# MAPEFLOOR I 357 ESD

**Two-component, self-leveling epoxy formulation for electrically conductive resin systems in compliance with ESD standards**


## DESCRIPTION

**Mapefloor I 357 ESD** is a two-component, high solid content, pigmented, self-levelling epoxy resin-based product containing electrically-conductive fillers according to a formula developed in the MAPEI R&D laboratories.
**Mapefloor I 357 ESD** is used to create smooth, electrically conductive resin systems according to ESD standards, watertight, with good chemical and mechanical resistance, on concrete floors and cement-based screeds, including those exposed to medium to heavy traffic.

## TECHNICAL CHARACTERISTICS

- electrically conductive;
- good chemical resistance;
- good wear resistance;
- impermeable to water and liquids in general;
- dustproof;
- fulfils the requirements of DIN EN 61340-4-1 and DIN EN IEC 61340-4-5;
- meets the ANSI/ESD S20.20 requirements;
- complies with the requirements of EN 13813 “Screed material and floor screeds - Screed material - Properties and requirements”, which specifies the requirements for screed materials used in the construction of internal floors.
- suitable for seamless resin systems specific for cleanrooms for VOC/SVOC emission according to ISO 14644-8, antibacterial activity according to ISO 22196, chemical resistance according to ISO 2812-1 and Riboflavin test of cleaning validation according to ISO 4628-1.

## ADVANTAGES

- ease of cleaning of treated surfaces;

- sanitizable;
- ease of maintenance;
- fast return to service of the system.

## WHERE TO USE

**Mapefloor I 357 ESD** is mainly used to make electro-conductive resin systems for concrete and cementitious floors in general, according to ESD standards in environments such as:

- electronic industries;
- chemical and pharmaceutical industries;
- laboratories;
- hospitals and operating theatres;
- automotive and aerospace industries;
- sterile environments.

## COLOURS

**Mapefloor I 357 ESD** is supplied in various RAL colours. For the full range of colours available, please contact the Head Office.

## RECOMMENDATIONS

- The moisture content in the substrate must be maximum 4% and there must be no capillary rising damp.
- **Mapefloor I 357 ESD** is applied on substrates after treating their surface with **Primer W-AS N**, a special two-component water-based epoxy primer for electrically conductive systems. Make sure the film of **Primer W-AS N** has completely hardened before applying **Mapefloor I 357 ESD**.
- Before applying **Mapefloor I 357 ESD**, check the electrical conductivity of the surface of **Primer W-AS N**.
- Do not apply **Mapefloor I 357 ESD** on dusty or crumbly substrates or that have not been prepared as specified and primed.
- Do not apply **Mapefloor I 357 ESD** on substrates with oil or grease stains or dirt in general.
- **Mapefloor I 357 ESD** contains special, electrically-conductive fibres which may produce colour or surface unevenness, but this will have no effect on the final performance of the product.
- Do not dilute **Mapefloor I 357 ESD** with solvent or water.
- 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.
- The surfaces of systems made with **Mapefloor I 357 ESD** may change colour if exposed to UV rays, but this has no effect on their performance.
- The surface colour may also change in case of contact with aggressive chemicals. A change in colour, however, does not mean that the resin system has been damaged by the chemical.
- Remove aggressive chemicals as soon as possible if they come into contact with **Mapefloor I 357 ESD**.
- 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 of the finish and its appearance. Use electric heaters only.
- Protect the product from water for at least 24 hours after application.
- The temperature of the substrate during application and hardening process must be at least 3°C higher than the dew point. The relative humidity of the air must be max. 80%.
- Use suitable specific cleaning equipment and detergent to clean the resin system, depending on the type of dirt or stain to be removed.
- The consumption of **Mapefloor I 357 ESD** should never exceed 2.5 kg/m² to avoid compromising the characteristic of the system.

# 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 concrete substrates must be at least 25 N/mm² and their tensile strength must be at least 1.5 N/mm². The substrate must also be strong enough for its final intended use and to withstand the types of loads acting on the floor. The moisture content in the substrate must be maximum 4% and there must be no capillary rising damp. The surface of the floor must be prepared with a suitable mechanical process (e.g. shot-blasting or grinding with a diamond disc) to remove all traces of dirt, cement laitance and crumbling or detached portions and to make the surface slightly rough and absorbent. Before applying the product, thoroughly remove all dust on the surface by vacuum.
Any defects present in the surface, such as holes, pitting, cracking, etc., must be repaired, for example, with **Primer SN** fillerized with quartz sand or thickened with **Additix PE**, or with **Mapefloor JA** or **Mapefloor JA Fast** depending on the width and depth of the defects or cracks. To repair highly deteriorated areas and joints, fill large hollows and to create or slightly modify the slope in confined areas, use **Mapefloor EP19**, pre-dosed, three-component epoxy mortar.

## Application of Primer SN

Apply an even coat of **Primer SN** mixed with **Quartz 0.5** on the substrate with a straight trowel or rake after it has been prepared accordingly. Do not broadcast the surface of the primer with quartz sand. Make sure there are no open pores in the surface of the substrate, otherwise air could escape and form small craters or pinholes in the self-levelling layer.If there are any holes or open pores in the substrate, apply a second skim coat of **Primer SN.**
When **Primer SN** has hardened, sand the surface and apply a further coat of **Primer SN** neat, using a roller.

## Application of Copper Band and Primer W-AS N

The special, self-adhesive, electrically conductive **Copper Band** strips must be placed on **Primer SN**, once hardened. The number and position of the strips depend on the shape of the surface to be coated, the presence of any joints, drainage channels, pillars, etc. and, in any case, they must be positioned minimum every 80 m² (approx. a circular area with 5 m radius). The strips can be positioned close to a wall, pillar, vertical surface, etc. by placing a 1-1.5 metre long piece on the floor surface and then folding it up over the vertical surface for at least 50 cm. Take great care when handling and folding the copper strips along the wall, otherwise they may be torn or permanently damaged. Once the resin system has been applied, the free ends of the strips must be earthed by a qualified electrician.
Once the copper strips have been positioned, apply by roller a coat of water-based electrically conductive **Primer W-AS N**, over the entire surface.
After 24 hours, when the product has cured and an even matt black finish has been achieved, the electrical resistance should be measured. The resistance to earth $R_E$ value must be $<3 \times 10^3$ Ω using 10 V.
Apply **Mapefloor I 357 ESD** only after having applied and checked the conductivity of **Primer W-AS N**.
Before applying **Mapefloor I 357 ESD**, remove all traces of dust from the surface by vacuum.
For further details regarding the preparation and application of **Primer SN** and **Primer W-AS N**, refer to the relevant Technical Data Sheets.

## Preparation of the product

Stir component A thoroughly with a low-speed electric mixer (300-400 rpm) and add approximately 20% by weight of **Quartz 0.25**. Mix to form a well-blended compound.
Then pour all the contents of component B into the container of component A and mix for at least 2 minutes, until a homogeneous mixture is obtained. Do not overmix the product to avoid entraining too much air into the mixture. Pour the mixture into a clean container and briefly mix again.
Apply the product within the pot life indicated in the data table (referred to a temperature of +23°C). Higher surrounding temperatures will reduce the pot life, while lower temperatures will increase it.

## Application of the product

Apply a single layer up to 1.5-2 mm thick of **Mapefloor I 357 ESD** with a rake or a notched spreader (with "V" shaped notches) over the entire surface.
Immediately after spreading the product, back-roll with a spiked roller to eliminate any air entrained during mixing. It is recommended to pass over the surface with the roller in two perpendicular directions.
When **Mapefloor I 357 ESD** has hardened, test a reference area of the system to check its conductive capacity. The number of tests must be proportional to the area to be tested, as indicated below:

| Size of the area | Number of tests |
|---|---|
| < 10 m² | 1 test per m² |
| 10 < m² < 100 | from 10 to 20 tests |
| > 100 m² | 10 tests every 100 m² |

Tests must be carried out measuring the resistance of the system to the earth connection.

## CLEANING

Clean tools used to prepare and apply **Mapefloor I 357 ESD** with ethanol or thinner immediately after use. Once hardened, the product can only be removed mechanically.

## CONSUMPTION

1.8-2.0 kg/m² of **Mapefloor I 357 ESD** for 1.5 mm thickness of self-levelling layer. The maximum consumption is 2.5 kg/m².

## PACKAGING

20 kg kits:

- component A: 15 kg;
- component B: 5 kg.

## STORAGE

24 months in its original sealed packaging, in a dry place at a temperature between +5°C and +30°C. Protect from frost.

## SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Instructions for the safe use of our products can be found on the latest version of the SDS available from our website www.mapei.com.
When the product reacts, it generates a high amount of heat. After mixing components A and B we recommend applying the product as soon as possible and never leaving the container unattended until it is completely empty.
PRODUCT FOR PROFESSIONAL USE.

## TECHNICAL DATA (typical values)

| PRODUCT IDENTITY | | |
|---|---|---|
| | **component A** | **component B** |
| **Colour:** | coloured | transparent |
| **Consistency:** | thick liquid | liquid |
| **Density:** | 1.35 g/cm³ | 1.00 g/cm³ |

| | | |
|---|---|---|
| **Viscosity at +23°C:** | 4.0 - 6.0 Pa·s<br>(#4, rpm 20) | 0.2 - 0.3 Pa·s<br>(# 2 - rpm 50) |

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

| | | |
|---|---|---|
| **Mixing ratio:** | comp. A : comp. B = 3 : 1 by weight | |
| **Colour of the mix:** | coloured | |
| **Consistency of the mix:** | fluid | |
| **Density of the mix:** | 1,290 kg/m³ | |
| **Viscosity of mix:** | from 1.5 to 1.7 Pa·s<br>(# 4 - rpm 50) | |
| **Pot life:**<br>**– at +10°C:**<br>**– at +20°C:**<br>**– at +30°C:** | <br>approx. 40 min<br>approx. 25 min<br>approx. 15 min | |
| **Waiting times between the application of Primer W-AS N and Mapefloor I 357 ESD *(times indicated may vary depending on environmental parameters such as temperature and relative humidity)***<br>**Substrate temperature:**<br>**– at +10°C:**<br>**– at +20°C:**<br>**– at +30°C:** | Minimum<br><br>26 hours<br>17 hours<br>12 hours | Maximum<br><br>7 days<br>5 days<br>4 days |
| **Set to light foot traffic:**<br>**– at +10°C:**<br>**– at +20°C:**<br>**– at +30°C:** | <br>approx. 30 hours<br>approx. 24 hours<br>approx. 16 hours | |
| **Waiting time before setting to light traffic:**<br>**– at +10°C:**<br>**– at +20°C:**<br>**– at +30°C:** | <br>approx. 5 days<br>approx. 3 days<br>approx. 16 hours | |
| **Waiting time before ready for maximum loads:**<br>**– at +10°C:**<br>**– at +20°C:**<br>**– at +30°C:** | <br>approx. 10 days<br>approx. 7 days<br>approx. 5 days | |
| **Application temperature:** | +8°C to +35°C (refers to the surroundings, material and substrate) | |

## FINAL PERFORMANCE (at +23°C - 50% R.H.)

| | |
|---|---|
| **Electrical resistance (EN 1081):** | $R_E < 10^6$ Ohm |
| **Resistance to ground (DIN 61340-4-1):** | $R_E < 10^9$ Ohm |
| **Walking test (DIN 61340-4-5):** | < 100 V |
| **Total resistance of the system (person, shoes):** | < 35 MΩ |
| **Compressive strength after 7 days (EN 196-1):** | approx. 55 N/mm² |
| **Flexural strength after 7 days (EN 196-1):** | approx. 27 N/mm² |
| **Abrasion resistance - - Taber abrasion meter (CS17 wheel - 1,000 revs. - 1,000 g) after 7 days (EN ISO 5470-1):** | approx. 70 mg |

| | |
|---|---|
| **Abrasion resistance - Taber abrasion meter (CS10 wheel - 1,000 revs. - 1,000 g) after 7 days (EN ISO 5470-1):** | approx. 57 mg |
| **Shore D hardness after 3 days (DIN 53505):** | approx. 77 |

| Essential characteristics | Test method | Requirements according to EN 13813 for synthetic resin-based screeds | Typical values |
|---|---|---|---|
| **BCA wear resistance:** | EN 13892-4 | ≤ AR6 | AR0.5 |
| **Bond strength:** | EN 13892-8 | ≥ B1.5 | B2.0 |
| **Impact resistance:** | EN ISO 6272 | ≥ IR4 | IR10 |
| **Capillary absorption and permeability to water:** | EN ISO 1062-3 | $W < 0.1\ kg/m^2 \cdot h^{0.5}$ | $W < 0.1\ kg/m^2 \cdot h^{0.5}$ |
| **Chemical resistance:** | EN 13529 | Declared CR value | CR1, CR10, CR11, CR12 (class 2)<br>CR4 (class 1) |
| **Reaction to fire:** | EN 13501-1 | from $A1_{FL}$ to $F_{FL}$ | $B_{FL}$-s1 |

| CLEANROOM TESTING (CSM standard) | | | |
|---|---|---|---|
| **Performance characteristic** | **Test method** | **Test parameters** | **Classification** |
| **Evaluation of volatile organic compound (VOC/SVOC) emissions at +23°C and +90°C:** | ISO 14644-8 | Class from 0 (high VOC concentration of 1 $g/m^3$) to -12 (VOC emissions of 10 $g/m^3$, or 0.001 $ng/m^3$) | ISO-ACCm Class: -6.9 / <- 9.6 |
| **Antibacterial efficacy:** | ISO 22196 | R factor<br>> 2 Antibacterial activity Reduction >99%<br>> 1 Reduction >90%<br>< 1 Reduction <90% (insufficient) | Antibacterial activity >99% |
| **Chemical resistance (10 test liquids at T 22°C):** | ISO 2812 | 0 = excellent<br>1 =very good<br>2 =good<br>3 = poor<br>4 = very poor<br>5 = not resistant | 1= very good |
| **Cleanability (Riboflavin test):** | ISO 4628-1 | 0 = excellent<br>1 = very good<br>2 =good<br>3 = poor<br>4 = very poor<br>5 = not resistant | 0 = excellent |

## 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.*
**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 force at the time of the MAPEI product installation. The most up-to-date TDS can be downloaded from our website www.mapei.com.***
***ANY ALTERATION TO THE WORDING OR REQUIREMENTS CONTAINED OR DERIVED FROM THIS TDS EXCLUDES THE RESPONSIBILITY OF MAPEI.***

## TECHNICAL SPECIFICATIONS

Supply and installation of smooth, electrically conductive self-levelling resin system in compliance with ESD standards, waterproof, characterized by good chemical and mechanical resistance, by application of a two-component epoxy resin with special electro conductive fillers (such as **Mapefloor I 357** by Mapei S.p.A.) to be applied in 1.5 mm thickness on suitably prepared substrate. The application must be done on substrate which have already been prepared by means of suitable mechanical method, primed with two-component fillerized epoxy resin (such as **Primer SN** by Mapei S.p.A.), followed by the placing of the specific copper stripes for the connection to the earthing points (such as **Copper Band** by Mapei S.p.A.) followed by the application by roller of suitable two-component water-based electro conductive epoxy primer (such as **Primer W-AS N** by MAPEI S.p.A.).
The product must have the following performance characteristics:

| | |
|---|---|
| Density of the mix: | 1,290 kg/m$^3$ |
| Viscosity of mix: | from 1.5 to 1.7 Pa·s (#4, rpm 50) |
| Electrical resistance (EN 1081): | $R_E < 10^6$ Ohm |
| Resistance to ground (DIN 61340-4-1): | $R_E < 10^9$ Ohm |
| Walking test (DIN 61340-4-5): | < 100 V |
| Total resistance of the system (person, shoes): | < 35 MΩ |

These values may vary according to surrounding conditions (temperature and humidity) and the equipment used to take the readings

| | |
|---|---|
| Compressive strength after 7 days at +23°C (EN 196-1): | approx. 55 N/mm$^2$ |
| Flexural strength after 7 days at +23°C (EN 196-1): | approx. 27 N/mm$^2$ |
| Abrasion resistance - Taber abrader (CS17-1 wheel - 1,000 revs. - -1,000 g) after 7 days at +23°C (EN ISO 5470-1): | approx. 70 mg |
| Abrasion resistance - Taber abrader (CS10-1 wheel - 1,000 revs. - -1,000 g) after 7 days at +23°C (EN ISO 5470-1): | approx. 57 mg |
| Shore D hardness after 3 days at +23°C (DIN 53505): | approx. 77 |
| BCA wear resistance (EN 1382-4): | < 10 µm |
| Bond strength (EN 13892-8): | ≥ 2.0 N/mm$^2$ |
| Impact resistance (EN ISO 6272): | 10 Nm |
| Capillary absorption and permeability to water (EN ISO1062-3): | w < 0.1 kg/m$^2$·h0.5 |
| Chemical Resistance (EN 13529): | CR1, CR10, CR11, CR12 (class 2) CR4 (class 1) |
| Reaction to fire (EN 13501-1): | $B_{FL}$-s1 |
| VOC/SVOC emission (ISO 14644-8): | ISO-ACCm Class -6.9/< -9.6 |
| Antibacterial efficacy (ISO 22196): | >99% reduction |

| | |
|---|---|
| Riboflavin test (ISO 4628-1): | excellent |

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