

Amodel® A-1933 HSL

polyphthalamide

Amodel® A-1933 HSL is a 33% glass reinforced grade of polyphthalamide (PPA) resin. This grade was developed specifically for improved performance in a 50/50 ethylene glycol and water environment. This material was tested using the aggressive automotive coolant system, ethylene glycol with organic acid stabilizer, at 130°C (266°F). It exceeds the performance required by the automotive industry for polymeric materials exposed to high-temperature antifreeze solutions.

Potential applications include a variety of automotive components such as thermostat housings, heater core endcaps, heater hose connectors, and water inlets, outlets, and valves.

- Black: A-1933 HSL BK 328

General

Material Status	<ul style="list-style-type: none"> • Commercial: Active
Availability	<ul style="list-style-type: none"> • Africa & Middle East • Asia Pacific • Europe • Latin America • North America
Filler / Reinforcement	<ul style="list-style-type: none"> • Glass Fiber, 33% Filler by Weight
Additive	<ul style="list-style-type: none"> • Heat Stabilizer • Lubricant • Mold Release
Features	<ul style="list-style-type: none"> • Antifreeze Resistant • Chemical Resistant • Creep Resistant • Good Dimensional Stability • Good Glycol Resistance • Good Stiffness • High Heat Resistance • High Strength • Lubricated
Uses	<ul style="list-style-type: none"> • Automotive Applications • Automotive Under the Hood • Housings • Valves/Valve Parts
RoHS Compliance	<ul style="list-style-type: none"> • RoHS Compliant
Automotive Specifications	<ul style="list-style-type: none"> • ASTM D6779 PA131G35 Color: BK328 Black • CHRYSLER MS-DB-478 CPN4771 Color: BK328 Black • GM GMP.PPA.019 Color: BK328 Black • GM GMW16360P-PPA-GF35 Color: BK328 Black • ISO 1874-PA6T/6I, MH, 11-120, GF33 Color: BK-328 Black • ISO 1874-PA6T/6I, MH, 11-120, GF33 Color: NT-07 Natural
Appearance	<ul style="list-style-type: none"> • Black
Forms	<ul style="list-style-type: none"> • Pellets
Processing Method	<ul style="list-style-type: none"> • Injection Molding

Physical	Typical Value	Unit	Test method
Density	1.49	g/cm ³	ISO 1183/A
Molding Shrinkage			
Flow ¹	0.20	%	ASTM D955
Across Flow ¹	1.0	%	ASTM D955
Across Flow	1.0	%	ISO 294-4
Flow	0.20	%	ISO 294-4
Water Absorption (24 hr)	0.19	%	ASTM D570

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Mechanical	Typical Value	Unit	Test method
Tensile Modulus	11500	MPa	ISO 527-2
Tensile Stress (Yield)	195	MPa	ISO 527-2
Tensile Strain (Break)	1.8	%	ISO 527-2
Flexural Modulus	10300	MPa	ISO 178
Flexural Stress	280	MPa	ISO 178
Impact	Typical Value	Unit	Test method
Charpy Notched Impact Strength	8.2	kJ/m ²	ISO 179/1eA
Notched Izod Impact Strength	8.1	kJ/m ²	ISO 180/1A
Thermal	Typical Value	Unit	Test method
Heat Deflection Temperature 1.8 MPa, Unannealed	295	°C	ISO 75-2/A
Melting Temperature	323	°C	ISO 11357-3
Aging	Typical Value	Unit	Test method
Retention of Flexural Modulus - 1000 hr, in Glycol (130°C)	76	%	ISO 178
Retention of Flexural Strength - 1000 hr, in Glycol (130°C)	71	%	ISO 178
Retention of Tensile Modulus - 1000 hr, in Glycol (130°C)	75	%	ISO 527-2
Retention of Tensile Strength - 1000 hr, in Glycol (130°C)	69	%	ISO 527-2
Flammability	Typical Value	Unit	Test method
Flame Rating (> 0.8 mm, Black)	HB		UL 94

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Injection	Typical Value	Unit
Drying Temperature	120	°C
Drying Time	4.0	hr
Suggested Max Moisture	0.030 to 0.060	%
Rear Temperature	313 to 330	°C
Front Temperature	326 to 339	°C
Processing (Melt) Temp	331 to 352	°C
Mold Temperature	150	°C

Injection Notes

Mold Temperature:

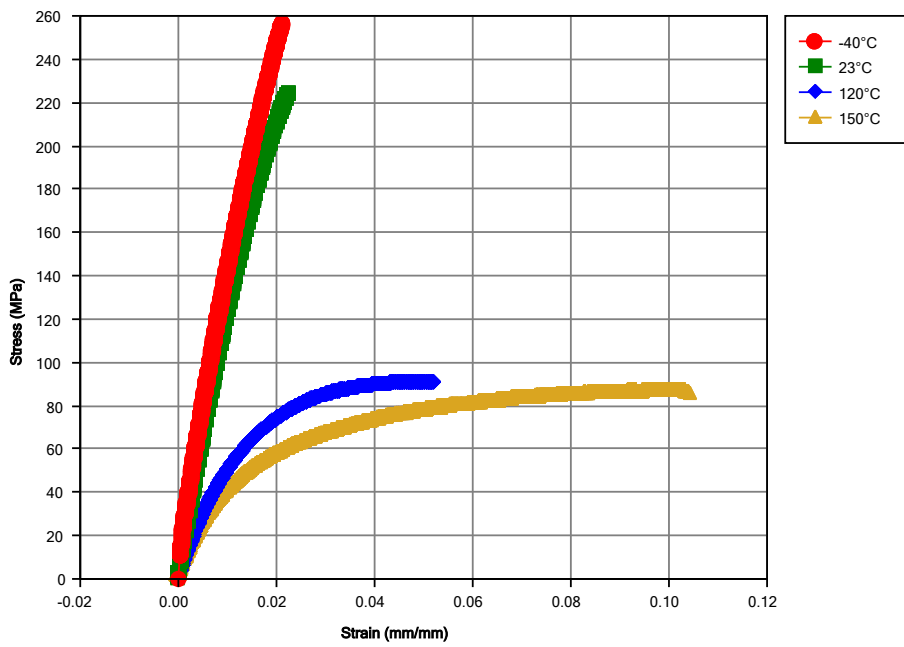
- Higher tool temperatures might be required for thin wall sections

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.
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Isothermal Stress vs. Strain (ISO 11403-1)



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Notes

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

¹ Type D2

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