

**CELCON® M90 - POM**
**Description**

General purpose, good optimization of properties

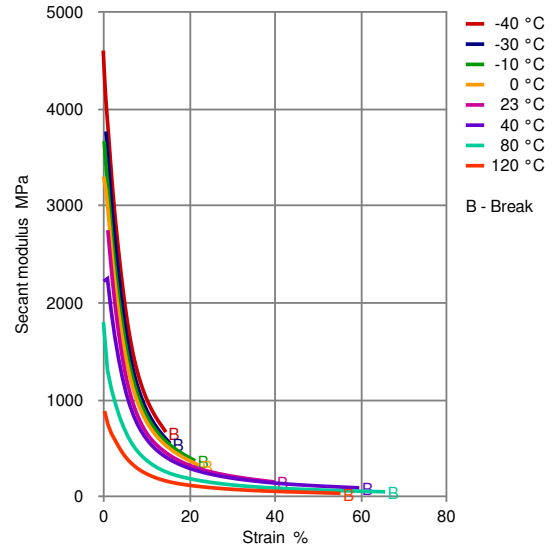
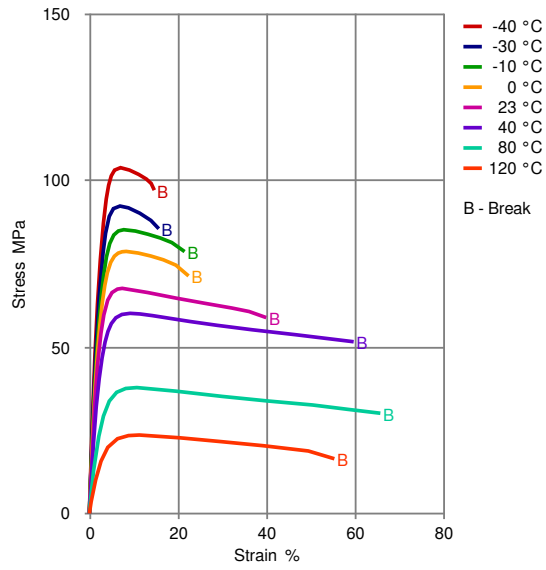
Celcon® acetal copolymer grade M90 is a medium viscosity polymer providing optimum performance in general purpose injection molding and extrusion of thin walled tubing and thin gauge film. This grade provides overall excellent performance in many applications. Chemical abbreviation according to ISO 1043-1: POM Please also see Hostaform® C 9021.

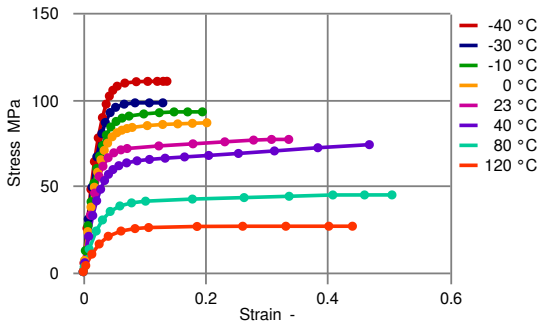
<b>Physical properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Density	1410	kg/m <sup>3</sup>	ISO 1183
Melt volume rate, MVR	8	cm <sup>3</sup> /10min	ISO 1133
MVR temperature	190	°C	ISO 1133
MVR load	2.16	kg	ISO 1133
Molding shrinkage, parallel (flow)	2.0	%	ISO 294-4, 2577
Molding shrinkage, transverse normal	1.9	%	ISO 294-4, 2577
Water absorption, 23°C-sat	0.75	%	Sim. to ISO 62
Humidity absorption, 23°C/50%RH	0.2	%	ISO 62
<b>Mechanical properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Tensile modulus	2760	MPa	ISO 527-1, -2
Tensile stress at yield, 50mm/min	65	MPa	ISO 527-1, -2
Tensile strain at yield, 50mm/min	10	%	ISO 527-1, -2
Tensile creep modulus, 1h	2450	MPa	ISO 899-1
Tensile creep modulus, 1000h	1350	MPa	ISO 899-1
Flexural modulus, 23°C	2550	MPa	ISO 178
Flexural stress at 3.5% strain	73	MPa	ISO 178
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 impact notched, 23°C	5.7	kJ/m <sup>2</sup>	ISO 180/1A
Izod impact notched, -30°C	5.5	kJ/m <sup>2</sup>	ISO 180/1A
Compressive stress at 1% strain	26	MPa	ISO 604
Compressive stress at 6% strain	88	MPa	ISO 604
<b>Thermal properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Melting temperature, 10°C/min	166	°C	ISO 11357-1/-3
DTUL at 1.8 MPa	101	°C	ISO 75-1, -2
DTUL at 0.45 MPa	158	°C	ISO 75-1, -2
Coeff. of linear therm expansion, parallel	1.2	E-4/°C	ISO 11359-2
Coeff. of linear therm expansion, normal	1.2	E-4/°C	ISO 11359-2
<b>Electrical properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Volume resistivity, 23°C	8E12	Ohm*m	IEC 62631-3-1
Surface resistivity, 23°C	3E16	Ohm	IEC 62631-3-2
<b>Rheological calculation properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Density of melt	1200	kg/m <sup>3</sup>	Internal
Thermal conductivity of melt	0.155	W/(m K)	Internal
Spec. heat capacity melt	2210	J/(kg K)	Internal
Eff. thermal diffusivity	4.85E-8	m <sup>2</sup> /s	Internal
Ejection temperature	140	°C	-

Diagrams

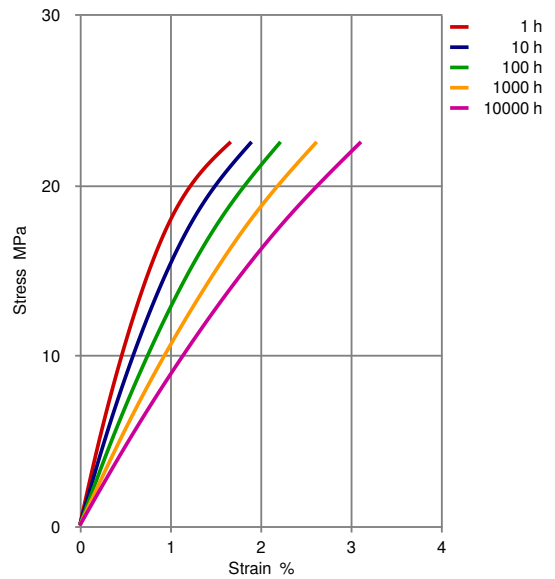
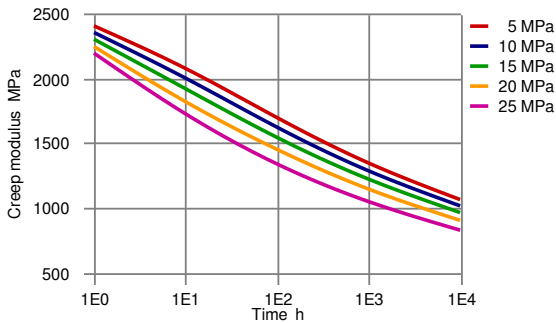
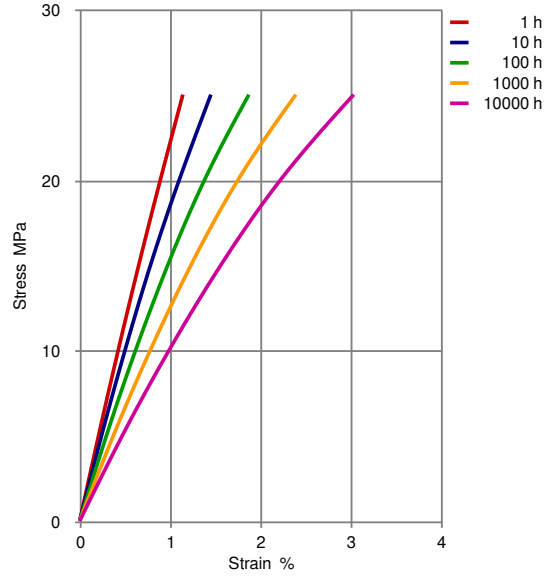
Stress-strain

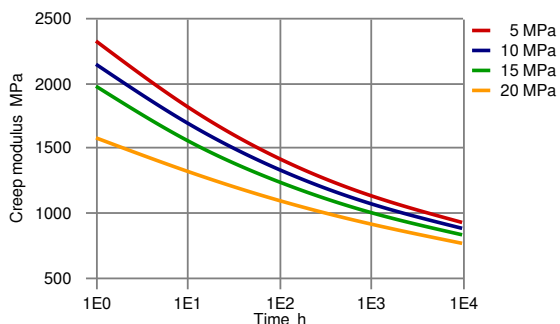
Secant modulus-strain





-40 °C yield at 0.06806 strain, 109.249 stress  
 -30 °C yield at 0.06693 strain, 97.045 stress  
 -10 °C yield at 0.03158 strain, 73.058 stress  
 0 °C yield at 0.03985 strain, 74.448 stress  
 23 °C yield at 0.07175 strain, 71.324 stress  
 40 °C yield at 0.04124 strain, 56.374 stress  
 80 °C yield at 0.10200 strain, 40.814 stress  
 120 °C yield at 0.10702 strain, 25.530 stress  
 Poisson's ratio used is 0.38





**Typical injection moulding processing conditions**

<b>Pre Drying</b>	<b>Value</b>	<b>Unit</b>
Drying time	<b>3 - 4</b>	h
Drying temperature	<b>100 - 120</b>	°C
<b>Temperature</b>	<b>Value</b>	<b>Unit</b>
Zone1 temperature	<b>170 - 180</b>	°C
Zone2 temperature	<b>180 - 190</b>	°C
Zone3 temperature	<b>180 - 190</b>	°C
Zone4 temperature	<b>190 - 200</b>	°C
Nozzle temperature	<b>190 - 200</b>	°C
Melt temperature	<b>180 - 190</b>	°C
Mold temperature	<b>80 - 120</b>	°C
Hot runner temperature	<b>180 - 200</b>	°C
<b>Pressure</b>	<b>Value</b>	<b>Unit</b>
Back pressure max.	<b>40</b>	bar
<b>Speed</b>	<b>Value</b>	
Injection speed	<b>slow-medium</b>	
<b>Other</b>	<b>Value</b>	<b>Unit</b>
Flow temperature	<b>174</b>	°C

**Other text information**

**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.

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## **CELCON® M90 - POM**

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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**

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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**

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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.

### **Film extrusion**

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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)

### **Film Extrusion Preprocessing**

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Drying is generally not required because Celcon materials are not hydroscopic nor are they degraded by moisture during processing. Excessive moisture can cause surface defects on the extruded film. For better uniformity especially when using regrind or material that has been stored in containers open to the atmosphere, recommended drying conditions are 3 Hrs. at 80 C (180 F). Desiccant hopper dryers are not required. Max. moisture content = 0.35%.

### **Film Extrusion Postprocessing**

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Postprocessing conditioning or moisturizing is not required.

### **Other extrusion**

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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)

### **Other Extrusion Preprocessing**

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Drying is generally not required because Celcon materials are not hydroscopic nor are they degraded by moisture during processing. Excessive moisture can cause surface defects. For better uniformity especially when using regrind or material that has been stored in containers open to the atmosphere, recommended drying is 3 hours at 80 C (180 F). Desiccant hopper dryers are not required. Max. moisture content = 0.35%

### **Other Extrusion Postprocessing**

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Postprocessing conditioning or moisturizing are not required. For thick walled sections (>3mm or 1/8 in.), annealing is recommended to reduce internal stresses.

Annealing temperature: 130-140 C (265-285 F)

Annealing time: 10 min/mm thickness

### **Profile extrusion**

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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).

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## **CELCON® M90 - POM**

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### **Profile Extrusion Preprocessing**

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Drying is generally not required because Celcon materials are not hydroscopic nor are they degraded by moisture during processing. Excessive moisture can cause surface defects on the extrusion. For better uniformity especially when using regrind or material that has been stored in containers open to the atmosphere, recommended drying conditions are 3 Hrs. at 80 C (180 F). Desiccant hopper dryers are not required. Max. moisture content = 0.035%.

### **Profile Extrusion Postprocessing**

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Postprocessing or moisturizing is not required. For thick walled extrusions (>3 mm or 1/8 in.), annealing is recommended to reduce internal stresses.

Annealing temperature: 130-140 C (265-285 F)

Annealing time: 10 min/mm thickness

### **Sheet extrusion**

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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).

### **Sheet Extrusion Preprocessing**

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Drying is generally not required because Celcon materials are not hydroscopic nor are they degraded by moisture during processing. Excessive moisture can lead to surface defects. For better uniformity in sheet extrusion especially when using regrind or material that has been stored in containers open to the atmosphere, recommended drying is 3 hours at 80 C (180 F). Desiccant hopper dryers are not required. Max. water content = 0.35%.

### **Sheet Extrusion Postprocessing**

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Postprocessing conditioning or moisturizing is not required. For thick walled sections (>3mm or 1/8 in.), annealing is recommended to reduce internal stresses.

Annealing temperature: 130-140 C (265-285 F)

Annealing time: 10 min/mm wall thickness

### **Blow molding**

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Consult product information services.

### **Blow Molding Preprocessing**

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Consult product information services.

### **Blow Molding Postprocessing**

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Consult product information services.

### **Calendering**

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Consult product information services.

### **Calendering Preprocessing**

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Consult product information services.

### **Calendering Postprocessing**

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Consult product information services.

### **Compression molding**

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Consult product information services.

### **Compression Molding Preprocessing**

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Consult product information services.

## CELCON® M90 - POM

### Compression Molding Postprocessing

Consult product information services.

### Characteristics

<b>Special Characteristics</b>	Auto spec approved
<b>Product Categories</b>	Unfilled
<b>Processing</b>	Blow molding, Calendering, Film extrusion, Injection molding, Other extrusion, Profile extrusion, Sheet extrusion
<b>Delivery Form</b>	Pellets

### Other Approvals

OEM	Specification	Additional Information
BJEV	Q-BJEV 01.59	
Bosch	N28 BN22-O034	Natural & Black
Continental	30.5251-0367.7	
Continental	TST N 055 54.07	
Stellantis - Chrysler	CPN 1532	Natural
Stellantis - Chrysler	CPN 1586	Black, pre-compounded or Salt & Pepper
Stellantis - Chrysler	CPN 3766	CANOD
Evergrande Auto	EGW.PL.0603-POM-CO	
Ford	WSK-M4D635-A2	Natural & Black
Geely	Q/JLY J7110235B	2018
GM	GMP.POM.005	Natural & Black
GM	GMW22P-POM-C2	
Great Wall Motor	MP05-01	
Hyundai	MS237-09, Type A	
Li Auto	Q/LiA5310020	2021 (V2)
Nissan	POM-IC2-1	
Renault	IP13g	PMR2020
Renault	UB15	PMR2020
Renault	UB03f	PMR2020
Renault	EP03a	PMR2020
Renault	EP03-3	PMR2020
SAIC Motor	SMTC 5 310 020	
Tesla	TM-1005-40	Black, Bishop USA
Tesla	TM-1005-50	Black, Bishop USA
Toyota	TSM5515G-1B	

### Contact

#### Americas

8040 Dixie Highway  
Florence, KY 41042 USA  
Product Information Service  
t: +1-800-833-4882  
t: +1-859-372-3244  
Customer Service  
t: +1-800-526-4960  
t: +1-859-372-3214  
e: info-engineeredmaterials-am@celanese.com

#### Asia

4560 Jinke Road  
Zhang Jiang Hi Tech Park  
Shanghai 201210 PRC  
Customer Service  
t: +86 21 3861 9288  
e: info-engineeredmaterials-asia@celanese.com

#### Europe

Am Unisys-Park 1  
65843 Sulzbach, Germany  
Product Information Service  
t: +49-800-86427-531  
t: +49-(0)-69-45009-1011  
e: info-engineeredmaterials-eu@celanese.com

**General Disclaimer**

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