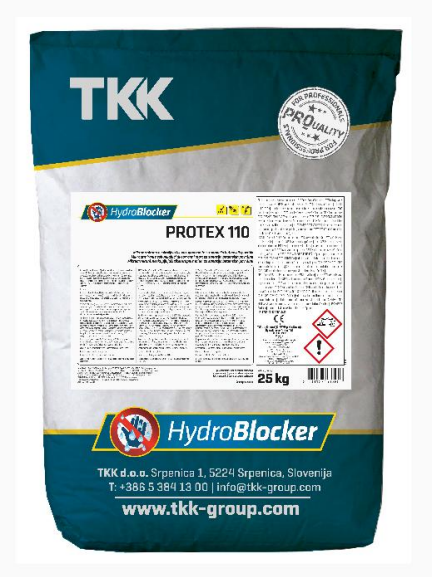
PROTEX 110

Fibre-reinforced non-shrink thixotropic mortar for the rehabilitation of concrete surfaces

DESCRIPTION AND FIELD OF APPLICATION

Hydroblocker Protex 110 is a one-component ready-mix dry mortar prepared with high quality cement, selected sands and special chemical additives that ensure good workability, cohesiveness and swelling of fresh mortar, consequently compensated shrinkage and greatly reduced risk of cracking , high compressive strengths and durability of hardened mortar. It is reinforced with fibres that reduce the risk of cracking due to drying of the mortar. The fresh mortar is thixotropic and therefore particularly suitable for structural repairs of sloping, vertical and overhead surfaces.



In accordance with the principles of the EN 1504-9 standard: Products and systems for the protection and repair of concrete structures - General principles for the use of products and systems is suitable for:

- concrete restoration by manual application or spraying of mortar according to methods 3.1 and 3.3,
- structural strengthening or increasing the load-bearing capacity of the concrete structure by increasing the cross-section (adding mortar) according to method 4.4,
- preserving or restoring passivity of reinforcement by increasing the cover or replacing contaminated or carbonated concrete according to methods 7.1 and 7.2.

Hydroblocker Protex 110 is used for the repair of damaged concrete and mortar wherever it is particularly important to avoid mortar shrinkage, where high early and final strength are required (faster work progress), as well as high durability:

- girders, columns and lintels of bridges and viaducts,
- water treatment plants,
- energy facilities: hydroelectric power plants, thermal power plants, nuclear power plants,
- industrial facilities,
- precast concrete elements,
- filling rigid joints between concrete elements,
- filling rigid joints of stone walls.

The recommended application thickness in one layer is 3-15 mm, but this varies depending on the location and roughness of the surface to be repaired. When applying thicker coats in multiple layers, apply the next layer only after the previous layer has adhered well and is stable, but has not completely set yet.

ADVANTAGES OF USE

Fresh mortar

- easy preparation: add only the required amount of water at the construction site,
- easy application: by hand or by machine (dry or wet spray technique),
- does not excrete water - does not "bleed",
- easy smoothing,
- reduced risk of cracking due to plastic shrinkage.

Hardened mortar

- excellent compatibility with the substrate,
- high alkaline reinforcement protection,
- excellent mechanical properties (high compressive, adhesion, flexural strength),
- excellent adhesion to old concrete,
- compensated shrinkage,
- resistance to carbonation,
- low capillary water absorption,
- high resistance to water penetration,
- high resistance to negative water pressure,
- high resistance to temperature changes,
- high resistance to freezing and salts,
- high abrasion resistance.

TECHNICAL CHARACTERISTICS

Characteristic	**Declared value**
Colour and appearance	Grey powder
Maximum aggregate grain size	1 mm
Chloride ion content	≤ 0,05 %
DATA FOR FRESH MIX (20 °C, 55% RH)	
Mixing water	3,8 – 4,1 kg / 25 kg, depending on the desired workability
Workability	160 mm ± 15 %
Density	2135 kg/m^3 ± 5 %
Optimal application temperature - mortar, reinforcement, substrate, environment	from +15 °C to +25 °C Acceptable: from +5 °C to +30 °C
Workability time	approx. 30-45 min, depending on the amount of mixing water and temperature
Thickness of single coat	Min. 3 mm Max. 15 mm

DATA FOR HARDENED REPAIR MORTAR				
Characteristic	Testing method	Standard requirements EN 1504-3		Achieved values
Compressive strength [MPa] - 1 day - 7 days - 28 days	EN 12190	**R4**	 No requirement No requirement ≥ 45	 ≥ 30 ≥ 50 ≥ 60
Flexural strength [MPa] - 1 day - 7 days - 28 days	EN 12190	**-**	 No requirement No requirement No requirement	 ~ 5 ~ 8 ~ 10

Adhesive bond (Pull-off), 28 days [MPa]	EN 1542	**R4**	≥ 2.0	> 3.0
Restrained shrinkage / expansion, 56 days [MPa]	EN 12617-4	**R4**	Restrained shrinkage: ≥ 2.0 Restrained swelling: ≥ 2.0	≥ 2.0 ≥ 3.5
Carbonation resistance	EN 13295	**R4**	dk ≤ control concrete (MC (0.45))	corresponds
Elastic modulus, 28 days [GPa]	EN 13412	**R4**	≥ 20	> 20
Capillary absorption [$kg/m^2h^{0.5}$]	EN 13057	**R4**	≤ 0.5	< 0.2
Thermal compatibility, Part 1: Adhesion bond after freeze-thaw cycling with de-icing salts immersion (50 cycles) *See: Note 1*	EN 13687-1	**R4**	≥ 2.0	> 2.0
Resistance to negative water pressure 1.5 bar *See: Note 2*	EN 12390-8	**-**	No requirement	No water penetration

Note 1:
If the product meets the requirement for thermal compatibility - Part 1, it is considered to meet the requirements for:
- Thermal compatibility after thunder-shower cycling; thermal shock (30 cycles), EN 13687-2
- Thermal compatibility after cyclic freezing and thawing without de-icing salt impact (30 cycles), EN 13687-3

Note 2:
The test was performed at a constant negative water pressure of 1.5 bar for 14 days and at mortar layer thickness of 10 mm.

COMPLIANCE

Hydroblocker Protex 110 complies with the requirements of the standard EN 1504-3: Products and systems for protection and repair of concrete structures - Structural and non-structural repair: CC mortar for structural repair, meets the requirements for class R4.

INSTRUCTIONS FOR USE

Preparation of the substrate

The surfaces to which Hydroblocker Protex 110 is applied must be sound, free of dust, greasy stains, corrosion products, mould, and other impurities as well as poorly bonded parts. Any loose material and/or remnants of old coatings must be removed mechanically by grinding, sandblasting, or water jet under pressure. Before applying the repair mortar, the clean surface must be deeply soaked with water - the capillaries must be saturated with water, and there must be no standing water or water film on the surface, which prevents good adhesion to the substrate.

Mortar preparation

Pour the prescribed amount of water into a suitably clean container, and then slowly add the dry powder of Hydroblocker Protex 110 while mixing. Smaller quantities are mixed by hand and larger quantities with an electric stirrer at low speed to entrain as little air as possible. Depending on the amount of mortar required, an electric paddle mixer, mortar mixer or forced action mixer can be used for mixing. Free-fall concrete mixers are not suitable!

Stir for 3-4 minutes, then scrape off any unmixed powder from the bottom and perimeter of the container and add it to the fresh mixture. Stir for another 1-2 minutes, or until the mixture is homogeneous and free of lumps. Allow it to rest for approx. 5 minutes before mixing it again briefly

and using it. The resulting fresh mortar is useful for approx. 30-45 minutes, depending on the amount of water added or the consistency of the mortar, as well as the temperature at which we work.

Mortar application

Hydroblocker Protex 110 is applied manually using a trowel (or other traditional masonry tools) or by machine (by spraying). The choice depends on the size and location (smooth, with recesses, horizontal, slope, overhead, ...) of the surface to which it is applied, as well as the type of damage (patching, overlaying).
The mortar is installed from the bottom up by pressing it firmly against the base and smoothing it. For manual application, we recommend applying a thinner layer of mortar over the entire surface and rubbing it into the base before installing the remaining mortar to the desired thickness.
Support the mortar with formwork if necessary for thicker coatings or smoother substrate surfaces.
Before applying new layers to multi-layer applications, ensure that the previously applied layers are well "adhered" and stable. In order to achieve better adhesion, do not smooth the first layer, but rather leave it as rough as possible. If the second layer is applied after the first layer has cured completely, the first layer must be moistened before application.
The final smoothing is performed when the mortar is stable enough and allows the final treatment without "lubricating" the surface. Under normal conditions, this is approx. 1-1.5 hours.

If the spaces around the steel reinforcement are filled during renovation, the mortar is applied after finished protection of the reinforcement bars with a mixture of cement and Cementol Concrete Contact which was previously diluted with water in ratio 1 : 3 (1 part Cementol Concrete Contact + 3 parts water).

When repairing or patching small areas, the damaged areas must be pre-formed so that they have sharp edges (at an angle of 90° to 135°) and do not run into zero to avoid cracking at the junction of the old substrate and newly applied mortar.

Curing of freshly installed mortar

It is important to protect fresh mortar from premature drying - direct sun, wind, and drafts - by moistening or covering with wet felt, jute, and polyethylene foil as soon as possible.
The mortar must be protected for at least 7 days, and in more severe conditions, the cure must be extended to 10 days. In this way the correct way of expansion and thus the shrinkage of mortar is achieved.

Fresh mortar can also be protected with the Cementol Expert Kontrasol 22 V or Cementol Expert Kontrasol NOVI curing agents.

Cleaning of tools and work accessories

All tools and work accessories must be thoroughly washed with water immediately after completion of work. Hardened mortar can only be removed mechanically.

ADDITIONAL RECOMMENDATIONS AND WARNINGS

- Always use bags that have been originally packaged, sealed, undamaged, and properly stored.
- Never apply mortar to an uncleaned surface (reinforcement and/or concrete)!
- Mortar should never be applied to a smooth, unroughed surface!
- Never apply mortar to a dry surface!

- Do not apply the mortar at temperatures below +5 °C or above +35 °C!
- Low temperatures (below +10 °C) cause the setting and curing time to be extended; therefore, we recommend storing the dry powder in heated rooms and working during the warmest part of the day. The mortar is prepared using warm water (up to +35 °C).
- Setting accelerator Cementol Expert Omega P (approx. 1% by weight of dry powder) can be added to the mortar to shorten the setting time.
- Because the setting time is shortened at high temperatures (above +30 °C), we recommend storing the dry powder in refrigerated rooms and working during the coldest part of the day. The mortar is prepared using cold water.
- When repairing large areas in unfavourable conditions and there is a risk of cracking due to plastic shrinkage, the shrinkage reducing admixture Cementol Expert Antikontrakt T (approx. 0.25-0.5% by weight of dry powder) can be used as additional protection.
- Never add water or dry powder to a mixture that has already thickened significantly. Such mortar is thrown away!
- We adhere to the requirements and principles of the standard EN 1504-10 in our work: Products and systems for the protection and repair of concrete structures - Site application of products and systems and quality control of the works.
- The technical characteristics in this technical data sheet apply to the factory-prepared product. If any of the chemical admixtures were added to the product during the mixing process, the user must check the suitability of fresh and hardened mortar with previous tests.
- Please contact our technical service if you require any additional information or clarification.

CONSUMTION

- approx. 1.9 kg / m^2 for application of each layer of 1 mm thickness,
- we get approx. 1 L of fresh mortar from 1.9 kg of dry powder,
- consumption also depends on the amount of added water and the roughness of the surface to which it is applied

PACKAGING

- vreče 25 kg

STORAGE

- Store the product in tightly sealed packaging in a dry and well ventilated place. Protect it from damage, water and moisture, and direct sunlight.
- A properly stored product has a shelf life of at least 1 year after the date of manufacture.
- The product may still be used after the date of expiry, but the characteristics important for the intended use have to be examined.

HEALTH, SAFETY AND ECOLOGY

Product contains cement, which irritates the eyes and skin. When in contact with skin, it may cause allergic reactions. Therefore, we must wear appropriate protective gloves at work and avoid contact with the eyes (goggles). We should also avoid inhaling dust. We follow the general instructions for

working with chemicals: we take care of cleanliness, do not eat, drink, or smoke during work. After finishing work, we wash our hands thoroughly with water.
More information on safe handling and disposal of the product is available in the safety data sheet, which is provided on request and is also available from the dealer or distributor where you purchased the product.

WARNING

Instructions and recommendations are given based on examinations in our laboratories and experience to date. Due to the specific conditions and method of work, we recommend preliminary tests for each individual case of use.

Since we cannot influence the course of work, we cannot be held responsible for its quality!

TKK d. o. o. · Srpenica 1, 5224 Srpenica, Slovenija
+386 (0) 5 38 41 300 | info@tkk-group.com | www.tkk-group.com