



Machinery
overcoming the rotational moulding
limits

persicorotomoulding

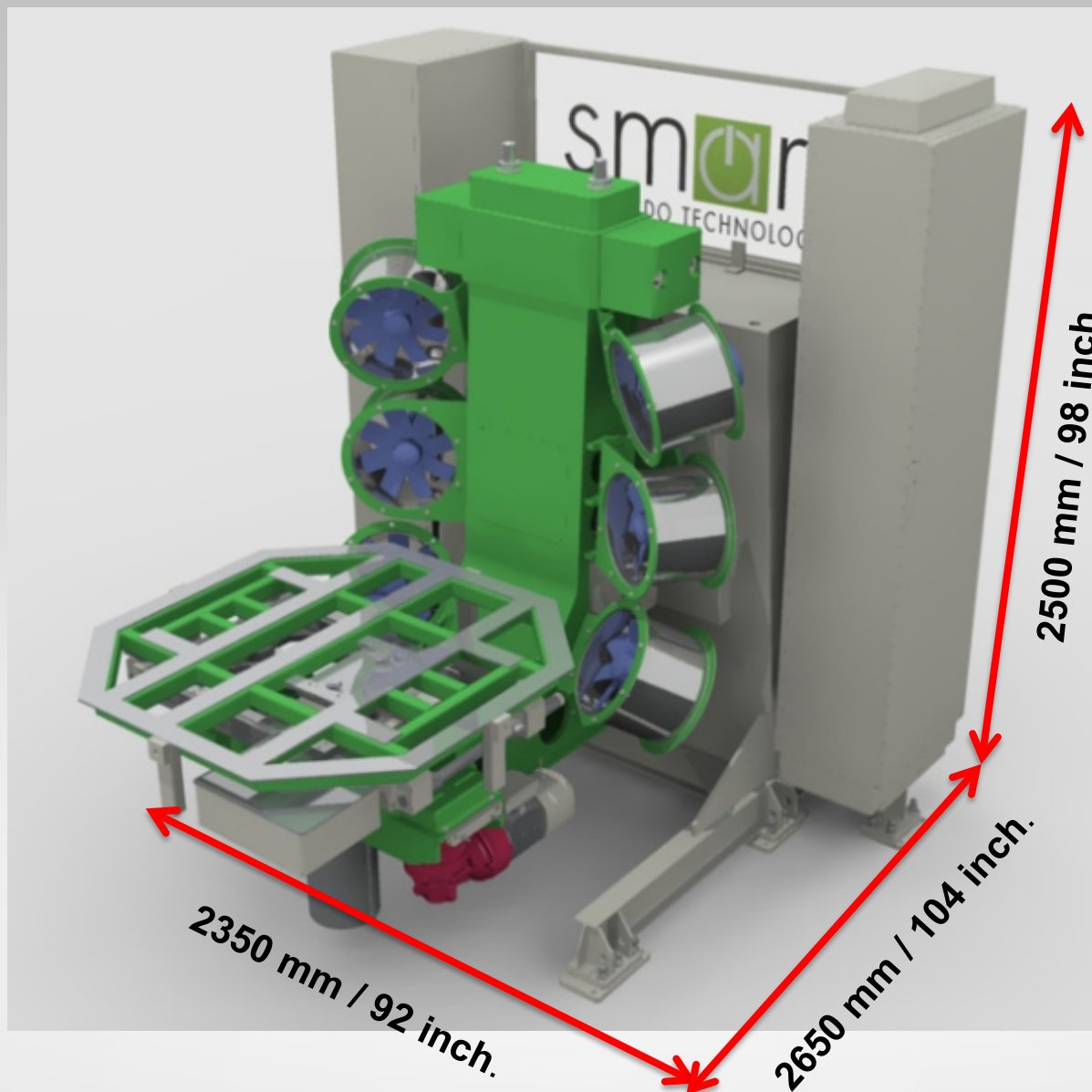
- ✓ Why Smart
- ✓ How it works
- ✓ Lay out
- ✓ Technical specifications
- ✓ Molds
- ✓ Process control
- ✓ Production configurations
- ✓ Benefits and Applications

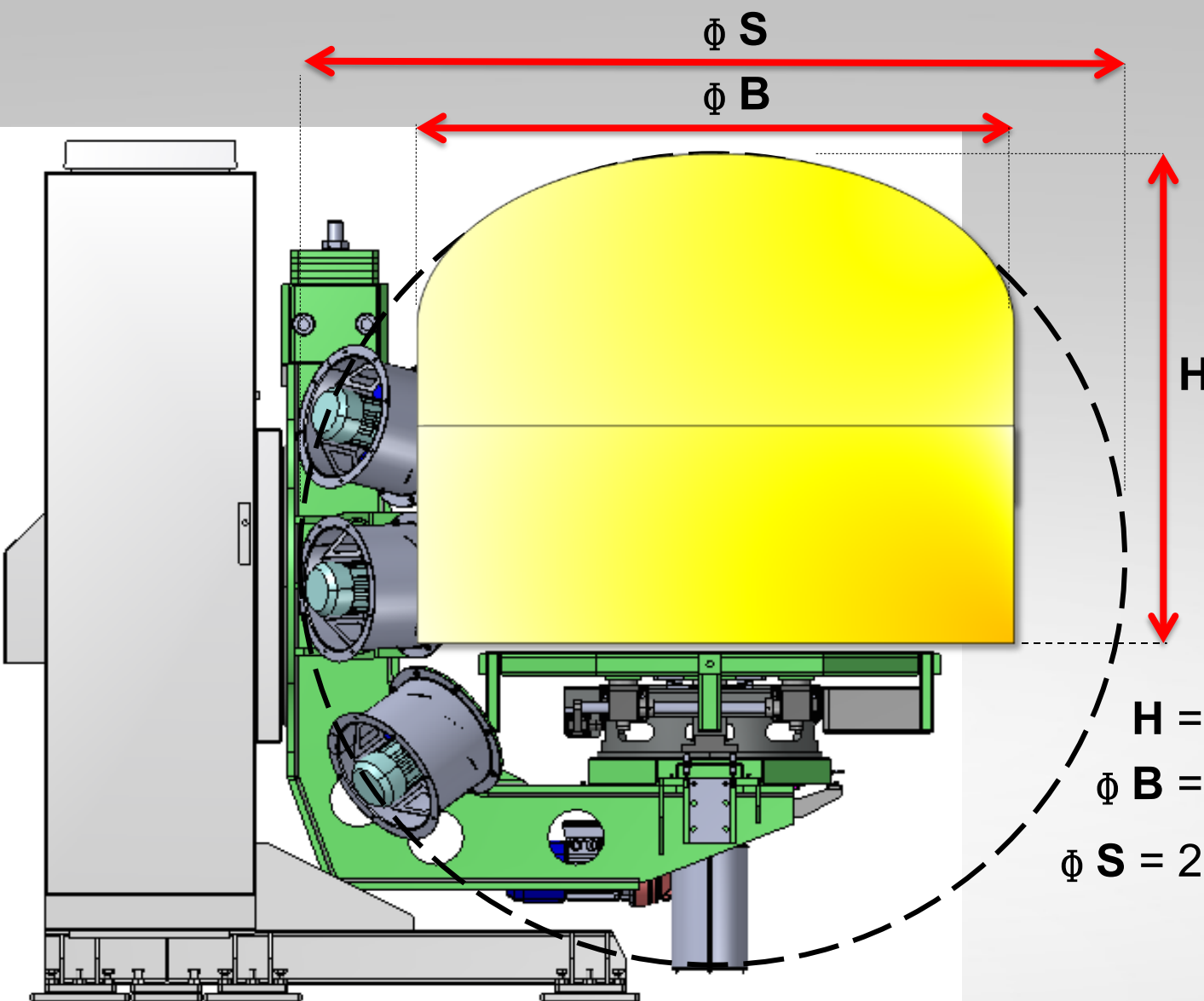
- ✓ Smart features the advantage of Leonardo process control, with the same flexibility and capital investment as a traditional machine.
- ✓ Smart increases rotomoulding market potential by broadening the range of special materials that can be used.



How it works





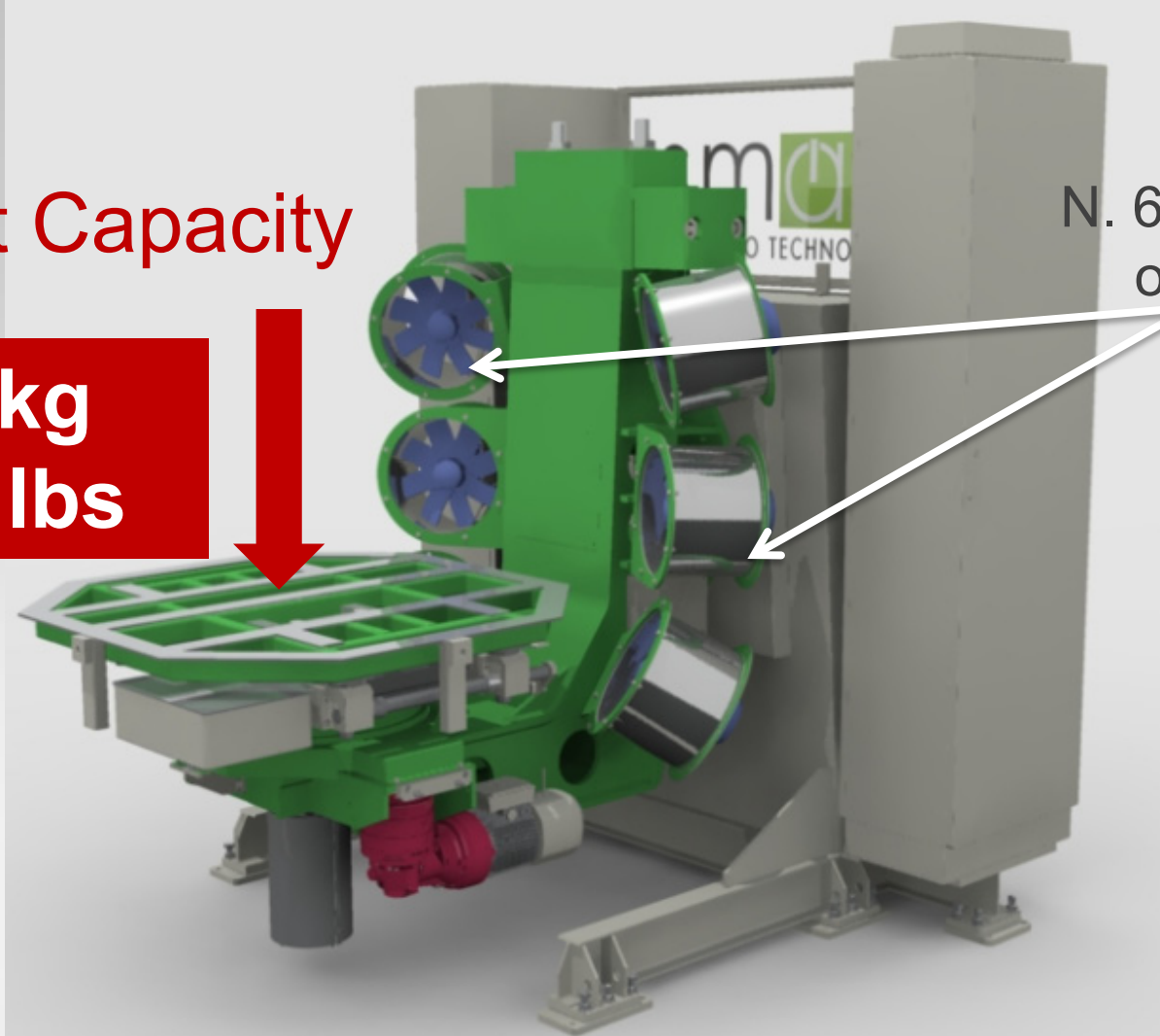


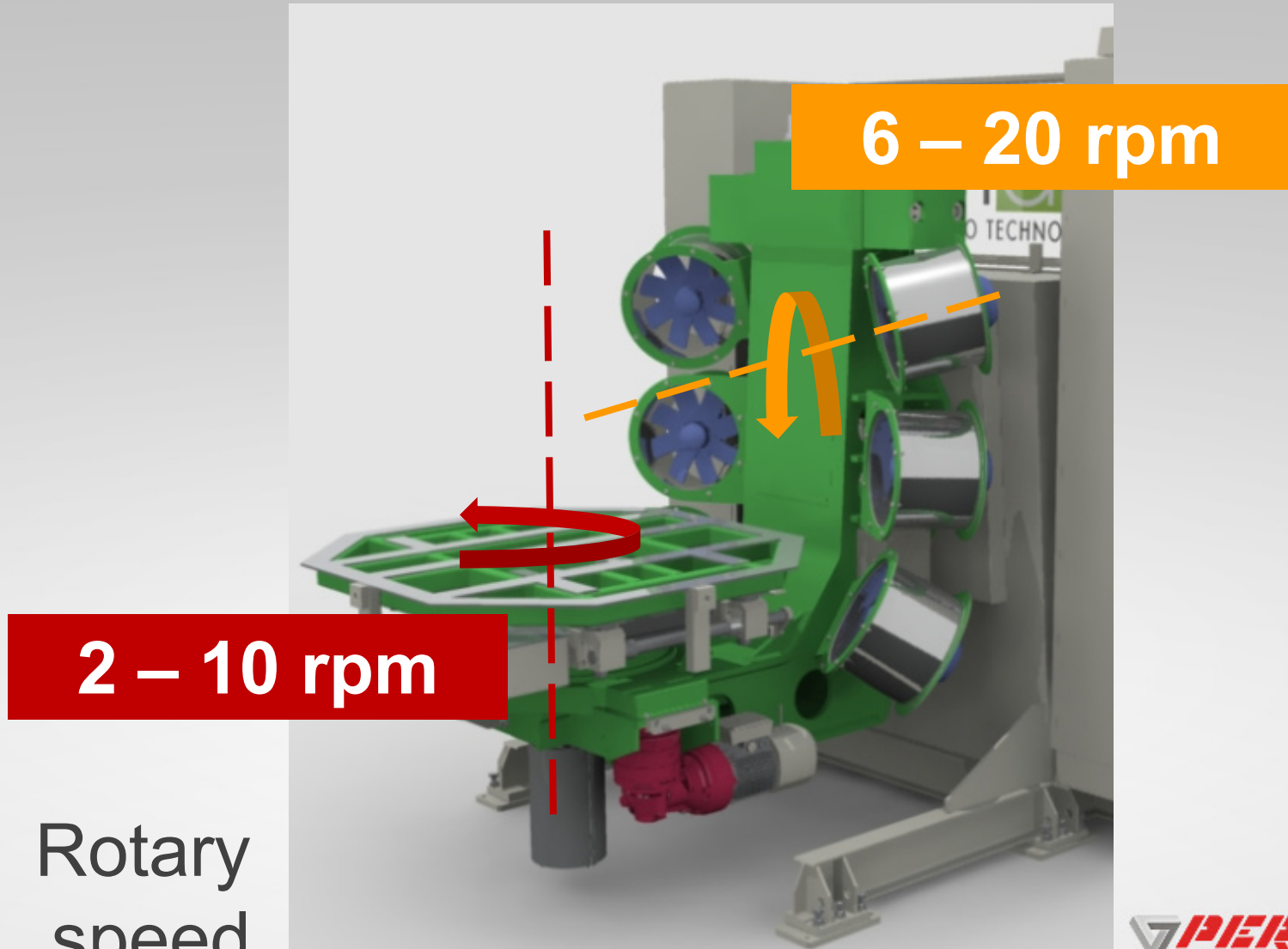
$H = 1400 \text{ mm} - 55 \text{ inch.}$
 $\Phi B = 1700 \text{ mm} - 70 \text{ inch.}$
 $\Phi S = 2200 \text{ mm} - 86,6 \text{ inch.}$

Weight Capacity

650 kg
1430 lbs

N. 6 cooling fans
on the 1 axis





N . Of mold
heating zones

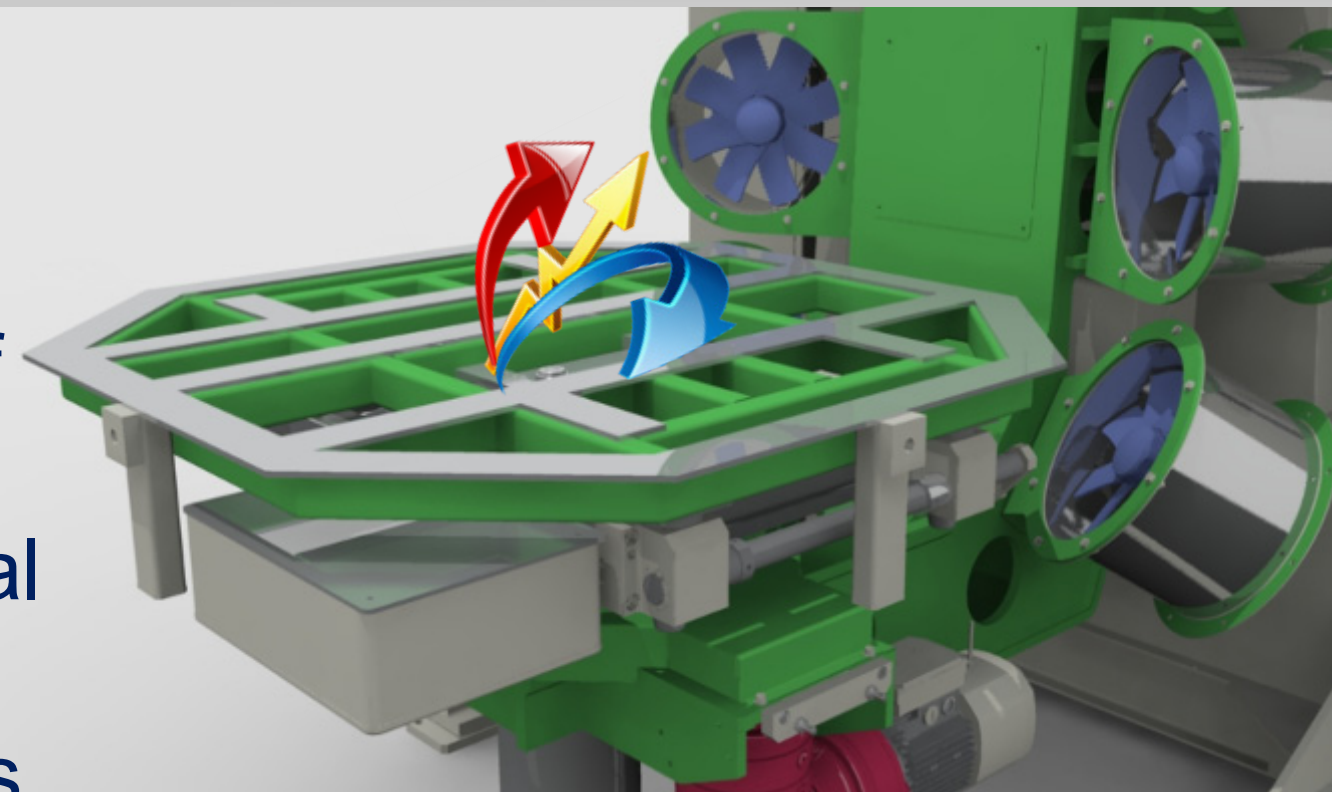
N . Of mold
temperatures probes

16

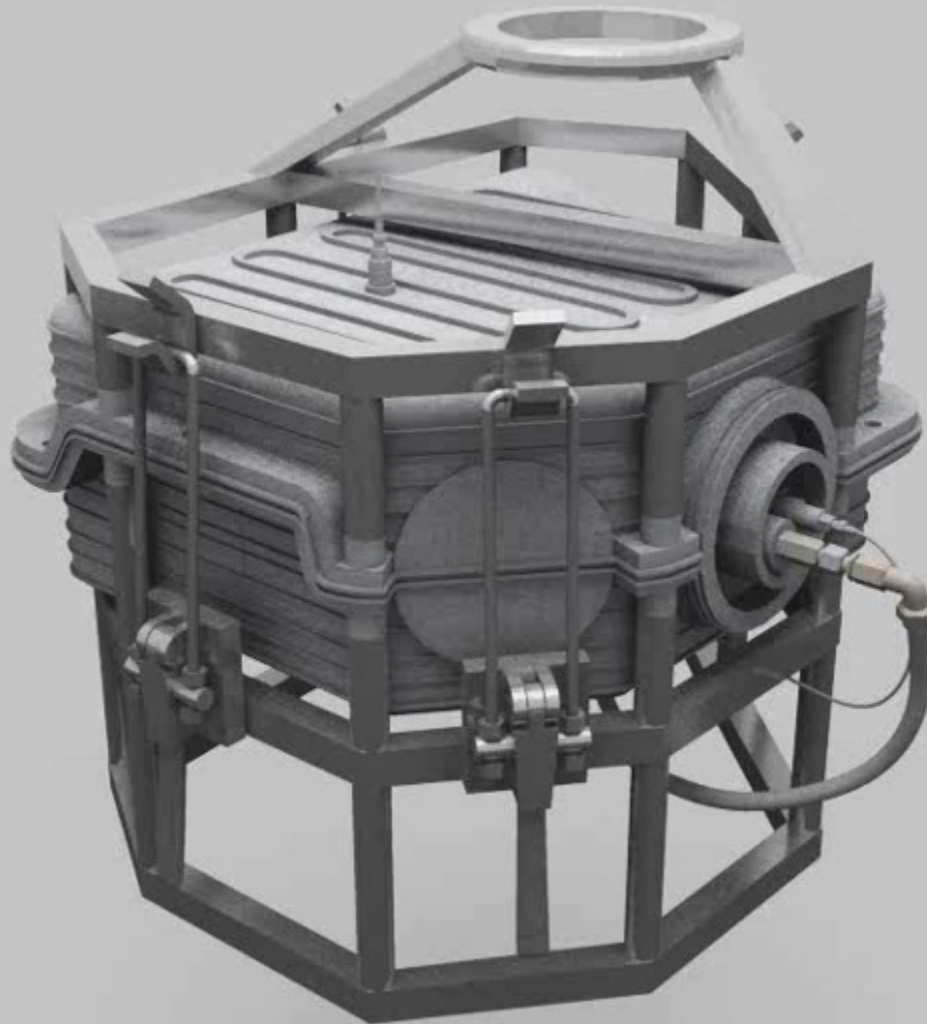
16

N . Of
mold
internal
air
probes

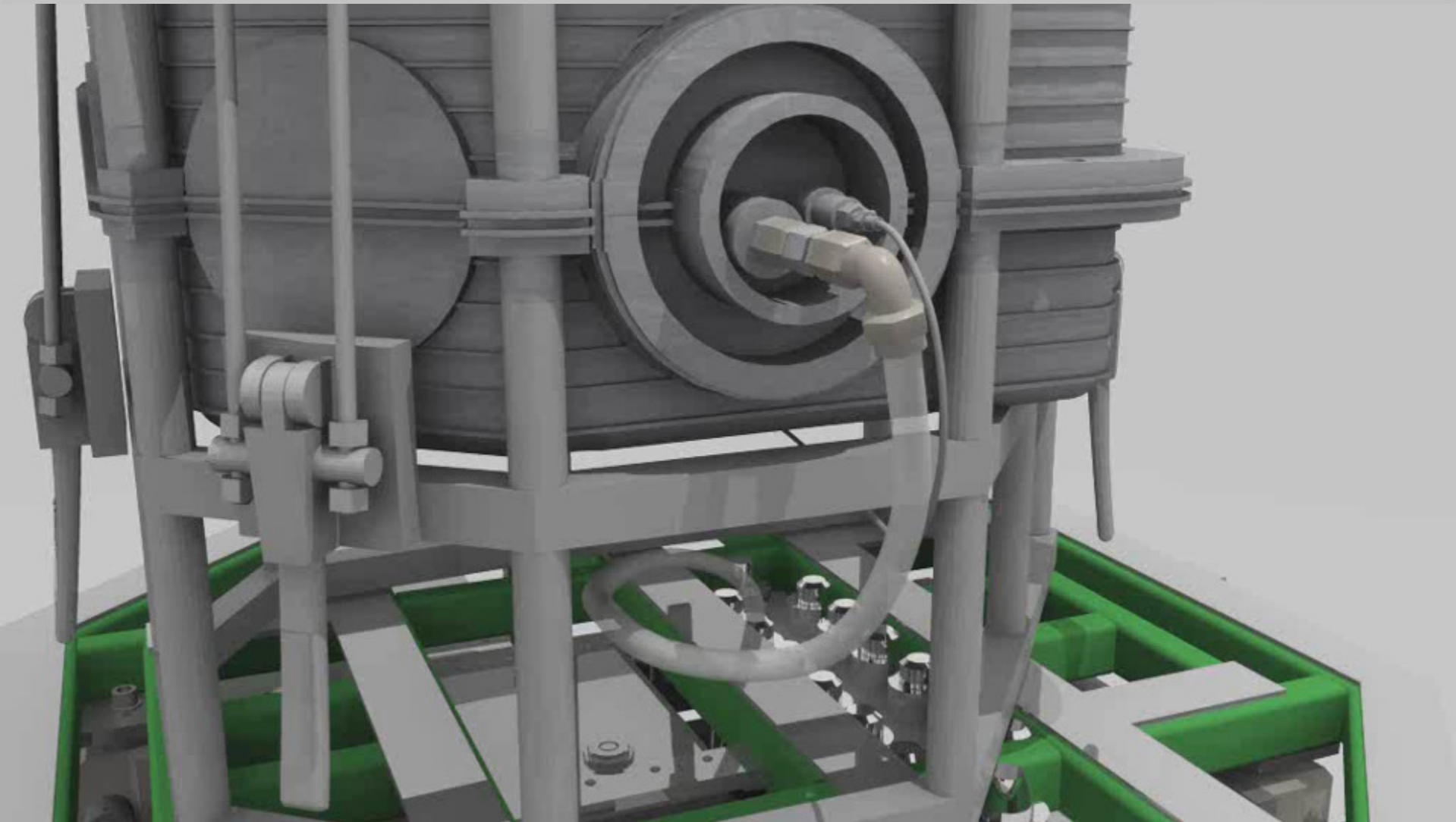
2









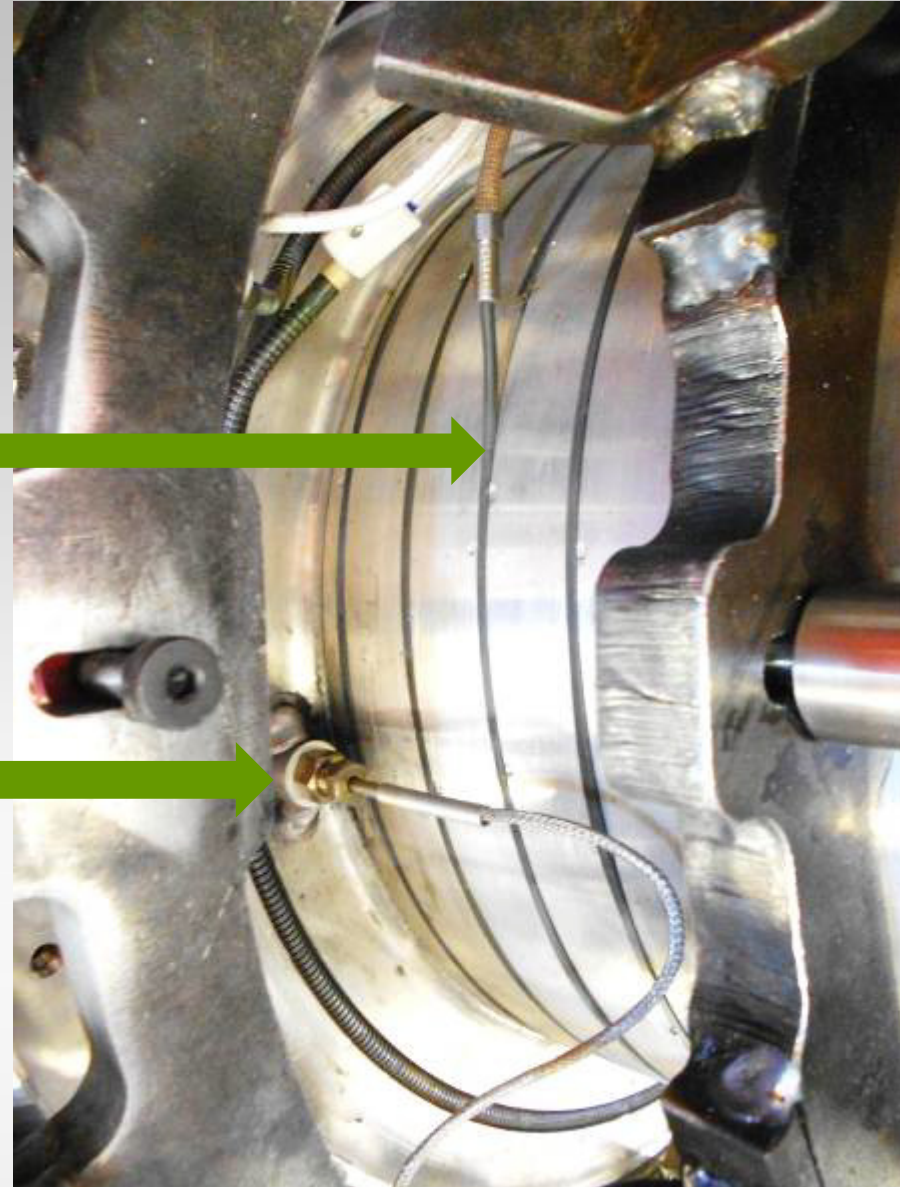


✓CNC Aluminum Mold
with standard Frame



✓ Flexible heaters mechanically locked into channels

✓ Temperature probes



✓ Possible installation of
automatic mechanisms



Potential for traditional molds to be retrofitted for
Smart electrical molding

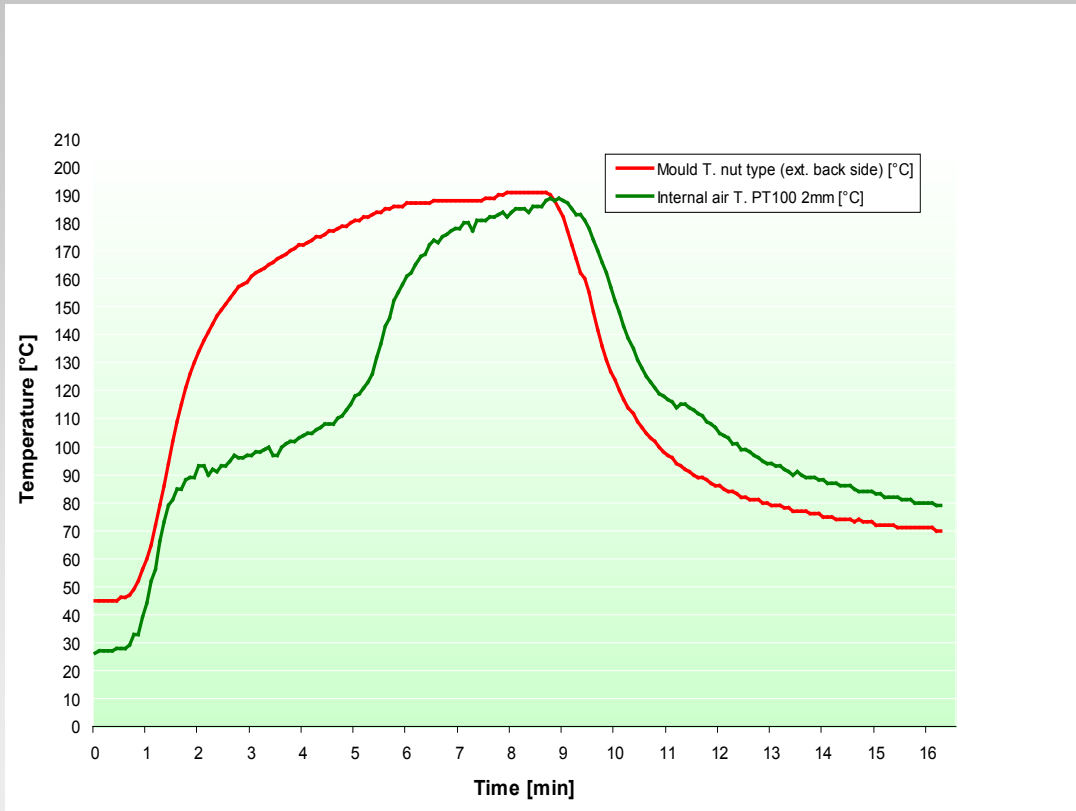


**Mold design
and
construction
with
channels**

**Conventional
production
(oven) for
short run**

**Smart for
mass
production**

Molding Cycle Control

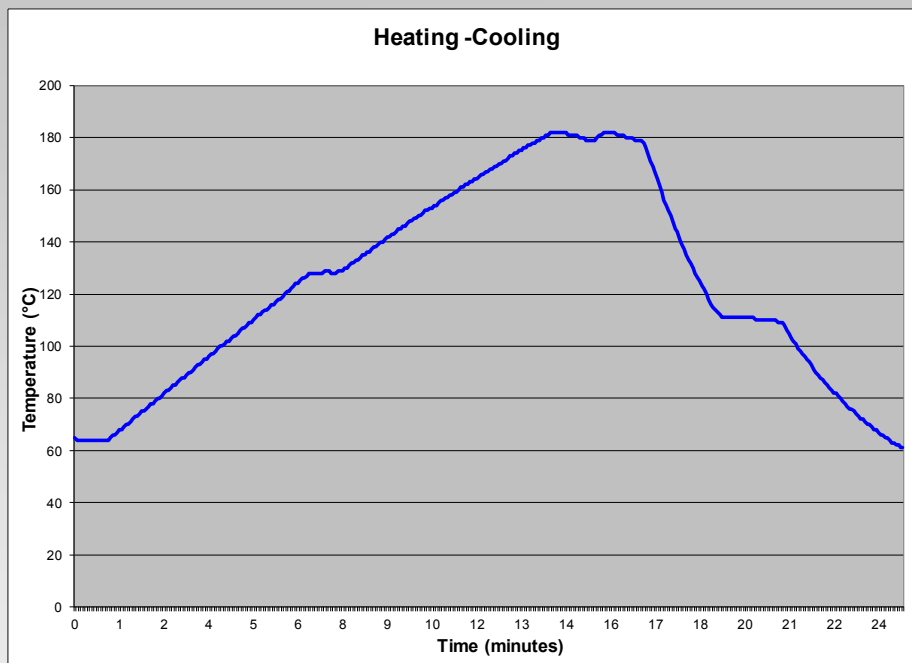


✓ Continuous In-Mold Temperature Control via PLC

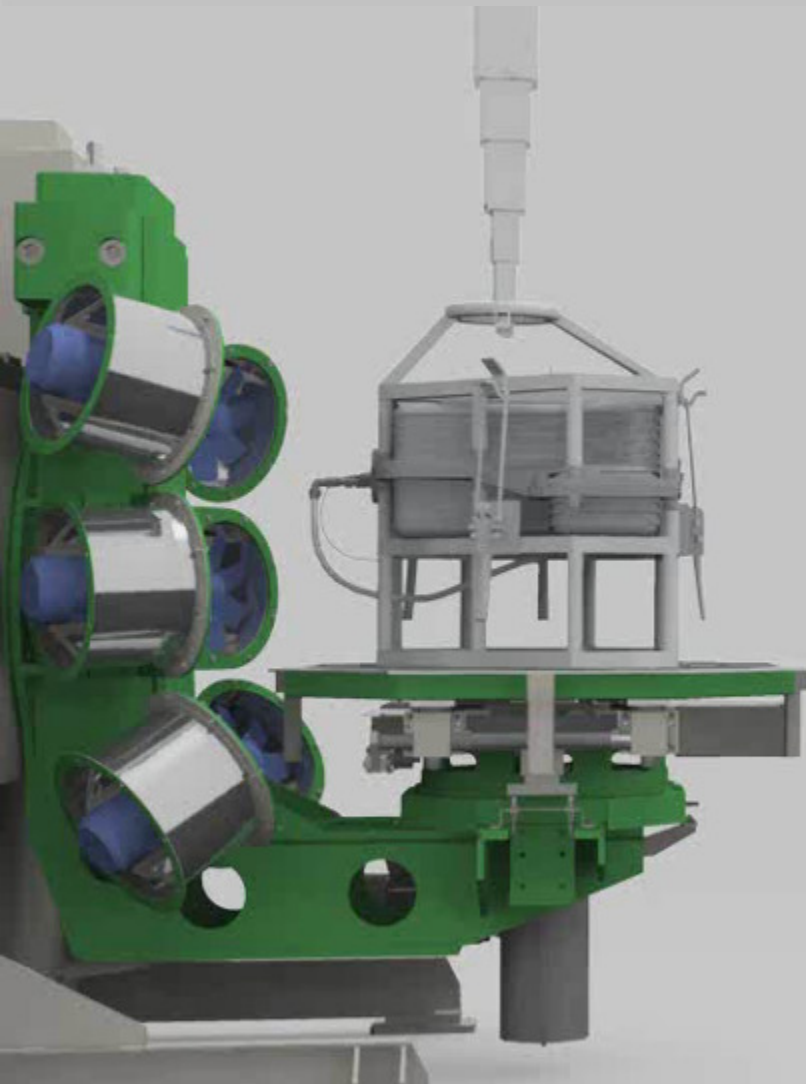
WHY ELECTRICAL HEATING?

- ✓ No Cooling and Heating Units Required (vs. oil heating)
- ✓ Reduced Weight
- ✓ Reduced Energy Usage
- ✓ Higher Upper Temperature Limits for Processing
- ✓ Well Proven Components (Ind. Heaters, Electrical Rotary Joints, etc.)
- ✓ Immediate Machine Start-Up for Production (No Warm-Up)

Process Control



- ✓ Uniform Heating: ± 5 C
- ✓ 70 C (158 F) to 220 C (428 F) in approx. 4 mins
- ✓ Up to 350 C (662 F)
- ✓ Cooling with local fans or venturi devices
- ✓ 220 C (428 F) to 70 C (158F) in approx. 7 mins
- ✓ Stop at Consistent Temperature



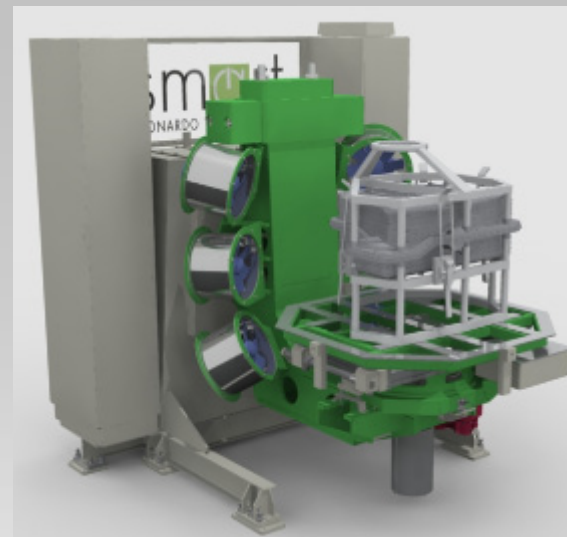
Production Cycle Data

- ✓ Operation: 24 hours x 6 days x 48 weeks
- ✓ Efficiency: 90%
- ✓ Part Thickness: 4 mm (0.160 in)
- ✓ Material: Polyethylene

Configuration

One Machine

1 Mold Fixed on Arm
(Continuous Operation)



Cycle #1

Cycle #2

SMART



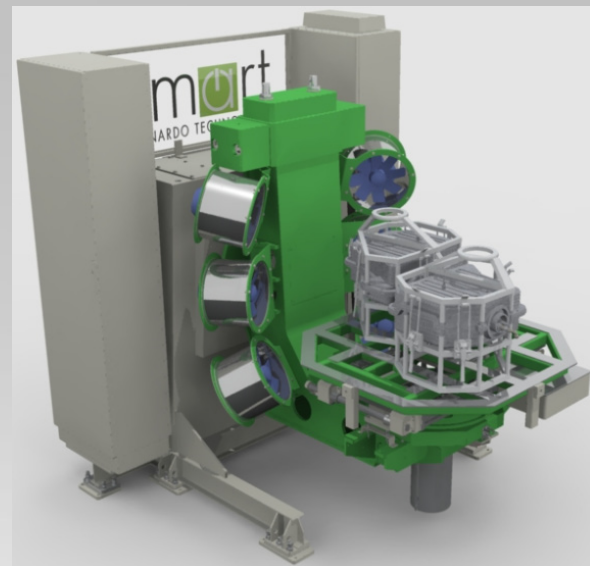
✓ Machine Productivity: 11,300 pcs/years

✓ Mold Productivity: 11,300 pcs/mold/year

Configuration

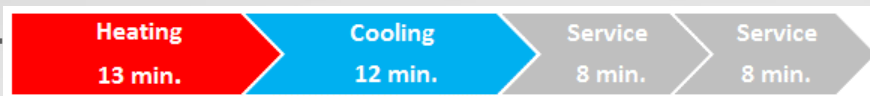
One Machine

2 Molds Fixed on Arm
(Continuous Operation)

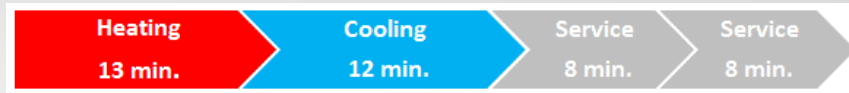


Cycle #1

SMART



Cycle #2

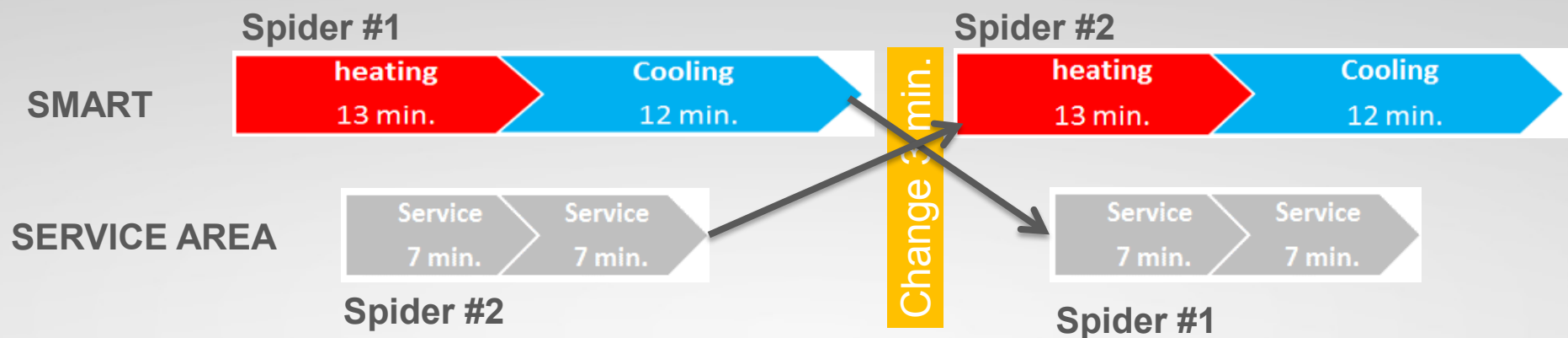
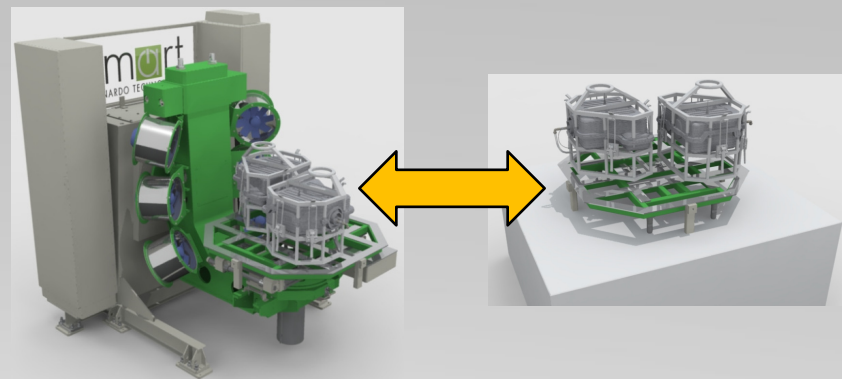


- ✓ Machine Productivity: 18,207 pcs/year
- ✓ Mold Productivity: 9,103 pcs/mold/year

Configuration

One Machine

2 Molds on 2 Spiders
(Interchanging Operation)

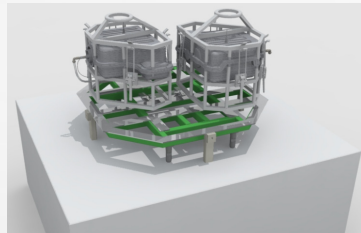
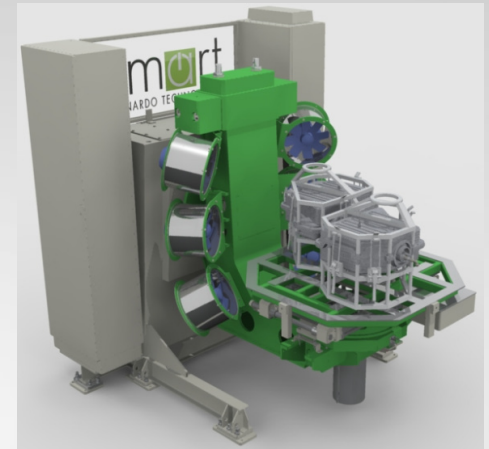
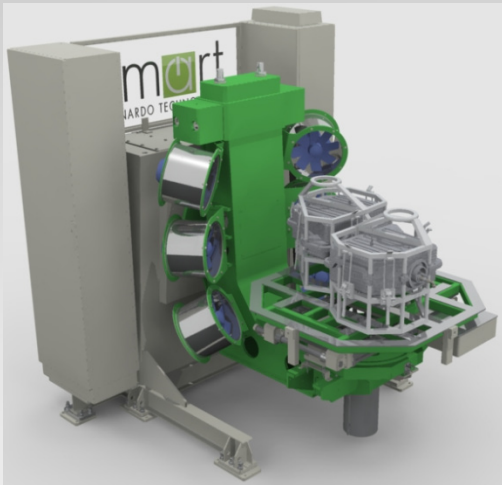


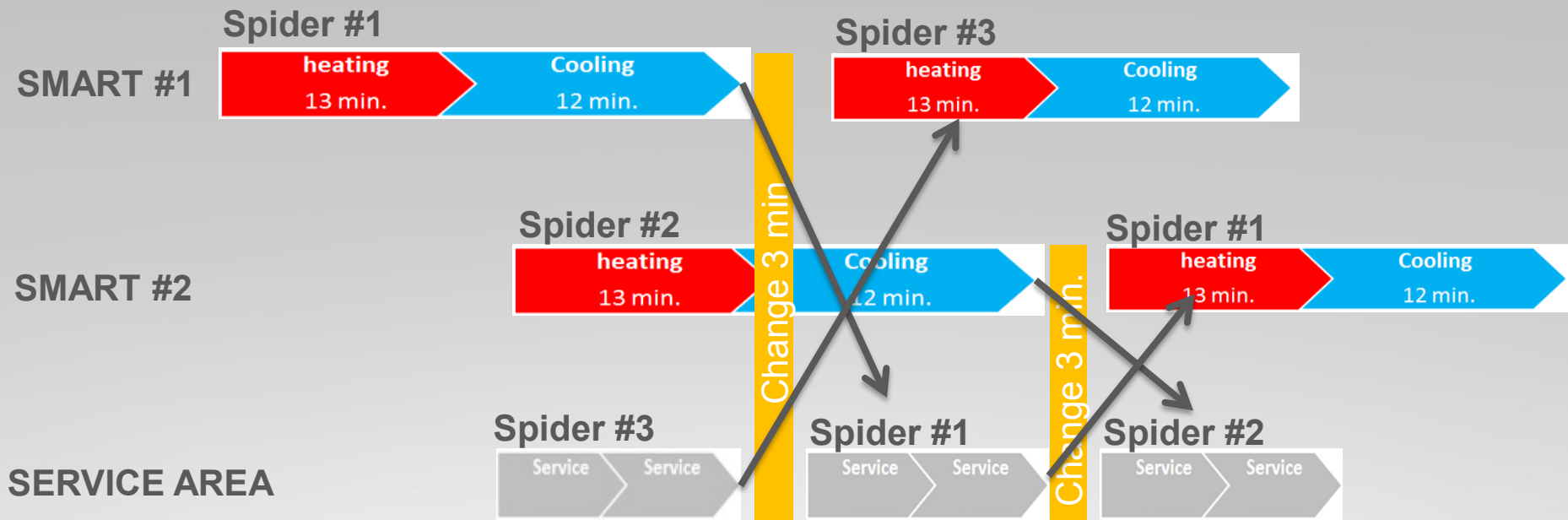
- ✓ Machine Productivity: 26,600 pcs/year
- ✓ Mold Productivity: 6,650 pcs/mold/year

Configuration

2 Machines

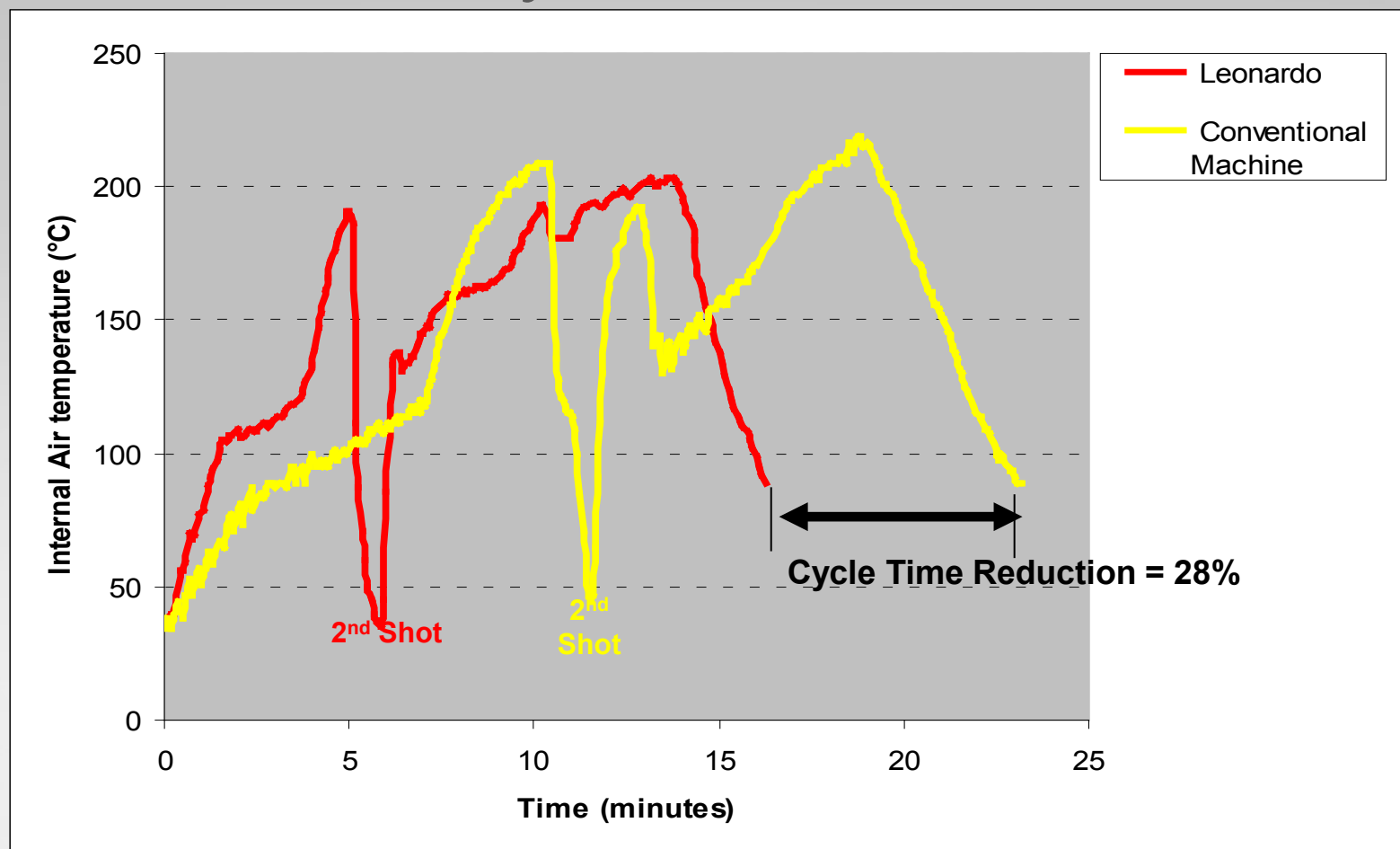
6 Molds on 3 Spiders
(Interchanging Operation)





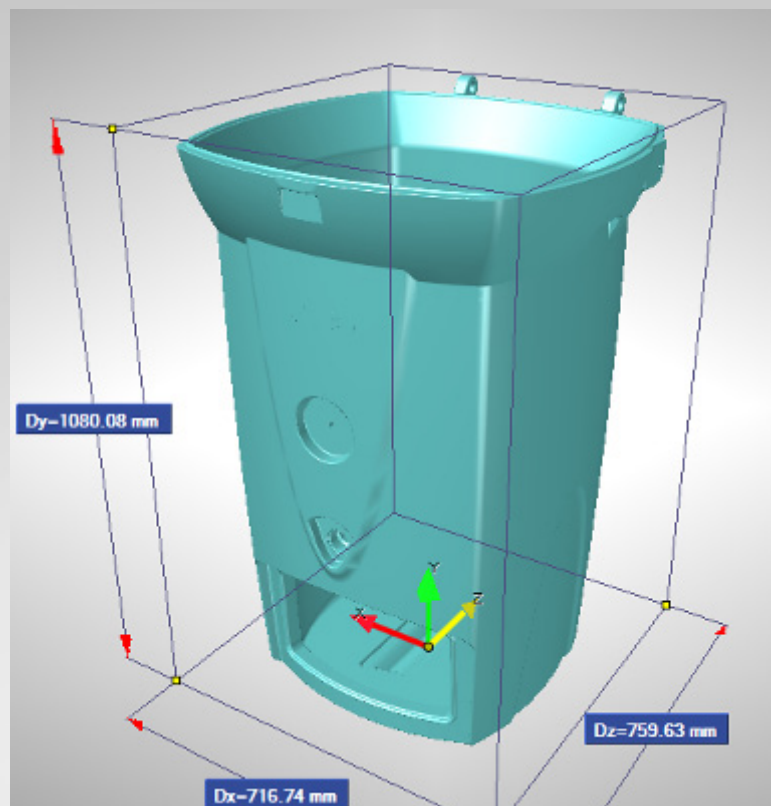
- ✓ System Productivity: 43,900 pcs/year
- ✓ Mold Productivity: 7,300 pcs/mold/year
- ✓ Only 1 Operator Required

Shorter Cycles – Two Shots



Courtesy Total Petrochemicals

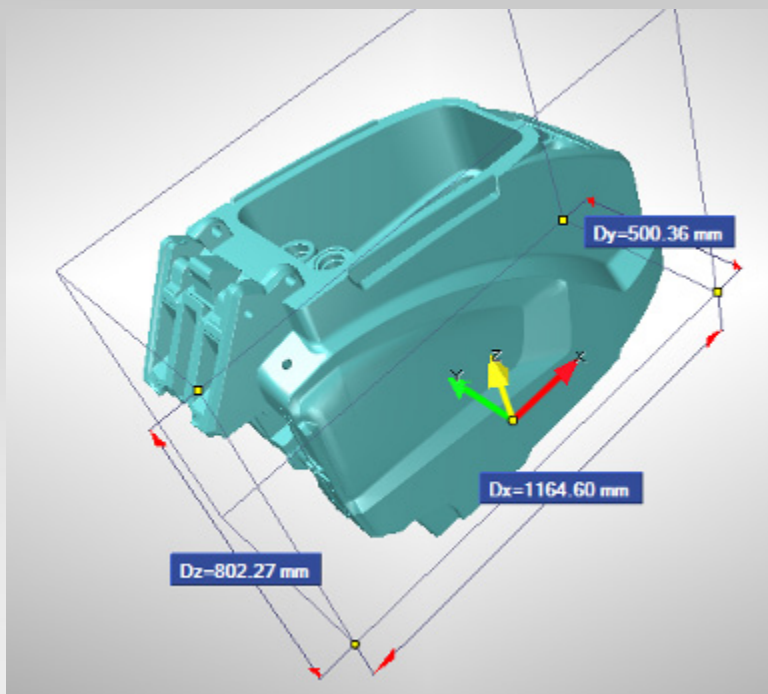
Reduced Energy Consumption



- ✓ Material: PE
- ✓ Weight: 15 kg (33 lbs)
- ✓ Energy Consumption: 11,5 kw-h /cycle

Dimension: 716 x 759 x 1.080 (mm)
Body of composter

Scrap Reduction

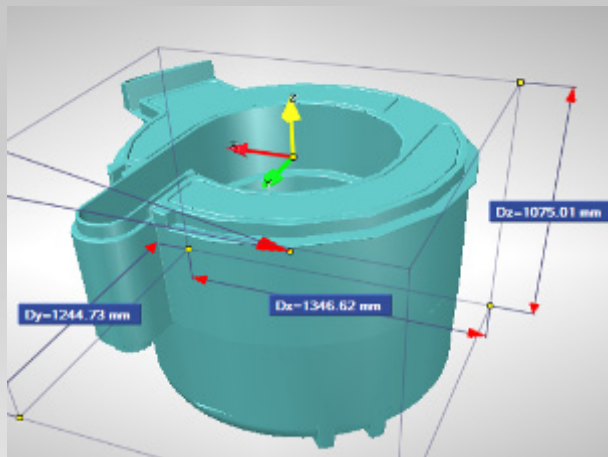


- ✓ Material: PE
- ✓ Weight: 20 kg (44 lbs)
- ✓ Scrap with Leonardo: 0,5%
- ✓ Scrap with Conventional > 4%

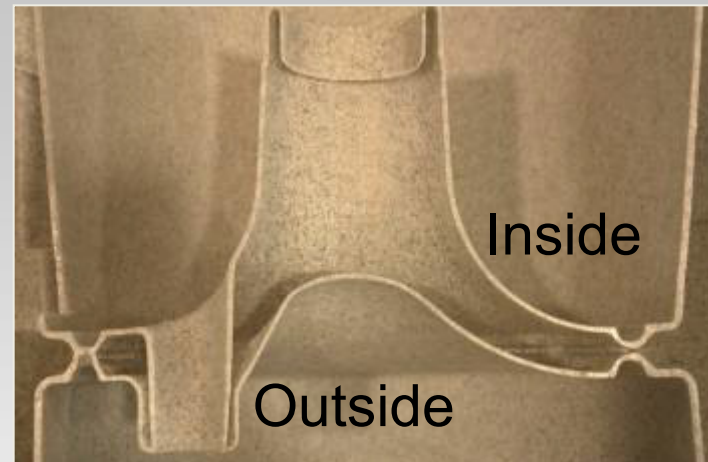
Dimension: 1.164 x 500 x 802 (mm)

Body of cleaning machine

Raw Material Reduction



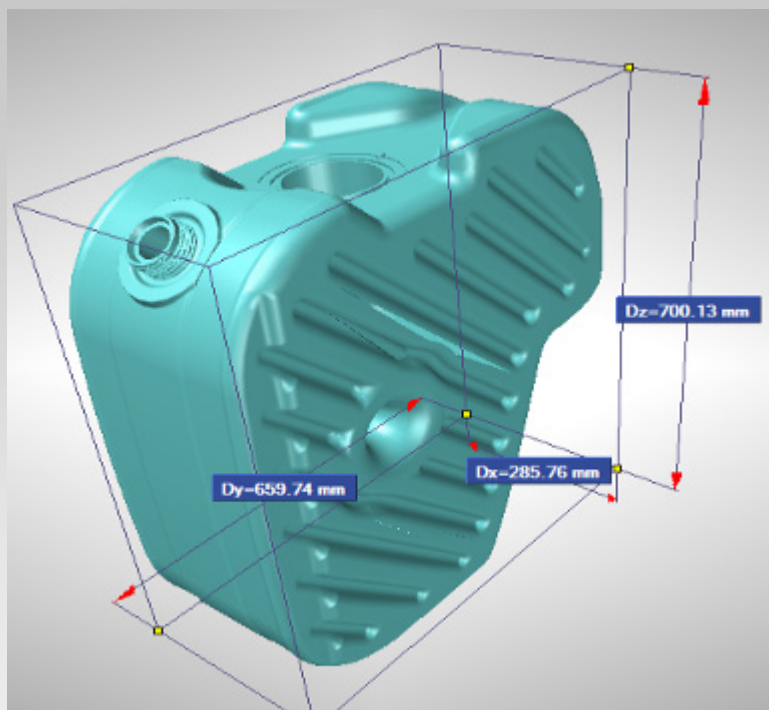
Dimension: 1.244x1346x1075(mm)



Fish farming water filter

- ✓ Material: PE
- ✓ Weight: 30 kg (66 lbs)
- ✓ Raw Material Saving: Leonardo vs. Conventional > 15%

Process Repeatability



- ✓ Material: PE
- ✓ Weight: 7.8 kg (17 lbs)
- ✓ Capability values: dimension: 695 mm
 - CpK: 1,42

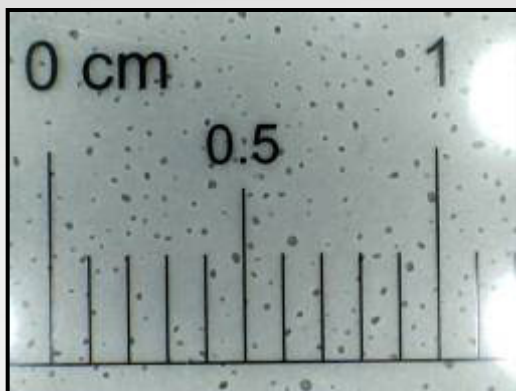
Dimension: 659 x 285 x 700 (mm)

Urea tank

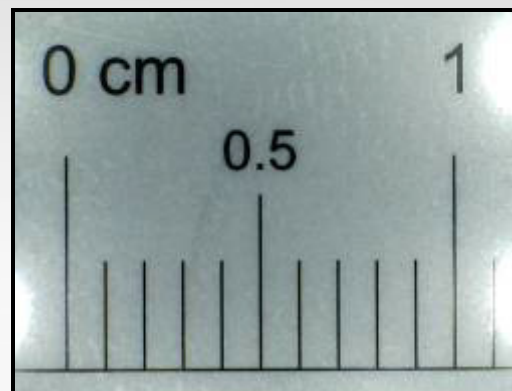
Partial Vacuum

inside the mould during the heating

- ✓ More effective cooling of the plastic part
- ✓ Bubbles (or pin-holes) are removed rapidly
- ✓ Cycle times can be reduced
- ✓ Impact strength of the molded part is increased



Atmospheric Pressure
PIAT: 180-200 C (356-392 F)
Impact: 87-100 ft.lbs.



Vacuum Applied: – 0,7 bar
PIAT: 160-180 C (320-356 F)
Impact: 121-128 ft.lbs.

> 35%

All this makes SMART ideal for:

- ✓ Technical Components
- ✓ Tight Tolerances
- ✓ Dimensional Stability
- ✓ Complex Geometric Shapes

Special materials

require major **process controls**

(pressure, temperature, etc.)

XLPE,PA6 (caprolactam): Fuel and Hydraulic oil tanks



Polycarbonate: Furniture and Light Globes



Multilayers: Fuel tanks



Multilayers: Foam



BioPolymers-PLA Technical, High Performance Applications



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Thank you

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