# Product Datasheet

## Resicoat® R4-FB
## for Fluidized Bed Application on Preheated Surfaces
## Code: HKC71R

**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 fulfils the stringent requirements of GSK. The powder coating is applied in one layer on a preheated surface by fluidized bed application. Typical film thickness achieved is in the range of 250 – 500 µm. The coating is self curing and forms a continuous, insulating and corrosion barrier on the surface. 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 application areas are Pipes, Fittings, Gate valves, Butterfly valves, Insulation valves, Water meters, Hydrants.**

**Product Features**

- One layer system
- Designed for use in large or small fluidised bed applications on 3-dimensional objects.
- The gel and flow out characteristics are designed to give good flow without sag on large components.
- High adhesion and surface toughness.
- Resists soil stress and backfill compaction.
- Resicoat® R4 has been tested to WIS 4-52-01 and meets the requirements
- Approved for use in public water supplies.

**Coating Process**

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| 1. Pre-cleaning: | The surface must be free of oil, grease, salt, paint and other impurities. |
| 2. Blast Cleaning | Moulding sand, rust and sharp edges are removed. The graphite from the cast iron must be removed from the blasting material. |
| 3. Pre-heating: | This form of heating produce a uniform, defined temperature in the component. Any oxidation should be avoided. |
| 4. Coating Application: | The coating is applied automatically or manually, in the shortest possible time and ideally within the gel time of the powder. |
| 5. Coating Cure: | Achieved by the heat contained in the object, If the heating capacity of the work piece is sufficient. |

**Cleaning Guidelines**

Steel valves, pipes and fittings produced for use in contact with water are often coated with a fusion bonded epoxy (FBE) powder coating layer to prevent corrosion of steel pipe work and also provide a barrier to materials leaching into the water inside the system.

The manufacturing process requires the metal components to be coated in a factory remote from the water system into which they will be installed. Following the coating process there may be an elapsed time during transportation and installation where some contamination may build up on the internal surfaces of the components.

To prevent any foreign material being introduced into the water system it is recommended that prior to final installation of the component the internal, FBE coated, surface should be treated as follows.

1. Wash using a solution of a mild detergent in warm water.
2. Use a soft cloth or sponge
3. Flush out thoroughly with the water which is to be carried through the system

Care should be taken during cleaning and transportation in order not to damage the intact coating.

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RESICOAT®
Experts in Functional Powder Coatings

| | | Typical value | Method |
|---|---|---|---|
| **Powder Properties** | **Binder system** | Epoxy resin | |
| | **Density** | 1.40 – 1.50 g/cm³ | ISO 8130-2 |
| | **Gel time at 200° C** | 30 – 45 sec. | modified ISO 8130-6 |
| | **Particle size distribution** | < 63 µm = 30 – 50 %<br>< 200 µm > 99 % | Malvern<br>ISO 8130-1 |
| | **Storage stability** | 6 months at ≤ 23° C from date of manufacture | |
| **Application Properties** | **Preheating temperature object** | 190 – 220° C object temperature | |
| | **Post cure conditions object** | - self curing if wall thickness of steel/cast iron is > 8 mm.<br>- if wall thickness of steel/cast iron is < 8 mm or the curing is not sufficient, post curing of 10 – 3 min./190° C object temperature is necessary. | |
| **Material Properties** | **Color** | green | |
| | **Recommended film thickness** | 250 – 350 µm | |
| | **Flow** | smooth | |
| | **Gloss at 60° angle** | 65 – 90 units | ISO 2813 |
| | **Adhesion cross cut test** | Gt 0 | DIN EN ISO 2409 |
| | **Adhesion after 7 days H2O 90° C** | > 12 N/mm² | DIN EN 24624 |
| | **Impact resistance** | > 5 Joule | DIN 30677-2 |
| | **Indentation resistance** | < 30 % | DIN 30677-2 /DIN EN 14901 |
| | **Heat aging**<br>**in air (110° C, 90 days)**<br>**in water (70° C, 7 days)** | <br>pass<br>pass | DIN EN 14901 |
| | **Hardness (Buchholz)** | ≥ 80 | DIN EN ISO 2815 |
| | **Cathodic disbonding** | 1 – 3 mm | DIN 30677-2 |
| | **Cathodic disbonding 24 h, 66° C** | 1 – 3 mm | NACE RP0394 |
| | **Water immersion test 90° C, 4 weeks** | no visible change | DIN EN ISO 4624, GSK |
| | **Abrasion resistance 1000 g / 5000 cycles** | 53.5 mg | ASTM D 245-74 |
| | **Salt spray test** | 2000 hours<br>no under-rusting on the cut | ASTM B 117<br>DIN EN ISO 9227 |
| | **Saturated NaCl-solution** | 23° C, 30 weeks<br>100° C, 3 weeks | |
| | **Humidity test** | 600 hours | DIN EN ISO 6270-2 |
| | **Disinfectant resistance**<br>according DVGW work sheet W 291<br>(chlorine dioxide, sodium hypochlorite) | no change of surface,<br>no chalking.<br>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 |
| | **Chemical resistance (pH 3 – 13, 23° C)** | fulfilled | EN 598 |
| **Drinking Water Approval** | BS 6920, Approval No. 1701509, WRAS | | |

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| **Date of issue:** | **March 13, 2017** |
| **Authorized by:** | **GK** |
| **Revision no.:** | **7** |

# Resistance against chemical substances of Resicoat® R4 at room temperature

| | | | |
|---|---|---|---|
| Acetic acid | 10 % | 2 years | no change |
| Ammonia | 10 % | 2 years | no change |
| Ammonia | 36 % | 1.5 years | no change |
| Antifrogen L | 50 % | 1 year | no change |
| Antifrogen N | 50 % | 1 year | no change |
| Benzol | | 1 month | no change |
| Bore oil | | 1 year | no change |
| Butanol | | 6 months | no change |
| Carbon tetra chloride | | 1 year | no change |
| Caustic soda solution | 10 % | 2 years | no change |
| Caustic soda solution | 50 % | 2 years | no change |
| Chlorine cleanser and disinfectant | | 1.5 years | no change |
| Citric acid | | 2 years | no change |
| Deicer Safeway KF HOT | | 1 year | no change |
| Deicer Safeway SF (solid) | | 1 year | no change |
| Deicer Safewing MP II 1951 | | 1 year | no change |
| Dichromatic potassium | 10 % | 1 year | no change |
| Diesel | | 2 years | no change |
| Engine oil SAE 20 | | 1 year | no change |
| Ethanol | | 1 year | no change |
| Ethyleneglycole | | 1 year | no change |
| Formaldehyde | 37 % | 6 months | no change |
| Formic acid | 5 % | 2 years | no change |
| Formic acid | 10 % | 1.5 years | no change |
| Glycerol | | 1 year | no change |
| Glysantin | | 1 year | no change |
| Hydrochloric acid | Concentrate | 1 week | no change |
| Hydrochloric acid | 10 % | 2 years | no change |
| Hydrochloric acid | 25 % | 1.5 years | no change |
| Hydrofluoric acid | 1 % | 1 day | no change |
| Hydrogen peroxide | 3 % | 1 year | no change |
| Hydrogen peroxide | 10 % | 1 year | faded |
| Lactic acid | 10 % | 1 week | no change |
| Methanol | | 1 week | no change |

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|---|---|---|---|
| Methyl tert-butyl ether (MTBE) | 100% | 6 months | softening |
| Nitric acid | 10 % | 1.5 years | no change |
| Nitric acid | 25 % | 1 year | no change |
| Oxalic acid | 5 % | 6 months | no change |
| Palm oil | at 90° C | 7 days | no change |
| Petrol | | 2 years | no change |
| Petroleum | | 1 year | no change |
| Phosphoric acid | 10 % | 2 years | no change |
| Phosphoric acid | 50 % | 2 years | no change |
| Potassium hydroxide | 10 % | 1 year | no change |
| Potassium hydroxide | 25 % | 1 year | no change |
| Potassium hydroxide | 50 % | 1 year | no change |
| Propanol | | 1 year | no change |
| Sea water | | 2 years | no change |
| Sodium acetate | 10 % | 1 year | no change |
| Sodium carbonate | 20 % | 1 year | no change |
| Sodium hypochlorite (15 % $Cl_2$) | | 10 weeks | no change |
| Sodium chloride | 2 % | 1 year | no change |
| Sodium chloride | 20 % | 1 year | no change |
| Sodium formiate | 10 % | 1 year | no change |
| Suds | 1 % | 1 year | no change |
| Sulphuric acid | 2 % | 2 years | no change |
| Sulphuric acid | 20 % | 2 years | no change |
| Sulphuric acid | 50 % | 2 years | no change |
| Tartaric acid | 5 % | 1 year | no change |
| Toluol | | 1 year | no change |
| Turpentine oil | | 1 year | no change |
| Urea | 10 % | 1 year | no change |
| Urine | | 1 year | no change |
| Xylol | | 1 year | no change |



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