Product Datasheet

Resicoat® R4 ES
for Electrostatic Spray Application on Preheated Surfaces

Product Description

Resicoat® R4 is a high quality thermosetting epoxy powder coating for the corrosion protection of valves and fittings, manufactured from cast iron or steel. It fulfills the stringent requirements of GSK. The powder coating is applied in one layer on a preheated surface by electrostatic spray application. Typical film thickness achieved is in the range of 250 – 500 µm. The resultant thermoset epoxy has a high mechanical resistance with excellent electrical insulation properties. Drinking water approvals are available to confirm the coatings suitability, as a hygienic and environmental friendly coating. The outstanding adhesion of Resicoat R4® epoxy powders to the metal substrate provides long term protection of the coated component. It ensures a reliable conservation to the function and value of the parts for the common water and gas distribution network. The applicator of Resicoat® R4 benefits from a modern and environmentally friendly process. It is possible to overcoat Resicoat® R4 with polyester powder and liquid coatings to achieve an UV protection.

		Typical value	Method
Powder Properties	**Binder System**	Epoxy	
	Density	1.30 – 1.50 g/cm³	ISO 8130-2
	Gel time at 200° C	30 –55 sec. Modified	ISO 8130-6
	Storage stability	6~12 months from delivery date at ≤23° C	
Application Data	**Preheating temperature object**	190 – 235° C object temperature	
	Post cure conditions object	- self curing if wall thickness of steel/cast iron is > 8 mm. - if wall thickness of steel/cast iron is < 8 mm or the curing is not sufficient, post curing of 8 to 3 min./200° C object temperature is necessary.	
Coating Process	**1. Pre-cleaning**	The surface must be free of oil, grease, salt, and other impurities.	
	2. Blasting	Moulding sand, rust and sharp edges must be removed with angular steel grit. The graphite from the cast iron must be removed from the blasting material according NACE No.2 / SSPC-10 / Sa 2.5. Recommended anchor profile of □ 60 µm should be stored max. 4 hours before pre-heating (dust-free and dry).	
	3. Pre-heating	This form of heating produces a uniform, defined temperature in the component. Any oxidation should be avoided.	
	4. Coating application	Immediately after preheating, the coating process starts without loosing any object temperature. The coating is done in the shortest possible time in a single pass with no interruption.	
	5. Coating cure	Curing is achieved by the heat contained in the object. If the heating capacity of the work piece is sufficient. To confirm fully curing, MIBK is dropped for 30 sec. on the film surface with no visible change.	

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		Typical value	Method
Material Properties	**Color**	Blue/ Red	
	Recommended film thickness	250 – 350 µm	
	Flow	smooth	
	Gloss at 60° angle	80 – 100 units	DIN 67530
	Cross cut	Gt 0	DIN EN ISO 2409
	Impact resistance	> 5 Joule	DIN 30677-2
		> 2.26 Joule	ASTM D2794 20 inchpound
		> 18 Joule	ASTM G14 modified 1/8 in (3.2 mm) steel plate
	Abrasion resistance	< 40 mg	ASTM D4060 CS-17, 1000 g, 1000 cycles
	Dielectric strength	≥30 kV/mm	IEC 60243-1
	Volume resistivity (DC voltage)	1.1 x 10^{15}	ASTM D257
	Elongation	> 3 %	DIN 30677-2
	Indentation resistance 48 h, 70° C	< 30 %	DIN 30677-2/DIN EN 14901
	24 h, 60° C	< 10 %	ASTM G17
	Compressive strength	> 100 MPa	ASTM D695
	Shear adhesion	> 35 MPa	ASTM D1002
	Heat aging in air (90 days), water	fulfilled	DIN EN 14901
	Thermal stability under heat aging	pass	AS/NZS 4158:2003
	Weathering (Xenon test), 100 days	pass	ASTM D2596-99
	Hardness (Buchholz)	≥90	DIN EN ISO 2815
	Strain polarization	pass	WIS 4-52-01
	Cathodic disbonding, 30 days, 23° C	≤10 mm	DIN 30677-2, GSK
	Hot water immersion 90 days, 70° C	pass	ASTM C550-05
	Adhesion after 7 days, 90° C water	≥16 MPa	ISO 4624, GSK
	Disinfectant resistance according DVGW work sheet W 291 (chlorine dioxide, sodium hypochlorite)	no change of surface, no chalking The following migration test with demineralised water showed no defects of the film. The concentration of the examined parameters in the tested water were below the limits of the epoxy guideline for ancillaries for pipes DN > 300 mm (in main trunks).	after 10 test stages à 15 h
	Water condensation test (Cleveland test), 21 days	no change	ASTM D4585
	Salt spray resistance, 2000 h	no blistering, no loss of adhesion	BS 3900:F4
	Salt spray test, 4000 h	no under-rusting on the cut	DIN EN ISO 9227 (steel substrate)
	Water absorption, 100 days, 23°C ± 2	pass	AS/NZS 3862
	Chemical resistance	fulfilled	EN 598

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Conformities	**ASTM C550-05** **ISO 12944-2, table 1** (standard does not include powder coating systems) It is assumed that Resicoat® R4 is suitable to meet the high atmospheric corrosivity category C4 (typically in industrial areas and coastal areas with moderate salinity) and the very high atmospheric-corrositivitycategories C5-I (industrial) and C5-M (marine) if applied as a holiday-free coating at a film thickness > 400 µm. A sufficient film thickness is highly required to ensure good edge coverage. For gloss and color stability a UV-resistant polyester topcoat has to be applied.
Approvals	**Drinking water:** DE: UBA-Coatings Guideline, Approval no.: K-235947-13, Hygiene Institut DE: DVGW directive work sheet W 270, Approval no. W-211795-11, Hygiene Institut FR: DGS/VS 4 No99/217, AFNOR XP P41-250-1-3, No. de dossier: 12 MAT LY 129, LSEHL NL: Guideline BRL-K759, Certificate no.: K 11557, KIWA UK: BS 6920, Approval No. 1112500, WRAS CZ: Regulation no. 409/2005 Statute Book; Mark 45/2008, Regional Institute of Public Health Brno AT: ÖNORM B 5014 Teil 1, Doc. No. D-897017, AGES BE: Pidpa/Hydrocheck 011, Certificat R4 Dark Blue, Belgaqua US: ANSI/NSF 61 Drinking Water System Components – Health Effects, NSF **GSK:** Material approval **Gas:** DE: Test of resistance to gas according G 260, Report no.: 06/069/5123/3, DVGW
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