

SURFACE PREPARATION

WHAT ARE THE STEPS OF SURFACE PREPARATION?

1. Break, hole, collapse and crack repairing,
2. Corner and sharp curve rounding,
3. Eyelet forming on concrete and repairing,
4. Non-structural layer removing, dusting surface strengthening, segregated (concrete - aggregate segregation) surface repairing,
5. Shiny surface roughening,
6. Tie rod hole filling,
7. Removing of anti-adhesive layers such as molding oil, grease, paint, rust, salt efflorescence,
8. Designation of moisture content in concrete
9. Undercoat selection and its significance.

1. BREAK, HOLE, COLLAPSE AND CRACK REPAIRING

First of all, the surface should be cleared of defects such as break, hole, collapse, if any, before the application of waterproofing material. First, the type of such crack should be determined, and then repaired.

The cracks are separated into two groups by types;

- Non-Structural Cracks
- Structural Cracks

Non-Structural Cracks;

These are superficial cracks called as plaster cracking. These type of cracks are generally static (inactive) cracks, and they have an irregular appearance.

The causes of nonstructural cracks are classified as follow;

- Plastic cracks
Plastic wet shrinkage cracks
Plastic settlement cracks
- Heat stress cracks
- Drying shrinkage cracks

Structural Cracks;

These are cracks on structural reinforced concrete. Such cracks are separated into two group;

- Static, also known as inactive, cracks (fresh concrete cracks);

Settlement cracks
Plastic wet shrinkage cracks
Limited wet shrinkage cracks

- Dynamic, also known as inactive, cracks;

The causes of structural cracks are classified as follow;

- Defects in project design
- Design change
- Overload misused
- Misuse of construction materials
- Fast and hasty construction methods

lead to structural cracks, which occur as inclined cracks near the structural supports of bearings due to shearing forces, and as vertically inclined cracks at sections with high bending moment.

For the repair of these two cracks, they should be opened up in the shape of V by breaking in 3-6 mm range by mechanical methods, and it should be filled by using SUFFIX PUR SEAL 25F, SUFFIX PU SEAL BT2K10, SUFFIX EP REPAIR BOND.

Also, the cracks are grouped according to their method of repair as follow;

The cracks repairable by using repair mortars;

Superficial structural and non-structural cracks are repaired by using various mineral and resin-based products. The cold applied joints and inactive cracks can be repaired by using SUFFIX ER REPAIR BOND after being opened in the shape of "U" in 2-3 cm.

The cracks repairable by injection;

The process of injecting material from crack gap by using a motor pump by the help of steel dowel end (injection packers) by using various mineral and resin-based products for repair of deep cracks is called as injection, and the cracks which are repaired by using this method are called as cracks repairable by injection. For the cracks repairable by injection, you can repair them by using SUFFIX INJECTION PUR 1K or SUFFIX INJECTION PUR 2K.

2. CORNER AND SHARP CURVE ROUNDING

The corners on the points of junction of floor – wall, wall – wall and wall – floor should be rounded by breaking or cutting the sharp corners first and then beveled by using SUFFIX PUR SEALANT 1K or SUFFIX TPE-BASED BEVEL BAND.

3. EYELET FORMING ON CONCRETE AND REPAIRING

The eyelet is the hole formed due to the air trapped inside the mold. These air voids should not be confused with the segregations depending on the factors such as the greatness of maximum aggregate diameter, the frequency of reinforcement, the non-use of vibrators etc. There is a rate of air void allowed in the ready-mixed concrete. This differs by the technical specifications, it does not pose any risk statistically, but the eyelets comes up with negative effects during the waterproofing or floor coating process. During surface preparation stage, the necessary repair procedures must be carried out on the eyelets after wiping. The surface with eyelets should be corrected by adding 0.1 - 0.3 silica quartz sand into SUFFIX EP REPAIR BOND, SUFFIX PRIMER FILLER or SUFFIX PRIMER EP in the rate of 1:5 by using a flat steel trowel during the repair process.

4. NON-STRUCTURAL LAYER REMOVING, DUSTING SURFACE STRENGTHENING, SEGREGATED (CONCRETE - AGGREGATE SEGREGATION) SURFACE REPAIRING

The non-structural layers, lime stuff, oil absorbing cement floor etc. on mineral-based surfaces should be fully removed before the application.

These layers can be removed by

- Mechanical cracking process,
- High pressure water (water jet),
- Wet or dry blasting,
- Milling,
- Mechanical brushing or
- Shot blasting, grid blasting etc.

By removing such layers, the waterproofing layer can provide full adherence to application surface. There may be weakness on concrete surface due to insufficiency of concrete quality or negative external factors during concrete manufacturing. Such weakness may cause dusting or loose pieces. Before application, such surfaces should be scratched out to solid structure or strengthened by using proper methods. The surface can be cleared of loose parts by using mechanical methods. Following the process, wait for the dust to settle for a while, and then sweep by using an industrial vacuum cleaner to remove dust from the surface.

This method provides both removal of loose parts from the surface and the elimination of the materials such as oil, wax reducing adhesive strength.

If there are segregated (concrete-aggregate segregation) surfaces, they should be repaired before the application of waterproofing layer. Such a segregated area should be cleared of loose pieces by mechanical methods, and it should be filled by using a repair mortar. The grain-size distribution of material should be considered to prevent segregation from the very beginning, and the molding conditions should be provided. Otherwise, the segregated concrete leaks and loses its bearing strength.

5. SHINY SURFACE ROUGHENING:

The shiny or low adhesive surfaces preventing adhesion of materials are roughened by mechanical methods.

The methods to be used for roughening;

- High pressure water (water jet),
- Wet or dry blasting,
- Milling,
- Mechanical brushing or,
- Shot blasting, grid blasting etc.

6. TIE ROD HOLE FILLING

These are holes which are used to insert iron bars for fixing of molds during concrete manufacturing process. These holds should be filled before waterproofing process. If there are plastic pieces in the holes, they are also removed. If there are reinforcement bars on surface, their concrete surface should be broken and cut inside to 2 cm at least. Such types of holes and gaps should be filled by using highly adhesive epoxy repair mortar SUFFIX EP REPAIR BOND.

7. REMOVING OF ANTI-ADHESIVE LAYERS SUCH AS MOLDING OIL, GREASE, PAINT, RUST, SALT EFFLORESCENCE

Degreasing;

The molding oil should be cleaned to prevent adhesion on surface. Various methods are used for it. These methods are as follow;

- Torch burning,
- Surface abrasion by using mechanical methods,
- Pressure water washing with detergent,
- Chemical solvent washing.

Among these cleaning methods, the relevant precautions should be taken against the danger of flame during torch burning and risk of flashing due to overheating of concrete.

Salt Efflorescence;

When the mineral-based building materials come into contact with water, the available and water-soluble salts rise to the surface. Such salt risen to the surface as a result of water evaporation may cause to salt efflorescence. Such type of salt efflorescence decreases the waterproofing layer's adherence to surface, so that it should be fully cleared before the application. This process should be made by using pressure water, wet blasting or special cleaning materials.

Corrosion (rust) Repair;

The abrasion and degradation of the reinforcement metals due to the electro-chemical reaction with their environment, is called as corrosion. Due to corrosion, the concrete on the reinforcement surface cracks and breaks into pieces depending on the ambient conditions. With the exposure of reinforcement, the corrosion rate is further increased. If the necessary precautions have not been taken and there is corrosion due to various reasons, these parts should be repaired.

In the repair of corrosion (rusty surface); the loose parts around rusty surface should be immediately removed. Then, all sides of corroded reinforcement should be scratched and removed, or it should be opened properly for repair. And then, the corrosion on surface is fully removed by scratching. Connect the new reinforcement to this area by stretching (as overlapped). The length of this additional reinforcement is higher than the corroded area, so the area in such length should have been opened. Clean this area by using pressure air. SUFFIX PRIMER EP is applied on this reinforcement, and then this area should be filled by using a cement-based

highly-resistant repair mortar or epoxy-based SUFFIX ER REPAIR BOND.

8. DESIGNATION OF MOISTURE CONTENT IN CONCRETE

In order to prevent the damages arising from melting, swelling, freezing, cracking, shrinkage, decomposition, shocking, breaking, inflorescence, color fading in building materials, swelling, suberication in wood building materials and corrosion in metal building materials due to water-moisture exposure; it is important to prefer suitable details and materials conforming to standards, and to have qualified personnel for application. The moisture measurement tests should be performed by the personnel on the concrete application surfaces so as to control the dryness of surface before the application.

It should be properly calibrated before using the measuring device according to the type of lower layer. The surface should have minimum 25 N/mm² pressure resistance and minimum 1.5 N/mm² pull-off test result. The new concrete should be poured at least 28 days ago, and the concrete surfaces should have maximum 4-8% humidity. When the moisture content is high, it should be reduced to the desired level by using a drying device.

The conditions necessary for the application as follow;

- The relative humidity of the air should be maximum 90%, and the application temperature (environment and surface) should be between +5°C and +35°C.
- The application surface should not be exposed to rain for 24 hours before, during and after the outdoor application.
- The floor temperature should be 3°C higher than the present dewing temperature.

After all these conditions are provided, as the surface preparation processes are almost the same for each type of application, the relevant surface is cleared by shot blasting, grid blasting etc., and then it is cleaned by using an industrial vacuum cleaner to begin the undercoating process.

9. UNDERCOATING SELECTION AND ITS SIGNIFICANCE

Almost all types of single or two-component resin-based materials used to support the process of filling holes in the concrete and dust-freeness of surface, have excellent penetration, and they are used in the surface preparations for the application of epoxy, polyurethane and polyure-based coatings so as to provide strength and adhesion of layers. The highly absorptive surfaces such as concrete, cement floor or wood can be undercoated after being filled with SUFFIX PRIMER PUR 1K in advance as impregnation undercoating.

The most important issue is to prefer proper undercoating according to the structure of application surface. You can check the undercoating selection table below according to the application surfaces.

CHARACTERISTICS OF APPLICATION SURFACE	Primer EP Barrier	Primer EP	Primer EP Filler	Primer PUR 1K	Primer PUR 2K
Humidity Rate $\leq 4\%$		✓		✓	
Humidity Rate 4% - 8%	✓				
Humidity Rate 8% - 12%					✓
Uneven Concrete Surfaces with eyelets			✓		
Metal, Aluminum, Marble, Ceramic, Galvanized Surfaces					✓
Wood	✓				✓
PVC					✓
Highly Absorptive Surfaces				✓	
Bitumen Coated Surfaces				✓	✓

The prepared mixture is applied by saturating the surface and filling the pores by using a roller or airless spray after the proper undercoating is selected. These reaction-cured products reach its full mechanical and chemical resistance in almost 7 days. The other important issue is to consider the mixture life of the two-component undercoatings and prepare it according to the specified mixing rate.

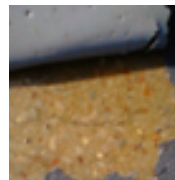
Some sections from surface defects,



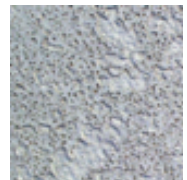
Expansion due to moisture on lower surface



Swelling due to sand on undercoating and the gap between sand particles



Adhesion weakness due to late waterproofing on undercoating



Defect on surface with rough preparation

SURFACE PREPARATION METHODS

The concrete surface preparation should be conducted by using one of the methods given in the pictures. Our technical staff would be pleased to help you for different surfaces and preparation processes.



Wiping



Crack Filling



Milling



Shotblasting



Surface Washing