ZEDEX ®

Tribological Polymer Solutions

ZX-200 family
24.10.24

Injection moulding instruction

EN 1.0

Following injection moulding suggestions apply to ZX- 200. Please note that these parameters may change depending on the component to be injected, the machine used etc.

1. Delivery form

ZX-200 granules are available in valve sacks (up to 25 kg) and big-bags (up to 1500 kg). Bulk density: 0,75 to 0,85 kg/dm³.

2. Pre-drying

The granules must be pre-dried before injection moulding. Insufficient pre-drying leads to operational and qualitative problems. The drying time is inversely proportional to the temperature:

- 2 hours at 90°C
- overnight at 60°C
- 3-4 hours at 80°C (Recommended)

Drying should be performed by dry-air-drying or vacuum drying method such that the moisture content in granules must be less than 0.2%. Process parameter must be controlled and executed in timely manner to ensure desired results. While POKETONE polymers are hydrolytically stable and not highly moisture-sensitive, it is important to reduce its contact with ambient air to prevent surface defects such as drools, voids in parts, or surface problems such as splay.

3. Processing

3.1 Barrel

The volume of the barrel should preferably be less than five times the total size of the part to be injected plus the sprue. A typical temperature setting for the barrel would be:

- Hopper flange: 50°C to 60°C
- Feed zone: 210°C to 220°C
- Compression zone: 215°C to 225°C
- Metering zone: 220°C to 230°C
- Barrel head: 230°C to 240°C
- Nozzle temperature: 240°C to 250°C

The melting temperature should be ranging from 235-260°C. The residence time of the material in the barrel should be limited to 6-8 minutes.

3.2 Nozzle

Full band coverage and a reliable thermocouple are essential. A well-controlled heated nozzle, with a sufficiently powered heater and a separate thermocouple, is strongly recommended to prevent freeze-off issues at the nozzle, particularly due to a small nozzle orifice or rapid solidification. Set the nozzle temperature 5~10°C higher than barrel zone. The system should be thoroughly purged. Recommended nozzle orifice size:

- Small-sized m/c (200T or less): min. Ø3.5 mm
- Mid-sized m/c (200~450T): min. Ø4 mm
- Mid~Large m/c (over 500T): min. Ø5 mm

3.3 Injection conditions

The screw speed should be between 50 and 100 rpm. For thin (<4 mm) and long parts, medium speed and medium pressure are recommended. For thick parts (> 5 mm), slow speed and high pressure are recommended.

3.4 Mould

The Mould temperature should be between 40°C and 80°C. The usage of hot oil is preferred over the electrical system. The mould should be isolated from the press and the mould frame.

3.5 Miscellaneous

The material has a high melt viscosity. At higher temperature than recommended melting temperature, the material begins to deteriorate, resulting in serious processing and quality issues. The material can be defined as an abrasive medium for screw, cylinder and mould. Good ventilation is required.

3.6 Purging

The following cleaning procedure should be followed af ter injection mould ZX-200 material:

- Empty the barrel of all material.
- Preferably purge the barrel with using high viscosity-PP, PCTG HDPE, GPPS or other commercially available purging compound. (Should be immediately purged after PK molding)
- Empty the barrel of the purge material.
- Reduce the temperature to 240°C
- Once the temperature has stabilized, purge the barrel again with the purge material.
- Empty the barrel from the purge material

Replace the purge material with your own purge material and clean it according to your own standard instructions. After the standard cleaning, barrel and screw should be thoroughly cleaned.
Note: Please follow instructions provided by supplier of purging compound

5. Downtime procedure

When interruptions occur in the molding cycle, do one of the following:

- For periods up to 30 min, retract the nozzle. At start-up take a sufficient number of air shots to clear the barrel before resuming.
- For interruptions between 30 min and 2 hour decrease barrel temperature by 120-212° F, take two or three air shots leaving the screw in the forward position. At start-up, raise temperatures to proper settings and take several air shots prior to molding.
- For interruptions greater than 2 hour, purge the barrel with HDPE as recommended above.

6. Mold release

Sticking is uncommon in well-designed tools. However, if certain part geometries cause issues, a light application of standard release agents can be utilized

7. Troubleshooting

Poor surface finish or presence of bubble:

- Ensure that the material has been dried according to the recommended guidelines. Check process parameters and use dew point measurement tools to confirm proper drying.

Purging is recommended when the following phenomena occur,

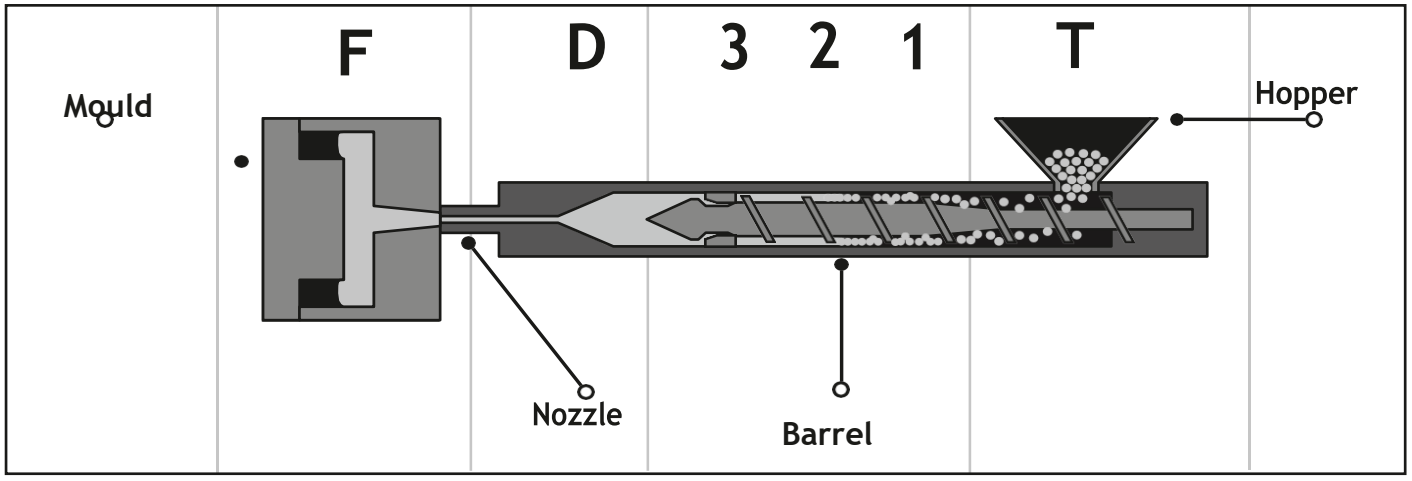
- Cross-linked gels and black specks are rapidly increased
- The color of the products is getting yellowish
- The extrudate is rapidly decreasing due to bad feed of the pellets
- The melt pressure or the screw torque is abnormally increasing

Finished products show surface defects, dimensional instability, or poor surface quality

- After being removed from the mold, ensure they are properly cooled and protected from excessive moisture absorption from ambient conditions.

Table 1: Injection Molding Process Parameters for ZX-200 family

Material	Zone Temperatures (in °C)						Melting temp. (in °C)
	1 - Feed	2 - Compression	3 - Metering	D – Barrel head	Nozzle	F - Mold	
ZX-200 ZX-200GF15 ZX-200T1 ZX-200T2 ZX-200T10 ZX-200T11 ZX-200T5 ZX-200T6 ZX-200T7	210	215	220	230	240	40-80	235~ 250
ZX-200SF	220	225	230	240	250	40-80	240~260



Material- / machine data ZX-200

Product Characteristics			
Properties	Unit	Test method	Values
Material Code	-	-	612
Colour	-	-	Beige
Density	kg / dm³	ISO 1183	1,25
Bulk Density	kg / dm³	Internal Standard	0,8
Melt flow rate MFR 240°C/2,16kg	g / 10 min	ISO 1133	4-8

Shrinkage			
Molding shrinkage (parallel)	%	Internal Standard	1,8-2
Molding shrinkage (normal)	%	Internal Standard	1,8-2,2

Drying			
Moisture, max.	%	-	0,2
Dryer temperature T (Dry air dryer or vacuum dryer)	°C	-	80
Drying time	h	-	4

Injection Molding			
Melt temperature range	°C	-	235-250
Melt temperature (optimal)	°C	-	240
Mold temperature range F	°C	-	40-80
Mold temperature F (optimal)	°C	-	60
Back pressure	MPa	-	0,45
Injection speed	-	-	medium
Injection pressure (depending on part and gate geometry)	MPa	-	4,9-9,1
Holding pressure (depending on part and gate geometry)	MPa	-	3,5-6,3
Thermal Properties			
Melting temperature	°C	-	220
Heat deflection temperature HDT (1,8 MPa)	°C	-	105
Vicat softening point	°C	-	210
Machine Settings			
Temperature hopper feed throat	°C	-	50-60
Barrel Head temperature 1 (feed zone)	°C	-	210-220
Barrel Head temperature 2 (compression zone)	°C	-	215-225
Barrel Head temperature 3 (metering zone)	°C	-	220-230
Barrel Head temperature D	°C	-	240-250
Melting temperature	°C	-	235-260
Screw speed	rpm	-	50-100

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