Series 9100

FBE-4 Type Phenolic Epoxy Powders Fusion Bonded Epoxy

General Description:

FBE-4 pure primer epoxy powders are based on epoxy (Novolac) and phenolic resins. FBE-4 pure epoxy powder creates a coating with outstanding adhesion to metal, high level hardness, high resistance to abrasion, good resistance to chemicals and to acute corrosive conditions. FBE-4 pure epoxy powder can be applied in one coat (>300 microns and above) on preheated products, and is intended for coating pipes, irrigation devices and heavy machinery. The powder received the American drinking water NSF authorization for the Ral colors 5010, 5017, 5005, 5015. (Certificate can be provided upon request).

Powder Feature:

Properties	Test Method	Value
Specific Gravity	ASTM D792	1.50±0.1 g/cm3
Glass Transition (Tg)	DSC	52-55'C/126'F-131'F
Gel Time*	Hot plate method	
180'C/356'F		70 ± 10 seconds
200'C/392'F		45 ± 5 seconds
220'C/428'F		30 ± 5 seconds

*Gel Time can be achieved according to customers requirements.

Particle Size Distribution (% undersize):

	Laser particle size -	
D-10	ASTM D792	10-20 µm
D-50	DSC	40-50 µm
D-50	Hot plate method	100-120 µm

Powder Application Preconditions:

Surface preparation		SA2.5
Roughness depth		Rmax 60-70 micron
Usage options:		
For castings with preheating	Preheating temperatur	180-230oC/356-446oF
For other applications	Metal temperature	200°C/392°F (MTP) - 10 minutes
	Metal temperature	190°C/374°F (MTP) - 15 minutes

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FBE-4 Epoxy Coating properties:

Adhesion-cross cut	ISO 2409	GT=0 100%
Pull Off test	ISO 4624	>15 MPa
Buchholz	DIN 56153	100 minimum
Impact	ASTM D2794	100 kg cm
Abrasion resistance		
Wheel CS 17.1KG. 1000 revolutions	ASTM D 1044	<100 milligram
Flexibility tension %	ASTM G 10	>5%
Cathodic protection	B.G. CW6	
-1.5 Volts, 28 days, 23oC/73oF		3 mm
-1.5 Volts, 30 days, 60oC/140oF		10 mm
Water resistance 50oC/122oF 28 days		GT=0, no surface flaws
Water absorption 80oC/176oF,200 hours	DIN 53495	<3%
Salt spray	ASTM B 117	>1500 hours without any flaws

Contact with food:

The Phenolic Epoxy powder FBE-4 is based on raw materials that meet the requirements of the FDA 175,300 standard for contact with food. In addition, the phenolic epoxy powder is suitable for continuous contact with drinking water.

Chemical Durability:

The pure epoxy powder FBE-4, when applied according to Univercol's instructions, creates a coating which is highly resistant to a wide variety of organic and inorganic chemicals. The chemical durability was inspected by immersion, in a temperature of 40°C/104°F for 3 months. The surface, adhesion and changes in shade were inspected at the end of the immersion.
Note: Changes in the coating's shade are possible without affecting the adhesion level.

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Chemical Durability Table for Epoxy FBE-4:

Chemical group	Chemical types	Durability
Carbon solvents- Aliphatic – Aromatic	Hexane, Isooctane Turpentine Calsilan, Toluen	6 6
Chlorinated solvents	,Dichloromethane 1.1.1 Trichlorothylene Carbon Tetrachloride	5 5 5
Alcohol – Aliphatic Aromatic	Methanol, Ethanol 1 Isopropanol Benzil Alcohol	4 3
Esters – Aliphatic Aromatic	Ethyl Acetate, Butyl Acetate, Phenyl Acetate	3 3
Cathonic – Aliphatic Aromatic	Acetone, MEK, Cyclohexanon	2 3
Ethers – Aliphatic Aromatic	Butyl Diglycol Phenyl Methyl Ether	4 6
Aldahydes – Aliphatic Aromatic	Formaldehyde 37% Benzilaldahyde	6 6
Glycols	Polyethylene Glycol	6
Organic Acids	Acetic Acid 0.5% Propionic Acid Octanoic Acid	6 2 6
Phenolics	Karsol	6
Eminics	Diethylamine Ethylén Diamine	6 1
Neutrals	Acetonitrille	6
Different Water Based	Dimethyl Formaldehyde Tetrahydrophoran Methyl Pirrolidone	4 4 4
Water Solutions and Emulsions	Acrylic Styran Emulsion Rubber Latex	5 4
InOrganic Acids	Sulphuric Acid 1 N Hydrochloric Acid 1 N	6 6
InOrganic Bases	Sodium Hydroxide 1 N Ammonium Hydroxide 1 N	6 6
Food Products	Coke, Sugar Syrup, Sorbitol, Juice, Oranges, Lemon Juice, Tomato Sauce	6

Legend:
1. Immersion up to a week.
2. Immersion up to a month.
3. Immersion up to two months.
4. Immersion of up to 3 months.
5. Immersion after 3 months (minor flaw).
6. Immersion after 3 months (without a flaw).

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Storage:

Powder coating tend to absorb moisture, and therefore it must be stored in a sealed container once opened or used. Also, it must be kept away from sources of heat and direct sunlight. The powder's shelf life expectancy is 12 months, at a temperature of 25°C (77°F), at a relative humidity below 60%.

Precautionary Measures:

It is recommended that the areas surrounding the site where coating takes place be properly ventilated. The powder's particles cause irritation of the respiratory tract; the inhalation of the powder must therefore be avoided. In case of contact with the skin, wash with water and soap. In case of contact with the eyes, wash with water immediately and seek medical help. A mask, gloves and protective glasses must be worn while working with powdered paint. All equipment must be grounded in order to avoid the build-up of static electric current.

General notes:

what is specifically recommended in this sheet should not be considered a substitute for consultation when formulating specifications for a specific project. All the data and recommendations contained in this sheet are based on inspections, knowledge and experience accumulated in our lab and on the ground, and they are most reliable. We claim no responsibility, implied, or otherwise. We are solely responsible for the product quality; users must verify whether it suits their specific requirements. The information contained herein is liable to modification without advance notice.

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