Effect of Static Mixers SMN and SMB on Injection Molding and Extrusion Processes

Type of flow pattern

- Streaks in direction of flow
  - Characteristics: Installation of SMN Mixing Nozzle
  - Corrective actions: Mixing in radial direction, perpendicular to flow direction

- Streaks perpendicular to direction of flow
  - Characteristics: Corrective actions assisting mixing in axial flow direction, e.g.:
  - Changing dosing ratio of colorant
  - Increasing back pressure

Pattern of concentration distribution

- without mixer SMN / SMB
  - Reduction of C average by ΔC
  - Savings of color and/or additives
  - Better homogenization of regrind and mixing of virgin polymer with regrind
  - C max, C average, C min

- with mixer SMN / SMB
  - C max, C average, C min

Injection Molding

- Polymer melt with large ΔT (without mixer SMN/SMB)
  - Asymmetrical filling, uneven cooling
  - parts with distortion and weight differences, high reject rate

- Polymer melt with narrow ΔT (with mixer SMN/SMB)
  - Symmetrical filling and even cooling
  - parts without distortion and of constant weight, small reject rate

Extrusion

- Uneven plate thickness
  - Time consuming adjustment
  - High reject rate during start-up

- Uniform plate thickness
  - Adjustment in short time
  - Small reject rate during start-up

Legend:
- polymer melt of high temperature
- polymer melt of low temperature
- polymer melt of uniform temperature
- SMN Mixing Nozzle
- SMB Melt Blender
- flow direction