Amodel® AT-1002 HS

polyphthalamide

Amodel® AT-1002 HS is a neat, toughened, heat stabilized polyphthalamide (PPA) resin that offers superior retention of properties after humid thermal aging; high impact at low temperature and better mechanical properties than many unreinforced thermoplastic polyester and nylon resins.

This material was specifically designed for automotive electrical/electronic applications such as connectors, sockets and sensors.

- Natural: AT-1002 HS NT

General

Material Status	• Commercial: Active	
Availability	• Africa & Middle East • Asia Pacific • Europe	• Latin America • North America
Additive	• Heat Stabilizer • Impact Modifier	• Lubricant • Mold Release
Features	• Chemical Resistant • Ductile • Heat Stabilized • Hot Water Moldability	• Impact Modified • Low Temperature Impact Resistance • Low Warpage • Lubricated
Uses	• Automotive Applications • Automotive Electronics • Automotive Under the Hood	• Machine/Mechanical Parts • Metal Replacement • Valves/Valve Parts
RoHS Compliance	• RoHS Compliant	
Automotive Specifications	• DELPHI MS008756 Color: NT Natural • FORD WSS-M98P14-A3 [1] • GM GMP.PPA.015 Color: Natural	• GM GMW16799P-PPA Color: Natural • IMDS ID 11974222 Color: Natural
Appearance	• Natural Color	
Forms	• Pellets	
Processing Method	• Water-Heated Mold Injection Molding	

Physical	Dry	Conditioned	Unit	Test method
Density	1.13	--	g/cm³	ISO 1183/A
Molding Shrinkage				ASTM D955
Flow	2.0	--	%	
Across Flow	2.1	--	%	
Water Absorption (24 hr)	0.50	--	%	ASTM D570

Mechanical	Dry	Conditioned	Unit	Test method
Tensile Modulus				
--	2760	2760	MPa	ASTM D638
23°C	2760	--	MPa	ISO 527-2
100°C	2100	--	MPa	ISO 527-2
Tensile Stress				
Yield, 23°C	75.2	--	MPa	ISO 527-2
Yield, 100°C	38.6	--	MPa	ISO 527-2
Break, 23°C	68.3	--	MPa	ISO 527-2
--	83.4	76.5	MPa	ASTM D638

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Mechanical	Dry	Conditioned	Unit	Test method
Tensile Strain				
Yield, 23°C	5.0	--	%	ISO 527-2
Yield, 100°C	3.7	--	%	ISO 527-2
Break [2]	80	100	%	ASTM D638
Break, 23°C	15	--	%	ISO 527-2
Flexural Modulus				
--	2210	2280	MPa	ASTM D790
23°C	2280	--	MPa	ISO 178
100°C	1720	--	MPa	ISO 178
Flexural Strength				
--	103	73.1	MPa	ASTM D790
23°C	79.3	--	MPa	ISO 178
100°C	49.6	--	MPa	ISO 178
Shear Strength	64.1	57.2	MPa	ASTM D732

Impact	Dry	Conditioned	Unit	Test method
Charpy Notched Impact Strength (23°C)	13	--	kJ/m²	ISO 179/1eA
Charpy Unnotched Impact Strength (23°C)	No Break	--		ISO 179/1eU
Notched Izod Impact				
--	140	150	J/m	ASTM D256
23°C	13	--	kJ/m²	ISO 180/1A
Unnotched Izod Impact Strength (23°C)	No Break	--		ISO 180/1U
Instrumented Dart Impact (Total Energy)	54.2	47.5	J	ASTM D3763
Penetration Impact [3]	4448	4003	N	ASTM D3763

Thermal	Dry	Conditioned	Unit	Test method
Deflection Temperature Under Load				
0.45 MPa, Annealed	163	--	°C	ASTM D648
1.8 MPa, Unannealed	118	--	°C	ISO 75-2/Af
1.8 MPa, Annealed	121	--	°C	ASTM D648
Melting Temperature	315	--	°C	ISO 11357-3 ASTM D3418
CLTE				ASTM E831
Flow : 0 to 100°C	7.8E-5	--	cm/cm/°C	
Flow : 100 to 200°C	1.3E-4	--	cm/cm/°C	
Transverse : 0 to 100°C	9.3E-5	--	cm/cm/°C	
Transverse : 100 to 200°C	1.4E-4	--	cm/cm/°C	

Electrical	Dry	Conditioned	Unit	Test method
Surface Resistivity	8.0E+13	2.5E+13	ohms	ASTM D257
Volume Resistivity	1.2E+16	7.0E+14	ohms·cm	ASTM D257
Dielectric Strength	17	17	kV/mm	ASTM D149
Dielectric Constant				ASTM D150
60 Hz	3.30	3.80		
1 MHz	3.30	3.80		
Dissipation Factor				ASTM D150
60 Hz	4.0E-3	0.018		
1 MHz	0.016	0.035		

Electrical	Dry	Conditioned	Unit	Test method
Comparative Tracking Index	> 600	> 600	V	ASTM D3638
High Voltage Arc Tracking Rate (HVTR)	12.0	12.0	mm/min	UL 746

Flammability	Dry	Conditioned	Unit	Test method
Flame Rating [4]	HB	--		UL 94

Injection	Dry	Unit
Drying Temperature	110	°C
Drying Time	4.0	hr
Suggested Max Moisture	0.030 to 0.060	%
Rear Temperature	304	°C
Front Temperature	324	°C
Processing (Melt) Temp	321 to 329	°C
Screw Speed	100 to 200	rpm
Screw Compression Ratio	2.5:1.0	

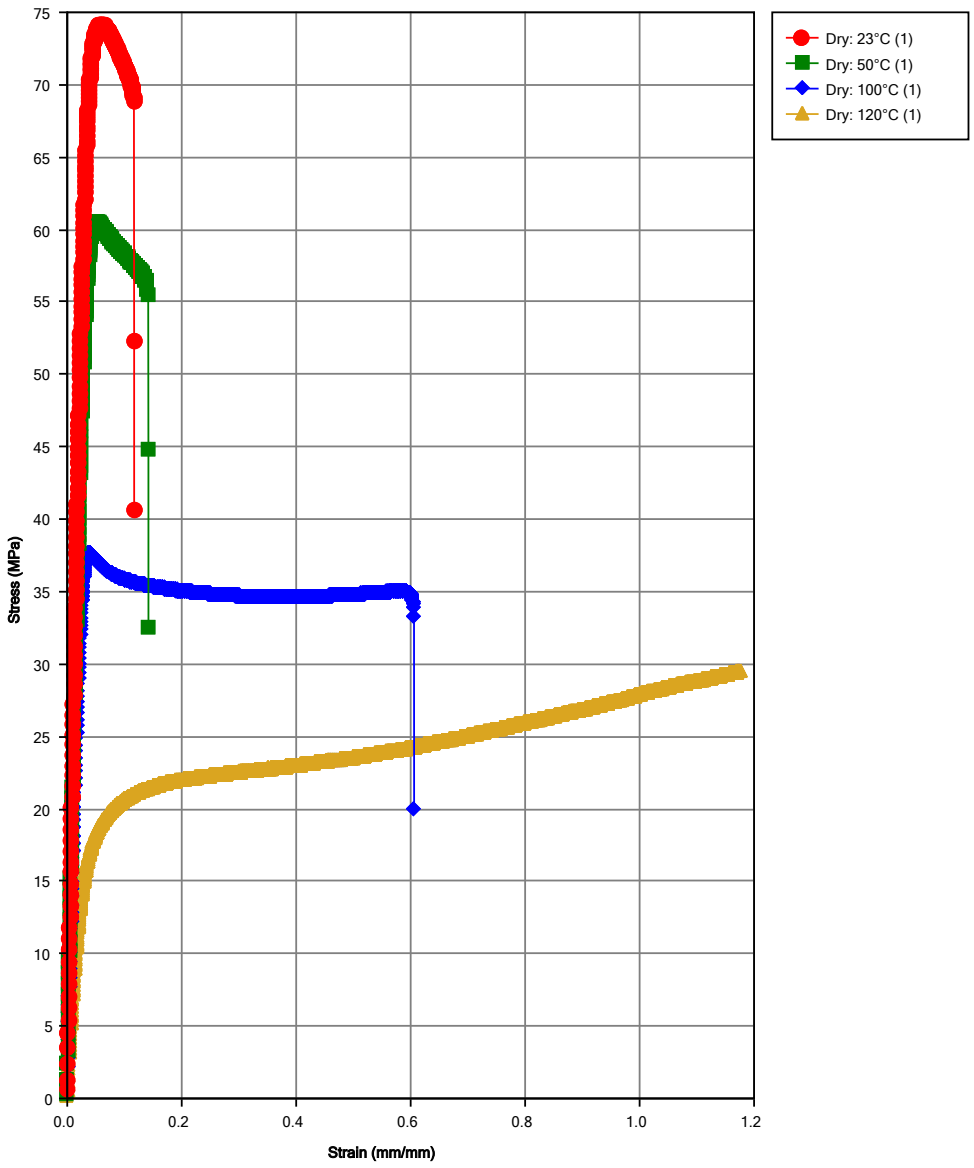
Injection Notes

INJECTION RATE: 1 to 3 in/sec
HOLDING PRESSURE: 50% of injection pressure

STORAGE:

- Amodel® compounds are shipped in moisture-resistant packages at moisture levels according to specifications. Sealed, undamaged bags should be preferably stored in a dry room at a maximum temperature of 50°C (122°F) and should be protected from possible damage. If only a portion of a package is used, the remaining material should be transferred into a sealable container. It is recommended that Amodel® resins be dried prior to molding following the recommendations found in this datasheet and/or in the Amodel® processing guide.

Isothermal Stress vs. Strain (ISO 11403-1)



Data Notes
(1) - 2 in/min (50 mm/min)

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Notes

Typical properties: these are not to be construed as specifications.

[1] Approval listed in Ford MATS system to this fuel performance specifcation, as well as to Ford WSS-M98P14-A7.

[2] Type IV

[3] Maximum Load

[4] This rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

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