Amodel® ET-1000 HS

polyphthalamide

Amodel® ET-1000 HS is an impact modified, heat stabilized polyphthalamide (PPA) that exhibits exceptional impact strength and toughness. Like all Amodel® PPA resins, ET-1000 HS offers high fatigue strength, good chemical resistance and high mechanical property retention over a broad temperature and humidity range.

- Natural: ET-1000 HS NT

General

Material Status	• Commercial: Active	
Availability	• Africa & Middle East • Asia Pacific • Europe	• Latin America • North America
Additive	• Heat Stabilizer	• Impact Modifier
Features	• Chemical Resistant • Ductile • Heat Stabilized	• Hot Water Moldability • Impact Modified • Low Warpage
Uses	• Automotive Applications • Automotive Electronics • Automotive Under the Hood • Connectors • General Purpose • Housings	• Industrial Applications • Industrial Parts • Lawn and Garden Equipment • Machine/Mechanical Parts • Metal Replacement
RoHS Compliance	• RoHS Compliant	
Automotive Specifications	• ASTM D4000 PA1234 Color: BK684 Black • ASTM D4000 PA1234 Color: NT Natural • ASTM D6779 PA1234 • DELPHI 23295267 Color: BK-684 Black • DELPHI 23295267 Color: NT Natural	• DELPHI 28213409 Color: BK-684 Black • DELPHI 28213409 Color: NT Natural • DELPHI M-2965 Color: BK684 Black • DELPHI M-2965 Color: NT Natural • DELPHI MSP24103175 Color: NT 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	1.5	--	%	
Across Flow	1.5	--	%	
Water Absorption (24 hr)	0.70	--	%	ASTM D570

Mechanical	Dry	Conditioned	Unit	Test method
Tensile Modulus				
--	2410	2410	MPa	ASTM D638
23°C	2410	--	MPa	ISO 527-2
100°C	2000	--	MPa	ISO 527-2

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Mechanical	Dry	Conditioned	Unit	Test method
Tensile Stress				
Yield, 23°C	70.3	--	MPa	ISO 527-2
Yield, 100°C	33.8	--	MPa	ISO 527-2
Break, 23°C	60.0	--	MPa	ISO 527-2
-40°C	110	96.5	MPa	ASTM D638
23°C	68.9	62.7	MPa	ASTM D638
Tensile Elongation				
Yield, -40°C	9.0	9.0	%	ASTM D638
Yield, 23°C	6.0	6.0	%	ASTM D638
Yield, 23°C	5.0	--	%	ISO 527-2
Yield, 100°C	4.3	--	%	ISO 527-2
Break, -40°C	12	11	%	ASTM D638
Break, 23°C	20	18	%	ASTM D638
Break, 23°C	7.0	--	%	ISO 527-2
Break, 100°C	95	--	%	ISO 527-2
Flexural Modulus				
--	2280	2140	MPa	ASTM D790
23°C	1790	--	MPa	ISO 178
100°C	1310	--	MPa	ISO 178
Flexural Strength				
--	109	85.5	MPa	ASTM D790
23°C	70.3	--	MPa	ISO 178
100°C	44.1	--	MPa	ISO 178
Shear Strength	58.6	--	MPa	ASTM D732
Taber Abrasion Resistance				ASTM D1044
1000 Cycles, 1000 g, CS-17 Wheel	6.00	--	mg	

Impact	Dry	Conditioned	Unit	Test method
Charpy Notched Impact Strength (23°C)	78	--	kJ/m²	ISO 179/1eA
Charpy Unnotched Impact Strength (23°C)	No Break	--		ISO 179/1eU
Notched Izod Impact				
-40°C	110	--	J/m	ASTM D256
23°C	910	1100	J/m	ASTM D256
23°C	73	--	kJ/m²	ISO 180/1A
Unnotched Izod Impact Strength (23°C)	No Break	--		ISO 180/1U
Instrumented Dart Impact				ASTM D3763
Energy to Maximum Load [1]	38.0	--	J	
Total Energy	54.2	--	J	

Hardness	Dry	Conditioned	Unit	Test method
Rockwell Hardness (R-Scale)	120	--		ASTM D785

Thermal	Dry	Conditioned	Unit	Test method
Heat Deflection Temperature				
1.8 MPa, Unannealed	109	--	°C	ISO 75-2/A
1.8 MPa, Annealed	120	--	°C	ASTM D648
Melting Temperature	310	--	°C	ISO 11357-3 ASTM D3418

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Thermal	Dry	Conditioned	Unit	Test method
CLTE				ASTM E831
Flow : 0 to 100°C	7.7E-5	--	cm/cm/°C	
Flow : 100 to 200°C	1.4E-4	--	cm/cm/°C	
Transverse : 0 to 100°C	8.1E-5	--	cm/cm/°C	
Transverse : 100 to 200°C	1.1E-4	--	cm/cm/°C	

Injection	Dry	Unit
Drying Temperature	110	°C
Drying Time	4.0	hr
Suggested Max Moisture	0.030 to 0.060	%
Rear Temperature	304 to 318	°C
Front Temperature	316 to 329	°C
Processing (Melt) Temp	321 to 343	°C
Mold Temperature	> 135	°C

Injection Notes

MOLD TEMPERATURE

- If the wall is thick, lower temperatures may be used to prevent ejector pin problems.

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.

Notes

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

[1] Maximum Load: 1050 lb (4670 N)

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