ACETAL COPOLYMER AC90MC10L

AC90MC10L is an acetal copolymer reinforced with 10% mineral, coupled to achieve optimum adhesion of the reinforcement at the mineral/polymer interface. This results in improved rigidity, especially at higher temperatures, combined with good practical toughness. Further, due to ists almost isotropic shrinkage, this compound exhibits reduced warpage characteristics. Although parts molded from acetal copolymer are recognized for exhibiting excellent dimensional stability, incorporation of mineral also improves dimensional stability over a broad temperature range.

Acetal copolymer is a highly crystalline engineering thermoplastic based on trioxane, polymerized with a comonomer to provide exceptional thermal stability both in processing and for molded parts which may be exposed to high temperature environments.

As with AC90 the base polymer, **AC90MC10L** exhibits excellent friction and wear characteristics, resistance to the effects of a broad range of chemicals, oils, solvents and greases, and very low moisture absorption.

AC90MC10L should be considered for applications where the fundamental benefits of using acetal are required, combined with improved rigidity, especially at higher temperature, dimensional stability, and reduced warpage, especially in large area or complex shape parts.

TYPICAL PROPERTIES

	ASTM	ENGLISH		S.I.	
PROPERTY	**TEST METHOD**	**UNITS**	**VALUE**	**UNITS**	**VALUE**
Melting Range	D789	°F	320-338	°C	160-170
Specific Gravity	D792	-	1.47	-	1.47
Water Absorption (24 hrs. immersion)	D570	%	0.27	%	0.27
Heat Deflection Temp. at 264 lbs/in^2	D648	°F	198	°C	92
Mold Shrinkage* (Flow/Cross Flow Direction)	1/8" section	%	1.9/1.6	%	1.9/1.6
Tensile Strength at Break	D638	lbs/in^2	7,800	MPa	54
Elongation at Break	D638	%	10-20	%	10-20
Flexural Strength	D790	lbs/in^2	13,500	MPa	93
Flexural Modulus	D790	lbs/in^2	435,000	MPa	3,000
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	1.0	J/m	53
Rockwell Hardness	D785	M scale	M83	_	_

*** Please review shrinkage projections for specific applications with an MDE Technical Representative.**

All data generated using test specimens injection molded from natural color 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.

AC90MC10
Processing Guidelines

Pre-heating

Although acetal copolymer resins and compounds do not normally require to be dried before processing, drying is suggested if due to storage or weather conditions, moisture may have condensed on the surface of the pellets. Drying conditions would typically combine a material temperature of 170-190° with a drying time of 1-2 hours in an air circulating or de-humidifying dryer.

Temperature Guidelines

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

Tool Surface	Melt Temperatures (ºF)			Typical Cylinder Temperatures (ºF)		
Temperature (ºF)	Max.	Preferred	Min.	Front	Center	Rear
180-220	440	410-420	360	400	400	400

- 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.
- A mold surface temperature in the suggested range will significantly improve surface appearance, and in addition helps consistency of mold fill and therefore consistency of dimensions, minimizes the effect of weld lines and also helps realize best molded part performance. Temperatures at the recommended level can normally be achieved by conventional mold heaters using water, provided the water supply is at a minimum of 30 p.s.i. gauge. Extreme care is required, however, to minimize the risk of water line breakage - the use of appropriately rated flexible hose and fittings is a mandatory safety precaution.
- A medium to fast injection speed maximizes weld line strength, minimizes molded-in stress, and also contributes to achievement of best surface gloss. Good venting of cavities is essential to allow fast fill without burning.

Gate Size

Experience has shown that generous size assists the production of parts of not only best performance, but also optimum surface appearance. As a guide, gate area should be at least 50% of the cross-sectional area of the part next to the gate. A land-length maximum of 0.040 inches also helps to minimize injection pressure losses.

Screw Forward Time

Adequate screw forward time under follow-up pressure is important 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 overpacking, which can generate molded-in stresses.

Screw Recovery

Low back pressures - nominal 50 p.s.i. gauge - are generally adequate to ensure development of a homogeneous melt and a consistent shot-to-shot volume. Screw rotation should also be as slow as possible consistent with cycle time goals, usually 40-80 r.p.m.

Mold Shrinkage

Standard ASTM test specimens are used to develop shrinkage guidelines. Test specimens are end-gated, 1/8 inch thickness, and molded at conditions recommended for this formulation. **Actual shrinkage in molded parts will depend on several variables, including processing conditions, part configuration and gate location, both of which influence material flow direction, and wall section thickness.**