# *Mapefloor*™ Resinous Flooring Systems

***Mapefloor I 900***
***Primer SN***™
***Mapefloor EP 19***
***Mapefloor EP 20***
***Mapefloor I 302 SL***

## Installation Manual

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The information contained herein and any other advice, are given in good faith based on MAPEI's current knowledge and experience, and are adequate when the products are properly stored, handled and applied under normal conditions, in accordance with MAPEI's recommendations. The information only applies to the applications and products expressly referred to herein, and are based on laboratory tests which do not replace practical tests and may not fully reflect actual performance on site where application and service conditions will be different. In case of changes in the parameters of the application, such as differences in substrates, temperature and ambient moisture, etc., or in case of different service conditions, consult your local MAPEI Technical Assistance prior to using the products. The information contained herein does not relieve the user of the products from testing them for the intended application and purpose. The specialist contractor is responsible for strictly following the application recommendations contained in the available documentation.

Users must always refer to the most recent local Technical Data Sheet for the product concerned, which can be obtained from the website (**www.mapei.ca**) or local MAPEI representative.

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# Section 1: System Description

## 1.1 General information

*Mapefloor EP 19* and *Mapefloor EP 20* are both three-component, epoxy binders for industrial flooring, specifically designed to enhance adhesion of multi-layer floor systems, such as *Mapefloor I 302 SL* systems. They are typically applied on concrete surfaces that require leveling with a slight slope and repairing deteriorated concrete, such as floor slabs in institutional buildings, storage and logistical areas.

## 1.2 Uses – destinations

*Mapefloor EP 19* and *Mapefloor EP 20* systems are the right solutions for floors subjected to high fork-lift traffic, in which the surface could also be wet, so an anti-slip characteristic could be required. They are also suitable for those situations in which a few millimetres of concrete surface must be removed because they are weak and deteriorated. For example, they can be used in institutional buildings, storage and logistical areas, and wet and dry processing areas.

*Mapefloor EP 19* and *Mapefloor EP 20* are not designed to withstand thermal shocks.

*Mapefloor EP 19* and *Mapefloor EP 20* are generally used for indoor floors. When applied onto outdoor surfaces it will turn to a yellowish tone when exposed under direct sunlight, but it will keep almost all its mechanical properties. Color deviation must be accepted by the end-user. In case of outdoor application, please check carefully the presence of rising dampness.

## 1.3 Products

*Mapefloor EP 19* and *Mapefloor EP 20* are composed of the following products:

**Primer – base coat**:
*Mapefloor I 900* or *Primer SN* - two-component, low viscosity epoxy resins used as a primer for resinous flooring systems.

**Mortar screed**:
*Mapefloor EP 19* and *Mapefloor EP 20* - three-component, epoxy binders for industrial flooring.

**Body and top coat**:
*Mapefloor I 302 SL* - two-component, epoxy resin for industrial flooring, suitable for both self-smoothing and textured coatings, as well as for multi-layering broadcast systems and seal coats for epoxy mortar screeds.

| COLOR | |
|---|---|
| **Part A** (pre-pigmented per the colors listed below)<br>**Part B**: Straw yellow | |
| RAL 1001 Beige | RAL 3020 Traffic Red |
| RAL 6028 Pine Green | RAL 7038 Agate Grey |
| RAL 1018 Zinc Yellow | RAL 5007 Brilliant Blue |
| RAL 7012 Basalt Grey | RAL 7030 Stone Grey |
| RAL 3009 Oxide Red | RAL 5017 Traffic Blue |
| RAL 7046 Telegrey | RAL 9003 Signal White |

Special colors could be possible on request. This could take a few weeks waiting time to study and test the pigment formulation.

All the colors are similar to the official color chart (e.g. RAL shades) but they may not always be a perfect match to the standard color if pigments, gloss, smoothness, base materials, reflection etc. between the epoxy resin and the color chart reference point are different. The shade difference could be stronger when very bright colors are compared.

# Section 1: System Description

## 1.4 Main characteristics of the system components

The main properties which characterise epoxy resin systems are:

- Very good mechanical resistance
- Good chemical resistance for medium to high exposures
- Seamless surface
- Long lasting solution
- Dust free
- Ease of cleaning
- Ease of maintenance
- Good appearance

There could be some discoloration or color variation if a *Mapefloor* system is in contact with chemicals. The discoloration doesn't necessarily mean that the mechanical properties are adversely affected. The end-user must accept the color variation.

For more information regarding chemical resistances please consult a MAPEI technical representative.

Typical color deviation due to concentrated sulphuric acid attack.

# Section 2: Preliminary Floor Analysis

All following general issues are valid for any kind of flooring system.

## 2.1 Substrate evaluation

Before any operation, the substrate must be carefully examined and checked. Visual and instrumental inspections must be carried out to verify the concrete and surface quality and condition. The visual examination must verify the surface condition for the presence of cracks, concrete failures, roughness, areas made in different periods or with different materials, static and dynamic joints, general levels, slopes, presence of oils or contaminants, presence of old coatings, porosity, etc.

Check for the presence of cracks, damaged areas, slope and flatness, concrete slabs made in different time, etc.

When examining a tiled surface, it is important to check if tiles are well bonded to the substrate. To do that, it is possible to make a small steel ball roll on the tile surface. The sound the ball makes when rolling on loose tiles is totally different from the sound it makes on a monolithic substrate.

Instrumental examination must check concrete resistances and conditions. Here are descriptions of the most important tests to be done.

## 2.2 Concrete and cementitious substrates

The *Mapefloor EP 19* and *Mapefloor EP 20* build-ups can be laid over concrete and cementitious substrates in our *Mapecem*® range of products.

### 2.2.1 Concrete test hammer

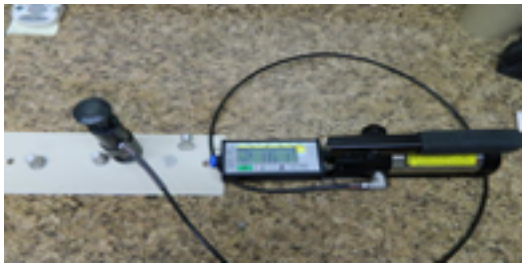
Concrete test hammer gives an idea of concrete compressive strength. In general it works well on young concrete, but even on old substrates, it's able to provide an idea of whether the concrete has good resistance or not. This test is not-destructive, and very easy and fast to do.


The minimum compressive strength required is 25 MPa (>3600 psi).

# Section 2: Preliminary Floor Analysis

### 2.2.2 Pull-off test

Pull-off test measures the concrete cohesion strength. It must be done when concrete test hammer gives low strength values, close to the minimum value required, or when there is some doubt of having low concrete strength.



The minimum pull-off strength required is 1.5 MPa (>217 psi)

### 2.2.3 Substrate moisture

The substrate moisture content (% by weight) could be checked using a non-destructive electronic moisture-meter that displays moisture content on its digital or analogic dial. Destructive testing could be done, but take note that a calcium-carbide test could measure different moisture content than an electronic moisture-meter due to the kind of chemical reaction involved in that test.

The maximum value of substrate moisture content, for the primer application when a water vapor impervious system is applied, is 4% by weight.


Digital moisture meter

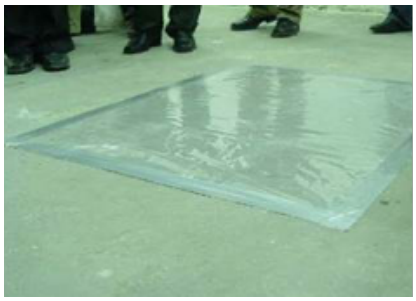

Calcium Chloride Test Kit

A digital moisture meter and a concrete test hammer.

# Section 2: Preliminary Floor Analysis

### 2.2.4 Rising dampness

Rising damp cannot be checked with moisture-meter. It must be checked with the polyethylene sheet test according to ASTM D 4263. This test is done positioning a polyethylene sheet of at least one square meter (10.8 sq. ft.) onto the floor surface, sealing its edges with adhesive tape. After one day check the presence of condensation in the underneath side of the sheet or check if the concrete surface is darkened.



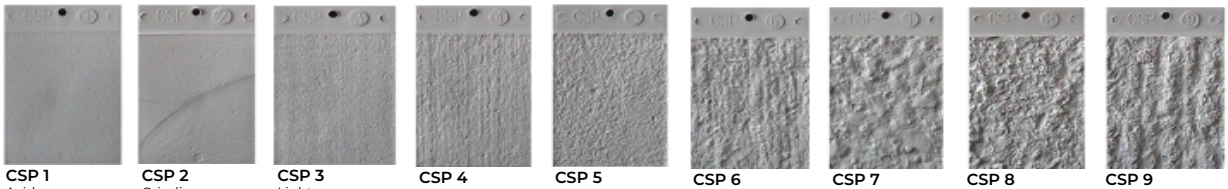
In both cases, the concrete probably contains too much water or there is rising damp. This test doesn't work well in cold conditions because the concrete could retain its humidity. In that case it could be possible and useful to heat the test area using infrared lamps or direct sunlight, but those conditions couldn't be the same to which the coating will be exposed once applied. For this reason those test results may be misleading.

There must be no rising damp when a vapour impervious system such as our *Mapefloor* system is applied.

### 2.2.5 Roughness and porosity

Surface roughness influences the material consumption. A rough surface also guarantees proper adhesion strength, but when excessive, it makes it difficult to have a totally pore-free base coat. Also concrete porosity can badly affect the full filling of surface pores by the base coat.

The roughness can be increased by mechanical surface treatment, especially when a scarifier is used. As a general and smart rule, the roughness should not exceed 1/3 of the designed coating thickness. This indicates the average increase in thickness to be considered, over the consumption for the nominal thickness.




Another method for determining the substrate roughness is to compare with the reference plates by the International Concrete Repair Institute (ICRI) in their Technical Guideline 310.2R "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair" which defines 10 different degrees of Concrete Surface Profiles or CSP's, depending on the method used and the thickness of the coating to be applied.

Concerning the porosity of the substrate, it will have an impact on the consumption of the primer layer applied and how well the whole system bonds to the substrate.

The more porous the substrate, the higher the material consumption will be, and the better the bond, provided sufficient material is applied to ensure an adequate build-up structure. Consequently, it will affect the type of substrate preparation to perform.

# Section 2: Preliminary Floor Analysis

### 2.2.6 Surface pollution

Contaminants are very dangerous for a good bonding of the coating system to the substrate and for the absence of fish-eyes or equivalent aesthetical defects. Contaminants could be oils or grease. Wash the surface very well with adequate detergents and cleaning machines, then let the substrate dry and check if there is more rising oil leaching up to the surface; in that case repeat the washing operation. When cleaned, surface must be shot blasted. In some cases it is impossible to obtain a clean substrate because the surface is almost saturated by oils. In this situation it is advisable to wash the surface as best as possible and scarify it to remove contaminated substrate. Do not use solvents, because they dilute the oils making them penetrate deeper into the concrete.

Typical example of damaged and oil-impregnated surface.

When contaminants are blood, animal fats, milk, or organic compounds from food products, there is also the risk to have bacterial growth at the bonding line that can badly affect the adhesion of the coating to the substrate. In this case pay more attention to cleaning with appropriate detergents, followed by mechanical removal.

Do not forget: in any case, a strong mechanical preparation (e.g.: strong shot blasting or scarifying) is always necessary!

It is almost impossible to be absolutely sure that every contaminant has been removed. It is always recommended to do a test on-site to confirm the method of preparation and check the final result.

Flames can cause spalling and can otherwise damage the concrete (hazardous fumes or a full-blown fire may also result) and therefore should not be used.

# Section 2: Preliminary Floor Analysis

## 2.3 Non-cementitious substrates

### 2.3.1 Tiles

As a general rule, all tiled substrates must be removed prior to the application of *Mapefloor* flooring systems.

Refurbishment of tiled floors is generally undertaken because of failures of the joints, loose tiles, contaminated substrate, etc. Such conditions do not provide a sound substrate for the *Mapefloor* systems, and will eventually lead to the failure of the refurbished floor.

In the exceptional case that a tiled floor is to be refurbished with a *Mapefloor* system, the tiled substrates must be strong, sound, and solid. Tiles must have good adhesion onto their substrate; the minimum pull-off strength value of 1.5 $N/mm^2$ is always valid. Loose tiles must be removed, and the area repaired with cementitious or resin mortars. It's impossible to be sure that all the tiles have good adhesion to the substrate or that all non-adherent tiles have been removed. So the best solution is to remove all tiles, if possible.

### 2.3.2 Natural stones

Natural stones must be treated and considered as ceramic tiles mentioned above. Natural stones are generally used in public and civic buildings; therefore there shouldn't be any risks of surface contamination. Contact MAPEI's Technical Services department for stone recommendation.

### 2.3.3 Asphalt

It is not possible to give a straightforward answer to this question, as there are huge variations in what is called "asphalt" worldwide. The amount of bitumen and size of the aggregates play an important role in determining the suitability of the substrate. Asphalt surfaces are extremely tricky to overlay, particularly when subjected to extreme temperature variations (summer / winter). They generally will be a softer, suppler, substrate than is recommended for the application of other flooring systems.

The application on asphalt is also problematic because it is not possible to guarantee the best adhesion on it of any resin system. Asphalt could be very porous or not, and it softens as temperature rises. The application of a rigid system on asphalt, like *Mapefloor* systems, must be avoided.

### 2.3.4 Old resin coatings

An existing resin coating could be a perfect substrate for a new resin application. The old one must be perfectly bonded onto the substrate and must have the minimum mechanical resistance required for a concrete slab. Damaged areas must be removed and repaired.

Existing resin-coated substrates which require refurbishing should be carefully evaluated in every case.

Problem areas will generally be:

- existing cracks in the floor which must be evaluated for movement.
- de-bonded or worn out coatings.
- blistered coatings.

In general, if the substrate is sound and any cracks and damaged areas are repaired, mechanical treatment of the surface by grinding of self-levelling resin screeds or preferably shot blasting for thin resin coatings, will achieve removal of dirt and contamination, opening up the surface texture, according to the recommended surface profile for each type of *Mapefloor* system product. (E.g.: with a diamond grinding, shot blasting, scarified, etc.).

After dust removal, the new resin can be applied directly onto the surface. Not all the resins are compatible with each other. It is impossible to be sure beforehand whether the new resin will adhere to the old one; there is just a general rule described below:

| NEW RESIN | OLD RESIN | VIABLE |
|---|---|---|
| epoxy | epoxy | Yes |
| epoxy | polyurethane | Not recommended |
| polyurethane | polyurethane | Yes |
| polyurethane | epoxy with broadcast | Yes |
| polyurethane-cement | epoxy | Yes with primer |
| polyurethane-cement | polyurethane | Yes with primer |

*Don't forget, this is not a universal rule! So a test on site to confirm the compatibility is advisable*.

2.3.5 **Other types of substrate**

Even rarely, it is possible to find other kinds of substrate like vinyl or linoleum or rubber sheets, textiles, timber floor, steel floor, cement-asphalt screed, etc.

All resilient and textile coatings and their adhesives must be totally removed. Wood guarantees a very good adhesion, but it is a flexible and hygroscopic substrate with high potential movements. All the other kinds of possible substrates must be evaluated on a case-by-case basis.

## 2.4 Job-site logistic

Check for the presence of electrical power near the application areas. The power must be sufficient for surface preparation machinery, vacuum cleaners, mixing equipment, artificial lighting, possible heating system, etc. If not, a portable generator must be used. You need the power! Never mix the resin or the cementitious mortar by hand!

In some cases, when water-based products are used, the water supply is necessary.

All the products must be stored in a covered and protected area, in cool and dry conditions. The best situation is when temperature is between 15°C (59°F) and 25°C (77°F), and relative humidity is at <85%. Allow the material to acclimatize to the ambient temperature for at least 24 hours.

Verify the accessibility to the job-site and to application area: the availability of a fork lift for unloading the pallets, a recovery area for disposable materials such as empty tins, general garbage, waste products of the surface preparation, etc.

# Section 3: Preliminary Operations

## 3.1 Surface treatment

*Mapefloor* systems are suitable for very strongly polluted or damaged surfaces, even if the mechanical treatment that must be used to remove contaminants may give a very rough surface.

The best way to prepare the floor surface for the application of *Mapefloor* system is through either shot blasting or scarifying, to achieve a surface profile value of between CSP #4 and CSP #8 according to the ICRI, depending on the application thickness.

| Concrete surface profiles according to ICRI 310.2R-2013 | | Application thickness D.F.T according to BS 8402 part6 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Floor Seal | Floor Coating | High-build coating | | | Flow applied flooring | Heavy duty flowable flooring | | | | | | | | | |
| | | | | | | | | Screed flooring | | | | | | | | | |
| | | | | | | Multilayer coating | | | | | Heavy duty screed flooring | | | | | | |
| | | 0 mm | 0,15 mm | 0,30 mm | 0,60 mm | 1 mm | 2 mm | 3 mm | 4 mm | 5 mm | 6 mm | 7 mm | 8 mm | 9 mm | 10 mm | 11 mm | 12 mm |
| **CSP 1** | Acid etching | | | | | | | | | | | | | | | | |
| **CSP 2** | Grinding | | | | | | | | | | | | | | | | |
| **CSP 3** | Light shot blasting | | | | | | | | | | | | | | | | |
| **CSP 4** | Medium shot blasting | | | | | | | | | | | | | | | | |
| **CSP 5** | Medium-heavy shot blasting | | | | | | | | | | | | | | | | |
| **CSP 6** | Heavy shot blasting | | | | | | | | | | | | | | | | |
| **CSP 7** | Heavy shot blasting | | | | | | | | | | | | | | | | |
| **CSP 8** | Extreme shot blasting | Can also be achieved by scabbing | | | | | | | | | | | | | | | |
| **CSP 9** | Extreme shot blasting | Can also be achieved by scabbing | | | | | | | | | | | | | | | |

### 3.1.1 Diamong grinding

Diamond grinding is not recommended for application of *Mapefloor EP 19* or *Mapefloor EP 20*. Diamond grinding has to be made with appropriate machinery using an abrasive diamond disc as shown in the picture below:

This treatment removes a thin layer of the floor surface and makes the surface clean, lightly absorbent, and textured. It is the perfect solution for non-contaminated and non-damaged floor surfaces. In such cases, *Mapefloor* systems will have a perfect adhesion and the material consumption will be easier to be controlled.

Diamond grinding is also suitable for ceramic tiles and stones. On tiles, the best way is to perform the preliminary operation with the diamond grinding (which will prepare the whole surface), followed by shot blasting that will perfectly clean all tile joints and will roughen the surface.

Old solid and adherent resin coatings may be treated with a light diamond grinding, or with sandpaper discs. The diamond grinding should be used carefully because it can heat the resin surface, which may cause it some damage.

### 3.1.2 Shot blasting

Shot blasting has to be done with appropriate machinery using steel abrasive shot. The machinery is connected to a powerful vacuum cleaner that removes almost all dust during operations. Shot blasting power can be regulated by choosing the quantity of abrasive to be used and the feed speed of equipment. A low speed and a big quantity of abrasive make a very rough floor surface. Increase the speed or reduce the abrasive quantity to reduce roughness. Always ensure the floor surface is free from oil, grease, loose particles, contaminants, cement laitance, or any substance that can reduce the adhesion.

The best way to prepare a tiled surface is the combination of the diamond grinding disc treatment followed by the shot blasting treatment.

Before the application of *Mapefloor* systems, remove all remaining steel abrasives and dust by vacuum cleaner.

Shot blasting creates an open-textured surface profile, so it's the best method for a perfect adhesion of thin-medium layer coatings. But it can also create surface defects like holes, cracks, roughness, etc. that can increase the consumption of materials.

Shot blasting treatment made cracks deeper and wider and removed all loose and friable parts.

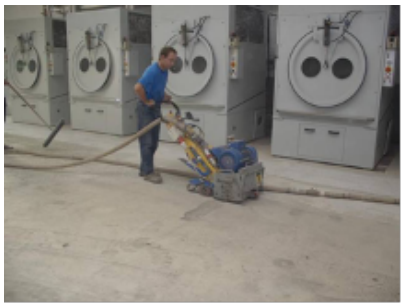
Shot blasting treatment on tiles and old concrete surfaces.

# Section 3: Preliminary Operations

3.1.3 Scarifying

The milling treatment consists of a series of hardened steel discs rotating freely along several axes, which in turn rotate horizontally around a main axis and are driven by a relatively heavy machine.

The scarifying treatment makes the surface very rough, so it is the best way to ensure a very good adhesion. However, this treatment in some cases may create some surface problems due to the intense and continuous stress from chipping. Before the application of  systems, remove all dust by vacuum cleaner.



## 3.2 Cracks, holes, joints, surface defects

Weak concrete in limited areas must be totally removed, manually or mechanically. All cracks, holes and similar defects must be totally exposed. Use power hammers, power chisels, grinding machines, etc.

After that, small defects, holes, joint profiles, etc. must be repaired with epoxy products – e.g.: the epoxy mortar done by *Mapefloor EP 19* or *Mapefloor EP 20*. This solution can also be used to patch areas in which tiles have been removed.

Joints must be sealed to avoid the material flows into them during the application of *Mapefloor* systems. To do that, it is possible to use *Mapefloor I 900* or *Primer SN* mixed with *Additix™ PE* until a high thixotropic consistency is reached, like putty. This solution is also suitable to fill cracks, pores, voids etc. If the substrate is sufficiently dry, the use of epoxy resins is preferable with respect to the use of cementitious mortars because resins harden and cure faster.

# Section 3: Preliminary Operations

All dynamic joints, or those joints where movement is to be expected, must be respected and reflected on the surface within 24 hours of the *Mapefloor* system application. The new joints will be created in the same position as existing ones. Old joint positions can be detected inserting a nail during preliminary sealing with the epoxy grout mentioned above.

Remove all weak and friable parts, and then repair with the epoxy mortar, *Mapefloor EP 19* or *Mapefloor EP 20*.

Inserting a nail in the old joint and marking its line on the wall is useful to trace the new line to saw to create the new joint.

In areas which are particularly weak, or surfaces where different materials are present (i.e. ceramic tiles and cementitious patches), the application of *Mapefloor I 900* or *Primer SN*, reinforced with glass fibre mesh, followed by a full broadcast of quartz is the best way to provide a suitable repair when it is necessary.

Filling cracks and joints is easy with *Mapefloor I 900* or *Primer SN* modified with *Additix PE*. The addition of an embedded mesh is useful, but not always necessary.

# Section 3: Preliminary Operations

## 3.3 Mixing area

Choose an appropriate area for mixing operations. It must be close to the application area and power supply, so as to reduce cable length and the risk of stumbling accidents. To avoid soiling the area, it must be well protected with cardboards, polyethylene sheets or other protective coverings, all well fixed with adhesive tape to the floor surface.

All the *Mapefloor* systems products should be placed near the mixing area.

## 3.4 Ambient and surface conditions

Surface and air temperature and air relative humidity must be checked. Be sure there is no possibility of condensation on the substrate or onto the uncured product once applied. Condensation can affect the setting time and aesthetical surface aspect. The substrate must be at least 3°C (5°F) above the dew point to reduce the risk of condensation. (Refer to the relative attached table.)

The ambient and surface conditions should be checked at least 3 times per day: (morning, midday, afternoon).

E.g.: air temperature is approx. 24°C (75°F) – relative air humidity is 55% (we can consider 60%) – dew point is at 15.7°C (60.3°F). To ensure there will be no condensation, the floor surface must be at least at 18.7°C (65.7°F).

# Section 3: Preliminary Operations

| **Application Requirements**<br>No coating should be applied unless surface temperature is a minimum of 3°C (5.4°F) above the dew point | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Air Temp. | Dew point temperature in degrees Celcius with a relative humidity (%) of: | | | | | | | | | | |
| Celcius | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 0 | – | - 27.9 | - 20.2 | - 15.4 | - 12 | - 9.2 | - 6.8 | - 4.8 | - 2.8 | - 1.4 | 0 |
| 1 | – | - 27.2 | - 19.3 | - 14.5 | - 11.1 | - 8.2 | - 5.8 | - 3.8 | - 1.9 | - 0.4 | 1 |
| 2 | – | - 26.4 | - 18.5 | - 13.7 | - 10.2 | - 7.3 | - 5 | - 2.8 | - 1 | 0.6 | 2 |
| 3 | – | - 25.6 | - 17.7 | - 12.9 | - 9.4 | - 6.4 | - 4.1 | - 1.9 | 0.1 | 1.5 | 3 |
| 4 | – | - 24.8 | - 16.8 | - 12 | - 8.5 | - 5.5 | - 3.1 | - 1 | 0.8 | 2.5 | 4 |
| 5 | – | - 24 | - 15.9 | - 11.2 | - 7.6 | - 4.6 | - 2.2 | - 0.1 | 1.8 | 3.5 | 5 |
| 6 | – | - 23.1 | - 15 | - 10.3 | - 6.6 | - 3.7 | - 1.3 | 0.8 | 2.8 | 4.5 | 6 |
| 7 | – | - 22.3 | - 14.2 | - 9.4 | - 5.7 | - 2.8 | - 0.4 | 1.8 | 3.8 | 5.5 | 7 |
| 8 | – | - 21.6 | - 13.5 | - 8.5 | - 4.8 | - 1.8 | 0.6 | 2.3 | 4.8 | 6.5 | 8 |
| 9 | – | - 21 | - 12.8 | - 7.6 | - 3.8 | - 0.8 | 1.6 | 3.8 | 5.8 | 7.4 | 9 |
| 10 | – | - 20.2 | - 12 | - 6.7 | - 2.9 | 0.1 | 2.5 | 4.8 | 6.8 | 8.4 | 10 |
| 11 | – | - 19.5 | - 11.1 | - 5.9 | - 2 | 0.9 | 3.5 | 5.7 | 7.8 | 9.4 | 11 |
| 12 | – | - 18.7 | - 10.2 | - 5 | - 1.2 | 1.7 | 4.4 | 6.6 | 8.7 | 10.4 | 12 |
| 13 | – | - 17.9 | - 9.4 | - 4.2 | - 0.3 | 2.6 | 5.3 | 7.5 | 9.7 | 11.4 | 13 |
| 14 | – | - 17.2 | - 8.6 | - 3.3 | 0.6 | 3.5 | 6.2 | 8.5 | 10.6 | 12.3 | 14 |
| 15 | – | - 16.4 | - 7.8 | - 2.4 | 1.5 | 4.5 | 7.2 | 9.5 | 11.6 | 13.3 | 15 |
| 16 | – | - 15.7 | - 6.9 | - 1.5 | 2.4 | 5.5 | 8.1 | 10.5 | 12.6 | 14.3 | 16 |
| 17 | – | - 14.9 | - 6 | - 0.7 | 3.3 | 6.5 | 9.1 | 11.5 | 13.5 | 15.3 | 17 |
| 18 | – | - 14.1 | - 5.2 | - 0.2 | 4.2 | 7.4 | 10.1 | 12.4 | 14.5 | 16.3 | 18 |
| 19 | – | - 13.2 | - 4.5 | 1 | 5.1 | 8.3 | 11 | 13.4 | 15.4 | 17.3 | 19 |
| 20 | – | - 12.5 | - 3.6 | 1.9 | 6 | 9.3 | 12 | 14.3 | 16.4 | 18.3 | 20 |
| 21 | – | - 11.7 | - 2.8 | 2.7 | 6.8 | 10.2 | 12.9 | 15.3 | 17.4 | 19.3 | 21 |
| 22 | – | - 11 | - 2 | 3.6 | 7.7 | 11.1 | 13.9 | 16.3 | 18.3 | 20.3 | 22 |
| 23 | – | - 10.3 | - 1.2 | 4.5 | 8.6 | 12.1 | 14.7 | 17.2 | 19.3 | 21.2 | 23 |
| 24 | – | - 9.6 | - 0.3 | 5.4 | 9.5 | 12.9 | 15.7 | 18.2 | 20.3 | 22.2 | 24 |
| 25 | – | - 8.8 | 0.5 | 6.3 | 10.4 | 13.8 | 16.7 | 19.2 | 21.3 | 23.2 | 25 |
| 26 | – | - 8 | 1.3 | 7.1 | 11.3 | 14.8 | 17.7 | 20.2 | 22.3 | 24.2 | 26 |
| 27 | – | - 7.3 | 2.1 | 7.9 | 12.2 | 15.8 | 18.5 | 21 | 23.2 | 25.2 | 27 |
| 28 | – | - 6.5 | 3 | 8.7 | 13.1 | 16.7 | 19.5 | 22 | 24.2 | 26.2 | 28 |
| 29 | – | - 5.7 | 3.8 | 9.6 | 14 | 17.5 | 20.4 | 23 | 25.2 | 27.2 | 29 |
| 30 | – | - 5 | 4.6 | 10.5 | 14.9 | 18.4 | 21.4 | 24 | 26.2 | 28.2 | 30 |

In winter the risk of condensation is higher. It is suggested that appropriate dehumidifiers be used in order to reduce the air relative humidity.

The ambient temperature also influences the resin's reaction speed. High ambient temperature increases that speed and reduces the working time of the material. Contrarily, a low temperature reduces the reaction speed and increases the working time.

Also, a low temperature increases the viscosity of the material, reducing the workability, whereas with a higher temperature the workability is increased. The right temperature to apply *Mapefloor* systems is between 8°C (46°F) and 30°C (86°F).

If ambient heating is required do not use gas, oil or other fossil fuel heaters that produce large quantities of both $CO_2$ and $H_2O$ water vapour, which may adversely affect the finish. Use only electric powered warm air blower systems.

The application of resins with rising temperature will increase the risk of pinholes.

The maximum value of relative air humidity is 85%.

# Section 4: System Application

The best application is done when the temperature of the *Mapefloor* systems is between 15°C (59°F) and 30°C (86°F). The material temperature influences the viscosity and the ease of mixing and application. At temperatures below 15°C (59°F), the flow of *Mapefloor* systems makes its application difficult.

A temperature increase of 10°C (18°F) almost halves the viscosity of an epoxy resin like *Mapefloor I 900* or *Primer SN*.

Material temperature also influences the working and hardening time. The material is faster in curing, but must be applied quickly. A temperature increase of 10°C (18°F) almost halves the working time.

If a job-site's ambient temperature is close to 10°C (50°F), it's a good idea to create a separate and insulated storage and mixing area, like the tent shown in the picture, in which a heating system creates an ambient temperature of 18°C to 25°C (64°F to 77°F). The quartz sand to be mixed or broadcast on the materials should have the same temperature.

## 4.1 Mixing of *Mapefloor I 900* or *Primer SN*

Stir part A, resin, then add part B, hardener, and mix with a low-speed electric stirrer (300-400 rpm) for at least 2 minutes until a homogeneous mix has been achieved.

To ensure thorough mixing, pour the materials in another container and mix again for a few moments.

Things not to do:

- Do not over-mix, in order to reduce air entrapment.
- Do not change mixing ratio of parts A and B. The addition of a greater or lesser quantity of part B, the hardener, will not affect the working or hardening time; there will simply be more hardener or more resin that will not react!
- Do not dilute the materials.
- Do not mix more material than can be placed within the working time with the available resources.
- Do not mix partial quantities of the components to avoid mixing errors; the product may not harden correctly.
- Do not mix materials that have just been stored under hot sun exposure or in freezing conditions.

# Section 4: System Application

4.1.1 Application of *Mapefloor I 900* or *Primer SN*

Measure the area to be covered with the amount prepared at the desired consumption rate. The actual porosity and absorption of the surface will determine the real consumption.

Measurement of areas to be covered with each kit of product. Use of a masking tape as a guide during application.

Pour the mixed *Mapefloor I 900* or *Primer SN* onto the floor surface and spread evenly, using a brush, roller or squeegee. The preferred application method is to use a squeegee and back-roll crosswise, ensuring that the minimum required thickness is maintained. Be sure to close and seal all pores, voids, micro cracks, etc. The surface must be free of pores to prevent pinholes from appearing on the *Mapefloor* systems.

# Section 4: System Application

4.1.2 Mixing of *Mapefloor EP 19* or *Mapefloor EP 20*

In order to improve application properties, to ensure that all solids are evenly dispersed, mix Part A of *Mapefloor* System mechanically for about 1 minute.

Pour all of the Part B hardener into the Part A container and mix thoroughly to a smooth, homogeneous consistency.

Add *Mapefloor* System Part C quartz blend into Part A and Part B. Do not mix at high speeds or over mix, which can trap air within the mixed material. Use an adequate mixing paddle with a low-speed drill mixer (at 300 to 400 rpm).

During the mixing process, scrape down the sides and bottom of the container to completely mix all of the components. Apply the mixed *Mapefloor* System within the pot life. Higher ambient and substrate temperatures will reduce the pot life of the mix, while lower temperatures will increase its pot life, as well as increase the viscosity and affect coverage.

During the mixing operations, scrape down the sides and bottom of the container with a flat or straight edge trowel at least once to ensure complete mixing. The resin components of the product can be mixed with a hand electric mixer, as parts A and B are fluid. The preparation of the mortar mix requires heavy duty mixers such as a Ted Baugh mixer, rotary drums mixer, double axis forced action mixers, etc.

| | MIXING PACE | | | 8 HOURS |
|---|---|---|---|---|
| **Temperature** | **Time between mixes (min)** | **Mixing time (min)** | **Number of mixes per hour** | **Mixes per day** |
| 25°C – 30°C<br>77°F – 86°F | 2.5 | 2 | 24 | 192 |
| | 3 | 2.5 | 20 | 160 |
| 20°C – 25°C<br>68°F – 77°F | 3.5 | 3 | 17.1 | 137.1 |
| | 4 | 3.5 | 15 | 120 |
| 15°C – 20°C<br>59°F – 68°F | 4.5 | 4 | 13.3 | 106.7 |
| | 5 | 4.5 | 12 | 96 |
| 10°C – 15°C<br>50°F – 59°F | 5.5 | 5 | 10.9 | 87.3 |
| | 6 | 5.5 | 10 | 80 |

Providing a continuous supply of freshly mixed material constitutes a key success factor to ensure an adequate job completion. Indicatively, the mixing times depending on the temperature would be according to this table.

At higher temperatures, the mixing times can be slightly shortened thanks to the lower viscosity, which facilitates the mixing process, and to compensate the faster reaction times. Likewise, at lower temperatures, the mixing times must be slightly increased to improve the mixing result and thanks to the delayed reaction time this does not negatively influence the mixing process.

A point of great importance is doing the mixing in clean containers for each mix. Not only can remaining material from previous mixes appear as hardened lumps in successive mixes, but as the reaction is exothermic, the container is heated progressively thus shortening the pot life (literally) of successive mixes.

Things not to do:

- Do not use high-speed mixer.
- Do not over-mix, in order to reduce air entrapment.
- Do not change mixing ratio of parts A, B and C.
- Do not dilute the materials.
- Do not mix more material than can be placed within the working time with the available resources.
- Do not mix materials that have been stored under hot sun exposure or in freezing conditions.

### 4.1.3 Application of *Mapefloor EP 19* or *Mapefloor EP 20*

Pour the mixed *Mapefloor* system on wet primed substrate and spread epoxy mortar by means of a steel trowel. The use of a screed box, a pin or gage rake can make the application faster and the thickness easier to be controlled.

Keeping a continuous supply of mixed material and placing it efficiently will allow maintaining a "wet edge" to reduce the unavoidable differences between batches and between fresh mixes and material already starting to dry and set.

Once spread, lightly smooth the surface with a steel trowel to remove joints between pours and/or steel and gage rake marks.

### 4.1.4 Mixing of *Mapefloor I 302 SL*

Stir pre-tinted part A, resin, and then add part B, hardener, and mix with a low-speed electric stirrer (300-400 rpm) for at least 2 minutes until a homogeneous mix has been achieved. To ensure thorough mixing, pour the materials in another container and mix again for a few moments.

Things not to do:

- Do not over-mix, in order to reduce air entrapment.
- Do not change mixing ratio of parts A and B. The addition of a greater or lesser quantity of part B, the hardener, will not affect the working or hardening time; there will simply be more hardener or more resin that will not react!
- Do not dilute the materials.
- Do not mix more material than can be placed within the working time with the available resources.
- Do not mix partial quantities of the components to avoid mixing errors; the product may not harden correctly.
- Do not mix materials that have just been stored under hot sun exposure or in freezing conditions.

# Section 4: System Application

## 4.2 Application of *Mapefloor I 302 SL* (Systems 31, 32, 33 and 34)

*Mapefloor* System 31 – Non-slip, multi-layer finish

- First coat: Apply a priming coat of *Primer SN* with a serrated trowel or squeegee. Back-roll with a short-pile roller (in a crisscross pattern) and broadcast with #32 mesh quartz sand, which will create a slip-resistant surface.
- Finishing coat: Apply a finishing coat of *Mapefloor I 302 SL* with a serrated trowel or squeegee and back-roll with a short-pile roller (in a crisscross pattern).

*Mapefloor* System 32 – Non-slip, multi-layer finish

- First coat: Apply a priming coat of *Primer SN* with a serrated trowel or squeegee. Back-roll with a short-pile roller (in a crisscross pattern) and broadcast with #32 mesh quartz sand, which will create a slip-resistant surface.
- Intermediate coat: Apply a priming coat of *Mapefloor I 302 SL* with a serrated trowel or squeegee. Back-roll with a short-pile roller (in a crisscross pattern) and broadcast with #32 mesh quartz sand, which will create a slip-resistant surface.
- Finishing coat: Apply a finishing coat of *Mapefloor I 302 SL* with a serrated trowel or squeegee and back-roll with a short-pile roller (in a crisscross pattern).

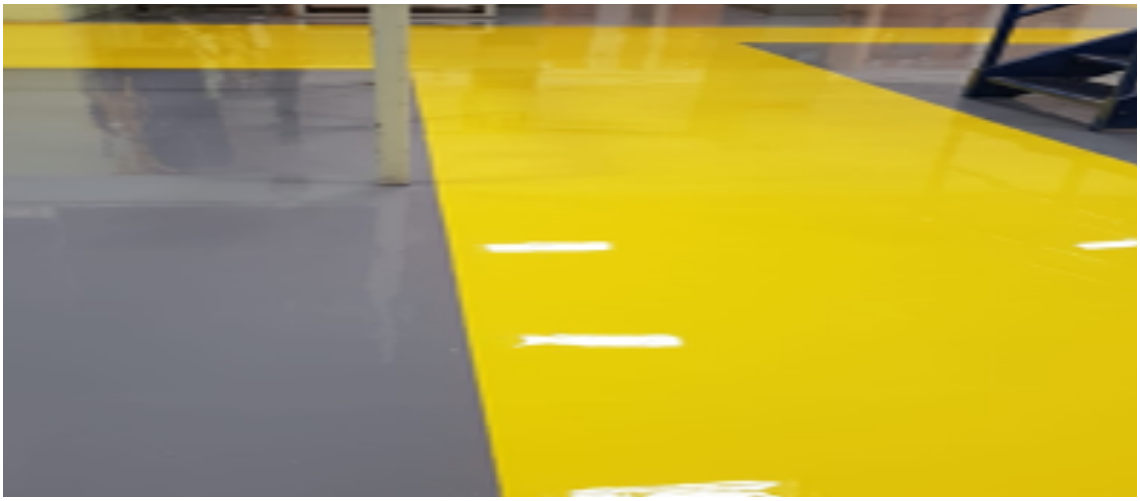
*Mapefloor* System 33 – Smooth, self-leveling finish

- First coat: Apply a priming coat of *Primer SN* with a serrated trowel or squeegee. Back-roll with a short-pile roller (in a crisscross pattern) and broadcast with #32 mesh quartz sand which will create a slip-resistant surface.
- Finishing coat: Apply a finishing coat of *Mapefloor I 302 SL* with a blend of #70 mesh quartz sand using a serrated trowel or screed rake. Roll immediately with a spike roller to remove trapped air.

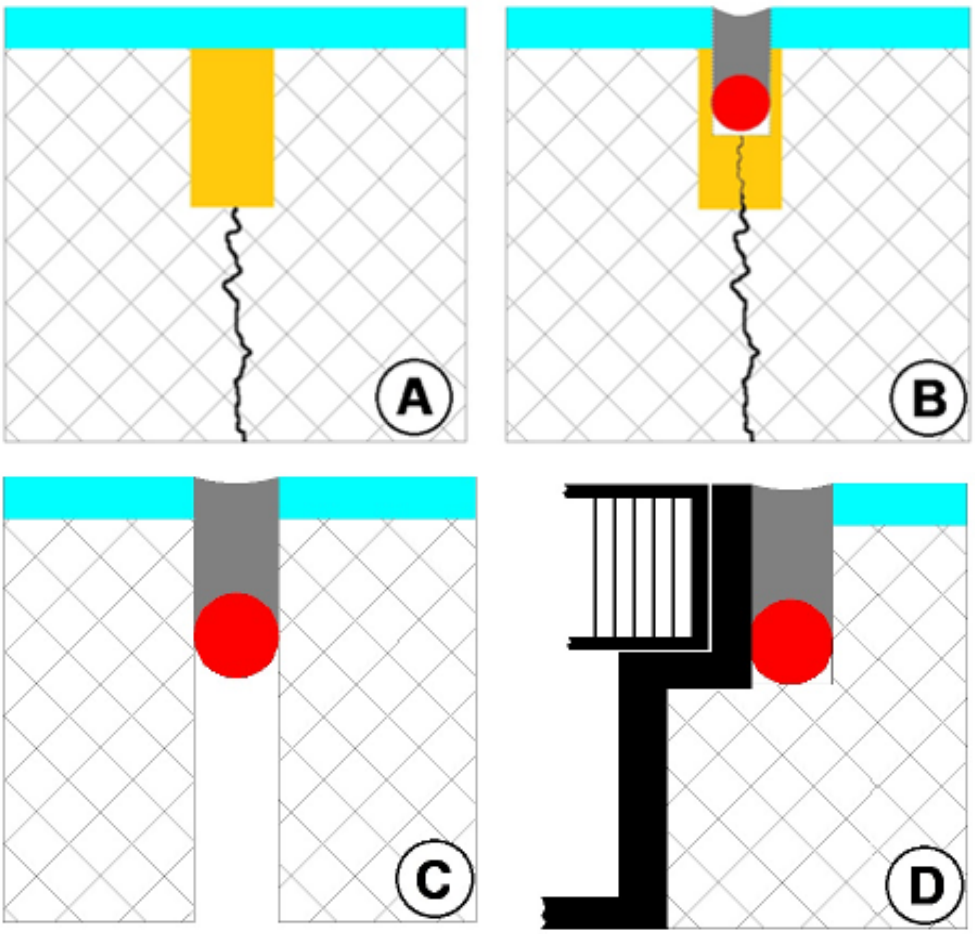
*Mapefloor* System 34 – Smooth finishing coat

- First coat: Apply a priming coat of *Primer SN* with a serrated trowel or squeegee. Back-roll with a short-pile roller (in a crisscross pattern).
- Finishing coat: Apply a finishing coat of *Mapefloor I 302 SL* with a serrated trowel or squeegee and back-roll with a short-pile roller (in a crisscross pattern). Optionally, *Additix PE* can be added for a surface with an orange-peel texture.

# Section 4: System Application



# Section 5: Details




## 5.1 Joints

All movement joints must be reflected on the coating surface (see picture “C”). They can be patched before the coating application, and after the application of the top coat they are sawed in the same position of pre-existing joints.

Contraction joints, as well as all sawed and induced joints, should be theoretically static. They could be patched and covered with a *Mapefloor* system and it shouldn’t be necessary to saw them again (see picture “A”). But if there is any small evidence or doubt that those joints can move, they must be reflected on the resin coating as dynamic joints mentioned before (see picture “B”). If not, *Mapefloor* systems will be damaged by movements.

All those new joints will be sealed with a polyurethane sealant, such as *Mapeflex™ P1 SL* single component, thixotropic, quick-hardening polyurethane sealant and adhesive, with high modulus of elasticity for sealing expansion and distribution joints. It is strongly recommended to apply *Primer SN* and insert Backing Rod Foam closed cell polyethylene foam cord, of adequate section, (25% larger than the nominal joint thickness of the joint), beforehand to obtain the required depth and prevent the sealant sticking to the bottom of the joint.

# Section 5: Details

## 5.2 Drain channels

All connections with drain channels, gullies, catch basin, etc. can be done by making a small retaining groove on the edge, a few millimetres wide and deep. Edge coating terminations should be treated in the same way.

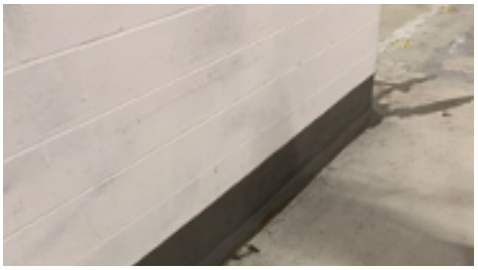
When different expansions due to thermal stresses are expected, e.g.: in the case of installation of prefabricated channels, a sealed joint as shown in the picture will reduce the risk of cracks between the resin coating and the drainage channel (see picture "D" above). Ensure you use *Planibond® EBA* high-modulus epoxy bonding agent, with a full broadcast of #32 to #24 mesh the day before applying a sealed joint around the drain channel. This will ensure a mechanical bond between the metal pan and the *Planibond EBA*.

Some examples of retaining joint near pillars, catch basins, drains, etc.

## 5.3 Coves

The floors to wall joints are probably the most critical details. There could be movements between the floor and the wall. Normally, a foam profile is used to separate the coating from the wall, which if necessary, is later treated like a joint and sealed with a *Mapeflex* product (our Technical Services department can help you determine the best choice for the job). If, for hygienic purposes, a cove is required, a rigid one will probably crack, so a prefabricated cove installed onto the coating surface should be preferable.

Coves could be made with cementitious or resin mortar. Cementitious coves must be perfectly dry before being covered with the resin coating. In general coves are done before the resin coating. The finish layer of the resin coating will be applied also onto the coves to fill the pores and give the same general color and aspect.



# Section 6: Tools and Equipment

Each installer must be provided with the minimum tools and equipment required. Tools and equipment for surface preparation can be rented. The most commonly-used items for surface preparation are the shot blaster, the scarifier, and the grinding diamonds disc equipment. Small grinding tools, as a scrabbler, are often used to prepare edges near the wall, pillars, etc.

Minimum tools required: thermometer and moisture meter to check the dew-point, weighing scale, two electric stirrers with adequate mixing blade, clean containers, spiked shoes, spiked rollers, brushes and wool-rollers, steel and rubber trowels, serrated trowels, smoothers, cleaning tools, etc.

# Section 7: Safety

Each installer must be provided with health and safety equipment like gloves, safety-glasses, safety-shoes, filter masks, helmet, etc. and they must use them. Dust extraction and individual protective masks are recommended for mixing. Check your local health and safety regulations for further information.

Construction chemicals must be handled according the relevant Safety Data Sheets. For any further or more detailed information please consult these documents.

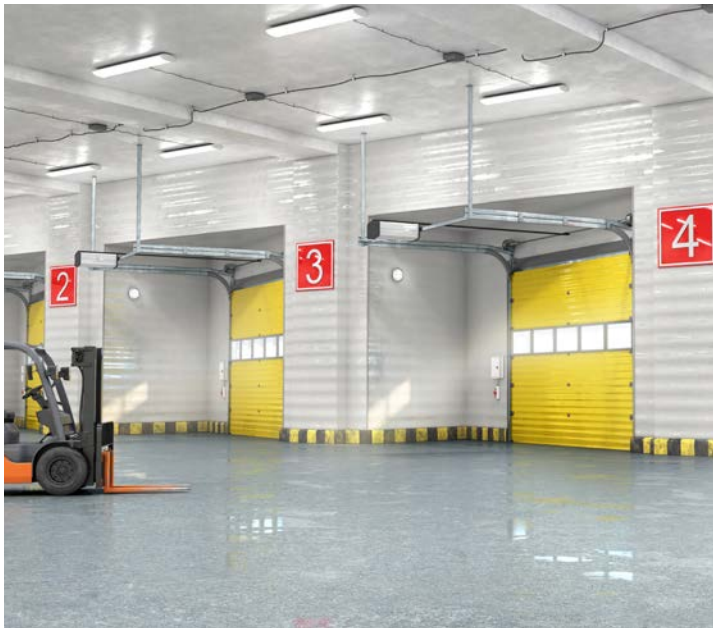
Before a new job-site starts, take note of the nearest hospital or emergency room.

All empty containers, used application tools, dust and waste materials, resin waste etc. must be disposed of according to local legislation.

# Section 8: Acceptance Criteria

The resin coatings and cementitious floor screeds are systems applied on the job-site. The final aesthetic result could be influenced by ambient conditions, installer's skill, type of broadcast quartz sand, ambient pollution, insects, wind, floor surface conditions, slope and flatness, etc.

*Mapefloor* systems are low- to high-build thickness coatings. Depending on the above mentioned influences, the surface aspect may not be perfectly homogeneous; the roughness could be slightly different in some areas, application tool marks may be visible, the slope and flatness may be almost the same as the concrete substrate, the color could not-perfectly match the standard color chart, the colors of different areas may be slightly different, underneath patching and repairing marks could be visible, etc. If those aspects do not affect the technical performances and properties, the coating must be accepted.




# Section 9: Cleaning and Maintenance

All resin coatings and cementitious screeds require adequate maintenance. Cleaning operations must be done using adequate detergents and cleaning tools in order to remove all dirt and pollutants on the floor surface. Any spills of aggressive chemicals (oils, lubricants etc.), must be promptly removed. Mechanical damages must be repaired in order to avoid liquid penetration of the substrate.

The surface properties must be checked in the future; when there will be any evidence of any decrease of those properties, a new treatment with the same top finish used prior for the protection must be done.

Maintenance inspections should be done frequently, with respect to the kind of use and exposures present.

Regular cleaning and maintenance operations increase the life of the treated floor, improve its appearance and reduce its capacity to collect dirt. Floors created using the *Mapefloor* systems are generally easy to wash with neutral detergents, or with alkali detergents diluted at a concentration of from 5% to 10% in water.

For further information, please refer to the specific *Mapefloor* Resin Maintenance Instructions.

A resin can be easily over-coated with itself after cleaning and light surface roughening, so it's advisable to proceed with the maintenance operations when the existing coating is not yet totally removed by wear.

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