

MasterShield PR SYSTEM

A solvent-based, elastomeric polyurethane protection system for concrete structures: **MasterShield PRI 210** primer and **MasterShield PR 220** two-component coating.

Material description

MasterShield PR SYSTEM is a protection system for concrete structures comprising the following components:

- **MasterShield PRI 210:** a two-component epoxy primer with a high solids content;
- **MasterShield PR 220:** a two-component, elastomeric, solvent-based polyurethane protective coating.

The system thus created offers a high level of protection against the ingress of water, chlorides and atmospheric CO₂, and in chemically aggressive environments. The formulation, with its aliphatic structure, ensures excellent colour stability.

Main uses

The **MasterShield PR SYSTEM** polyurethane-based system is suitable for the protection of concrete structures and cementitious substrates, whether in good condition or previously repaired using mortars from the **MasterCrete** range, such as:

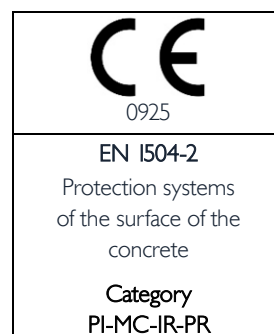
- reinforced concrete structures requiring protection against chlorides (due to contact with seepage water, without permanent contact), such as: bridge decks, abutments, piers and abutments;
- structures made of reinforced concrete with insufficient concrete cover;
- parts of hydraulic structures such as dams, canals, pipelines and reservoirs that are exposed to the air and not in constant contact with water.

If the project involves specific service conditions, please always contact the Master Builders Solutions Technical Service for approval of the application.

Features

- **Preventing water ingress** helps to prevent any corrosion of the reinforcement caused by, for example, the ingress of chloride ions or repeated freeze-thaw cycles.
- **Provide good crack-bridging properties** to ensure the durability of the application even if small cracks form in the substrate to which the coating has been applied.
- **Check the moisture content:** high water vapour permeability is essential to prevent the build-up of vapour pressure at the interface with the substrate as temperatures fluctuate, which could lead to delamination.
- **Resistance to UV radiation:** an important characteristic for ensuring long-term durability, including from an aesthetic point of view, thanks to its aliphatic formulation.
- **Effectively preventing the ingress of carbon dioxide,** which over time alters the pH of the concrete matrix and its natural ability to protect the reinforcement, thereby preventing the onset of corrosion.

In compliance with the European Regulations (EU No. 305/2011 and EU No. 574/2014), the coating is CE marked in accordance with UNI EN 1504-2 and is accompanied by the relevant Declaration of Performance (DoP).



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Consumption

MasterShield PRI 210: approximately 0.15–0.25 kg/m², depending on absorption of the substrate.
Can be diluted with epoxy solvent: max 8%.

MasterShield PR 220: 200 g/m² per 100 µm of dry film to be produced.

Dry film [µm]	Wet film [µm]	Consumption [kg/m ²]
200	270	0.40
300	400	0.60
400	550	0.80

Can be thinned with polyurethane solvent when applied by machine: max. 10%.
We recommend a dry film thickness of between 200 µm and 400 µm.

Packaging and storage

MasterShield PRI 210 is available in a 24 kg kit:
Component A: 20 kg bucket.
Component B: 4 kg bucket.

MasterShield PR 220 is available in a 22 kg kit:
Component A: 20 kg bucket.
Component B: 2 kg bucket.

Keep the products in their original packaging in a dry, protected location at a temperature between +5°C and +30°C. Do not expose to direct sunlight.
Under the above conditions, the products have a shelf life of 12 months.

Preparation and method of application

Preparing the substrates

- The concrete surface to be smoothed with **MasterCrete PR SYSTEM** must be perfectly clean, solid, without degraded, loose or detached parts, without irregularities that could compromise the application of the product, and free of cement laitance, traces of release agents, or any substance that could affect the adhesion of the product to the substrate.
- Once the above has been verified, you can proceed according to the possible scenarios described below:
 - If it is not necessary to restore degraded areas or repair surface irregularities, the substrate must still be made slightly rough by sandblasting, hydro-sandblasting or high-pressure washing;
 - If, on the other hand, the substrate has slight irregularities or is slightly uneven, these must be repaired, after adequate treatment and saturation of the dry substrate surface with water, using fine-grained cortical repair mortars from the **MasterCrete** range;
 - If the substrate shows deterioration with thicknesses to be restored exceeding 1 cm and any exposed reinforcement rods, the latter must be treated with the **MasterCrete** range passivating mortar, while the appropriate **MasterCrete** line product must be used for the volume to be restored, depending on the nature of the work.
- Before applying the **MasterShield PR SYSTEM**, ensure that the substrate is dry and free from dust and any substances that could impair adhesion.

Product preparation

The **MasterShield PRI 210** primer must be prepared by mixing components A and B together using a low-speed resin mixer, in accordance with the mixing ratios specified in this technical data sheet.

If strictly necessary for application purposes, dilution with epoxy resin thinner is permitted, up to a maximum of 8%.

The **MasterShield PR 220** coating must be prepared by mixing components A and B together with a low-speed resin mixer, in accordance with the mixing ratios specified in this technical data sheet; the entire contents of the container must be mixed.

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If applying with a machine, the product may be thinned with a polyurethane resin thinner, up to a maximum of 10%.

System installation

The first stage of the system's application involves applying the primer **MasterShield PRI 210** using a brush, roller or suitable spray equipment, ensuring a minimum dry film thickness of approximately 50 μm and, in any case, a thickness sufficient to ensure adequate absorption by the substrate.

Depending on the conditions at the site, you should wait between 8 and 24 hours before applying the protective coating. In any case, it is recommended that no more than 48 hours elapse between the application of the primer and the first coat of the protective coating **MasterShield PR 220**.

If the **MasterStrength** FRP reinforcement systems are applied within 48 hours of application, there is no need to apply the **MasterShield PRI 210** primer; but the **MasterShield PR 220** coating can be applied directly.

On the substrate described above, apply the **MasterShield PR 220** coating by spraying using a suitable airless system, or by brush or roller, allowing a drying time of between 8 and 24 hours between coats, depending on site conditions.

We recommend applying two coats of the coating until the thickness specified in the design is achieved; this is usually between 200 and 400 μm of dry film, depending on the level of protection required by the design.

Apply the products under environmental conditions with temperatures between +10 °C and +40 °C and relative humidity between 35 % and 75 %.

Cleaning of equipment

To clean tools whilst the product is still fresh, use the appropriate thinners for epoxy resins (primer) and polyurethane (protective coating).

Ageing and maturation

Protect the applied system throughout the curing process from wash-off, dust, excessive draughts and direct sunlight.

Application temperatures

Application environment temperature needs to be between +10°C and +40°C.

Warnings

- Do not apply **MasterShield PR SYSTEM** to surfaces that are overheated, frozen or thawing.
- Protect from rain or any water or other substances seeping in for at least 24 hours after application; however, avoid applying the system if rain or a risk of frost is forecast for the next 24 hours.

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Technical data for MasterShield PRI 210

Product identification data (A+B)	
Consumption	Approximately 0.15 – 0.25 kg/m ² depending on the type of substrate
Appearance	Neutral liquid
Mixing ratio A: B	5: 1
Brookfield viscosity (+25°C, UNI EN ISO 2555)	5500 - 6500 cps
Recoating time (+20 °C, 65% RH)	8-24 hours depending on site conditions
Pot-life (+20°C, UNI EN ISO 9514)	45 minutes
Density (EN ISO 2811-1)	1.5 kg/L ± 0.05
Dry residue (UNI EN ISO 3251)	93% ± 2%
Application temperature	+10°C to +40°C
Time until touch dry at +20°C	3 hours
Recommended minimum thickness	50 µm depending on the type of substrate

Technical data for MasterShield PR 220

Product identification data (A+B)	
Consumption	200 g/m ² per 100 µm of dry film
Appearance	Satin-finished
Mixing ratio A: B	100: 10
Density (EN ISO 2811-1)	1.45 kg/L ± 0.05
Dry residue (UNI EN ISO 3251)	75% ± 2%
Brookfield viscosity (+25°C, UNI EN ISO 2555)	8000 - 10000 cps
Colours	RAL colour chart
Pot-life (+20°C, UNI EN ISO 9514)	180 minutes
Recoating time (+20 °C, 65% RH)	8-10 hours depending on site conditions
Touch-dry (+20°C, UNI EN ISO 1517)	12 – 48 hours
Application temperature	+7°C to +40°C
Category (EN 1504-2)	PI-MC-IR
Recommended thickness	200 µm – 400 µm

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Performance of coating – UNI EN 1504-2

(The performance values shown below are obtained in accordance with UNI EN 1504-2 for a dry thickness of the coating of 200 µm)

Feature	Test method		Regulatory requirement	Product performance
Adhesion to concrete	UNI EN 1542 (MC 0.40 substrate – UNI EN 1766)		≥ 0.8 MPa	> 3.0 MPa
Resistance to freeze-thaw cycles with de-icing salts	UNI EN 1542 after the UNI EN 13687/1 cycles on an MC 0.40-type substrate.		≥ 0.8 MPa	≥ 3.0 MPa
Water permeability as capillary absorption coefficient	EN 1062-3		$W < 0.1 \text{ kg/m}^2\text{h}^{0.5}$	$W < 0.005 \text{ W kg/m}^2\text{h}^{0.5}$ Prevents the ingress of chlorides
Crack bridging	static at +23°C	EN 1062-7	Classes A ₁ , ..., A ₅	Class A1 (0.1–0.25 mm)
	static at -10°C	EN 1062-7	Classes A ₁ , ..., A ₅	Class A1 (0.1–0.25 mm)
	dynamic at +23°C	EN 1062-7	Classes B ₁ ,...B _{4,2}	Class B1
Permeability	Water vapour	EN 7783	Class I, Sd < 5 m Class II, 5 m ≤ Sd ≤ 50 m Class III, Sd > 50 m	Class I, Sd < 1.5 m μ < 7500
	CO ₂	EN 1062-6	Sd > 50 m	Sd > 250 m
Mechanical strength	Impact	UNI EN ISO 6272-1	Class I: 4 N·m Class II: 10 N·m Class III: 20 N·m	Class III
	Abrasion	UNI EN ISO 5470-1	Weight loss < 3000 mg	< 700 mg
UV resistance	UNI EN 1062-11 (2,000 hours of UV exposure)		No bulges or flaking	Specification superseded

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Safety instructions

For guidance on the correct and safe use, transport, storage and disposal of the product, please see the latest Safety Data Sheet (SDS).

Other services

For additional technical information, brochures, references, technical reports and technical assistance please visit www.master-builders-solutions.com/it-it or alternatively contact infomac@masterbuilders.com.

Scan QR code to visit the product page and download the latest version of this technical sheet and any additional documentation.



Disclaimer

Since 16/12/1992, Master Builders Solutions Italia Spa has been operating under a Certified Quality System compliant with the UNI EN ISO 9001 Standard. Furthermore, the Environmental Management System is certified according to the UNI EN ISO 14001 Standard and the Safety Management System is certified according to the UNI ISO 45001 Standard.

For further information, please consult the local Technician of Master Builders Solutions. The technical advice on how to use our products, either written or verbally given, are based on the current state of our scientific and practical expertise, and does not imply the assumption of any guarantee and/or responsibility for the final results of works executed using our products.

Therefore, the customer is not exempted from the exclusive task and responsibility of verifying the suitability of our products for the intended use and purposes. This version supersedes all the previous ones.

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