Polyphenylene Sulfide
PPS200MG50L

PPS200MG50L is a polyphenylene sulfide compound, 50% reinforced with a blend of glass fiber and mineral. Developed for processing by injection molding, it is lubricated for ease of mold release.

Polyphenylene sulfide (PPS) is a semi-crystalline polymer that, when reinforced, exhibits an exceptional property profile including high strength and rigidity, the ability to withstand exposure to temperatures up to 480°F (250°C), excellent electrical insulation characteristics combined with inherent flame retardance, and resistance to exposure to very aggressive chemical environments.

PPS200MG50L can be considered for applications requiring very high rigidity, combined with exceptional dimensional stability, and control of warpage in complex shape parts

PRELIMINARY PROPERTIES

	ASTM	ENGLISH		S.I.	
PROPERTY	**TEST METHOD**	**Units**	**VALUE**	**UNITS**	**VALUE**
Melting Point	D789	°F	536	°C	280
Specific Gravity	D792	-	1.78	%	1.78
Water Absorption (24 hrs.)	D570	%	0.03	-	0.03
Heat Deflection Temp. at 264 lbs/in^2(1.82MPa)	D648	°F	480	°C	250
Mold Shrinkage (Flow/Cross Flow Direction)	1/8" section	%	0.2/0.4	%	0.2/0.4
Tensile Strength at Break	D638	lbs/in^2	16,000	MPa	110
Elongation at Break	D638	%	2	%	2
Flexural Strength	D790	lbs/in^2	26,500	MPa	183
Flexural Modulus	D790	lbs/in^2	2,100,000	MPa	14,480
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	1.0	J/m	53

All data generated using test specimens injection molded from black pigmented material. Inclusion of color pigments or other additives may change some or all of these test results. Tests are conducted at 23°C and 50% relative humidity unless otherwise stated.

These mechanical property test data have been developed using injection molded specimens tested under standardized conditions; furthermore, many of the mechanical properties of thermoplastic materials can be influenced by changes in processing conditions, environmental factors such as temperature and humidity, and rate of application of stress. Therefore, these test results, which characterize typical production material, should not be used either to establish specification limits or alone as the basis for engineering design.

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PPS200MG50L
Processing Guidelines

Drying

Although PPS compounds from MDE are shipped in moisture-resistant packaging, and PPS absorbs very little moisture from the atmosphere, drying prior to processing is recommended.

Drying will ensure best molded part appearance, and has been found effective in minimizing nozzle drool; it is also strongly recommended when using reground material to ensure best property retention.

The use of a dehumidifying hopper dryer is strongly preferred, with a drying air dewpoint of -20°F, or preferably lower. The dryer temperature should be set to achieve a pellet temperature of at least 265°F - temperatures to 300°F can be considered if residence times are limited by material throughput. Insulation of air supply and return hoses, and the hopper, is recommended. Residence time of the material at 265°F should be at least 4 hours.

Temperature Guidelines

The following guidelines are suggested if a machine can be selected where shot size is 40-70% of nominal machine capacity.

Tool Surface	Melt Temperatures (°F)			Typical Cylinder Temperatures (°F)		
Temperature (°F)	Max.	Preferred	Min.	Front	Center	Rear
275 - 325	680	590 - 630	570	610	610	610

- A flat temperature profile helps ensure a homogeneous melt, improves screw recovery, and by accelerating the transition from solid pellets to a melt significantly reduces abrasive wear on screw and barrel surfaces, and helps preserve reinforcing glass fiber length. Flow length is aided significantly by increases in melt temperature, so for long flow path or complex shape parts, temperatures at the higher end of the range are suggested.
- A mold surface temperature of at least 275°F will ensure adequate crystallization of the polymer, and therefore the best balance of molded part performance, will minimize the effect of weld lines, and contribute to achieving best surface gloss. Some conventional water mold temperature controllers can achieve this temperature, provided water supply pressures are adequate (usually 40 lbs/in^2 minimum) - however, insulation between the tooling and machine platens will be required. Oil circulating mold heaters or cartridge heaters may be required for larger tools.
- PPS compounds flow very easily, so that medium injection speeds are usually adequate to achieve good part packing. Venting is critical to allow part fill without burning. Shallow vents must be used, up to about 0.0005 inches depth at the cavity.

Screw Forward Time

Adequate screw forward time under follow-up pressure is critical to ensure proper packing before gate freeze, during which time it is essential to maintain a "cushion" of 1/8-1/4". Optimum screw forward time can be judged by a part weight vs. forward time plot. Avoid over packing, which can generate molded-in stresses.

Screw Recovery

It is recommended that back pressures be limited to 50 p.s.i. gauge to help minimize mechanical damage to the reinforcing glass fibers, ensure a consistent "cushion", and a homogeneous good quality melt. Screw rotation should also be as slow as possible consistent with cycle time goals, usually 40-80 r.p.m.

Shut-Down Procedure

Due to the high melt temperatures required for PPS, machines should be thoroughly purged with polypropylene or high density polyethylene at PPS molding temperatures until all traces of the PPS are removed from the barrel. Temperatures can then be lowered, and the machine shut down with the screw fully forward, following typical practices. PPS should **NOT** be left in the barrel to cool below melt point.