

# HEGSEL FRP 333

Glass Mat Reinforced Furan Lining System

**Description:** **HEGSEL FRP 333** is a black, approx. 3 mm thick; glass mat reinforced lining system based on a furan resin. **HEGSEL FRP 333** is electrically conductive by using a hybrid mat.

**Characteristics:**

- Universal chemical resistance, especially against acids and solvents
- High temperature resistance up to +100°C (dry)
- Electrically conductive adjustable
- Very good storage stability

**Applications:** **HEGSEL FRP 333** can be applied on **HEGSEL Pox** coatings, sheets or rubber linings.

**Chemical resistance:** Information on the chemical resistance is available on request.

**Substrate:** Components to be coated shall be designed and manufactured in accordance with EN 14879-1. Before start of coating work, the suitability of the surface preparation measures according EN 14879-1 must be checked and recorded.

**Pot life (20°C):**

Product	Time (min)
HEGSEL FRP 333	ca. 30
HEGSEL Pox 409	ca. 60-120

**Curing (20°C):**

Product	Over workable		Accessible (Fully mechanically and chemically resistant)
	Until further processing	Maximum waiting time (Between operations)	
HEGSEL Pox 409	ca.16 hours	2 weeks	-
HEGSEL FRP 333	ca.24 hours	ca. 48 hours	7 days

**Packaging:** The products are supplied in the following standard package sizes:

Product	Package	Size
HEGSEL Pox 409 SOLUTION	Drum	10 kg
HEGSEL Pox 409 SOLUTION	Hobbock	25 kg
HEGSEL Pox 409 HARDENER	Drum	5 kg
HEGSEL Pox 409 HARDENER	Drum	12.5 kg
HEGSEL FRP 333 SOLUTION	Hobbock	25 kg
HEGSEL FRP 333 SOLUTION	Barrel	50 kg
HEGSEL FRP 333 HARDENER	PE Canister	5 kg

**Storage:** The products must be stored in a cool and dry place, away from direct sunlight. At the specified storage temperatures, a shelf life of the products is given of at least for the following periods:

Product	Temperature	Shelf Life
HEGSEL Pox 409 SOLUTION	+20°C	24 Months
HEGSEL Pox 409 SOLUTION	+20°C	24 Months
HEGSEL Pox 409 HARDENER	+20°C	24 Months
HEGSEL Pox 409 HARDENER	+20°C	24 Months
HEGSEL FRP 333 SOLUTION	+20°C	24 Months
HEGSEL FRP 333 SOLUTION	+20°C	24 Months
HEGSEL FRP 333 HARDENER*	+15°C	24 Months

\* HEGSEL FRP 333 HARDENER must be stored and transported above 15 °C.

If the storage time is exceeded, the materials must be tested before use. Higher storage and transport temperatures will reduce the shelf life. The containers must be kept tightly closed. Liquid products must be stored frost-proof. In addition, the DIN 7716 must be observed.

## 1. Surface preparation

Steel and concrete surfaces must be primed with **HEGGEL Pox 409** before application. If a sealing layer of rubber or coating is present, **HEGGEL FRP 333** can be directly applied on the sealing layer. Unevenness should be compensated in the ground.

### C-STEEL

Refer to DIN EN 14879-1.

All contaminants, including non-visible detectable contaminants, must be removed in accordance with DIN SPEC 55684 or EN ISO 8502.

The steel surface shall be sandblasted to a metallic bright finish. A preparation degree of SA 2 ½ as specified in DIN EN ISO12944-4 and a roughness grade "medium (G)" as specified in DIN EN ISO 8503-1 must be achieved; minimum surface roughness Rz = 70 µm. The primer must be applied immediately after the blasting.

### CONCRETE

Refer to DIN EN 14879-1.

Appropriate action shall be taken to prepare the concrete surfaces; dry and free of dust and free of contaminants such as oil or grease.

To attain a sufficient adhesive tensile strength, the substrate is generally to be pretreated in such a way that it is free of cement slurry, cement skin, loose and crumbly particles, structure imperfections and separating substances. The concrete shall have minimum tensile strength of 1.5 N/mm<sup>2</sup>. The residual moisture content must not exceed 4%.

Mechanical treatment by blasting with solid abrasives, high pressure blasting or shot blasting is recommended. After milling, flame blasting or staking, blasting is also required.

## 2. Environmental conditions

The specified environmental conditions must be observed during surface preparation and coating work and be tested and recorded according EN 14879.

Environmental conditions	Value
Relative Humidity	≤ 80%
Processing temperature	ca. 15-30°C
Dew Point Distance	> 3K
Dew point distance from 70% air humidity	> 5K

Optimal temperature is 20 °C. Higher and lower temperatures influence the processing time and consistency of the compounds and can change consumption, coating thickness and properties.

## 3. Application

The execution of the coating work is only permitted, if the requirements of "Surface Preparation" and "Environmental Conditions" are met.

### STEEL

**HEGGEL Pox 409** (undiluted) is applied once or, in case of lower surface qualities, twice, by brushes, wide brushes or rollers. Before applying the second layer **HEGGEL Pox 409**, the first layer of the **HEGGEL Pox 409** must be through hardened (at least 12 hours). For reworking times > 24 hours, the last coat must be lightly grinded. The not yet hardened second primer coat must then be sanded in fresh state with quartz sand.

On the primed surface, the **HEGGEL FRP 333** is applied with a smoothing trowel and immediately the first 300 g/m<sup>2</sup> glass mat pressed fresh in fresh, – with an overlapping width of approx. 5 cm – and rolled on free from bubbles by using a roller, saturated with **HEGGEL FRP 333** solution. The remaining air must be removed by using a laminate roller. The middle of the second 300 g/m<sup>2</sup> glass mat layer must be pressed on the overlapping edges of the first layer, soaked with **HEGGEL FRP 333** solution again and rolled on free from bubbles by using a roller, saturated with **HEGGEL FRP 333** solution. The remaining air must be removed again by using a laminate roller. Finally, a 30 g/m<sup>2</sup> C-Glass veil is applied as cover free from bubbles on the second glass mat fresh in fresh with a lamination roll. Due to the nature of hand craft application, small air inclusions cannot be avoided 100%. This is already considered and it's compensated by a higher lining thickness of **HEGGEL FRP 333**.

### CONCRETE

Depending on the condition of the concrete it may be necessary to apply a levelling mortar. The levelling mortar is, if required over the entire surface, applied between the first and second primer. It may be necessary to use an additional adjusting agent on vertical surfaces. On the properly prepared surface, the **HEGGEL Pox 409** (undiluted) is applied once or, in case of lower surface qualities, twice, by brushes, wide brushes or rollers at earliest 24 hours after application of the optional levelling mortar. Before applying the second layer **HEGGEL Pox 409**, the first layer of the **HEGGEL Pox 409** must be through hardened (at least 12 hours). For reworking times > 24 hours, the last coat must be lightly grinded. On the primed surface, the **HEGGEL FRP 333** base coat is applied with a smoothing trowel and immediately the first 300 g/m<sup>2</sup> glass mat pressed fresh in fresh, – with an overlapping width of approx. 5 cm – and rolled on free from bubbles by using a roller, saturated with **HEGGEL FRP 333** solution. The remaining air must be removed by using a laminate roller. The middle of the second 450 g/m<sup>2</sup> glass mat layer must be pressed on the overlapping edges of the first layer, soaked with **HEGGEL FRP 333** solution again and rolled on free from bubbles by using a roller, saturated with **HEGGEL FRP 333** solution. The remaining air must be removed again by using a laminate roller. Finally, a 30 g/m<sup>2</sup> C-Glass veil is applied as cover free from bubbles on the second glass mat fresh in fresh with a lamination roll. Due to the nature of hand craft application, small air inclusions cannot be avoided 100%. This is already considered and it's compensated by a higher lining thickness of **HEGGEL FRP 333**. Depending on the present chemical and thermal load, a thermal after treatment of **HEGGEL FRP 333** must be carried out.

**CONDUCTIVITY**  
If **HEGGEL FRP 333** should be conductive, a hybrid fleece must be applied on the second glass mat in-stead of the 30 g/m<sup>2</sup> surface veil.

## SLIP RESISTANCE

To improve the slip resistance of **HEGGEL FRP 333**, the fresh laminate coating can be sanded with silicon carbide / quartz sand.

## 4. Work tools

The following tools are essential for the application:

- PPE (Safety goggles, hand gloves etc.)
- Scissors / glass knife
- Lambskin rollers
- Laminate rollers (disc rollers)
- Mohair rollers to smooth the surface
- Steel smoothing trowels for application on even surfaces
- 2-3 cm wide spatulas
- Mixing vessels
- Stirrer (max. 300 r/min.)
- Surface Thermometer
- Hardness measuring device (Shore D)
- Flat / wide brush / roller
- High voltage tester
- Insulation measuring device (if necessary)

## 5. Mixing ratio

### MIXING PRIMER

**HEGGEL Pox 409 PRIMER** must be stirred before adding the **HEGGEL Pox 409 HARDENER** in the recommended mixing ratio. The stirring of the merged components should be at least 3 minutes and must result in a homogeneous mixture. Then pour the mixture into a clean pail and mix again briefly.

### MIXING HEGGEL FRP 333 SOLUTION

**HEGGEL FRP 333 SOLUTION** must be stirred before adding the **HEGGEL FRP 333 HARDENER** in the recommended mixing ratio. The stirring of the merged components should be at least 3 minutes with a drill and mortar mixer whisk at 300-500 rpm and must result in a homogeneous mixture. Then pour the mixture into a clean pail and mix again briefly.

Primer	l/batch	kg/batch	kg/m <sup>2</sup>
HEGGEL Pox 409 SOLUTION	1.790	10.000*	0.200
HEGGEL Pox 409 HARDENER	1.000	5.000*	0.100
<b>Total</b>		<b>15.000</b>	<b>0.300</b>

\*Predosed packaging

HEGGEL FRP 333	l/batch	kg /batch	kg /m <sup>2</sup>
HEGGEL FRP 333 SOLUTION	8.264	10.000	1.942
HEGGEL FRP 333 HARDENER	0.219	0.300	0.058
<b>Total</b>		<b>10.300</b>	<b>2.000</b>

\*All amounts are only applicable for concrete substrate

## 6. Consumption

Layer	Product	Coverage (g/m <sup>2</sup> )
Primer	HEGGEL Pox 409	ca. 300 - 500 (concrete) / ca. 250 (steel)
Laminate layer	HEGGEL FRP 333	ca. 2000
	2 x Fibreglass mats 300 g/m <sup>2</sup>	ca. 660
	1 x Surface veil 30 g/m <sup>2</sup>	ca. 33

## 7. Cleaning

Clean all equipment with MEK or acetone-based thinners immediately after use. The cleaning is done while the material is still not hardened.

## 8. Safety measures

The material safety data sheets of the individual components, the safety instructions on the packing (label) as well as the legal requirements for handling hazardous materials must be observed.

Technical Data	Standard	Unit	Value
Adhesion Strength (Concrete / Screed)	DIN EN ISO 4624	MPa	>Inherent tensile strength (concrete)
Adhesion Strength (Steel)	DIN EN ISO 4624	MPa	Approx. 4
Electrical leakage resistance (Electrically conductive variant)	DIN EN 14879-3 at a relative humidity of > 70 %, ASTM F 150/98	$\Omega$	$\leq 1 \times 10^6$
Hardness Shore D	DIN 53505, ASTM D 2240	-	> 60
Max. Operating Temperature Dry concrete / steel	-	°C	+60 / +100

**Note:** The indicated temperatures are dependent on the present load and may vary

**HEGGEL FRP 333;** 0.00/10.02.2021. All information contained herein is based on the current state of our knowledge and practical experience at the time of release. Therefore, please make sure that this is the actual edition of the Technical Data Sheet. All data are only intended as a guideline for informational purposes and do not constitute a legally-binding warranty of the suitability for a certain purpose of use, due to its dependence on site conditions and possible processing, use and applications. All information contained in this technical datasheet is subject to change without notice.

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