HEGGEL

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HEGGEL FRP 330

Glass Mat Reinforced Furan Lining System

Description:

HEGGEL FRP 330 is a black, approx. 2-3 mm thick; glass mat reinforced lining system based on a furan resin.

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:

HEGGEL FRP 330 can be applied on **HEGGEL 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)
Levelling mortar	ca. 60
HEGGEL Pox 414 PRIMER	ca. 60
HEGGEL FRP 330	ca. 30
Conductive topcoat	ca. 20

Curing (20°c):

Load Capacity	Time
Over workable	ca. 24 h
Accessible	ca. 24 h

Packaging:

The products are supplied in the following standard package sizes:

Product	Size	Article No.
HEGGEL Pox 414 SOLUTION	20 kg	17761815
HEGGEL Pox 414 HARDENER	8 kg	17761845
HEGGEL FRP 330 HARDENER	10 kg	17762400
HEGGEL FRP 330 SOLUTION	20 kg	17762430
HEGGEL FRP 330 SOLUTION CONDUCTIVE	10 kg	17762445
C-Glass veil - 26 g/m²	250	17729400
E- Fibreglass mats - 450 g/m²	5 m²	17700759
E- Fibreglass mats - 450 g/m²	20 m²	17700780
E- Fibreglass mats - 450 g/m²	50 m²	17700831
FILLER F1	25 kg	17730420
Cleaner E-200	4 kg	17701830
Cleaner E-200	8 kg	17701833

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
HEGGEL Pox 414 HARDENER	≤ +25°C	24 Months
HEGGEL Pox 414 SOLUTION	≤ +25°C	24 Months
HEGGEL FRP 330 HARDENER	≤ +25°C	24 Months
HEGGEL FRP 330 SOLUTION	≤ +25°C	12 Months
HEGGEL FRP 330 SOLUTION CONDUCTTIVE	≤ +25°C	6 Months
FILLER F1	-	24 Months
Cleaner E-200	5-25°C	60 Months

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 414** before application. If a sealing layer of rubber or coating is present, **HEGGEL FRP 330** can be directly applied on the sealing layer. Unevenness should be compensated in the ground.

C-STEEL

All surfaces to be coated must be dry and free of contaminants. All contaminants, including non-visible detectable contaminants, must be removed in accordance with DIN SPEC 55684 or EN ISO 8502. Non-alloyed steel surfaces shall be abrasive blasted to "Near White Metal" in accordance with EN ISO 12944-4. A surface preparation degree of SA 2½ (SSPCSP 10; NACE No. 2) as specified in EN ISO 8501-1 and a “medium (G)” roughness degree as specified in EN ISO 8503-2 must be achieved. A minimum surface profile of Rz ≥ 70 µm is required. To prevent flash rust, the primer must be applied immediately after the blasting and cleaning of the substrate or the component must be air conditioned to a relative humidity of ≤ 40%.

CONCRETE

Appropriate action shall be taken to prepare the concrete surfaces; dry and free of dust and free of contaminants such as oil or grease. The concrete shall have minimum tensile strength of 1.5 N/mm². 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%
Surface Temperature	≥ +10°C up to +30°C
Application Temperature	+20°C ± 5°C recommended
Dew Point Distance	min. 3K

3. Application

The execution of the coating work is only permitted, if the requirements Of „Surface Pre-treatment” and „Environmental Conditions” are met.

APPLICATION STEEL

HEGGEL Pox 414 is applied twice (undiluted) by using brushes, wide brushes or rollers. Before applying the second layer **HEGGEL Pox 414**, the first layer of the **HEGGEL Pox 414** 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 (0.3 - 0.7 mm, consumption: approx. 0.8 kg / m²). On the primed surface, the **HEGGEL FRP 330** base coat is applied approx. 1.0 mm thick with a smoothing trowel and immediately the first 450 g/m² 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 330** solution. The remaining air must be removed by using a laminate roller. The second 450 g/m² glass mat is pressed - with an overlapping width of approx.
50 cm – on the uncured layer, soaked with **HEGGEL FRP 330** solution again and rolled on free from bubbles by using a roller, saturated with **HEGGEL FRP 330** solution. The remaining air must be removed again by using a laminate roller. Finally, a 26 g/m² 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 330**. Depending on the present chemical and thermal load, a thermal after treatment of **HEGGEL FRP 330** must be carried out.

APPLICATION 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 (Cabosil) on vertical surfaces. On the properly prepared surface, the **HEGGEL Pox 414** is applied is applied twice (undiluted) by using brushes, wide brushes or rollers at earliest 24 hours after application of the optional levelling mortar. Before applying the second layer **HEGGEL Pox 414**, the first layer of the **HEGGEL Pox 414** 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 330** base coat is applied
approx. 1.0 mm thick with a smoothing trowel and immediately the first 450 g/m2 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 330** solution. The remaining air must be removed by using a laminate roller. The second 450 g/m2 glass mat is pressed - with an overlapping width of approx. 50 cm – on the uncured layer, soaked with **HEGGEL FRP 330** solution again and rolled on free from bubbles by using a roller, saturated with **HEGGEL FRP 330** solution. The remaining air must be removed again by using a laminate roller. Finally, a 26 g/m2 CGlass 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 330**. Depending on the present chemical and thermal load, a thermal after treatment of **HEGGEL FRP 330** must be carried out.

CONDUCTIVITY (optional)

Before applying the conductive top coat, place self-adhesive copper strips on the hardened **HEGGEL FRP 330** to connect the surface to the ground. Guideline for the number of earthing straps: 1 band per 50m2, but at least 2 bands per surface. Furthermore, before application of the top coat, all excess glass fibres must be ground off. In order to achieve a conductive top coat, the top coat is rolled up at the earliest 12 hours after application of the second laminate layer. If a brick lining is applied to the conductive top coat, the conductive top coat must be sanded with silicon carbide (0.5 - 1.0 mm) in its fresh state.

SLIP RESISTANCE

To improve the slip resistance of **HEGGEL FRP 330**, the fresh laminate coating can be sanded with silicon carbide (0.5mm; Consumption: 1.5 kg/m2).

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 414 PRIMER must be stirred before adding the **HEGGEL Pox 414 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 330 SOLUTION

HEGGEL FRP 330 SOLUTION must be stirred before adding the **HEGGEL FRP 330 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.

Levelling Mortar (optional)	Parts by Weight (kg)	Parts by Volume (Liter)
HEGGEL POX 414 SOLUTION	100	2.00
HEGGEL POX 414 HARDENER	40	0.81
FILLER F1	330	6.72

Primer	Parts by Weight (kg)	Parts by Volume (Liter)
HEGGEL POX 414 SOLUTION	100	2.00
HEGGEL POX 414 HARDENER	40	0.81

HEGGEL FRP 330 Base Coat	Parts by Weight (kg)	Parts by Volume (Liter)
HEGGEL FRP 330 SOLUTION	100	2.00
HEGGEL FRP 330 HARDENER	5	0.09
FILLER F1	240	5.28

HEGGEL FRP 330 Laminate Layer	Parts by Weight (kg)	Parts by Volume (Liter)
HEGGEL FRP 330 SOLUTION	100	2.00
HEGGEL FRP 330 HARDENER	3	0.05

Conductive Top Coat	Parts by Weight (kg)	Parts by Volume (Liter)
HEGGEL FRP 330 SOLUTION CONDUCTIVE	100	2.00
HEGGEL FRP 330 HARDENER	3	0.05

6. Consumption

STEEL

Layer	Product	Coverage (g/m²)
1st Coat Primer	HEGGEL Pox 414 PRIMER	ca. 250
2nd Coat Primer	HEGGEL Pox 414 PRIMER Quartz sand	ca. 250 ca. 800
Base Coat	HEGGEL FRP 330 laminate solution	ca. 1000
	FILLER F1	ca. 2400
1st Laminate Layer	HEGGEL FRP 330 laminate solution	ca. 1200
	Fibreglass mats 450 g/m²	ca. 500
2nd Laminate Layer	HEGGEL FRP 330 laminate solution	ca. 1200
	Fibreglass mats 450 g/m²	ca. 500
	C-Glass veil 26 g/m²	ca. 30
Conductive Top Coat (optional)	HEGGEL FRP 330 SOLUTION CONDUCTIVE	ca. 250

CONCRETE

Layer	Product	Coverage (g/m²)
Levelling mortar (optional)	HEGGEL Pox 414 PRIMER	ca. 1000
	FILLER F1	ca. 2400
1st Coat Primer	HEGGEL Pox 414 PRIMER	ca. 250
2nd Coat Primer	HEGGEL Pox 414 PRIMER Quartz sand (0,2 – 0,7 mm)	ca. 250 ca. 800
Base Coat	HEGGEL FRP 330 solution	ca. 1000
	FILLER F1	ca. 2400
1st Laminate Layer	HEGGEL FRP 330 solution	ca. 1200
	Fibreglass mats 450 g/m²	ca. 500
2nd Laminate Layer	HEGGEL FRP 330 solution	ca. 1200
	Fibreglass mats 450 g/m²	ca. 500
	C-Glass veil 26 g/m²	ca. 30
Conductive Topcoat (optional)	HEGGEL FRP 330 SOLUTION CONDUCTIVE	ca. 250

7. Cleaning

Clean all equipment with **Cleaner E-200** 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
Resistance to Ground	DIN 14879-6	Ω	$<10^6$
Density (Mixture)	EN ISO 2811 (ASTM D1475)	g/cm^3	1.154
Adhesion Strength Concrete	EN ISO 4624	N/mm^2	Own tensile strength
Adhesion Strength Steel	EN ISO 4624	N/mm^2	3
Hardness Shore D	-	-	> 60
Max. Operating Temperature Dry (Concrete)	-	°C	+60
Max. Operating Temperature Dry (Steel)	-	°C	+100

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

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