Parting Line Best Practices for Injection molded parts

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What is Zero Parting Line Execution?

- Primarily a Design Standard in providing surface and parting lines that encourage better tooling conditions for parting lines.
- Secondarily a Standard to build tools. Build tools that are robust and easier to create better parting lines, as well as tool build quality standard.
- Lastly it is a part quality standard. Because of the part and tool design and build requirements the production part will have the Zero parting line qualities with proper care of the tool.
Parting Line Definitions

**Parting Line**

Parting Line is defined as the point at which the core and cavity sides of the mold meet and subsequently to form the separation point of the tool.

**Flash**

Flash is defined as excess material formed where the core and cavity meet resulting from the core and cavity not being properly shut-off leaving a gap for the plastic to fill or flow into. (or rolled edges on steel)

**Die Mismatch**

Die mismatch is defined as an offset condition between the core and cavity sides of the mold.

NOTE: Parting lines caused by mechanical mechanisms such as lifters, slides or cams must meet the requirements of this standard.
Ideal Condition

Core/Cavity mismatch

Max Allowable mismatch .05mm

Flash

Flash not acceptable

Ungrained parting line will die lock grained area if not removed to depth of grain

Grain masked incorrectly

Grain
Parting Line Best Practices for Injection molded parts

1. The Best Practice for any part is that the parting line should be completely non-visible and non-tactile.

2. When the split line is on a tactile surface the plastic parts used for texture kick off need to have no tool mismatch. Corresponding tool may have a mismatch up to 0,05mm. If needed by toolmaker the cad model can have a 0,1mm mismatch.

3. When cavity and/or core sliders have the same texture of the cavity then they have to be textured together with the cavity with no interruption of the texture.

4. In case of big cavity sliders (as in floor console) a groove can be accepted if properly designed.

5. When the split line is on a non-visible and/or non-tactile the tool mismatch is by default of 0,1mm. Upon request it can be modeled up to 0,2mm.

6. When cavity and/or core are textured independently the texture can be limited up to a max of 0,38mm from the edge. The 0,38mm band is a free etched area.

7. Parting line should be on a flat surface (within 1mm of the tangent) and not on a radius or corner/peak (See Slide 8) or executed with a slide to allow for full grain depth, minimize mismatch, and allow graining and benching of slide-cavity parting line as assembly. (see Slide 11). Parting lines on a radius are more difficult to maintain a smooth cavity-to-core match and will cause more flash on a part on a production basis.
Archetype solution #1

visible split line

0,38mm max of free etched band when the depth of the texture is > 45µm

Aesthetic result:
- The texture can be limited up to a max of 0,38mm from the edge.
- Visible split line.
Archetype solution #2

texture interruption

visible and tactile split line

from 0 to max 1mm

Minimum draft required for texturing

0,38 max

Not textured area (free etched)

from 0 to max 1mm

Design surface

Minimum draft required for texturing

0,76 max

Try to reduce the cusp to a minimum to improve the tactile feeling

Aesthetic result:
- Shape with cusp;
- Texture interruption (max 0,76 mm free etched).
- Visible and tactile split line.
Archetype solution #3

In case of big cavity sliders (as in floor console) a groove can be accepted if properly designed.

Aesthetic Result:
- Texture interruption. The texture on the cavity can be limited up to a max of 0.38mm from the edge.
- Groove presents on the component
Archetype solution #4

Aesthetic result:
- Shape with cusp and mismitch of 0,1/0,2 mm.
- Texture interruption (max 0,76 mm free etched).
- Visible and tactile split line.

When the split line is on a non visible and/or non tactile the tool mismatch is by default of 0,1mm. Upon request it can be modeled up to 0,2mm.
Archetype solution #5 (Zero Parting Line Slide Execution with sliders)

Tooling Archetype for parting line built with a slider without stopping the graining.

- **Slide plates**: It contrasts and locks the slider during the moulding phase. To be unlocked before opening the mould.
- **SLIDER**: Screw needed to fix the slider to the cavity during texturing process.
- **LIFTER**: are used for relieving undercuts.
- **PIN**: delayed for relieving the cavity before opening the slider.
- **To be determined by styling**: Minimum draft angle required for texture.
- **Slide to Cavity interlock**: 100% shot off all faces.

Tooling Archetype for parting line built with a slider without stopping the graining.
Archetype solution #5 (Zero Parting Line Slide Execution with sliders)

Aesthetic Result:
- Shape without cusp;
- Not texture interruption;
- Not visible and tactile split line.
Archetype solution #6 (Zero Parting Line without stopping the graining with cusp)

Tooling Archetype for parting line built with a Stationary insert without stopping the graining but with a cusp

Parting line with draft angle limit

LIFTER are used for relieving undercuts

Stationary insert

1- Pins and bushings have to be used in order to align the insert with the cavity for the texture process.

2- Pins have to be used in order to place the insert on the core before the fixing phase in order to garantuee the right alignement.

3- the pins have not to be used during the moulding phase.
Archetype solution #6 (Zero Parting Line without stopping the graining with cusp)

Fix stationary insert on cavity looking pockets for the texture process grain

Fix stationary insert on core with the Pins and bushings for align

Aesthetic Result:
- Shape with cusp;
- Not texture interruption;
- Not visible and tactile split line.
Recommended Tool Maintenance

• Prevent closing on part
  • Robot grip sensors in use on part and runners, stop press if part and runners do not make it out of press with robot.
  • Consider sensors on core to ensure part is clear in manual mode.
• Use care when doing maintenance on tool
  • Prevent chains, bolts, pillars from dinging parting line.
• Normal maintenance applies:
  • Clean tool daily or by shift
  • Grease side locks, leader pins, slides and lifters regularly
  • Inspect side locks, leader pin bushings, wear plates and gibbs regularly and replace when wear is measured. (Do not wait for parting line issues to appear to replace).
• Ensure Tool halves are parallel when mounted in Press, ensure that Platens are parallel and there is not excessive sag or tie bar wear.