Amodel® AS-4133 HS

polyphthalamide

Amodel® AS-4133 HS is a 33% glass reinforced, lubricated, heat stabilized grade of polyphthalamide (PPA) that offers fast cycle times and moldability in hot water molds. Testing conducted on samples dry as molded and samples conditioned to 50% relative humidity in accordance with ISO-1110, Accelerated Method. Typical applications include electrical and electronic components especially for automotive systems.

- Black: AS-4133 HS BK 324
- Natural: AS-4133 HS NT

General

Material Status	• Commercial: Active	
Availability	• Africa & Middle East • Asia Pacific • Europe	• Latin America • North America
Filler / Reinforcement	• Glass Fiber, 33% Filler by Weight	
Additive	• Heat Stabilizer • Lubricant	• Mold Release
Features	• Chemical Resistant • Creep Resistant • Fast Molding Cycle • Good Dimensional Stability • Good Stiffness • Heat Stabilized	• High Heat Resistance • High Strength • Hot Water Moldability • Laser Weldable • Low Moisture Absorption • Lubricated
Uses	• Automotive Applications • Automotive Electronics • Automotive Under the Hood • Cell Phones • Connectors • Electrical/Electronic Applications • General Purpose	• Industrial Applications • Industrial Parts • Lawn and Garden Equipment • Machine/Mechanical Parts • Metal Replacement • Thick-walled Parts • Valves/Valve Parts
RoHS Compliance	• RoHS Compliant	

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General

Automotive Specifications	• ASTM D4000 PA102 G35 Color: BK324 Black • ASTM D4000 PA102 G35 Color: NT Natural • ASTM D4000 PPA0121 G34 GB145 KD170 KN100 PN060 YI285 Color: BK324 Black • ASTM D4000 PPA0121 G34 GB145 KD170 KN100 PN060 YI285 Color: NT Natural • ASTM D6779 PA102G35 • BOSCH N28 BN05-OX2 BN0515-GF35-3Anf01AM Color: NT Natural • BOSCH N28 BN05-OX2 BN0515-GF35-3Asw01AM Color: BK324 Black • CHRYSLER MS-DB-478 Type A CPN3598 Color: BK Black • CHRYSLER MS-DB-478 Type A CPN3972 Color: Natural • DELPHI M-2396 Color: BK324 Black • DELPHI M-2396 M2396001 Color: NT Natural • DELPHI M-2396 M2396002 Color: BK-324 Black • DELPHI M-2396 M239600x Color: BU474 Blue • DELPHI M-53291 Color: BU474 Blue • DELPHI M-53293 Color: BK324 Black • DELPHI M-53293 Color: NT Natural • DELPHI M-6081 Color: NT Natural • DELPHI M-6083 Color: BK324 Black • GM GMP.PPA.002 Color: BK324 Black • GM GMP.PPA.002 Color: NT Natural • GM GMW16357P-PPA-GF35 Color: Black • GM GMW16357P-PPA-GF35 Color: Natural • ISO 1874 PA6T/66, MH, 12-120, GF33 Color: BK324 Black • ISO 1874 PA6T/66, MH, 12-120, GF33 Color: NT Natural • TORRINGTON T-456 Color: BK324 Black • TRW S-13972700 Color: BK324 Black • TRW S-13972700 Color: NT Natural • TYCO 100-1392 Color: BK324 Black • TYCO 100-1392 Color: NT Natural • YAZAKI YPES-25-02-306 Color: BK324 Black • YAZAKI YPES-25-02-306 Color: NT Natural
Appearance	• Black • Natural Color
Forms	• Pellets
Processing Method	• Water-Heated Mold Injection Molding

Physical	Dry	Conditioned	Unit	Test method
Density	1.45	--	g/cm³	ISO 1183/A
Molding Shrinkage				ASTM D955
Flow	0.50	--	%	
Across Flow	1.0	--	%	
Water Absorption (24 hr)	0.29	--	%	ASTM D570

Mechanical	Dry	Conditioned	Unit	Test method
Tensile Modulus				
--	11700	11700	MPa	ASTM D638
23°C	12600	--	MPa	ISO 527-2
100°C	6830	--	MPa	ISO 527-2
150°C	5310	--	MPa	ISO 527-2
175°C	4830	--	MPa	ISO 527-2

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Mechanical	Dry	Conditioned	Unit	Test method
Tensile Stress				
Break, 23°C	211	--	MPa	ISO 527-2
Break, 100°C	125	--	MPa	ISO 527-2
Break, 150°C	87.6	--	MPa	ISO 527-2
Break, 175°C	79.3	--	MPa	ISO 527-2
--	200	172	MPa	ASTM D638
Tensile Elongation				
Break	2.5	2.2	%	ASTM D638
Break, 23°C	2.6	--	%	ISO 527-2
Break, 100°C	4.3	--	%	ISO 527-2
Break, 150°C	6.6	--	%	ISO 527-2
Break, 175°C	6.6	--	%	ISO 527-2
Flexural Modulus				
--	11000	11000	MPa	ASTM D790
23°C	10400	--	MPa	ISO 178
100°C	7170	--	MPa	ISO 178
150°C	4620	--	MPa	ISO 178
175°C	4210	--	MPa	ISO 178
Flexural Strength				
--	290	241	MPa	ASTM D790
23°C	296	--	MPa	ISO 178
100°C	177	--	MPa	ISO 178
150°C	111	--	MPa	ISO 178
175°C	99.3	--	MPa	ISO 178
Compressive Strength	179	172	MPa	ASTM D695
Shear Strength	89.6	75.8	MPa	ASTM D732
Poisson's Ratio	0.41	--		ASTM E132

Impact	Dry	Conditioned	Unit	Test method
Charpy Notched Impact Strength (23°C)	11	--	kJ/m²	ISO 179/1eA
Charpy Unnotched Impact Strength (23°C)	67	--	kJ/m²	ISO 179/1eU
Notched Izod Impact				
--	80	69	J/m	ASTM D256
23°C	9.7	--	kJ/m²	ISO 180/1A
Unnotched Izod Impact				
--	960	--	J/m	ASTM D256
23°C	59	--	kJ/m²	ISO 180/1U

Thermal	Dry	Conditioned	Unit	Test method
Deflection Temperature Under Load				
0.45 MPa, Annealed, 3.20 mm	320	--	°C	ASTM D648
1.8 MPa, Unannealed	294	--	°C	ISO 75-2/A
1.8 MPa, Annealed, 3.20 mm	300	--	°C	ASTM D648
Continuous Use Temperature [1]	210	--	°C	ASTM D3045
Melting Temperature	320	--	°C	ASTM D3418 ISO 11357-3

Thermal	Dry	Conditioned	Unit	Test method
CLTE				ASTM E831
Flow : 0 to 100°C	2.0E-5	--	cm/cm/°C	
Flow : 100 to 200°C	1.5E-5	--	cm/cm/°C	
Transverse : 0 to 100°C	7.6E-5	--	cm/cm/°C	
Transverse : 100 to 200°C	1.2E-4	--	cm/cm/°C	

Electrical	Dry	Conditioned	Unit	Test method
Volume Resistivity	2.0E+16	5.0E+14	ohms·cm	ASTM D257
Dielectric Strength (1.60 mm)	20	20	kV/mm	ASTM D149
Dielectric Constant				ASTM D150
60 Hz	3.80	4.30		
1 MHz	3.60	3.40		
Dissipation Factor				ASTM D150
60 Hz	4.0E-3	0.020		
1 MHz	0.012	0.019		
Comparative Tracking Index (CTI)	600	600	V	UL 746
High Voltage Arc Tracking Rate (HVTR)	14.0	18.0	mm/min	UL 746

Flammability	Dry	Conditioned	Unit	Test method
Flame Rating [2] (3.2 mm)	HB	--		UL 94

Optical	Dry	Conditioned	Unit	Test method
Transmittance [3]				ASTM D1003
1070 nm : 1.60 mm	> 20	--	%	
940 nm : 1.60 mm	> 20	--	%	

Injection	Dry	Unit
Drying Temperature	120	°C
Drying Time	4.0	hr
Suggested Max Moisture	0.030 to 0.060	%
Rear Temperature	318 to 324	°C
Front Temperature	327 to 332	°C
Processing (Melt) Temp	329 to 343	°C
Mold Temperature	66 to 93	°C

Injection Notes

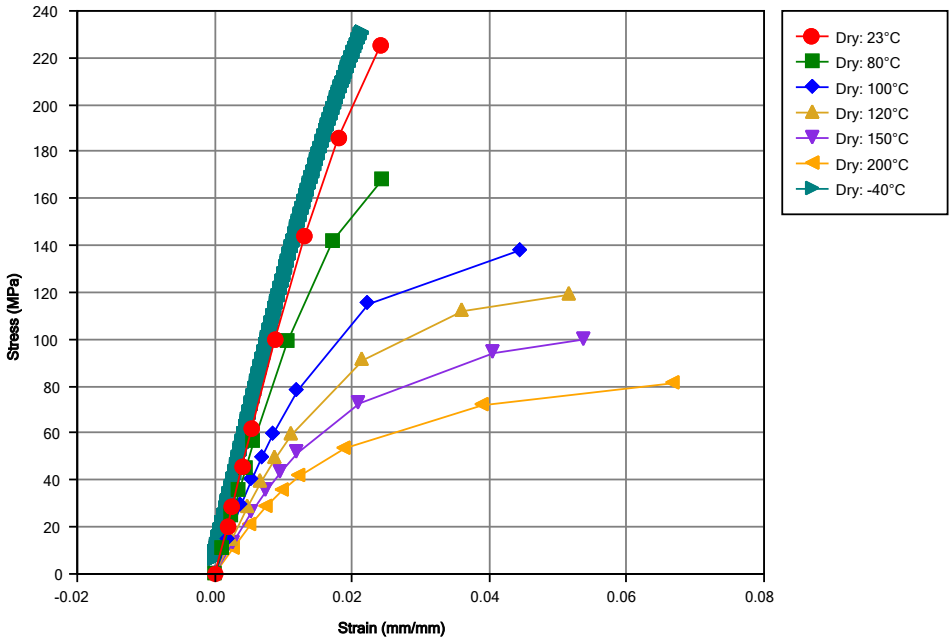
Injection Rate: 3 to 4 in/sec

Holding Pressure: 50% of injection pressure

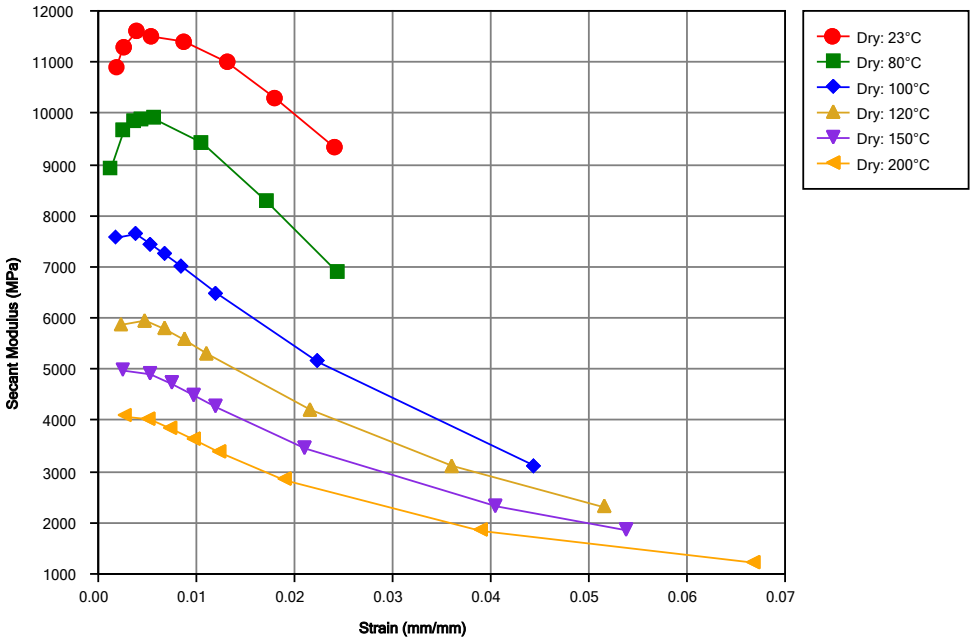
Storage:

- 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.

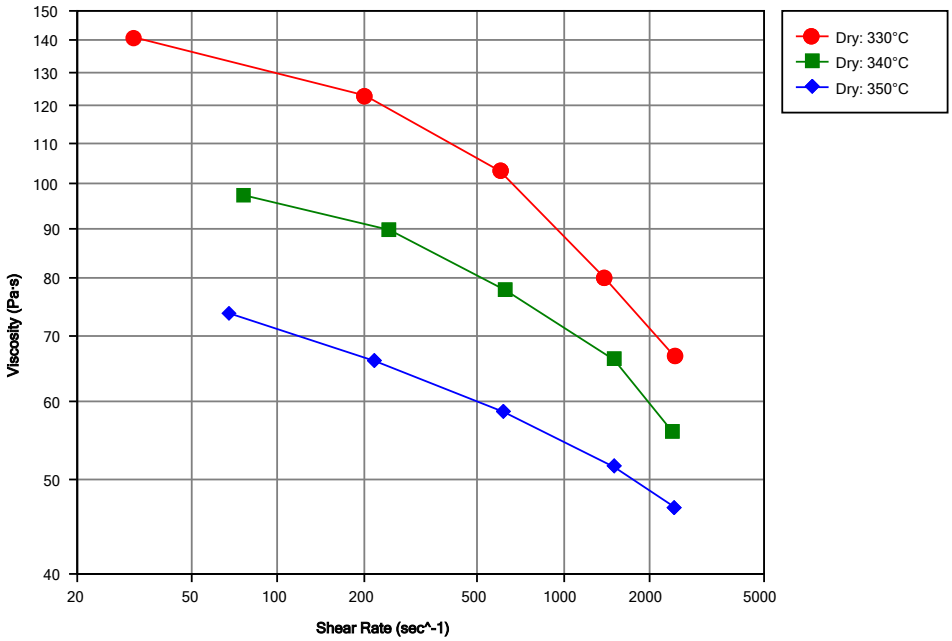
Isothermal Stress vs. Strain (ISO 11403-1)



Secant Modulus vs. Strain (ISO 11403-1)



Viscosity vs. Shear Rate (ISO 11403-2)



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Notes

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

[1] 1500 hr

[2] These flammability ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.

[3] Transmittance for natural grade

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