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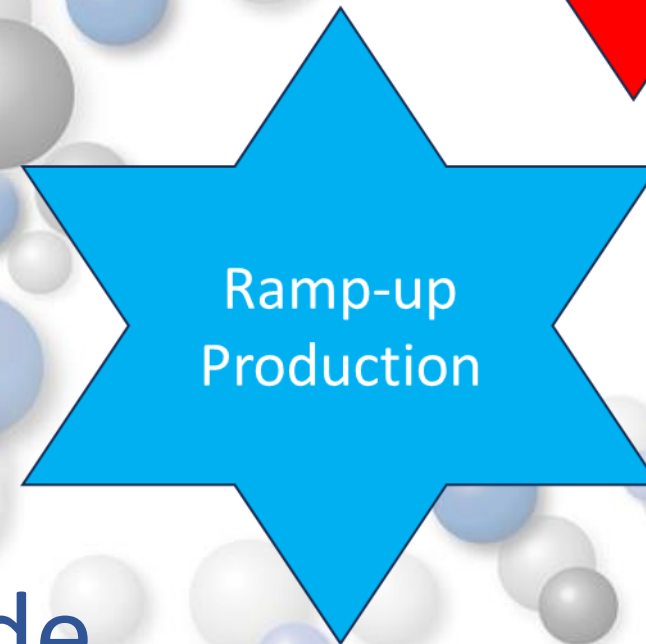
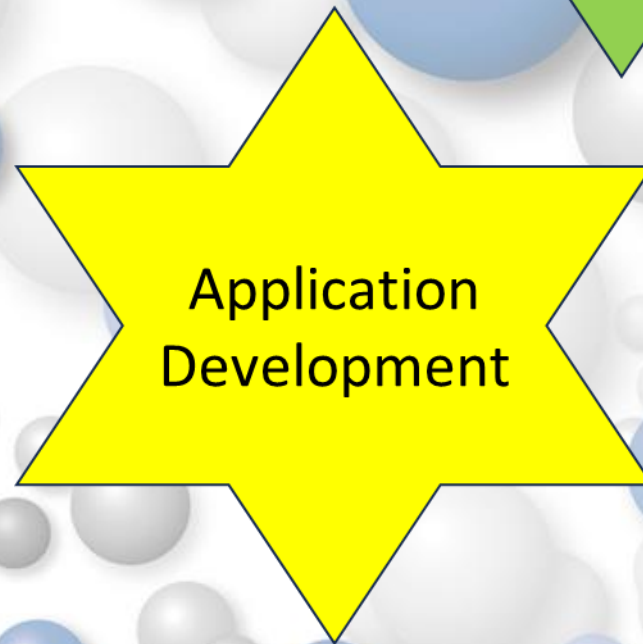
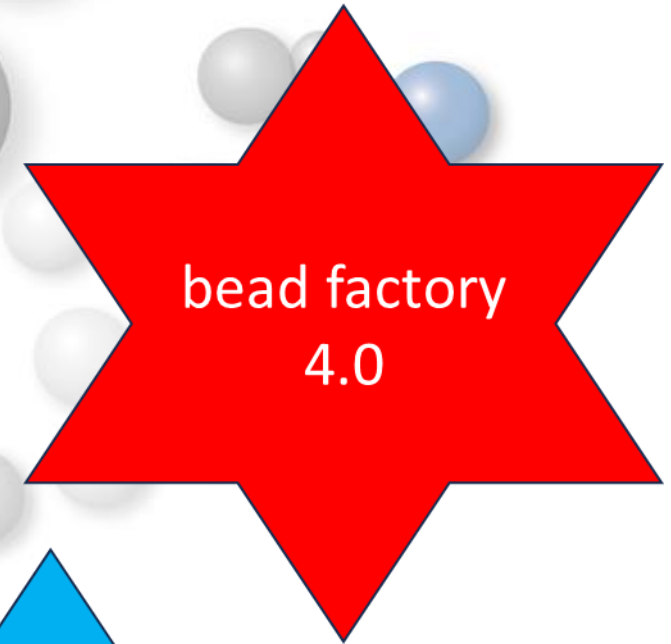


3 – 5 DECEMBER 2024

MESSE STUTTGART (HALL 1), GERMANY

*Lightweighting Complex Automotive
Parts with Software-Assisted Foaming.*

Uwe Wäckerle



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Process engineering in the TecCenter

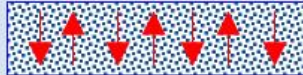
Steam powered foaming operation

Kurtz POR Foamer



Clamping surface: 1500x1300mm

Max. working temperature: 155C°



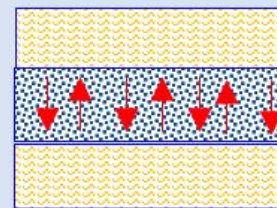
Energy consumption: 
Cycle time:



Particle foam



Hot water steam



Clamping surface: 1500x1300mm

Max. working temperature: 200C°

Energy consumption: 
Cycle time:



Variothermal heating and cooling

RF - (radio frequency) foaming operation

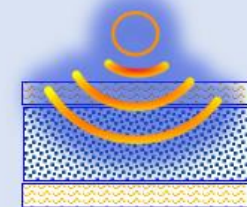
Kurtz Wave Foamer



Clamping surface: 600x600mm

Available as 10/2023: 1200x1400mm

Max. working temperature: 260C°



Energy consumption: 
Cycle time:

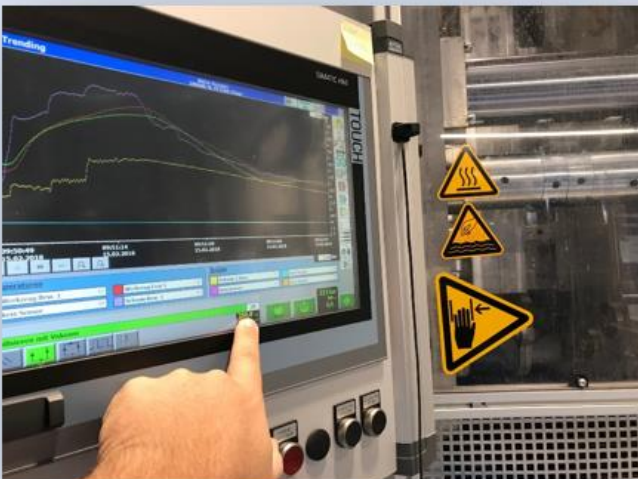


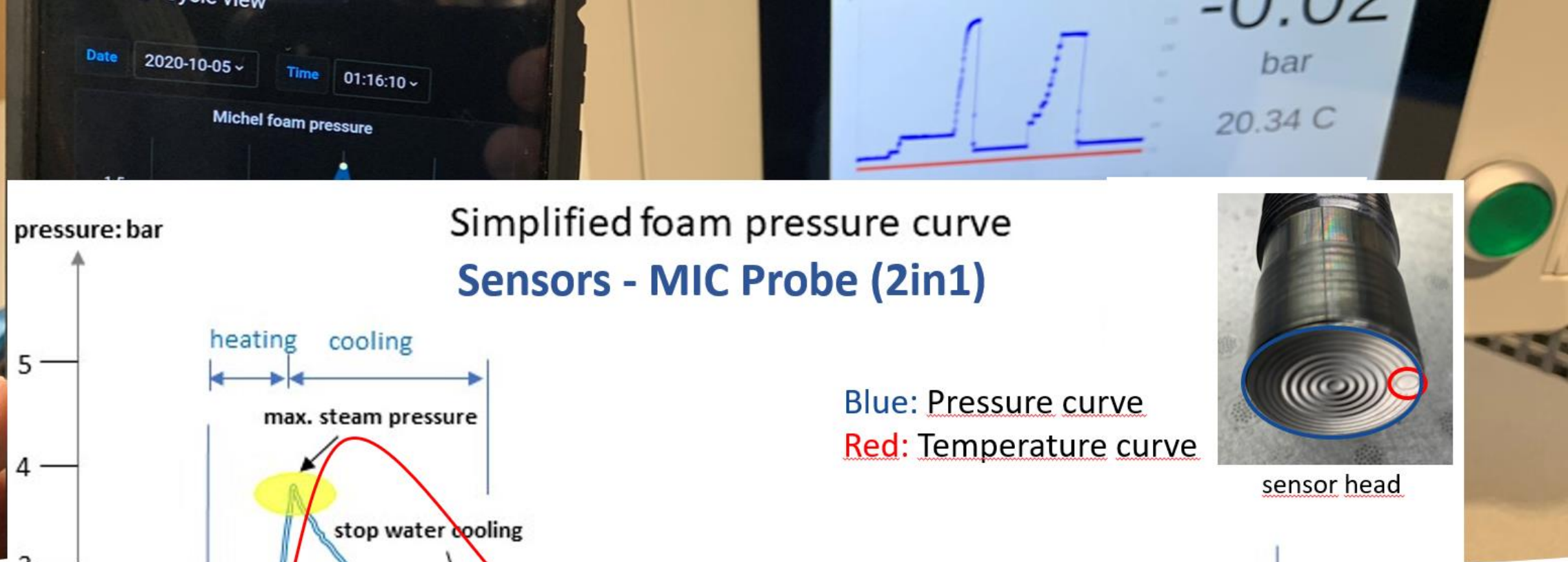
Radio wave



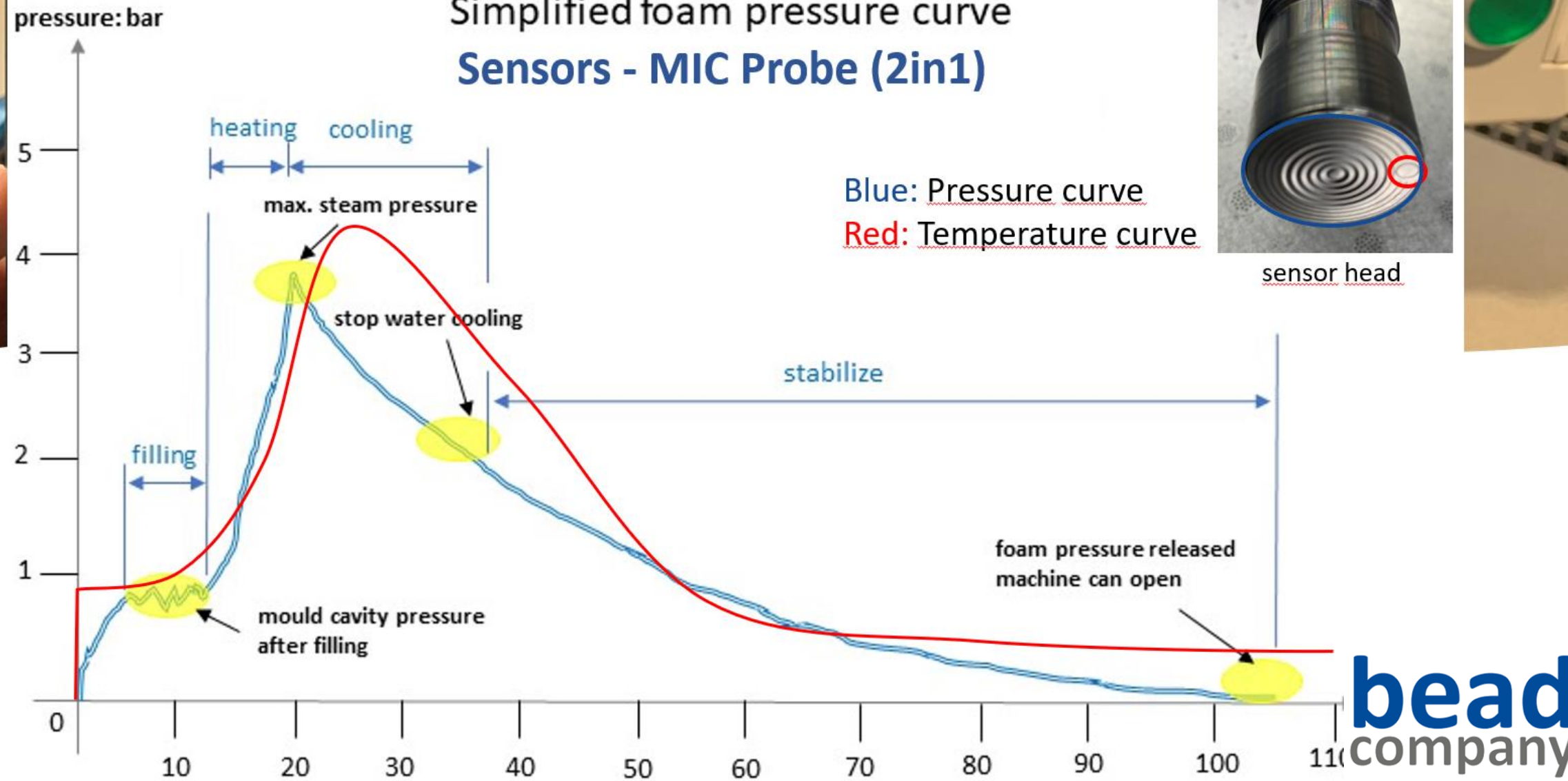
Sensors - MIC Probe (2in1)

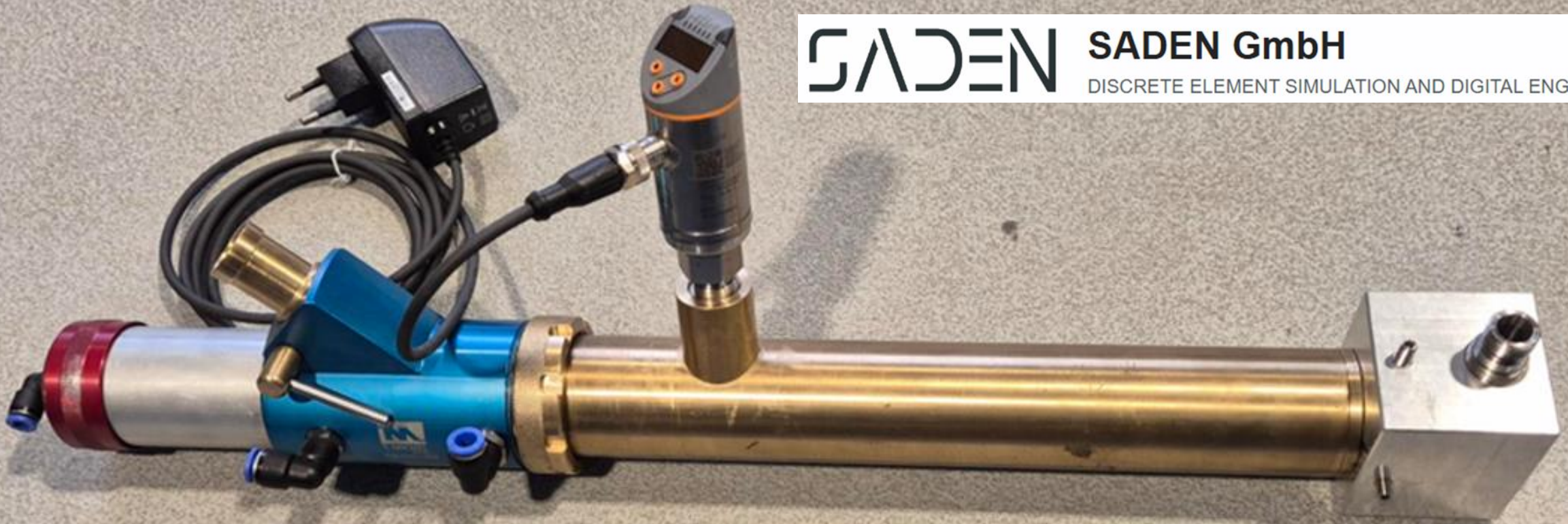
Steam pressure and steam temperature sensor
Fully electronic sensor for reliable process control





Simplified foam pressure curve Sensors - MIC Probe (2in1)





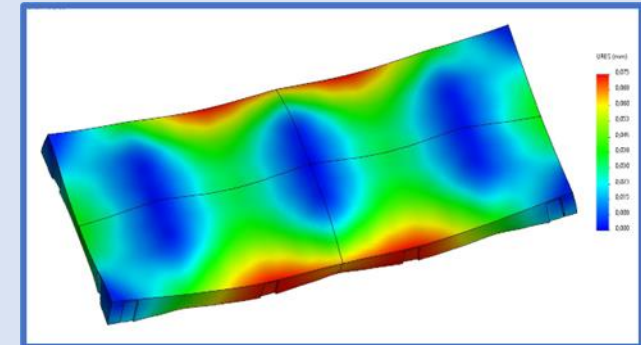
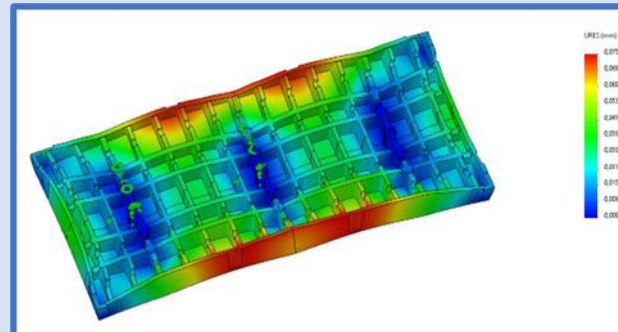
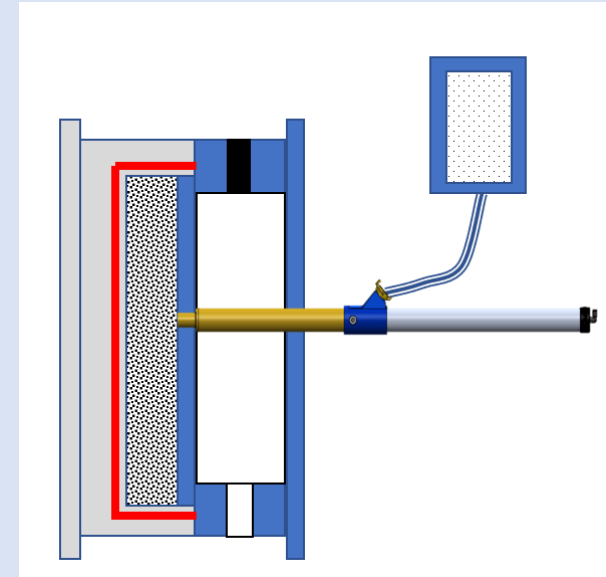
T. MICHEL

T.Michel Fillgun Sensor:

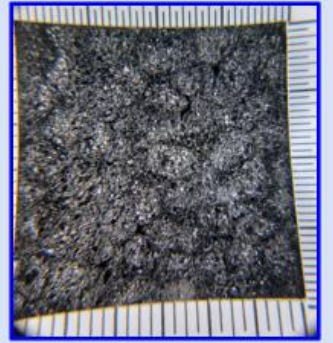
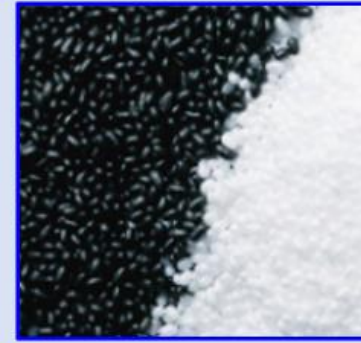
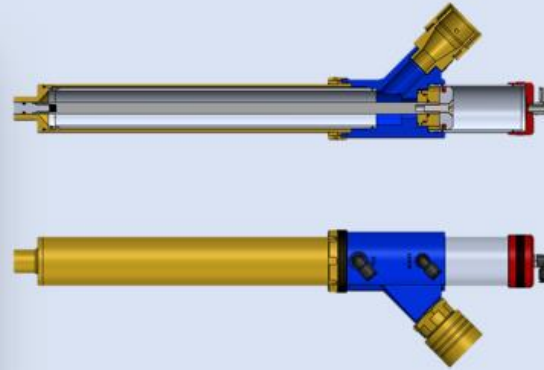
- Volume of the fillair (l/min)
- Speed of the fillair (m/s)

Why Simulation of the filling process?

- Avoid compression of the beads, homogeneous filling, density/packing
- No overfilling or underfilling of the part
- Similar mechanical properties all over the part
- Important combination with FEM simulations
- Optimize the position of the fill guns
- Optimize fill pressure and filling time
- Reduce air consumption/cooling of the tool
- Shortest possible cycle time
- Energy saving
- Quality control



Foaming process programme sequence



Cycle start

Close mould

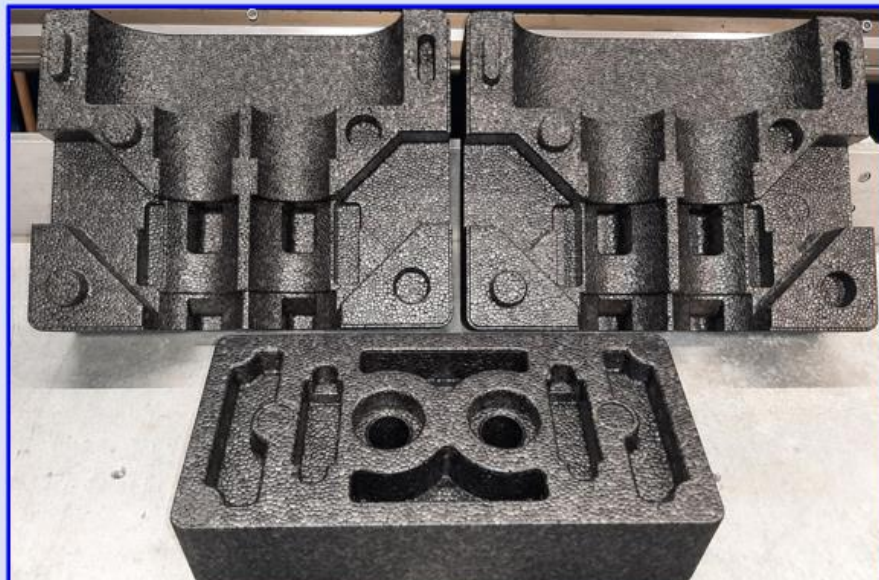
Filling the mould

Tool steaming

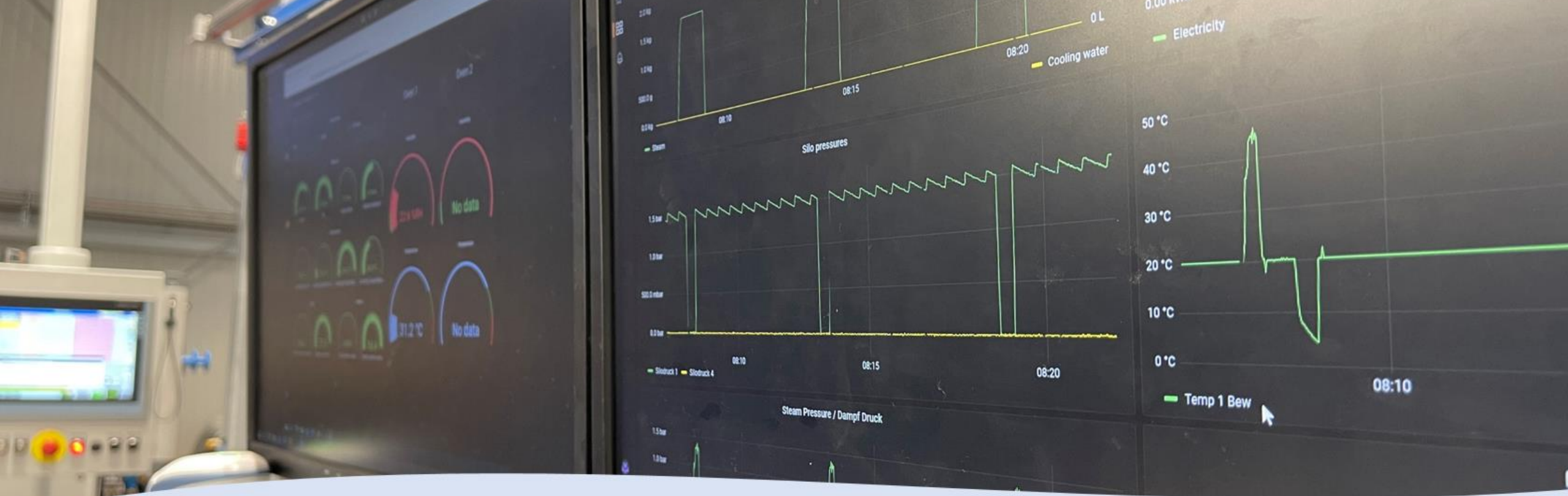
Cooling/stabilising moulded part

part demoulding

Cycle end



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TecCenter process database

For all samples, the laboratory records all process data and writes it to an SQL database. Each production part is provided with a barcode in order to create later reports.



Foaming process programme sequence

The variety of new particle foams increases in recent years

1950

EPS

1989

EPP / EPE

E-ABS 100% Rec
E-PP 100% Rec
E-PP 25% Rec
E-PS 25% Rec
ETPS
EPET 100% Rec.
TOPF
ETPU

Paperforms

ARCEL 2.0

EPHBH

Available particle foams

The close cooperation with many renowned raw material manufacturers enables us to get a good overview of the market.

Foaming with RF radio wave welding and steam = ●
(Materials that T.Michel has processed himself !)

Plastics

E-PP

E-
TPO

E-
PPE

E-PE

TOP
F

E-
POM

E-
PLA

E-
ABS

Arcel
2.0

E-
TPU

E-
TPS

E-
PET

E-
TPE

Pio
Cela.

E-PS

E-
ABS

E-
PA6

Organic materials

Pop-
corn

E-
PHBH

mashed
potatoes

Paper
forms

Sugar
beets

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Sensor Data Box

- The Control Panel of older machines is often not capable to show and use the signal of the Sensors.
- The data sensor box is used and external device to show the sensor data
- **Next: Step: Sensor data Box attached to the mold:**
 - Machine independent data recording
 - Quality control records
 - Remote access to the data
 - Gyro sensor to locate the tool



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Any Questions?

Thanks for your attention!

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