

Rilsan® Fine Powders and Rilsan® Fine Powders-based coatings properties

Physical Properties

Rilsan® Fine Powders are thermoplastic polyamide 11 powders used primarily for metal coating. These coatings are characterized by their excellent durability, with outstanding toughness, impact and abrasion resistance, as well as excellent weatherability and corrosion resistance.

GENERAL PROPERTIES OF RILSAN® PA11 FINE POWDERS

Melt. point Standard grades Invent grades	ISO 11357	186-190°C 201°C
Vicat point	ISO 306	181°C
Specific gravity at 20°C	ISO 1183	natural powders 1,040 g/cm ³ dipping and ES powders, white 1.065 g/cm ³ to 1.25 g/cm ³
Water absorption to saturation	ISO 62/1	at 20°C and 65% RH 0.9 to 1.1% depending on grade at 20°C and 100% RH 1.6 to 1.9% depending on grade at 100°C and 100% RH (boiling water) 2.4 to 3% depending on grade

MECHANICAL PROPERTIES OF RILSAN® PA11 FINE POWDERS

		Laser sintered part	Stripped coating
Tensile modulus	ISO 527	1500 MPa	1000-1200 MPa
Tensile strength at yield		45-50 MPa	40-45 MPa
Elongation at yield		18-24%	18-24%
Tensile strength at break		45 MPa	39-47 MPa
Elongation at break		45%	>200%
Flexural modulus	ISO 178 (23°C)	1200 MPa	1100-1200 MPa
Shore D hardness	ISO 868 (20°C)	77	70-85
Impact strength (Charpy – unnotched)	ISO 179 1eU (23°C)	No break	No break

ELECTRICAL PROPERTIES OF RILSAN® PA11 FINE POWDERS-BASED COATINGS

Surface resistivity at 20°C and 65% RH at 500 V	ASTM D 257	2.4 x 10 ¹⁴ Ω
Dielectric constant	102 Hz 106 Hz	3.9 3.1
Transverse or volume resistivity at 20°C and 65% RH at 500 V	ASTM D 257	10 ¹⁴ to 10 ¹⁶ Ω.cm
Tangent of the angle of loww (power factor) at 1,000 V R.M.S., with a current of 1,000 Hz (at 20°C and 65% RH)		0.05
Resistance to surface tracking KA method	DIN 53-480	Grade KA3c
Dielectric rigidity ES powders thickness ± 100 µm Dipping powders, thickness 350 to 450 µm	ASTM D 149	55 to 90 kV/mm 30 to 36 kV/mm
Dielectric strength Influence of the thickness studied on a natural coating (measured at 20°C and 65% RH)	0.20 mm 0.43 mm 0.70 mm 0.90 mm	52.8 kV/mm 38.4 kV/mm 34.7 kV/mm 33.1 kV/mm

SPECIFIC PROPERTIES OF RILSAN® PA11 FINE POWDERS-BASED COATINGS

Hardness measured with a Persoz pendulum at 20°C	ISO 1522	200-280
Surface hardness at 20°C, 10s under load	DIN 53-456	80 N/mm ²
Scratch resistance Clemen apparatus; load necessary to induce a scratch which reaches the underlying metal for a coating of 0.4 mm thickness	ISO 1518	59 N
Pencil hardness	ECCA T4	Note: B
Shear strength	ASTM D 732	35-42 N/mm ²
Impact resistance Dip coating powder (thickness 350 µm) ES powders (thickness 100 µm)	ASTM G14 ISO 3678 ISO 6272	> 2 J > 2.5 J > 19 J
Abrasion resistance Taber abrasimeter (wheel type CS 17, load 1 kg) Loss of weight after 1,000 cycles	ISO 9352	15mg
Coefficient of friction Black powders	NFT 54-112 (8) Static K Dynamic K	0.15-0.3 0.05-0.2
Flexibility Conical mandrel folding	ISO 6860	> 35%
Specific heat		2.09 kJ/kg.K
Thermal conductivity		0.29 W/mK between 50° and 170°C
Latent heat of fusion		83.7 kJ/kg
Inflammability measured at a thickness greater than 3 mm to eliminate the influence of the substrate	ASTM D 635	self-extinguishing
Resistance to boiling water after 2,000 hours; neither bubbling nor modification	ISO 1521	Excellent adhesion
Resistance to outdoor exposure	ASTM D 1235	3 years of exposure in Florida: Excellent adhesion
Resistance to salt water		No corrosion after 10 years exposure
Salt spray resistance	ISO 9227 on scribed primed plates (testing according to WIS 4-52-01)	< 1 mm corrosion after 2,000 hours

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