



Mapecfloor I 309 CR

Two-component epoxy formulate with very low emissions for coating floors in cleanrooms



WHERE TO USE

Mapecfloor I 309 CR is a two-component, coloured epoxy formulate with high solid content used to form a smooth, self-levelling coating on industrial floors. Once hardened, **Mapecfloor I 309 CR** is characterised by the very low level of micro-particles and volatile organic compounds (VOC) it releases into the air. This characteristic makes it ideal for coating floors in areas such as cleanrooms, where a very high standard of hygiene is required and the size and concentration of dust particles and micro-particles need to be monitored. In fact, thanks to **Mapecfloor I 309 CR**, it is possible to maintain a tight control on potential biological and physical pollutants that could affect processes in various sectors of industry, such as:

- foodstuffs;
- electronics;
- hospitals and operating theatres;
- optics;
- nano-technology;
- pharmaceutical, etc.

TECHNICAL CHARACTERISTICS

Mapecfloor I 309 CR is a two-component, fillerized epoxy resin-based formulate with high solid content according to a formula developed in the MAPEI R&D laboratories.

Mapecfloor I 309 CR is used to form seamless, self-levelling coatings specific for cleanrooms with class ISO 2 particle emissions and VOC emissions lower than class -9.6 according to ISO 14644-8, and

with good resistance to microorganisms according to ISO 846.

Mapecfloor I 309 CR is also characterised by its good mechanical strength and good resistance to chemicals and abrasion.

EN 13813 (*"Screed material and floor screeds - Screed material - Properties and requirements"*), which specifies the requirements for screed materials used for internal floors.

Mapecfloor I 309 CR responds to 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. General principles for the use of products and systems"*), and the minimum requirements of EN 1504-2 (*"Surface protection systems for concrete"*) for class: products for protecting surfaces – coating (C) – protection against the risk of penetration (1.3) protection against ingress (PI) + moisture control (MC) + increasing resistivity by limiting moisture content (IR).

COLOURS

Mapecfloor I 309 CR is supplied ready-tinted. For the full range of colours available please contact Head Office.

RECOMMENDATIONS

- Do not apply **Mapecfloor I 309 CR** on damp substrates or on substrates with capillary rising damp (contact MAPEI Technical Services Department).

Mapecfloor I 309 CR

- Do not dilute **Mapecfloor I 309 CR** with solvent or water.
- Do not apply **Mapecfloor I 309 CR** on dusty or crumbling substrates.
- Do not apply **Mapecfloor I 309 CR** on substrates with oil or grease stains or dirt in general.
- Only apply **Mapecfloor I 309 CR** on substrates treated with **Primer SN** and which have been prepared according to specification.
- Do not mix partial quantities of the components to avoid mixing errors; the product may not harden correctly.
- Do not expose the mixed product to sources of heat.
- Coatings made from **Mapecfloor I 309 CR** may change colour or fade if exposed to sunlight but this has no effect on the performance characteristics of the coating.
- The coating may also change colour if it comes into contact with aggressive chemicals. A change in colour, however, does not mean it has been damaged by the chemical.
- If rooms where the product is being used need to be warmed up, do not use heaters that burn fossil fuels, otherwise the carbon dioxide and water vapour given off into the air will affect the shine on the coating and ruin its appearance. Use electric heaters only.
- Remove aggressive chemicals as soon as possible after they come into contact with **Mapecfloor I 309 CR**.
- Use suitable specific cleaning equipment and detergent to clean the coating, depending on the type of dirt or stain to be removed.
- Protect the product from water for at least 24 hours after application.
- Do not apply the product directly on substrates with moisture content higher than 4% and/or with capillary rising damp (check by testing it with a sheet of polythene).
- The temperature of the substrate must be at least 3°C above the dew-point temperature.

APPLICATION PROCEDURE

Preparation of the substrate

The surface of concrete floors must be dry, clean and sound and have no crumbling or detached areas. The compressive strength of the concrete used for the substrate must be at least 25 N/mm² and its tensile strength must be at least 1.5 N/mm². The strength of the substrate must also be suitable for its final use and the types of load to which it will be subjected.

The moisture content must be max. 4% and there must be no capillary rising damp (check by testing it with a sheet of polythene).

The surface of the floor to be treated must be prepared with a suitable mechanical process (e.g. shot-blasting or grinding with a diamond disk), to remove all traces of dirt and cement laitance and crumbling or detached portions, and to make the surface slightly rough and absorbent. Before applying the product remove all dust from the surface with a vacuum cleaner.

Any cracks must be repaired by filling them with **Eporip**, while any deteriorated areas in the concrete must be repaired with **Mapecfloor EP19**, epoxy mortar.

Remove all the dust with a vacuum cleaner before applying **Mapecfloor I 309 CR**.

Application of Primer SN

Apply **Primer SN** as is or mixed with **Quartz 0.5** with a straight trowel or rake on the substrate after it has been prepared as specified. Immediately after applying **Primer SN**, lightly broadcast the surface while still wet with **Quartz 0.5** at a rate of 0.5 kg/m²; we advise against exceeding this consumption rate. Make sure there are no open pores on the surface of the substrate, otherwise air bubbles could escape and form small craters or pinholes in the self-levelling finishing coat. If there are holes or open pores in the substrate fill them with **Eporip** or **Primer SN** with the addition of **Additix PE** in order to obtain a thixotropic mix.

Preparation of the product

The two components which make up **Mapecfloor I 309 CR** must be mixed together just before application.

Mix component A thoroughly and add the contents of component B. Add around 30% by weight of **Quartz 0.25** and mix again with a low-speed electric mixer to prevent entraining air into the mix (300-400 revs/min.), for at least 2 minutes until the mix is completely blended.

Pour the mix into a clean container and briefly mix again.

Do not mix the product for too long to avoid entraining too much air into the mix.

Apply the mix within the pot life indicated in the data table (refers to a temperature of +20°C). Higher surrounding temperatures will reduce its pot life, while lower temperatures will increase its pot life.

Application of the product

Pour **Mapecfloor I 309 CR** on the surface of the floor and spread it out evenly with a straight or notched trowel (with "V" shaped notches). Using a notched trowel allows the thickness of the layer and the consumption rate of the product to be controlled more easily.

Back-roll with a spike-roller several times while the product is still wet to even out the thickness of the coating and to remove any air entrained into the product during mixing.

TECHNICAL DATA (typical values)

PRODUCT IDENTITY

| | component A | component B |
|-------------------------------|-------------------------------|-----------------------------|
| Colour: | RAL colour | straw yellow |
| Consistency: | liquid | liquid |
| Density (g/cm ³): | 1.52 | 1 |
| Viscosity at +23°C (mPa·s): | 5500 ÷ 7000 (# 5 - 20 rpm) | 350 ÷ 650 (# 3 - 20 rpm) |

APPLICATION DATA (at +23°C and 50% R.H.)

| | |
|--------------------------------------|--|
| Mixing ratio: | comp. A : comp. B = 100 : 22 parts in weight |
| Colour of mix: | coloured |
| Consistency of mix: | viscous |
| Viscosity of mix at +23°C (mPa·s): | 1500 ± 200 (# 3 - 20 rpm) |
| Density of mix (kg/m ³): | 1,400 |
| Workability time at +20°C: | 30 mins. |
| Application temperature: | +8°C to +35°C |

FINAL PERFORMANCE

| | |
|--|---------------------------------|
| Hardening time at +23°C and 50% R.H.: – dust dry: – set to foot traffic: – complete hardening time: | 3-5 hours 24 hours 7 days |
| The times above are for indication purposes only and are influenced by actual site conditions (e.g. temperature of the surroundings and substrate, relative humidity of the surrounding air, etc.) | |
| Shore D hardness (DIN 53505) after 7 days at +23°C and 50% R.H.: | 77 |
| Compressive strength after 7 days (EN 196-1) (N/mm ²): | 53 |
| Flexural strength after 7 days (EN 196-1) (N/mm ²): | 22 |

| Essential characteristic | Test method | Requirements according to EN 13813 for synthetic resin-based screeds | Performance of product |
|--------------------------|------------------|--|------------------------|
| BCA wear resistance: | EN 13892-4 | ≤ 100 µm | < 5 µm |
| Adhesion strength: | EN 13892-8; 2004 | ≥ 1.5 N/mm ² | 3,80 N/mm ² |
| Impact strength: | EN ISO 6272 | ≥ 4 Nm | 20 Nm |
| Reaction to fire: | EN 13501-1 | from A1 _{FL} to F _{FL} | B _{FL} -s1 |

PERFORMANCE CHARACTERISTICS FOR CE CERTIFICATION ACCORDING TO EN 1504-2 – TAB. ZA 1.E.1d and ZA.1e - ZA.1f - ZA.1g - (coating C, principles PI-MC-IR-PR-RC)

| Essential characteristic | Test method according to EN 1504-2 | Requirements | Performance of product |
|---|--|--|---|
| Abrasion resistance (TABER test) Note: testing methods for flooring systems according to EN 13813 are also acceptable: | EN ISO 5470-1 | Loss in weight less than 3000 mg with an H22 abrasive disk/1,000 cycles/1,000 g load | 812 mg |
| Permeability to CO ₂ : | EN 1062-6 (test samples treated according to EN 1062-11) | Permeability to CO ₂ S _D > 50 m | S _D 914 m |
| Permeability to water vapour: | EN ISO 7783 | Class I: S _D < 5 m (permeable to water vapour) Class II: 5m < S _D < 50 m Class III: S _D > 50 m (not (permeable to water vapour)) | Class III |
| Capillary absorption and permeability to water: | EN 1062-3 | w < 0.1 kg/m ² ·h ^{0.5} | 0.002 kg/m ² ·h ^{0.5} |
| Impact strength measured on MC (0.40) coated concrete samples according to EN 1766. Note: the design 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 |
| Direct traction adherence test. Reference substrate: MC (0.40) as specified in EN 1766, curing time: – 28 days for one-components systems containing concrete and PCC systems: – 7 days for reactive resin systems: | EN 1542 | Average (N/mm ²) Cracking or flexible systems: without traffic: ≥ 0.8 (0.5) ^{b)} with traffic: ≥ 1.5 (1.0) ^{b)} Rigid systems ^{c)} : without traffic: ≥ 1.0 (0.7) ^{b)} with traffic: > 2.0 (1.0) ^{b)} | 3.78 MPa |

PERFORMANCE CHARACTERISTICS FOR CE CERTIFICATION ACCORDING TO EN 1504-2 – TAB. ZA 1.E.1d and ZA.1e - ZA.1f - ZA.1g - (coating C, principles PI-MC-IR-PR-RC)

| Performance characteristic | Test method according to EN 1504-2 | Requirements | Performance of product |
|--|------------------------------------|---|--|
| Resistance to thermal shock (1x) | EN 13687-5 | ≥ 2 MPa | 4.45 MPa |
| 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 types of the most commonly-used 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 coating material from immersion in the test liquid | Group 1: class II Group 4: class I Group 5a: class I Group 10: class II Group 11: class II Group 12: class II |
| Reaction to fire: | EN 13501-1 | Euroclass | B _{FL} - s1 |

CLEANROOM TESTING (CSM standard)

| Performance characteristic | Test method | Test parameters | Classification |
|---|-------------|--|--------------------------------------|
| Concentration of airborne particles from the material when subjected to friction: | ISO 14644-1 | vs. PA6 Normal force: 300 N | ISO Class: 2 |
| Evaluation of volatile organic compound (VOC) emissions at +23°C and +90°C: | ISO 14644-8 | from class 0 (high concentration of VOC, equal to 1 g/m ³) to -12 (VOC emissions equal to 10 ⁻¹² g/m ³ or 0.001 ng/m ³) | ISO-ACC _m Class < -9.6 |

In particular, the amount of sand added to **Primer SN** may vary according to the surrounding temperature. The amount required may be less at low temperatures and more at high temperatures.

CONSUMPTION

Smooth self-levelling coat - average thickness 2 mm

1° coat:

Primer SN (A+B): 0.7 kg/m²

Quartz 0.5: 0.14 kg/m²

Broadcast on wet primer:

Quartz 0.5 0.5 kg/m²

Finish:

Mapefloor I 309 CR

(A+B): 2.3 kg/m²

Quartz 0.25 0.7 kg/m²

The consumption rates above are theoretical and are influenced by the condition of the surface to be treated, absorbency, roughness, the actual conditions on site, etc.

Cleaning tools

Clean tools used to prepare and apply **Mapefloor I 309 CR** with ethanol or thinners immediately after use. Once hardened, the product may only be removed using mechanical means.

PACKAGING

19.5 kg kits:

– component A = 16 kg;

– component B = 3.50 kg.

STORAGE

24 months in its original packaging in a dry place at a temperature of +5°C to +35°C.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Mapefloor I 309 CR component A is irritant for the skin and the eyes. Both components A and B may cause sensitisation if they come in contact with the skin of those predisposed. **Mapefloor I 309 CR** component B is corrosive and may cause burns and damage to the eyes. The product contains low molecular weight epoxy resins that may cause sensitisation if cross-contamination occurs with other epoxy compounds.

During use wear protective gloves and goggles and take the usual precautions for handling of chemicals. If the product comes in contact with the eyes or skin wash immediately with plenty of water and seek medical attention.

When the product reacts it generates considerable heat. After mixing components A and B, we recommend applying the product as soon as possible and to never leave the container unguarded until it is completely empty.

Mapefloor I 309 CR component A is also hazardous for aquatic life. Do not dispose of this product in the environment.

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

PRODUCT 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

LEGAL NOTICE

The contents of this Technical Data Sheet ("TDS") may be copied into another project-related document, but the resulting document shall not supplement or replace requirements per the TDS in effect at the time of the MAPEI product installation. For the most up-to-date TDS and warranty information, please visit our website at www.mapei.com. ANY ALTERATIONS TO THE WORDING OR REQUIREMENTS CONTAINED IN OR DERIVED FROM THIS TDS SHALL VOID ALL RELATED MAPEI WARRANTIES.

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

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