

## Cubic Ink® High Performance 4-2100 VP

Highly impact resistant and flexible material with good toughness for final part production

<b>Liquid Properties</b>	<b>Value<sup>1</sup></b>	<b>Unit</b>
Viscosity @ 25 °C (DIN EN ISO 3219)	25	mPa·s
Density (DIN EN ISO 15212-1)	1.10	g/mL
Critical Energy (E <sub>c</sub> ) @405 / 385 nm	2.4 / 2.3	mJ/cm <sup>2</sup>
Depth of Penetration (D <sub>p</sub> ) @405 / 385 nm	0.28 / 0.20	mm
<b>Tensile Properties<sup>2</sup> (DIN EN ISO 527-5A)</b>		
Ultimate Tensile Strength	48	MPa
Yield Strength	48	MPa
Tensile Modulus	2200	MPa
Elongation at Break	37	%
<b>Flexural Properties<sup>3</sup> (DIN EN ISO 178)</b>		
Flexural Strength	64	MPa
Flexural Modulus	1600	MPa
Deflection at Fracture	>10	%
<b>Impact Properties</b>		
Izod notched (DIN EN ISO 180)	67	J/m
Charpy notched (DIN EN ISO 179-1)	9.9	kJ/m <sup>2</sup>
Izod unnotched (DIN EN ISO 180)	670	J/m
Charpy unnotched (DIN EN ISO 179-1)	110	kJ/m <sup>2</sup>

### Hardness (DIN EN ISO 7619)

Shore Hardness (green)	40 - 45	D
Shore Hardness	77	D

### Thermal Properties

T <sub>g</sub> (TMA) <sup>4</sup>	90	°C
HDT A (DIN EN ISO 75)	49	°C
HDT B (DIN EN ISO 75)	76	°C
CTE (-50 °C, 70 °C) (DIN EN ISO 11359-2)	94	x 10 <sup>-6</sup> K <sup>-1</sup>
CTE (120 °C, 200 °C) (DIN EN ISO 11359-2)	113	x 10 <sup>-6</sup> K <sup>-1</sup>
Specific Heat Capacity, 20 °C (DIN EN ISO 11357-4)	1.7	J/(g·K)

### Electrical Properties

Dielectric strength (IEC60243-1)	22	kV/mm
Relative Permittivity (Dielectric Constant, 21 °C, 10000 Hz, IEC60250)	8.9	-
Dissipation Factor (21 °C, 10000 Hz, IEC60250)	0.016	-
Volume Resistivity (IEC60093)	1.5 x 10 <sup>14</sup>	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, 168 h, 23 °C <sup>5</sup>	6.4	%
Performance after Water Uptake, 30 min, 90 °C <sup>6</sup>	28	%

### Thermal Ageing<sup>7</sup>

125 °C for 168 hours	<1	%
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### Ageing at -40 °C<sup>6</sup>

for 168 hours	<1	%
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### Print Appearance/ Color

Natural color is translucent light yellow. Also available in cyan, magenta, yellow, black and grey. More colors on request.

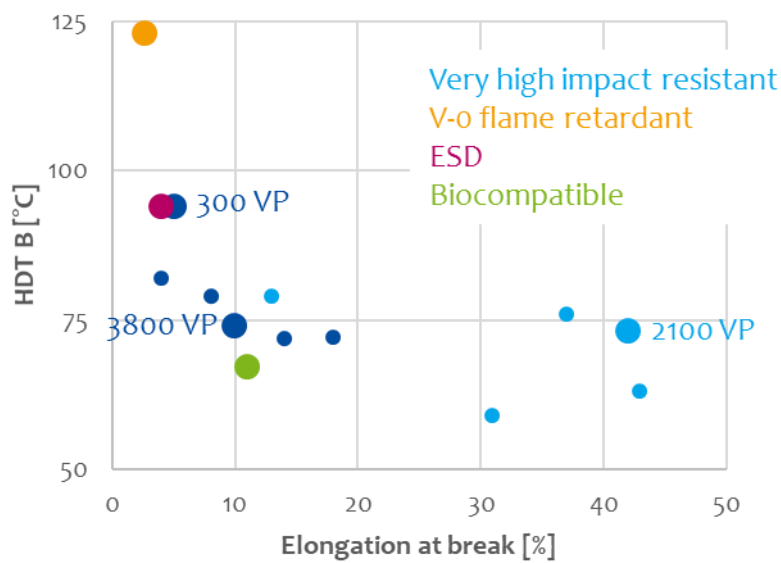
## Availability and Storage

Batch sizes starting from 1 kg.

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

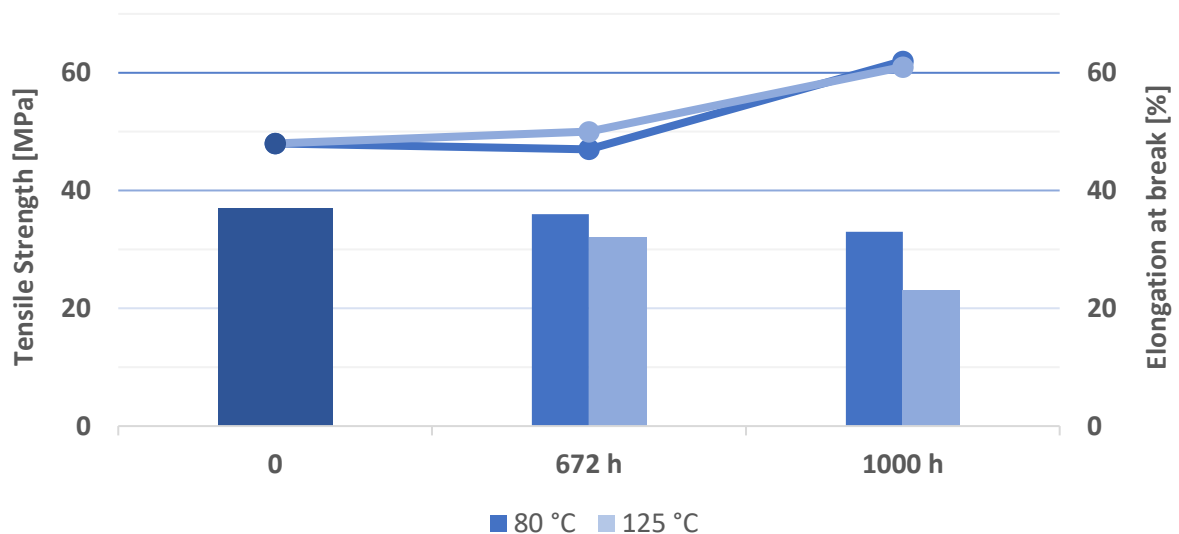
<sup>1</sup>Properties with post-processing – washed with water, UV post-cure. All material properties can vary with printer, print settings, object orientation, part geometry, post-processing and age of sample. <sup>2</sup>5 mm/min; <sup>3</sup>5 mm/min; <sup>4</sup>-20 - 200 °C, 5 K/min, TMA; <sup>5</sup>Weight loss of 5A-specimen DIN EN ISO 527; <sup>6</sup>Relative loss of tensile strength compared to reference, DIN EN ISO 527-5A, 5 mm/min; <sup>7</sup>Relative loss of elongation at break compared to reference, DIN EN ISO 527-5A, 5 mm/min.

## Versatility and Customization of High Performance 4-Series

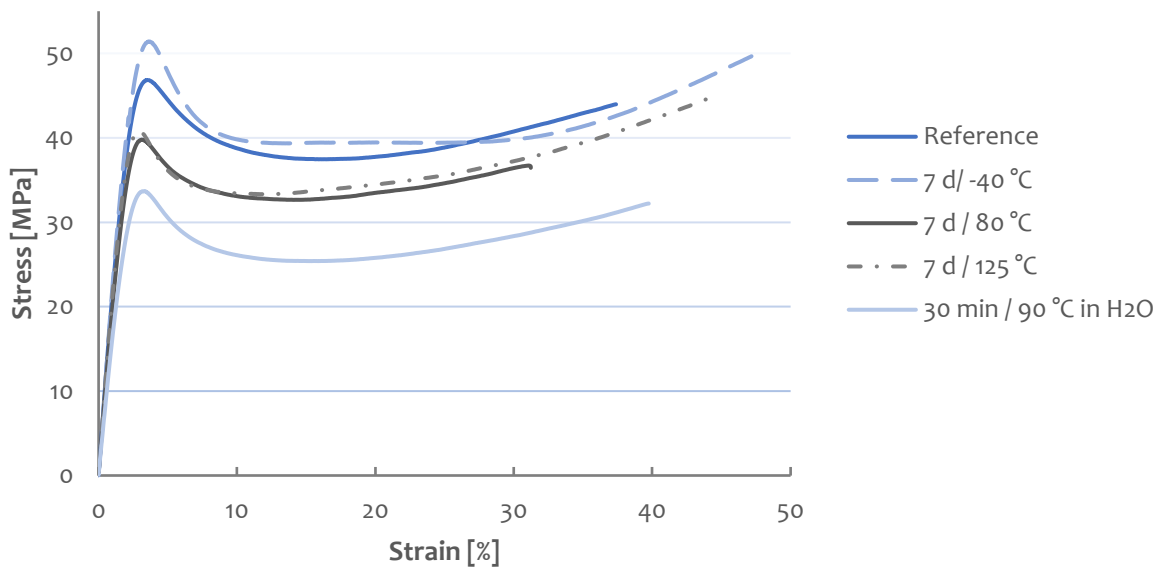


## Ageing of High Performance 4-2100 VP

(points - tensile strength & bars - elongation at break)



### Tensile Testing of High Performance 4-2100 VP



Chemical Resistance	Mass Gain [%] <sup>1</sup>
Water	4.9
Acetic Acid (5%)	5.8
Hydrochloric Acid (1%)	11.2
Nitric Acid (5%)	8.4
Sodium Hypochlorite (10%)	0.4
Hydrogen Peroxide (3%)	5.8
Sodium Hydroxide (1%)	4.1
Isopropyl Alcohol	0.3
Methanol	10.9
Butyl Glycol Acetate	-0.2
Super Gasoline	1.6
Acetone	12.4
Methyl Ethyl Ketone	8.4

<sup>1</sup>Percental weight gained after 24 h submersion of printed and post-cured (washed with water, UV post-cure) 1 x 1 x 1 cm cubes.

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**Learn more about Cubic Ink® materials** [www.altana.com/cubic-ink](http://www.altana.com/cubic-ink) [www.altana.de/cubic-ink](http://www.altana.de/cubic-ink)

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