



## INJECTION BLOW MOLDING

Polypropylene polymers can and have been processed by injection blow molding. Typical melt flow can range from fractional melt to 35, depending on the polymer type and application. This guide provides guidelines to set up the injection blow molding process and describes potential problems and their possible causes when injection blow molding polypropylene.

Process Engineers resolving molding problems must consider the many variables and limitations of machine, materials and processes.

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## SUGGESTED HEAT PROFILES, HOLDING PRESSURES AND SPLIT TIMES

Zone 1, Feed	425 <sup>0</sup> F	220 <sup>0</sup> C
Zone 2, Compression	450	230
Zone 3, Metering	475	240
Zone 4, Nozzle	475	240
Zone 5, Manifold	480	250
Holding Pressure	300 lbs/in <sup>2</sup>	
Split/Hold Time	2 to 3 sec	
Cure Time	1.5 to 2.5 sec	
Preform conditioning temperature, thread lines	85-190 <sup>0</sup> F	30 to 90 <sup>0</sup> C
Preform conditioning temperature, body lines	220	105
Preform conditioning temperature, base lines	200	95

All preforms should have the same weight and fill at the same rate. Nozzle orifice can be used to balance the weight and fill time.

## PRODUCT TROUBLESHOOTING

### PREFORM AND BOTTLE

**Flashing (in preform molds) will show as a rough or ragged part line in blown bottle and as ragged edges on unblown preforms. This can be the result of:**

- (1) Melt temperature too high.
- (2) Preform mold temps too high
- (3) Injection pressure too high
- (4) Holding pressure too high
- (5) Clamping pressure is insufficient for mold size
- (6) Mold parting surfaces not flat and level (damaged mold)
- (7) Mold nozzles not seating properly
- (8) High-pressure preform time too long

**SHORT shots in preform molds will show as short necks of half-filled preforms. Common causes are:**

- (1) Loss of zone(s) heat in preform mold
- (2) Loss of heat in one or more extruder or manifold zones
- (3) Injection pressure too low
- (4) Loss of holding pressure
- (5) Drop off in screw RPM
- (6) Burnt or foreign material blocking nozzle orifice(s)
- (7) Nozzle freeze-off.
- (8) Inadequate low pressure preform time
- (9) Bridge of material in hopper feed zone

**MATERIAL sticking to preform core rods will show as pulls or stringing. Common causes are:**

- (1) Melt temperature too high
- (2) Preform mold temperature too high
- (3) Packing or holding pressure too low or high
- (4) Core rods too hot
- (5) Polymer internal lube too low
- (6) Split or cure time too short

**NECK folds, shoulder cuts or funnels will show as thick sections. This occurs at the point where the shoulder and neck meet. This is unblown material that has set up on the core rod with other material, usually from a lower part of the rod that has blown up over and around it. Cause of neck folds and shoulder cuts are:**

- (1) Neck zone temperature too cold
- (2) Melt temperature too cold
- (3) Injection pressure too high
- (4) Holding pressure too high
- (5) Holding time too long
- (6) Split and cure time too long

**NECK threads not filling will show as flat spots. Causes may be:**

- (1) Neck zone too cold
- (2) Melt too cold
- (3) Injection pressure too low
- (4) Holding pressure too low
- (5) Holding time too short
- (6) Poor venting in preform mold
- (7) Not enough blow pressure/time-in blow mold

**ROCKER bottoms show up as bulges in the container bottom. Cause may be attributed to:**

- (1) Insufficient exhaust time
- (2) Poor venting
- (3) Insufficient cooling time in bottom of bottle
- (4) Melt temperature too hot

**WARPED side walls and non-uniform shrinkage of bottles will appear as oval or banana rounds and concave panels on squares, oblongs, and oval. Common causes are:**

- (1) Not enough blow time or enough air pressure
- (2) Poor blow mold venting
- (3) Insufficient blow mold cooling
- (4) Melt temperature too cold
- (5) Preform temperature too cold

**POOR bottle surface will show up as “windows”, or “voids”, lace curtains, rounded “sharp” corners and poor surface definition. Poor surface is generally caused from:**

- (1) Improper blow mold surface finish
- (2) Not enough blow pressure or time
- (3) Preform body temperature too cold
- (4) Split or cure time too long

**POOR bottom gate area appearing as pinching, fisheyes, flash, tails are caused from:**

- (1) Too much decompress, RPM or time – fisheyes only
- (2) Not enough slug on preform bottom – fisheyes and holes
- (3) Too much slug on bottom of preform – tails
- (4) Not enough decompress, RPM, or time – drool and tails
- (5) Bottom zone too cold
- (6) Manifold too hot – fisheyes; too cold – tails
- (7) Not enough external tip cooling – fisheyes
- (8) Not enough pack time, cure time, or hold time

**Pigtails or solid plastic screws in hopper only result from decompression settings. General causes are:**

- (1) Too high reverse RPM
- (2) Too much decompress time
- (3) Water cooling jacket in feed throat not functioning properly

**Please call your Technical Service Representative  
if you have any questions**