

ENGEL Sustainable Packaging Performance

Packaging is an integral part of the ENGEL strategy



Founded 1945



100% Family Owned



6.900 Employees



€70 MM R&D



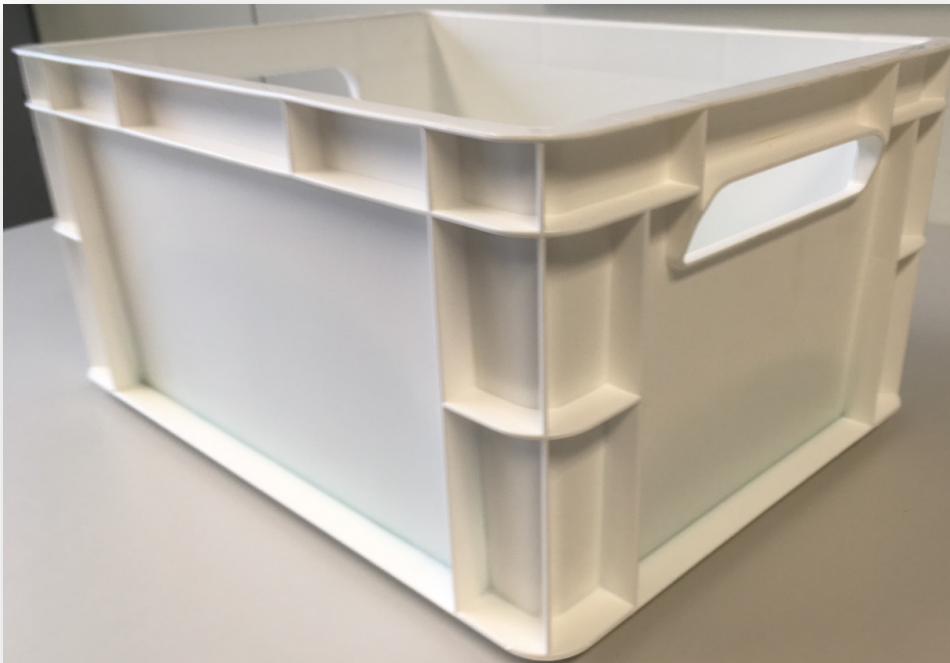
Packaging



Multilayer Molding

K 2019 exhibit

- Skin material: PP
- Core material: PP, recycled material
- Core portion: 45%
- Part weight: 1025 grams
- Core visible at gate and part bottom



Multi-layer Pail

Collaboration, Encapsulation, Launch



Market
and
materials

Machine,
robot and
process

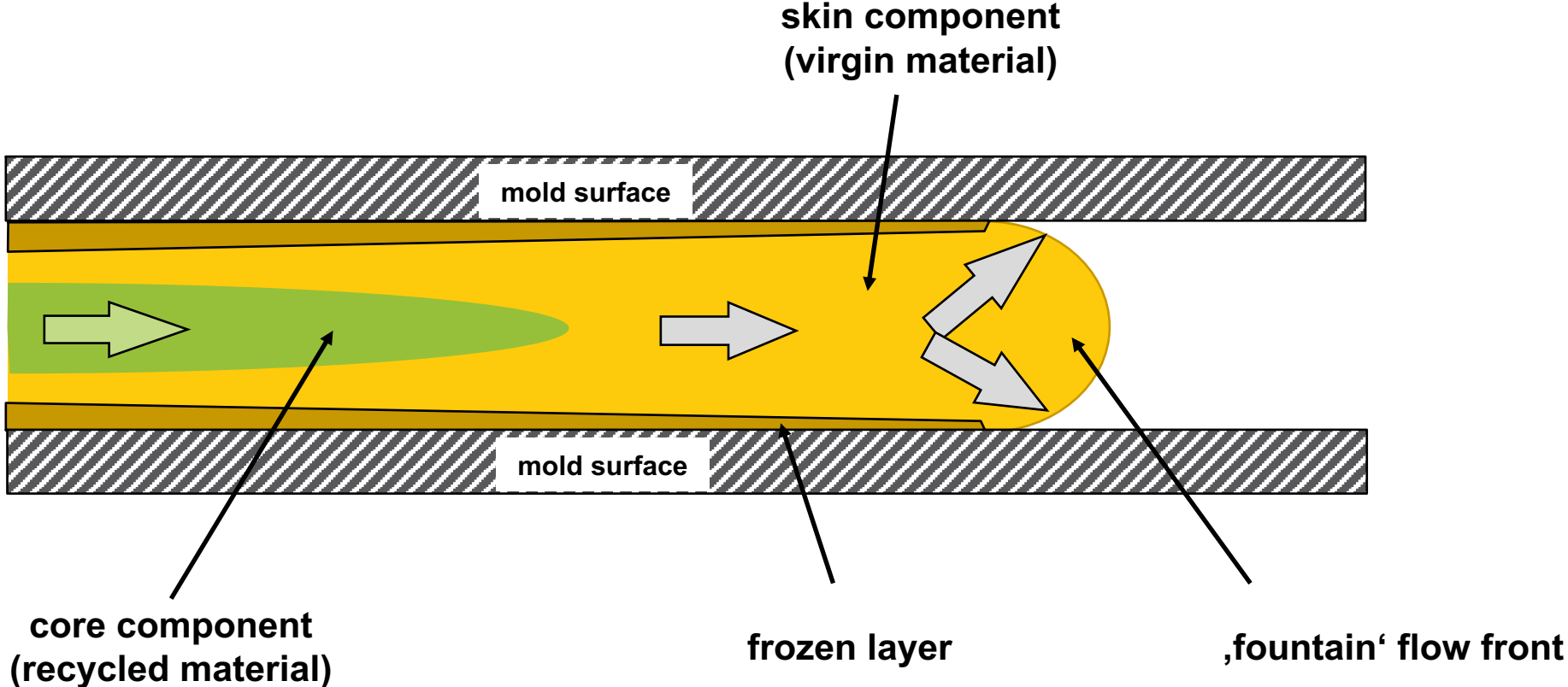
ENGEL

Mold, hot
runner, and pilot
facility

TCM
TOP GRADE MOLDS

Laminar Flow of Polymer

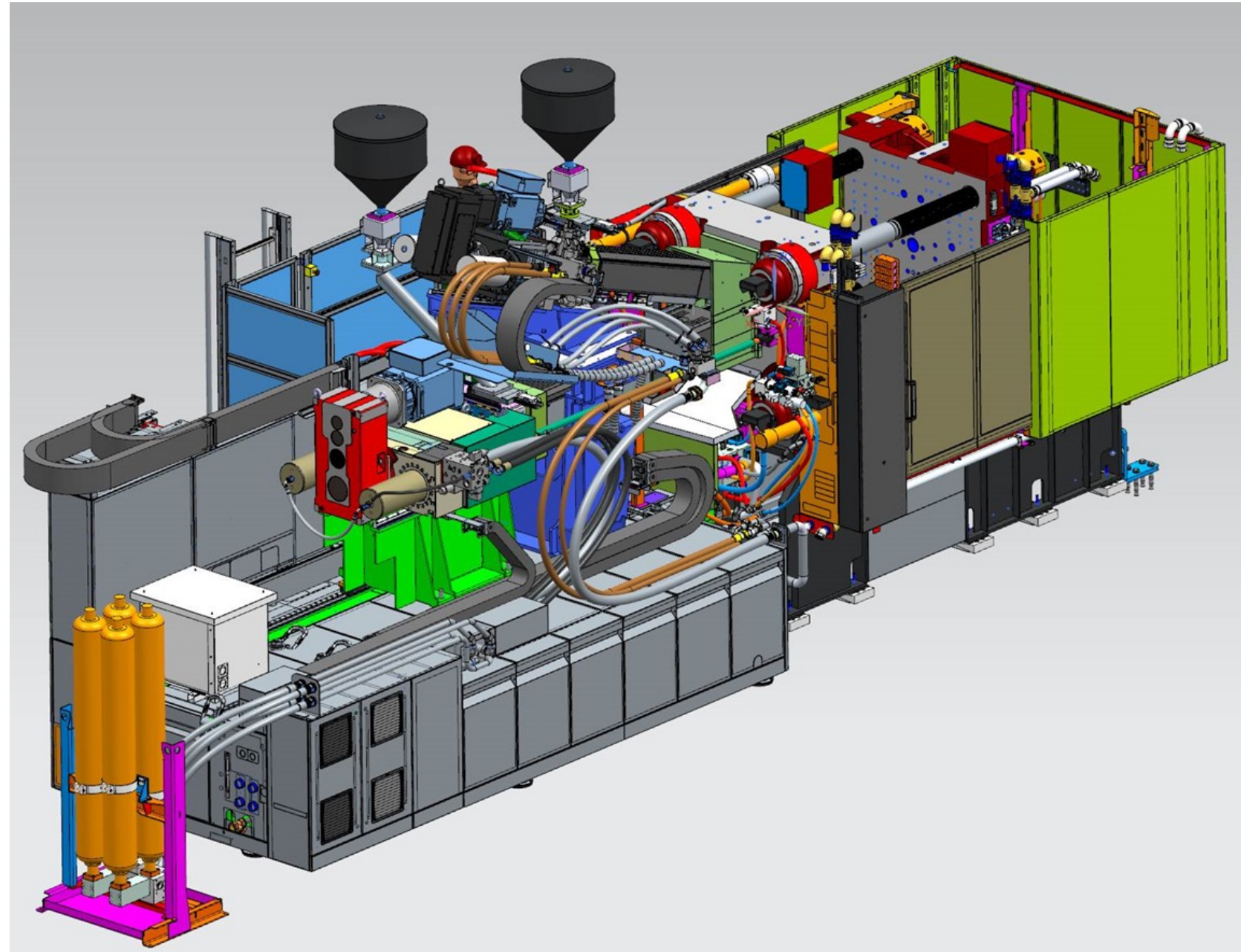
Multilayer by Skinmelt or Coinjection



Co-injected Pail

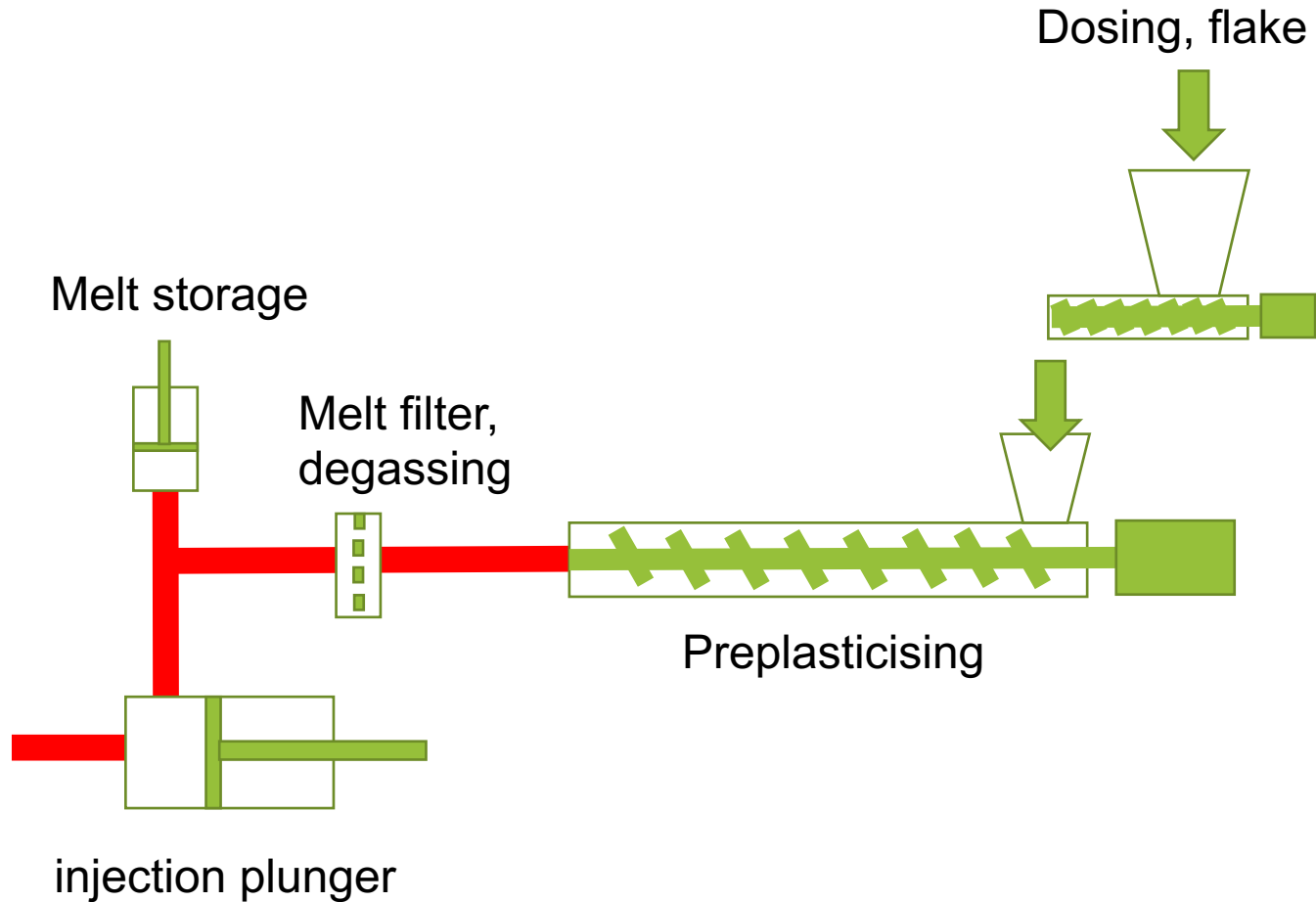
TopGrade pilot facility

- Inline injection unit for the skin material
- Piggyback injection unit for the core
- Run either a coinjected or standard pail mold
- 35-40% machine premium



Processing Recycled Material

Assembly kit for recycling solutions



iQ weight control compensates viscosity variations

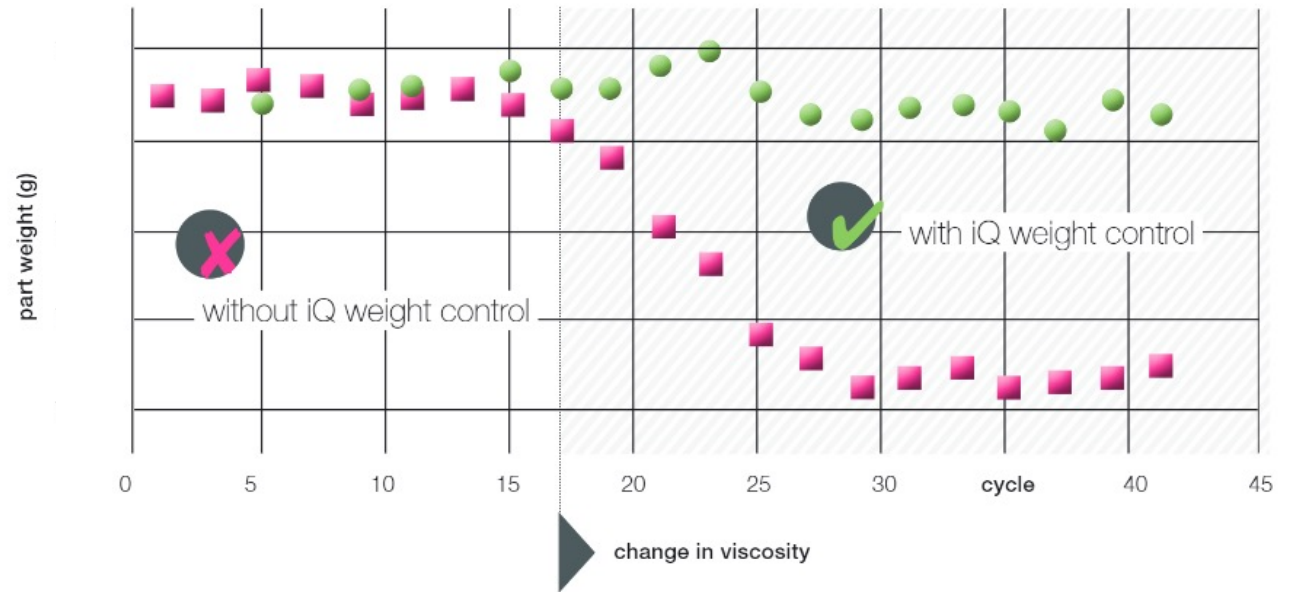
PCR material requires a different process control

ENGEL e-mac 220

Product: 4 cav lid
Material: PCR content - rPP
Weight: 8.9 gram per part
Cycle time: 5.5 sec

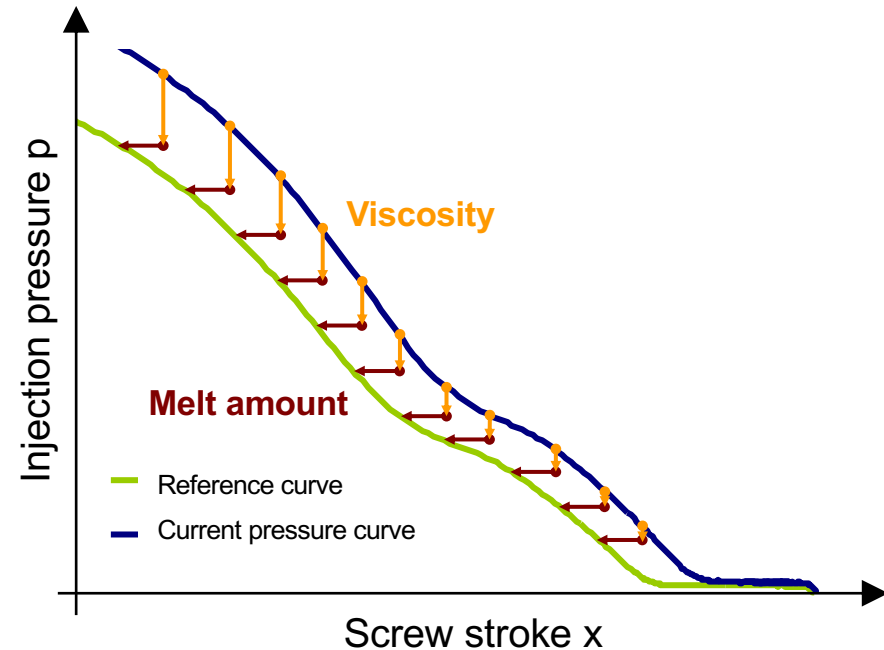


Shot weight inconsistency triggered by viscosity variation of PCR material



iQ weight control - injection

The deviation from the reference curve is split up into contributions of **melt amount** and **viscosity**



iQ clamp control

Mold breathing – the basis for iQ clamp control

what is mold breathing?

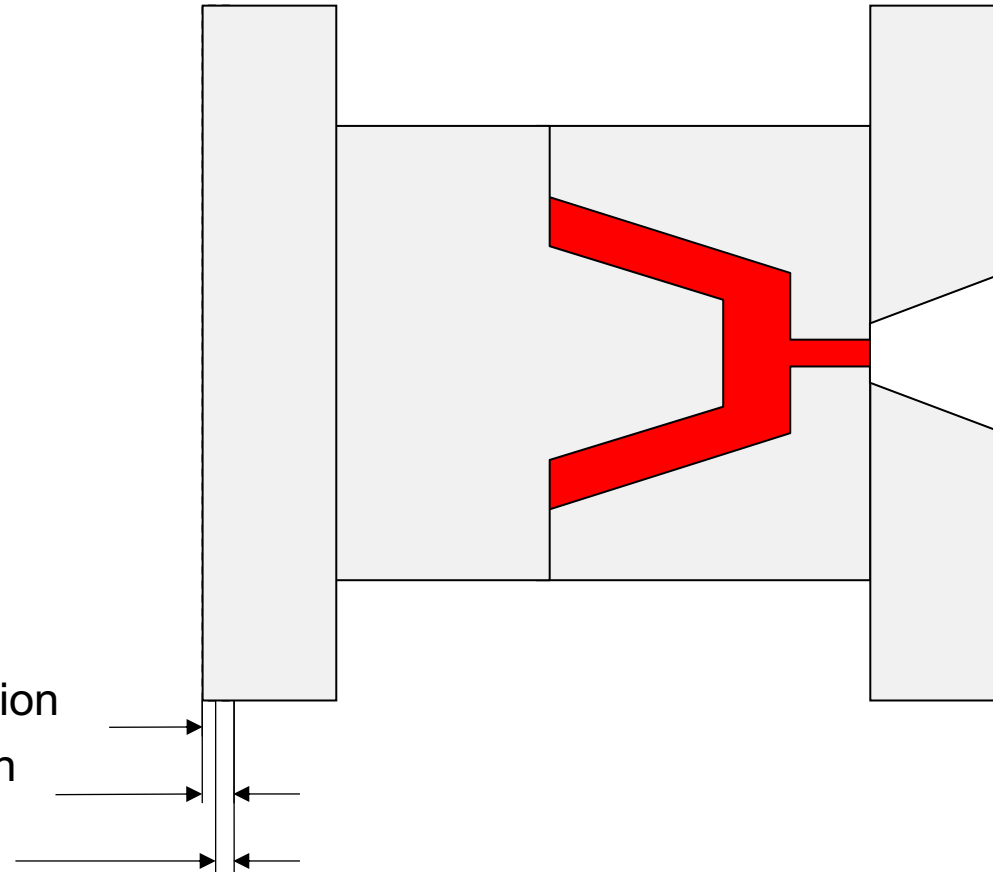
clamp force build up: mold compression

holding phase: partial resetting of mold compression by the **cavity pressure**

mold closed position

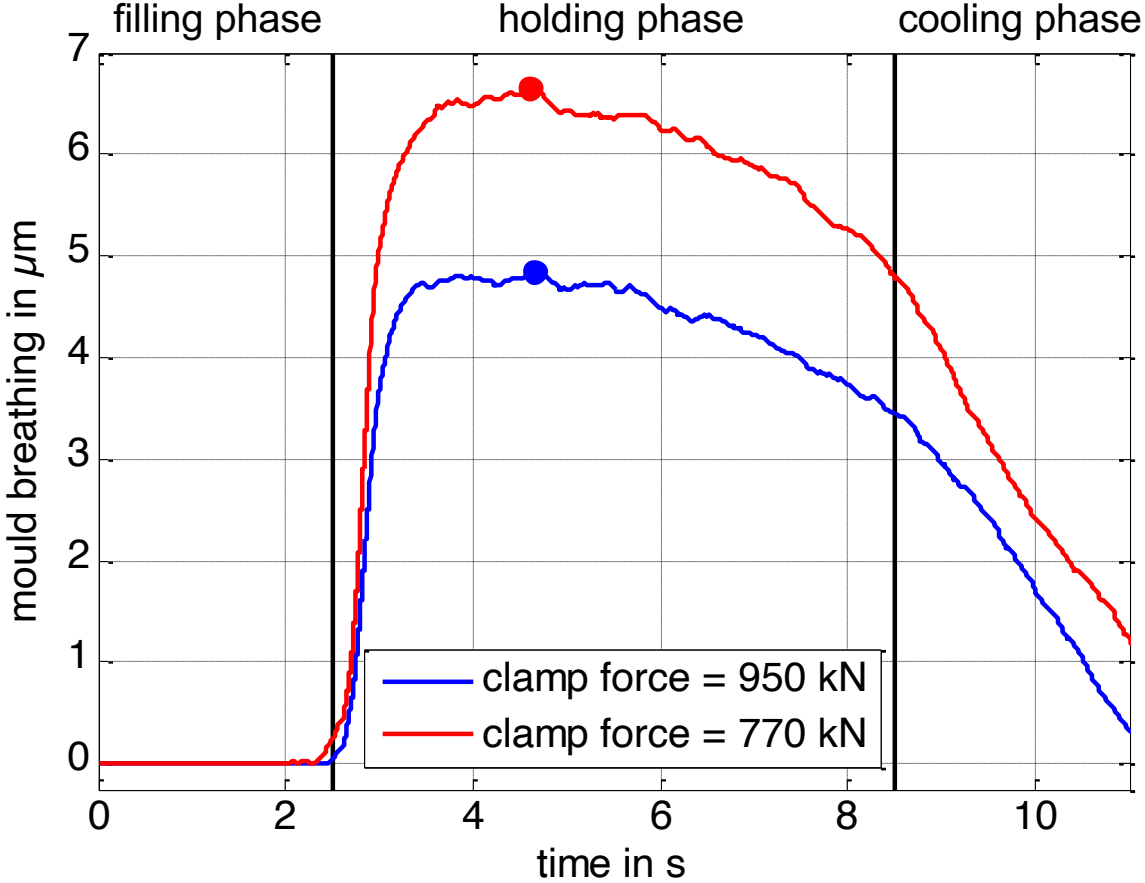
mold compression

mold breathing



iQ clamp control

Mold breathing



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Thank you for your attention

www.engelglobal.com