EPOXONIC®

# EX1824 Rapid

**Formwork resin for sewer renovation**

EPOXONIC® EX 1824 Rapid is a solvent-free, 2-part, epoxy resin-amine-based formwork resin with a particularly low density. It is slightly flexible and has a high internal toughness, which enables the material to compensate for minor mechanical stresses. It has been specially developed for robot technology.

## Key-features:

- Especially for robot applications
- Good workability for injection and filler
- Good internal toughness, therefore suitable for sewer inlets in the presence of groundwater (pay attention to back milling!)
- Adhesion to wet concrete and stoneware
- Also adheres to PVC and pipe liners
- Low density ~1.04 g/cm³
- Curing possible from +8 °C
- Curing under water
- Low shrinkage
- Free of solvents and nonylphenol
- Resistant to e.g. household waste water, oil and petro
- Hot water resistant

## Recommended applications:

EPOXONIC® EX 1824 Rapid is particularly suitable for the rehabilitation of damaged sewer inlets in wastewater, combined and rainwater sewers in nominal sizes DN 150 to DN 800 using robot technology. The sewers can be made of vitrified clay, clinker brick, concrete, fibre cement, reinforced concrete or PVC.
EPOXONIC® EX 1824 Rapid achieves fast and complete filling when using moulds for the rehabilitation of side inlets.
Thanks to the medium curing speed and long working time, it can also be used to repair larger excavations.

## Monitoring:

External monitoring of **EPOXONIC® EX 1824 Rapid** is carried out by **cbm Centrum Baustoffe und Materialprüfung - Technische Universi¬tät München**.

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## Recommended additional equipment:

- Climate cabinet
- Mixer with integrated timer and slowly rotating spiral helix according to manufacturer's specifications.
- Temperature measuring device (IR technology, non-contact measurement).

## Table 1: Properties of uncured EPOXONIC® EX 1824 Rapid

| Technical data | Part A | Part B | Mixture |
|---|---|---|---|
| Form | paste-like | paste-like | paste-like |
| Colour | blue (minor differences in colour are due to technical reasons and do not affect the quality) | greyish-brown | medium-blue (minor differences in colour are due to technical reasons and do not affect the quality). |
| Mixing ratio (parts by weight) | 100 | 39 | |

## Processing:

In general, the device-specific specifications (manuals) of the respective sewer robot manufacturer must be observed during processing.

### Preliminary work: Wastewater control

Depending on the damage arrangement, the user may have to carry out waste water control. It must be ensured that the milled and cleaned bonding surfaces are not contaminated by contaminated waste water before the application of the resin compounds has been completed.
If groundwater is present, formwork must generally be used for the repair work.
The renovation area must be kept free of waste water during the repair or renovation work.

### Preparation of the surface

The substrate must be clean, free of loose particles, dirt, grease, oil, rust and dust. In the case of cementitious materials, the cement skin must be removed. Edge areas must be prepared by milling and cleaning.

### Preliminary work

In preparation for repair work in the old sewer, the damaged areas must be milled over a large area using a suitable milling tool in accordance with the specifications of the respective equipment manufacturer. If necessary, an existing liner in the old sewer must be milled open around the opening of the connecting sewer and the liner edge must be milled back for optimised anchoring of the resin (e.g. in the case of rising groundwater). The inlet area must then be cleaned with a suitable water jet technique to remove the grinding dust.

## Mixing process

Part B is completely emptied from the bag into the can with part A and thoroughly mixed with a suitable mixing device until the mixture appears uniformly blue. We recommend using a mixer with a helical, spiral-shaped kneading tool and a low speed of approx. 100 - 200 rpm. When mixing, particular care should be taken to ensure that no unmixed material remains on the base and walls of the can and that no air is stirred in.
The mixing process should take at least 4 minutes and be completed within 10 minutes. The energy input during mixing increases the resin temperature. This temperature must be measured and documented after the mixing process.
Using Table 2, the expected pot life and stripping time can be determined.

## Working time resp. pot life

The processing time and pot life can be found in Table 2. Processing is generally possible between +8 °C and +25 °C. If possible, the temperature of the substrate should not be below 8 °C. Curing is possible from 5 °C, but curing must be expected to be very delayed. Caution! At mixing temperatures above 25 °C, the processing time is considerably reduced! When applying (levelling) on a wet surface, the material must be pressed on for ≥ 10 seconds to achieve initial adhesion.

## Injection

EPOXONIC® EX 1824 Rapid can be processed using suitable formwork technology (e.g. formwork sleeve and formwork bladder). The grouting pressure should be adapted to the robot and material. After the resin has hardened, the bubble and the formwork collar must be removed and the repaired area reworked if necessary.
The use of EPOXONIC® EX 3130 Rapid is particularly useful for short blocking periods, at the end of a work section, etc., as the achievable curing speed at the same temperature is approximately twice as high as with conventional levelling compounds.
For more details, please refer to the EPOXONIC® EX 3130 Rapid data sheet.

## Cleaning the devices

Uncured EPOXONIC® EX 1824 Rapid can be removed with paper and then warm water, possibly with the addition of detergent. Cured product residues can only be removed mechanically.

## Table 2: Processing data for EPOXONIC® EX 1824 Rapid

| Sewer temperature [°C] | Resin temperature after mixing [°C] | Pot life [min] | Demoulding times [hours] |
|---|---|---|---|
| 10 – 12 | 10 | 100 | 16 |
| 10 – 12 | 20 | 50 | 8 |
| 10 – 12 | 30 | 25 | 4 |

The values stated are approximate values.

Please note: Both the processing time and the time until stripping depend on the ambient temperature. Longer stripping times may be necessary in the case of groundwater flushing. Damaged areas may generally only be exposed to the HD flushing carriage after at least 10 days.

## Table 3: Properties of cured EPOXONIC® EX 1824 Rapid

| Technical data | Value | Norm |
|---|---|---|
| Shore hardness (23-25°C) | Shore D 82 | DIN EN ISO 868 |
| Density[1] | 1.04 g/cm³ | EN ISO 1183-1 |
| Adhesive tensile strength [MPa]<br>dry concrete[2]<br>concrete, water-saturated[1]<br>on PVC-pipe[3]<br>on PVC coiled tube SWP profile[4]<br>on PVC-pipe smooth[5]<br>on PVC-pipe roughened[5]<br>on UP-liner[1] | 3.14 MPa<br>> 3 MPa<br>2.4 MPa<br>4.65 MPa<br>6.20 MPa<br>6.60 MPa<br>5.30 MPa<br>4.0 MPa | DIN EN 1542<br>DIN Spec. 19544<br>DIN EN 1542/SN EN 1542<br>DIN EN 1542<br>DIN EN 1542<br>DIN EN ISO 4624/DIN EN 1542<br>DIN EN ISO 4624/DIN EN 1542<br>DIN EN 1542/SN EN 1542 |
| Flexural-E-modulus[1] | 26.1 MPa | SN EN 196-1 |
| Charpy-impact strength | 2.6 kJ/cm² | DIN EN ISO 179-1:2010-11 |
| Compressive strength[1] | 36.9 MPa | SN EN 196-1 |
| Shear strength[2] | 12.2 MPa | |
| Tensile strength | 3.89 MPa | DIN EN ISO 527-2:2012-06 |
| Tensile elongation | 3.4 % | DIN EN ISO 527-2:2012-06 |

[1] LPM-AG Labor für Prüfung und Materialtechnologie, Research report A-34´373-1 from 04-06-2009
[2] TU München, Baustoffinstitut, Dr. Letsch, Investigation from November 2002
[3] SBKS, Research report No.:110825_68501_0020
[4] SBKS, Research report No. 120208_95801_0002a_rev01
[5] SBKS, Research report No. 111107_95801_0001 and 120208_95801_0002b

## Delivery form:

EPOXONIC® EX 1824 Rapid is supplied in part A and B as a set in the correct mixing ratio.

| | |
|---|---|
| Part A<br>Part B | 3-litre cans<br>welded aluminium/plastic bags |
| - big<br>- small | 2.10 kg part A + 0.82 kg part B<br>1.27 kg part A + 0.50 kg part B |
| PMO-can | 1.87 kg part A + 0.73 kg part B |

### Storage

EPOXONIC® EX 1824 Rapid part A and part B can be stored for 12 months at 0 - 35 °C, ideally at ≤ 25 °C in closed original containers in a dry place. Avoid direct sunlight.

### Safety instructions

The safety precautions and personal protection measures to be observed when processing epoxy resins and hardeners apply; in particular, protective gloves must be used and skin and eye contact must be avoided. Do not eat, drink or smoke while working.
Further information can be found in our safety data sheets and the hazardous substance information system of the BAU trade association (Gisbau). Please pay particular attention to the technical data sheet and the "Practical guide for handling epoxy resins", available at:
(https://www.bgbau.de/fileadmin/Gisbau/676_Praxisleitfaden-Epoxidharze_2-2018.pdf) (German)

## Important user information

The information in this data sheet is provided to the best of our knowledge, but to the exclusion of any liability. It is not intended as an authorisation for licence-free use, but merely as a working aid for the user, who should carry out his own tests to determine the suitability of the product for his specific requirements.