

PROBLEM

Cause

- remedy

NOZZLE DROOL

Material is wet:

- Use dried material ($\leq 0.02\%$ moisture)

Melt temperature too high:

- Check melt temperature
- Reduce nozzle temperature
- Reduce cylinder temperature
- Reduce residence time in cylinder
- (shorter cycle time) or use smaller barrel size
- Reduce screw speed

(Back) pressure too high:

- Reduce back pressure
- Use screw decompression

Wrong nozzle design:

- Improve temperature control of nozzle
- Use nozzle with smaller orifice-diameter
- Use nozzle with heating band

NOZZLE FREEZE-OFF

Temperature too low:

- Increase nozzle temperature
- Retract nozzle from mould after plasticizing

Wrong nozzle design:

- Improve temperature control of nozzle
- Use nozzle with larger orifice diameter
- Use nozzle with heating band

NOZZLE SPITTING

Degradation of material leads to gas formation

- Use dried material ($\leq 0.02\%$ moisture)
- Reduce melt temperature

MOULDING CONTAINS UNMOLTEN GRANULES

Insufficient energy input

- Increase barrel temperature
- Increase back pressure
- Increase screw speed
- Increase barrel size
- Use Barrier screw

SCREW SLIP

Low friction or premature melting:

- Reduce temperature to hopper side
- Preheat granulate
- Decrease back pressure
- Decrease screw speed
- Purge to cool down

SHORT SHOTS

Insufficient material:

- Check hopper content
- Adjust feed setting
- Check the transfer point

Insufficient flow:

- Check melt temperature: if necessary increase temperature
- Increase injection pressure/speed
- Increase diameter of gate, runner, sprue and nozzle orifice
- Increase venting
- Use more gates

FLASH

Insufficient locking force:

- Increase clamping force
- Reduce injection speed/pressure
- Use profiled injection speed/pressure
- Check transfer point
- Reduce holding pressure
- Reduce melt temperature

Overpacking

- Reduce feed setting
- Reduce injection speed
- Check the transfer point
- Reduce holding pressure
- Check if mating area is clear

Mould problems

- Clean or enlarge vent
- Check parting line
- Check for wear in mould

SINK MARKS AND/OR VOIDS

Too much shrinkage

- Increase holding time
- Increase holding pressure
- Decrease injection speed for thick sections
- Increase injection speed for thin sections
- Increase mould temperature

Mould problems

- Increase diameter of gate, runner, sprue and nozzle orifice
- Change position of the gate towards thickest section
- Use more gates

WELD LINES, FLOW LINES

Incomplete mixing of two melt fronts

- Increase injection speed
- Increase holding pressure and time
- Improve venting at weld area
- Increase melt temperature
- Increase mould temperature
- Add an overflow well at the weld line area
- Change position of the gate to move weld line to less critical area

- Increase diameter of gate, runner, sprue and nozzle orifice
- Large cold slug in sprue/gate area

Air traps

- Decrease injection speed
- Improve venting
- Improve flow
- Change location of the gate

BURN MARKS

Diesel effect due to compressed air

- Improve venting
- Decrease injection speed
- Decrease melt temperature
- Change location of the gate

DELAMINATION

Melt temperature too low

- Increase melt temperature
- Increase mould temperature
- Increase injection pressure/speed
- Increase diameter of gate, runner, sprue and nozzle orifice

Contamination of the granules with other polymers

- Purge the cylinder
- Use clean virgin granulate

SILVER STREAKS, SPLAY MARKS

Wet material

- Use dried material ($\leq 0.02\%$ moisture)

Streaks in gate area

- Polish the gate/sprue surface

Degraded material:

- Reduce residence time (cycle time) or use a smaller barrel
- Reduce melt temperature (check nozzle temperature)
- Reduce screw speed
- Reduce back pressure
- Increase gate diameter

- Reduce injection speed/pressure
- Avoid/minimize decompression

Air trapped in the melt

- Increase back pressure
- Reduce screw speed
- Reduce injection speed/pressure
- Reduce temperature in rear zone
- Improve mould venting

Air bubbles on surface

- Increase back pressure
- Reduce screw speed
- Reduce injection speed/pressure
- Reduce temperature in rear zone
- Improve mould venting

DISCOLORATION, BROWN STREAKS

(Locally) Overheated material

- Check for dead spots; nozzle and/or hot runner and non-return valve
- Reduce residence time (cycle time) or use smaller cylinder
- Reduce melt temperature
- Check injection unit for wear, causing excessive shear
- Check for contamination, also drier, hopper etc.
- Reduce injection speed
- Reduce decompression

Contamination of the granulate

- Clean injection unit
- Use clean virgin granulate

STREAKS

Contamination of the granulate

- Clean injection unit
- Use clean virgin granulate

(Locally) Overheated material

- See: discoloration, brown streaks

Too low melt temperature

- Increase cylinder temperature especially at hopper side

BRITTLINESS

Degraded material

- Reduce residence time (cycle time) or use smaller cylinder
- Reduce melt temperature
- Reduce screw speed
- Increase diameter of gate
- Reduce amount of regrind

Too cold material

- Increase melt temperature

Wet material:

- Use dried material ($\leq 0.02\%$ moisture)

Internal stresses

- Reduce holding pressure
- Check the transfer point
- Increase mould temperature

Non-homogeneous melt

- Increase back pressure

Contamination of the granulate

- Check for contamination

Design problems

- Avoid sharp corners, apply radii

DULL SURFACE

Incorrect mould finish

- Improve mould surface
- Increase injection speed
- Increase mould temperature
- Reduce thermal hot spots in mould (opposite gate)
- Polishing of the gate surface
- Increase melt temperature
- Increase holding temperature

MOULD RELEASE PROBLEMS

Overpacking

- Reduce injection speed
- Reduce melt temperature
- Check the transfer point
- Reduce holding temperature/time

Mould design problems

- Check for mould damage or undercuts
- Use more draft angle
- Change mould temperature
- Weakness of mould (bending)
- Apply more and large surface ejector pins

WARPAGE

Differential shrinkage

- Adjust mould temperature of each mould half (high mould temperature = high shrinkage)
- Assure uniform wall thickness
- Increase cooling time
- Reduce holding pressure

Internal stresses

- Reduced holding temperature
- Reduce holding time
- Check the transfer point
- Increase mould temperature
- Use high flow grades

Contact

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