

MX-Nylon: Meta-xylene Diamine Polyamide for Medical Manufacturing

Manufactured by Mitsubishi Gas Chemical, MX-Nylon (MXD6) is a semi-crystalline, semi-aromatic polyamide, comprised on meta-xylene diamine. MX-Nylon offers superior mechanical properties when compared to other performance polymers, including PEEK, and superior gas barrier properties against oxygen and carbon dioxide compared to all commercially available polyamides. MX-Nylon is USP Class VI certified for use in medical applications (contact devices up 30 days), and is also suitable for applications utilizing gamma, e-beam, and ethylene oxide sterilization methods. The following grades are available for injection molding and extrusion.

General Properties

PROPERTY	METHOD	UNITS	MX-NYLON (MXD6 GRADES)		
			ME 1121	ME1007	ME1003
GENERAL DESCRIPTION			HIGH VISCOSITY	MEDIUM VISCOSITY	LOW VISCOSITY
SPECIFIC GRAVITY	ASTM D792	-	1.22	1.22	1.22
WATER ABSORPTION (EQUILIBRIUM @ 20C)	ASTM D570	%	5.8	5.8	5.8
MELTING POINT (Tm)	DSC	°C °F	237 459	237 459	237 459
GLASS TRANSITION TEMPERATURE (Tg)	DSC	°C °F	85 185	85 185	85 185
RELATIVE VISCOSITY	ISO 307	-	3.56	2.65	-
MELT FLOW RATE	ASTM D1238	g/10 MIN	0.5	2.0	2.10
MELT VISCOSITY (100 SEC ⁻¹)		PA-S @260°C PA-S @260°C	2000 1500	770 550	240 170

Physical Property Comparison Properties

PROPERTY	ASTM METHOD	UNIT	MXD6	NYLON 66	NYLON 6	PET	PEEK
TENSILE STRENGTH	D638	MPa	99	77	62	79	100
		psi	14,355	11,165	8,990	11,455	14,500
TENSILE ELONGATION	D638	%	2.3	60	200	5.8	45
TENSILE MODULUS	D638	GPa	4.7	3.1	2.6	3.0	3.7
		ksi	682	450	377	435	540

(continued)

Physical Property Comparison Properties (continued)

PROPERTY	ASTM METHOD	UNIT	MXD6	NYLON 66	NYLON 6	PET	PEEK
FLEXURAL STRENGTH	D790	MPa	160	130	120	120	165
		psi	23,200	18,850	17,400	17,400	23,900
FLEXURAL MODULUS	D790	GPa	4.4	2.9	2.4	3.4	4.1
TENSILE MODULUS NOTCHED IZOD IMPACT	D638 D256	ksi	638	421	348	493	590
		J/m	20	39	59	39	84
FLEXURAL STRENGTH ROCKWELL HARDNESS	D790 D785	ft-lb/in	0.37	0.73	1.10	0.73	1.57
		SCALE	M 108	M 89	M 85	M 106	R 126

Market Applications

The outstanding strength of MX-Nylon makes this specialty polyamide a choice material for catheter tubing, shafts and monofilaments. The superior oxygen and gas barrier properties also provide necessary functionality for blood collection equipment, including tubing and multilayer containment systems, as well as extruded films for medical packaging applications. Injection molded parts, including hubs and connectors requiring both strength and transparency, are also among market applications for MX-Nylon.

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