Acetal Homopolymer AH50G20L

AH50G20L is an acetal homopolymer compound incorporating 20% glass fiber, with a viscosity suitable for injection molding applications. It is internally lubricated for use of mold release.

Acetal homopolymer is a highly crystalline engineering thermoplastic which exhibits predictable mechanical performance over a wide temperature range and for extended time periods. The addition of glass fiber significantly improves rigidity, especially at higher temperatures, as well as dimensional stability. As with AH50, the base polymer, **AH50G20L** exhibits excellent resistance to the effects of a broad range of chemicals, oils, greases and solvents, as well as extremely low moisture absorption.

AH50G20L should be considered for applications where the fundamental characteristics of acetal homopolymer are required, but where improved rigidity, particularly at higher temperatures, and dimensional stability are critical.

PRELIMINARY PROPERTIES

	ASTM	ENGLISH		S.I.	
PROPERTY	**TEST METHOD**	**UNITS**	**VALUE**	**UNITS**	**VALUE**
Melting Point	D789	ºF	347	ºC	172-176
Specific Gravity	D792	-	1.56	-	1.56
Water Absorption (Equilibrium, 50% r.h.)	D570	%	0.20	%	0.20
Heat Deflection Temp. at 264 lbs/in^2(1.82 MPa)	D648	ºF	316	ºC	158
Mold Shrinkage (Flow/Transverse Direction)*	1/8" section	%	0.6/1.2	%	0.6/1.2
Tensile Strength at Break	D638	lbs/in^2	10,000	MPa	69
Elongation at Break	D638	%	5-10	%	5-10
Flexural Strength	D790	lbs/in^2	14,000	MPa	97
Flexural Modulus	D790	lbs/in^2	900,000	MPa	6,207
Izod Impact Strength (Notched,1/8" specimen)	D256	ft. lbs/in of notch	1.2	J/m	64
Rockwell Hardness	D785	M scale	M90	-	-

***Please review shrinkages 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.

AH50G20L
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 170-190°F 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 (°F)			Typical Cylinder Temperatures (°F)		
Temperature (°F)	Max.	Preferred	Min.	Front	Center	Rear
180-220	440	390-410	375	400	390	380

A mold surface temperature in the range of 180-200°F 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 200-240°F are suggested for precision molding, or to achieve exceptional surface appearance. Temperatures at these levels can normally be attained with 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.

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. With thin section parts, high injection speeds are usually required to fill the cavity before the melt freezes. 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 parts of 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.

A land-length maximum of 0.040 inches also helps to minimize injection pressure losses.

As a guide, gate area should be at least 50% of the cross-sectional area of the part next to the gate.

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

It is recommended that back pressure be applied to the screw to help development of a homogenous melt, and to ensure consistent shot volume. For this reinforced grade, limiting back pressure to about 50 psi gauge will minimize the risk of mechanical damage to the glass fibers with consequent loss of part performance. 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.**