

ENGEL sim link®

Connecting two worlds:

Simulation and production

06/2022

ENGEL



MFS
Software | Service | Solutions

About ENGEL

Our world is injection moulding

We are one of the leading plastics machinery manufacturers and offer injection moulding machines for any kind of application, innovative technologies, robotics and customized system solutions from a single source. We are world market leader in generating added values and are 100% customer orientated.



About ENGEL

Facts & figures



Founded 1945 in Austria by Ludwig Engel



1,5 billion Euro turnover worldwide (FY 21/22)



100% family-owned in the 4th generation



over 500 Mio. Euro Investment volume (FY 2018 – 2022)



7,000 employees worldwide (FY 21/22)



70 Mio. Euro R&D investment per year

About ENGEL

Expertise around the world and close to home

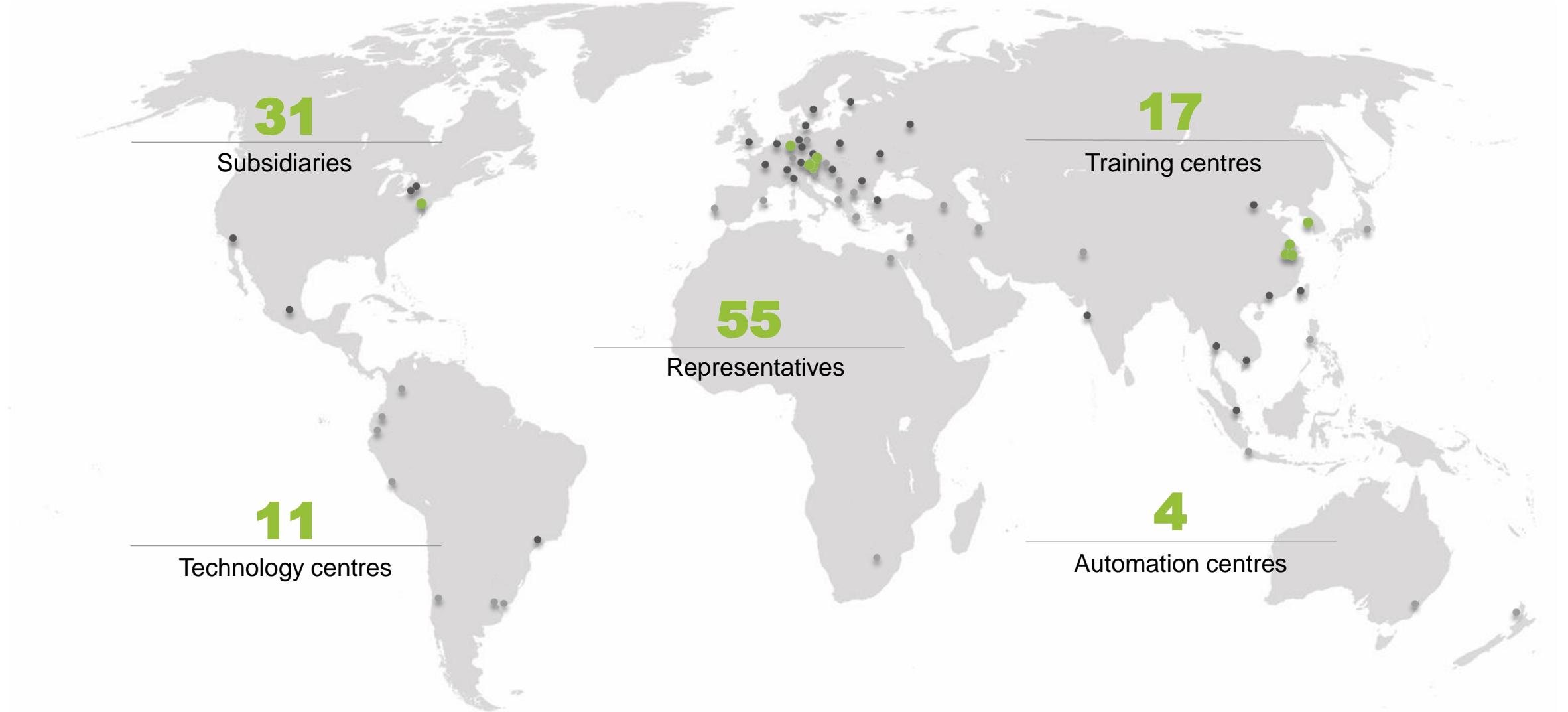


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Global production plants

About ENGEL

Expertise around the world and close to home



Market expertise

Specialized experts for all kind of business sectors



AUTOMOTIVE

Customized and trend-setting solutions for all areas of the mobility industry



PACKAGING

Sophisticated solutions for efficient production of packaging articles in any shape, colour or size.



MEDICAL

Hygienic solutions with zero error strategy in the medical environment



TECHNICAL MOULDING

Flexible solutions for daily use products to get quickly ready for the global market



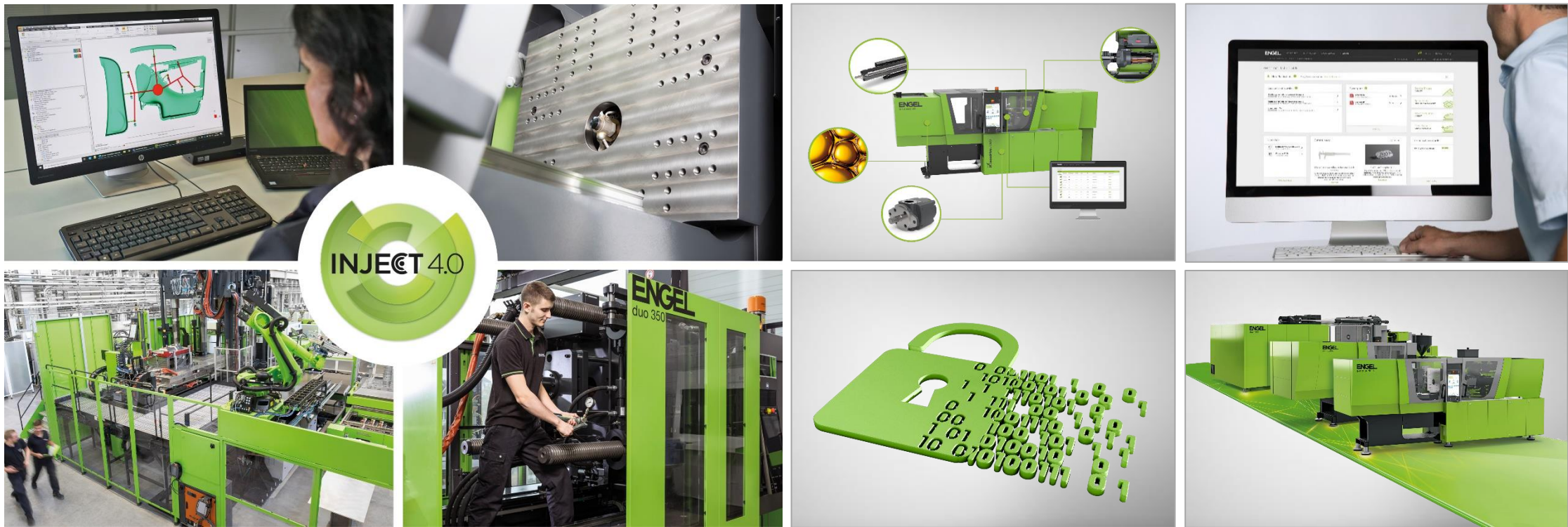
TELETRONICS

Innovative solutions for smart communication products & consumer electronics

ENGEL inject 4.0

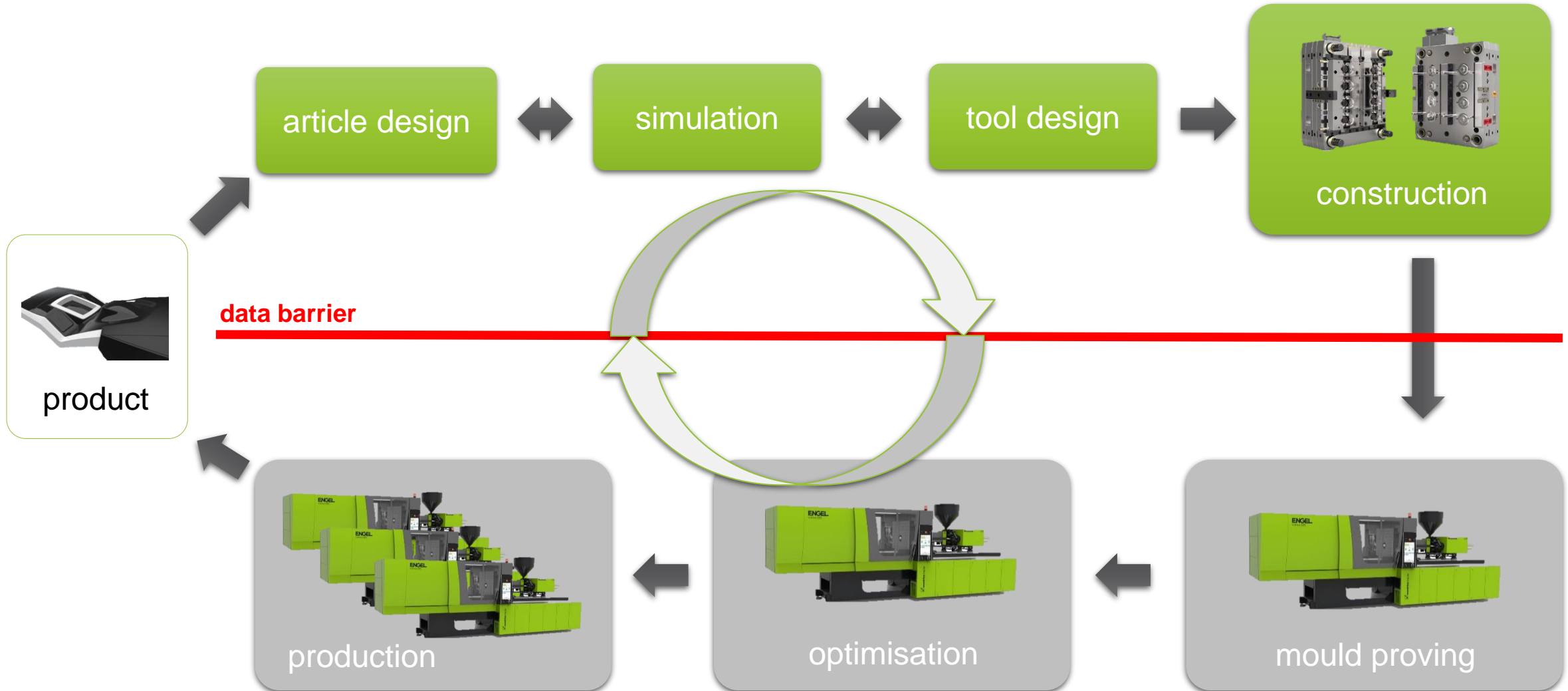
Digital solutions for the smart factory

Process stability, productivity and availability together with maximum data security and flexibility remain the guiding principles of ENGEL's inject 4.0 solutions. Superior and reproducible quality, significantly fewer rejects and optimized energy efficiency will help you to maximize productivity and reduce downtime costs.



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Status Quo: situation at injection moulding productions



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Partnership

Cooperation between Autodesk¹, MF Software & ENGEL:

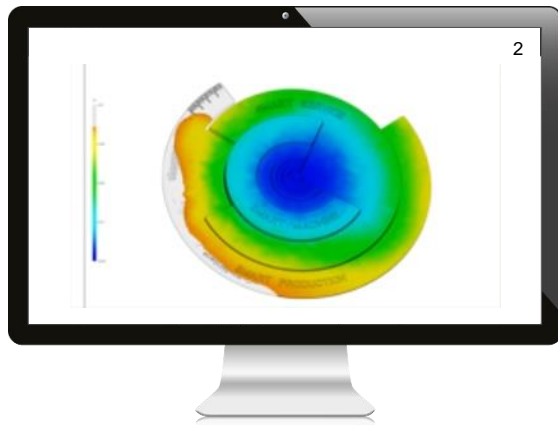
- Strategic alignment of global leaders
- Bridge the gap between simulation and shop floor
- Improvements for customer workflows



¹ Autodesk, AutoCAD, DWG, the DWG logo, and Inventor are registered trademarks or trademarks of Autodesk, Inc., and/or its subsidiaries and/or affiliates in the USA and other countries.

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Key features: data interface



Autodesk Moldflow

MODIFICATION

of simulation parameters/profiles and verification of the constraints on base of the chosen machine

EXPORT

of simulation data to a ENGEL machine

IMPORT

of real production data into Autodesk Moldflow



ENGEL machine

² Autodesk screen shots reprinted courtesy of Autodesk, Inc.

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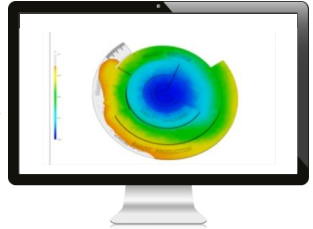
when and how to use sim link[®]

Tool layout is prepared and simulation results are OK
integrating machine behaviour/
dynamics into simulation

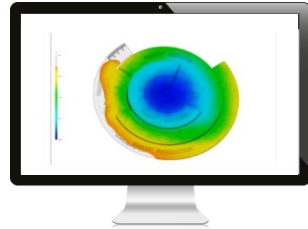


MODIFICATION

of simulation parameters/profiles and verification of the constraints
on base of the chosen machine



Re-simulation with modified settings is ok
export initial data set for mould
proving



EXPORT

of simulation data to a ENGEL machine (initial partdata settings)

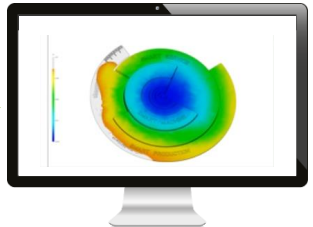


After start of production
feedback of real production data
to simulation



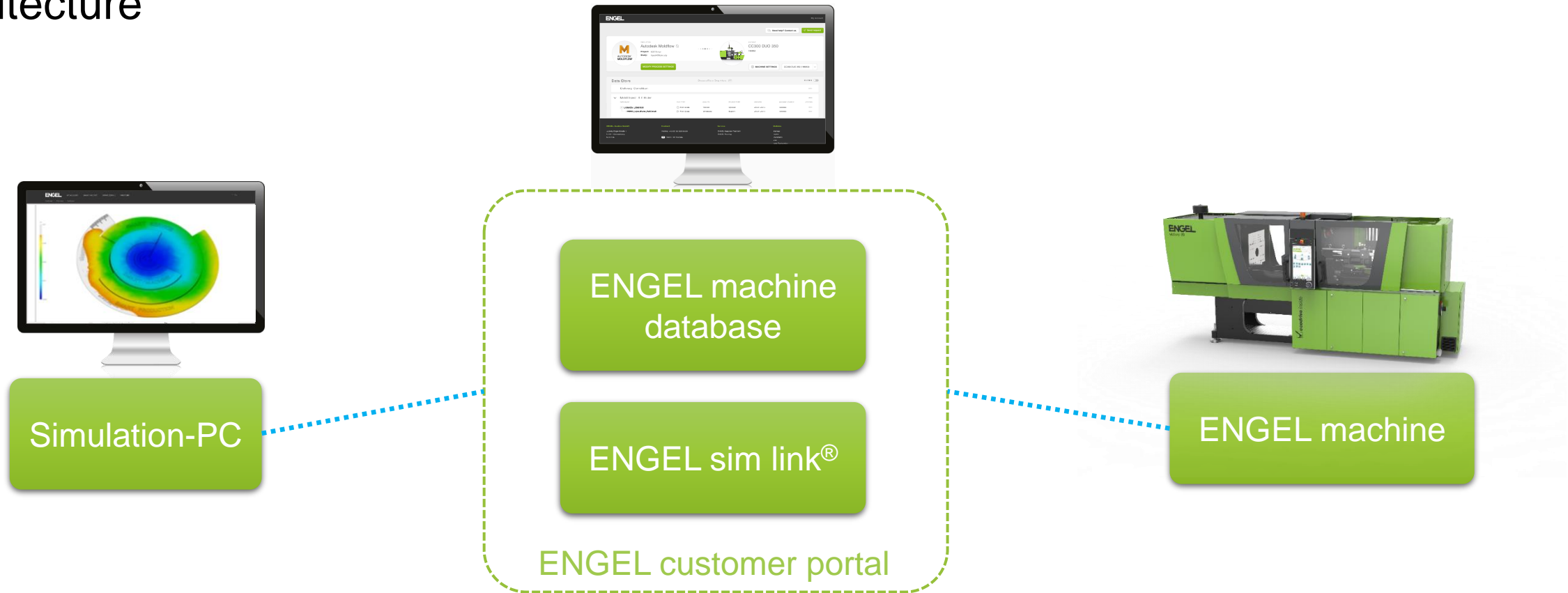
IMPORT

of real production data into Autodesk Moldflow



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Architecture



NO upload of CAD models or Moldflow studies
to the ENGEL customer portal necessary!

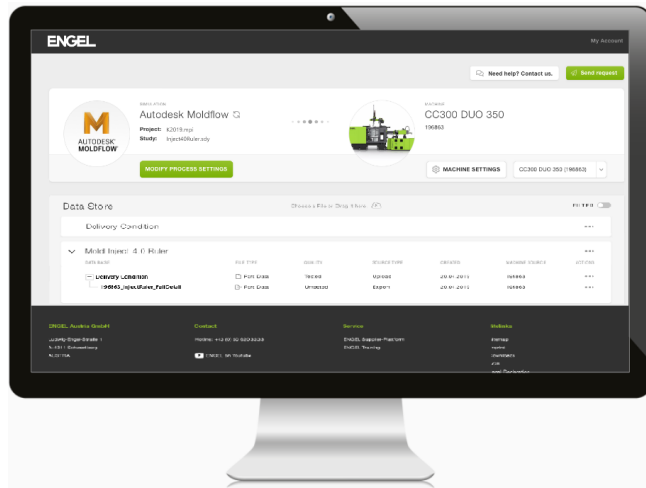
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Data exchange between simulation and sim link®



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Data exchange between sim link® and machine



sim link®
at ENGEL customer portal



ENGEL injection molding machine
from controller CC200-A02

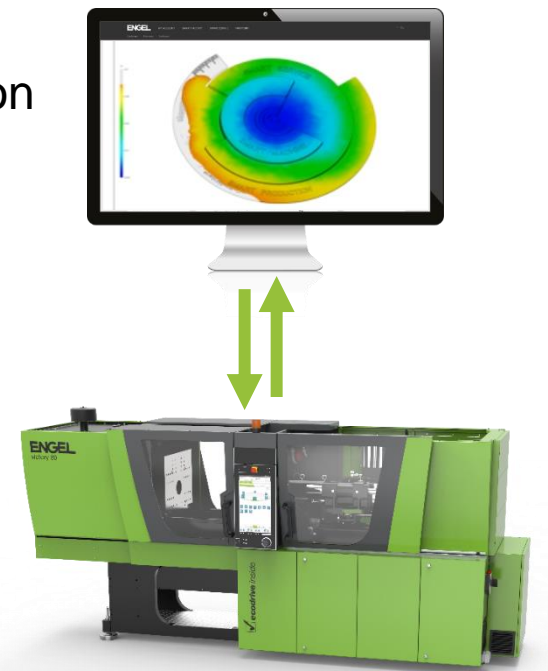
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Key messages/Benefits

Now available

ENGEL sim link®...

- ...increases my simulation quality
- ...reduces startup time by decreasing the number of iteration cycles until production
- ...transfers my simulation expertise directly to production vice versa
→ enabling the closed loop/digital twin
- ...facilitates the collaboration between different technical divisions
- ...works on every ENGEL machine back to controller version CC200-A02



ENGEL sim link[®]

Requirements

Now available

- Autodesk Moldflow **Insight** Standard/Premium/Ultimate
- Account at ENGEL customer portal + product activation of sim link[®]
- Compatible with all ENGEL injection moulding machines
(controller version CC200-A02 and beyond)



Case study with ENGEL sim link®

General information

General framework:

- Family mould with 3 door modules from HRS
- Materialdata from Borealis (PP with 7% Minerals)
- ENGEL duo 12060/1700, 90 mm screw diameter
- CFD-simulation with Autodesk Moldflow



Project partners:



BOREALIS

oerlikon
hrsflow

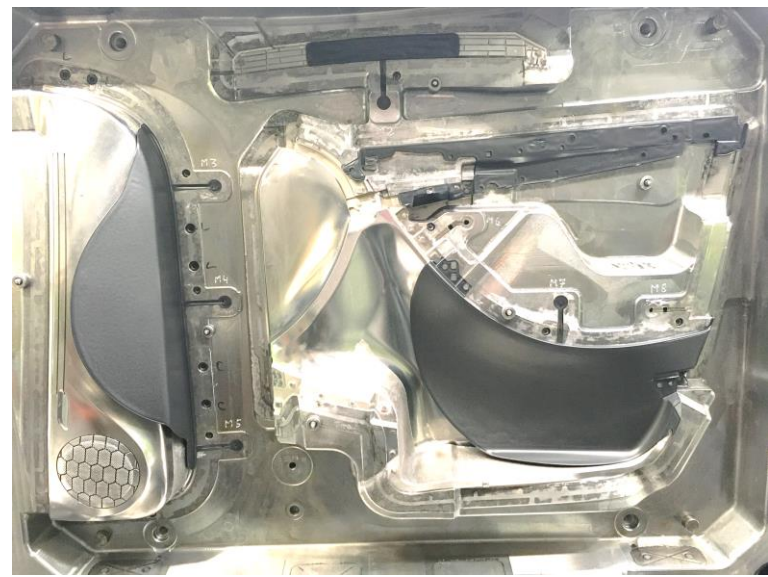
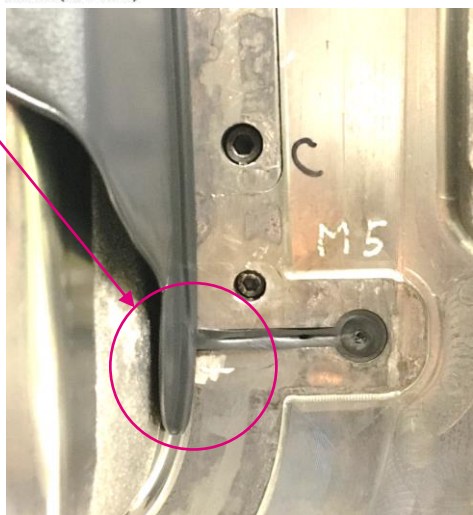
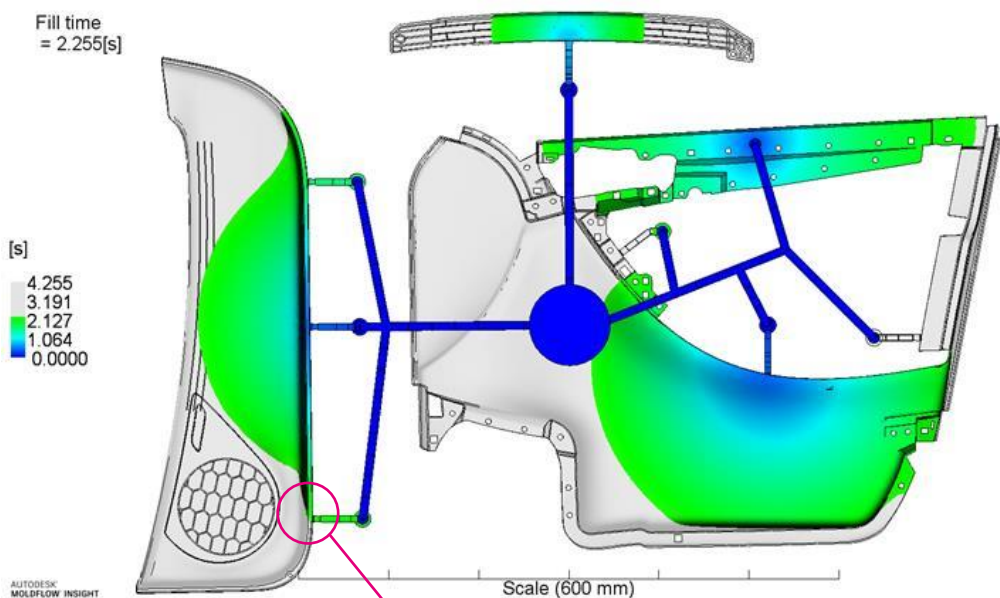
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Case study with ENGEL sim link®

Procedure/best practice

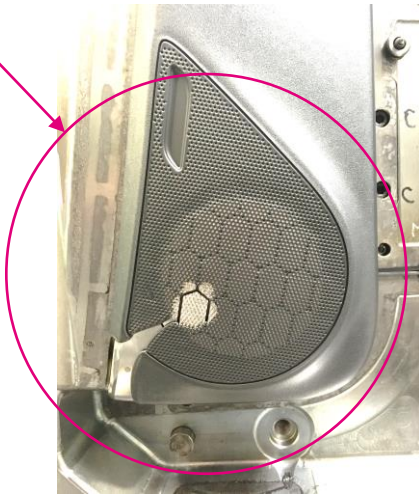
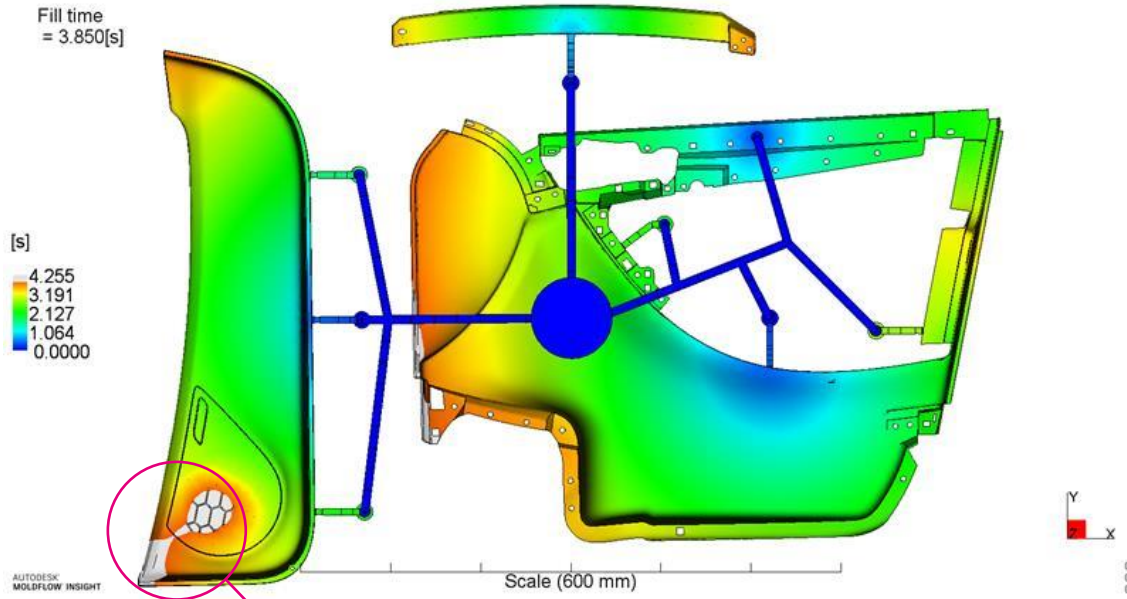
- Execution of a machine-independent simulation and optimization in Autodesk Moldflow
- Modification and checks of the process settings in the simulation with respect to the chosen injection moulding machine
- Re-simulation with the adopted data and subsequent examination of the new simulation results
- Export of the new created process settings to the chosen injection moulding machine
- Adjustment of the switchover point from the safe preset towards the theoretical switchover point from simulation
- Here: all parameters one-to-one exported to the chosen injection moulding machine:
 - Automated via sim link®
 - Manually for the theoretical switchover point and the valve related parameters for HRS Flexflow
- The production of the parts could be started in a very short time

Comparison: Reality and simulation



Fill time = 2,4s

Comparison reality and simulation at switchover point



Füllzeit = 3,96s

Now available

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