

# CELANEX® 2002-2

unfilled; medium melt flow; lubricated PBT

Celanex 2002-2 is a general purpose, unreinforced polybutylene terephthalate with a good balance of mechanical properties and processability. Celanex 2002-2 is a medium flow material that contains an internal lubricant.

## Rheological properties

Melt volume-flow rate	20 cm <sup>3</sup> /10min	ISO 1133
Temperature	250 °C	
Load	2.16 kg	
Moulding shrinkage, parallel	1.8 %	ISO 294-4, 2577
Moulding shrinkage range, parallel	1.5 - 2.0 %	ISO 294-4, 2577
Moulding shrinkage, normal	1.8 %	ISO 294-4, 2577
Moulding shrinkage range, normal	1.5 - 2.0 %	ISO 294-4, 2577

## Typical mechanical properties

Tensile Modulus	2600 MPa	ISO 527-1/-2
Yield stress, 50mm/min	60 MPa	ISO 527-1/-2
Yield strain, 50mm/min	4 %	ISO 527-1/-2
Stress at 50% strain	30 MPa	ISO 527-1/-2
Stress at break, 50mm/min	60 MPa	ISO 527-1/-2
Nominal strain at break	>50 %	ISO 527-1/-2
Flexural Modulus	2500 MPa	ISO 178
Flexural Strength	80 MPa	ISO 178
Charpy impact strength, 23°C	NB kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	190 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 kJ/m <sup>2</sup>	ISO 180/1A
Hardness, Rockwell, M-scale	78	ISO 2039-2

## Thermal properties

Melting temperature, 10°C/min	225 °C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	60 °C	ISO 11357-1/-3
Temp. of deflection under load, 1.8 MPa	55 °C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa	150 °C	ISO 75-1/-2
Vicat softening temperature, 50°C/h, 50N	190 °C	ISO 306
Coeff. of linear therm. expansion, parallel	110 E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	130 E-6/K	ISO 11359-1/-2

## Flammability

Burning Behav. at thickness h	HB class	UL 94
Thickness tested	0.71 mm	UL 94
Oxygen index	22 %	ISO 4589-1/-2

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## Electrical properties

Relative permittivity, 100Hz	4	IEC 62631-2-1
Relative permittivity, 1MHz	3.5	IEC 62631-2-1
Dissipation factor, 100Hz	14 E-4	IEC 62631-2-1
Dissipation factor, 1MHz	220 E-4	IEC 62631-2-1
Volume resistivity	1E13 Ohm.m	IEC 62631-3-1
Surface resistivity	1E15 Ohm	IEC 62631-3-2
Electric strength	23 kV/mm	IEC 60243-1
Comparative tracking index	PLC 0 PLC	UL 746A

## Other properties

Humidity absorption, 2mm	0.2 %	Sim. to ISO 62
Water absorption, 2mm	0.45 %	Sim. to ISO 62
Density	1310 kg/m <sup>3</sup>	ISO 1183

## Injection

Drying Temperature	120 - 130 °C	
Drying Time, Dehumidified Dryer	4 h	
Processing Moisture Content	0.02 %	
Melt Temperature Optimum	250 °C	Internal
Max. mould temperature	65 - 93 °C	
Injection speed	medium-fast	

## Characteristics

Additives	Release agent
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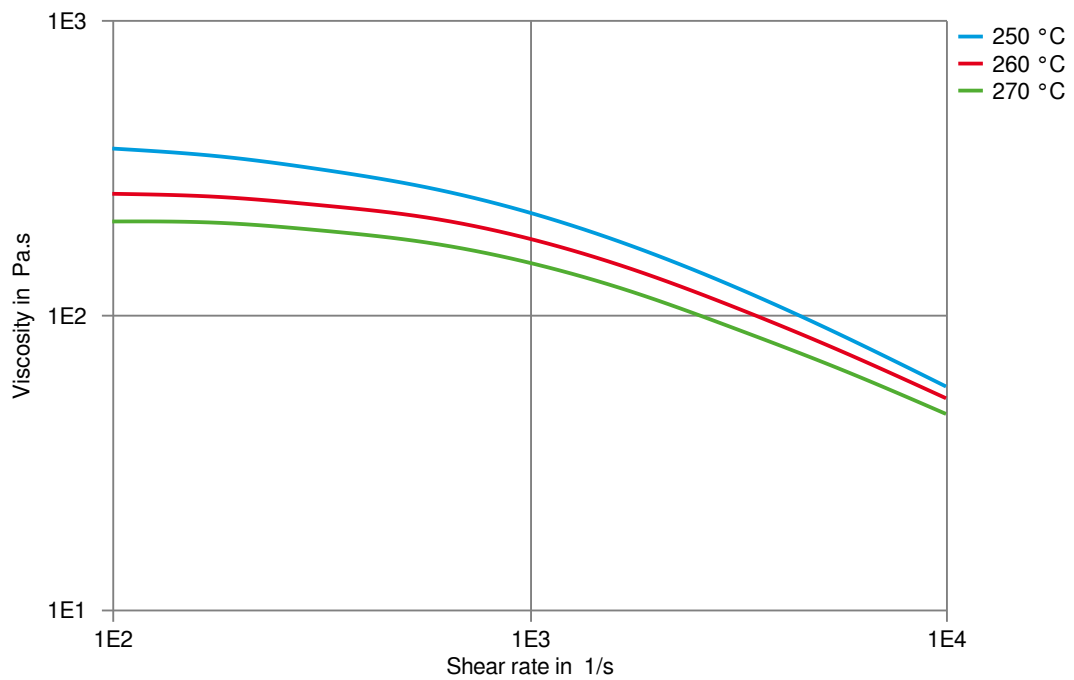
## Additional information

Injection molding	Rear Temperature 450-470 (230-240) deg F (deg C)
	Center Temperature 460-480 (235-250) deg F (deg C)
	Front Temperature 470-500 (240-260) deg F (deg C)
	Nozzle Temperature 480-500 (250-260) deg F (deg C)
	Melt Temperature 465-500 (240-260) deg F (deg C)
	Mold Temperature 165-200 (74-93) deg F (deg C)
	Back Pressure 0-50 psi
	Screw Speed Medium
	Injection Speed Fast

Injection speed, injection pressure and holding pressure have to be optimized to the individual article geometry. To avoid material degradation during processing low back pressure and minimum screw speed have to be used. Overheating of the material has to be avoided, in particular for flame retardant grades. Up to 25% clean and dry regrind may be used.

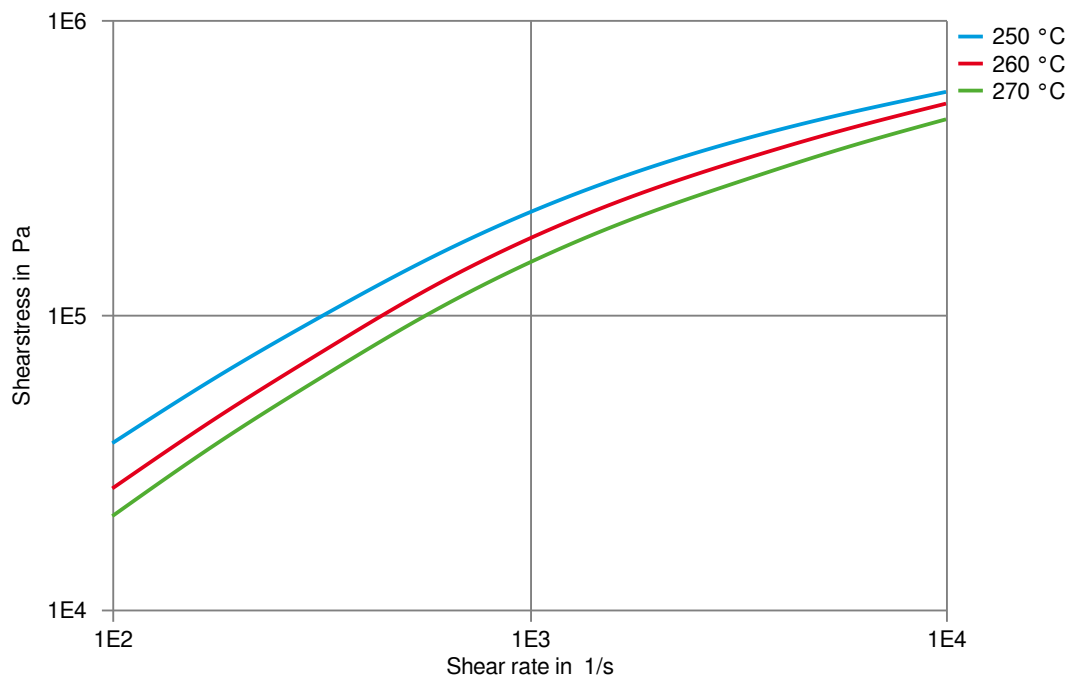
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## Viscosity-shear rate



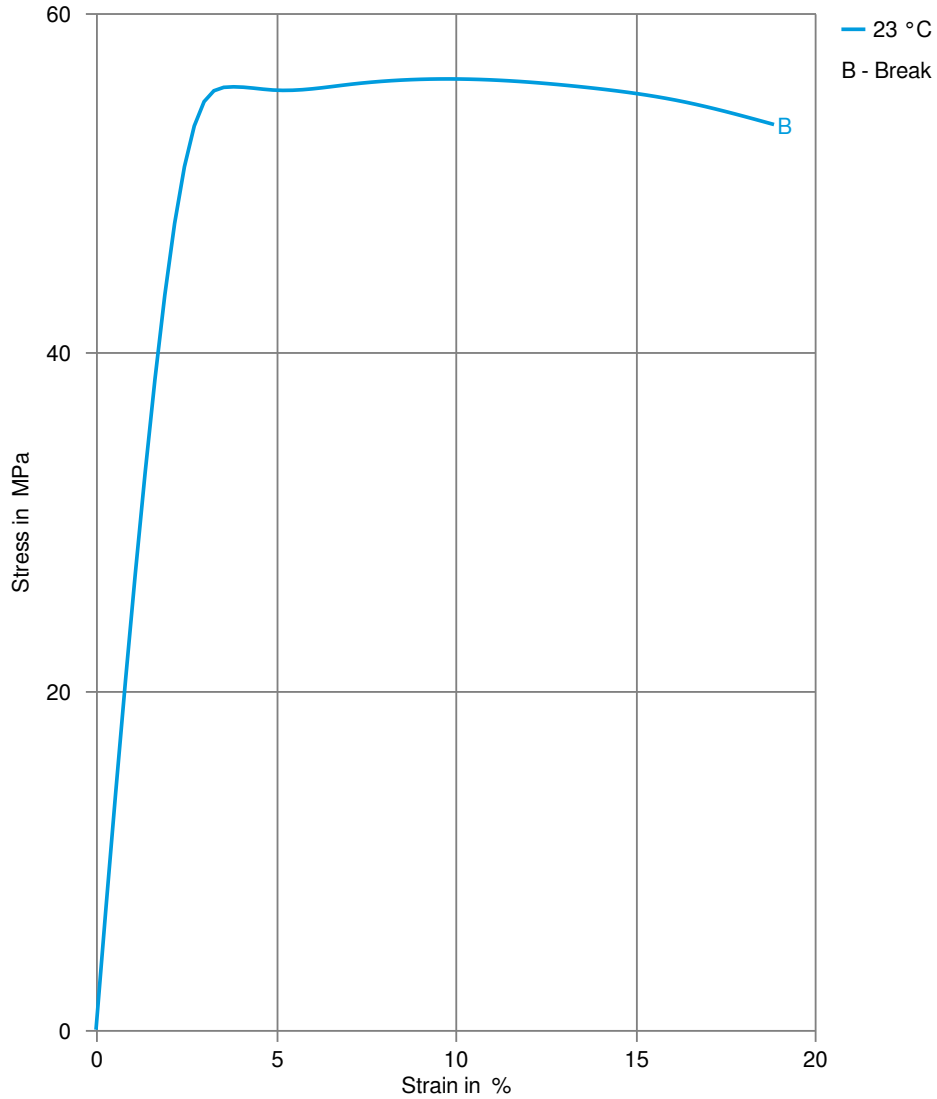
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## Shearstress-shear rate



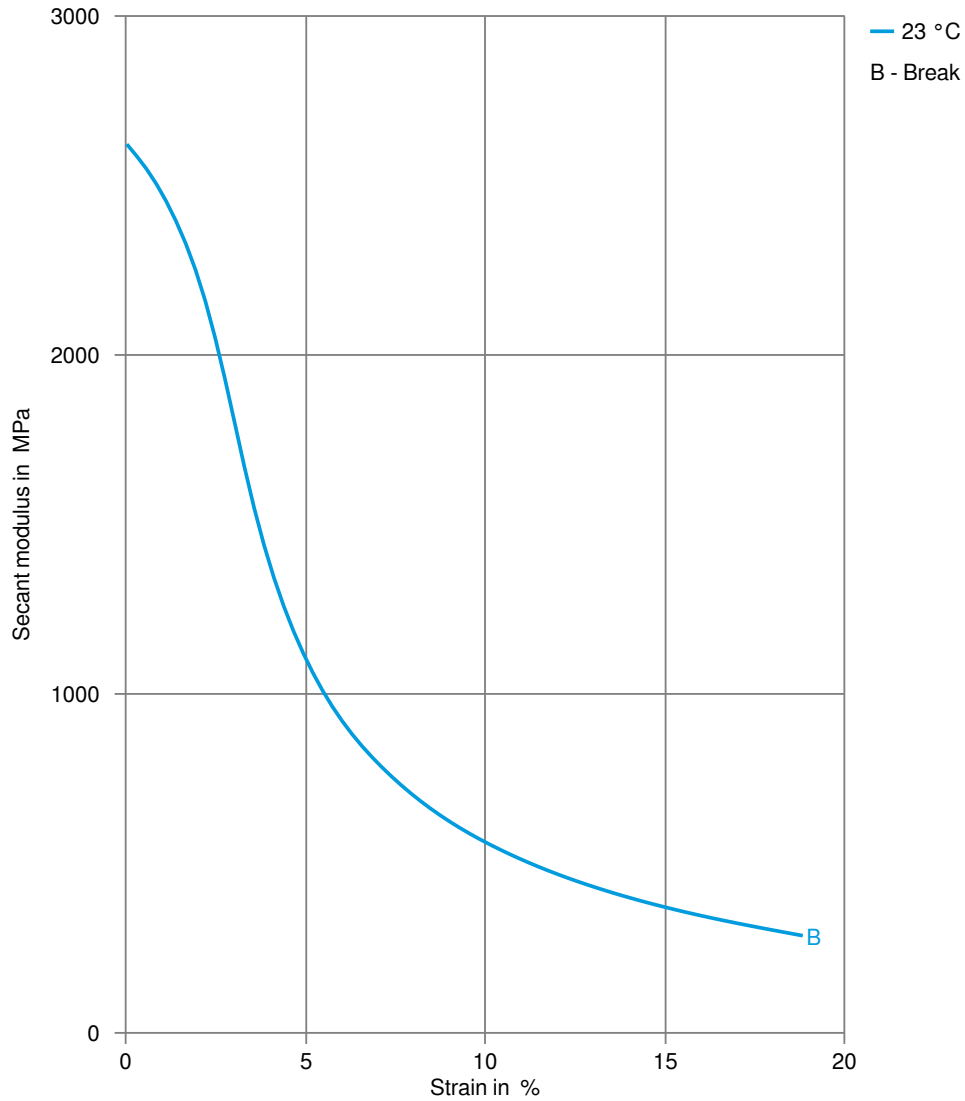
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## Stress-strain



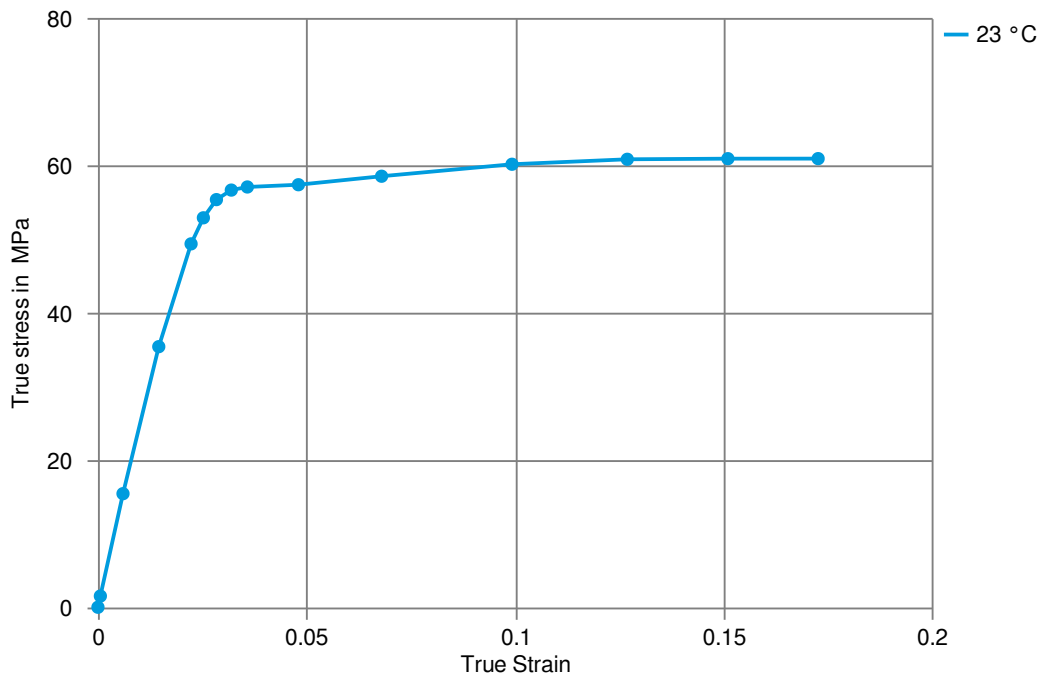
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## Secant modulus-strain



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## True stress-strain



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## Processing Texts

### Pre-drying

To avoid hydrolytic degradation during processing, CELANEX resins have to be dried to a moisture level equal to or less than 0.02%. Drying should be done in a dehumidifying hopper dryer capable of dewpoints <-40°F (-40°C) at 250°F (121°C) for 4 hours.

### Longer pre-drying times/storage

For subsequent storage of the material in the dryer until processed (<= 60 h) it is necessary to lower the temperature to 100° C.

### Injection molding

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### Injection molding Preprocessing

To avoid hydrolytic degradation during processing, CELANEX resins have to be dried to a moisture level equal to or less than 0.02%. Drying should be done in a dehumidifying hopper dryer capable of dewpoints <-30°F (-34°C) at 250°F (121°C) for 4 hours.

## Other Approvals

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OEM	Specification	Additional Information
Stellantis - Chrysler	CPN 3942	CANOD
Ford	WSS-M4D359-C1	
GM	GMW17539P-PBT	Natural & Black
Mercedes-Benz Group (Daimler)	DBL 5410	(5410.00)
Mercedes-Benz Group (Daimler)	DBL 5420	(5420.00)
Li Auto	Q/LiA5310038	2021 (V2)

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Toyota	TSM5527	
Nissan	PBTP-IX	