Product Data

AMODEL® polyphthalamide

AFA-6133 V0 Z

AMODEL AFA-6133 V0 Z is a 33% glass-fiber reinforced grade of polyphthalamide (PPA) resin that was developed specifically for connector applications requiring compatibility with both “infrared” and “vapor phase” soldering operations typically used by the electronics industry.

This resin processes readily using conventional injection molding equipment and methods. It offers high flow and short molding cycles. The processing window is relatively broad, and mold temperatures as low as 150°F (65°C) can be used.

Table 1 Typical Properties of AFA-6133 V0 Z Resin - ASTM Test Methods (See Table 2 for Properties by ISO Methods)

	ASTM	Typical Values[1]					
	Test	U.S. Customary Units			SI Units		
Property	Method	DAM[2]	50%RH[3]	Units	DAM[2]	50%RH[3]	Units
Mechanical							
Tensile Strength	D 638	28.8	24.1	kpsi	199	166	MPa
Tensile Elongation	D 638	1.7	1.7	%	1.7	1.7	%
Tensile Modulus	D 638	2.33	1.99	Mpsi	16.1	13.7	GPa
Flexural Strength	D 790	32.5	33.2	kpsi	224	229	MPa
Flexural Modulus	D 790	1.90	1.93	Mpsi	13.1	13.3	GPa
Shear Strength	D 732	11.6	9.0	kpsi	80	62	MPa
Compressive Strength	D 695	21.1		kpsi	145		MPa
Izod Impact, Notched	D 256	1.6	1.5	ft-lb/in	85	80	J/m
Izod Impact, Un-notched	D 4812	13		ft-lb/in	710		J/m
Thermal							
Deflection Temperature at 264 psi (1.8 MPa)	D 648	531		°F	277		°C
Melting Point	D 3418	590		°F	310		°C
Flammability[4] 1/32" (0.8 mm) bar	UL-94	V0			V0		
Electrical							
Dielectric Strength, 1/8" (3.2 mm)	D 149	610		V/mil	24		kV/mm
Dielectric Constant at 100 Hz	D 150	4.4					
Dielectric Constant at 1 MHz	D 150	4.1			4.1		
Dissipation Factor at 1 MHz	D 150	0.011			0.011		
Volume Resistivity[5]	D 257	1×10^{15}		ohm-cm	1×10^{15}		ohm-cm
Surface Resistivity[5]	D 257	1×10^{15}		ohm	1×10^{15}		ohm
General							
Specific Gravity	D 792	1.68			1.68		
Moisture Absorption, 24 hours	D 570	0.2		%	0.2		%
Mold Shrinkage Flow Direction	D 955	0.3		%	0.3		%
Mold Shrinkage Transverse Direction	D 955	0.6		%	0.6		%

(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) Conditioned to 50% RH in accordance with ISO-1110, Accelerated Method.
(4) This flammability rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.
(5) Specimens conditioned for 96 hours at 95°F (35°C) and 90% RH.

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Table 2 Typical Properties of AMODEL AFA-6133 V0 Z 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	27.0	kpsi	186	MPa
	100	527	16.5	kpsi	114	MPa
	150	527	10.9	kpsi	75	MPa
	175	527	9.2	kpsi	63	MPa
Tensile Elongation	23	527	1.6	%	1.6	%
	100	527	2.4	%	2.4	%
	150	527	5.1	%	5.1	%
	175	527	4.9	%	4.9	%
Tensile Modulus	23	527	2.10	Mpsi	14.5	GPa
	100	527	1.33	Mpsi	9.2	GPa
	150	527	0.86	Mpsi	5.9	GPa
	175	527	0.74	Mpsi	5.1	GPa
Flexural Strength	23	178	37.6	kpsi	259	MPa
	100	178	23.3	kpsi	161	MPa
	150	178	14.6	kpsi	101	MPa
	175	178	12.7	kpsi	88	MPa
Flexural Modulus	23	178	1.83	Mpsi	12.6	GPa
	100	178	1.17	Mpsi	8.1	GPa
	150	178	0.72	Mpsi	5.0	GPa
	175	178	0.67	Mpsi	4.6	GPa
Izod Impact, Notched	23	180/1A	3.9	ft-lb/in^2	8.0	kJ/m^2
Izod Impact, Unnotched	23	180/1U	21	ft-lb/in^2	44	kJ/m^2
Charpy Impact, Notched	23	179/1eA	6.6	ft-lb/in^2	14.0	kJ/m^2
Charpy Impact, Unnotched	23	179/1eU	22	ft-lb/in^2	47	kJ/m^2
Thermal						
Melting Point		11357-3	590	°F	310	°C
Heat Deflection Temperature at 1.8 MPa		75Af	540	°F	282	°C
General						
Specific Gravity		1183A	1.68		1.68	

(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 AFA-6133 V0 Z 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 AFA-6133 V0 Z 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 AFA-6133 V0 Z 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