

MasterShield FLU SYSTEM

Polyurethane protection system with a fluoropolymer-based topcoat, for reinforced concrete structures: primer **MasterShield PRI 410**, coating **MasterShield FLU 420** and topcoat **MasterShield FLU 440**.

Material description

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

- **MasterShield PRI 410**: anti-salt acrylic-siloxane primer with high penetrating power;
- **MasterShield FLU 420**: two-component polyurethane intermediate protective coating;
- **MasterShield FLU 440**: a two-component polyurethane topcoat with a high fluorine content.

The system thus created offers a high level of protection against the ingress of water, chlorides and atmospheric CO₂, and increases the surface resistance to abrasion and scratches. The formulation, with its aliphatic structure and high fluorine content, ensures that the coating remains highly stable and durable over time.

Main uses

The **MasterShield FLU 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:

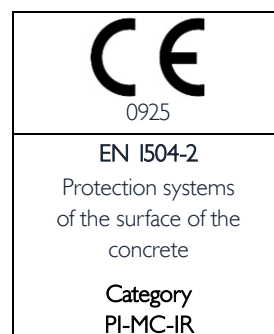
- reinforced concrete structures requiring protection against chlorides (due to contact with seepage water, without permanent contact), such as: bridge decks, abutments, piers and abutments;
- structures made of reinforced concrete with insufficient concrete cover;
- parts of hydraulic structures such 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.
- **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.
- **High durability**, thanks to the high-fluorine content of the topcoat formulation.

In compliance with the European Regulations (EU No. 305/2011 and EU No. (574/2014) the products comprising the system bear the CE marking in accordance with UNI EN ISO4-2 and are accompanied by the relevant Declaration of Performance (DoP).



MasterShield FLU SYSTEM

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Consumption

For all the following consumption figures, please take into account any wastage resulting from site conditions and the type of machinery used to apply the system's products.

MasterShield PRI 410: approximately 0.1–0.2 kg/m², depending on absorption of the substrate.

MasterShield FLU 420: 100 g/m² per 50 µm of dry film to be produced.

Dry film [µm]	Wet film [µm]	Consumption [kg/m ²]
50	95	0.10
100	185	0.20
200	370	0.40

The figures given above are approximate and may vary depending on the colour chosen, as the dry matter content by weight changes accordingly.

It can be diluted with demineralised water or tap water, up to a maximum of 10%.

We recommend a dry film thickness of between 50 µm and 100 µm; the thickness should be determined in accordance with the design requirements.

MasterShield FLU 440: 100 g/m² per 50 µm of dry film to be produced.

Dry film [µm]	Wet film [µm]	Consumption [kg/m ²]
50	80	0.10
100	160	0.20
200	310	0.40

The figures given above are approximate and may vary depending on the colour chosen, as the dry matter content by weight changes accordingly.

It can be diluted with drinking water by 10% for the first coat and by 5–8% for the second coat.

We recommend a dry film thickness of between 50 µm and 100 µm; the thickness should be determined in accordance with the design requirements.

Packaging and storage

MasterShield PRI 410 is available in a 25 kg kit of cans:

MasterShield FLU 420 pigmentato is available in a 14.5 kg kit:

Component A: 12.5 kg bucket.

Component B: 2 kg bucket.

MasterShield FLU 420 trasparente opaco is available in an 11.5 kg kit:

Component A: 10 kg bucket.

Component B: 1.5 kg bucket.

MasterShield FLU 440 pigmented is available in a 22 kg kit:

Component A: 20 kg bucket.

Component B: 2 kg bucket.

MasterShield FLU 440 transparent matt is available in a 12 kg kit:

Component A: 10.5 kg bucket.

Component B: 1.5 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 shelf life of the products is as follows:

- **MasterShield PRI 410:** 12 months.
- **MasterShield FLU 420:** 8 months.
- **MasterShield FLU 440:** 12 months.

MasterShield FLU SYSTEM

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Preparation and method of application

Preparing the substrates

- The concrete surface to be smoothed with **MasterCrete FLU 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 significant 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 FLU SYSTEM**, ensure that the substrate is dry and free from dust and any substances that could impair adhesion.

Product preparation

The **MasterShield PRI 410** primer is ready to use and does not require dilution.

The **MasterShield FLU 420** 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.

It can therefore be diluted with demineralised water or plain drinking water, up to a maximum of 10%.

The **MasterShield FLU 440** topcoat 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.

It can be diluted with drinking water: by 10% for the first coat and by 5–8% for the second coat.

System installation

The first stage in the system consists of applying the primer **MasterShield PRI 410** using a brush, roller or suitable spray equipment, in one or two coats depending on the absorption of the substrate.

Apply **MasterShield PRI 410** in ambient temperatures between +10°C and +35°C.

Depending on the site conditions, you should wait between 8 and 24 hours before applying the next coat. In any case, it is recommended that no more than 4 days elapse between the application of the primer and the first coat of the protective coating **MasterShield FLU 420**.

On the substrate described above, apply the **MasterShield FLU 420** coating by spraying using a suitable airless system, or by brush or roller, allowing a drying time of approximately 24 hours between coats, depending on site conditions.

Apply **MasterShield FLU 420** in ambient temperatures between +10°C and +35°C and, in any case, on surfaces whose temperature is at least 4°C above the dew point.

We recommend applying the coating using an airless spray system to achieve a dry film thickness of between 50 and 100 µm, depending on the level of protection required by the design.

MasterShield FLU SYSTEM

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Depending on the conditions at the site, you should wait approximately 24 hours before applying the top coat. In any case, it is recommended that no more than three days elapse between the application of the intermediate protective coating and the topcoat **MasterShield FLU 440**.

Once the substrate has been prepared as described above, apply the **MasterShield FLU 440** topcoat using a suitable airless spray system, a brush or a roller, allowing approximately 24 hours to elapse between coats, depending on the site conditions.

Apply **MasterShield FLU 440** in ambient conditions where the temperature is between +7°C and +35°C and the relative humidity is between 35% and 70%.

We recommend applying the coating using an airless spray system to achieve a dry film thickness of between 50 and 100 µm, depending on the level of protection required by the design.

If the transparent version of the **MasterShield FLU SYSTEM** is to be used, a test area must be created in order to assess the visual result on the existing substrate to be treated.

Cleaning of equipment

For all products comprising the **MasterShield FLU SYSTEM**, tools can be cleaned with water while the product is still wet.

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 +7°C and +35°C.

Warnings

- Do not apply **MasterShield FLU 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.

Technical data for MasterShield PRI 410

Product identification data	
Consumption	Approximately 100 - 200 g/m ² depending on the type of substrate
Appearance	Milky white
Dust-free (20°C and 65% RH)	About 2 hours
Recoating time (+20 °C, 65% RH)	8 hours – 4 days depending on site conditions
Density (EN ISO 2811-1)	1.05 kg/L ± 0.05
Dry residue (UNI EN ISO 3251)	12% ± 1%
Application temperature	+10°C to +35°C
Category (EN 1504-2)	PI-MC-IR
Recommended minimum thickness	50 µm depending on the type of substrate

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Technical data for MasterShield FLU 420

Product identification data (A+B)	
Consumption	80-200 g/m ² Varies depending on the level of protection required
Appearance	Glossy or Matt
Available colours	Clear or RAL colour
Mixing ratio A:B	100: 16 for the colour version 100 : 20 for the transparent version
Specific weight of Comp. A (EN ISO 2811-1)	1.08 kg/L ± 0.05
Specific weight of Comp. B (EN ISO 2811-1)	1.15 kg/L ± 0.05
Dry residue (UNI EN ISO 3251)	50%-60% Varies depending on the colour chosen
Brookfield viscosity (+25°C, UNI EN ISO 2555)	1600 - 2400 cps
Dust-free (20°C and 65% RH)	About 2 hours
Recoating time (+20 °C, 65% RH)	24 hours – 3 days depending on site conditions
Application temperature	+7°C to +35°C
Category (EN 1504-2)	PI-MC-IR
Recommended thickness	40 µm – 100 µm Varies depending on the level of protection required

Technical data for MasterShield FLU 440

Product identification data (A+B)	
Consumption	80-200 g/m ² Varies depending on the level of protection required
Appearance	Transparent version: Matt Pigmented version: Matt / Satin
Available colours	Clear or RAL colour range
Mixing ratio A:B	100: 10 for the colour version 100 : 14 for clear matt version
Specific weight of Comp. A (EN ISO 2811-1)	1.3 kg/L ± 0.05
Specific weight of Comp. B (EN ISO 2811-1)	1.15 kg/L ± 0.05
Dry residue (UNI EN ISO 3251)	65% ± 2%
Brookfield viscosity (+25°C, UNI EN ISO 2555)	6500 - 8500 cps
Dust-free (20°C and 65% RH)	About 2 hours

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Recoating time (+20 °C, 65% RH)	24 hours – 4 days depending on site conditions
Fluoride content	15 %
Application temperature	+7°C to +35°C
Category (EN 1504-2)	PI-MC-IR
Recommended thickness	40 µm – 100 µm Varies depending on the level of protection required

Performance of MasterShield PRI 410 primer – 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 100 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
Water permeability as capillary absorption coefficient	EN 1062-3	$W < 0.1 \text{ kg/m}^2\text{h}^{0.5}$	$W < 0.01 \text{ W kg/m}^2\text{h}^{0.5}$ Prevents the ingress of chlorides
CO ₂ permeability	EN 1062-6	$S_d > 50 \text{ m}$	$S_d > 70 \text{ m}$

Performance of MasterShield FLU 420 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	> 0.8 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	≥ 0.8 MPa
Water permeability as capillary absorption coefficient	EN 1062-3		$W < 0.1 \text{ kg/m}^2\text{h}^{0.5}$	$W < 0.001 \text{ W kg/m}^2\text{h}^{0.5}$ Prevents the ingress of chlorides
Permeability	Water vapour	EN 7783	Class I, $S_d < 5 \text{ m}$ Class II, $5 \text{ m} \leq S_d \leq 50 \text{ m}$ Class III, $S_d > 50 \text{ m}$	Class I, $S_d < 1.6 \text{ m}$ $\mu < 8000$
	CO ₂	EN 1062-6	$S_d > 50 \text{ m}$	$S_d > 750 \text{ m}$ $\mu > 3.75 \times 10^6$

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Performance of MasterShield FLU 440 finish – 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	> 0.8 MPa
Resistance to freeze-thaw cycles with de-icing salts	UNI EN 1542 after the UNI EN 13687/I cycles on an MC 0.40-type substrate.		≥ 0.8 MPa	≥ 0.8 MPa
Water permeability as capillary absorption coefficient	EN 1062-3		$W < 0.1 \text{ kg/m}^2\text{h}^{0.5}$	$W < 0.001 \text{ W kg/m}^2\text{h}^{0.5}$ Prevents the ingress of chlorides
Permeability	Water vapour	EN 7783	Class I, $S_d < 5 \text{ m}$ Class II, $5 \text{ m} \leq S_d \leq 50 \text{ m}$ Class III, $S_d > 50 \text{ m}$	Class I, $S_d < 1.5 \text{ m}$ $\mu < 7500$
	CO ₂	EN 1062-6	$S_d > 50 \text{ m}$	$S_d > 680 \text{ m}$ $\mu > 3.40 \times 10^6$

Performance of MasterShield FLU SYSTEM

(The performance values shown below are obtained in accordance with UNI EN 1504-2 for a total dry thickness of 120 µm)

Feature	Test method		Regulatory requirement	Product performance
Adhesion to concrete	UNI EN 1542 (MC 0.40 substrate – UNI EN 1766)		≥ 0.8 MPa	> 0.8 MPa
Resistance to freeze-thaw cycles with de-icing salts	UNI EN 1542 after the UNI EN 13687/I cycles on an MC 0.40-type substrate.		≥ 0.8 MPa	≥ 0.8 MPa
Water permeability as capillary absorption coefficient	EN 1062-3		$W < 0.1 \text{ kg/m}^2\text{h}^{0.5}$	$W < 0.001 \text{ W kg/m}^2\text{h}^{0.5}$ Prevents the ingress of chlorides
Permeability of coatings	Water vapour	EN 7783	Class I, $S_d < 5 \text{ m}$ Class II, $5 \text{ m} \leq S_d \leq 50 \text{ m}$ Class III, $S_d > 50 \text{ m}$	Class I, $S_d < 1.5 \text{ m}$
	CO ₂	EN 1062-6	$S_d > 50 \text{ m}$	$S_d > 650 \text{ m}$

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primer **MasterShield PRI 410**, coating **MasterShield FLU 420** and topcoat **MasterShield FLU 440**.

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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