

8 A GUIDE TO POLYETHYLENE BLOW MOULDING

BLOW MOULDING TROUBLESHOOTING GUIDE

Problem/Issue	Causes	Potential Solutions/Actions
Bottle Blow-outs	Contamination	Check for contamination in resin and regrind.
	Moisture	Check resin for presence of moisture.
	Bridging in extruder feed section	Increase rear barrel zone temperature slightly to prevent voids forming in the melt.
	Damaged moulds	Repair mould edges and pinch-offs to prevent holes forming along the seam.
	Fill pressure too low (applicable to reciprocating screw blow moulding machines)	To prevent air entrapment, increase fill pressure until drooling occurs at dies, then reduce pressure a little until drooling just stops.
	Mould closing speed too fast	Reduce mould closing speed to prevent formation of weak welds at the seams which may split when the bottle is trimmed and/or use clamp pause.
	Pinch-off too sharp or too hot	Increase pinch-off land width so that it does not cut parison. Increase cooling in pinch-off area.
Bottle Volume (Too low or too high)	Bottle weight incorrect	Check bottle weight every hour and maintain to target.
	Cycle time	Faster cycle times may increase parison and bottle temperatures and result in greater shrinkage.
	High pressure blow psi setting	Should be at recommended setting to insure good contact of parison with the mould surface and consistent cooling.
	Poor parison/mould contact	Clean mould vents Increase high pressure blow psi setting.
	Extruder profile temperature	A higher stock temperature will result in higher parison and bottle temperatures and result in greater shrinkage.
	Mould temperature	A higher mould coolant temperature will result in a higher bottle temperature and greater shrinkage.
	Storage temperature	Higher ambient bottle storage temperatures and longer storage times will result in greater shrinkage.
	Annealing conditions	Higher annealing temperatures and slower belt speeds will result in greater shrinkage.
	Mould volume incorrect	Resize mould.
	Volume inserts	Install or remove volume inserts.
Bubbles	Moisture in resin	Reduce cooling in feed throat if condensation is occurring here. Check for moisture in resin and ensure resin handling system is water tight.
	Bridging in extruder feed throat	Increase rear barrel zone temperature slightly.
	Fill pressure too low (applicable to reciprocating screw blow moulding machines)	To prevent air entrapment, increase fill pressure until drooling occurs at dies, then reduce pressure a little until drooling just stops.
	Worn screw and/or barrel	Screw and/or barrel may need to be replaced.
Contamination	Dirty regrind	Keep contaminants out of regrind; isolate regrind.
	Hopper magnets fully loaded	Clean hopper magnets regularly.
	Dust	Install filters on air intakes and clean regularly.
	Contaminated resin	Check for dirt, dust or other contamination in the resin.

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Die Lines	Contamination or degraded resin	Lower mandrel and purge, or if contamination is adhered, remove tooling and clean. Check for foreign matter in virgin resin and in regrind.
	Low melt temperature	Check heaters and controllers, adjust so that stock temperature is in the recommended range.
	Damaged die or mandrel	Replace tooling if scratches or nicks are present.
Indented Parting Line	Blow air pressure too low	Increase blow air pressure.
	Air entrapment	Clean mould vents.
	Moulds not closing completely	Increase clamp pressure
		Reduce blow air pressure
		Check mould alignment or damage that may prevent moulds closing
		Clean mould faces
	Increase preblow cushion time.	
Mould temperature too high	Check mould cooling, especially around parting line Reduce mould temperature.	
Melt temperature too high	Reduce feed zone temperature Reduce die tip temperature.	
Neck Finish	Incorrect bottle weight	Underweight bottles can result in improper shearing and overweight can cause neck finish trimming issues.
	Blow pin alignment or damage	Align blow pin centrally and at the correct elevation or replace if damaged.
	Damaged shear steels	Replace shear steels.
	Damaged pinch-off lands in thread area	Replace pinch-off lands.
	Moulds misaligned	Check and replace mould pins and bushings.
Parison Swing or Hooking	Incorrect die adjustment	Centre the die and ensure parison bolts are tightened.
	Off-centre pressure ring	Centre the pressure ring.
	Die temperature variation	Check head and manifold heaters and controllers, ensure die tip heaters are turned off after startup.
(parison swing at start-up is normal)	Air currents	Shield parisons from air draughts.
	Dirty die/mandrel	Clean the die gap.
Poor Weld at Pinch-off/ Weak Seams	Melt temperature too low	Increase melt temperature.
	Melt temperature too high	Reduce melt temperature.
	Mould close speed too fast	Reduce mould close speed; introduce a clamp pause.
	Mould temperature too high	Reduce mould temperature.
	Pinch lands damaged	Refurbish or replace pinch lands.
	Moulds not closing completely	Check mould alignment or damage that may prevent moulds closing
		Clean mould faces.
	Flash volume too large or too small	Reduce or increase flash volume.
Excessive preblow or high pressure air too high coming on too early	Reduce preblow air and/or increase blow delay time.	

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Rough Surface on Bottle	Moisture condensation on moulds	Dry the mould cavities or reduce humidity in moulding room.
	Blow air pressure too low	Increase blow air pressure
		Check for leakage around neck rings, shear steel and blow pins.
		Inspect pneumatic system including air regulator, valves and air filter.
	Inadequate mould venting	Inspect and clean or repair mould vents.
Melt temperature too low	Increase melt temperature.	
Variable Parison Lengths	Bottle weight	Ensure weights are adjusted to target. If all bottle weights are varying, check shot pressure and accumulator precharge.
	Choke adjustment	Tail lengths can be changed by adjusting the chokes.
	Extruder screw rpm	Output is controlled by the screw rpm. Increase speed if tails too short and vice versa.
	Barrel and/or screw wear (over-riding temperatures)	Replace barrel and/or screw.
	Virgin/regrind ratio and consistency	Ensure consistent blending of virgin and regrind resin.
	Surging	Check for resin melting in barrel throat and ensure proper cooling.
	Incorrect temperature profile	Check heaters and controllers, adjust so that stock temperature is in the recommended range.
	Uneven head temperatures	Check temperatures, heaters and controllers.
	Incorrect tension in V-belts	Tighten or replace V-belts.
	Dirty hydraulic oil filter	Replace oil filter.
	(varying tail lengths at start-up is normal)	Worn seals, excessive oil by-pass in shot cylinder
Worn thrust bearing centering bushing		Replace the centering bushing.
Webbed Handles	High melt temperature	Reduce melt temperature to increase parison swell.
	Preblow air pressure too low	Increase preblow air pressure, increase preblow time.
	Parisons hooking	Adjust die to straighten parison.
	Air currents	Shield parisons from air draughts.
	Mandrel sleeve incorrectly positioned	Adjust sleeve to the full up position.
	Mould/head alignment incorrect	Realign mould to catch the handle.
	Low shot pressure	Check the Manitrol valve for proper setting.
		Check the shot cylinder for leaks around seals and rings.
		Check hydraulic pump for worn parts.
	Pneumatics issue	Check for low charge in nitrogen accumulator – if charge is lost, check for broken or leaking nitrogen bag.
Check that the air lubricator is dispensing the correct amount of oil		
Check that the preblow air regulator diaphragm is not ruptured or has a dirty seat		
Ensure that the Ross valve is clean.		
	Check for dirt or faulty electrical connection in high/low pressure selector valve spool.	

Disclaimer

The proposed solutions in this guide are based on conditions that are typically encountered in the manufacture of products from polyethylene. Other variables or constraints may impact the ability of the user to apply these solutions. Qenos also refers the user to the disclaimer at the beginning of this document.