



ULTEM™ Resin XH1015F
Europe-Africa-Middle East: COMMERCIAL

Thermoplastic Polyimide Extem* XH1015 Resin. EFSA food Contact approved.

TYPICAL PROPERTIES ¹	TYPICAL VALUE	Unit	Standard
MECHANICAL			
Tensile Stress, yld, Type I, 5 mm/min	1050	kgf/cm ²	ASTM D 638
Tensile Stress, brk, Type I, 5 mm/min	970	kgf/cm ²	ASTM D 638
Tensile Strain, yld, Type I, 5 mm/min	7	%	ASTM D 638
Tensile Strain, brk, Type I, 5 mm/min	10	%	ASTM D 638
Tensile Modulus, 5 mm/min	34800	kgf/cm ²	ASTM D 638
Flexural Stress, yld, 1.3 mm/min, 50 mm span	1710	kgf/cm ²	ASTM D 790
Flexural Modulus, 1.3 mm/min, 50 mm span	31900	kgf/cm ²	ASTM D 790
Tensile Stress, yield, 5 mm/min	101	MPa	ISO 527
Tensile Stress, break, 5 mm/min	74	MPa	ISO 527
Tensile Strain, yield, 5 mm/min	6	%	ISO 527
Tensile Strain, break, 5 mm/min	7	%	ISO 527
Tensile Modulus, 1 mm/min	3100	MPa	ISO 527
Flexural Stress, yield, 2 mm/min	2870	MPa	ISO 178
Flexural Modulus, 2 mm/min	120	MPa	ISO 178
IMPACT			
Izod Impact, notched, 23°C	4	cm-kgf/cm	ASTM D 256
Izod Impact, notched, -30°C	0	cm-kgf/cm	ASTM D 256
Instrumented Impact Total Energy, 23°C	0	cm-kgf	ASTM D 3763
Izod Impact, notched 80*10*4 +23°C	4	kJ/m ²	ISO 180/1A
Izod Impact, notched 80*10*4 -30°C	0	kJ/m ²	ISO 180/1A
Charpy 23°C, V-notch Edgew 80*10*4 sp=62mm	0	kJ/m ²	ISO 179/1eA
THERMAL			
Vicat Softening Temp, Rate B/50	260	°C	ASTM D 1525

(1) Typical values only. Variations within normal tolerances are possible for various colors. All values are measured after at least 48 hours storage at 23°C/50% relative humidity. All properties, except the melt volume and melt flow rates, are measured on injection molded samples. All samples tested under ISO test standards are prepared according to ISO 294.

(2) Only typical data for selection purposes. Not to be used for part or tool design.

(3) This rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

(4) Internal measurements according to UL standards.

(5) Measurements made from laboratory test coupon. Actual shrinkage may vary outside of range due to differences in processing conditions, equipment, part geometry and tool design. It is recommended that mold shrinkage studies be performed with surrogate or legacy tooling prior to cutting tools for new molded article.

Source GMD, last updated:

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TYPICAL PROPERTIES ¹	TYPICAL VALUE	Unit	Standard
THERMAL			
HDT, 0.45 MPa, 3.2 mm, unannealed	250	°C	ASTM D 648
HDT, 1.82 MPa, 3.2mm, unannealed	235	°C	ASTM D 648
HDT, 1.82 MPa, 6.4 mm, unannealed	237	°C	ASTM D 648
CTE, 23°C to 150°C, flow	5.E-05	1/°C	ISO 11359-2
CTE, 23°C to 150°C, xflow	5.1E-05	1/°C	ISO 11359-2
Vicat Softening Temp, Rate B/50	250	°C	ISO 306
Vicat Softening Temp, Rate B/120	247	°C	ISO 306
HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm	223	°C	ISO 75/Af
PHYSICAL			
Specific Gravity	1.31	-	ASTM D 792
Water Absorption, 23°C/48hrs	0.6	%	ASTM D 570
Mold Shrinkage, flow, 3.2 mm (5)	1 - 1.2	%	SABIC Method
Melt Flow Rate, 200°C/3.8 kgf	0	g/10 min	ASTM D 1238
Melt Flow Rate, 367°C/6.6 kgf	10	g/10 min	ASTM D 1238
Density	1.31	g/cm ³	ISO 1183
Water Absorption, (23°C/sat)	2.3	%	ISO 62
Moisture Absorption (23°C / 50% RH)	0	%	ISO 62
Melt Volume Rate, MVR at 220°C/5.0 kg	0	cm ³ /10 min	ISO 1133

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PROCESSING PARAMETERS	TYPICAL VALUE	Unit
Injection Molding		
Drying Temperature	175	°C
Drying Time	4 - 6	hrs
Drying Time (Cumulative)	24	hrs
Maximum Moisture Content	0.02	%
Melt Temperature	380 - 410	°C
Nozzle Temperature	375 - 405	°C
Front - Zone 3 Temperature	380 - 410	°C
Middle - Zone 2 Temperature	370 - 400	°C
Rear - Zone 1 Temperature	360 - 385	°C
Mold Temperature	150 - 175	°C

PROCESSING CRITICAL SUCCESS FACTORS:

- **DRYING:** must dry to $\leq 0.02\%$ moisture. Good dehumidifying dryer is critical (verify dew point). If needed, dry longer than 6 hours and at a higher temperature (200°C).
- **FEEDING:** minimize exposure of dried resin to humid air to avoid moisture absorption. Cover the feed hopper in case of an open hopper.
- **RESIDENCE TIME:** use a ramp profile for residence times > 2-3 minutes.
- **INJECTION SPEED:** slow speed (e.g., 15-25 mm/sec) is good for minimizing part stress. Higher speed (e.g., 25-50 mm/sec) is better for part appearance and higher gloss.
- **GATES:** pin-gates (used for crystalline resins) cause shear degradation. Use generous gates when possible.
- **TEMPERATURE SETTINGS:** Use high heat rated (e.g., ceramic) heater bands

PROCESSING BEST PRACTICES:

- Barrel temperature profile depends on residence time
 - flat profile for ~2-3 min residence time
 - ramp profile for longer residence time
- Use 40-70% of barrel capacity per cycle to reduce residence time
- XH resins are amorphous and do not need long cooling times (unlike crystalline resins)
- Use low shear screw to minimize shear (similar to Ultem)
- Minimize back pressure and minimize decompression/suckback (can cause splay)
- Use slow injection velocity to reduce shear splay; decoupled molding preferred
- During shut-down, heaters can be banked at 200-225°C after all the residual resin is run out of the barrel

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PROCESSING PARAMETERS	TYPICAL VALUE	Unit
Injection Molding		
Back Pressure	0.3 - 0.7	MPa
Screw Speed	70 - 100	rpm
Shot to Cylinder Size	40 - 70	%
Vent Depth	0.025 - 0.076	mm

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