

# MedEco ICB, IGH

## Injection Molding Processing Information

### General Information

The processing parameters below are a good starting point. You can vary them depending on the specific requirements of your tooling, machinery and product.

It is advised to keep temperatures, shearing of the melt and processing duration rather low to minimize material degradation and maximize processability and mechanical properties. In tooling design, please plan for sufficiently large flow cross sections.

For support and optimization feel free to contact us anytime at [be-green@biovox.systems](mailto:be-green@biovox.systems).

### Preparation (1/2)

#### Storage

- ▶ Keep the material tightly closed in a dry and cool place (5 - 35°C).
- ▶ Keep away from heat and sources of ignition and avoid exposure to moisture, dampness.
- ▶ Do not store outdoors.
- ▶ Use material within 6 month after delivery.

#### Drying

- ▶ Dry the material with residual moisture control or for at least 6 hours at 50°C with a desiccant dryer (dew point at least -30°C, air speed 0.06 m<sup>3</sup>/min per kg/h).
- ▶ A moisture content of less than 0.10% (1000 ppm) is required, less than 0.07% (700 ppm) is recommended. The optimum is 0.02% (200 ppm).
- ▶ Avoid exposing the material to atmospheric conditions after drying; process immediately or store in closed containers.

#### Injection Molding Start-Up (1/2)

- ▶ Vacuum-out/clean hopper and air-suction system to avoid contamination.
- ▶ Clean/purge the barrel.
- ▶ Once the barrel has been cleaned, reduce barrel temperatures to the right set points (see page 3). Introduce the compounds into the barrel only after all barrel temperatures are at target set points.



**Avoid dwell times > 5 min of the material at temperatures above 190°C!**

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## Injection Molding Processing Information

### Preparation (2/2)

- ▶ The material can basically be processed in two different ways. The type of processing should be selected based on the required heat deflection temperature (HDT).

#### Injection molding, mold run-up, HDT <50 °C

- ▶ The mold temperature has a direct influence on the cycle times, but also on the strength and transparency of the component. Short cycle times and transparent components are achieved at 20-40°C. The highest strengths at 55°C.
- ▶ Start with moderate and long holding pressure. Crystallization takes time, but increases strength. Sink marks occur if the holding pressure is too short and too low. Carefully increase the holding pressure and holding time to eliminate sink marks.
- ▶ Start with a long cooling time. Rule of thumb for an initial setting: cooling time in seconds = wall thickness in mm x 10
- ▶ After the ramp-up phase, the process parameters can be gradually adjusted and optimized. **Do not leave the material in the heated screw for longer than 5 minutes.** If necessary, flush the material completely and restart the mold filling.

#### Injection molding, mold run-up, HDT >105 °C

- ▶ The mold temperature has a direct influence on the cycle times, but also on the strength of the component. Around 105°C (minimum 90°C) mould temperature, the fastest crystallization can be ensured in order to create enough stability for easy demoulding.
- ▶ **A mould temperature of at least 90°C should already have been reached** when the material is plasticized in the screw, otherwise the components cannot be demoulded.
- ▶ Start with moderate and long holding pressure. Crystallization takes time, but increases strength. Sink marks occur if the holding pressure is too short and too low. Carefully increase the holding pressure and duration to eliminate sink marks.
- ▶ Start with a long cooling time. For reliable full crystallization, start with a cooling time of 120 seconds and then reduce the cooling time in 15 second steps to less than 30 seconds.
- ▶ After the ramp-up phase, the process parameters can be optimized step by step.
- ▶ **Do not leave the material in the heated screw for longer than 5 minutes.** For the first trials with a long cooling time, check for discoloration of the material. If necessary, rinse the material completely and restart the mold filling.



**The parts cannot be demolded at a mold temperature of 60 - 85°C!**

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Injection Molding Processing Information

## Processing Information HDT < 50°C

Drying: min. 6h at 50°C

Parameter			Wert	Einheit
	min	max	soll	
Hopper Temperature	15	50	25	°C
Feed Zone Temperature	140	190	170	°C
Compression Zone Temperature	180	210	180	°C
Metering Zone Temperature	180	220	190	°C
Nozzle Temperature	180	220	190	°C
Mold temperature	10	55	40	°C
Screw Speed	190	210	195	°C
Injection Pressure				Low
Holding Pressure				Medium
Injection Speed	approx. 80% of injection pressure Switch at 95% - 98% filling			
Cooling Time				Medium
Hopper Temperature				Medium – Long

## Processing Information HDT > 105°C

Drying: min. 6h at 50°C

Parameter			Wert	Einheit
	min	max	soll	
Hopper Temperature	15	50	25	°C
Feed Zone Temperature	140	190	170	°C
Compression Zone Temperature	180	210	180	°C
Metering Zone Temperature	180	220	190	°C
Nozzle Temperature	180	220	190	°C
<b>Mold temperature</b>	<b>90</b>	<b>120</b>	<b>105</b>	<b>°C</b>
Screw Speed	190	210	195	°C
Injection Pressure				Low
Holding Pressure				Medium
Injection Speed	approx. 80% of injection pressure Switch at 95% - 98% filling			
Cooling Time				Medium
Hopper Temperature				Medium – Long

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## Injection Molding Processing Information

### Post-crystallizing (for increased heat stability)

Molded parts can be post-crystallized during or after injection molding. Post-crystallizing initiates a further crystallization of the material. The molded part will, depending on the intensity of the heat treatment process, become effectively heat stable to temperatures above 105°C (HDT-B).

Mechanical properties will change as well; please refer to the respective TDS.

#### Post-crystallization in the mould (wall thicknesses below 1.5 mm):

Thin parts can be post-crystallized directly in the injection mold. The mold temperature should be above 90°C for this purpose. The fastest crystallization occurs at 105°C, but may lead to problems during demolding. Depending on the part thickness, the crystallization time is about 8 - 30 seconds after the temperature of the melt has fallen below. For a campus plate D2 (ISO 294-3) with a thickness of 2 mm, the cooling time is 60 s at a mold temperature of 105°C.

#### Post-crystallization outside the mould (wall thicknesses over 1.5 mm):

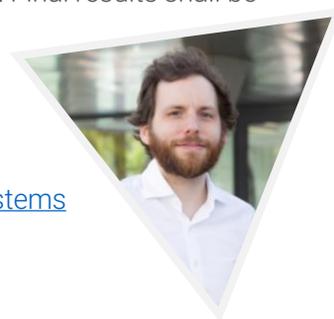
Post-molding annealing is the exposure of the part to temperatures around 110°C for 10 – 15 minutes (depending on the wall-thickness). Please make sure that there is no load on the part (during the annealing process, the material is softening) and that parts are not touching each other. Heat ovens or channels with circulating hot air are most suitable for mass production. After the direct annealing process, the material will further crystallize slowly. Final results shall be obtained after 24 – 48 hours.

Your direct support:

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