

# 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 <sup>3</sup> /10min	ISO 1133
Temperature	190 °C	
Load	2.16 kg	
Moulding shrinkage, parallel	2.0 %	ISO 294-4, 2577
Moulding shrinkage, 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
Shear Modulus	1000 MPa	ISO 6721
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 <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	181 kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	6 kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	6 kJ/m <sup>2</sup>	ISO 179/1eA
Izod notched impact strength, 23°C	5.7 kJ/m <sup>2</sup>	ISO 180/1A
Izod notched impact strength, -30°C	5.5 kJ/m <sup>2</sup>	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

# CELCON® M90 ECO-B

Thermal conductivity of melt	0.155 W/(m K)	Internal
Eff. thermal diffusivity	4.85E-8 m <sup>2</sup> /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 <sup>3</sup>	ISO 1183
Density of melt	1200 kg/m <sup>3</sup>	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	<p>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.</p>
-------------------	--

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

# CELCON® M90 ECO-B

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 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.

## Calendering

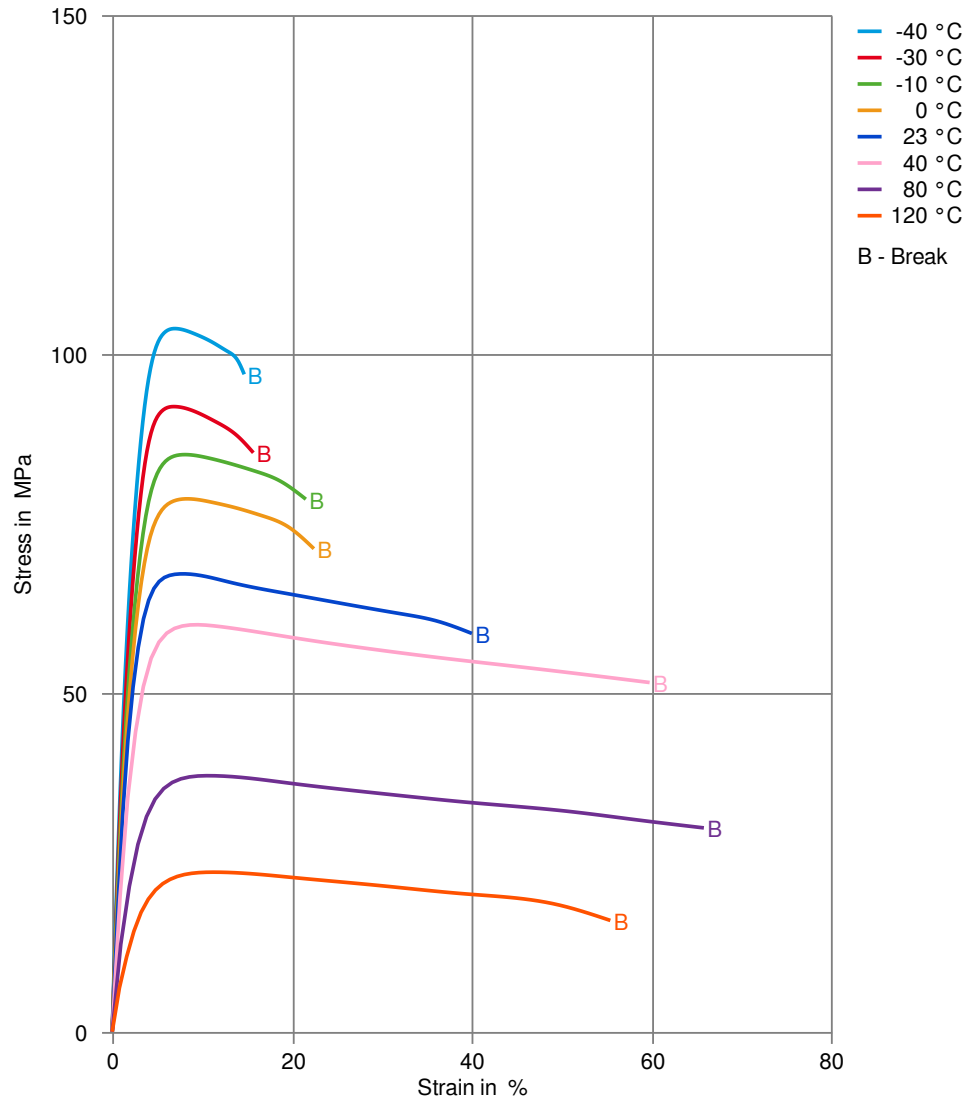
Consult product information services.

## Compression molding

Consult product information services.

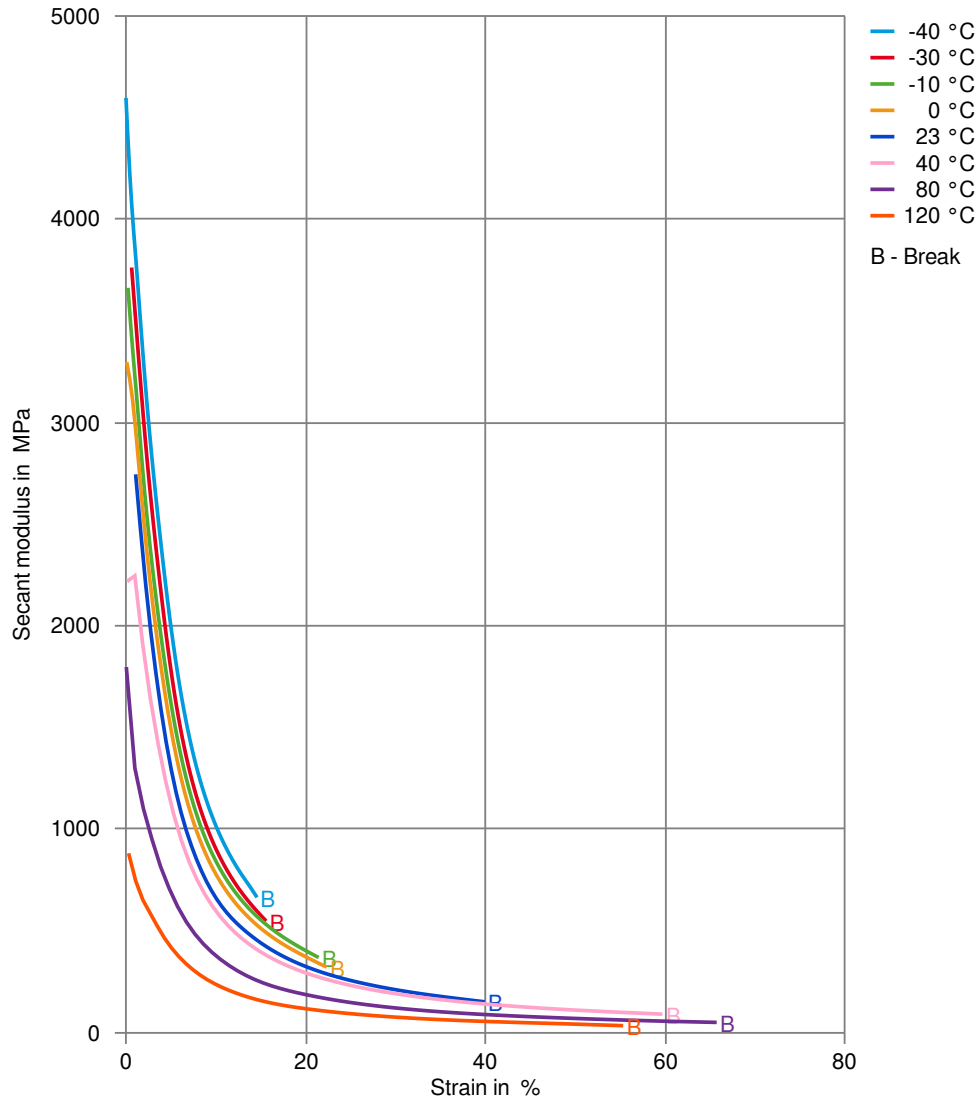
# CELCON® M90 ECO-B

## Stress-strain



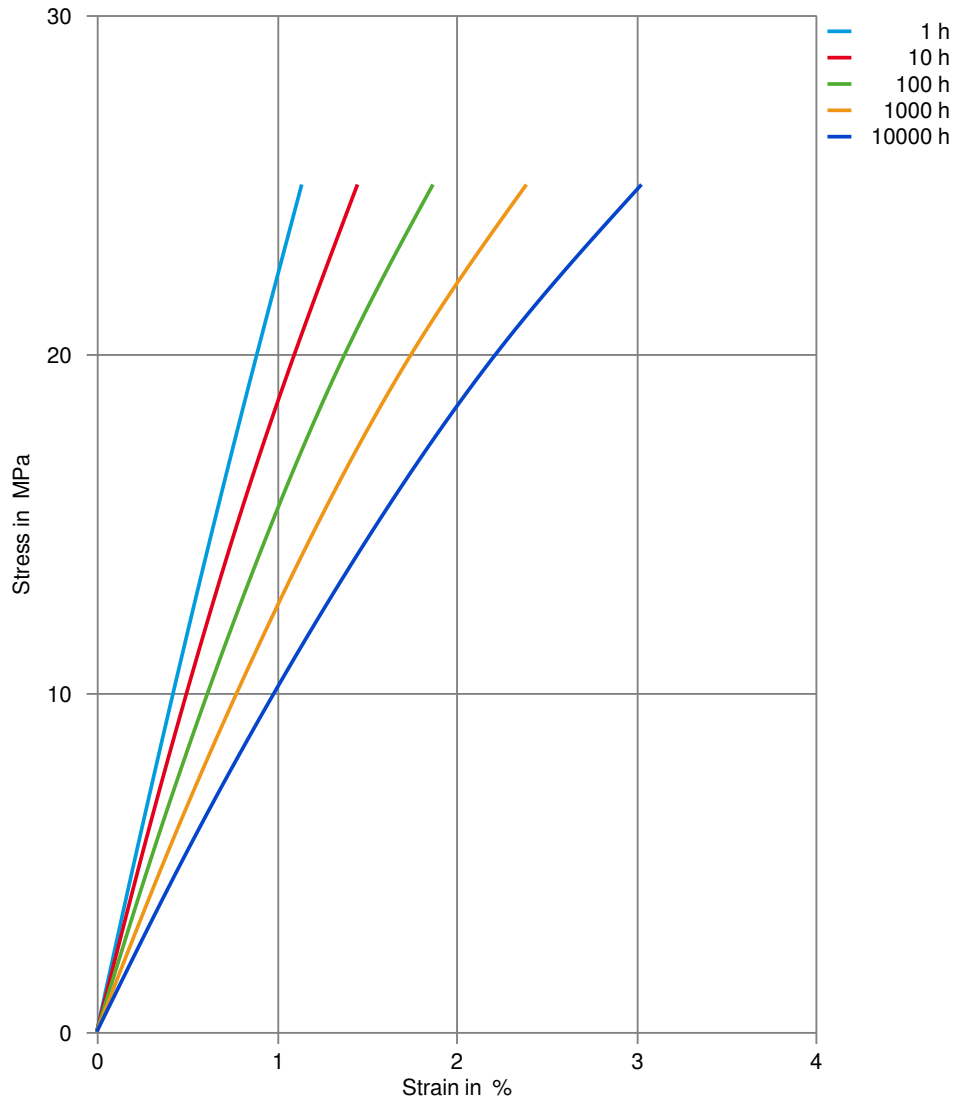
# CELCON® M90 ECO-B

## Secant modulus-strain



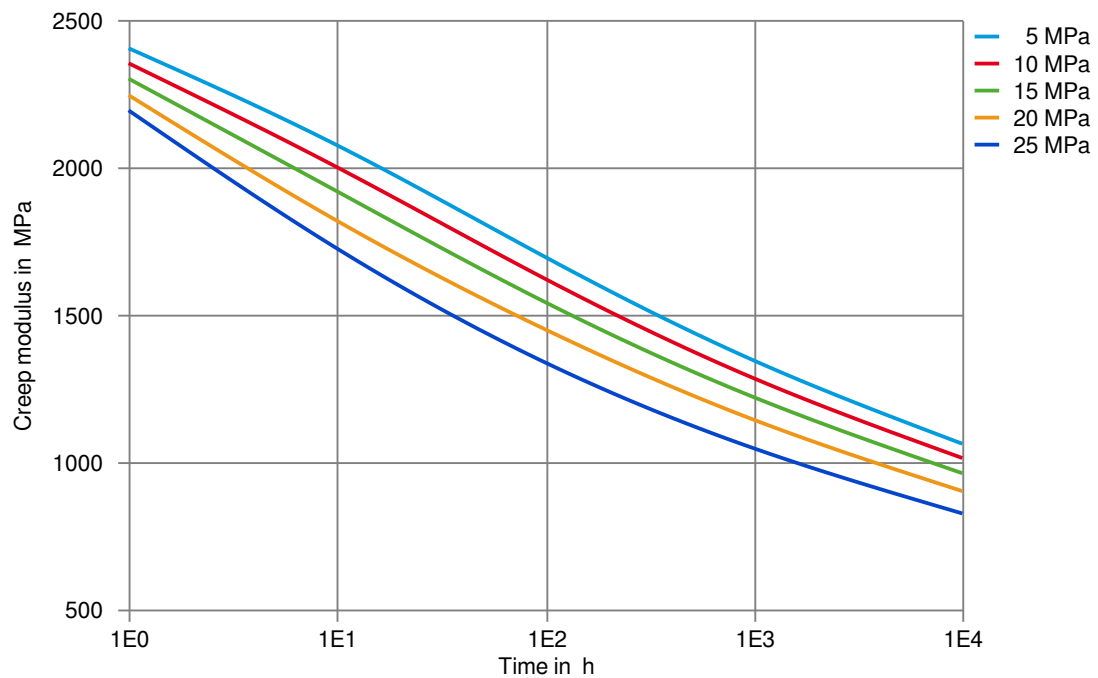
# CELCON® M90 ECO-B

Stress-strain (isochronous) 23°C



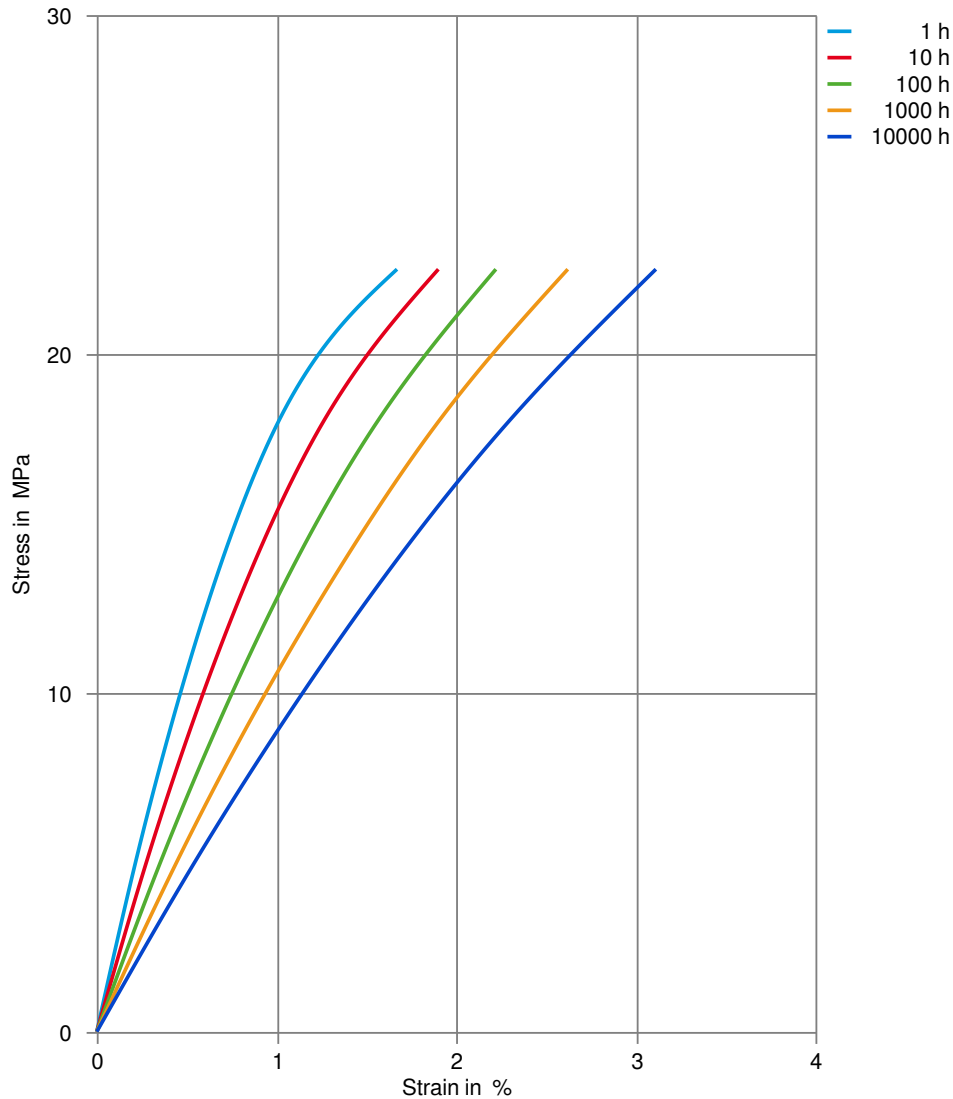
# CELCON® M90 ECO-B

Creep modulus-time 23°C



# CELCON® M90 ECO-B

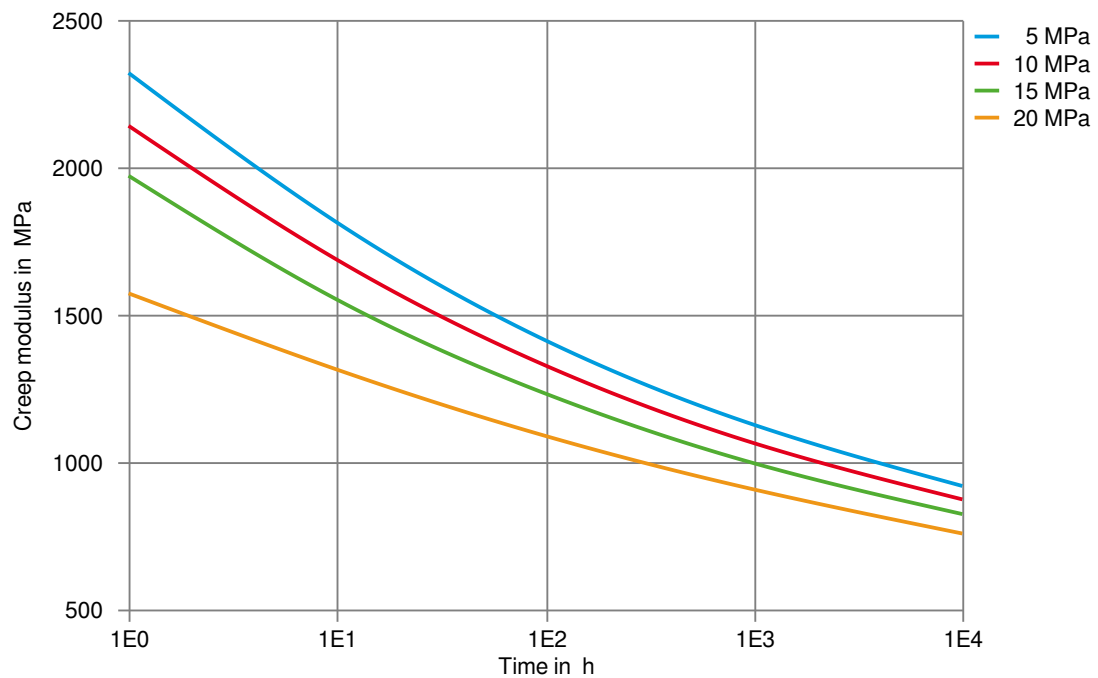
Stress-strain (isochronous) 40°C





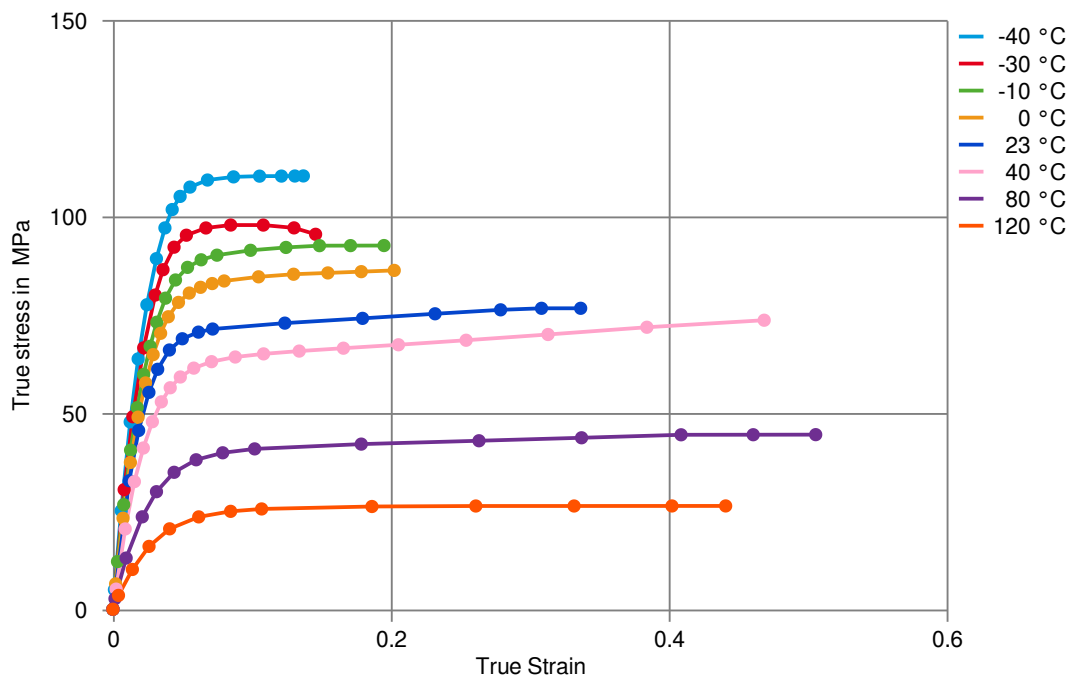
# CELCON® M90 ECO-B

Creep modulus-time 40°C



# CELCON® M90 ECO-B

## True stress-strain



# CELCON® M90 ECO-B

## 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 hygroscopic 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 3 hours. 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.

# CELCON® M90 ECO-B

Printed: 2023-08-07

Page: 12 of 12

Revised: 2023-05-26 Source: Celanese Materials Database

NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. These values alone do not represent a sufficient basis for any part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Colourants or other additives may cause significant variations in data values. Properties of moulded parts can be influenced by a wide variety of factors including, but not limited to, material selection, additives, part design, processing conditions and environmental exposure. Other than those products expressly identified as medical grade (including by MT® product designation or otherwise), Celanese's products are not intended for use in medical or dental implants. Regardless of any such product designation, any determination of the suitability of a particular material and part design for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use. To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such information. The information contained in this publication should not be construed as a promise or guarantee of specific properties of our products. It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication. Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones that exist. We recommend that persons intending to rely on any recommendation or to use any equipment, processing technique or material mentioned in this publication should satisfy themselves that they can meet all applicable safety and health standards. We strongly recommend that users seek and adhere to the manufacturer's current instructions for handling each material they use, and entrust the handling of such material to adequately trained personnel only. Please call the telephone numbers listed for additional technical information. Call Customer Services for the appropriate Materials Safety Data Sheets (MSDS) before attempting to process our products.

© 2023 Celanese or its affiliates. All rights reserved. Celanese®, registered C-ball design and all other trademarks identified herein with ®, TM, SM, unless otherwise noted, are trademarks of Celanese or its affiliates. Fortron is a registered trademark of Fortron Industries LLC. KEPITAL is a registered trademark of Korea Engineering Plastics Company, Ltd.