Product Data

RADEL® A
polyethersulfone

A-101, A-201, A-301

RADEL A polyethersulfone resins offer high heat deflection temperatures, excellent toughness and dimensional stability, and resistance to steam, boiling water, and mineral acids. Other desirable properties include thermal stability, creep resistance, and inherent flame resistance.

Three melt flow grades are available. A-101 is the low melt flow grade for extrusion. A-301, with the highest melt flow, is the general purpose injection molding grade. A-201 is a medium viscosity grade that can be used for either extrusion or injection molding.

All three grades are transparent, and they are FDA compliant and therefore approved for direct food contact.

Typical Properties of RADEL A-101, A-201, and A-301 Resins

Properties	ASTM Test Method	Typical Values[1] U.S. Customary units Value	Units	SI units Value	Units
General					
Specific Gravity	D 792	1.37		1.37	
Water Absorption, 24 hours	D 570	0.6	%	0.6	%
Mold Shrinkage	D 955	0.006	in/in	0.006	mm/mm
Mechanical					
Tensile Strength	D 638	12.0	kpsi	83	MPa
Tensile Modulus	D 638	385	kpsi	2.6	GPa
Tensile Elongation at yield	D 638	6.5	%	6.5	%
Flexural Strength	D 790	16.1	kpsi	111	MPa
Flexural Modulus	D 790	420	kpsi	2.9	GPa
Tensile Impact Strength	D 1822	160	ft-lb/in^2	336	kJ/m^2
Izod Impact Strength	D 256	1.6	ft-lb/in	85	J/m
Thermal					
Deflection Temperature, at 264 psi (1.82 MPa)	D 648	400	°F	204	°C
Flammability Rating[2] at 0.031 in. (0.8 mm)	UL-94	V-0		V-0	
Relative Thermal Index	UL-746B				
Electrical at 0.031 in. (0.8 mm)		356	°F	180	°C
Mechanical with impact at 0.031 in. (0.8 mm)		338	°F	170	°C
Coefficient of Thermal Expansion	D 696	27	ppm/°F	49	ppm/°C
Electrical					
Dielectric Strength	D 149	380	V/mil	15	kV/mm
Dielectric Constant at 60 Hz	D 150	3.51		3.51	
Dielectric Constant at 10^3 Hz		3.50		3.50	
Dielectric Constant at 10^6 Hz		3.54		3.54	
Dissipation Factor at 60 Hz	D 150	0.0017		0.0017	
Dissipation Factor at 10^3 Hz		0.0022		0.0022	
Dissipation Factor at 10^6 Hz		0.0056		0.0056	
Volume Resistivity	D 257	1.7 x 10^{15}	ohm-cm	1.7 x 10^{15}	ohm-cm
Fabrication					
Grade		**A-101**	**A-201**	**A-301**	
Melt Flow at 380°C (716°F), 2.16 Kg	D 1238	12.5	20	30	g/10 min

[1] Actual properties of individual batches will vary within specification limits. Properties are typical of uncolored resins. Colorants or other additives may alter properties.

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

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Drying

RADEL A-101, A-201, and A-301 polyethersulfone resins must be dried completely prior to melt processing. Incomplete drying will result in defects in the formed part ranging from surface streaks to severe bubbling. Because the polymer is thermally and hydrolytically stable, molding wet resin does not usually result in degradation; therefore, the defective parts can usually be recovered as regrind. Pellets of all RADEL grades can be dried on trays in a circulating air oven or hopper dryer. Drying conditions recommended are 2.5 hours at 350°F (177°C) .

Injection Molding

RADEL A-201, and A-301 resins can be readily injection molded in most screw injection machines. Stock temperature requirements will generally range from 650°F (343°C) to 725°F (385°C), depending on mold design and the type of equipment being used. A general purpose, 2.2:1 compression screw is recommended, with minimum back pressure. Injection speeds should be as fast as possible, consistent with part appearance requirements. Mold temperatures of at least 280°F (138°C) are suggested, and temperatures as high as 300-325°F (150-163°C) can be used for long-flow or thin-walled parts, or where low residual stresses are required.

Extrusion

RADEL A-101 resin is readily extrudable into sheet, film, tube, or other profile. Extrusion temperature will vary over a broad range depending on the sheet or profile being extruded and the thickness. Typical temperature profiles for extrusion range from 640°F (338°C) to 730°F (388°C) on the barrel. Useful adapter and die temperatures range from 620°F (327°C) to 700°F (371°C), with melt temperatures ranging from 650°F (343°C) to 735°F (390°C).

UDEL® polysulfone resin is recommended as a start-up and purge resin for extrusion of RADEL A resins.

Standard Packaging and Labeling

RADEL A resins are packaged in 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 blend number, and the net weight.

Precautionary Labeling

On the basis of the toxicological, physical, and chemical properties of RADEL A-101, A-201, and A-301 polyethersulfone resins, 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