PLASTIC AUTOMOTIVE TEAM 4

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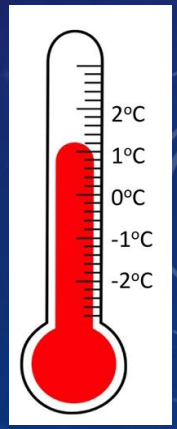
STUDY CASE - 2D

- You are producing injection molded rear mirror holders made out of PP, but the part is showing several problems: one of them seems to be that shows a charcoal like edge, show some silver-like splashe and an undesirable welding line.
- How could you solve the problem?

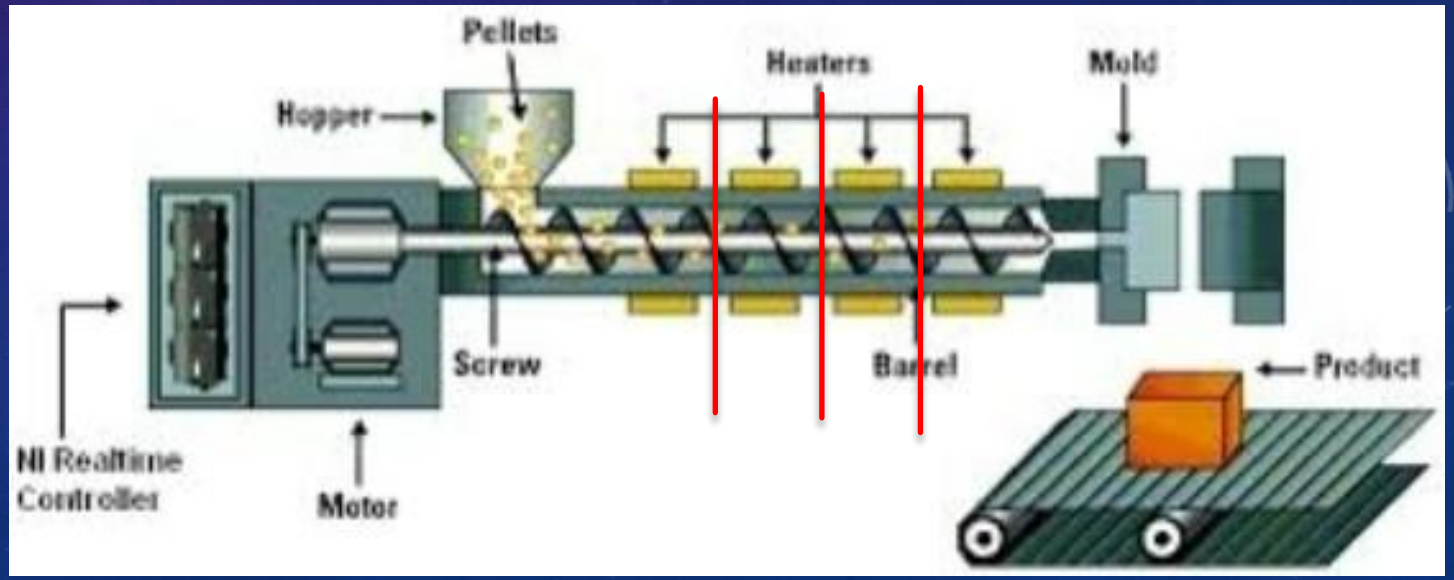
MAIN FACTORS THAT CAN PRODUCE THAT PROBLEMS

1. Temperature and pressure are high
2. Final stage process; Open mold and eject part.
3. Bad maintenance of the mold
4. Ejecting part (key parameter whenever the material is removed)
5. Temperature difference into the union line (pressurize plastic melt and inject into mold cavity).
6. Design parameters of the machinery (injection point)



POINTS TO SOLVE THE PROBLEMS

- To monitor the flux velocity of the equipment
- To control temperature and pressure
  - During all the process.
  - That all stages of the machine have the same temperature (not differences between parts).
- To take care when the piece is removed from the mold
- To control the stress in the piece when manipulated
- To control impurities in the environment, especially during filling of the equipment and at the time of extrusion



CLASS DISCUSSION

1. When injecting polymer into a mold, air needs to escape the mold by small windows (aka. vents). The air escaping process is known as venting. If the air doesn’t escape fast enough, pressure builds up inside the mold. Polymers (aka. hydrocarbons) under pressurized conditions heat up and the "diesel effect" takes place, carbonizing some of the polymer. The result are **charcoal-like edges** in the final product.
2. **Splashes** happen when the in-line pressure of the mold clamps fail, causing the polymer melt to 'splash' outside its confined space.
3. If the material is humid, the final product will present **shinny (silver-like) surfaces**, as water will try to escape the part. Water vapor will stretch the part surface at different locations.
4. The **welding lines** are prevented by ensuring the connecting parts to fuse at the same temperature. The difference in temperature causes a difference in density yielding a visible welding line. Visible welding lines are prone to break, as they are weak joints. Another workaround is to redesign the mold in such a way that the joint is hidden within the final part.