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Polyacetal

Polyacetal is easily machined by conventional engineering processes provided that the peculiarities of plastics, in comparison with metals are taken into consideration.

The most important differences that can affect machining are:

- Much lower rates of thermal conductivity
- Much higher rates of thermal expansion
- Comparatively low melting temperatures

To prevent problems, such as surface smearing and heat induced stress, it is essential that the amount of heat generated by a machining operation is kept as low as possible.

Overheating can be avoided if the following are observed:

- Use only correctly sharpened tools.
- Ensure that the cutting edges are kept sharp and smooth.
- Keep sufficient clearance so that only the cutting edges are in contact with the material.
- Use sufficient coolant when a particular operation is likely to generate excessive heat.
- Machine at high cutting speeds and low rates of feed.
- Support the work properly to prevent it from springing away from the cutting tool.
- When drilling, because it is the machining operation that generates the most concentrated heat, particular attention must be paid to the suggestions detailed above.
- The drill should be frequently removed from the hole to enable the accumulated swarf to be cleared. We do not advise the use of small pilot holes.
- If the design of a component necessitates the machining away of a large percentage of the material, we recommend that, to minimise the possibility of warping due to unbalanced stresses, the item is machined oversize and then allowed to stand for a few days before it is machined to the finished size.
- Polyacetal extrusions and mouldings tend to have slightly porous centres.

Unless otherwise stated the properties above were measured at 23˚C 50% R.H.
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THERMAL PROPERTIES	ASTM Test Method	Homopolymer *Delrin*	Co-Polymer ”Kematal”*	Units
Melting Point	D 2133	175	165	˚C
Deflection Temperature under Flexural Load				
1.8 N/mm^2	D 648	136	110	˚C
0.5 N/mm^2	D 648	172	157	˚C
Thermal Conductivity		0.37	0.37	W/mK
Specific Heat		1.47	1.47	kJ/kgK
Coefficient of Linear Thermal Expansion				
-40˚C to 30˚C	D696	10.4		1x 10-5 ˚C^{-1}
30˚C to 60˚C	D696	12.2		1x 10-5 ˚C^{-1}
60˚c to 105˚C	D696	13.7		1x 10-5 ˚C^{-1}
105˚C to 150˚C	D696	14.9		1x 10-5 ˚C^{-1}
Flammability	UL 94	HB	HB	
Maximum continuous use temperature				
in air		90	100	˚C
in water		65	80	˚C
Maximum Intermittent use temperature				
in air		150	150	˚C
in water		80	100	˚C
Minimum continuous use temperature		-40	-40	˚C
ELECTRICAL PROPERTIES				
Volume Resistivity	D257	10^{15}	10^{15}	ohm cm
Surface Resistivity	D257	10^{13}	10^{13}	ohn
Dielectric Strength Short Time (2.3mm sheet)	D149	20	19.7	kV/mm
Dielectric constant 10^2Hz - 10^6Hz	D150	3.7	3.7	
Dissipation Factor (1mm sheet)				
100 Hz	D150		0.0010	
1 KHz	D150		0.0010	
10 KHz	D150		0.0015	
1 MHz	D150	0.005	0.006	