



## Concrete Restoration

# RESTAURO R3

**Premixed, single-component, anti-shrinkage, semi-rapid, pre-mixed mortar for concrete and reinforced concrete reconstruction and protection, PCC type and class R3 according to EN 1504-3.**



- High mechanical strength
- Great thixotropy
- Anti-shrinkage
- Applicable in thickness between 10 and 40 mm for structural rehabilitation and greater than 5 mm for the rehabilitation of the concrete cover in situation localized
- Manually and mechanically applicable



### APPLICATION AREAS

- Volumetric restoration of concrete structures degraded by carbonation or other types of degradation, provided that the structures have not suffered major structural failure; if very high mechanical strength is required, use Strutturale, Restauro R4 or Colabile instead.
- Reconstruction of the concrete cover of structures subject to mechanical stresses and deformations during operation, for example, pillars, beams, retaining walls, viaducts and bridges.
- Renovation of balcony fronts, steps, parapets, and stringcourses.
- Protective coating of irrigation channels and other hydraulic works in reinforced concrete.

### TYPES OF SUBSTRATE

Reinforced concrete in general.

### TYPE OF MATERIAL TO BE LAID

4 cm each coat, 8 cm total.

## FEATURES

Restauro R3 is a single-component, ready-to-use, grey-coloured cementitious mortar, based on a mixture of special cements, selected aggregates, synthetic resins, fibres and specific additives. After mixing with water, the result is a mixture with excellent workability, excellent thixotropy, easy to apply vertically and on the ceiling in thickness up to 4 cm per coat without problems of dripping. A slight expansion both in the plastic phase and in the post-hardening phase makes it possible to compensate for hydraulic shrinkage, with a considerable increase in the final adhesion characteristics, while avoiding cracking. Its excellent water retention reduces the risk of "burning" in the case of application at low thickness (which must not be less than 10 mm) and, with appropriate attention, even in critical climatic conditions (summer temperatures and ventilation); in this case, however, it is necessary to take appropriate precautions (avoid direct exposure to the sun, mix with cold water, apply the product preferably during cooler hours and little sunshine, etc.). The presence of special flexible polymers gives the mortar excellent adhesion to the substrate. Specific additives make the hardened mortar impermeable to water and resistant to CO<sub>2</sub> penetration. Restauro R3 is a product for the structural repair of concrete structures by means of hydraulic mortar of PCC type and class R3 according to EN 1504-3.

## WARNINGS

- Never mix with other binders such as cement, hydraulic lime, gypsum, etc.
- Do not add water when the mixture has already started setting.
- Stop using the mixed product when it has already started to set, so take care to prepare from time to time a quantity of mixture that can be applied within its workability time
- Do not use the product at high temperatures and with strong ventilation. Protect from direct sunlight. In the hot season, wait for the cooler hours to apply, mix with cold water and protect the surface from ventilation.
- To prevent surface cracks from forming in the plastic mortar due to the too rapid evaporation of the mixing water, especially in the hot season, and to ensure that the expansive action which cancels the effects of mortar shrinkage is carried out, the fillings and repairs carried out with Restauro R3 must be kept damp for at least 24 hours and protected from the wind and direct sunlight by spraying the surface with nebulised water or covering with polyethylene sheets.
- Do not apply Restauro R3 at temperatures below +5 °C or above +30 °C.

## INSTRUCTIONS FOR USE

### Preparation for use

The application surfaces must be clean and and severely roughened. Remove cement residues and loose, crumbling, inconsistent parts until the sound, durable substrate is reached. Remove rust from the iron bars. If the section of the bars is weakened, supplement them with additional iron bars. Wash with a pressurized water jet. Apply water on the substrate until it is rejected. In the event of water seepage or water penetration, block these with quick-setting or very quick-setting mortars such as Umafix and Stop. For an effective adhesion on the substrate and/or corrosion protection of the reinforcement, apply Restauro Ferri (see the relative technical data sheet).

### Instructions for application

Mix Restauro R3 with 14-16% of water (equal to 3.5-4.0 litres of water per 25 kg bag) and stir for a few minutes until the mixture is homogeneous and free of lumps. Apply the mortar by hand with a masonry trowel or American trowel or by spraying with a suitable plastering machine. In the summer season, mix Restauro R3 with cold water and apply it away from the sun or protect it adequately from the direct sunlight. In places particularly exposed to ventilation and sunlight, mix Restauro R3 with 1:4 diluted Neoplast Latex – water solution and protect the applied mixture. For better adhesion of the fillings, it is advisable to spread on the substrate an adhesion grout made of Restauro R3 mixed with Neoplast Latex diluted in water 1:2 working fresh on the fresh substrate (see Neoplast Latex technical data sheet). Restauro R3 can be applied using a piston or worm plastering machine and continuous mixing machines such as Turbosol, Putzmeister or PFT.

### Cleaning

The tools used for laying can be cleaned with water before the mortar hardens; afterwards cleaning can be carried out only by mechanical removal.

## TECHNICAL SPECIFICATIONS

| PARAMETER | VALUE | REQUEST EN 1504-3 |
|-----------|-------|-------------------|
|-----------|-------|-------------------|

| POWDER PRODUCT VARIATION                         |   |  |
|--|---|--|
| Consistency                                      | Powder  |  |
| Bulk density (MIT 13*)                           | 1400 kg/m <sup>3</sup>                              |  |
| Particle size (EN 12192-1)                       | 0-3 mm  |  |
| Water-soluble chlorides (EN 1015-17)             | ≤ 0.05%   | ≤ 0.05%                                      |
| FRESH MIXTURE VARIATION                          |   |  |
| Mixing water                                     | 14 – 16 % water (3.5-4.0 litres of water per 25 kg) |  |
| Mixture density (EN 1015-6)                      | 2.130 kg/m <sup>3</sup>                             |  |
| Mixture consistency                              | thixotropic   |  |
| Setting times (EN 196-3) setting start           | approx. 50 minutes                                  |  |
| Setting times (EN 196-3) setting end             | approx. 100 minutes                                 |  |
| Mixture workability time (EN 13395)              | approx. 40 min                                      |  |
| Application temperature                          | from +5 °C to +30 °C                                |  |
| Consumption                                      | approx. 19 kg/m <sup>2</sup> each cm of thickness   |  |
| HARDENED PRODUCT VARIATION                       |   |  |
| Operating temperature                            | from -20 °C to +90 °C                               |  |
| Flexural strength (EN 12190) after 28 days       | 8.0 MPa   |  |
| Compressive strength (EN 12190) after 28 days    | 60.0 MPa  | ≥ 25 MPa                                     |
| Compressive modulus of elasticity (EN 13412)     | 28 GPa  | ≥ 15 GPa                                     |
| Adhesion bonding (EN 1542)                       | 2.5 MPa   | ≥ 1.5 MPa                                    |
| Resistance to carbonation (EN 13295)             | Specification passed                                | d <sub>k</sub> ≤ control concrete            |
| Shrinkage/expansion prevented (EN 12617-4)       | 2.3 MPa   | Bond strength after testing: ≥ 1.5 MPa       |
| Thermal compatibility (freeze-thaw) (EN 13687-1) | 2.4 MPa   | Bond strength after 50 cycles: ≥ 1.5 MPa     |
| Capillary absorption (EN 106213057)              | 0.1 kg/m <sup>2</sup> h <sup>0.5</sup>              | ≤ 0.5 kg/(m <sup>2</sup> •h <sup>0.5</sup> ) |
| Reaction to fire (EN 13501-1)                    | Class A1  | Manufacturer's declared value                |
| Product classification (EN 1504-3)               | R3 PCC  |  |

1 MPa equals 1 N/mm<sup>2</sup>\* Torggler's Internal Methods (MIT) are available on request.

|                |         |
|----------------|---------|
| Color          | Grey    |
| Packaging      | bag     |
| Packaging size | 25 kg   |
| Pallet         | 50 bags |

## CONSUMPTION

The consumption of Resaturo R3 is approx. 19 kg/m<sup>2</sup> each cm of thickness.

## STORAGE

Restauro R3 must be stored in a dry and sheltered place. In the original closed bags it is kept for at least 9 months. **PROTECT FROM HUMIDITY.**

## CERTIFICATIONS

Product classified R3 PCC according to EN 1504-3.

Additional certifications and tests performed:

- The product can be applied for exposures XC 1-4, XF 1-4, XW 1-2, XD 1-3, XS 1-3, XM 1, XA 1-2 and X0 according to EN 13396 "Products and systems for the protection and repair of concrete structures – Test methods – Measurement of chloride ion ingress".
- High resistance to freeze-thaw salts – detection by CDF method
- High resistance to chloride penetration – detection by chloride migration coefficient test (test according to EN 13396)
- Complies with water resistance under pressure according to DIN 12390-8
- Factory production checks according to DIN EN 1504-3
- Company certification according to DIN EN ISO 9001: 2015
- Meets the requirements of building material class A1 (non-combustible) according to European Commission Decision 2000/605 / EG of 26 September 2000 (published in the Official Journal L258)
- Cements: according to DIN EN 197-1
- Aggregates: according to DIN EN 12620

| Legend of classification according to EN 1504-3 |  |
|---|--|
| CC  | Hydraulic mortars and hydraulic concretes                          |
| PCC   | Polymer hydraulic cement mortars or concretes                      |
| PC  | Polymer binder-based mortar or concrete with calibrated aggregates |
| P   | Reactive polymer binders   |
| R1  | Non-structural mortars with compressive strength $\geq 10$ MPa     |
| R2  | Non-structural mortars with compressive strength $\geq 15$ MPa     |
| R3  | Structural mortars with compressive strength $\geq 25$ MPa         |
| R4  | Structural mortars with compressive strength $\geq 45$ MPa         |

The information contained in this document is reported on the basis of our experience and knowledge; therefore, any recommendations and suggestions made are without any guarantee and must be verified before using the product by those who intend to use it, who assume all responsibility that may result from its use since the conditions of use are not under our direct control. In case of doubt, it is always advisable to make preliminary tests and/or ask for the intervention of our technicians. Torggler reserves the right to modify, replace and/or delete the items, as well as to change the product data in this document without prior notice; in this case the indications given here may no longer be valid. Always refer to the latest version of the data sheet, available at [www.torggler.com](http://www.torggler.com). Version 04.02.2021.