

# MasterShield CI 8600PEL

Dual phase advanced organofunctional silane-based corrosion inhibitor

## Material Description

**MasterShield CI 8600PEL** is a single component, ready to use, low viscosity, clear liquid, that combines the power of almost 100% reactive, dual-function silane-based penetrating corrosion inhibitor, with an advanced corrosion inhibitor technology, to mitigate electrochemical corrosion of reinforcing steel in new or aged concrete.

**MasterShield CI 8600PEL** is an organofunctional silane corrosion protection system particularly developed for very dense reinforced concrete surfaces.

## Areas of Application

**MasterShield CI 8600PEL** is sprayed directly onto the surface of all uncoated steel reinforced concrete structures and buildings for quickly and deeply penetration into the concrete.

**MasterShield CI 8600PEL** has a unique and effective mechanism of action consisting of two sub-mechanism:

- The organofunctional silane reacts with the components of the concrete, developing hydrophobic properties to reduce ingress of water and pollutants such as chloride ions dissolved in it.
- It also bonds to the surface of the steel reinforcement, helping to rebuild the protective passivating layer on the steel surface.

This proven technology not only has no impact on the adhesion of subsequent coatings but also enhance the adhesion.

**MasterShield CI 8600PEL** is used as part of an overall repair strategy using MasterCrete repair systems to mitigate corrosion of the embedded reinforcing steel and significantly reduce the possibility of ring or incipient anode induced corrosion of the reinforcing steel.

Corrosion protection with **MasterShield CI 8600PEL** is scientifically proven and does not only improve the longevity and durability of new structures, but it can also significantly reduce the corrosion in existing old concrete structures.

It is highly reactive and resistant to alkaline environment and particularly suited for the protection of:

- Steel reinforced concrete, including cast-in place, precast, pre-stressed and post tensioned
- Building facades and balconies, parking structures, pedestrian walks, bridge decks and supporting elements (beams, columns, etc.), concrete docks and piers
- Marine and other high humidity environments not subject to hydrostatic pressure
- External surfaces of concrete water structures such as tanks, dams, spillways and culverts
- Steel-reinforced concrete exposed to de-icing salts or salt water/chloride environments

## Characteristics & Benefits

- Prevents ingress of water borne contaminants - dramatically reduces chloride and carbonation induced corrosion of steel reinforcement.
- Reinstates the passive layer on the outer layers of the reinforcing steel - increases resistance of steel to attack by chlorides already present in the structure. Works at the molecular level to effectively inhibit macrocell (rebar to rebar) and microcell (on the same rebar) corrosion.
- Proven long term effectiveness - global references in service for more than 30 years.
- Equally effective in high humidity conditions
- Chemically bonds to steel, cement paste and other siliceous material – will not wash or leach out during wetting / drying cycles, ensuring extended active life.
- Does not discolour or change appearance of concrete – suitable for use on architectural concrete.
- Breathable - Forms colorless and water vapour permeable impregnation. Allows vapour to leave structure but prevents ingress of liquid water.
- Equalizes in electrochemical potential between repaired section and existing concrete when applied to concrete structures repaired with polymer cementitious mortars
- Meets the requirements of EN 1504-2 and can be used according to principles 1, 2, 8 and 11 of EN 1504-9



## Properties

<b>Colour</b>	Clear to slightly amber
<b>Chemical base</b>	Silane
<b>Density DIN 51757</b>	0.88 g/cm <sup>3</sup>
<b>pH value</b>	10-11
<b>Flash Point</b>	63°C
<b>Viscosity DIN53015</b>	0.95 mPa.s (20°C)
<b>Active Ingredient</b>	≥ 98.9 % (wt)

## Technical Data

MasterShield CI 8600PEL meets all the requirements of EN 1504-2:2004.

<b>Depth of penetration</b>	EN 1504-2 Table 3	≥ 10 mm (Class II)
<b>Water absorption and alkali resistance</b> -Compared with the untreated specimen -After immersion in alkali solution	EN 13580	< 7.5 % < 10 %
<b>Drying rate for hydrophobic impregnation</b>	EN 13579	≥ 10 % (Class II)
<b>Loss of mass after freeze-thaw salt stress</b>	EN 13581	Pass
<b>Application temperature (ambient and substrate)</b>		-5 to +40°C

### Test Method:

U.S. Federal Highways Administration Test protocol for cracked Beam Concrete.

MasterShield CI 8600PEL was sprayed at the approved application rate onto standard test specimens where the concrete (W/C ratio 0.47) had been deliberately cracked along the length of the reinforcing steel to simulate real life experiences of transverse bridge deck cracking.

The specimens were then subject to the following rigorous conditions: 48 weeks cyclic salt water ponding (15% salt solution) whilst maintaining a relative humidity of 70-80% at a temperature of 37°C. The results are summarised below:

Specimen conditioning	Observed results compared with untreated control specimens
Cracked concrete: NO pre-existing corrosion	99% reduction in corrosion
Cracked concrete WITH existing corrosion	92% reduction in corrosion

## Chloride ingress measured in accordance with ASTM I 152 (% by mass concrete)

Sample Depth (mm)	Control			MasterShield CI 8600PEL treated		
	12 weeks	24 weeks	48 weeks	12 weeks	24 weeks	48 weeks
12.5	0.703	0.861	1.020	<0.007	0.010	<0.007
32.0	0.321	0.628	0.645	<0.007	<0.007	<0.007
50.0	0.032	0.386	0.514	<0.007	<0.007	<0.007
69.0	<0.007	0.040	0.259	<0.007	<0.007	<0.007

## Application

### Preparation of Substrate

Concrete surfaces must be dry and cleaned to remove all traces of mould oil, curing compounds, dirt, dust, efflorescence, mold, algae, grease, oil asphalt, paint, lacquers, or other coatings or any other materials that would prevent penetration. Acceptable cleaning methods include shotblasting, high pressure water blasting, or grinding.

All delaminated, loose or spalled concrete must be removed and repaired with an approved product from the MasterCrete concrete repair range.

MasterShield CI 8600PEL can, as an additional protective measure, be applied directly to exposed rebar before repair work commences.

Non-moving shallow shrinkage cracks are treated with multiple coats of MasterShield CI 8600PEL.

Other cracks or failed joint sealants should be routed clean and treated with MasterShield CI 8600PEL before being filled with suitable joint sealant from the MasterJoint range. MasterShield CI 8600PEL does not affect the adhesion of most sealants to concrete.

### Application

Apply MasterShield CI 8600PEL to the entire surface to be protected, including any repaired areas, using low-pressure spray equipment with a suitable fan nozzle.

Alternate methods include roller, brush or pouring (e.g. into a crack).

**Note: MasterShield CI 8600PEL should not be atomized.**

To achieve the desired effect, apply several consecutive coats of MasterShield CI 8600PEL to reach a minimum consumption rate of 500g/m<sup>2</sup> (≈570ml/m<sup>2</sup>). Depending on the substrate's absorption capacity, more than three coats may be necessary to meet the required consumption rate. Please refer to the coverage table for more details. Allow a minimum of 15 minutes between coats (or until visibly dry).

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A liquid film of **MasterShield CI 8600PEL** must remain in contact with the substrate for several seconds. Horizontal surfaces should have a shiny, wet appearance for 3-5 seconds. Vertical surfaces should exhibit a 30-50 cm shiny curtain of liquid.

As surfaces in tidal or splash zones should dry as long as possible before **MasterShield CI 8600PEL** is applied. As the substrate will still be wet, the ability to absorb is reduced; so **MasterShield CI 8600PEL** has to be applied in several coats (6 coats or more) in order to achieve the required amount of corrosion inhibitor inside the treated concrete.

Proper application conditions are between -5°C to 40°C.

Do not apply if rain is expected within four hours of following application, or if high winds or other conditions prevent proper application. Allow concrete surfaces to dry for between 24 and 72 hours after heavy rain or cleaning with water before applying **MasterShield CI 8600PEL**.

Do not alter or dilute the material as supplied.

Applied sealants should be fully cured before **MasterShield CI 8600PEL** is applied.

## Coverage

Concrete Substrate	Application rate per coat	Total Application rate
above water level	180-250 g/m <sup>2</sup> (205-275 ml/m <sup>2</sup> ) Per coat	Min 500 g/m <sup>2</sup> (>570 ml/m <sup>2</sup> ) in 2-3 coats
In tidal or splash zone	100-150 g/m <sup>2</sup> (114-170 ml/m <sup>2</sup> ) Per coat	>600 g/m <sup>2</sup> (>682 ml/m <sup>2</sup> ) in 5-6 coats

## Packaging

**MasterShield CI 8600PEL** is available in 20 or 205 litre drums.

## Storage & Shelf Life

**MasterShield CI 8600PEL** should be stored temperatures between -10°C and 40°C for a period of 12 months if stored in originally sealed containers. Keep containers closed when not in use and away from naked flames, heat sources and sparks.

For the full health and safety hazard information and how to safely handle and use this product, make sure that you obtain a copy of the Safety Data Sheet (SDS) from our office or website.

## Specification Clause

**Surface-applied concrete steel reinforcement corrosion inhibitors.**

Corrosion inhibitor shall be furnished and applied to concrete surfaces according to the manufacture's instructions and as specified herein.

A qualified product must comply with the specifications and standards of Table 1 (Properties) and Table 2 (Technical Data), except as otherwise specified.

Must increase the resistance of chloride ions using AASHTO T277 "Rapid Determination of the Chloride Permeability of Concrete" by minimum 90% .

Must reduce corrosion by 90% or greater using FHWA RD-98-153 test protocol on crack slab black bars subjected to 48 weeks of cyclic salt water ponding.

Must reduce corrosion by 80% when the presence of Chlorides is over 0.092 gr/cm<sup>3</sup> of concrete at the top level of reinforcing steel.

NOTE: All testing must be performed by an independent laboratory.

Product shall be applied as supplied by the manufacturer without dilution or alternation. Consumption and coverage rate as Table 3 (Coverage)



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## Disclaimer

MasterShield-CI-8600-PEL-ANZ-V3-1024

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