



Purtop 400 M

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



WHERE TO USE

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

Purtop 400 M is one of the waterproofing membranes used in **Purtop System Roof**, a dedicated system for flat roofs (roofs suitable for foot traffic, inverted roofs and garden roofs), and in **Purtop System Deck**, a dedicated system for flat roofs suitable for vehicles, bridge decks and viaducts.

Some application examples

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

Advantages

Purtop 400 M has excellent bond strength and once reticulated, it may form a continuous strong, flexible membrane.

Purtop 400 M has the following advantages:

- contains no solvents;
- immediate waterproofing (after 2 minutes) and rapid set to foot traffic (after 15-20 minutes);

- excellent tensile strength (14 N/mm² according to DIN 53504);
- excellent tear strength (55 N/mm according to ISO 34-1);
- high crack-bridging capacity both static and dynamic even at low temperatures;
- elongation capacity higher than 400% (DIN 53504);
- excellent resistance to alkalis and diluted acids;
- quick reaction of product when applied by spray: gel time at +70°C < 6 seconds;
- no reinforcement required;
- does not form overloads on load-bearing structures;
- after reticulation, the product is completely inert.

TECHNICAL CHARACTERISTICS

Purtop 400 M is a two-component, solvent-free, modified polyurea resin formulate according to a formula developed in MAPEI's R&D laboratories. The product is grey in colour and is applied using a high pressure industrial bi-mixer unit with flow and temperature control, and with a self-cleaning gun.

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.

Purtop 400 M



Spectator terraces waterproofed with Purtop 400 M coated with Mapefloor Finish 55



Application of Purtop Primer Black

Thanks to its exceptional tensile and tear strength and high crack-bridging properties, after reticulation (approximately 2 minutes) **Purtop 400 M** forms a continuous waterproof layer which adapts to any shape of substrate without cracking.

Purtop 400 M responds to the principles defined in EN 1504-9 ("*Products and systems for protecting and repairing concrete structures: definitions, requirements, quality control and conformity assessment. General principles for the use of products and systems*") and the requirements of EN 1504-2 coating (C) according to principles PI, MC, PR, RC and IR ("*Concrete surface protection systems*").

RECOMMENDATIONS

- Do not apply **Purtop 400 M** on substrates which have not been thoroughly cleaned or primed.
- Do not apply **Purtop 400 M** on substrates with 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 solvent.
- Do not use **Purtop 400 M** on surfaces continually immersed in water.

APPLICATION PROCEDURE

Preparation of the substrate

Each type of substrate (concrete, cementitious screed, terrazzo, porcelain, klinker, smooth bituminous membrane, metal, etc.) must be individually assessed to choose the most suitable surface-preparation method, such as 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 all surfaces 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**.

The waterproofing membrane must be applied within 12 and 24 hours of applying the primer (at a temperature of between $+15^{\circ}\text{C}$ and $+25^{\circ}\text{C}$).

For roller or airless spray applications we recommend using **Mapefloor I 914** two-component epoxy primer and dust the surface with **Quartz 0.5** or **Quartz 1.2**.

The waterproofing membrane must be applied within 12-24 hours of applying the primer (at a temperature of between $+15^{\circ}\text{C}$ and $+25^{\circ}\text{C}$).

If the level of residual humidity in the substrate is higher than 4% and it is not possible to wait until it drops to a lower value, apply a number of coats of **Triblock P** three-component epoxy-cementitious primer according to the condition of the substrate, until the system is completely sealed.

2. Application on bituminous membranes

Clean the bituminous membrane to remove all traces of oil, grease, dirt and any other substance or material which could compromise the bond 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, if it is damaged in any areas, such as with blisters, tears or detached areas, repair it before applying the primer. Apply a ready-to-use, synthetic resin-based impregnating product in solvent on the horizontal surfaces and vertical overlaps, such as **Primer BI**.

The waterproofing membrane must be laid within 2 to 4 hours of applying the primer (at a temperature of between $+15^{\circ}\text{C}$ and $+25^{\circ}\text{C}$).

3. Application on metallic 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 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. The waterproofing membrane must be laid within 6 to 24 hours of applying the primer (at a temperature of between $+15^{\circ}\text{C}$ and $+25^{\circ}\text{C}$).

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 best treatment to suit the surface.

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

TECHNICAL DATA (typical values)

PRODUCT IDENTITY

	component A	component B
Colour:	grey	amber yellow
Consistency:	fluid	liquid
Density (g/cm ³):	1.04 ± 0.03	1.11 ± 0.03
Brookfield viscosity at +23°C (mPa·s):	1,060 ± 200 (rotor 3 - RPM 50)	975 ± 175 (rotor 3 - RPM 50)

APPLICATION DATA OF PRODUCT (A+B) (at +23°C - 50% R.H.)

A/B ratio (by weight):	100/106.8
A/B ratio (by volume):	100/100
Gel time at +70°C (seconds):	4-6
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 (DIN 53504) (N/mm ²): – elongation at failure (DIN 53504) (%): – tear strength (ISO 34-1) (N/mm):	14 400 55
Modulus at 100% (DIN 53504) (MPa):	5
Hardness (DIN 53505):	Shore A = 70 Shore D = 35
Glass transition temperature (°C):	-50

PERFORMANCE CHARACTERISTICS FOR CE CERTIFICATION ACCORDING TO EN 1504-2 - Tables: ZA.1d,e,f and g (thickness 2 mm)

Performance characteristics	Test method according to UNI EN 1504-2	Requirements	Performance of product
Permeability to water vapour:	EN ISO 7783-2	Class I $s_D < 5$ m Class II $5 \text{ m} \leq s_D \leq 50$ m Class III $s_D > 50$ m	Class I (average $s_D = 1.9$ m)
Capillary absorption and permeability to water:	EN 1062-3	$w < 0.1 \text{ kg/m}^2 \cdot \text{h}^{0.5}$	average $w = 0.01 \text{ kg/m}^2 \cdot \text{h}^{0.5}$
Permeability to CO ₂ :	EN 1062-6	$s_D > 50$ m	$s_D = 277$ m
Direct traction adherence test Reference substrate: MC (0.40) as specified in EN 1766, curing time 7 days:	EN 1542	Average (N/mm ²) Cracking or flexible systems with no traffic: ≥ 0.8 (0.5) ^(b) with traffic: ≥ 1.5 (1.0) ^(b) Rigid systems ^(c) with no traffic: ≥ 1.0 (0.7) ^(b) with traffic: ≥ 2.0 (1.0) ^(b)	4.5 N/mm ² flexible system with traffic (shore D = 35)
Cracking capacity After conditioning as per EN 1062-11:2002, 4.1-7 days at +70°C for active resin systems:	EN 1062-7	Classes required and test conditions indicated in tables 6 and 7. Required crack resistance must be selected by design engineer according to local conditions (climate, width of cracks and movement of cracks). No failure permitted after testing the requested class.	static at -10°C: exceeds class A5 dynamic at +23°C: exceeds class B4.1
Impact resistance measured on MC (0.40) dressed concrete samples according to EN 1766. Note: The expected thickness and impact load influence which class is chosen:	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/mm ²) Cracking or flexible systems with no traffic: ≥ 0.8 (0.5) ^(b) with traffic: ≥ 1.5 (1.0) ^(b) Rigid systems ^(c) with no traffic: ≥ 1.0 (0.7) ^(b) with traffic: ≥ 2.0 (1.0) ^(b)	3.3 N/mm ² flexible system with traffic
Abrasion resistance (Taber test) Note: Testing methods according to EN 13813 for flooring systems are also acceptable:	EN ISO 5470-1	Loss by weight less than 3000 mg with a H22 abrasive disk/1,000 cycles/1,000 g load	loss by weight < 300 mg
Exposure to artificial atmospheric conditions according to EN 1062-11:2002, 4.2 (UV radiation and humidity) for external applications only. Only white and RAL 7030 require testing:	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 Class I: 3 days with no pressure Class II: 28 days with no pressure Class III: 28 days with pressure We recommend using test liquids for the 20 classes indicated in EN 13529, which cover all the most common chemical agents. Other test liquids may be agreed upon between those interested in the tests:	EN 13529	Reduction of hardness less than 50% when measured according to the Buchholz method, EN ISO 2815 or the Shore method (EN ISO 868), 24 hours after removing the finish from immersion in the test liquid	NaCl 20%: class II CH ₃ COOH 10%: class II H ₂ SO ₄ 20%: class II KOH 20%: class II CH ₃ OH : class II
Reaction to fire:	EN 13501-1	Euroclass	E

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**. The waterproofing membrane must be applied within 12 to 24 hours of applying the primer (at temperatures between +15°C and +25°C). 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.

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** has to be 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 M** (never wait more than 2 hours before painting or coating the primer).

Finishing off the membrane

If **Purtop 400 M** is exposed to UV rays its mechanical properties are not significantly affected.

However, to guarantee the durability of the membrane, it must be protected with **Mapefloor Finish 55** or **Mapecoat PU 15** two-component, aliphatic polyurethane coating applied with a roller or by spray. Apply the finish within 24 hours of applying **Purtop 400 M** waterproofing membrane. For further information, please refer to the relevant Technical Data Sheets.

If **Purtop 400 M** is to be covered by asphalt flooring, on the other hand, 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 on a hot bonding layer made generally from bitumen modified with styrene butadiene rubber (SBR).

Cleaning

Because of the high bond strength of **Purtop 400 M**, we recommend cleaning tools with solvent naphtha before the product 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 around 2.2 kg/m² every 2 mm of thickness. If the surfaces are rougher, consumption increases. If the substrate is seriously damaged, we recommend applying a suitable skimming coat.

PACKAGING

Purtop 400 M is available in metal drums. Component A: 210 kg drum. Component B: 225 kg drum.

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

Purtop 400 M is harmful and may cause irreversible damage to health. When applying the product we recommend following these guidelines:

- wear protective clothing, gloves and goggles;
- protect airways by wearing an A2 safety mask for organic vapours;
- make sure there is a continuous circulation of fresh air when working in closed environments.

In the event of accidents or sickness, seek medical attention.

Purtop 400 M component A is hazardous for aquatic life, do not dispose of the product in the environment.

For further and complete information about the safe use of our product please refer to the latest version of our Material Safety Data Sheet.

PRODUCT ONLY FOR PROFESSIONAL USE.

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



Application of Purtop 400 M over a bituminous membrane



Application of Purtop 400 M over Triblock P



Application of Purtop 400 M over Triblock P

TYPE OF PRIMER ACCORDING TO THE SUBSTRATE

SUBSTRATE	PRIMER	CONSUMPTION (g/m ²)	MIN/MAX COVERING TIMES (estimated values)
Concrete	Primer SN surface-dusted with Quartz 0.5	300-600	12-24 hours
	Mapefloor I 914 surface-dusted with Quartz 0.5/Quartz 1.2	500-700	12-24 hours
	Triblock P	600-1200	2-7 days
Metals	Primer EP Rustop	approx. 200	6-24 hours
Wood and OSB panels	Primer SN surface-dusted with Quartz 0.5	300-600	12-24 hours
Bituminous membrane	Primer BI	approx. 200	2-4 hours
Purtop 400 M	no primer	–	30 minutes-2 hours
	Primer M	approx. 50	1-2 hours

Note: covering times refer to temperatures of between +15°C and +25°C.

All relevant references for the product are available upon request and from www.mapei.com

Purtop 400 M



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