

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

Material with ESD-properties and toughness for final part production

Liquid Properties	Value¹	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/cm ²
Depth of Penetration (D _p) @405 / 385 nm	0.10 / 0.07	mm
Tensile Properties² (DIN EN ISO 527-5A)		
Ultimate Tensile Strength	67	MPa
Yield Strength	67	MPa
Tensile Modulus	3100	MPa
Elongation at Break	4.0	%
Flexural Properties³ (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/m ²
Izod unnotched (DIN EN ISO 180)	110	J/m
Charpy unnotched (DIN EN ISO 179-1)	11	kJ/m ²

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 ₂ O (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 ₂ O (IEC60093)	4.9 x 10 ⁷	Ω·cm
Comparative Tracking Index (IEC60112)	>600	V

Flame (UL94)

Flammability, horizontal (at 3.2 mm)	HB	-
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Chemical Resistance

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

Thermal Ageing⁶

125 °C for 672 hours	<1	%
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Print Appearance/ Color

Available in black.		
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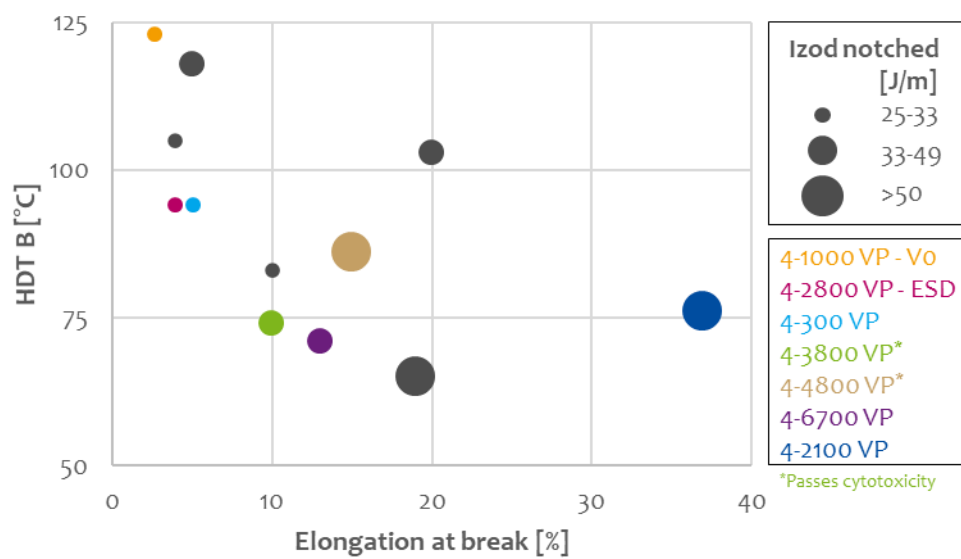
Availability and Storage

Batch sizes starting from 1 kg.

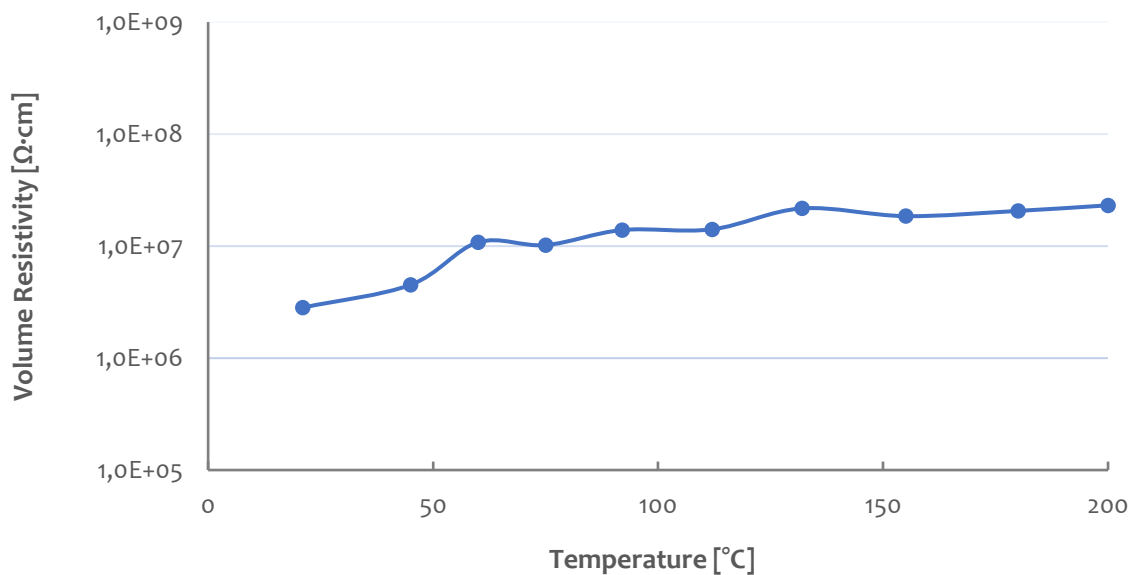
Store between 21 and 28 °C and protect from light. Stir prior to use.

¹Properties 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. ²5 mm/min; ³5 mm/min; ⁴-20 - 200 °C, 20 K/min; ⁵Relative loss of E-modulus, tensile strength and elongation at break compared to reference, DIN EN ISO 527-5A, 5 mm/min; ⁶Relative loss of tensile strength compared to reference, DIN EN ISO 527-5A, 5 mm/min.

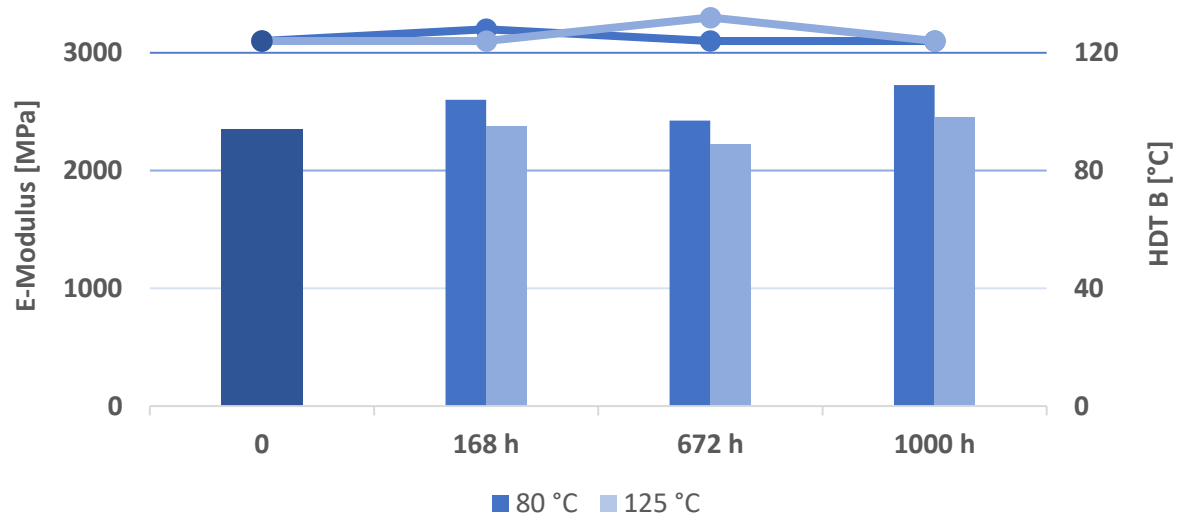
Characteristics and Versatility of High Performance 4-series



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



Ageing of High Performance 4-2800 VP-ESD black
(points - E-modulus & bars - HDT B)



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

¹Percental weight gained after 24 h submersion of printed and post-cured (washed with water, UV and thermal post-cure) 1 x 1 x 1 cm³ cubes.

Cubic Ink®
ALTANA New Technologies GmbH

located at

ACTEGA Terra GmbH
Mielestraße 13
31275 Lehrte
GERMANY

Tel +49 (0)5132 5009-600

cubic.ink@altana.com
www.altana.com

Learn more about Cubic Ink® materials

www.altana.com/cubic-ink
www.altana.de/cubic-ink

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