

FR-6133

AMODEL FR-6133 is a 33% glass-reinforced polyphthalamide (PPA) resin which offers enhanced processing capabilities for electrical and electronic applications. This UL-V0 resin is moldable in water-cooled molds with good flow and a wide processing window, and offers

a good surface appearance especially for larger electrical components. Mold temperatures as low as 150°F (65°C) can be used.

Typical Properties of AMODEL FR-6133 Resin

Property	Test Method	Typical Values ⁽¹⁾			
		U.S. Customary Units		SI Units	
		DAM ⁽²⁾	Units	DAM ⁽²⁾	Units
Mechanical					
Tensile Strength	ASTM D 638	27.2	kpsi	187	MPa
Tensile Strength	ISO 527	26.5	kpsi	183	MPa
Tensile Modulus	ASTM D 638	2,670	kpsi	18.4	GPa
Tensile Modulus	ISO 527	2090	kpsi	14.4	GPa
Tensile Elongation	ASTM D 638	1.8	%	1.8	%
Tensile Elongation	ISO 527	1.8	%	1.8	%
Flexural Strength	ASTM D 790	38.2	kpsi	263	MPa
Flexural Strength	ISO 178	37.8	kpsi	261	MPa
Flexural Modulus	ASTM D 790	1,880	kpsi	12.9	GPa
Flexural Modulus	ISO 178	1710	kpsi	11.8	GPa
Flexura Strain	ISO 178	2.3	%	2.3	%
Izod Impact, Notched	ASTM D 256	1.8	ft-lb/in	96	J/m
Izod Impact, Notched	ISO 180/1A	4.7	ft-lb/in ²	9.9	J/m ²
Izod Impact, Unnotched	D 256	9.9	ft-lb/in	528	J/m
Electrical					
Volume Resistivity	D 257	1 x 10 ¹⁶	ohm-cm	1 x 10 ¹⁶	ohm-cm
Surface Resistivity	D 257	>1 x 10 ¹⁶	ohm	>1 x 10 ¹⁶	ohm
Dielectric Strength @ 0.031 in. (0.8 mm)	D 149	790	V/mil	31	kV/mm
Dielectric Strength @ 0.062 in. (1.6 mm)	D 149	560	V/mil	22	kV/mm
HWI, Performance Level Class (PLC)	UL 746A -29	0		0	
HAI, Performance Level Class (PLC)	UL 746A - 30	0		0	
CTI, Performance Level Class (PLC)	UL 746A -21	0		0	
Thermal					
Deflection Temperature at 264 psi (1.8 MPa)	D 648	540	°F	282	°C
Flammability ⁽³⁾ 1/32" (0.8 mm) bar	UL-94	V0		V0	
General					
Specific Gravity	D 792	1.68		1.68	
Water Absorption, 24 hour	D 570	0.2		0.2	
Mold Shrinkage Flow Direction	D 955	0.3-0.4	%	0.3-0.4	%
Mold Shrinkage Transverse Direction		0.5-0.7	%	0.5-0.7	%

⁽¹⁾ Actual properties of individual batches will vary within specification limits. Values are typical of uncolored resin, addition of colorants or other additives may alter properties.

⁽²⁾ "dry, as molded".

⁽³⁾ This flammability rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

⁽⁴⁾ Specimens conditioned for 96 hours at 95°F (35°C) and 90% RH.

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.

Relative Humidity, %	Elapsed Time From Container Opening, hours				
	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 FR-6133 resin can be readily injection molded in most screw injection molding machines. A general purpose screw is recommended, with minimum back pressure.

The melt temperature should be between 610°F and 640°F (321°C and 338°C). Generally this can be achieved with barrel temperatures from 600° to 615°F (315° to 324°C) in the rear zone gradually increasing to 620° to 630°F (327° to 332°C) in the front zone.

Set injection pressure to give rapid injection, 3 to 4 in./sec (7.6 to 10 cm/sec). Adjust holding pressure to one-half injection pressure. Set hold time to maximize part weight. Transfer from injection to hold pressure at the screw position just before the part is completely filled. A mold temperature between 150°F and 200°F (65°C and 93°C) is generally high enough to achieve full crystallinity in the typical molded part with this resin.

Standard Packaging and Labeling

AMODEL FR-6133 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 FR-6133 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

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