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CELCON® M90 ECO-B

General purpose; good optimization of properties
Celcon® acetal copolymer grade M90 is a medium viscosity polymer providing optimum performance in general purpose injection molding and extrusion of thin walled tubing and thin gauge film. This grade provides overall excellent performance in many applications. Chemical abbreviation according to ISO 1043-1: POM Please also see Hostaform® C 9021.
ECO-B: Celcon® ECO-B POM-Copolymers have the same properties and performance as standard grades but produced with sustainability in mind. Using a mass-balance approach, biogenic feedstocks are used to offset the use of fossil-based raw materials and decrease greenhouse gas emissions. The process is audited and certified according to the ISCC Plus mass balance approach.

Product information

Part Marking Code	POM		ISO 11469

Rheological properties

Melt volume-flow rate	8	cm^3/10min	ISO 1133
Temperature	190	°C	
Load	2.16	kg	
Moulding shrinkage range, parallel	2.0	%	ISO 294-4, 2577
Moulding shrinkage range, normal	1.9	%	ISO 294-4, 2577

Typical mechanical properties

Tensile Modulus	2760	MPa	ISO 527-1/-2
Yield stress, 50mm/min	65	MPa	ISO 527-1/-2
Yield strain, 50mm/min	10	%	ISO 527-1/-2
Flexural Modulus	2550	MPa	ISO 178
Flexural Stress at 3.5%	73	MPa	ISO 178
Compressive stress at 1% strain	26	MPa	ISO 604
Tensile creep modulus, 1h	2450	MPa	ISO 899-1
Tensile creep modulus, 1000h	1350	MPa	ISO 899-1
Charpy impact strength, 23°C	188	kJ/m^2	ISO 179/1eU
Charpy impact strength, -30°C	181	kJ/m^2	ISO 179/1eU
Charpy notched impact strength, 23°C	6	kJ/m^2	ISO 179/1eA
Charpy notched impact strength, -30°C	6	kJ/m^2	ISO 179/1eA
Izod notched impact strength, 23°C	5.7	kJ/m^2	ISO 180/1A
Izod notched impact strength, -30°C	5.5	kJ/m^2	ISO 180/1A

Thermal properties

Melting temperature, 10°C/min	166	°C	ISO 11357-1/-3
Temp. of deflection under load, 1.8 MPa	101	°C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa	158	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h, 50N	161	°C	ISO 306
Ball pressure test	150	°C	IEC 60695-10-2
Coeff. of linear therm. expansion, parallel	120	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	120	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.155	W/(m K)	Internal

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Eff. thermal diffusivity	4.85E-8	m^2/s	Internal
Spec. heat capacity of melt	2210	J/(kg K)	Internal

Electrical properties

Volume resistivity	8E12	Ohm.m	IEC 62631-3-1
Surface resistivity	3E16	Ohm	IEC 62631-3-2

Other properties

Humidity absorption, 2mm	0.2	%	Sim. to ISO 62
Water absorption, 2mm	0.75	%	Sim. to ISO 62
Density	1410	kg/m^3	ISO 1183
Density of melt	1200	kg/m^3	Internal

Injection

Drying Temperature	100 - 120	°C	
Drying Time, Dehumidified Dryer	3 - 4	h	
Melt Temperature Optimum	180	°C	Internal
Max. mould temperature	80 - 120	°C	
Back pressure	4	MPa	
Injection speed	slow-medium		
Ejection temperature	140	°C	Internal

Characteristics

Additives	Biobased

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

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	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 remaining 30% as transition zone. Melt temperature 180-220 C (355-430F)
Profile 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: 180-220 C (360-430 F).
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).
Blow molding	Consult product information services.
Calandering	Consult product information services.
Compression molding	Consult product information services.

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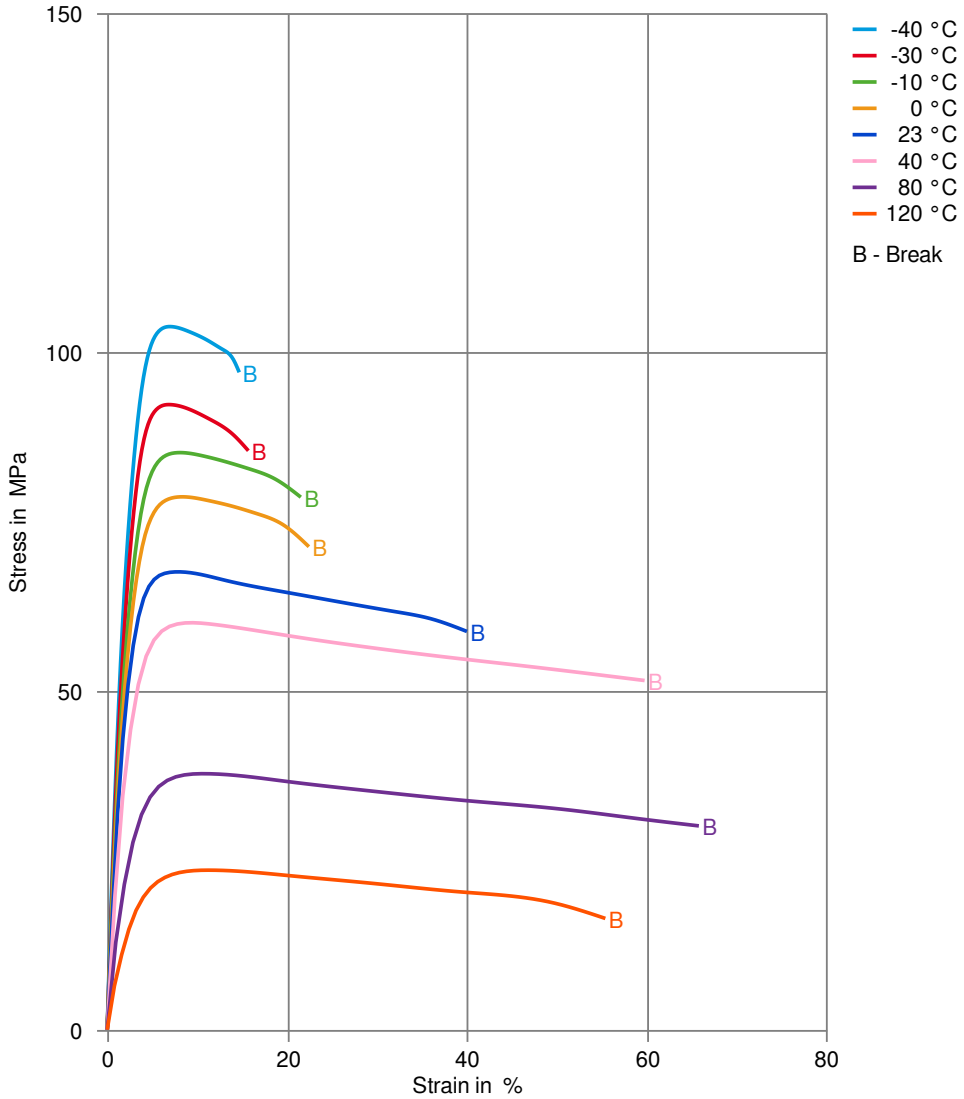
Stress-strain



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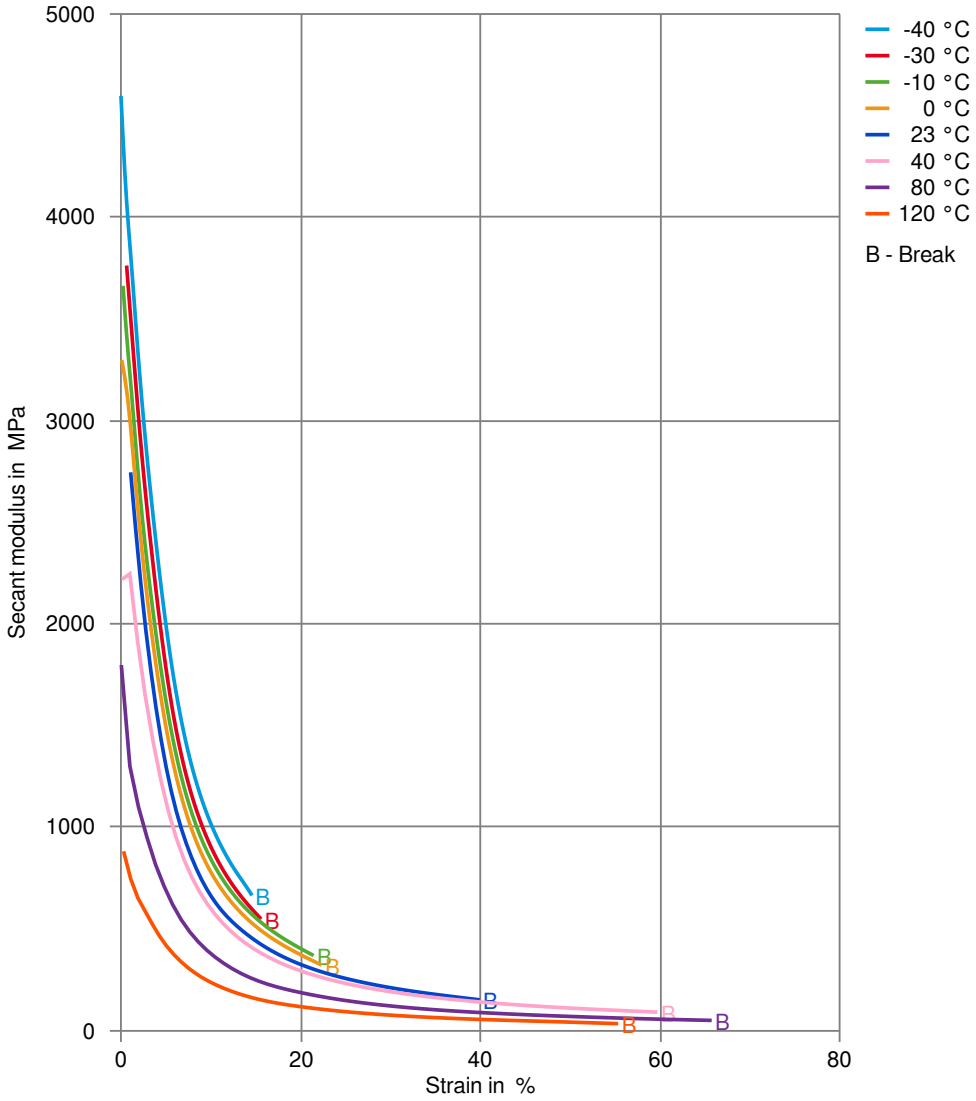
Secant modulus-strain



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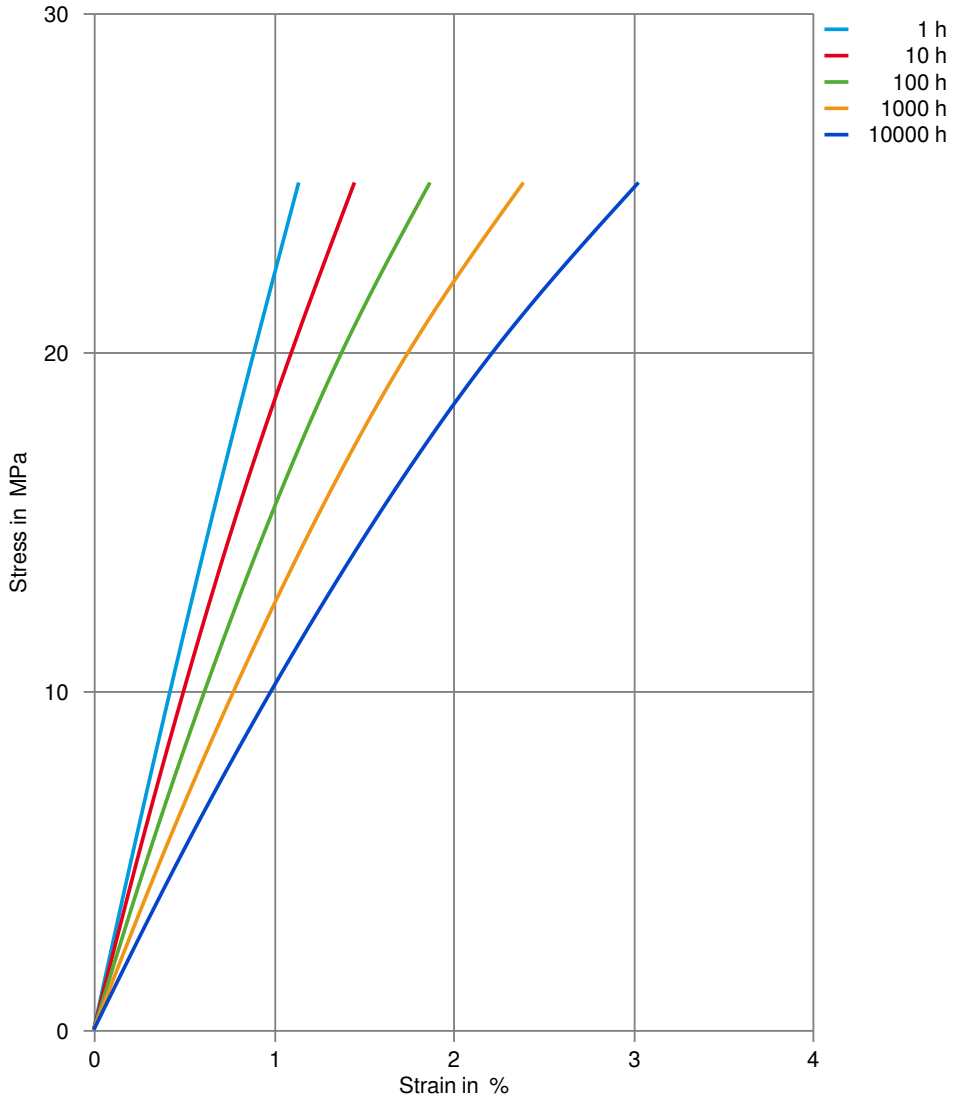
Stress-strain (isochronous) 23 °C



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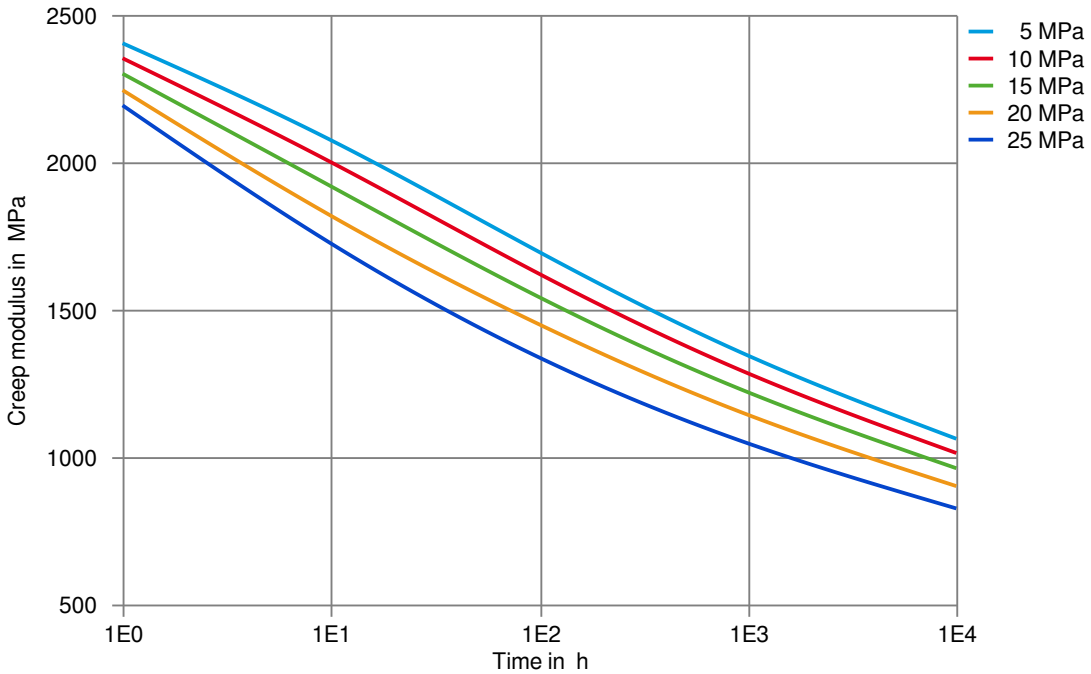
Creep modulus-time 23 °C



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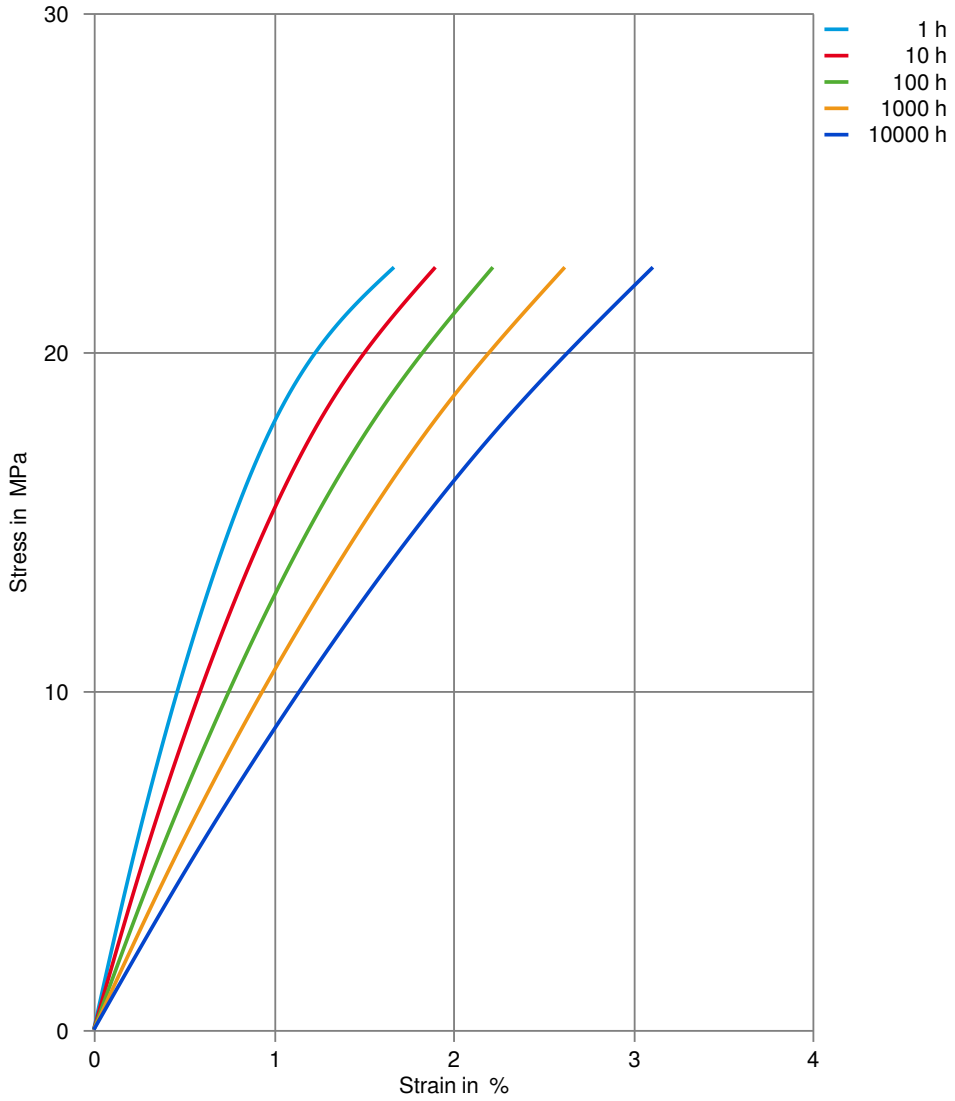
Stress-strain (isochronous) 40 °C



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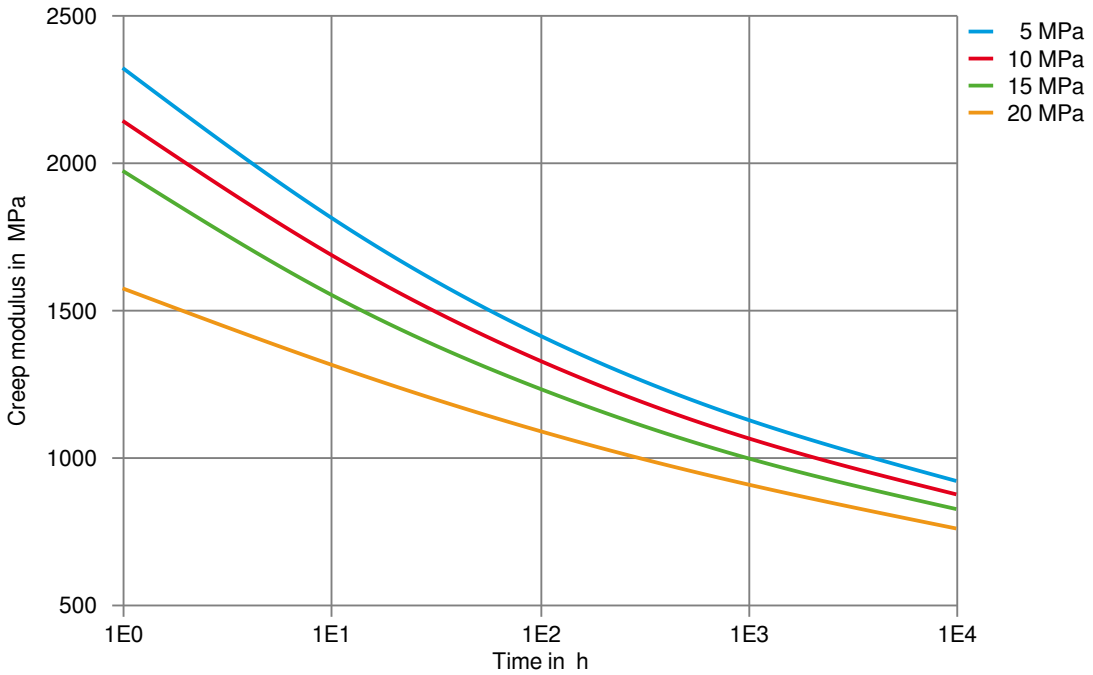
Creep modulus-time 40 °C



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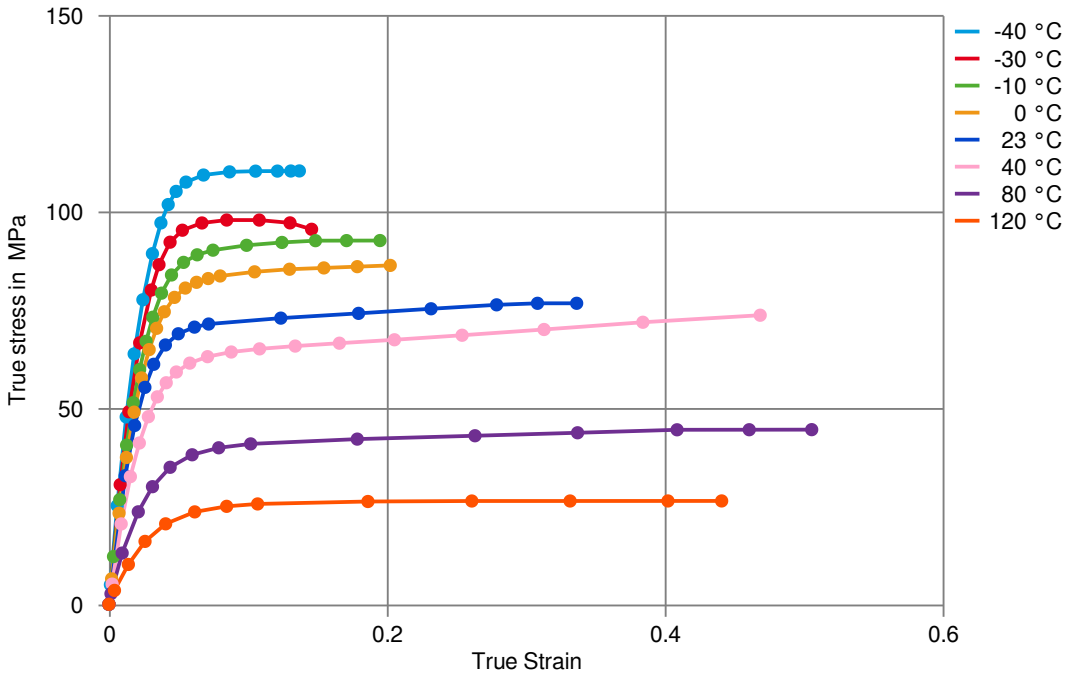
True stress-strain



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Processing Texts

Pre-drying	Drying is not normally 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.