

**Polybit**



**Concrete Repair  
and Protection Solutions**

**Henkel**

**Quality for Professionals**

# HENKEL AT A GLANCE


Henkel operates globally with a well-balanced and diversified portfolio. The company holds leading positions with its three business units in both industrial and consumer businesses thanks to strong brands, innovations and technologies. Henkel Adhesive Technologies is the global leader in the adhesives market – across all industry segments worldwide. We utilize our global presence and our expert knowledge to offer a winning combination of best-in-class service and leading technologies to customers and consumers around the world. Founded in 1876, Henkel looks back on more than 140 years of success, employing around 53,000 people globally – a passionate and highly diverse team, united by a strong company culture, a common purpose to create sustainable value and shared values.



**HEADQUARTERS**  
in Düsseldorf, Germany



**GLOBAL PRESENCE**  
of Henkel products in over 120 countries




**+53,000 EMPLOYEES**  
from 120 nationalities



**+140 YEARS**  
of success with brands and technologies




**185 PRODUCTION SITES**  
across the globe




**BRANDS & BUSINESSES**  
globally recognized across various industries

## Leadership in Sustainability


As pioneers in sustainability, we want to drive new solutions for sustainable development while shaping our business responsibly and driving our economic success. These aspirations are firmly anchored in our company values. With the global population expected to increase to 9 billion by 2050, natural resources will be more and more consumed, without nature being able to replace them at the same rate. Having this in mind, it is required that new solutions are developed for people to live in a good life standard, while consuming less resources. The key goal of Henkel's sustainability strategy is finding new ways of enhancing the quality of life using the least amount of resources possible. By improving our products and solutions through innovation, Henkel aims to create more value at a reduced ecological footprint.




Overall resource efficiency improved by <sup>1</sup>  
**+64%**




Improved safety per million hours worked <sup>1</sup>  
**+50%**



Electricity consumed from renewable sources  
**56%**



Less CO<sub>2</sub> emissions per ton of product <sup>1</sup>  
**-44%**



Reduced water consumption per ton of product <sup>1</sup>  
**-28%**



Reduced plastic usage in our product packaging<sup>2</sup>  
**-15%**

<sup>1</sup> Figures relate to fiscal 2020 compared to the base year 2010.  
<sup>2</sup> The share for the Adhesive Technologies business sector is based on an estimate.

# CONCRETE PROTECTION

## WHY IS IT NEEDED?

Protective and remedial systems may be applied onto concrete to protect it against chemical or mechanical effects. In principle, such systems are designed primarily to enhance structural durability and extend service life performance. To successfully implement a protective system, technical considerations are essential to sound decision-making in all cases. It is important to understand and access all the requirements and what would the structure be subject to when choosing a Concrete Protection material. Some of the factors to consider when selecting such materials are:

- Physical Resistance
- Chemical Resistance
- Chlorine and Sulfate Resistance
- Carbonation Resistance
- Protection Against Ingress
- Durability
- Moisture Control

Henkel Polybit offers a wide portfolio of products for Concrete Protection such as Impregnations and Coatings within several technologies like Polyurethane, Epoxy, Silane/Siloxane and Acrylic.

## PROTECTION METHODS FOR CONCRETE STRUCTURES



### COATINGS

Coatings produce a continuous protective layer on the concrete substrate.

### HYDROPHOBIC IMPREGNATIONS

Hydrophobic impregnations create a water-repellent layer reducing the penetration of water into the concrete, but allows evaporation through the coating, thus contributing to the reduction of moisture inside the concrete. This method can be used to prevent or reduce corrosion of reinforcement by chlorides or the attack of sulphates.

### IMPREGNATIONS

An impregnation is the application of a liquid product of low viscosity that is absorbed and that, partially or completely, fills the pores and capillaries of the concrete. This reduces surface porosity and strengthens the surface. This treatment produces a discontinuous fine line on the concrete surface that hardens and, in some cases, with increased wear resistance, limits the effects of abrasion.

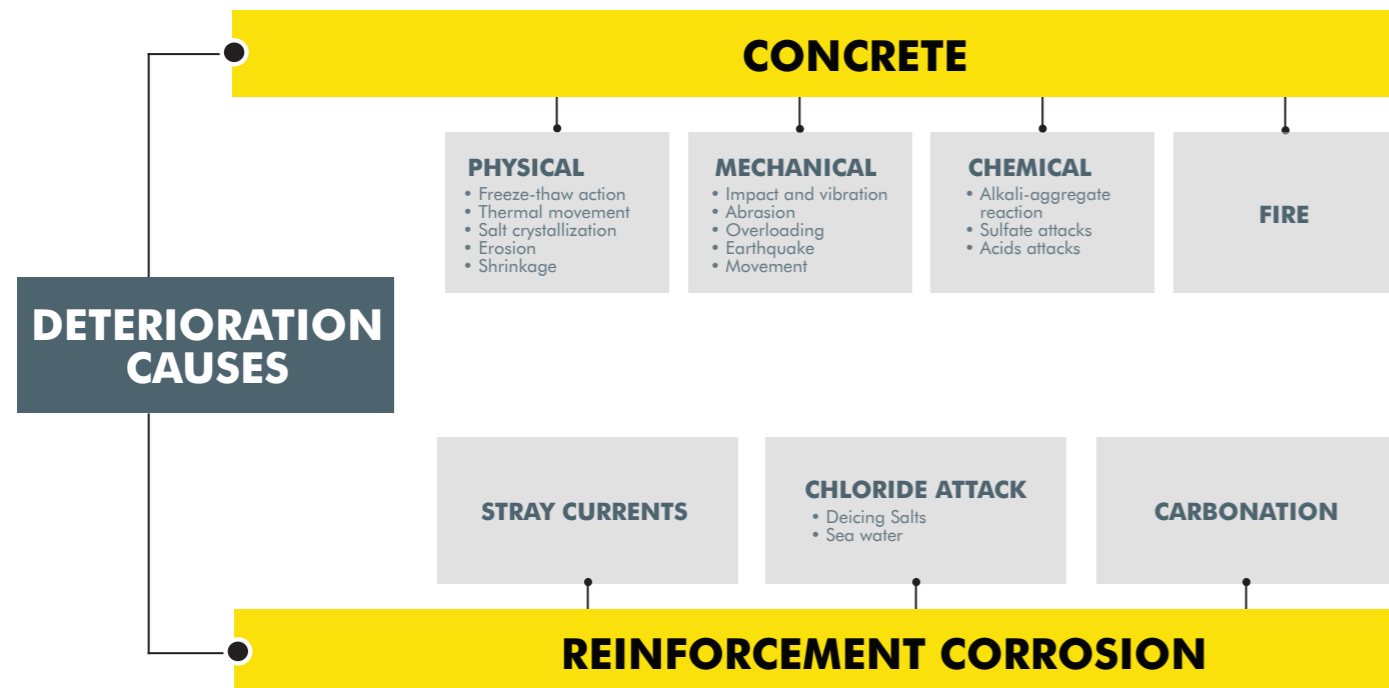


# REINFORCED CONCRETE & DETERIORATION CAUSES

Given the chemical nature of concrete, its macro and microstructure are constantly changing, due to its porous structure being always in contact with the environment. The existence of reinforcement inside the concrete and its deficient protection can lead to accelerated corrosion processes, causing severe damages that can jeopardize the stability of the structure. Damages in concrete can occur at a very early stage in new structures as a result of design or execution as well as at a later stage of the service life of the structure during its operation, which refer, essentially, to the mechanical, physical and chemical action that the structure may be exposed to. The repair, protection and reinforcement of concrete structures can be a complex process with challenges that differ from job to job, so it is vitally important to go through a thorough and detailed process including analysis, planning, preparation, and execution to ensure successful end results. Henkel Polybit has a range of versatile products and solutions specifically aimed at repairing and protecting concrete against corrosion, exposure to marine environments, chemical attack, abrasion and many other environmental factors.

## COMMON CAUSES OF REINFORCED CONCRETE DETERIORATION

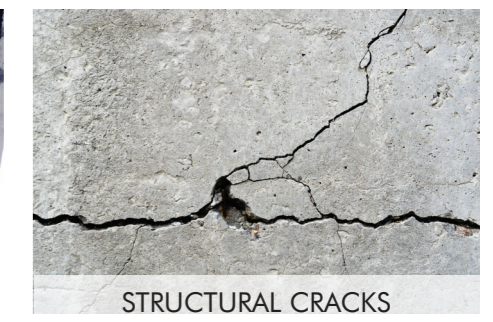
Before deciding which repair method to adopt, it is essential to understand what caused the defects in the structure so that the root cause can be eliminated. It is not sufficient to apply the repair material as, if the source of damage isn't eradicated, defects will reappear and, therefore, the repair will not last. This is one of the principles for a repair to be effective and durable. In the table below are identified the main causes of concrete deterioration and reinforcement corrosion.



## REINFORCED CONCRETE AND ITS DEFECTS

Concrete damages can occur before the start of the construction, in the design phase, during the construction phase through execution errors and during normal use of the construction due to biomechanical actions or the action of the environment and as a result of unpredictable natural disasters or even when a reinforced concrete structure undergoes a change in service conditions. Generally speaking, concrete damages can be divided into two main groups: structural damages, which can lead to severe deterioration in the structure that may endanger the safety of the building and its residents, and non-structural damages, which are characterized usually by minor surface defects that do not affect the safety of the structure but may look unsightly to the building users. Below are highlighted defects commonly present in reinforced concrete, structural and non-structural.

### STRUCTURAL



### NON-STRUCTURAL

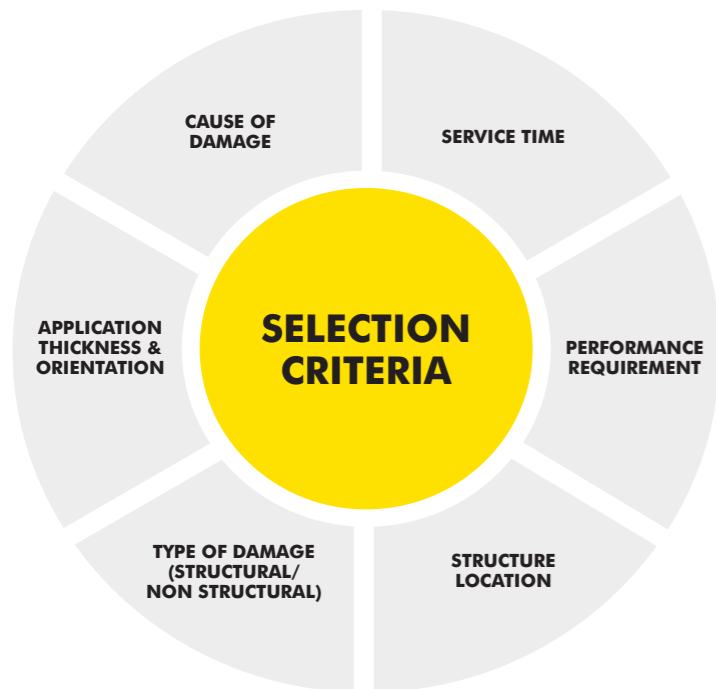




# CONCRETE REPAIR

## HOW TO CHOOSE THE RIGHT CONCRETE REPAIR MATERIAL?

Concrete repair consists of replacing damaged or contaminated concrete with an appropriate repair material. This method can generally be applied to all deterioration processes, with the aim of improving the original structural capacity of degraded concrete or just solving aesthetic problems. There are several key factors to be considered when choosing the right material to repair damaged concrete, being mentioned a few of them below:



Once all these aspects have been analyzed (and others that may be relevant), the most appropriate type of intervention may be selected, taking into consideration the cause or combination of causes which provoked the deterioration and the conditions to which the structure will be exposed.

## REPAIR MATERIAL APPLICATION METHODS

### HAND APPLIED REPAIR MATERIALS

This technique consists of applying a repair material in successive layers on vertical, overhead and horizontal surfaces. The material should have low shrinkage to prevent cracking and delamination so that the repair will be durable. An advantage of this method is that it does not require the use of a lot of equipment, but it is not recommended to be used when the reinforcements are too congested in the area to be repaired, to avoid the formation of voids around them.



### SPRAY APPLIED REPAIR MATERIALS

The repair material is projected under pressure at high speed, onto the previously prepared surface, thus combining the placement and compaction processes. The repair material can be applied dry or wet:

#### DRY

The repair material is transported dry along the entire length of the hose, up to the cannon, where water is added, to promote the hydration of the mixture.

#### WET

Water is immediately added to the repair material mixture, which is then transported by the hose, to the cannon, where additional air is introduced to increase the projection speed.

This technique is mainly adopted in large scale projects where traditional hand applied mortar would not be a time effective solution to restore the integrity of the structure.



### INJECTION CHEMICALS

This method implies the injection of low-viscosity resins into concrete cracks in order to restore the structural integrity and durability of the structure or stop the water leakages through the cracked surfaces.



### RECASTING OF REPAIR MATERIALS

Recasting with concrete is a technique that involves the application of a free-flowing repair mortar that is formulated to exhibit excellent flow characteristics through gaps and areas with congested steel reinforcement without bleeding and segregations. This process is widely used to restore damaged concrete in slab on grade, concrete pavement and pile heads. It is also highly recommended to repair deeply deteriorated concrete in vertical elements such as walls and columns when applied inside well-prepared and erected form-work.

### SPECIAL MORTARS

Henkel Polybit has a solution for all the problems and, as such, we have developed special mortars for the most uncommon applications, within the scope of repairs.

#### POLYQUICK

Fast-setting cementitious repair mortar for water leaks and emergency repairs, which sets in 1-2 minutes.

#### POLYCRETE XPRESS

Fast-setting cementitious mortar for indoor and outdoor applications for rapid repair, anchoring, fixing and assembly, which sets in 5-20 minutes.

# HENKEL POLYBIT CONCRETE REPAIR AND PROTECTION SOLUTIONS

	Product Type					Concrete Restoration application methods			Type of Damage		Protection Against Ingress	Moisture Control	Physical Resistance	Chemical Resistance	Structural Strengthening	Control of anodic areas
	Mortar	Grout	Coating	Hydrophobic Impregnation	Injection	Hand	Spray	Recasting	Non-structural	Structural						
<b>HENKEL POLYBIT PRODUCTS</b>	Polycrete FC	•				•			•							
	Polycrete FCX	•				•			•							
	Polycrete ST	•				•	•			•			•			
	Polycrete MC	•						•		•			•		•	
	Polyquick	•				•			•	•						
	Polycrete XPRESS	•				•			•	•						
	Polyoxy NF	•				•			•				•		•	
	Polyoxy BF	•				•			•				•		•	
	Polygrout EY 3000(PH)		•					•		•			•		•	
	Polygrout EY 3000(HS)		•					•		•			•		•	
	Polygrout EY 3000(HF)		•					•		•			•		•	
	Polygrout NS		•					•		•			•			
	Polyoxy MH	•				•				•			•	•	•	
	Polycure AC			•							•	•				
	Polyguard 101			•							•	•	•	•		
	Polyrelease WB			•												
	Polyrelease			•												
	Polyoxy CT			•							•	•	•			
	Polyoxy CR			•							•	•	•	•		
	Polyoxy EN			•							•	•	•	•		
	Polyoxy PS			•							•	•	•	•		
	Polyzinc			•												•
	Polyxane				•						•	•		•		
Polyinject range					•					•				• <sup>1</sup>		

<sup>1</sup> Polyinject EP





# PROJECT REFERENCES



**Project:** Museum of the Future  
**Location:** Dubai  
**Products Supplied:** Polycrete MC, Polybond AC, Polybond EP, Polygrout NS



**Project:** Warner Bros. Theme Park  
**Location:** Abu Dhabi  
**Products Supplied:** Polycrete MC, Polygrout GP, Polybond SBR, Polypoxy CT, Polygrout NS, Polyrelease, Polycure AC



**Project:** Port de La Mer  
**Location:** Dubai  
**Products Supplied:** Polycrete MC, Polycrete ST, Polycrete FC, Polygrout NS



# Polybit



**Henkel**

**Henkel Polybit Industries Ltd.**

PO Box: 293, urnm Al Quwain, UAE  
Phone: +971 (6) 76 70 777  
Fax: +971 (6) 76 70 197  
[henkelpolybit@henkel.com](mailto:henkelpolybit@henkel.com)

**Henkel Polybit Industries Ltd.**

PO Box: 5911, Dammam - 31432  
Industrial Area - II, Kingdom Of Saudi Arabia  
Phone: +966 13 808 4061 / 62  
Fax: +966 13 812 1164  
[polybitdammam@henkel.com](mailto:polybitdammam@henkel.com)

[www.henkelpolybit.com](http://www.henkelpolybit.com)

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