Acetal Homopolymer AH50F20

AH50F20 is an acetal homopolymer composition containing 20% of a specially selected fluoropolymer, finely dispersed throughout the base resin. It is suitable for processing by injection molding.

Although acetal homopolymer exhibits exceptional bearing characteristics, including a very low coefficient of friction, the incorporation of this fluoropolymer minimizes "stick/slip" behavior and substantially enhances PV capabilities throughout a wide range of pressure/velocity combinations, but in particular for higher load/lower speed applications.

AH50F20 processes easily and offers opportunities to attain fast cycle time. This composition should be considered for applications where the outstanding dimensional stability, and chemical, oil and solvent resistance, that are typical of acetal homopolymer are required, in combination with excellent low friction and wear characteristics, particularly where the use of externally applied lubricants is not acceptable.

TYPICAL PROPERTIES

PROPERTY	ASTM TEST METHOD	ENGLISH UNITS	ENGLISH VALUE	S.I. UNITS	S.I. VALUE
Melting Range	D789	ºF	338 - 347	ºC	170 - 175
Specific Gravity	D792	-	1.53	-	1.53
Heat Deflection Temperature at 264 lbs/in^2 (1.82 MPa)	D648	ºF	240	ºC	116
Mold Shrinkage Guideline* (Flow Direction)	1/8" section	%	1.5 – 1.8	%	1.5 – 1.8
Tensile Strength at Break	D638	lbs/in^2	7,700	MPa	53
Elongation at Break	D638	%	15 – 20	%	15 - 20
Flexural Strength	D790	lbs/in^2	12,100	MPa	83
Flexural Modulus	D790	lbs/in^2	380,000	MPa	2621
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	0.7 – 0.9	J/m	37 - 48

*** 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 23ºC 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.

AH50F20
Processing Guidelines

Pre-heating
Although acetal homopolymer 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 170-190ºF with a drying time of 1-2 hours in an air circulating or de-humidifying drier.

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 Temperature (ºF)	Melt Temperatures (ºF)			Typical Cylinder Temperatures (ºF)		
	Max.	Preferred	Min.	Front	Center	Rear
180-240	440	400-420	375	410	400	390

- A mold surface temperature in the range of 180-200ºF can significantly improve surface appearance, helps consistency of mold fill and therefore consistency of dimensions, minimizes the effect of weld lines and will realize best molded part performance.
- Mold cavity temperatures in the range of 200-240ºF are suggested for precision molding, or to achieve exceptional surface appearance. Conventional mold heaters, using water, can normally achieve temperatures at these levels 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.

Injection Speed
Optimum injection speed is dependent on part geometry, gate location and size, and the melt temperature. To achieve good surface appearance, injection speeds should be high enough to ensure that the cavity is filled before the resin starts to solidify. Local surface flaws such as jetting and gate blush can be minimized by careful adjustments of injection speed. For some components, a very slow injection speed combined with a high molding tool temperature can minimize such flaws and produce excellent surface appearance.

Gate Size
Experience has shown that for conventionally gated cavities, a generous gate size assists the production of parts of not only best performance, but also optimum surface appearance. As a guide, the 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 and reduce practical toughness.

Screw Recovery
Low backpressures - nominal 50 p.s.i. gauge - are normally sufficient to help development of a homogeneous melt, and ensure a consistent 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, which influence glass fiber orientation, and wall section thickness.**