Udel® P-3500 LCD MB

polysulfone

Udel® polysulfone is a tough, rigid, high-strength thermoplastic with outstanding hydrolytic resistance. Udel® P-3500 LCD MB series polymers are particularly well suited for the fabrication of porous hollow fiber and flat sheet membranes using a solvent-based process. These high molecular weight polymers are used in a variety of membrane filtration applications, such as renal dialysis, water treatment, bio-processing, food and beverage processing, and industrial gas separation.

Udel® polysulfone polymers possess a number of attributes that are valued by the membrane industry, including excellent mechanical properties, stability at pH levels from 2-13, excellent resistance to caustic and good resistance to moderate concentrations of chlorine. They feature low levels of extractible and insoluble materials making them suitable for drinking water and food contact uses. They may be sterilized using steam, ethylene oxide and e-beam radiation.

Udel® P-3500 LCD MB series polymers are available in various narrow molecular weight range grades, as shown below. Each grade features reduced levels of cyclic dimer compared to the previous grade, P-3500 NT 11. This can be important in solution processing applications such as membrane production, as it leads to improved dope solution stability and reduced equipment fouling.

The Udel® P-3500 LCD MB series polymers are soluble in commercially available, water-miscible, dipolar, aprotic solvents, such as dimethylacetamide (DMAC), dimethylformamide (DMF), and N-methylpyrrolidone (NMP). These materials offer membrane producers very good control of pore size and pore size distribution, high membrane strength, and good film-forming properties.

- Udel P-3500 LCD MB3
- Udel P-3500 LCD MB7

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General		
Material Status	• Limited Distribution	
Availability	• Asia Pacific • Europe	• Latin America • North America
Features	• Acid Resistant • Alcohol Resistant • Alkali Resistant • Chemical Resistant	• Good Toughness • High Heat Resistance • Hydrocarbon Resistant • Hydrolytically Stable
Uses	• Membranes	
Agency Ratings	• FDA 21 CFR 177.1655 • ISO 10993	• JHOSPA Unspecified Rating
RoHS Compliance	• RoHS Compliant	
Appearance	• Natural Color	
Forms	• Pellets	
Processing Method	• Cast Film • Injection Molding	• Solution Processing

Physical	Typical Value	Unit	Test method
Density / Specific Gravity	1.24		ASTM D792
Water Absorption (24 hr)	0.30	%	ASTM D570
Molecular Weight			
P-3500 LCD MB3	78000 to 84000	g/mol	
P-3500 LCD MB7	77000 to 83000	g/mol	
Solution Viscosity [1]			
P-3500 LCD MB3	2.2 to 2.8	Pa·s	
P-3500 LCD MB7	2.2 to 2.7	Pa·s	

Mechanical	Typical Value	Unit	Test method
Tensile Modulus	2480	MPa	ASTM D638
Tensile Strength (Break)	70.3	MPa	ASTM D638
Tensile Elongation (Break)	50 to 100	%	ASTM D638
Flexural Modulus	2690	MPa	ASTM D790
Flexural Strength	106	MPa	ASTM D790

Impact	Typical Value	Unit	Test method
Notched Izod Impact	69	J/m	ASTM D256
Tensile Impact Strength	420	kJ/m²	ASTM D1822

Thermal	Typical Value	Unit	Test method
Deflection Temperature Under Load			ASTM D648
1.8 MPa, Unannealed	174	°C	
CLTE - Flow	5.6E-5	cm/cm/°C	ASTM D696

Electrical	Typical Value	Unit	Test method
Volume Resistivity	3.0E+16	ohms·cm	ASTM D257
Dielectric Strength	17	kV/mm	ASTM D149
Dielectric Constant			ASTM D150
60 Hz	3.03		
1 kHz	3.04		
1 MHz	3.02		
Dissipation Factor			ASTM D150
60 Hz	7.0E-3		
1 kHz	1.0E-3		
1 MHz	6.0E-3		

Injection Notes

UDEL P-3500 polysulfones may be dried before preparing solutions. Pellets can be dried in a circulating hot air oven, by spreading the pellets on trays to a 1-2 inch depth and drying for 3.5 hours at 257 to 325°F (135 to 163°C).

Extrusion	Typical Value	Unit
Drying Temperature	135 to 163	°C
Drying Time	3.5	hr
Cylinder Zone 1 Temp.	302	°C
Cylinder Zone 5 Temp.	316 to 338	°C
Melt Temperature	316 to 371	°C

Notes

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

[1] 25 wt% polymer solution in DMAc measured at 40°C and 30s-1 shear rate

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