

**CONSTRUCTION / ENERGY**

# CarboPur WX

**TWO-COMPONENT POLYURETHANE INJECTION RESIN****DESCRIPTION**

CarboPur WX is a slow-reacting two-component polyurethane resin, CFC free and halogen-free, for sealing and stabilising in dry, wet and water-bearing areas. Without water contact the injection resin reacts slowly to a high-strength, viscoplastic duromer.

CarboPur WX, Component A is a mixture of various polyols and additives which reacts with the B-component to form a tough/hard polyurethane resin. CarboPur, Component B is a polyisocyanate.

CarboAdd WX is an accelerator promoting the gelling reaction.

**APPLICATION AND USE**

- Consolidation and stabilisation of loose rock, cracks, cavities, sand or dry, wet and water-bearing rock formations and all types of rock texture
- Sealing of water flows (incl. salt water) from rock formations, dams or shaft and tunnel walls
- Renovation of wet shafts, tunnels, sewers and constructions. Particularly the underground infrastructure or brickwork
- Sealing of excavation and sheet pile/slotted wall in ground water
- Sealing and strengthening of cracks and joints

Applicable at ambient temperature of between 0 °C and 40 °C. Applicable with 2-component injection pumps or 1-component injection pumps.

**ADVANTAGES**

- The reaction time can be variable adjusted by the addition of the catalyst CarboAdd WX
- Due to the volume ratio 1:1 a simple and safe processing is possible
- Due to the absence of toxic reactions, there are no objections against CarboPur WX coming in contact with ground or surface water
- CarboPur WX fulfils the fire examination according to DIN 4102-1 – Building material class B2 (normally inflammable)

**TECHNICAL DATA**

The data below are laboratory data only. They may vary in practice due to thermal exchange between resin and strata, surface properties of the stone, humidity, pressure and other factors.

**MATERIAL DATA**

Parameter	Unit	Comp A	Comp B	CarboAdd WX	Standard
Density by 25 °C	kg/m <sup>3</sup>	1013 - 1045	1200 - 1260	1014 - 1034	DIN 12791-1
Colour	-	honey	dark brown	honey	-
Flash point	°C	> 200	> 150	> 200	DIN 53213
Viscosity at 25 °C	mPa*s	250 ± 50	200 ± 50	245 ± 50	ISO 3219
Viscosity at 15 °C	mPa*s	520 ± 50	550 ± 100	510 ± 50	ISO 3219

## REACTION DATA

Starting temperature	Setting time	Pot life at 23°C	Foaming factor	Test Method
without contact to water				
15° C	~4 h	-	1.0 – 1.1	MCT PV 10-301
25 °C	~3 h	30 min ± 5 min*	1.0 – 1.1	MCT PV 10-301

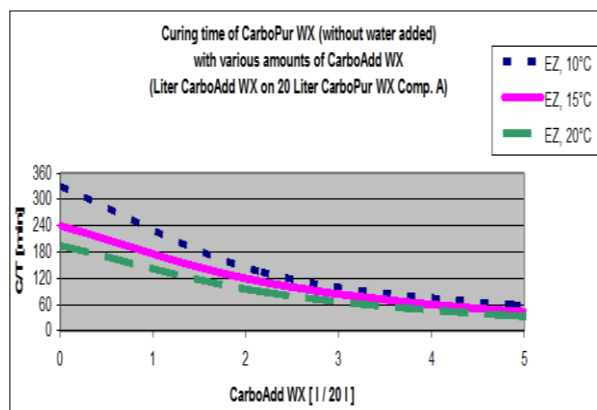
\*test method: MCT PV 10-328-1

## REACTION DATA WITH CONTACT OF WATER

Starting temperature	Start of foaming	End of foaming/Setting time	Foaming factor	Test Method
with contact to water (1% relative to mix)				
15° C	4 min ± 60 s	60min ± 10 min	2.0-3.0	MCT PV 10-301
25 °C	2 min 30 s ± 30 s	30 min ± 10 min	2.0-3.0	MCT PV 10-301
with contact to water (2% relative to mix)				
15° C	2 min 30 s ± 30 s	25 min ± 10 min	2.5-3.5	MCT PV 10-301
25 °C	1 min 30 s ± 30 s	14min ± 5 min	2.5-3.5	MCT PV 10-301

After contact with water CarboPur WX will be foaming.

The curing process can be accelerated by addition of max. 25 % CarboAdd WX to Component A, which shortens the working time.



## MECHANICAL DATA

Parameter	Value	Standard
Tensile strength (unfoamed) <sup>7,8,9</sup>	45 MPa	ISO 527
Elongation at break (unfoamed) <sup>7,8,9</sup>	2.1 ± 0,5 %	ISO 527
Flexural strength (unfoamed) <sup>7,9</sup>	90 ± 5 MPa	ISO 178
Flexural strain at flexural strength <sup>7</sup>	4.8 ± 0,5 %	ISO 178
Static E-Modulus <sup>7,8</sup>	2100 N/mm <sup>2</sup>	ISO 604
Compressive strength <sup>7,8</sup>	80 ± 10 MPa	ISO 604
Fire class <sup>4</sup>	B2	DIN 4102-1

## APPLICATION METHOD

The components are processed in a volume ratio of 1 : 1.

- Processing with 1-component injection pump - without addition of CarboAdd WX

Either mixed in a suitable clean and dry container by means of an effective stirrer and then introduced into the injection area by means of a one component pump. In dry ground, the curing can be accelerated by pre-injecting water. Only applicable without addition of CarboAdd WX.

- Processing with 2-component injection pump - with addition of CarboAdd WX

Or pumped separately via a two-component pump, then passing a static mixer and being injected into the rock formation through a bore hole packer. The resin can be accelerated by adding CarboAdd WX (cf. chart). In case of heavy water ingress, we recommend the use of CarboPur WFA or CarboPur WT or to contact the manufacturer.

Detailed information can be found in 'Directives for the use of CarboTech injection resins in tunnelling and civil engineering'.

The mixed resin penetrates the structure to be sealed. The major part of water in there is displaced due to the hydrophobicity and the viscosity of the resin. Traces of water make the resin foam. In contact with water, there is a rapid reaction and the resin foams to a compact and viscous foam. The foam is tough-hard and, thus, capable of following movements in the ground to some extent. CarboPur WX has an excellent adhesion, also on humid grounds.

It has to be assured that the product temperature is between 15° – 30 °C before processing and during application.

When the material is warmed up, local overheating e. g. at the container wall, must be avoided.

## **SAFETY INSTRUCTIONS AND LIMITATIONS**

Observe the usual precautionary measures for handling chemicals, see MSDS CarboPur WX component A and CarboPur component B as well as CarboAdd WX.

If the product is strongly cooled down ( $< 0^{\circ}\text{C}$ ) or at temporary lower temperatures ( $< -10^{\circ}\text{C}$ ), it should be warmed up before application to the recommended processing temperature.

## **PACKAGING AND TRANSPORTATION**

All forms of packaging comply with the dangerous goods regulations for road, rail and domestic shipping.

The components can be delivered in 18/26/200/1000 l units.

Other packaging units are available on request. Details are shown in the offer.

## **STORAGE AND SHELF LIFE**

Shelf-life period is 18 months from the date of production when stored in dry and well-ventilated areas between 10°C and 30°C.

The local legislation on storage needs to be considered.

## **DISPOSAL**

Follow local regulations.

## **APPROVALS AND CERTIFICATES**

1. DIBt: German approval Z-101.29-29 (2024) as curtain injection resin
2. CarboPur WX - Investigation of the elution behaviour of a polyurethane-based injection agent; inverse column test (MFPA Leipzig, 2024; PB 5.4/24-044-1)
3. Hygienic drinking water test acc. to DIN EN 12873-1:2014-09 and DIN EN 1420:2016-05 (Hygiene-Institut, Gelsenkirchen, 2023; K-371159-23-Kr)
4. Hygienic drinking water test acc. to EN 16421; Influence of materials on water for human consumption, Method 2 – Measured by biofilm (Hygiene-Institut, Gelsenkirchen, 2023; K-382287e-23-SI)
5. Test certificate according to UBA – Guideline for the hygienic assessment of "organic coatings in contact with drinking water" (Hygiene-Institut, Gelsenkirchen, 2011; K-201413-11-Bs)
6. Test certificate No. PZ 3.1/16-012-1 (MFPA Leipzig, 2016) Test on normal inflammability (building material class B2) acc. to DIN 4102-1
7. Certificate LPI to the durability of PU on the basis of CarboPur WF P060109C
8. Report LPI to the durability of PU in sulfate laden water on the basis of CarboPur WF P060109C
9. Technical data sheet CarboPur WF, February 2019
10. Determination of identifying properties and performance features of the crack filling material CarboPur WX according to DIN EN 1504-5:2013, PB 5.1/17-347-1, MFPA Leipzig
11. CarboPur WX slow-reacting two-component polyurethane injection resin, Institut pro Testovani A Certifikaci (ITC)

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## **ADDITIONAL DOCUMENTATION**

- Operating instructions on proper use of Minova injection resins
- MSDS of CarboPur WX component A
- MSDS of CarboPur component B
- TDS and MSDS of CarboAdd WX

## **CUSTOMER SERVICE**

For additional support options available at your area, contact our local offices.

[www.minovaglobal.com/emea-cis](http://www.minovaglobal.com/emea-cis)