/m ³	1.110 kg/m ³	1.540 kg/m ³
Solids content	100 %	100 %	100 %
Concrete adherence	> 2 MPa	> 2 MPa	> 2 MPa
Viscosity	450-A / 900-B cps	450-A / 900-B cps	680-A / 620-B cps
Yield per coat	± 150 g/m ²	± 150 g/m ²	± 450 g/m ²
Initial drying time	60 minutes	60 minutes*	3 hours
Recoat time	3 ~ 24 hours	3 ~ 24 hours*	3 ~ 6 hours
Temperature of use	5 ~ 35 °C	5 ~ 15 °C	5 ~ 35 °C
Maximum surface dampness	± 5 %	± 5 %	± 98 %
Dilution on water	NO	NO	NO

3. Tecnocoat membrane

TECNOCOAT P-2049 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 ETA 16/0680 Liquid Asphalt Bridge Deck Waterproofing certification (recommended thickness of 2.3 mm (±2.4 kg/m²))

APPLICATION METHODOLOGY

Spray gun application should be carried out applying the product always perpendicularly 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 coat continuously as needed to achieve the desired thickness according to the final use or technical requirements.

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

Heater isocyanate temperature	±75 °C
Heater amines temperature	±70°C
Hose temperature	±70°C
Pressure	2.900 psi (200 bar)
Recommended mixing chamber	GU-07008-1 or GU-07008-2



Component No.	2
Density	± 1.100 kg/m ³
Elongation	> 350%
Tensile strength	> 20 MPa
Concrete adherence	> 2 MPa
Hardness (shore A)	> 95
Hardness (shore D)	> 55
Initial drying time	3 ~ 5 seconds
Recoat time	max. 12 hours
Thickness (Yield)	2.3 mm (± 2.4 kg/m ²)
Fire reaction	Euroclass E
Solids content	100%
Mastic asphalt temp.	220 °C
Coarse bitumen temp.	160 °C
Watertightness	Yes
Resistance to shear / overlay	0.25 MPa
Bridge Crack (-20°C)	Pass
Ponding water works	YES



4. Primer + Silica Sand

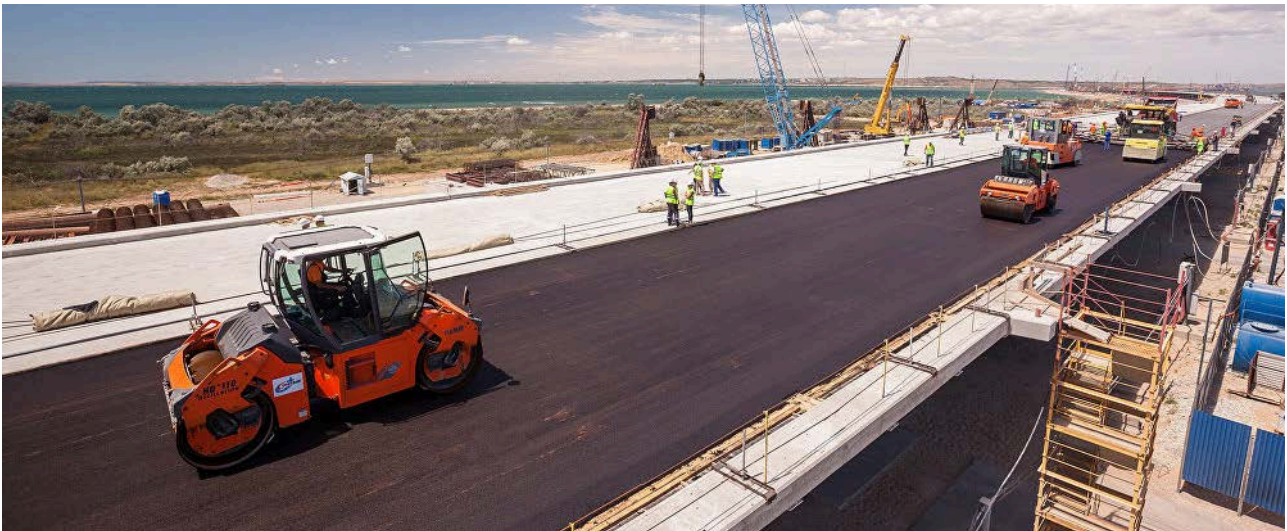
Optionally, apply a thin coat of polyurethane resin Primer PU-1000 and lightly sprinkle aggregate on the surface when it is still wet. In this way, an additional layer of protection is formed if necessary.



This final action is not included in the ETA obtained, although Tecnopol's technical department offers it as a safety if it is considered needed due to the mechanical action of the coarse bitumen pouring machinery.

5. Asphalt

The coarse bitumen (asphalt coat) will then be poured according to the specifications of the civil work project.



Application summary

	PRODUCT	EXISTING SURFACE HUMIDITY	APPLICATION METHOD	YIELD	THICKNESS
1	Surface preparation				
2	PRIMER PU-1050 / PUc-1050	± 5%	Apply by roller or trowel. The number of coats depends on the physical surface conditions.	± 200 g/m ²	± 180 μ
	PRIMER WET (concrete)	± 98%		450 ~ 500 g/m ²	290 ~325 μ
3	TECNOCOAT P-2049	-	Apply using TC-2049 spray equipment	2.4 kg/m ²	2.3 mm
4	PRIMER PU 1000 + SILICA SAND	-	Spread SILICA SAND over PRIMER when it is still wet	± 80 g/m ² Primer + 1.5~2 kg/m ² S.Sand	± 47 μ
5	ASPHALT	-	Pour the asphalt according to the specifications of the civil work project	-	-



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 (ETAG) n° 005 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 EN-13948 for use in green-roofs.

European TECHNICAL ASSESSMENT (ETA 16/0680)

This approval is based on a European technical approval guideline (**ETAG**) n° 033 which approves the suitability of the product how “Liquid Applied Bridge Deck Waterproofing Kits” (under asphalt).

- **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, plant roots penetration and service life for over 25 years.

- **NSF INTERNATIONAL LABORATORIES APPROVAL**

APPROVED FOR CONTACT WITH WATER INTENDED FOR HUMAN CONSUMPTION (BS6920)

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.

- **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 thereby allowing its use in the storage of wine, beer and liquors.



European Organisation for Technical Approvals
Europäische Organisation für Technische Zulassungen
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Established pursuant to Annex II of the Council Directive 89/106 of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products (Construction Products Directive)

ETAG 033

GUIDELINE FOR
EUROPEAN TECHNICAL APPROVAL
of

LIQUID APPLIED BRIDGE DECK WATERPROOFING KITS

Version July 2010

This Guideline for European Technical Approval is established and published in accordance with Article 11 of the Construction Products Directive as a basis for the preparation and issue of European Technical Approvals in accordance with Article 9.1 of the Construction Products Directive.

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