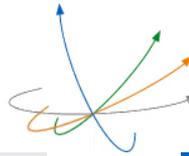


**MAUS**  
ROTATIONSGIESSFORMEN

*How to optimize  
wall thickness  
distribution  
by manipulating  
the mould*



Dimensional tolerances in rotomoulding are comparatively large, especially when it comes to wall thickness distribution and variation!

To have a fair chance to produce a rotomoulded plastic product with an relatively uniform wall thickness it is essential that:

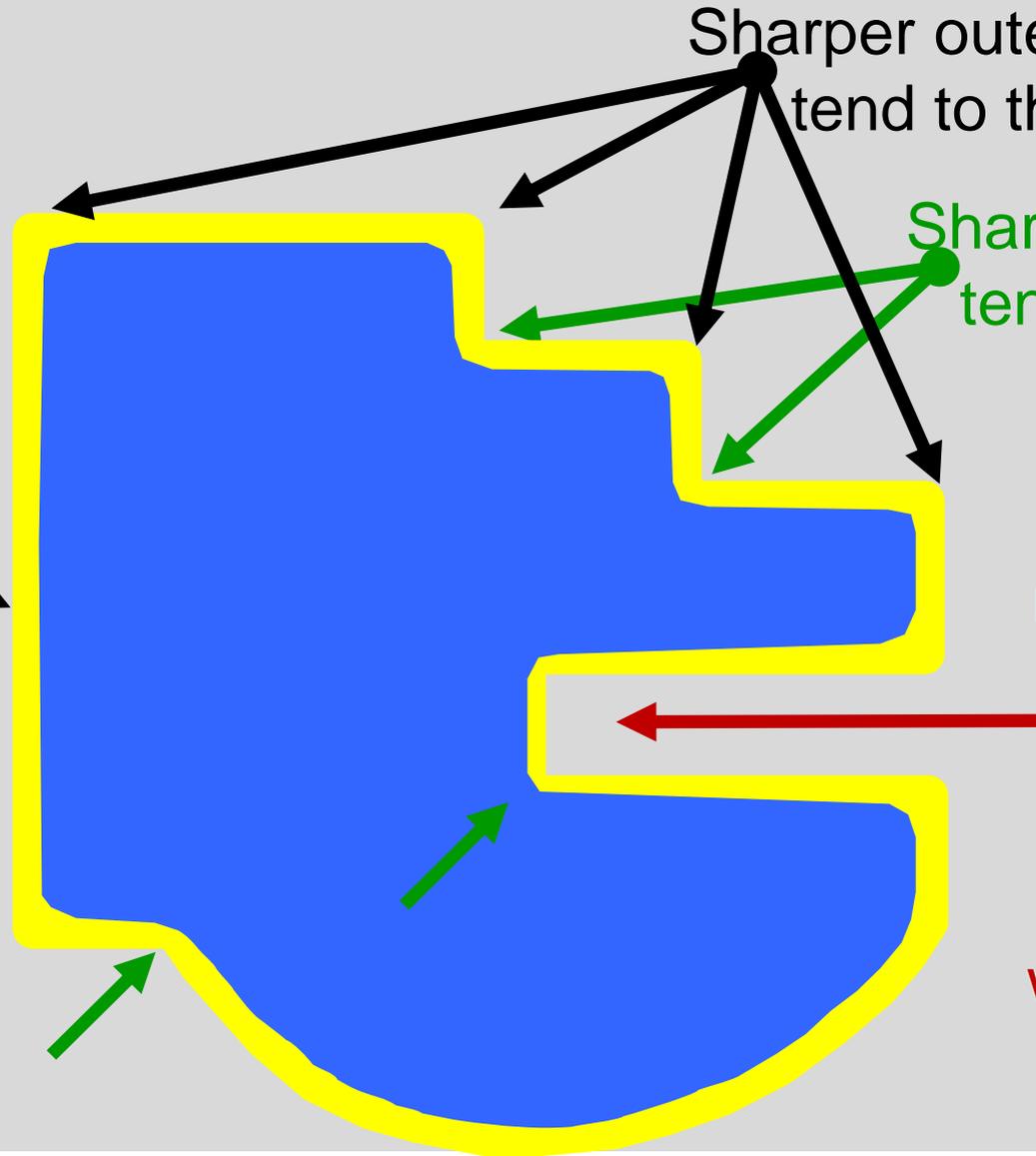
- ➡ part / mould design will allow for an even travel of the resin to all relevant surfaces
- ➡ relevant mould elements will allow for an even heat transmission

larger, flat areas tend to thinning due to speed of powder pool

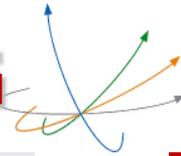
Sharper outer corners tend to thicken

Sharper inner corners tend to be thinned

Core areas results in thinner walls, due to reduced heat transition and shorter contact with powder pool



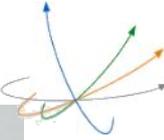
# HEATING



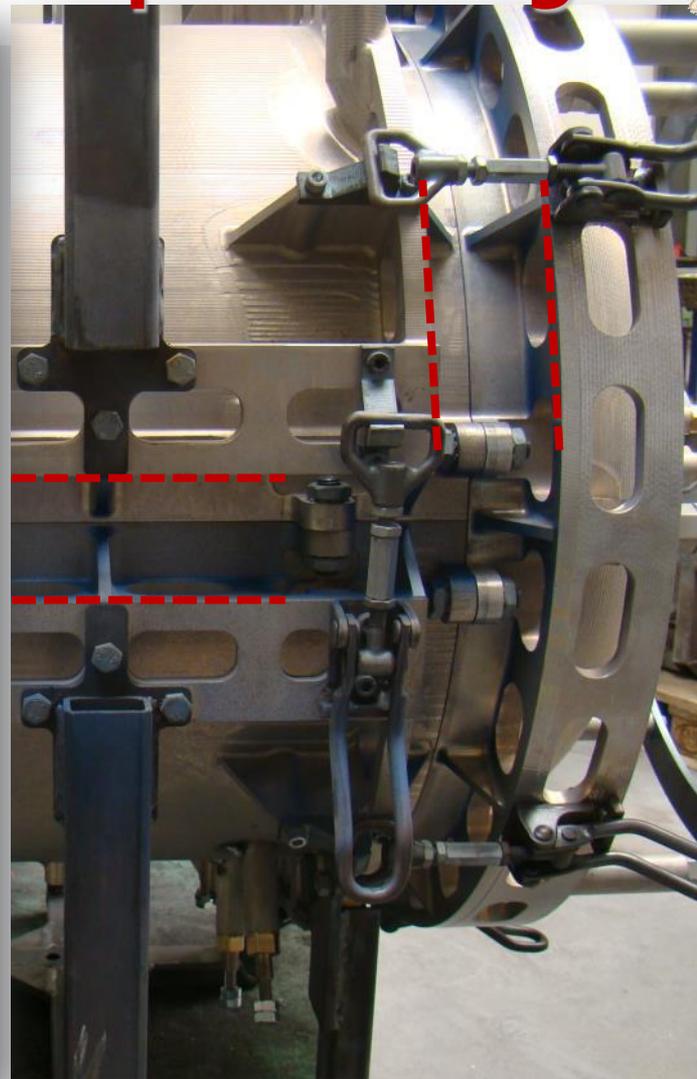
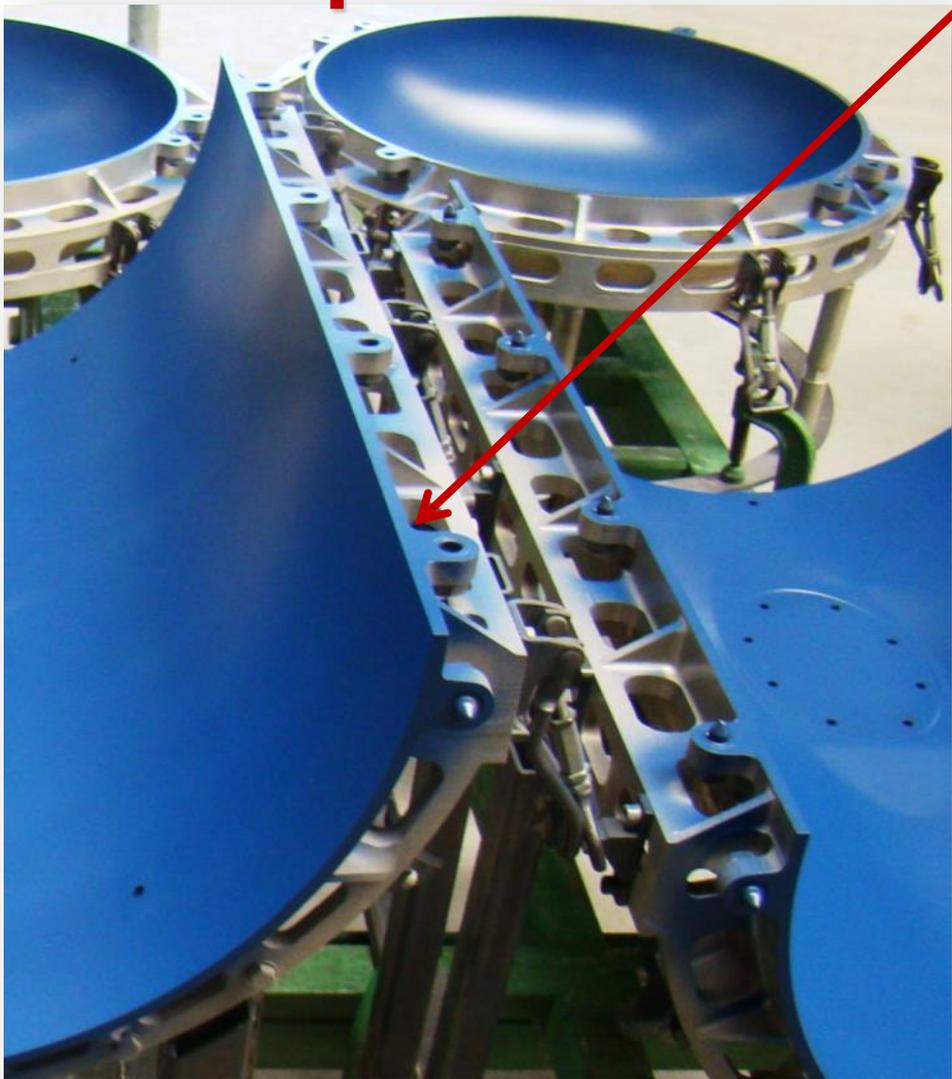
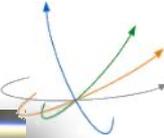
## Improving heating from > **OUTSIDE** <

- Mould periphery / framing situation?
- Roughen up outside mould surface
- Profit Pins
- Black paint
- Scoop Plates / Air baffles
- Venturis / Air nozzles

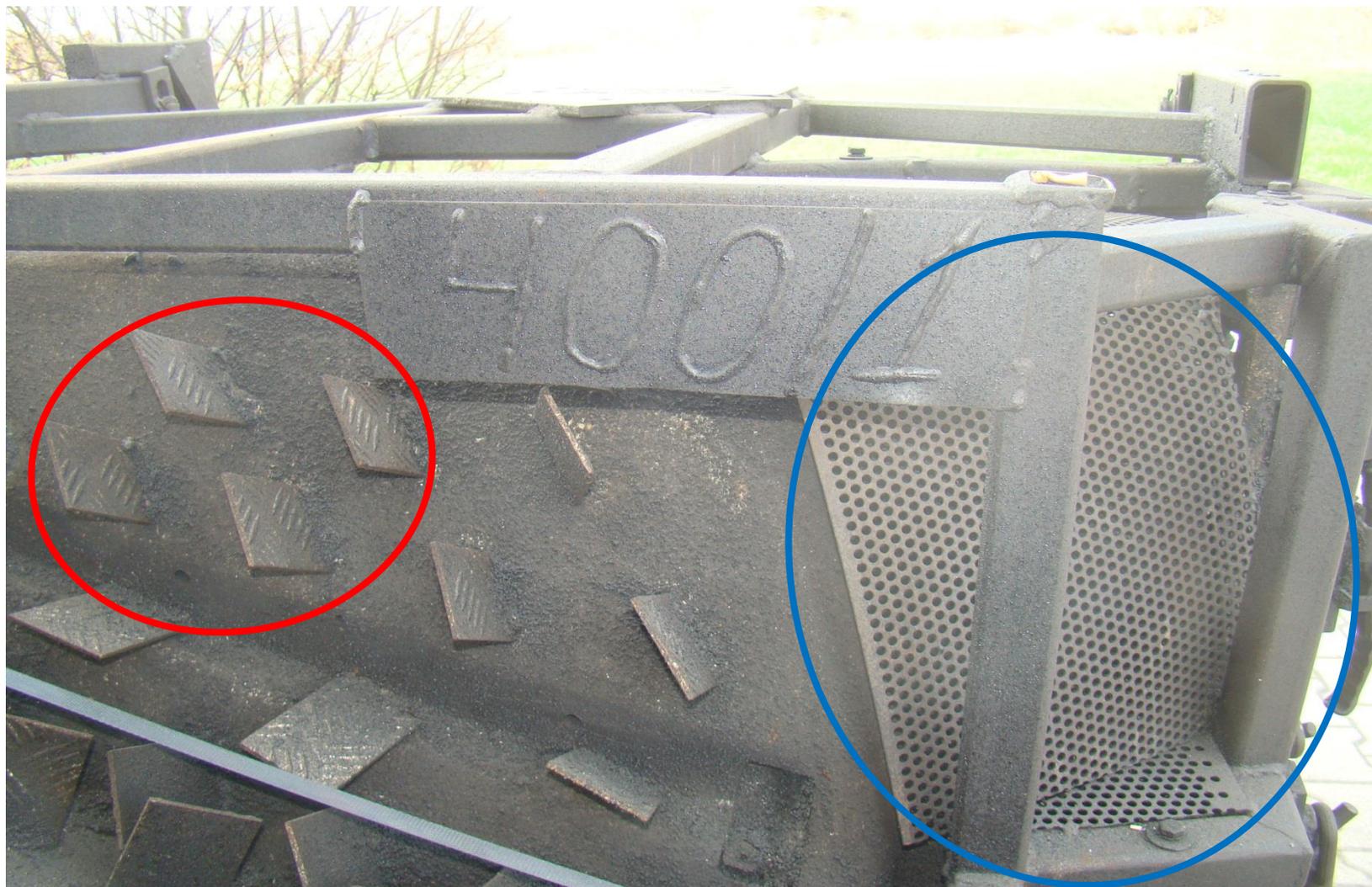
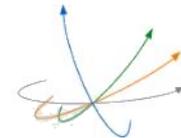
# Spaceframe with disperse flanges



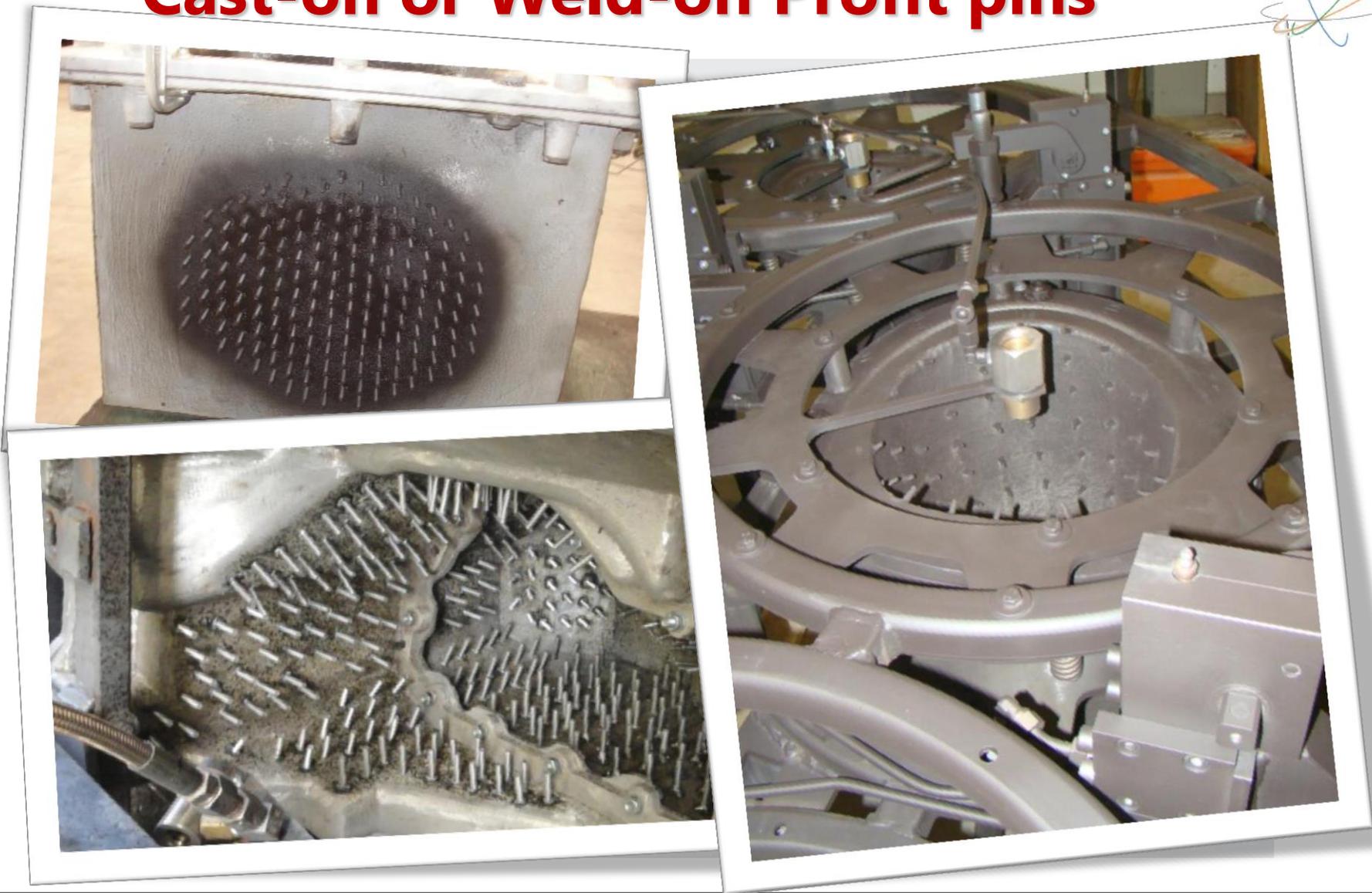
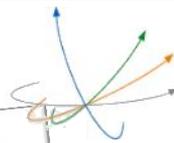
# Spaceframe with disperse flanges



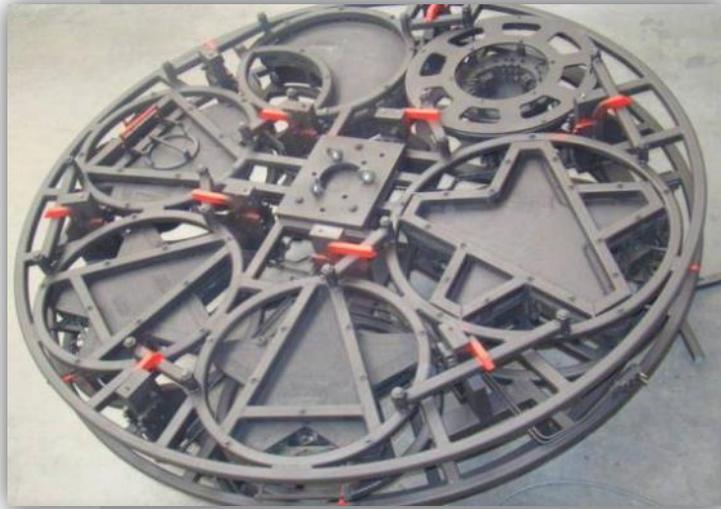
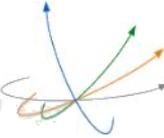
# Heat-Fins (and perforated shielding)



# Cast-on or Weld-on Profit pins

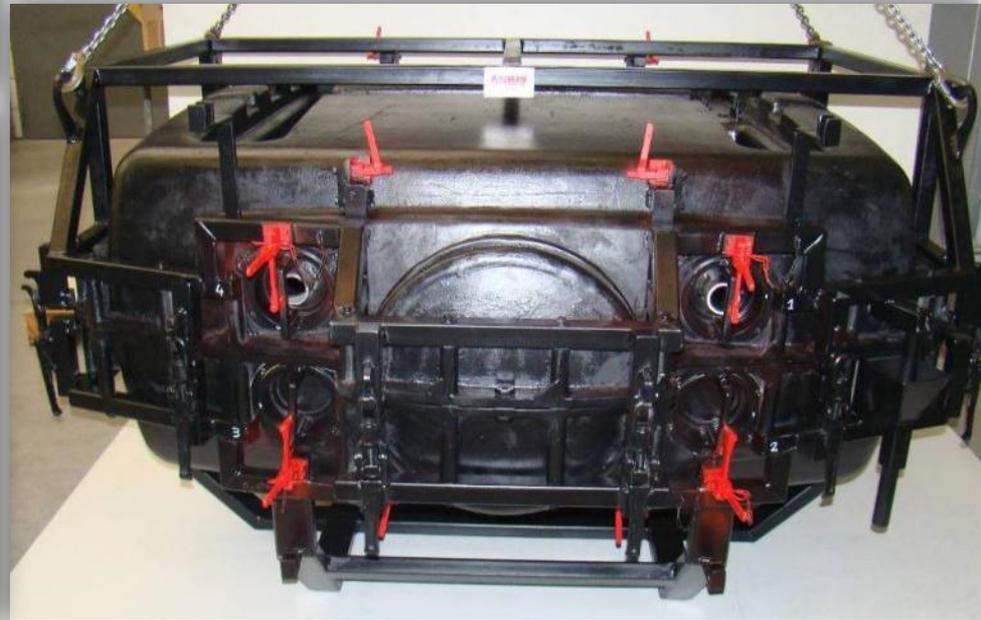


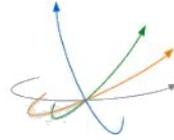
# Black Exterior + Precaution Red



... **BLACK** improves heating and cooling, better cleanability

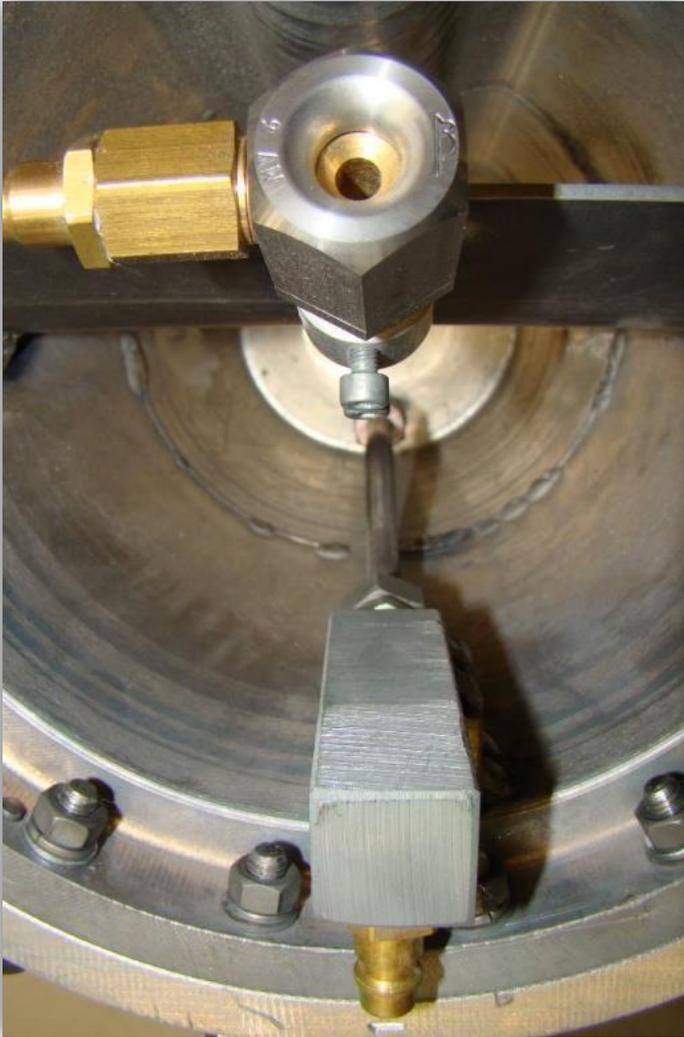
... **RED** for precaution, reduced operation failures, Safety

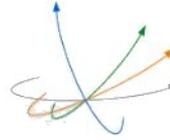




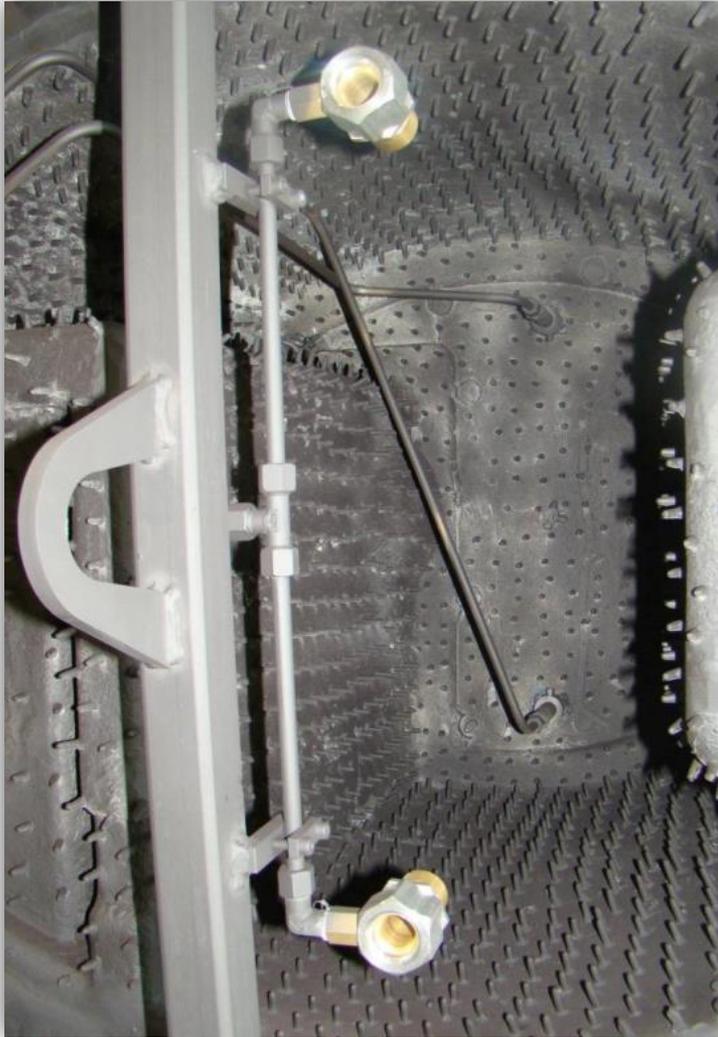
# MAUS-Venturi Systems

... energy efficient solution to heat (and cool) mould cores consistent and repeatable (*instead of manual pre-heat!*)



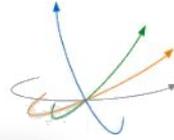


# MAUS-Venturi Systems

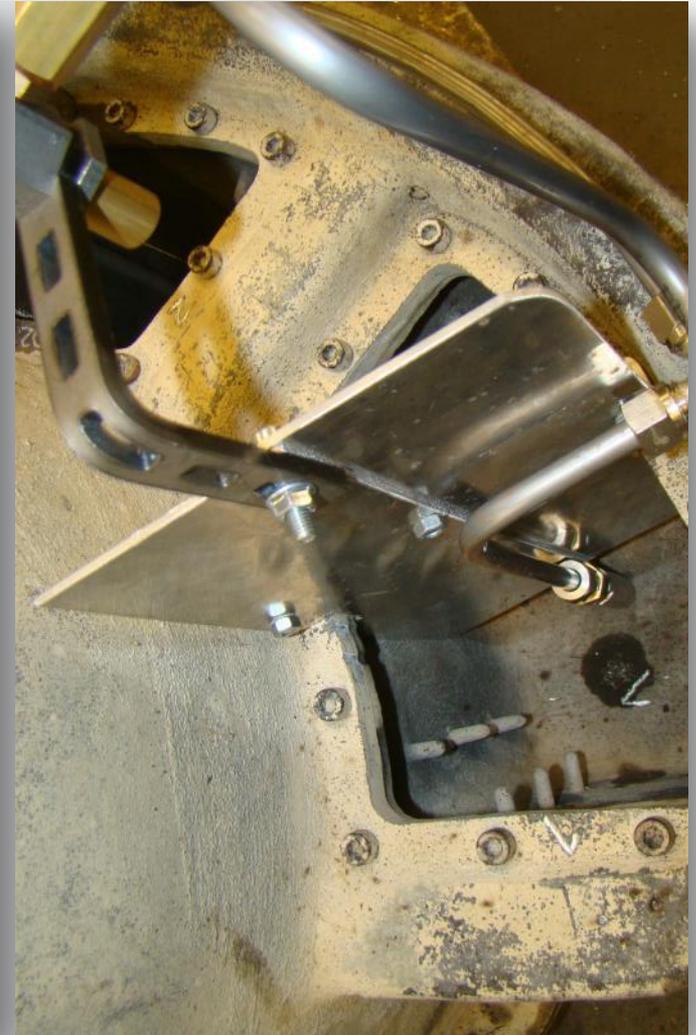
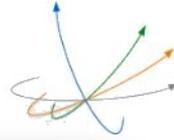


- ... lead-in compressed air, of machines' arm, is amplified with drawn ambient air (often or cooler). Amplification rates can be up to 35-times
- ... venturis are adjustable to suite the actual air line pressure
- ... air streams of venturi should be wisely "pointed" or „guided“

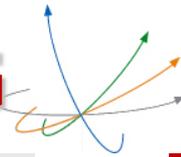
# Circuited Venturis with baffle plates



# Circuited Venturis with baffle plates



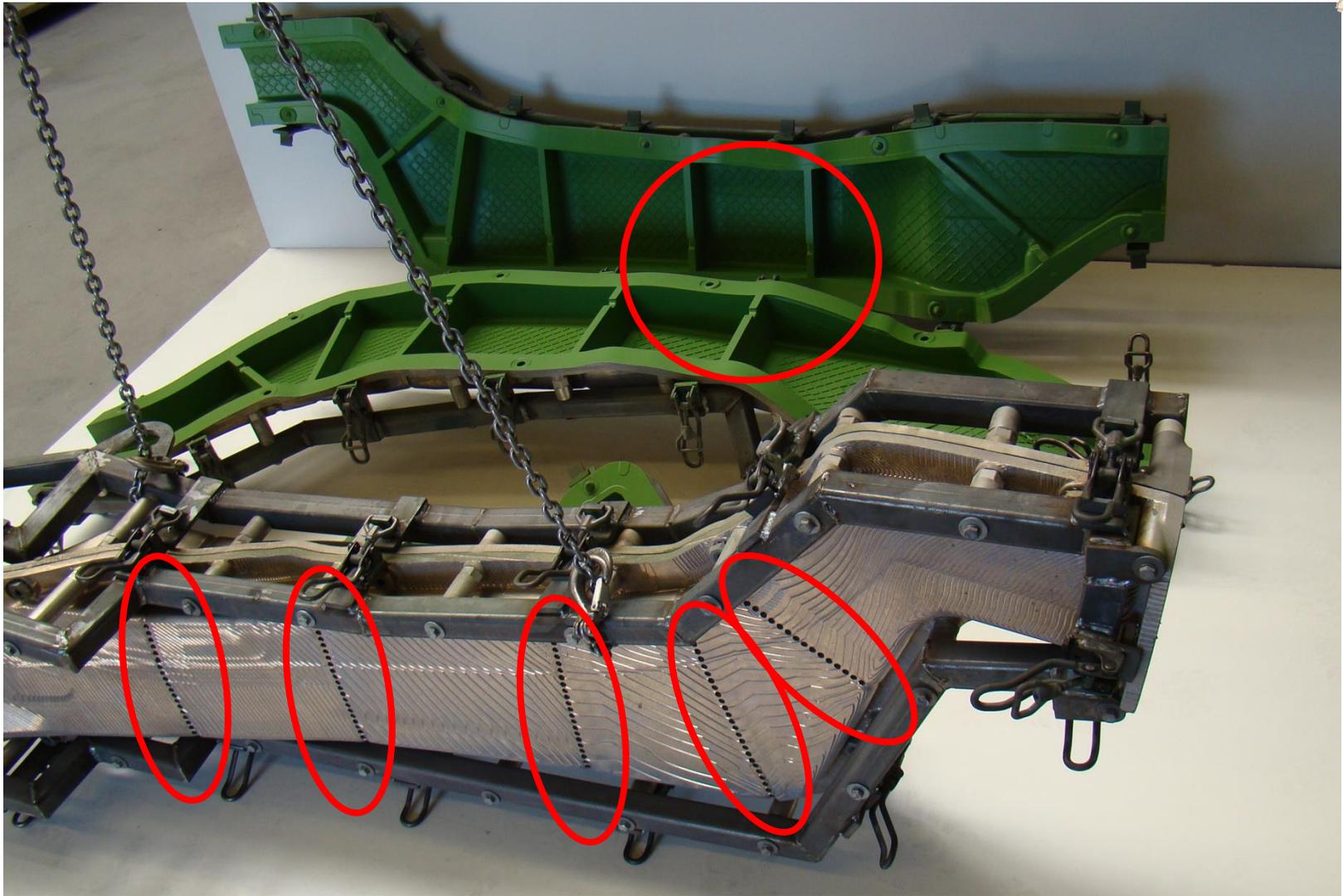
# HEATING

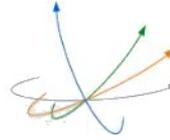


## Improving heating from > **INSIDE** <

- Avoid heat sinks (i.e. solid pins or ribs)
- Avoid air traps or dead-ends (i.e. "mirroring" elements)
- Copper or Aluminium Bronze
- Heat Pipes
- BMC Coatings

# Avoid Heat-Sinks

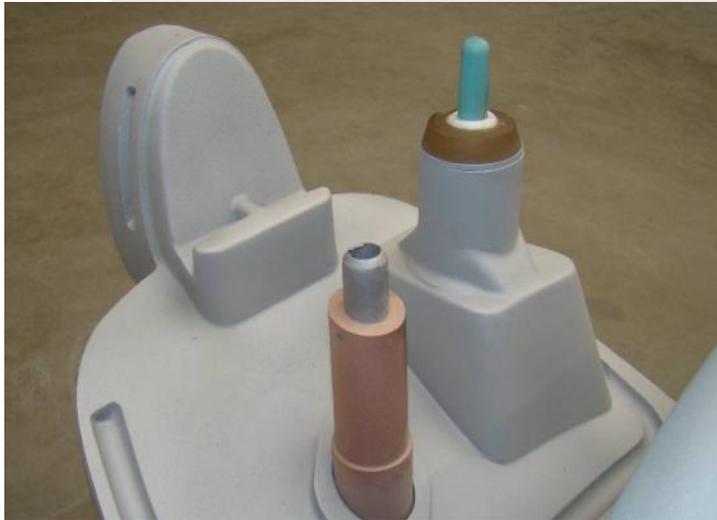


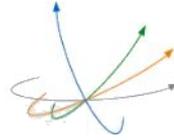


# Aluminium Bronzes

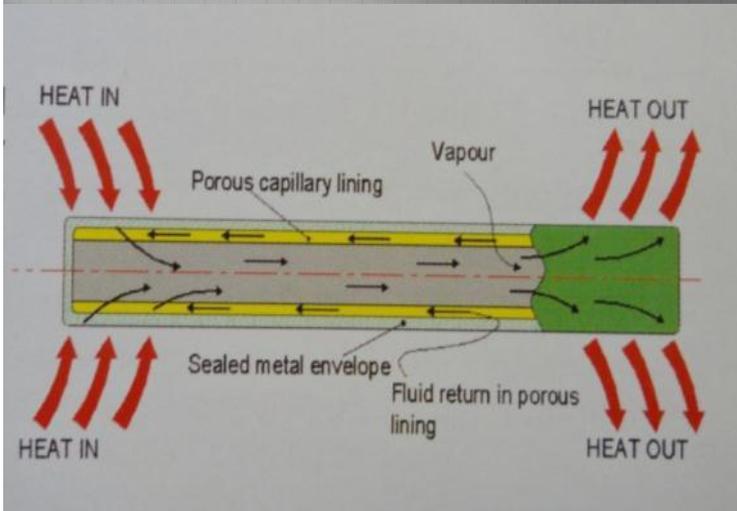


... for thread formers, pins,  
loose pieces, etc.  
*that need improved heat  
conductivity and improved  
endurance*

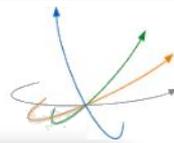




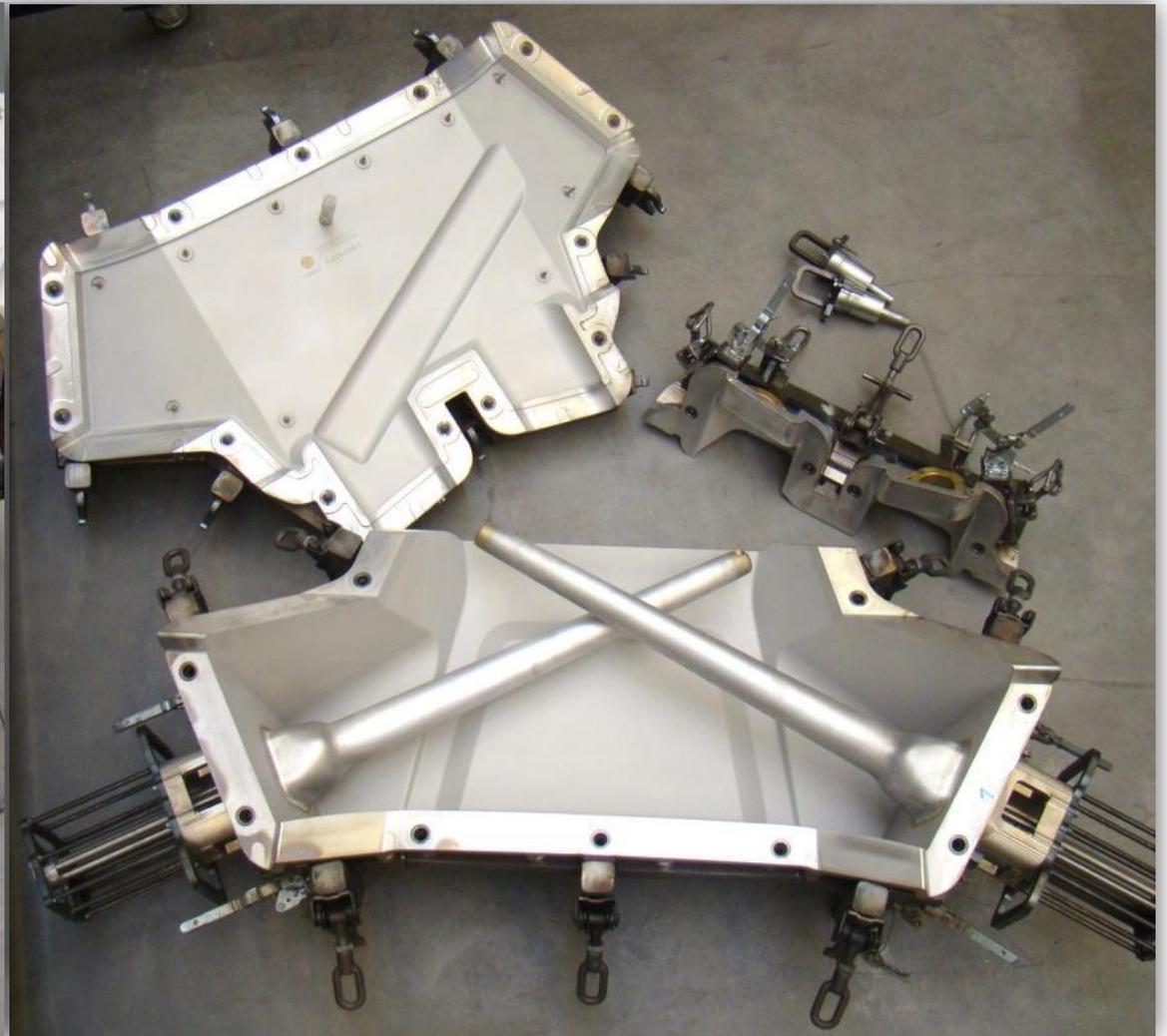
# Heat - Pipes

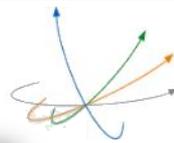


- ... tin plated rod, capillary wick, filled with water droplets, vacuum sealed
- ... 100% safe, maintenance free, no running cost
- ... Ø from 2 to 16mm, Length from 50 to 3000mm
- ... most accelerated heat-transfer for thru-holes, kiss-offs, deep cores, etc.

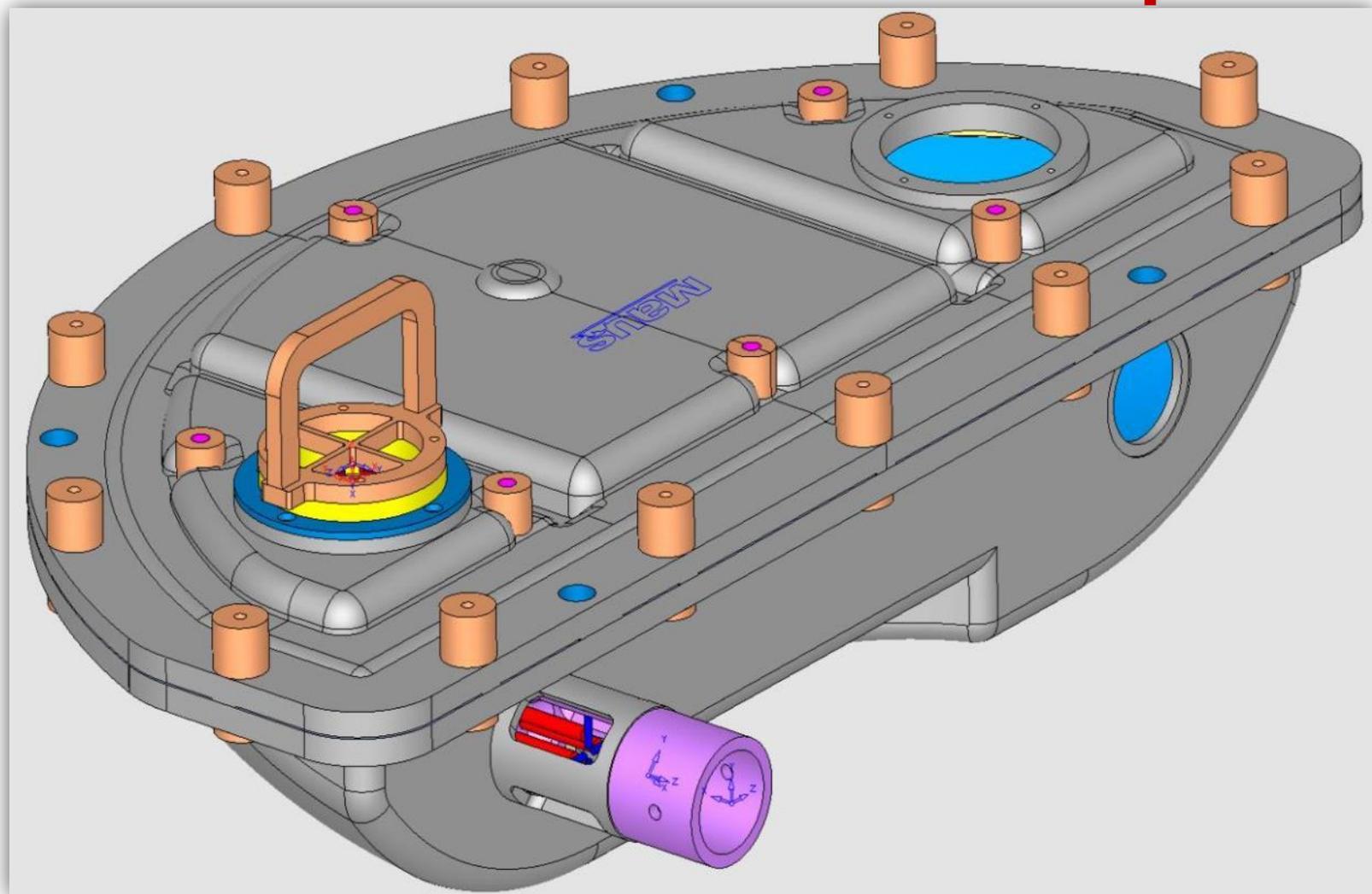


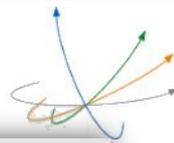
# Heat - Pipes



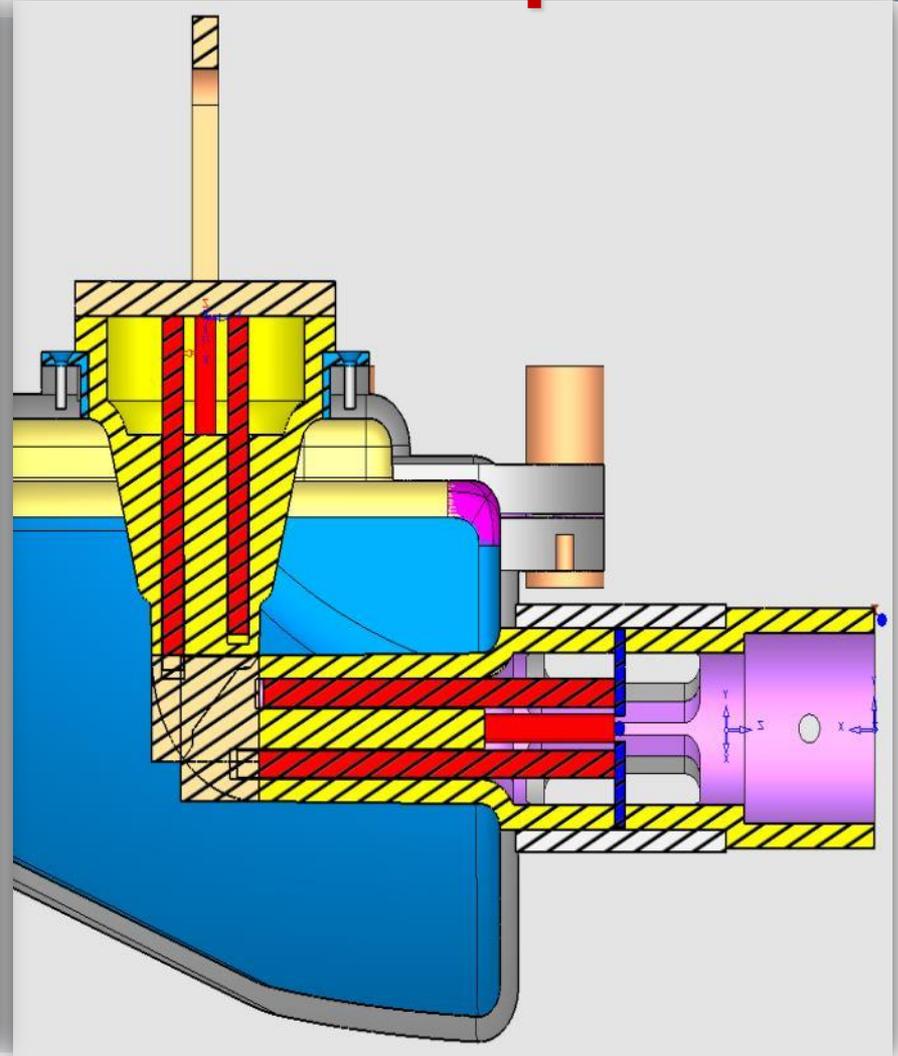
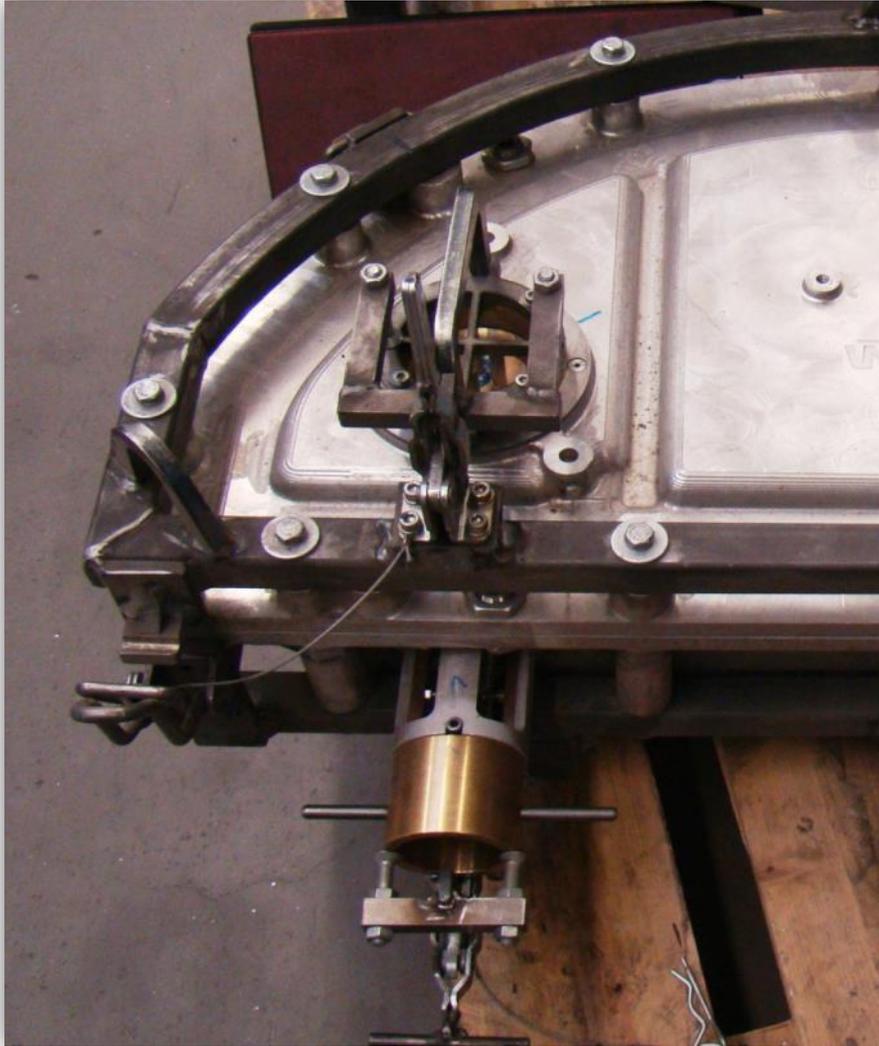


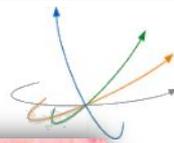
# Heat - Pipes





# Heat - Pipes





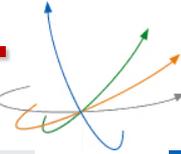
# Heat - Pipes



# Core Sections C10 coated

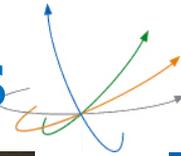


# DEFLECTING from HEAT

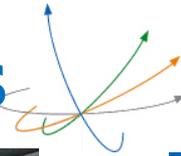


- Mould peripheries / framing situation?
- Smoothen, polish outside mould surface
- Silver painting
- Deflector Plates
- Shielding (Glasfibre, Rockwool, etc.)
- Venturis / Air nozzles

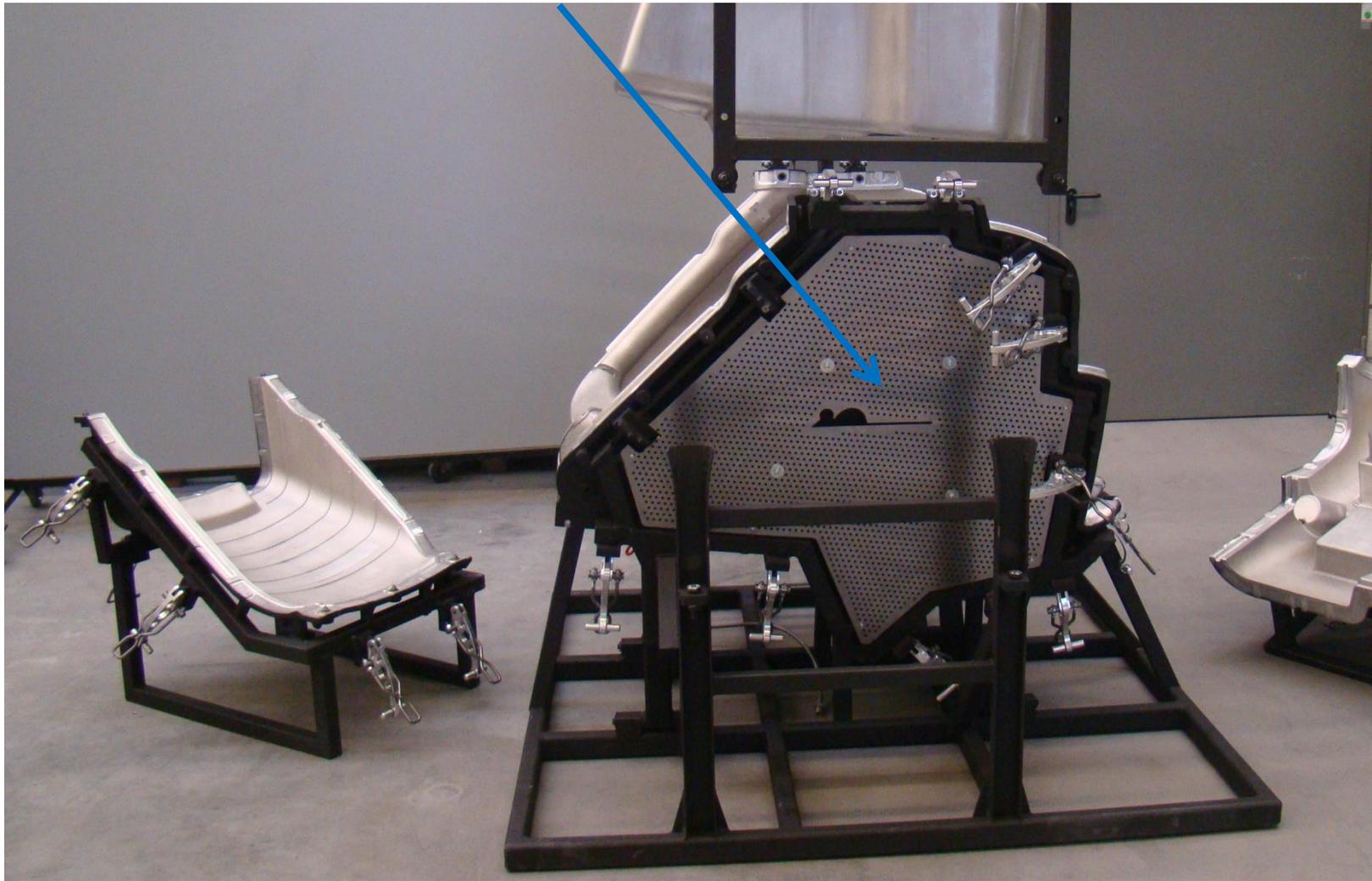
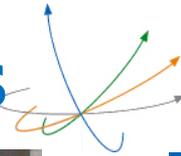
# Shielding with Glasfibre Matts



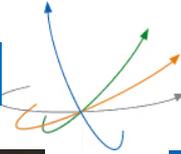
# (no nice) deflector plates



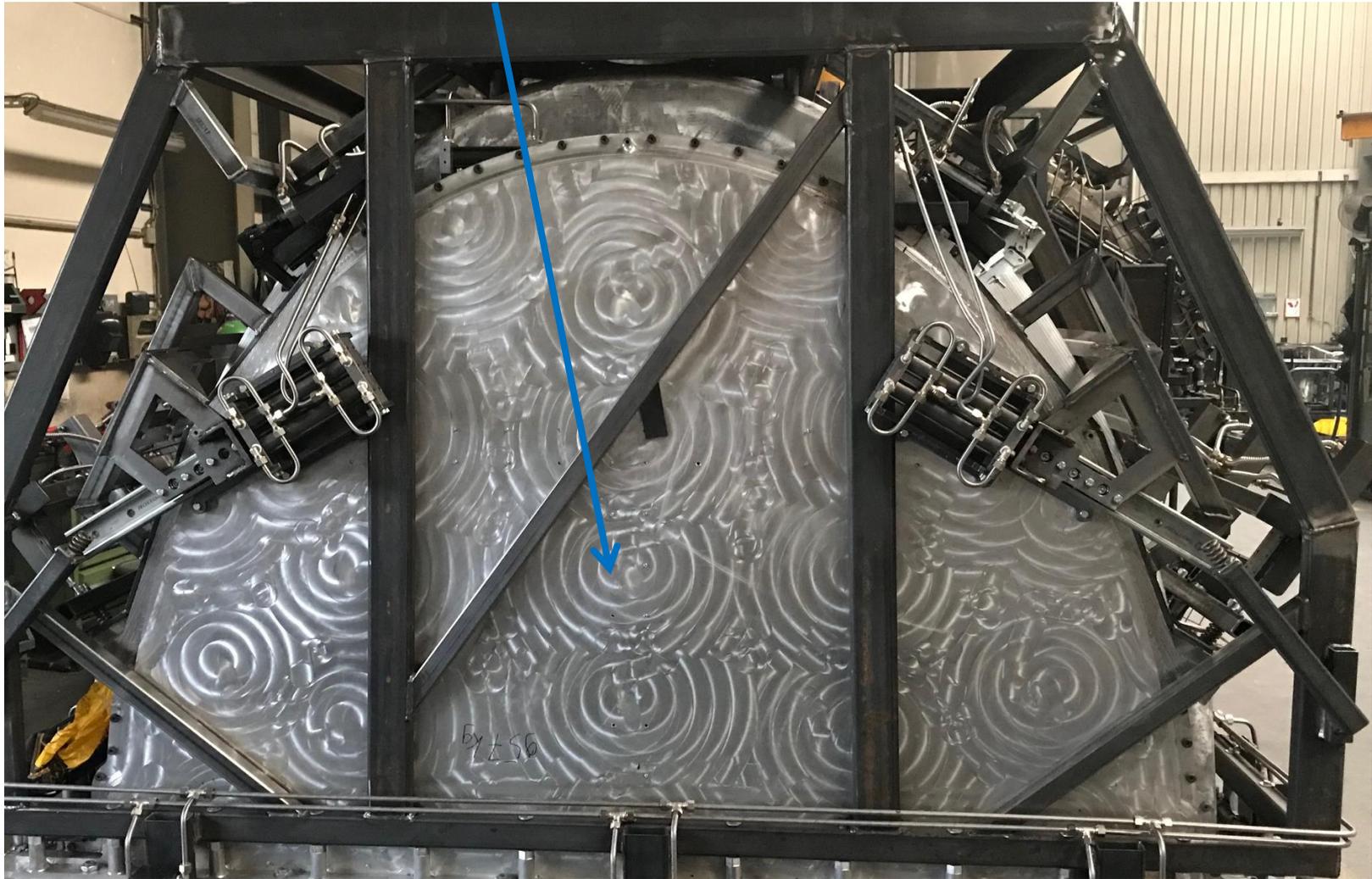
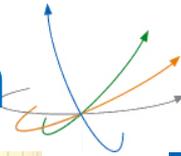
# Perforated deflector plates



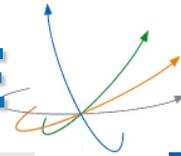
# Shielding with Rockwool



# Outside glossy/smooth



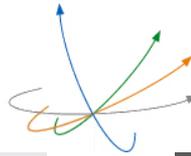
# MOULD MAINTENANCE



- **Do it frequently and In-Time !**
- Generate a maintenance plan for every mould
- Check tightness of mould flanges and fastenings
- Control cleanness of moulds (no plastic crust)
- Create Standards (+stock) for wearing parts
- Consultation with operators to recognize potential improvements for mould performance or handling

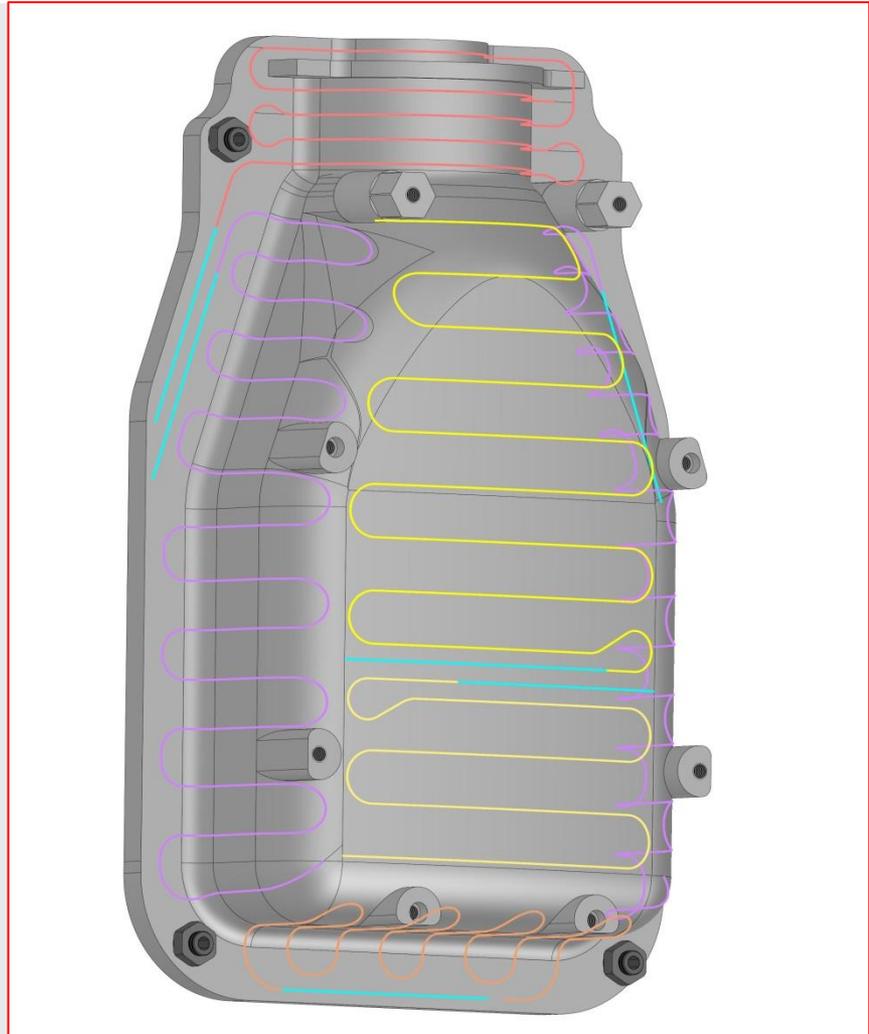
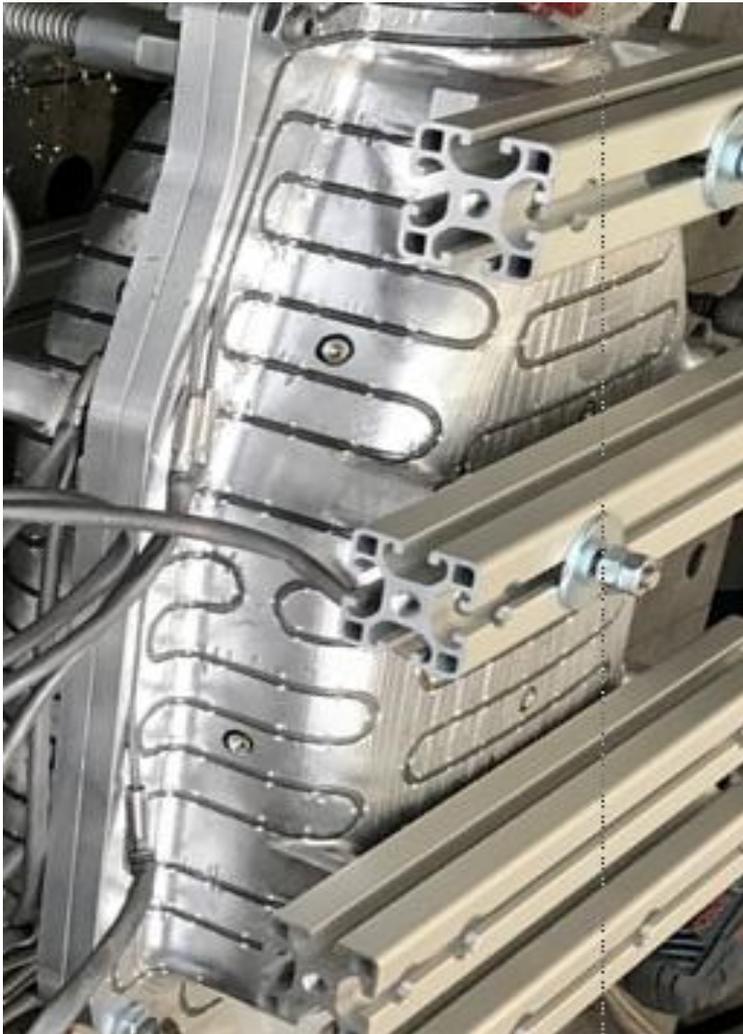
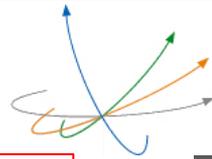


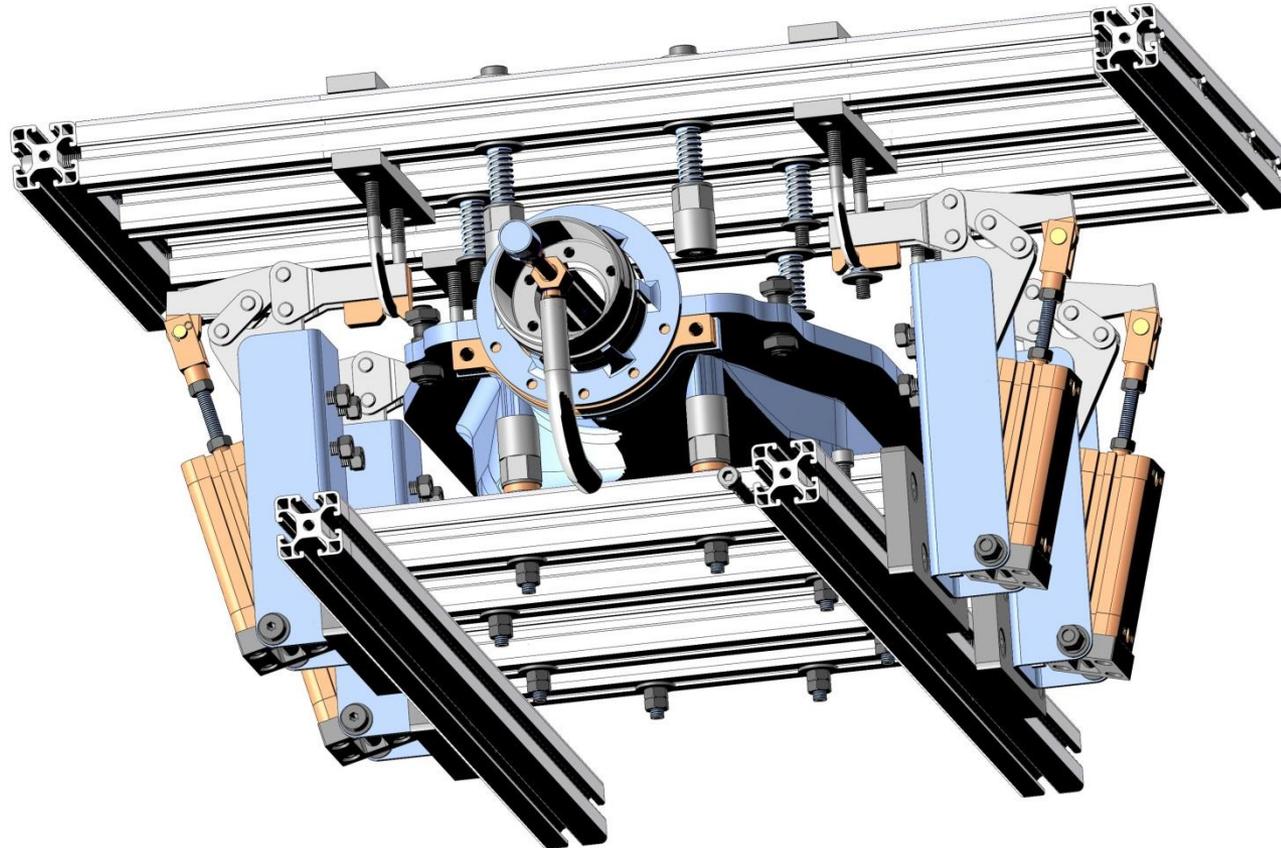
# **outlook / future possibilities**



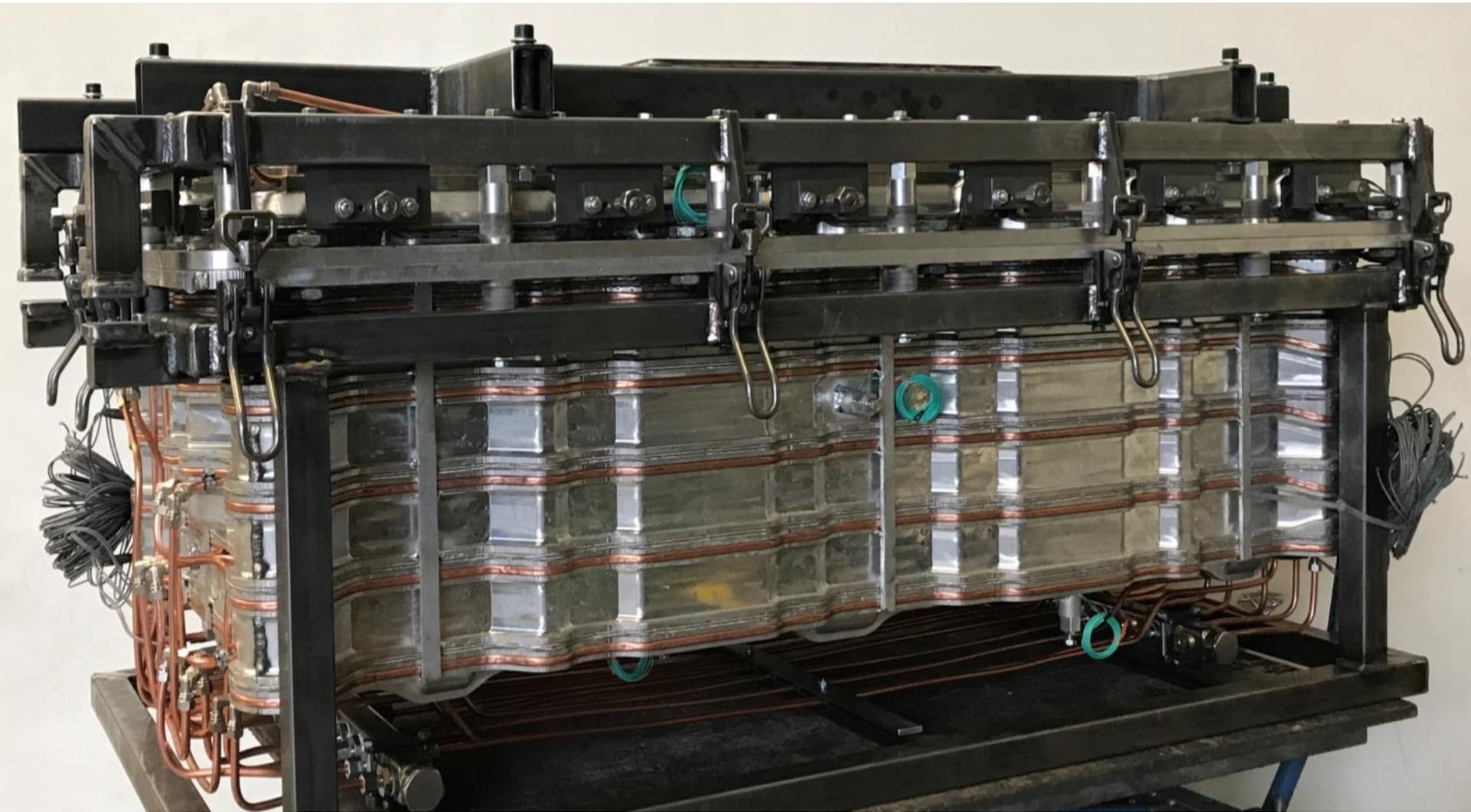
Combining latest mould making possibilities with electrical heating and new cooling method applied automation systems on the mould - run on autonomous, fully controllable and automated rotational machinery equipment - whereas the simulated and generic optimized process cycles are temperature driven.

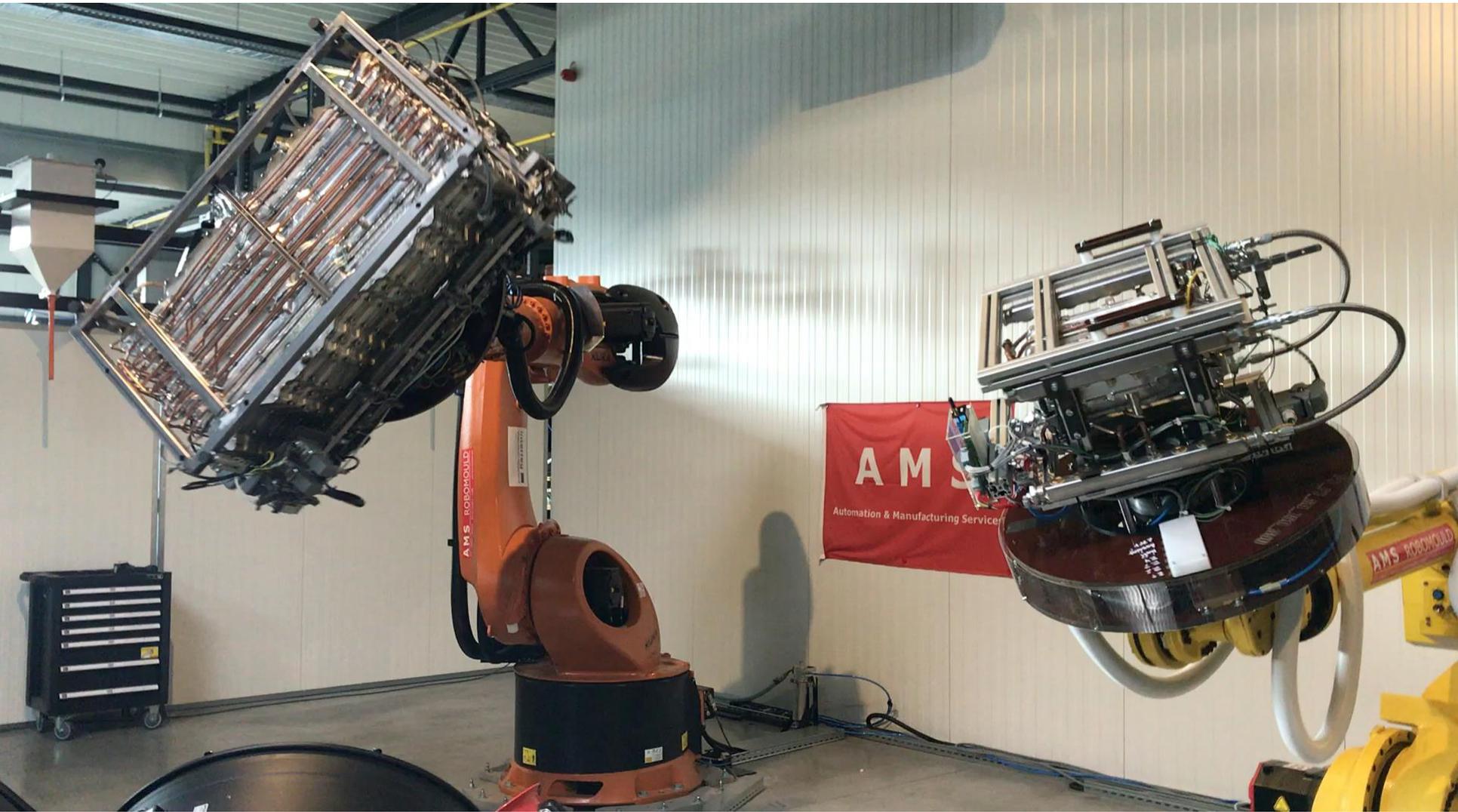
# Electrical heated moulds, heating zones



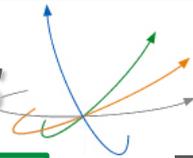


# *semi automated electrical robomould (DTH)*





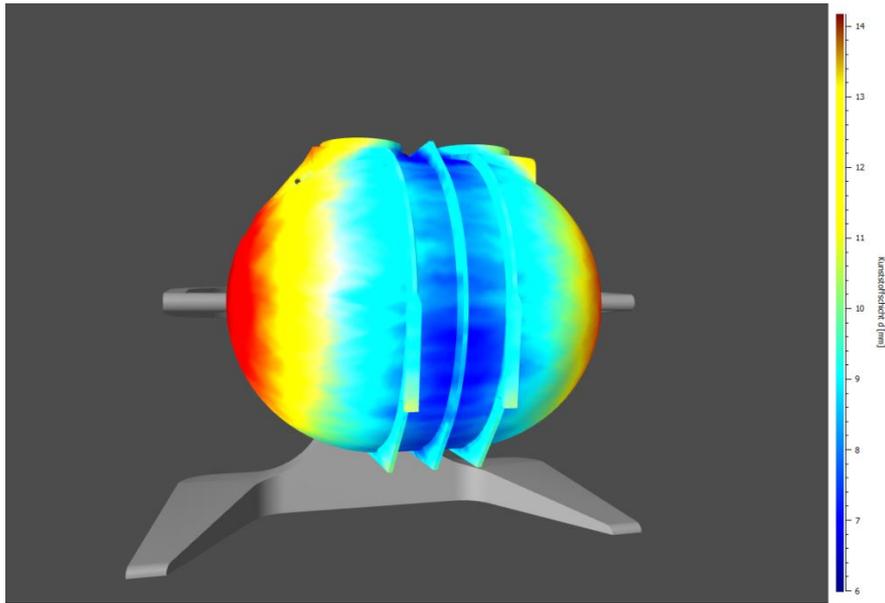
# Electrical heated moulds – pros vs. cons



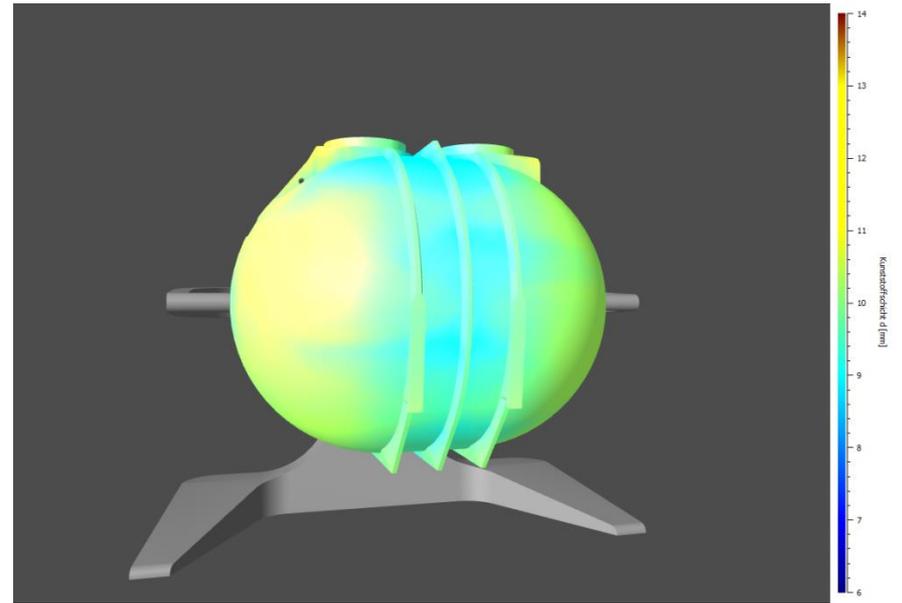
- Most effective, quickest and specific heating, with maximum process controls and configuration
- Small to large moulds, retrofit possible
- Fully automated processing possible
- Complex build, cost, lead-time, ...
- Adjustments & changes very difficult
- Energy supply for large moulds

Kindly supported by IPT,  
abstract from previous presentation

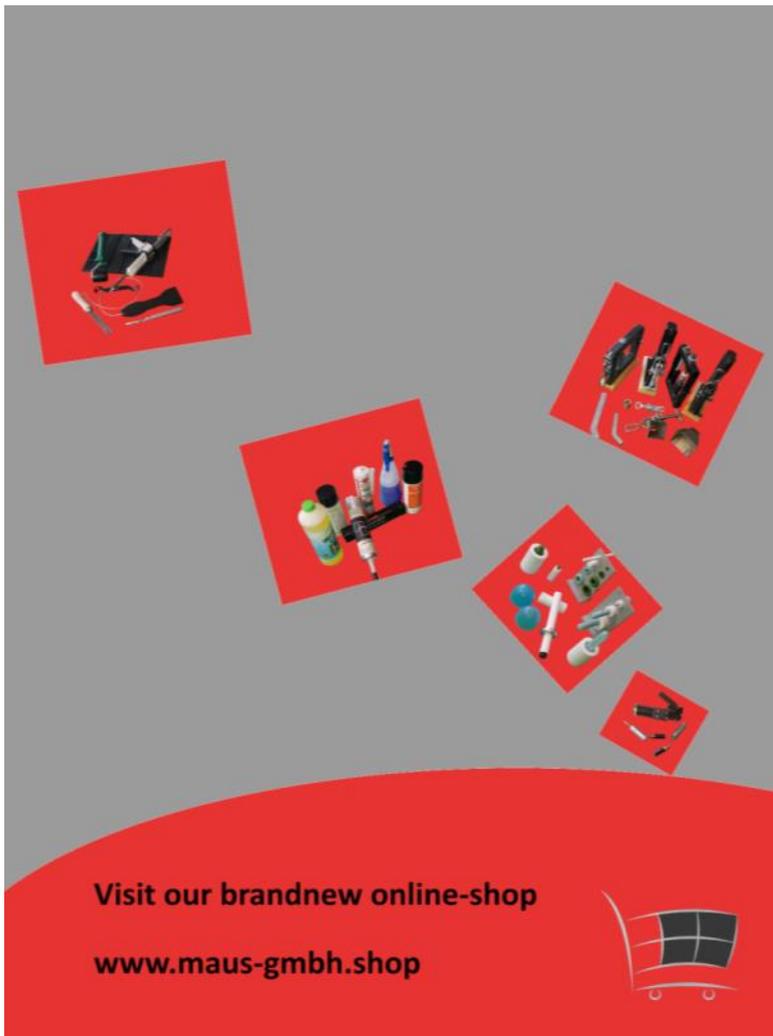
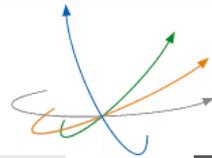
••••• A new simulation software - **RoMoSimulate**



*real process*



*genetic optimized*



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## THANK YOU FOR YOUR KIND ATTENTION

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