PURTOP 400 M

Two-component, solvent-free, hybrid polyurea membrane applied by spray using a high-pressure, bi-mixer type pump to form waterproof coatings on bridge decks and roofs directly on site





CE EN 1504-2

IN COMPLIANCE WITH EUROPEAN STANDARD EN 1504-2 (C) PRINCIPLES PI-MC-PR-RC-IR MAPEI SURFACE PROTECTION SYSTEMS FOR CONCRETE

WHERE TO USE

Due to its high tear strength and exceptional flexibility and resistance to chemicals, **Purtop 400 M** is suitable as a waterproofing membrane for bridge decks and large roofs. Also, thanks to its special characteristics, **Purtop 400 M** is suitable for waterproofing both new and existing structures.

Some application examples

- Waterproofing bridge and viaduct decks.
- Waterproofing roof gardens and inverted roofs.
- Waterproofing sheet metal roofs.
- Waterproofing steps and stands in stadiums (with a suitable finishing product).

ADVANTAGES

Purtop 400 M has excellent bond strength and, once reticulated, it forms a continuous strong, flexible membrane.
Purtop 400 M has the following advantages:

- contains no solvents and no VOC (volatile organic compounds);
- immediate waterproofing and rapid set to foot traffic;
- excellent tensile strength (> 12 N/mm^2 according to ISO 37);
- excellent tear strength (> 45 N/mm according to ISO 34-1);
- high crack-bridging capacity both static and dynamic, even at low temperatures;
- elongation capacity higher than 400% (ISO 37);
- excellent resistance to alkalis and diluted acids;
- quick reaction of product when applied by spray: gel time at +23°C takes approx. 7 seconds;
- no reinforcement required;
- does not form overloads on load-bearing structures;
- after reticulation, the product is completely inert.

CERTIFICATIONS

- **Purtop 400 M** complies with the principles defined in EN 1504-9 ("*Products and systems for the protection and repair of concrete structures: definitions, requirements, quality control and evaluation of conformity.*

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General principles for use of products and systems") and the requirements of the EN 1504-2 coating (C) according to principles PI, MC, PR, RC and IR ("*Surface protection systems for concrete*").

- Membrane certified for use underneath asphalt on bridge decks in compliance with ETAG 033 (please refer to **Purtop 400 M System Deck** System Sheet).
- Resistant to root penetration according to CEN/TS 14416.

TECHNICAL CHARACTERISTICS

Purtop 400 M is a two-component, solvent-free, modified polyurea resins formulate according to a formula developed in MAPEI's R&D laboratories.
Purtop 400 M must be applied in layers at least 2 mm thick and its very short reaction time means it may also be applied on vertical surfaces.
Thanks to its exceptional tensile and tear strength and high crack-bridging capacity, even with low temperatures, after reticulation (approximately 2 minutes)
Purtop 400 M forms a continuous waterproof layer which adapts to any shape of substrate without cracking.

RECOMMENDATIONS

- Do not apply **Purtop 400 M** onto substrates polluted with oil, grease or dirt in general.
- Do not apply **Purtop 400 M** on substrates which have not been thoroughly cleaned and primed.
- Do not apply **Purtop 400 M** on substrates subject to rising damp.
- A primer for damp substrates must be used whenever the level of residual humidity in the substrate is higher than 4%, such as **Triblock P**.
- Do not dilute **Purtop 400 M** with water or solvents.
- Do not use **Purtop 400 M** on surfaces constantly immersed in water (such as swimming pools, fountains, storage tanks).

APPLICATION PROCEDURE

Preparation of the substrate

Surfaces must be prepared accordingly depending on the type of substrate, for example by sand-blasting, shot-blasting, scarifying, bush-hammering or other methods.
The substrate must then be treated with a suitable primer as described below.

1. Application on concrete substrates, cementitious screeds

Check the substrate to make sure it is suitable for the waterproofing system.
The compressive strength and tear strength of the surface must be ≥ 25 MPa and ≥ 1.5 MPa respectively.
Prepare the surface by sanding or shot-blasting to remove all traces of oil, grease, dirt in general and any other material or substance which could compromise the bond of the waterproofing system. Remove all dust and crumbling or detached parts from the substrate to leave a dry, porous, slightly rough surface free of contaminants.
Repair any hollows, cavities and detached parts in the substrate with suitable products from the **Mapegrout** and **Planitop** ranges. Choose the most suitable product according to the thickness to be repaired, the time available and the operating conditions on site.
After preparing the surface as described above, apply a coat of **Primer SN**, two-component epoxy primer with fillers, with a smooth spatula or rake and sprinkle the surface with **Quartz 0.5** or, as an alternative, of **Primer FT** (two-component ultra-rapid polyurea primer), to be applied in two coats.
If the level of humidity in the substrate is higher than 4% and it is not possible to wait until it drops to a lower value, apply two or more coats of **Triblock P** three-component epoxy-cementitious primer according to the condition of the substrate, until the system is completely sealed.
When the primer has cured sufficiently apply a coat of epoxy primer (such as **Primer SN** or **Mapecoat I 600 W**); contact MAPEI Technical Services for further details.

2. Application on bituminous membranes

Clean the bituminous membrane to remove all traces of oil, grease, dirt in general and any other substance or material which could affect adhesion of the following coat of primer. Remove all dust with a vacuum cleaner or compressed air. The membrane must be perfectly dry before inspecting the surface and any damage in the membrane (such as blisters, tears, or detached areas) must be repaired before applying the primer. Apply

Primer PU 60, one-component solvent-based primer or **Primer I 60 W**, two-component epoxy primer in water dispersion, diluted 1:1 with water.

3. Application on metal surfaces

Check the condition of the substrate and then dry sandblast to grade SA 2½ (according to Swedish Standards). If it is not possible to use dry sandblasting, the substrate must be prepared using another system, such as mechanical cleaning with a scraping tool (rotary steel brush, grinding wheels or abrasive disks) or a percussion tool (such as a stripper, chipping hammer, flat chisel or needle chisel).
After treating the surface, apply a coat of **Primer EP Rustop**, two-component epoxy primer with a brush, roller or airless spray on the metal.
As an alternative, **Mapedeck Primer 200**, adhesion promoter for polyurethane systems, can be applied.

4. Application on wooden substrates and OSB panels

Clean the substrate to remove all traces of dust, dirt and other deposits.
Calculate the width and pitch of the joints between the panels in order to select the most suitable product to treat these joints.
Apply a coat of **Primer SN** two-component epoxy primer with fillers on the clean, dry substrate and dust the surface with **Quartz 0.5**.

For any other type of substrate, contact the MAPEI Technical Services Department to define the most suitable preparation treatment.

Application of the membrane

Purtop 400 M must be applied at a temperature of between +5°C and +40°C.
Before applying **Purtop 400 M**, remove all dust from the surface with an industrial vacuum cleaner. The temperature of the substrate must be at least 3°C higher than the dew-point temperature, while the level of residual humidity must be no higher than 4%.
Component A must be mixed carefully before use until it has an even colour.
To apply the **Purtop 400 M** membrane, use a high pressure industrial bi-mixer unit with flow and temperature control, preferably with a self-cleaning gun.
The application temperature of the two components must be between +65°C and +85°C and the pressure must be between 160 and 200 bar.
Purtop 400 M must be applied continuously on all the horizontal surfaces and vertical overlaps and inside any drain collectors positioned on the surfaces.
If the application of **Purtop 400 M** is interrupted and then taken up again after the maximum covering time (2 hours), an overlap of at least 30 cm must be made after applying a coat of **Primer PU 60**.

Finishing off the membrane

Purtop 400 M gradually turns yellow if exposed to UV rays. If the membrane is exposed to UV rays, apply **Mapecoat PU 20 N**, two-component aliphatic polyurethane finish with a roller or by spray to guarantee its durability, or alternatively **Mapecoat TC**, wear-resistant coloured aliphatic polyurethane finish.
Apply the finish onto the clean and dry substrate within 24 hours from the application of Purtop 400 M waterproofing membrane.
If **Purtop 400 M** is to be covered by asphalt flooring, apply a coat of **Purtop Primer Black**, one-component solvent-based primer over the clean, dry membrane with a roller or airless spray beforehand. Dust the surface of the primer with **Quartz 1.2** while it is still fresh. Lastly, before applying the asphalt, spread at least 1 kg/m² of hot bonding layer made from modified bitumen.

For further information regarding the products mentioned above, please refer to the relevant Technical Data Sheets.

CLEANING

Because of the high bond strength of **Purtop 400 M**, we recommend cleaning tools with solvent naphtha before the it starts to set. Once hardened, cleaning may only be carried out mechanically.

CONSUMPTION

The consumption of **Purtop 400 M** depends on the roughness of the substrate. The theoretical consumption for a smooth surface with a substrate temperature of between +15°C and +25°C is 2.2 kg/m² every 2.0 mm of thickness.
If the surfaces are rougher, consumption increases. If the substrate is seriously damaged, we recommend applying a suitable repairing product.

PACKAGING

Purtop 400 M is supplied in metal drums.
Component A: 220 kg drums.
Component B: 225 kg drums.

STORAGE

When stored in its original packaging in a dry, covered area at a temperature of between +15°C and +25°C, the shelf life of **Purtop 400 M** is 12 months.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Instructions for the safe use of our products can be found on the latest version of the Safety Data Sheet, available from our website www.mapei.com.
PRODUCT FOR PROFESSIONAL USE.

TECHNICAL DATA (typical values)

Purtop 400 M: ***two-component, solvent-free, hybrid polyurea membrane applied by spray with a high-pressure bi-mixer type pump, to form waterproofing coatings directly on site on bridge decks and roofs, in compliance with the requirements of EN 1504-2 coating (C) principles PI, MC, PR, RC and IR***

PRODUCT IDENTITY	component A	component B
Colour:	grey	amber yellow
Consistency:	fluid	liquid
Density:	1.08 g/cm³	1.11 g/cm³
Brookfield viscosity at +23°C:	1,060 ± 200 mPa·s (rotor 3 - 50 RPM)	975 ± 175 mPa·s (rotor 3 - 50 RPM)

PRODUCT APPLICATION (A+B) (at +23°C - 50% R.H.)	
A/B ratio (by weight):	100/103
A/B ratio (by volume):	100/100
Gel time at +23°C:	approx. 7 seconds
Ambient application temperature:	from +5°C to +40°C

PERFORMANCE ON FREE FILM (thickness 2 mm)		
Mechanical characteristics after 7 days at +23°C:		
– tensile strength (ISO 37):	> 12 N/mm²	
– elongation at failure (ISO 37):	> 400%	
– tear strength (ISO 34-1):	> 45 N/mm	
Hardness (DIN 53505):	Shore A = 70	Shore D = 35
Glass transition temperature:	-50°C	

FINAL PERFORMANCE DATA (thickness 2 mm)			
Performance characteristics	**Test method**	**Requirements according to EN 1504-2**	**Performance of product**
Permeability to water vapour:	EN ISO 7783-2	Class I s_D < 5 m Class II 5 m ≤ s_D ≤ 50 m Class III s_D > 50 m	Class I (average s_D = 1.9 m)
Capillary absorption and permeability to water:	EN 1062-3	w < 0.1 kg/m²·$h^{0.5}$	average w = 0.01 kg/m²·$h^{0.5}$
Permeability to CO_2:	EN 1062-6	s_D > 50 m	s_D = 277 m
Direct traction adherence test:	EN 1542	***Flexible systems*** with no traffic: ≥ 0.8 N/mm² with traffic: ≥ 1.5 N/mm²	≥ 3 N/mm² (on MC(0.40) substrate according to EN 1766)
Static crack-bridging at -10°C expressed as maximum width of crack:	EN 1062-7	from class A1 (> 0.1 mm) to class A5 (> 2.5 mm)	Class A5 (> 2.5 mm)
Dynamic crack-bridging at +23°C:	EN 1062-7	from class B1 to class B4.2	Class B4.2
Impact resistance:	EN ISO 6272-1	No cracks or delamination after loading Class I: ≥ 4 Nm Class II: ≥ 10 Nm Class III: ≥ 20 Nm	Class III
Resistance to thermal shock (1x):	EN 13687-5	After thermal cycles a) no swelling, cracking or delamination b) average direct traction adherence test (N/mm²) ***Flexible systems*** with no traffic: ≥ 0.8 N/mm² with traffic: ≥ 1.5 N/mm²	3.3 N/mm²
Abrasion resistance (Taber test):	EN ISO 5470-1	Weight loss less than 3000 mg with a H22 abrasive disk/1,000 cycles/1,000 g load	weight loss < 300 mg
Exposure to artificial atmospheric agents:	EN 1062-11	After 2,000 hours of artificial weather: no swelling according to EN ISO 4628-2 no cracking according to EN ISO 4628-4 no flaking according to EN ISO 4628-5 Slight colour variations, loss of brightness and crumbling may be acceptable.	no swelling, cracking or flaking (colour change)
Resistance to severe chemical attack:	EN 13529	Reduction of hardness less than 50% when measured according to the Shore method (EN ISO 868), 24 hours after removing the finish from immersion in the test liquid Class I: 3 days with no pressure Class II: 28 days with no pressure Class III: 28 days with pressure	NaCl 20%: class II CH_3COOH 10%: class II H_2SO_4 20%: class II KOH 20%: class II CH_3OH : class I
Reaction to fire:	EN 13501-1	Euroclass	E

OTHER PERFORMANCE CHARACTERISTICS	
Resistance to root penetration (CEN/TS 14416):	no penetration or perforation
Electrical resistance (EN 61340-4-1):	> 200 GΩ

TYPE OF PRIMER ACCORDING TO THE SUBSTRATE			
SUBSTRATE	PRIMER	CONSUMPTION (g/m²)	MIN/MAX COVERING TIMES (estimated values)
Concrete	Primer SN surface-dusted with Quartz 0.5	300-600	12-24 hours
	Triblock P	600-1200	2-7 days
Metals	Primer EP Rustop	approx. 200	6-24 hours
	Mapedeck Primer 200	approx. 100	1-3 hours
Wood and OSB panels	Primer SN surface-dusted with Quartz 0.5	300-600	12-24 hours
Bituminous membrane	Primer PU 60*	approx. 150	1-2 hours
	Mapecoat I 600 W (diluted 1:1 with water)	approx. 150	2-4 hours
Purtop 400 M	no primer	–	30 minutes-2 hours
	Primer PU 60*	approx. 50	1-2 hours

mixed with 1% by weight of **PU Catalyst*
***Note:** covering times refer to temperatures of between +15°C and +25°C and the consumption may vary according to the roughness of the substrate.*



Spectator terraces waterproofed with Purtop 400 M coated with Mapecoat PU 20 N



Application of Purtop Primer Black



Application of Purtop 400 M over a bituminous membrane



Application of Purtop 400 M over a bituminous membrane



Application of Purtop 400 M over Triblock P

WARNING

Although the technical details and recommendations contained in this product data sheet correspond to the best of our knowledge and experience, all the above information must, in every case, be taken as merely indicative and subject to confirmation after long-term practical application; for this reason, anyone who intends to use the product must ensure beforehand that it is suitable for the envisaged application. In every case, the user alone is fully responsible for any consequences deriving from the use of the product.
Please refer to the current version of the Technical Data Sheet, available from our website www.mapei.com

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