Product Data

AMODEL®
polyphthalamide

A-1160 HSL BK324

AMODEL A-1160 HSL BK324 resin is a 60% glass reinforced, heat stabilized polyphthalamide (PPA) which exhibits high heat deflection temperature and high stiffness and strength. The material has excellent creep resistance and outstanding dimensional stability.

It is suited for metal replacement applications that come in contact with aggressive automotive fluids.

AMODEL A-1160 HSL BK324 resin can be processed using conventional injection molding equipment and methods. Mold temperatures of at least 135°C (275°F) are required to obtain a smooth surface.

Table 1 Typical Properties of A-1160 HSL BK324 Resin - ASTM Test Methods (See Table 2 for Properties by ISO Methods)

Property	ASTM Test Method	Typical Values (1) U.S. Customary Units DAM(2)	50% RH(3)	Units	SI Units DAM(2)	50% RH(3)	Units
Mechanical							
Tensile Strength	D 638	39.4	36.5	kpsi	272	252	MPa
Tensile Elongation	D 638	1.5	1.5	%	1.5	1.5	%
Tensile Modulus	D 638	3.40	3.60	Mpsi	23.4	24.8	GPa
Flexural Strength	D 790	58.0	54.2	kpsi	400	374	MPa
Flexural Modulus	D 790	3.15	3.16	Mpsi	21.7	21.8	GPa
Shear Strength	D 732	13.6	14.4	kpsi	94	99	MPa
Compressive Strength	D 695	27.4		kpsi	189		MPa
Poisson's Ratio		0.35			0.35		
Izod Impact, Notched	D 256	2.1	2.1	ft-lb/in	110	110	J/m
Izod Impact, Unnotched	D 256	22		ft-lb/in	1120		J/m
Rockwell Hardness	D 785	124		R	124		R
Thermal							
Melting Point	D 3418	590		°F	310		°C
Heat Deflection Temperature	D 648						
at 264 psi (1.8 MPa)		549		°F	287		°C
General							
Specific Gravity	D 792	1.76			1.76		
Moisture Absorption, 24 hr.	D 570	0.2		%	0.2		%
Mold Shrinkage, Flow Direction	D 955	0.4		%	0.4		%
Mold Shrinkage, Transverse Direction		0.5		%	0.5		%

(1) Typical values, actual values of individual batches will vary within specification limits.
(2) DAM = "dry, as molded".
(3) Conditioned in accordance with ISO-1110, Accelerated Method.

Solvay
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Table 2 Typical Properties of AMODEL A-1160 HSL Resin - ISO Test Methods

Property	Temp., °C	ISO Test Method	Typical Values (1) U.S. Customary Units Value	Units	SI Units Value	Units
Mechanical						
Tensile Strength	23	527	40.8	kpsi	281	MPa
	100	527	28.5	kpsi	196	MPa
	150	527	13.4	kpsi	93	MPa
	175	527	11.1	kpsi	77	MPa
	200	527	7.5	kpsi	52	MPa
Tensile Elongation	23	527	1.6	%	1.6	%
	100	527	1.8	%	1.8	%
	150	527	3.7	%	3.7	%
	175	527	3.2	%	3.2	%
	200	527	3.6	%	3.6	%
Tensile Modulus	23	527	3.73	Mpsi	25.7	GPa
	100	527	2.48	Mpsi	17.1	GPa
	150	527	1.41	Mpsi	9.7	GPa
	175	527	1.26	Mpsi	8.7	GPa
	200	527	0.89	Mpsi	6.1	GPa
Flexural Strength	23	178	58.0	kpsi	400	MPa
	100	178	44.4	kpsi	306	MPa
	150	178	20.8	kpsi	144	MPa
	175	178	17.8	kpsi	123	MPa
	200	178	12.7	kpsi	88	MPa
Flexural Modulus	23	178	2.96	Mpsi	20.4	GPa
	100	178	2.68	Mpsi	18.5	GPa
	150	178	1.28	Mpsi	8.8	GPa
	175	178	1.16	Mpsi	8.0	GPa
	200	178	0.90	Mpsi	6.2	GPa
Izod Impact, Notched	23	180/1A	5.9	ft-lb/in^2	10.3	kJ/m^2
Izod Impact, Unnotched	23	180/1U	31	ft-lb/in^2	61	kJ/m^2
Charpy Impact, Notched	23	179/1eA	6.4	ft-lb/in^2	10.3	kJ/m^2
Charpy Impact, Unnotched	23	179/1eU	54	ft-lb/in^2	93	kJ/m^2
Thermal						
Melting Point		11357-3	590	°F	310	°C
Heat Deflection Temperature at 1.8 MPa		75Af	550	°F	288	°C
General						
Specific Gravity		1183A	1.76		1.76	

(1) Actual properties of individual batches will vary within specification limits. Properties are typical of uncolored resin. Colorants or other additives will alter values.

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Drying

Resin should be dried before molding because excessive moisture will result in nozzle drool, reduced mechanical properties, poor surface appearance, and sprue sticking. Extremely wet resin will result in a foamy extrudate. The target moisture level is 0.03 to 0.06% (300 to 600 ppm) and the maximum recommended drying temperature is 135°C (275°F).

Although AMODEL resins are shipped with less than 0.15% moisture and packaged in moisture-proof foil-lined bags or boxes, the resin should be dried for optimum molding results. The preferred drying condition is 4 hours at 120°C (248°F). Alternatively, the resins can be dried for 8 hours at 90°C (194°F). In either case, a desiccant bed dryer with a dew point below -30°C (-22°F) should be used.

Drying Tips:

- Do not open containers until ready to process.
- Drying at temperatures higher than 125°C (257°F) may result in the darkening of natural colored pellets.
- If a thermogravimetric moisture analyzer is used, it should be set to 170°C (338°F)
- AMODEL resin in an open container needs to be dried as shown in the following table. The recommended drying time depends on how long the container has been open and the estimated relative humidity.

Drying Time at 120°C (248°F), hours

	Elapsed Time From Container Opening, hours				
Relative Humidity, %	**0.25**	**0.5**	**1**	**2**	**3**
30	4.5	5.0	5.5	6.0	6.5
50	5.0	5.5	6.0	7.0	7.5
75	5.0	5.5	6.5	7.5	8.0
100	5.5	6.5	7.5	8.5	9.0

Injection Molding

AMODEL A-1160 HSL BK324 resin can be readily injection molded in most screw injection molding machines. A general purpose screw is recommended, with minimum back pressure.

Barrel temperatures generally should range from 304° to 318°C (580° to 605°F) in the rear zone and gradually increase to 315° to 329°C (600° to 625°F) in the front zone. These conditions should give melt temperatures of 321° to 343°C (610° to 650°F).

A mold temperature of 135°C (275°F) is recommended to ensure full crystallinity in the typical molded part. High crystallinity results in optimum mechanical properties, excellent dimensional stability and good surface appearance. The use of lower mold temperatures may produce parts with lower crystallinity and, consequently, optimal performance may not be achieved.

Standard Packaging and Labeling

AMODEL A-1160 HSL BK324 resin is packaged in foil-lined multiwall paper bags containing 25 kg (55.115 pounds) of material. Special packaging can be supplied upon request.

Individual packages will be plainly marked with the product number, the color, the lot number, and the net weight.

Precautionary Labeling

On the basis of toxicological, physical, and chemical properties of AMODEL A-1160 HSL BK324 resin, labeling used on containers is as follows:

Caution: Handling and/or processing this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose, and throat.

Product Safety and Emergency Service

For product safety information or a Material Safety Data Sheet on a product of Solvay Advanced Polymers

1 (800) 621-4557
1 (770) 772-8880 outside of U.S.

For information or help in an emergency such as a spill, leak, fire or explosion, call day or night:

Emergency Health Information

1 (800) 621-4590
1 (770) 772-5177 outside of U.S.

Emergency Spill Information

CHEMTREC 1 (800) 424-9300
1 (703) 527-3887 outside of U.S.
collect calls accepted

For Additional Information

Technical Service
1 (800) 621-4557

Customer Service
1 (800) 848-9744