Amodel® A-1133 HS
polyphthalamide

Amodel® A-1133 HS is a 33% glass reinforced, heat stabilized polyphthalamide (PPA) with a high heat deflection temperature, high flexural modulus and high tensile strength. Excellent creep resistance and low moisture absorption are also characteristic of this resin. Testing conducted on samples dry as molded and samples conditioned to 50% relative humidity in accordance with ISO-1110, Accelerated Method.

- Black: A-1133 HS BK 324
- Natural: A-1133 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	
Features	• Chemical Resistant • Creep Resistant • Good Dimensional Stability • Good Stiffness • High Heat Resistance	• High Stiffness • High Strength • High Temperature Strength • Low Moisture Absorption
Uses	• Automotive Applications • Automotive Electronics • Automotive Interior Parts • Automotive Under the Hood • Cell Phones • Connectors • Fuel Lines	• Housings • Industrial Applications • Industrial Parts • Machine/Mechanical Parts • Metal Replacement • Power/Other Tools
RoHS Compliance	• RoHS Compliant	

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General

Automotive Specifications	• 3M 11-0003-5762-1 Color: Colors • 3M 11-0003-5762-1 X62 4200 • ASTM D4000 PA121 G35 Color: BK324 Black • ASTM D4000 PA121 G35 Color: NT Natural • ASTM D6779 PA121G35 • BOSCH N28 BN05-OX1 BN0510-GF35-0Anf01SO Color: NT Natural • BOSCH N28 BN05-OX1 BN0510-GF35-0Asw01SO Color: BK-324 Black • DELPHI M-53290 Color: BK324 Black • DELPHI M-53290 Color: NT Natural • DELPHI M-6071 Color: NT Natural • DELPHI MS-5216 Color: BK324 Black • DELPHI MS-5216 Color: NT Natural • FORD WSP-M4D843-A Color: BK324 Black • FORD WSP-M4D843-A Color: NT Natural • GM GMP.PPA.004 Color: BK324 Black • GM GMP.PPA.004 Color: NT Natural • GM GMW15702-110020 >PPA+GF33< (A4, A22, A64, BA633, DC1473, G20, KM1158, KS2300, LS20, RS9, SS260, Z1) Color: NT Natural[1] • GM GMW16356P-PPA-GF35 Color: BK-324 Black • GM GMW16356P-PPA-GF35 Color: NT Natural • IMDS ID 13598045 Color: Black • IMDS ID 424835 Color: Natural • STELLANTIS MS-DB-478 CPN4242 Color: NT Natural • STELLANTIS MS-DB-478 Type A CPN3598 Color: BK324 Black • STELLANTIS SPA X62 4200 • TRW S-13318701 Color: BK543 Black • VALEO VMS-4470 Color: BK324 Black • VALEO VMS-4470 Color: NT Natural • YAZAKI YPES-25-02-135 Color: NT Natural
UL File NumberGlobal	• E95746
Appearance	• Black • Natural Color
Forms	• Pellets
Processing Method	• Injection Molding
Part Marking Code (ISO 11469)	• >PA6T/6I/66-GF33<

Physical	Dry	Conditioned	Unit	Test method
Density	1.48	--	g/cm³	ISO 1183/A
Molding Shrinkage				ASTM D955
Flow	0.40	--	%	
Across Flow	0.80	--	%	
Water Absorption (24 hr)	0.23	--	%	ASTM D570

Mechanical	Dry	Conditioned	Unit	Test method
Tensile Modulus				
--	13100	13100	MPa	ASTM D638
23°C	13400	--	MPa	ISO 527-1
100°C	10800	--	MPa	ISO 527-1
150°C	6700	--	MPa	ISO 527-1
175°C	4300	--	MPa	ISO 527-1

Mechanical	Dry	Conditioned	Unit	Test method
Tensile Stress				
Break, 23°C	233	--	MPa	ISO 527-2
Break, 100°C	148	--	MPa	ISO 527-2
Break, 150°C	80.0	--	MPa	ISO 527-2
Break, 175°C	72.0	--	MPa	ISO 527-2
--	221	193	MPa	ASTM D638
Tensile Elongation				
Break	2.5	2.1	%	ASTM D638
Break, 23°C	2.5	--	%	ISO 527-2
Break, 100°C	2.9	--	%	ISO 527-2
Break, 150°C	8.7	--	%	ISO 527-2
Break, 175°C	8.5	--	%	ISO 527-2
Flexural Modulus				
--	11400	11400	MPa	ASTM D790
23°C	11600	--	MPa	ISO 178
100°C	9800	--	MPa	ISO 178
150°C	4000	--	MPa	ISO 178
175°C	3600	--	MPa	ISO 178
Flexural Strength				
--	317	254	MPa	ASTM D790
23°C	319	--	MPa	ISO 178
100°C	227	--	MPa	ISO 178
150°C	93.0	--	MPa	ISO 178
175°C	80.0	--	MPa	ISO 178
Compressive Strength	185	--	MPa	ASTM D695
Shear Strength	101	88.9	MPa	ASTM D732
Poisson's Ratio	0.41	--		ASTM E132

Impact	Dry	Conditioned	Unit	Test method
Charpy Notched Impact Strength (23°C)	9.5	--	kJ/m²	ISO 179/1eA
Charpy Unnotched Impact Strength (23°C)	73	--	kJ/m²	ISO 179/1eU
Notched Izod Impact				
--	80	59	J/m	ASTM D256
23°C	8.8	--	kJ/m²	ISO 180/1A
Unnotched Izod Impact				
--	770	--	J/m	ASTM D4812
23°C	49	--	kJ/m²	ISO 180/1U

Hardness	Dry	Conditioned	Unit	Test method
Rockwell Hardness (R-Scale)	125	--		ASTM D785

Thermal	Dry	Conditioned	Unit	Test method
Deflection Temperature Under Load				
0.45 MPa, Annealed, 3.20 mm	297	--	°C	ASTM D648
1.8 MPa, Unannealed	280	--	°C	ISO 75-2/A
1.8 MPa, Annealed, 3.20 mm	285	--	°C	ASTM D648
Continuous Use Temperature				ASTM D3045
-- [2]	164	--	°C	
-- [3]	185	--	°C	
Melting Temperature	313	--	°C	ASTM D570 ISO 11357-3
CLTE				ASTM E831
Flow : 0 to 100°C	2.4E-5	--	cm/cm/°C	
Flow : 100 to 200°C	2.7E-5	--	cm/cm/°C	
Transverse : 0 to 100°C	5.5E-5	--	cm/cm/°C	
Transverse : 100 to 200°C	1.1E-4	--	cm/cm/°C	

Electrical	Dry	Conditioned	Unit	Test method
Volume Resistivity	1.0E+16	2.0E+15	ohms·cm	ASTM D257
Dielectric Strength (3.20 mm)	21	21	kV/mm	ASTM D149
Dielectric Constant				ASTM D150
60 Hz	4.40	4.70		
1 MHz	4.20	4.30		
Dissipation Factor				ASTM D150
60 Hz	5.0E-3	9.0E-3		
1 MHz	0.017	0.022		
Arc Resistance	140	120	sec	ASTM D495
Comparative Tracking Index (CTI)	600	--	V	UL 746A

Flammability	Dry	Conditioned	Unit	Test method
Flame Rating [4] (3.2 mm)	HB	--		UL 94

Optical	Dry	Conditioned	Unit	Test method
Transmittance [5]				ASTM D1003
1070 nm : 1.60 mm	> 30	--	%	
940 nm : 1.60 mm	> 30	--	%	

Additional Information	
Conditioned	Conditioned to equilibrium moisture content in accordance with ISO-1110, Accelerated Method

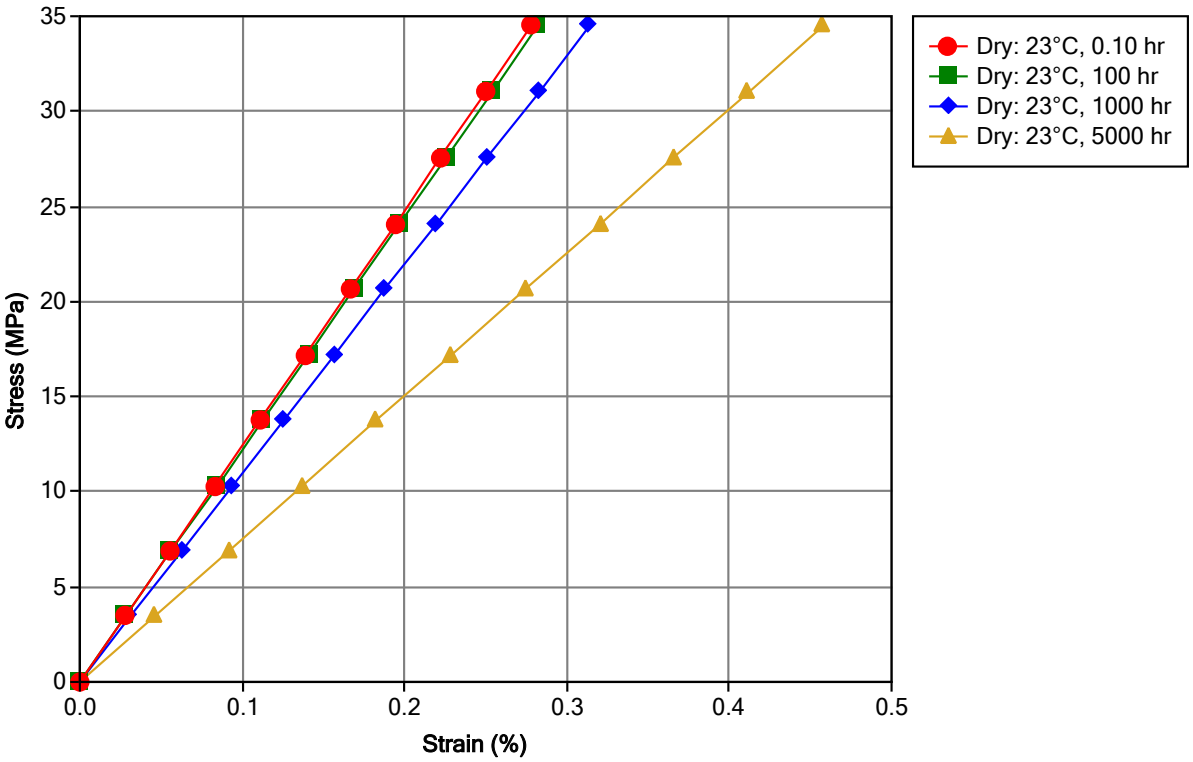
Injection	Dry	Unit
Drying Temperature	120	°C
Drying Time	4.0	hr
Suggested Max Moisture	0.030 to 0.060	%
Rear Temperature	304 to 318	°C
Front Temperature	316 to 329	°C
Processing (Melt) Temp	321 to 343	°C
Mold Temperature	135	°C

Injection Notes

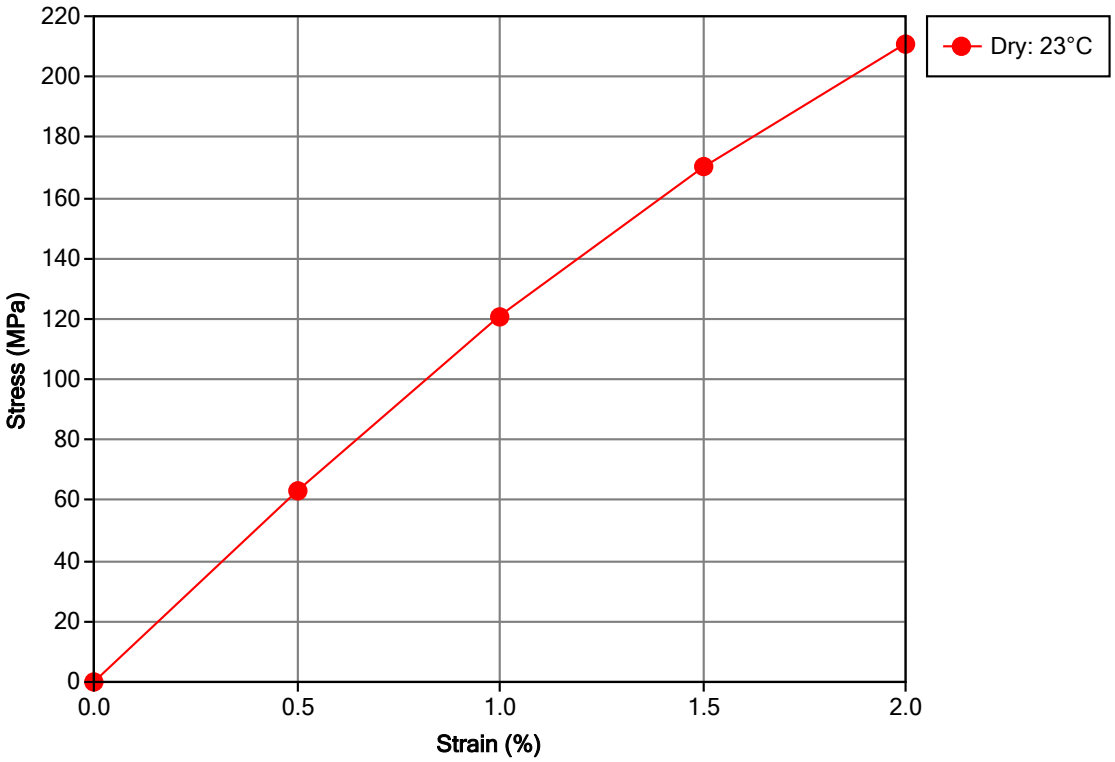
Storage:

- 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.

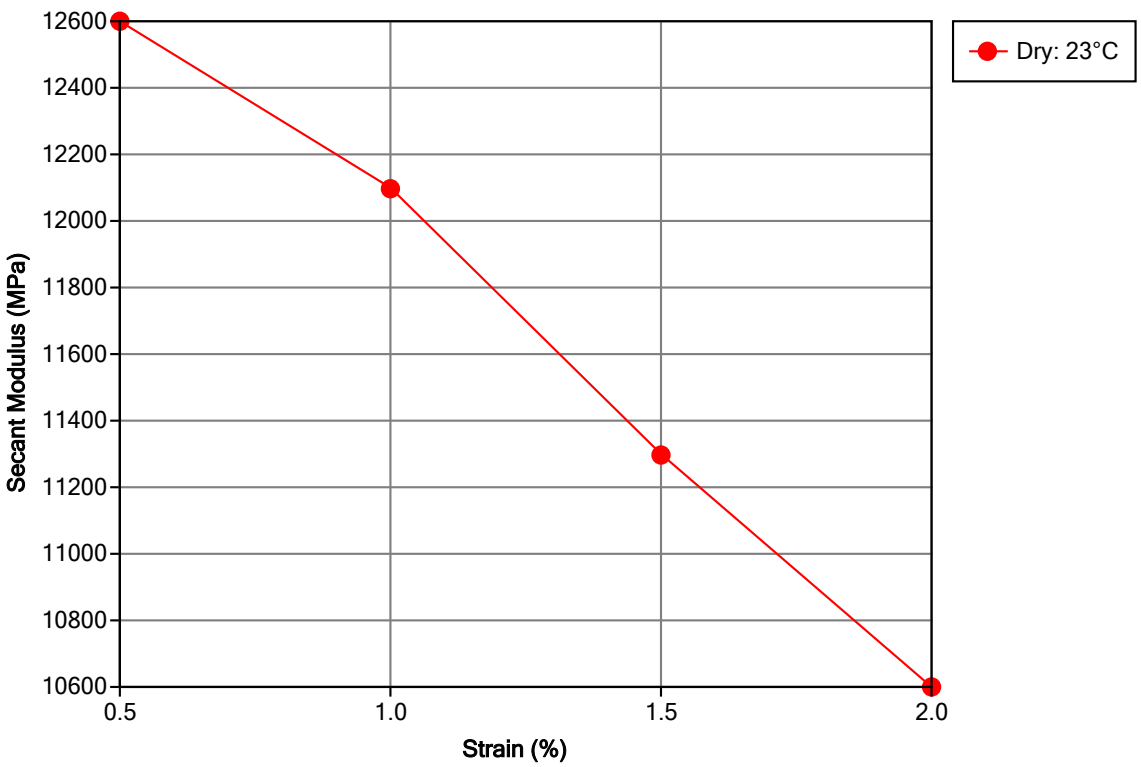
Isochronous Stress vs. Strain (ISO 11403)



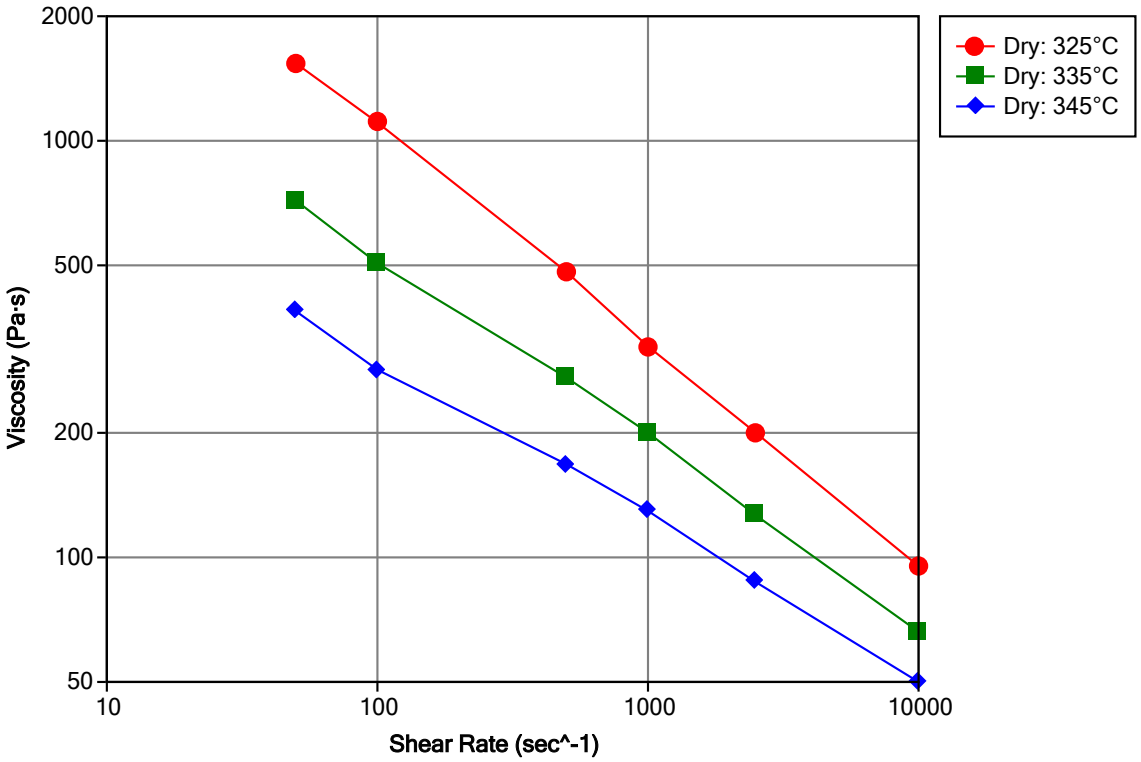
Isothermal Stress vs. Strain (ISO 11403)



Secant Modulus vs. Strain (ISO 11403)



Viscosity vs. Shear Rate (ISO 11403)



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Notes

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

[1] Limited to use by GMNA Powertrain in water baffles, use in any other application requires approval from GM.

[2] 20000 hr

[3] 5000 hr

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

[5] Transmittance for natural only.

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