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CELCON® TX90PLUS

High practical impact (Being replaced by Hostaform® S 9364)
Celcon® acetal copolymer grade TX90Plus is a highly impact modified grade. Celcon® TX90Plus provides a significant improvement in impact strength and flexibility while retaining many of the other performance properties of acetal copolymer. Chemical abbreviation according to ISO 1043-1: POM-HI Celcon® TX90Plus is being replaced by Hostaform® S 9364.

Rheological properties

Melt mass-flow rate	8	g/10min	ISO 1133
Melt mass-flow rate, Temperature	190	°C	
Melt mass-flow rate, Load	2.16	kg	
Moulding shrinkage range, parallel	2.1	%	ISO 294-4, 2577
Moulding shrinkage range, normal	2.0	%	ISO 294-4, 2577

Typical mechanical properties

Tensile Modulus	1700	MPa	ISO 527-1/-2
Yield stress, 50mm/min	46	MPa	ISO 527-1/-2
Yield strain, 50mm/min	14	%	ISO 527-1/-2
Flexural Modulus	1650	MPa	ISO 178
Flexural Stress at 3.5%	46	MPa	ISO 178
Tensile creep modulus, 1h	1300	MPa	ISO 899-1
Tensile creep modulus, 1000h	700	MPa	ISO 899-1
Charpy impact strength, 23°C	NB	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	205	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	12	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	8	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	10	kJ/m²	ISO 180/1A
Izod notched impact strength, -30°C	7	kJ/m²	ISO 180/1A

Thermal properties

Melting temperature, 10°C/min	166	°C	ISO 11357-1/-3
Temp. of deflection under load, 1.8 MPa	76	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h, 50N	161	°C	ISO 306
Coeff. of linear therm. expansion, parallel	120	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	140	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.16	W/(m K)	Internal
Spec. heat capacity of melt	2270	J/(kg K)	Internal

Other properties

Humidity absorption, 2mm	0.25	%	Sim. to ISO 62
Water absorption, 2mm	0.8	%	Sim. to ISO 62
Density	1360	kg/m³	ISO 1183
Density of melt	1130	kg/m³	Internal

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Injection

Drying Temperature	100 - 120	°C	
Drying Time, Dehumidified Dryer	3 - 4	h	
Max. mould temperature	80 - 120	°C	
Back pressure	2	MPa	
Injection speed	slow		
Ejection temperature	140	°C	Internal

Characteristics

Additives	Release agent

Additional information

Injection molding

Standard reciprocating screw injection molding machines with a high compression screw (minimum 3:1 and preferably 4:1) and low back pressure (0.35 Mpa/50 PSI) are favored. Using a low compression screw (I.E. general purpose 2:1 compression ratio) can result in unmelted particles and poor melt homogeneity. Using a high back pressure to make up for a low compression ratio may lead to excessive shear heating and deterioration of the material.

Melt Temperature: Preferred range 182-199 C (360-390 F). Melt temperature should never exceed 230 C (450 F).

Mold Surface Temperature: Preferred range 82-93 C (180-200 F) especially with wall thickness less than 1.5 mm (0.060 in.). May require mold temperature as high as 120 C (250 F) to reproduce mold surface or to assure minimal molded in stress. Wall thickness greater than 3mm (1/8 in.) may use a cooler (65 C/150 F) mold surface temperature and wall thickness over 6mm (1/4 in.) may use a cold mold surface down to 25 C (80 F). In general, mold surface temperatures lower than 82 C (180 F) may hinder weld line formation and produce a hazy surface or a surface with flow lines, pits and other included defects that can hinder part performance.

Film extrusion

Standard extruders with a length to diameter ratio of at least 20:1 are recommended. The screw should be a high compression ratio of at least 3:1 and preferably 4:1 to assure good melting and melt homogeneity. The design should be approximately 35% each for feed and metering sections with the remaining 30% as the transition zone.

Melt temperature: 160-220 C (320-430 F)

Other extrusion

Standard extruders with a length to diameter ratio of at least 20:1 are recommended. The screw should be a high compression ratio of at least 3:1 and preferably 4:1 to assure good melting and uniform melt homogeneity. The design should be approximately 35% each for the feed and metering sections with the

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	remaining 30% as transition zone. Melt temperature 180-220 C (355-430F)
Sheet extrusion	Standard extruders with a length to diameter ratio of at least 20:1 are recommended. The screw should be a high compression ratio (at least 3:1 and preferably 4:1) to assure good melting and uniform melt homogeneity. The screw design should be approximately 35% each for the feed and metering sections with the remaining 30% as the transition zone. Melt temperature 180-190 C (355-375 F).

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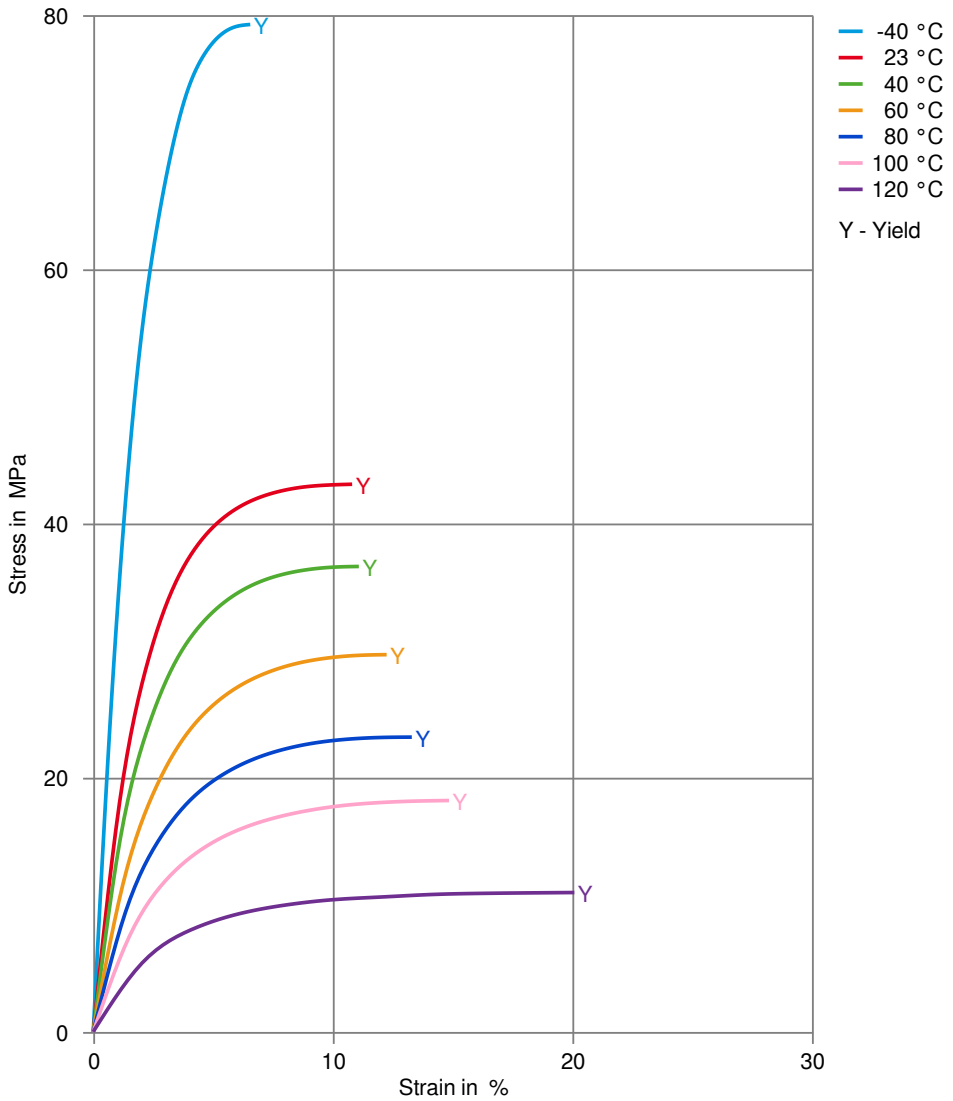
Stress-strain



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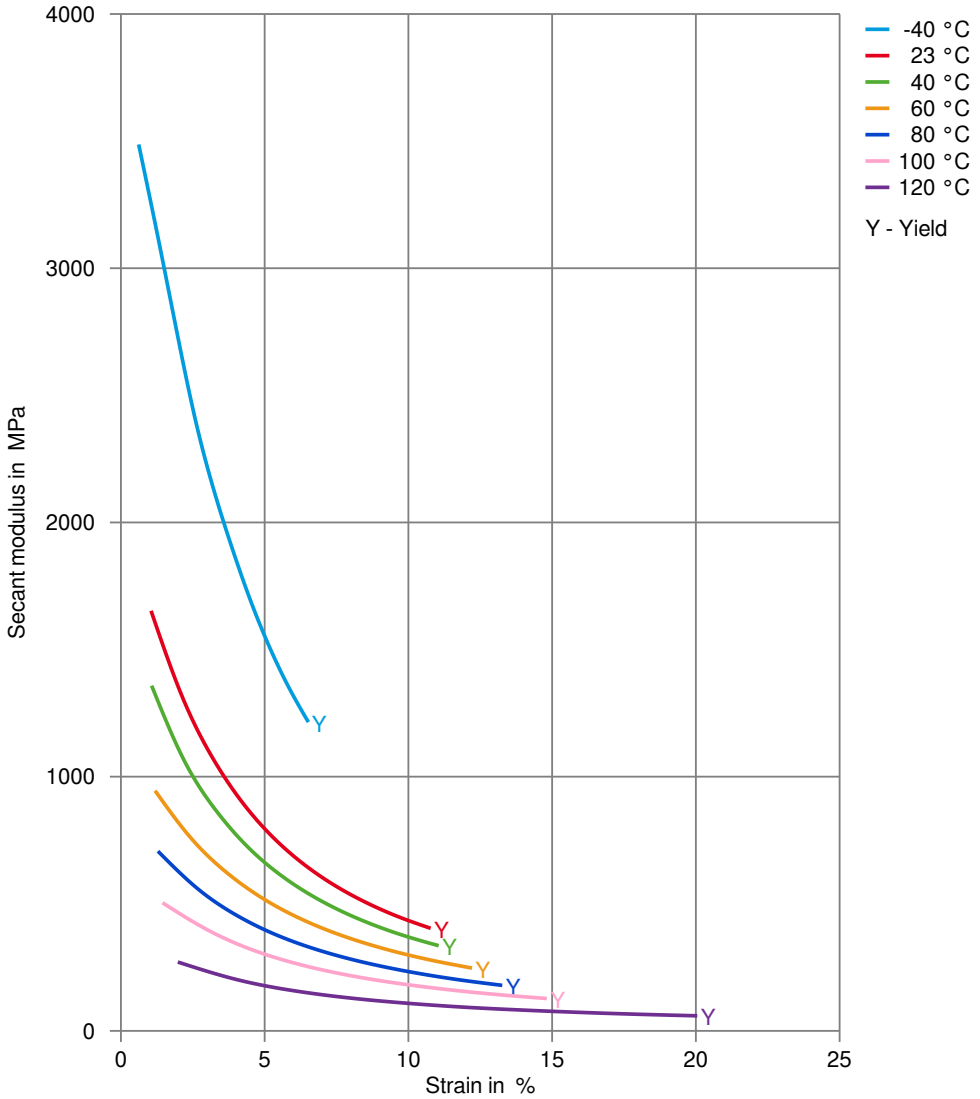
Secant modulus-strain



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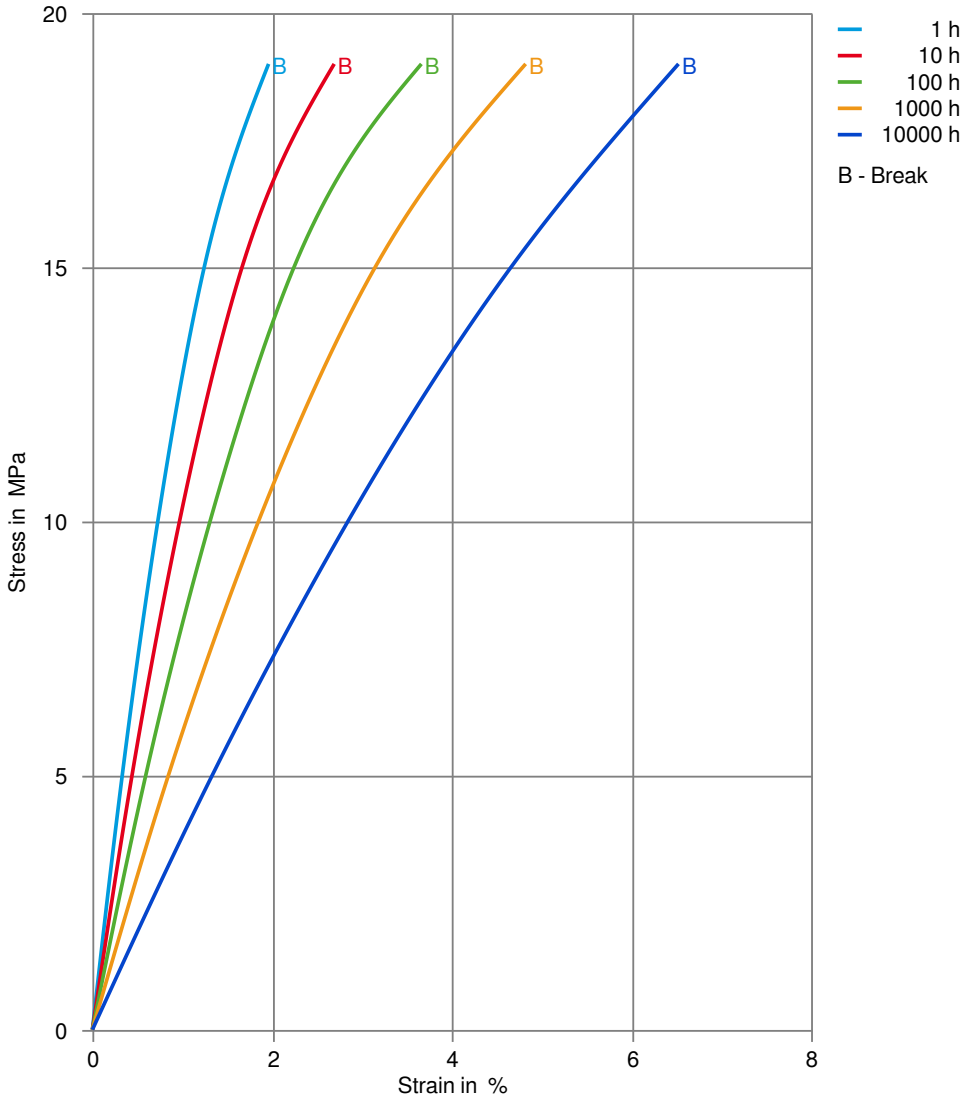
Stress-strain (isochronous) 23 °C



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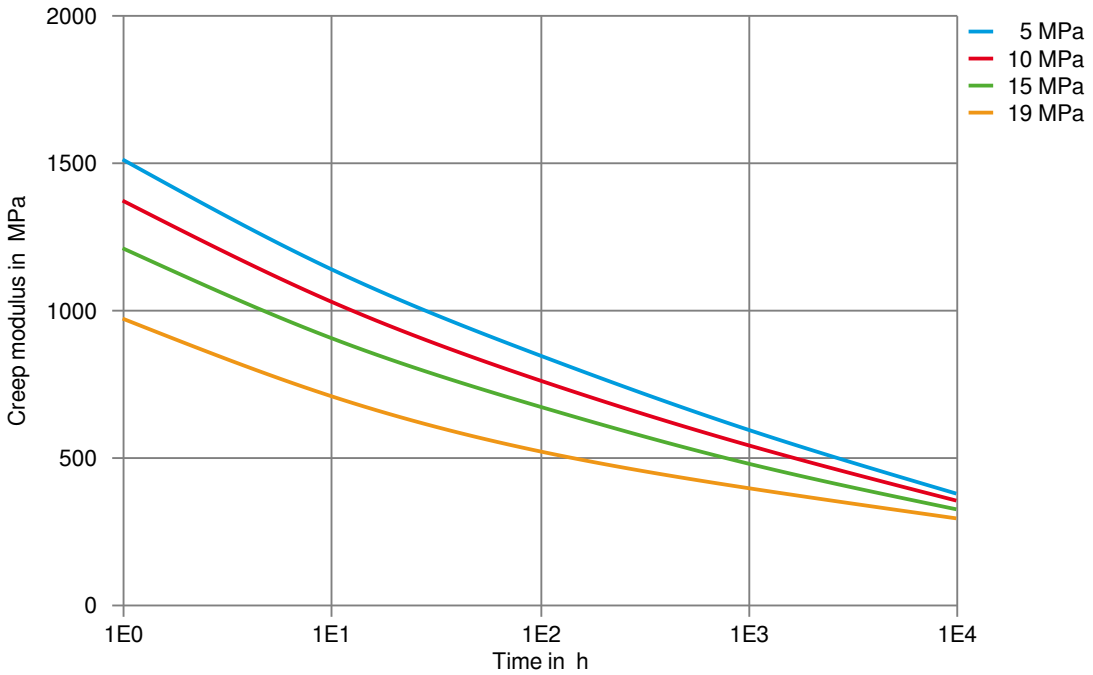
Creep modulus-time 23 °C



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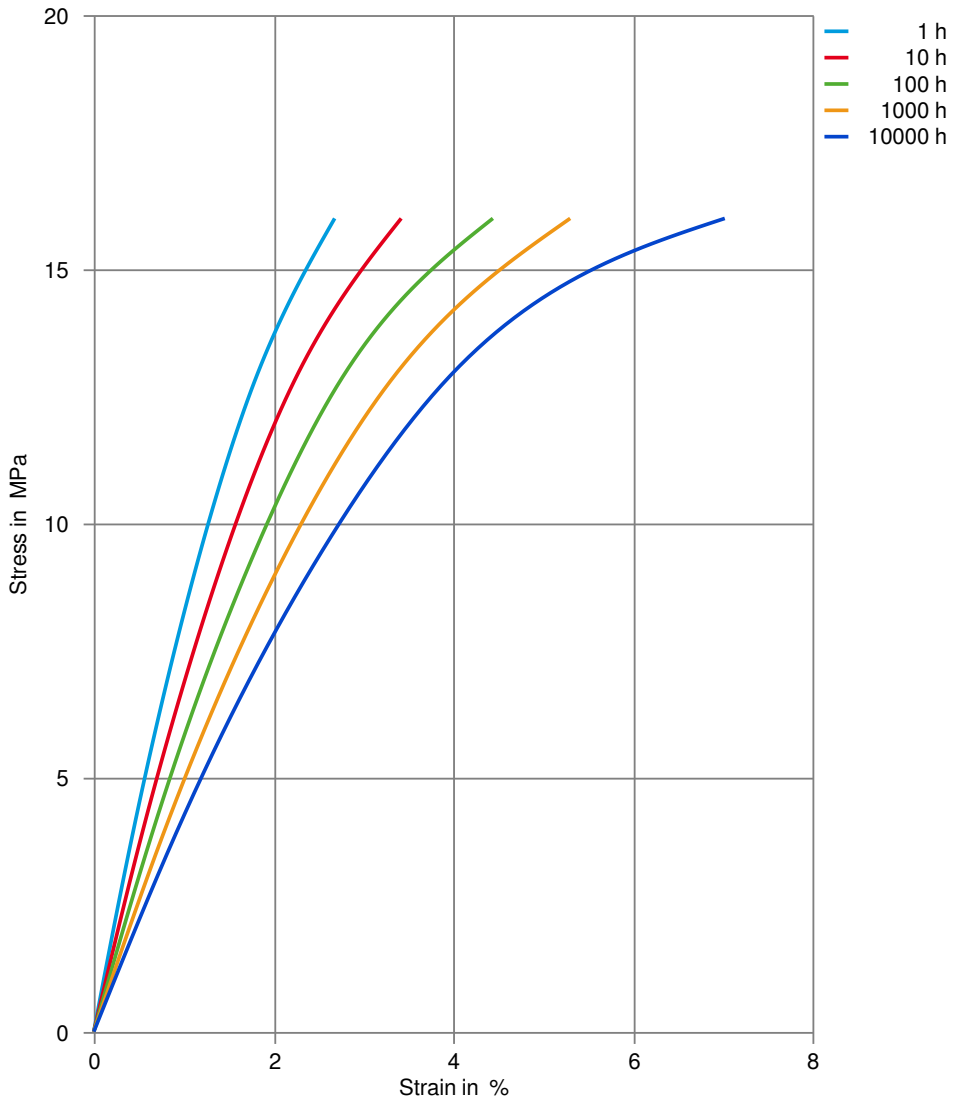
Stress-strain (isochronous) 40 °C



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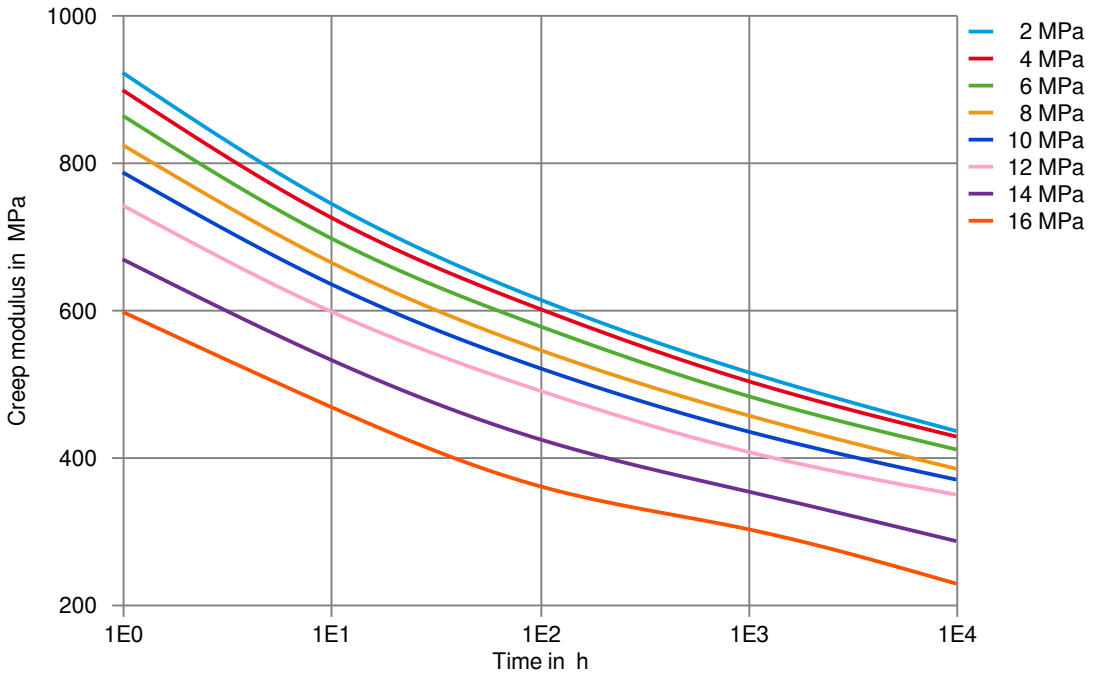
Creep modulus-time 40 °C



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Processing Texts

Pre-drying	Drying typically not required. If material has come in contact with moisture through improper storage or handling or through regrind use, drying may be necessary to prevent splay and odor problems.
Injection molding	Standard reciprocating screw injection molding machines with a high compression screw (minimum 3:1 and preferably 4:1) and low back pressure (0.35 Mpa/50 PSI) are favored. Using a low compression screw (I.E. general purpose 2:1 compression ratio) can result in unmelted particles and poor melt homogeneity. Using a high back pressure to make up for a low compression ratio may lead to excessive shear heating and deterioration of the material. Melt Temperature: Preferred range 182-199 C (360-390 F). Melt temperature should never exceed 230 C (450 F). Mold Surface Temperature: Preferred range 82-93 C (180-200 F) especially with wall thickness less than 1.5 mm (0.060 in.). May require mold temperature as high as 120 C (250 F) to reproduce mold surface or to assure minimal molded in stress. Wall thickness greater than 3mm (1/8 in.) may use a cooler (65 C/150 F) mold surface temperature and wall thickness over 6mm (1/4 in.) may use a cold mold surface down to 25 C (80 F). In general, mold surface temperatures lower than 82 C (180 F) may hinder weld line formation and produce a hazy surface or a surface with flow lines, pits and other included defects that can hinder part performance.
Injection molding Preprocessing	Drying is generally not required because Celcon® and Hostaform® acetal copolymers are not hydroscopic nor are they degraded by moisture during processing. Excessive moisture can lead to splay (silver streaking) in molded parts. For better uniformity in molding especially when using regrind or material that has been stored in containers open to the atmosphere, recommended drying conditions are 80 C (180 F) for 3hours. Desiccant hopper dryers are not required. Maximum water content = 0.35%
Injection molding Postprocessing	Postprocessing conditioning and moisturizing are not required. It may be necessary to fixture large or complicated parts with varying wall thickness to prevent warpage while cooling to ambient temperature.