Cubic Ink® High Performance 4-2800 VP-ESD black

Material with ESD-properties and toughness for final part production

Liquid Properties	Value[1]	Unit
Viscosity @ 25 °C (DIN EN ISO 3219)	130	mPa·s
Density (DIN EN ISO 15212-1)	1.10	g/mL
Critical Energy (E_c) @405 / 385 nm	1.9 / 2.6	mJ/cm²
Depth of Penetration (D_p) @405 / 385 nm	0.10 / 0.07	mm
Tensile Properties[2] (DIN EN ISO 527-5A)		
Ultimate Tensile Strength	67	MPa
Yield Strength	67	MPa
Tensile Modulus	3100	MPa
Elongation at Break	4.0	%
Flexural Properties[3] (DIN EN ISO 178)		
Flexural Strength	120	MPa
Flexural Modulus	2800	MPa
Deflection at Fracture	7.2	%
Impact Properties		
Izod notched (DIN EN ISO 180)	16	J/m
Charpy notched (DIN EN ISO 179-1)	1.5	kJ/m²
Izod unnotched (DIN EN ISO 180)	110	J/m
Charpy unnotched (DIN EN ISO 179-1)	11	kJ/m²

Hardness (DIN EN ISO 7619)

Shore Hardness (green)	80 - 85	D
Shore Hardness	86	D

Thermal Properties

T_g (DSC)[4]	111	°C
HDT A (DIN EN ISO 75)	78	°C
HDT B (DIN EN ISO 75)	94	°C
CTE (–50 °C, 80 °C) (DIN EN ISO 11359-2)	79	x 10^{-6} K^{-1}
CTE (110 °C, 200 °C) (DIN EN ISO 11359-2)	159	x 10^{-6} K^{-1}
Specific Heat Capacity, 20 °C (DIN EN ISO 11357-4)	1.5	J/(g·K)

Electrical Properties

Dielectric strength (IEC60243-1)	1	kV/mm
Dielectric strength after 24 h/RT H_2O (IEC60243-1)	1	kV/mm
Relative Permittivity (Dielectric Constant, 21 °C, 10000 Hz, IEC60250)	260	-
Dissipation Factor (21 °C, 10000 Hz, IEC60250)	0.84	-
Volume Resistivity (IEC60093)	1.8 x 10^7	Ω·cm
Volume Resistivity after 7 d/RT H_2O (IEC60093)	4.9 x 10^7	Ω·cm
Comparative Tracking Index (IEC60112)	>600	V

Flame (UL94)

Flammability, horizontal (at 3.2 mm)	HB	-

Chemical Resistance

Water Uptake, 24 h, 23 °C	0.2	%
Performance after Water Uptake, 24 h, 23 °C[5]	<1	%

Thermal Ageing[6]

125 °C for 672 hours	<1	%

Print Appearance/ Color

Available in black.

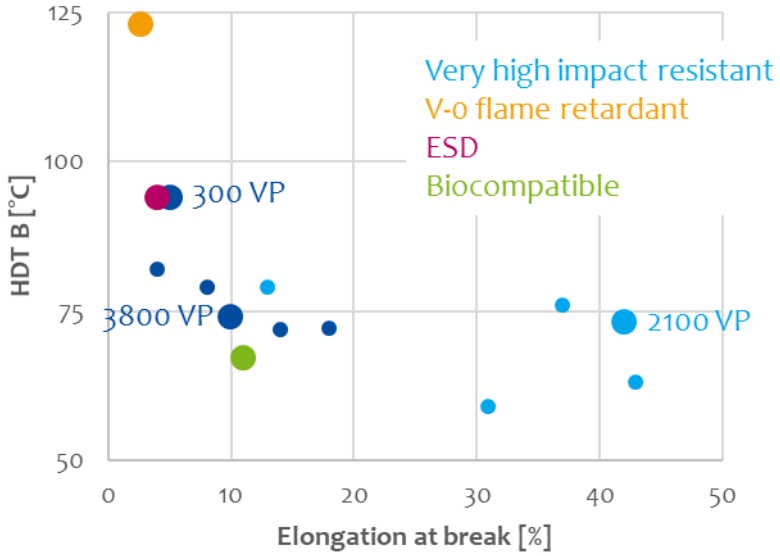
Availability and Storage

Batch sizes starting from 1 kg.

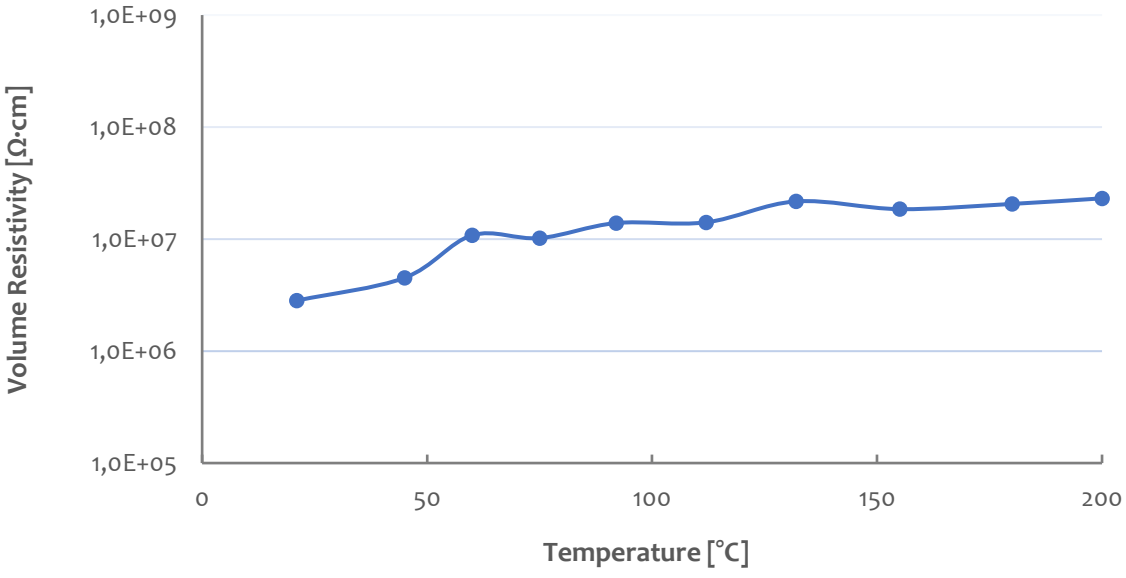
Store between 21 and 28 °C and protect from light. Stir prior to use.

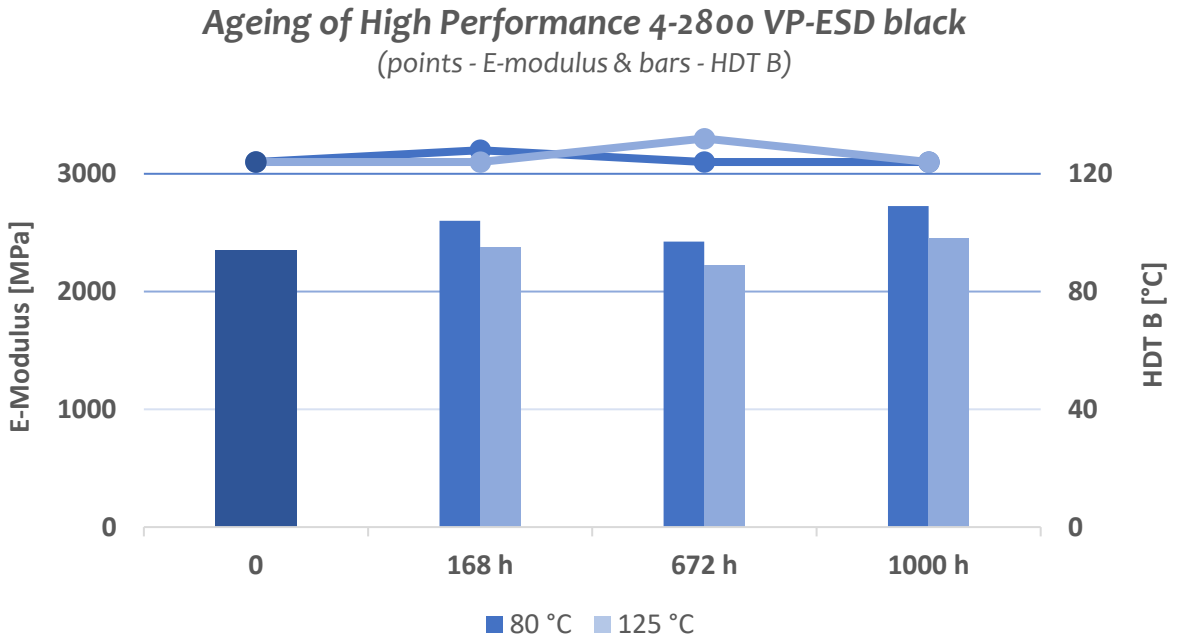
[1]Properties with post-processing – washed with water, UV and thermal post-cure. All material properties can vary with printer, print settings, object orientation, part geometry, post-processing and age of sample. [2]5 mm/min; [3]5 mm/min; [4]–20 - 200 °C, 20 K/min; [5]Relative loss of E-modulus, tensile strength and elongation at break compared to reference, DIN EN ISO 527-5A, 5 mm/min; [6]Relative loss of tensile strength compared to reference, DIN EN ISO 527-5A, 5 mm/min.

Versatility and Customization of High Performance 4-Series



ESD-Character of High Performance 4-2800 VP-ESD black





Chemical Resistance	Mass Gain [%][1]
Water	0.2
Acetic Acid (5%)	0.2
Hydrochloric Acid (1%)	<0.1
Nitric Acid (5%)	0.3
Sodium Hypochlorite (10%)	0.1
Hydrogen Peroxide (3%)	0.3
Sodium Hydroxide (1%)	0.1
Isopropyl Alcohol	<0.1
Methanol	3.4
Butyl Glycol Acetate	0.1
Super Gasoline	0.6
Acetone	5.4
Methyl Ethyl Ketone	2.2

[1]Percental weight gained after 24 h submersion of printed and post-cured (washed with water, UV and thermal post-cure) 1 x 1 x 1 cm cubes.

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