

# Kynar® 1000 HD

Polyvinylidene Fluoride

Arkema



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## Technical Data

### General

Material Status	• Commercial: Active		
Literature <sup>1</sup>	<ul style="list-style-type: none"> <li>• <a href="#">Processing - Kynar (English)</a></li> <li>• <a href="#">Technical Datasheet (English)</a></li> </ul>		
UL Yellow Card <sup>2</sup>	• <a href="#">E54699-244842</a>		
Search for UL Yellow Card	• <a href="#">Arkema</a>		
Availability	<ul style="list-style-type: none"> <li>• Africa &amp; Middle East</li> <li>• Asia Pacific</li> </ul>	<ul style="list-style-type: none"> <li>• Europe</li> <li>• Latin America</li> </ul>	<ul style="list-style-type: none"> <li>• North America</li> </ul>
Features	<ul style="list-style-type: none"> <li>• Fatigue Resistant</li> <li>• Fungus Resistant</li> <li>• Good Chemical Resistance</li> <li>• Good Creep Resistance</li> </ul>	<ul style="list-style-type: none"> <li>• Good Processability</li> <li>• Good Strength</li> <li>• Good Thermal Stability</li> <li>• Good Toughness</li> </ul>	<ul style="list-style-type: none"> <li>• Good Weather Resistance</li> <li>• Kosher Approved</li> <li>• Low to No Outgassing</li> <li>• Ozone Resistant</li> </ul>
Agency Ratings	<ul style="list-style-type: none"> <li>• FDA 21 CFR 177.1520</li> <li>• FDA 21 CFR 177.2510</li> <li>• FDA 21 CFR 177.2600</li> </ul>	<ul style="list-style-type: none"> <li>• NSF 51</li> <li>• NSF 61</li> <li>• USDA Food Contact, Unspecified Rating</li> </ul>	<ul style="list-style-type: none"> <li>• USP Class VI</li> </ul>
Appearance	• Natural Color		
Forms	• Pellets		
Processing Method	• Extrusion	• Injection Molding	
Multi-Point Data	<ul style="list-style-type: none"> <li>• Creep Modulus vs. Time (ISO 11403-1)</li> <li>• Isochronous Stress vs. Strain (ISO 11403-1)</li> </ul>	<ul style="list-style-type: none"> <li>• Isothermal Stress vs. Strain (ISO 11403-1)</li> <li>• Secant Modulus vs. Strain (ISO 11403-1)</li> </ul>	<ul style="list-style-type: none"> <li>• Shear Modulus vs. Temperature (ISO 11403-1)</li> <li>• Viscosity vs. Shear Rate (ISO 11403-2)</li> </ul>

Physical	Nominal Value (English)	Nominal Value (SI)	Test Method
Specific Gravity			
--	1.76 to 1.78	1.76 to 1.78 g/cm <sup>3</sup>	ASTM D792
--	0.0639 lb/in <sup>3</sup>	1770 kg/m <sup>3</sup>	ISO 1183 <sup>4</sup>
Melt Mass-Flow Rate (MFR) (450°C/5.0 kg)	1.5 to 2.5 g/10 min	1.5 to 2.5 g/10 min	ASTM D1238
Melt volume-flow rate (230°C/5.0 kg)	0.0671 in <sup>3</sup> /10min	1.10 cm <sup>3</sup> /10min	ISO 1133 <sup>4</sup>
Water Absorption			
73°F (23°C), 24 hr	0.010 to 0.030 %	0.010 to 0.030 %	ASTM D570
Saturation	0.030 %	0.030 %	ISO 62 <sup>4</sup>
Equilibrium	0.015 %	0.015 %	ISO 62 <sup>4</sup>
Mechanical	Nominal Value (English)	Nominal Value (SI)	Test Method
Tensile Modulus			
73°F (23°C)	200000 to 335000 psi	1380 to 2310 MPa	ASTM D638
--	290000 psi	2000 MPa	ISO 527-2 <sup>4</sup>
Tensile Strength			
Yield, 73°F (23°C)	6500 to 8000 psi	44.8 to 55.2 MPa	ASTM D638
Yield	7250 psi	50.0 MPa	ISO 527-2 <sup>4</sup>
Break, 73°F (23°C)	5000 to 7000 psi	34.5 to 48.3 MPa	ASTM D638
Tensile Elongation			
Yield, 73°F (23°C)	5.0 to 10 %	5.0 to 10 %	ASTM D638
Yield	9.0 %	9.0 %	ISO 527-2 <sup>4</sup>
Break, 73°F (23°C)	20 to 100 %	20 to 100 %	ASTM D638
Nominal strain at break	> 50 %	> 50 %	ISO 527-2 <sup>4</sup>
Tensile Creep Modulus			
1 hr	152000 psi	1050 MPa	ISO 899-1 <sup>4</sup>
1000 hr	94300 psi	650 MPa	
Flexural Modulus (73°F (23°C))	240000 to 335000 psi	1650 to 2310 MPa	ASTM D790

Mechanical	Nominal Value (English)	Nominal Value (SI)	Test Method
Flexural Strength 5.0% Strain, 73°F (23°C)	8500 to 11000 psi	58.6 to 75.8 MPa	ASTM D790
Compressive Strength (73°F (23°C))	10000 to 15000 psi	68.9 to 103 MPa	ASTM D695
Coefficient of Friction vs. Steel - Dynamic vs. Steel - Static	0.15 0.22	0.15 0.22	ASTM D1894
Taber Abrasion Resistance 1000 Cycles, 1000 g, CS-17 Wheel	5.00 to 9.00 mg	5.00 to 9.00 mg	No Standard
Impact	Nominal Value (English)	Nominal Value (SI)	Test Method
Charpy notched impact strength -22°F (-30°C) 73°F (23°C)	2.38 ft·lb/in <sup>2</sup> 10.5 ft·lb/in <sup>2</sup>	5.00 kJ/m <sup>2</sup> 22.0 kJ/m <sup>2</sup>	ISO 179/1eA <sup>4</sup>
Charpy impact strength -22°F (-30°C) 73°F (23°C)	95.6 ft·lb/in <sup>2</sup> 120 ft·lb/in <sup>2</sup>	201 kJ/m <sup>2</sup> 252 kJ/m <sup>2</sup>	ISO 179/1eU <sup>4</sup>
Notched Izod Impact (73°F (23°C))	1.8 to 4.0 ft·lb/in	96 to 210 J/m	ASTM D256
Unnotched Izod Impact (73°F (23°C))	20 to 80 ft·lb/in	1100 to 4300 J/m	ASTM D256
Hardness	Nominal Value (English)	Nominal Value (SI)	Test Method
Durometer Hardness (Shore D, 73°F (23°C))	77 to 82	77 to 82	ASTM D2240
Thermal	Nominal Value (English)	Nominal Value (SI)	Test Method
Deflection Temperature Under Load 264 psi (1.8 MPa), Unannealed 264 psi (1.8 MPa)	220 to 230 °F 219 °F	104 to 110 °C 104 °C	ASTM D648 ISO 75-2 <sup>4</sup>
Glass Transition Temperature .. <sup>5</sup> .. <sup>6</sup>	-40 °F -41.0 to -37.0 °F	-40 °C -40.6 to -38.3 °C	ISO 11357-2 <sup>4</sup> DMA
Vicat Softening Temperature 50°C/h, B (50N)	280 °F	138 °C	ISO 306 <sup>4</sup>
Peak Melting Temperature -- .. <sup>5</sup>	329 to 342 °F 336 °F	165 to 172 °C 169 °C	ASTM D3418 ISO 11357-3 <sup>4</sup>
CLTE - Flow -- --	0.000066 to 0.000080 in/in/°F 0.000083 in/in/°F	0.00012 to 0.00014 cm/cm/°C 0.00015 cm/cm/°C	ASTM D696 ISO 11359-2 <sup>4</sup>
Specific Heat	0.280 to 0.360 Btu/lb/°F	1170 to 1510 J/kg/°C	DSC
Thermal Conductivity	1.2 to 1.3 Btu·in/hr/ft <sup>2</sup> /°F	0.17 to 0.19 W/m/K	ASTM C177
Electrical	Nominal Value (English)	Nominal Value (SI)	Test Method
Surface resistivity	4.0E+13 ohm	4.0E+13 ohm	IEC 60093 <sup>4</sup>
Volume Resistivity 68°F (20°C) <sup>7</sup> --	2.0E+14 ohm·cm 9.1E+11 ohm·in	2.0E+14 ohm·cm 2.3E+10 ohm·m	ASTM D257 IEC 60093 <sup>4</sup>
Dielectric Strength 73°F (23°C) --	1600 V/mil 690 V/mil	63 kV/mm 27 kV/mm	ASTM D149 IEC 60243-1 <sup>4</sup>
Dielectric Constant 73°F (23°C) <sup>8</sup> 100 Hz 1 MHz	4.50 to 9.50 10.5 7.00	4.50 to 9.50 10.5 7.00	ASTM D150 IEC 60250 <sup>4</sup> IEC 60250 <sup>4</sup>

Electrical	Nominal Value (English)	Nominal Value (SI)	Test Method
Dissipation Factor			
73°F (23°C), 100 Hz	0.10 to 0.25	0.10 to 0.25	ASTM D150
100 Hz	0.027	0.027	IEC 60250 <sup>4</sup>
1 MHz	0.24	0.24	IEC 60250 <sup>4</sup>
Comparative tracking index	600	600	IEC 60112 <sup>4</sup>
Flammability	Nominal Value (English)	Nominal Value (SI)	Test Method
Flame Rating	V-0	V-0	UL 94
Burning Behav. at 1.6mm nom. thickn. 0.06 in (1.60 mm)	V-0	V-0	ISO 1210 <sup>4</sup>
Burning Behav. at thickness h 0.0315 in (0.800 mm)	V-0	V-0	ISO 1210 <sup>4</sup>
Oxygen Index			
--	60 %	60 %	ASTM D2863
--	83 %	83 %	ISO 4589-2 <sup>4</sup>
Optical	Nominal Value (English)	Nominal Value (SI)	Test Method
Refractive Index <sup>9</sup>	1.420	1.420	ASTM D542
Fill Analysis	Nominal Value (English)	Nominal Value (SI)	Test Method
Melt Viscosity (842°F (450°C), 100 sec <sup>-1</sup> )	1500 to 2000 Pa·s	1500 to 2000 Pa·s	ASTM D3835
Additional Information	Nominal Value (English)	Nominal Value (SI)	Test Method
Thermal Decomposition Temperature			TGA
-- <sup>10</sup>	707 °F	375 °C	
-- <sup>11</sup>	770 °F	410 °C	

**Notes**

- <sup>1</sup> These links provide you with access to supplier literature. We work hard to keep them up to date; however you may find the most current literature from the supplier.
- <sup>2</sup> A UL Yellow Card contains UL-verified flammability and electrical characteristics. UL IDES continually works to link Yellow Cards to individual plastic materials in Prospector, however this list may not include all of the appropriate links. It is important that you verify the association between these Yellow Cards and the plastic material found in Prospector. For a complete listing of Yellow Cards, visit the UL Yellow Card Search.
- <sup>3</sup> Typical properties: these are not to be construed as specifications.
- <sup>4</sup> Tested in accordance with ISO 10350. 23°C/50%r.h. unless otherwise noted.
- <sup>5</sup> 18 °F/min (10 °C/min)
- <sup>6</sup> 1 Hz
- <sup>7</sup> 65%RH
- <sup>8</sup> 100MHz to 100Hz
- <sup>9</sup> Sodium D line, 77°F
- <sup>10</sup> 1% wt. loss / in air
- <sup>11</sup> 1% wt. loss / in nitrogen

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## Where to Buy

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### Supplier

**Arkema**

Paris, France

**Telephone:** 33-1490-08080

**Web:** <http://www.arkemagroup.com/>

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### Distributor

**Polymix**

**Telephone:** +33-3-8920-1380

**Web:** <http://www.polymix.eu/>

**Availability:** France

**RESINEX Group**

*RESINEX is a Pan European distribution company. Contact RESINEX for availability of individual products by country.*

**Telephone:** +32-14-672511

**Web:** <http://www.resinex.com/>

**Availability:** Europe



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