

Moldex3D Users' Meeting - Italy 2016

Friday, Jun 24
Golf Club Lecco



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HRS FlexFlow Technology: *validation of a practical case on lighting application*

HRS - Inglass
Nicola Pavan



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MOLDING INNOVATION



HRS FlexFlow Technology:
*validation of a practical case on
lighting application*



Nicola Pavan – *CAE Manager*

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24-06-2016

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Who we are

- ✓ 15 Rheological analysis specialists
- ✓ 4 Senior Engineer Professional Level Certified (Formally Silver)
- ✓ 4 CAE centers on different jet lag
- ✓ Top Autodesk Moldflow and Moldex 3D licenses

Our experts are in the major production centers:

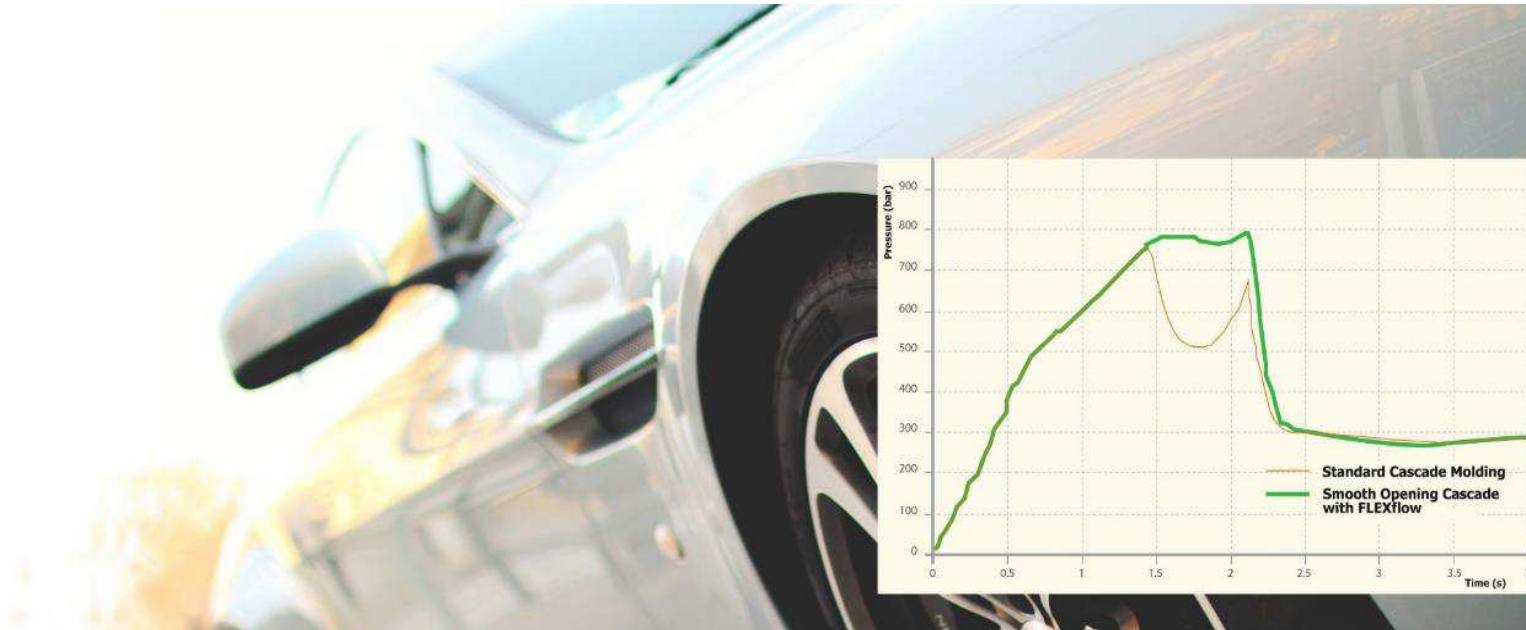
- Italy (EMEA)
- China/India (APEC)
- Canada/USA (NAFTA)
- Brazil (MERCOSUR)



FLEXflow



FLEXflow – The servo-driven valve gate system



What? The FLEXflow is an innovative electric servo-driven valve gate system

Output? Obtain accurate, easy and flexible pressure and flow rate control during the injection process

How? Through an independent adjustment of each valve pin during opening and closing phases, with a precise control of position, stroke, velocity and acceleration.

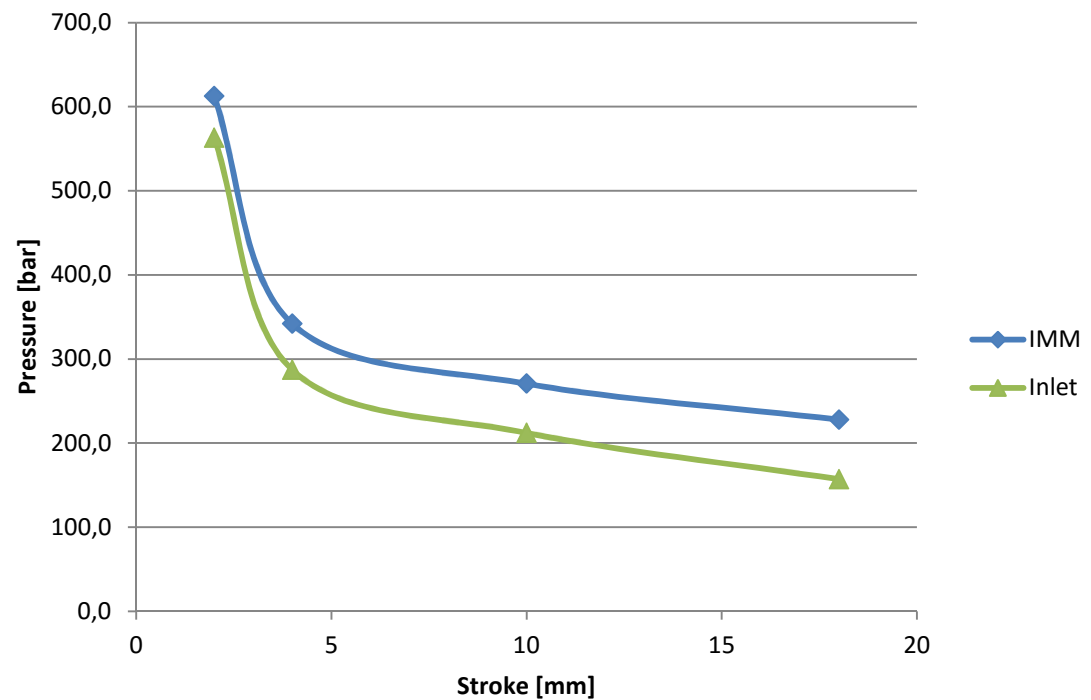
How does FLEXflow work?

FLEXflow cylinder allow a local regulation of pin stroke and velocity over time ensuring the largest capability in process control by:

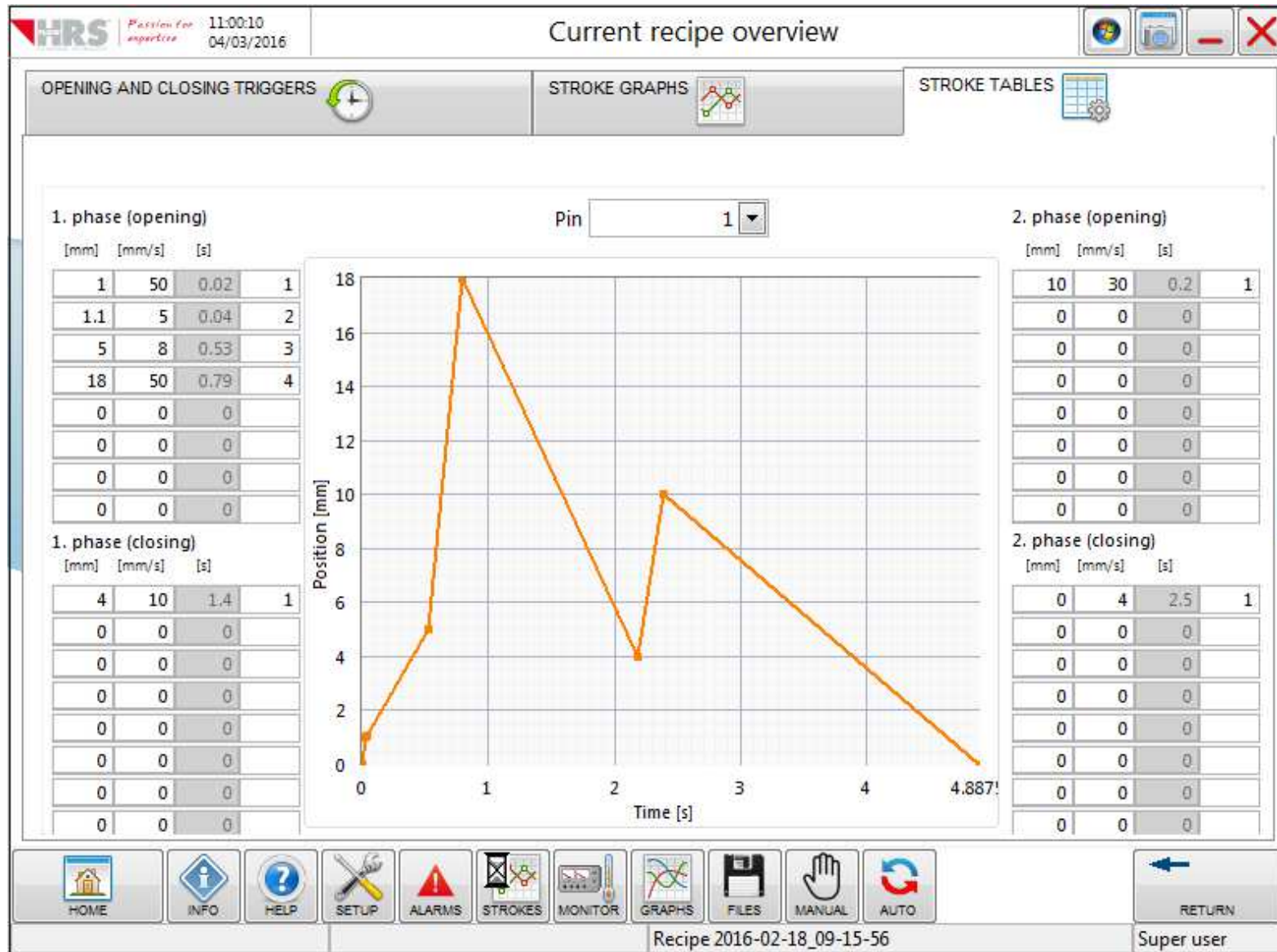
- Local control of flow rate during filling
- Local control of pressure during packing

The plot shows the real possibility of pressure regulation at constant flow rate.

Up to 400 bar can be recovered on average flow rate values (150÷200 cm³/s)



Setting capability



Main Advantages: aesthetical quality



1 Surface quality improvements: Class "A" large surface, grained surfaces, aesthetical parts

2 Optimal flow balancing for family moulds (flash removal)

3 Warpage reduction



DOE and run settings



Model description and process settings

Prototype tool: Single cavity thin wall lens

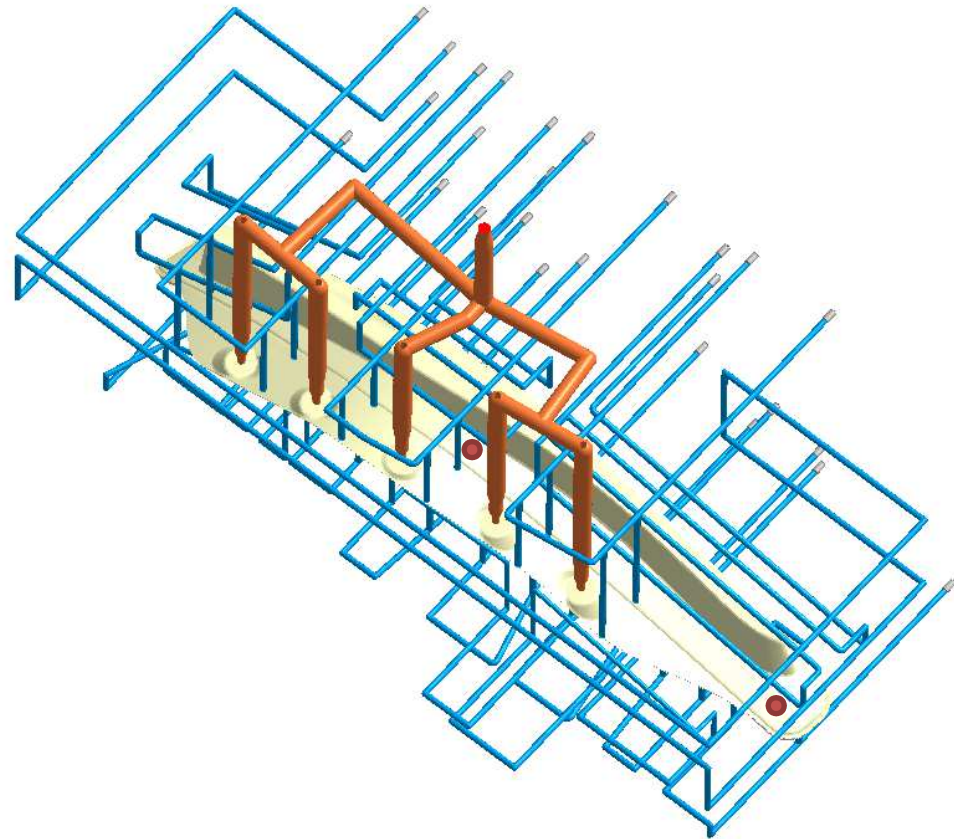
Part thickness: 18.0 mm

System definition: 5 drops valvegate Ø18 mm

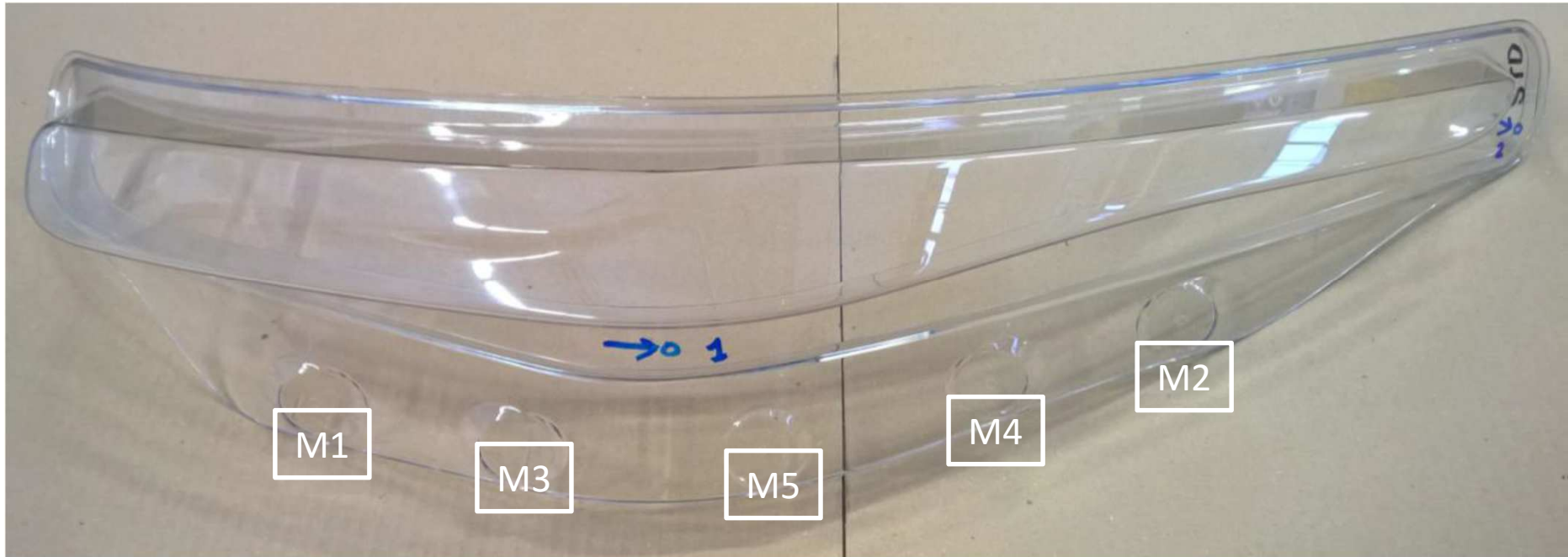
Material: Makrolon AL2447

Additional equipment: 2 pressure sensors

Melt temp	315°C
Water temp	70°C
Fill time	2.5 s
Packing time	17 s
Packing pressure	73 MPa
Cycle time	47 s
Mesh Tech	BML 5 layers
Mesh size	3.7 x 10 ⁶

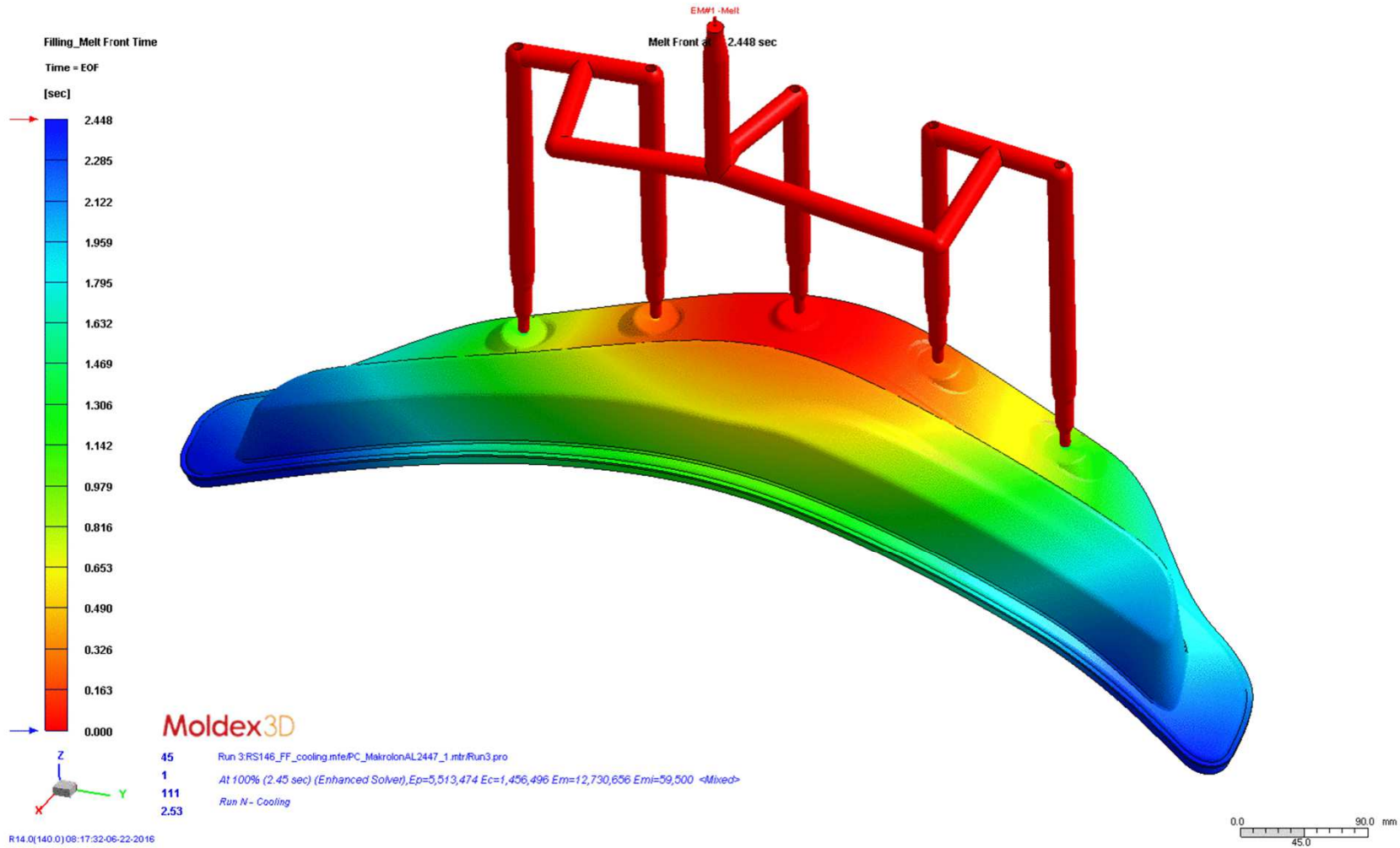


Picture of the part with pressure sensor locations and gates number



Filling results

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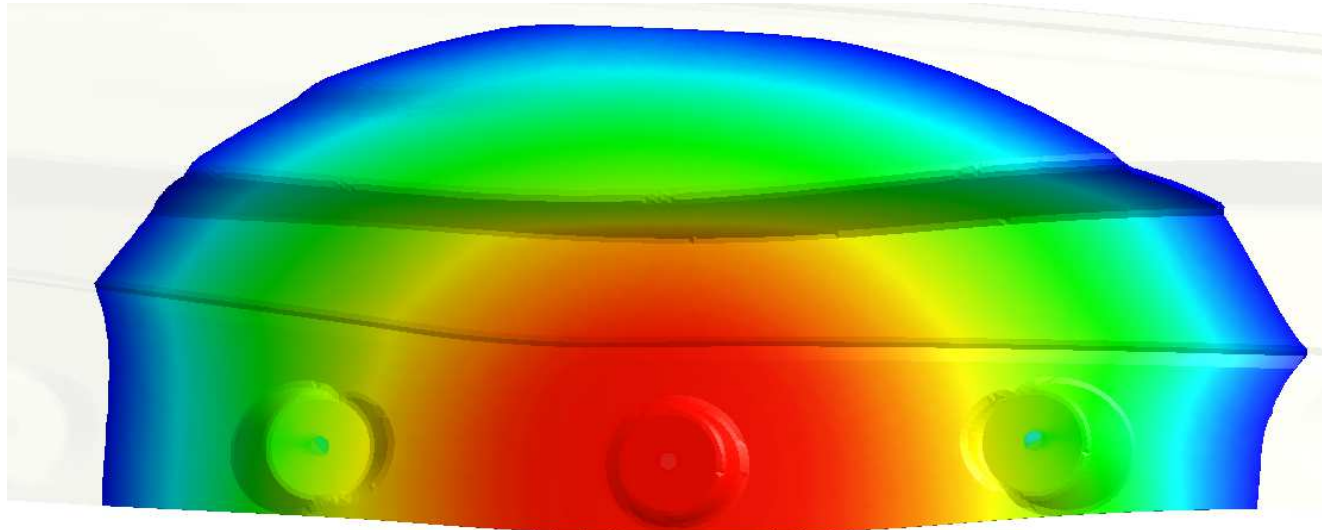


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Filling results 2

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Short shot on machine are in line with flow prediction by software

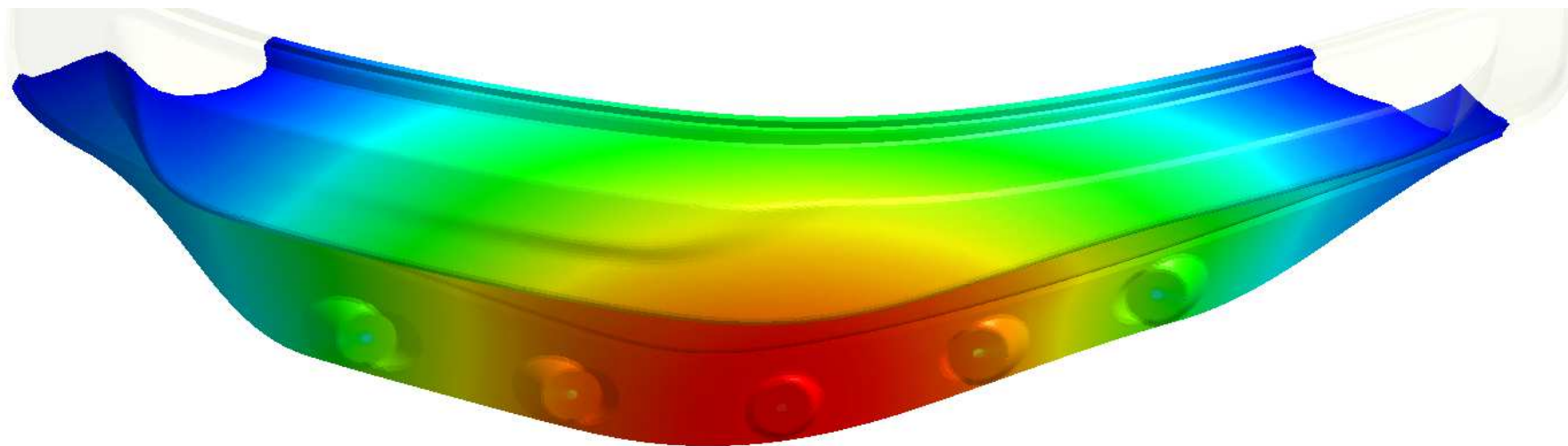


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Filling results 3

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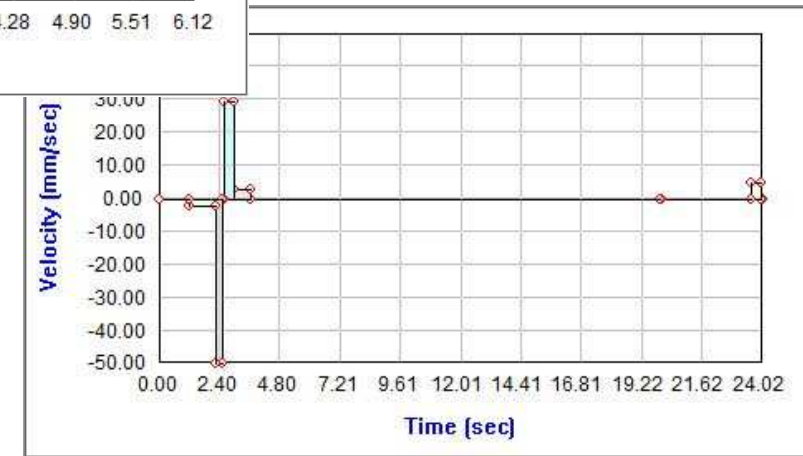
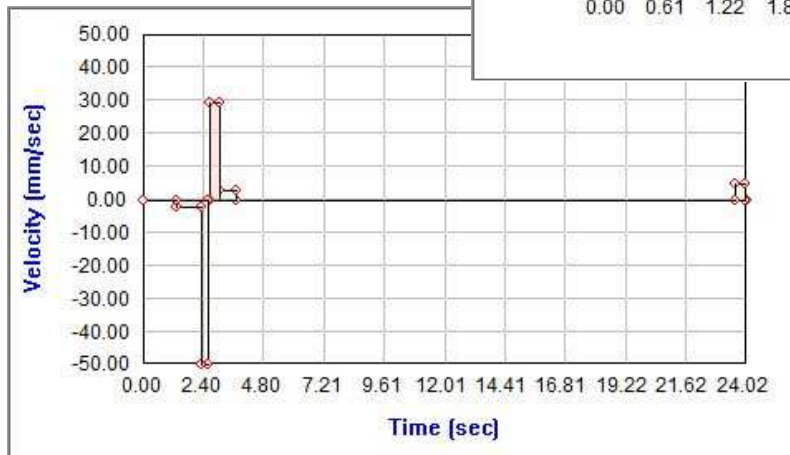
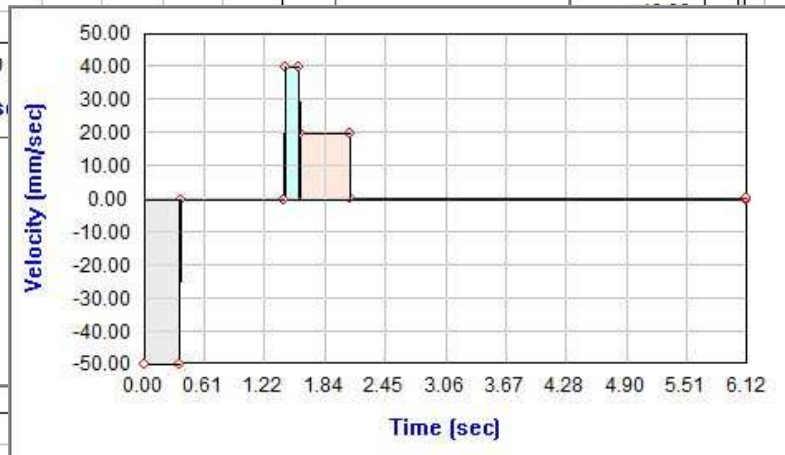
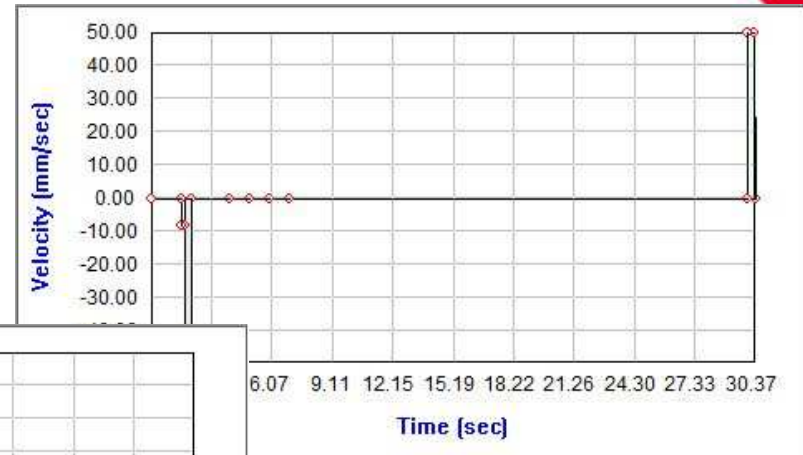


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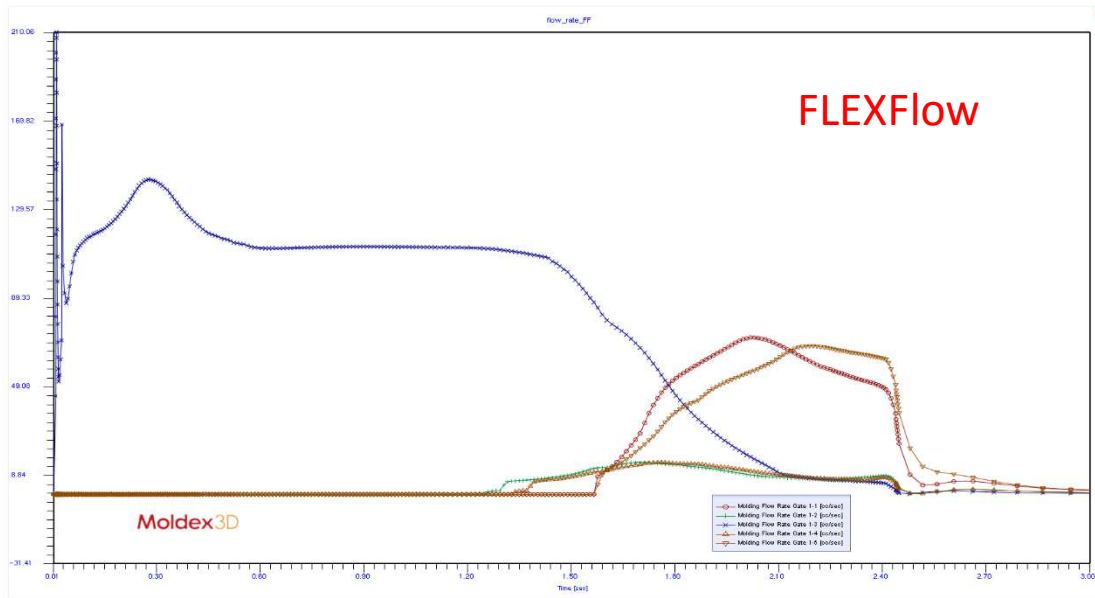
Passion for
expertise

Strokes settings

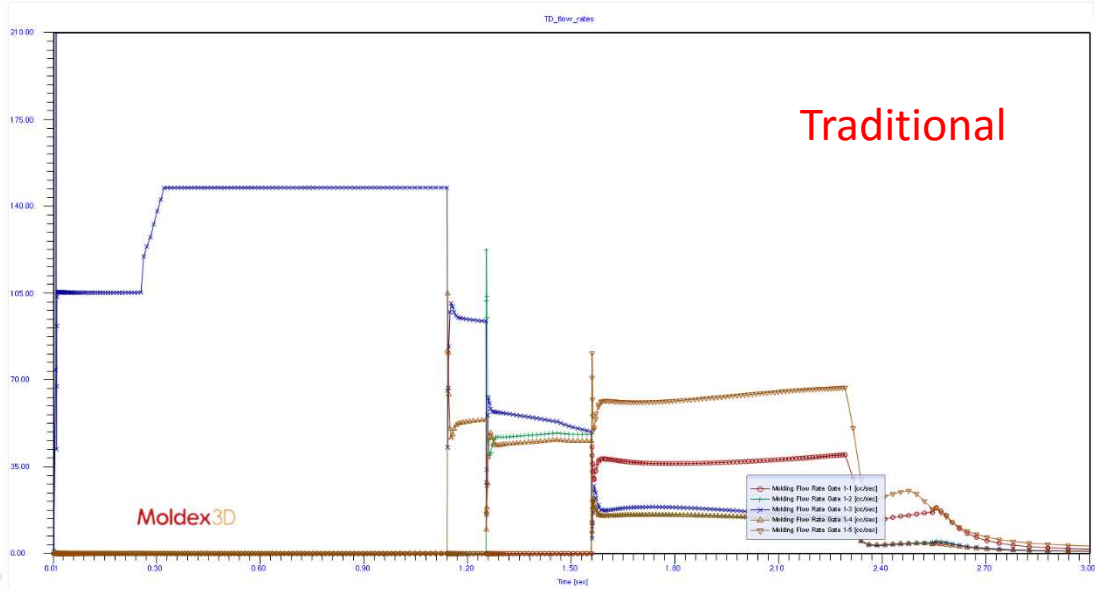


Comparison on flow rates

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FLEXFlow technology allow you to modify significantly the material behavior in cavity without any modification on the process settings on machine.



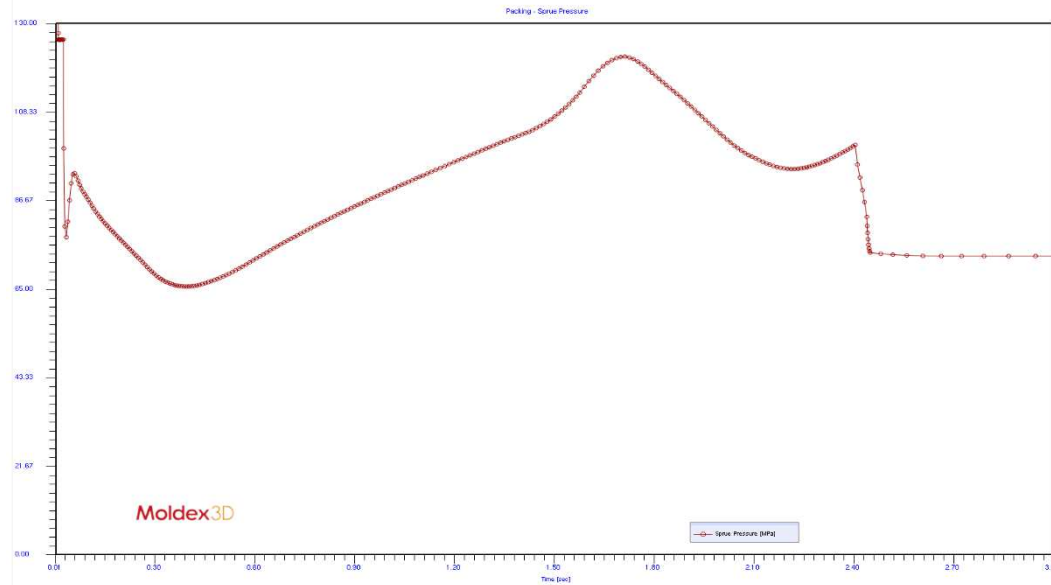
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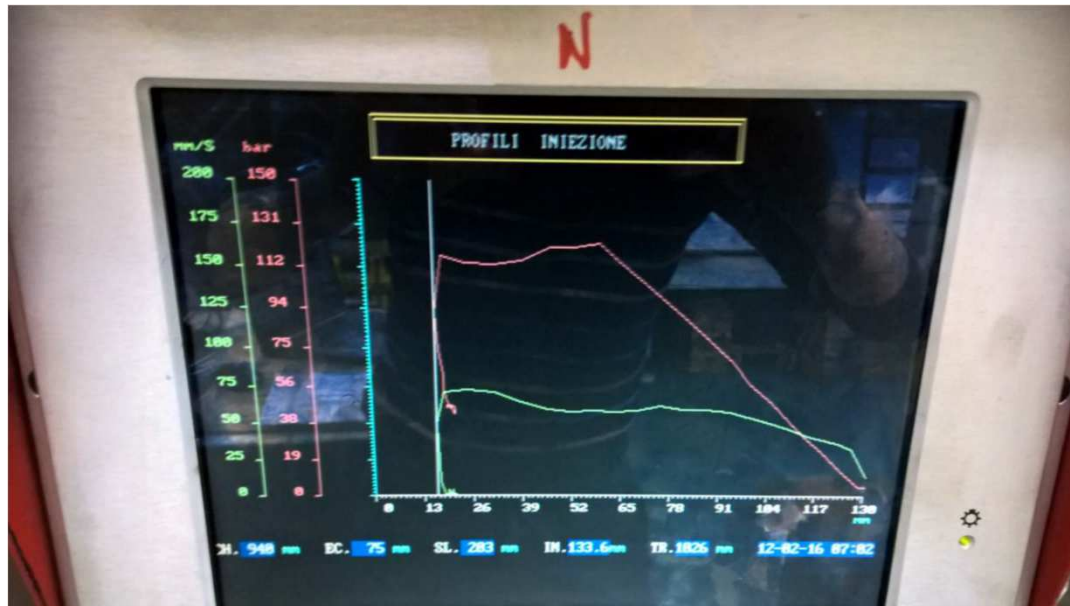
Passion for expertise

Inection Pressure

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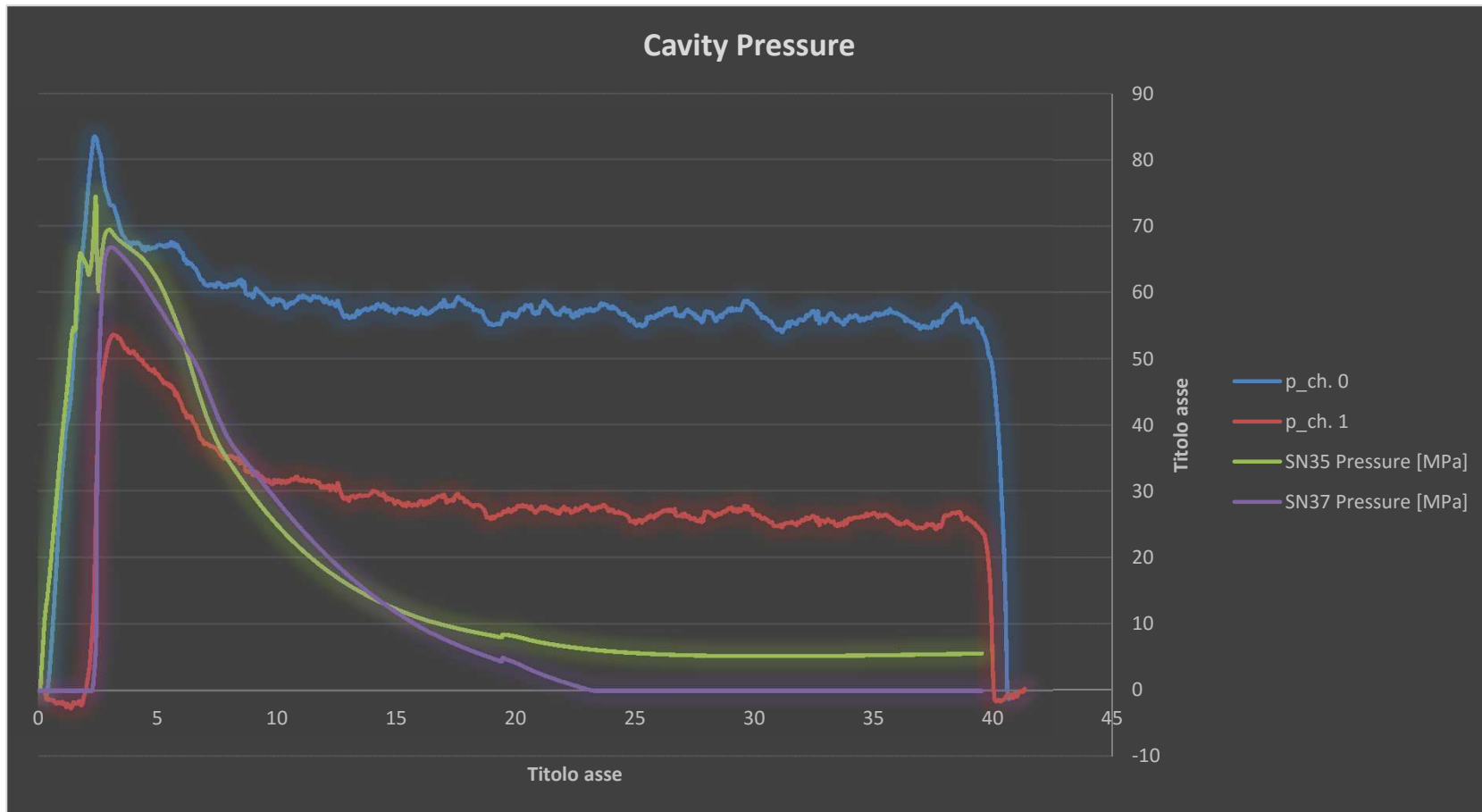
Maximum injection pressure is in line with real molding even if variations during filling are slightly different.



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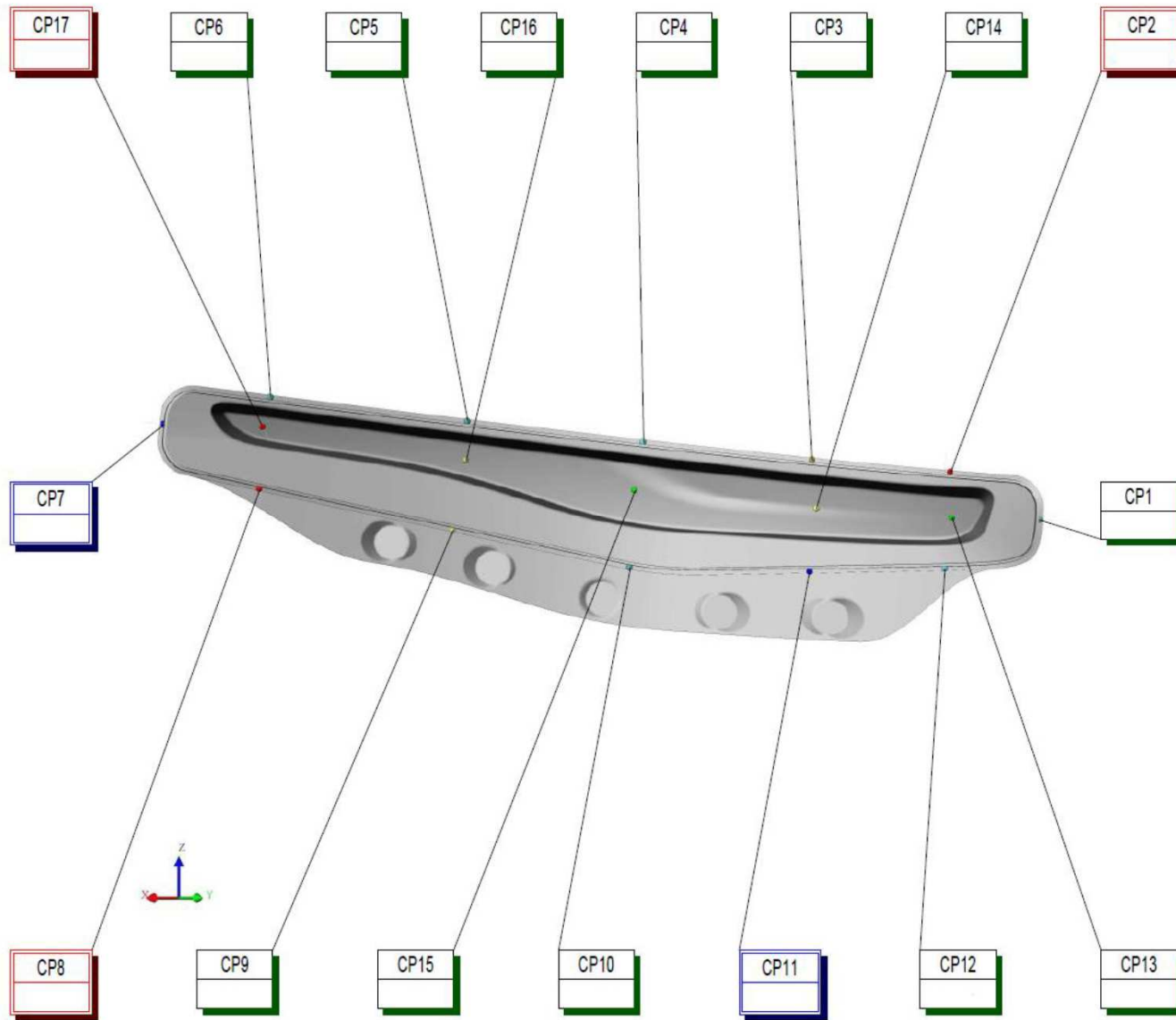
Passion for expertise



Curves by pressure sensor were compared to Moldex 3D expectation on cavity measured on same points.

Deflection comparison

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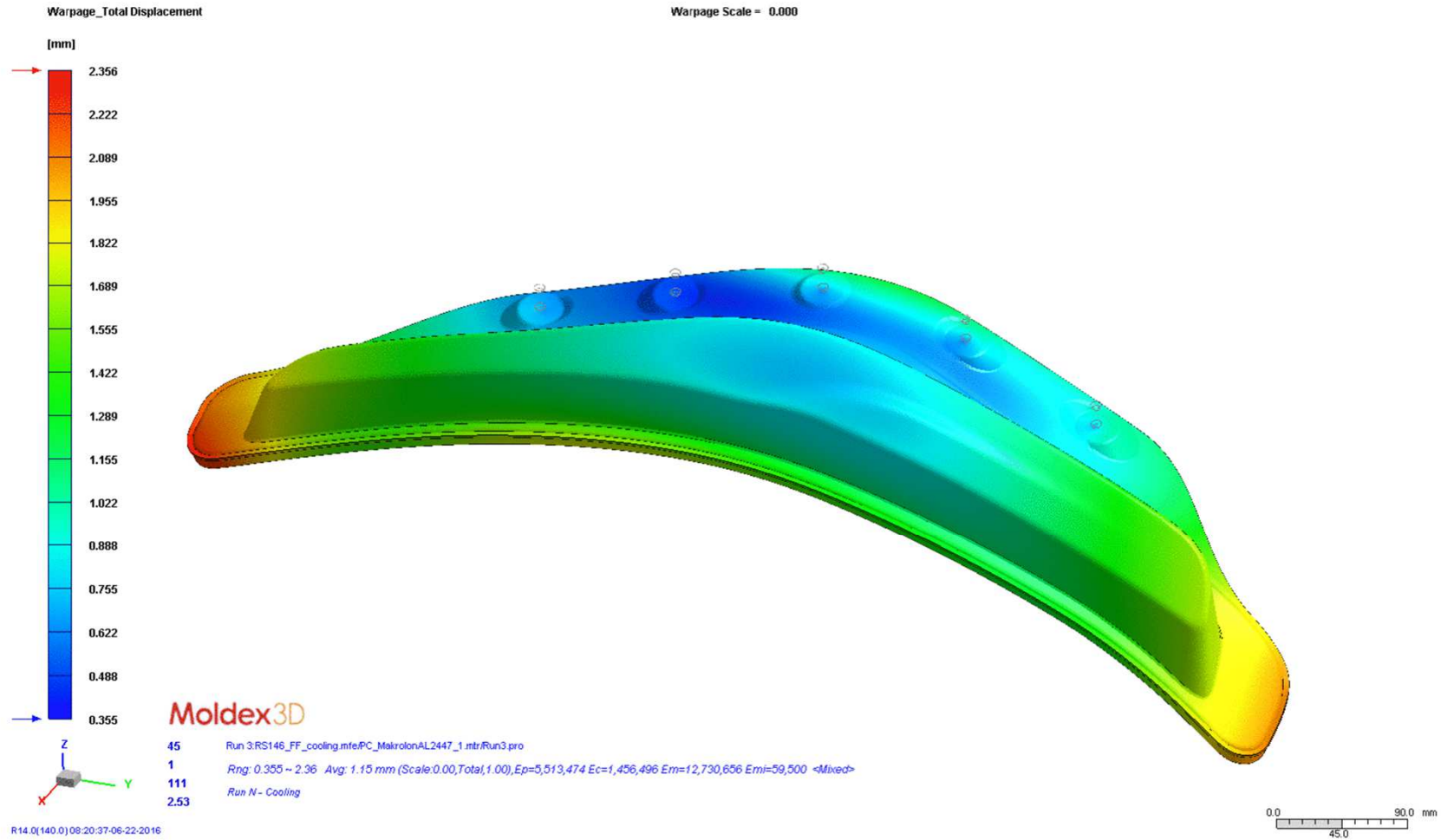
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Passion for expertise

Deflection comparison

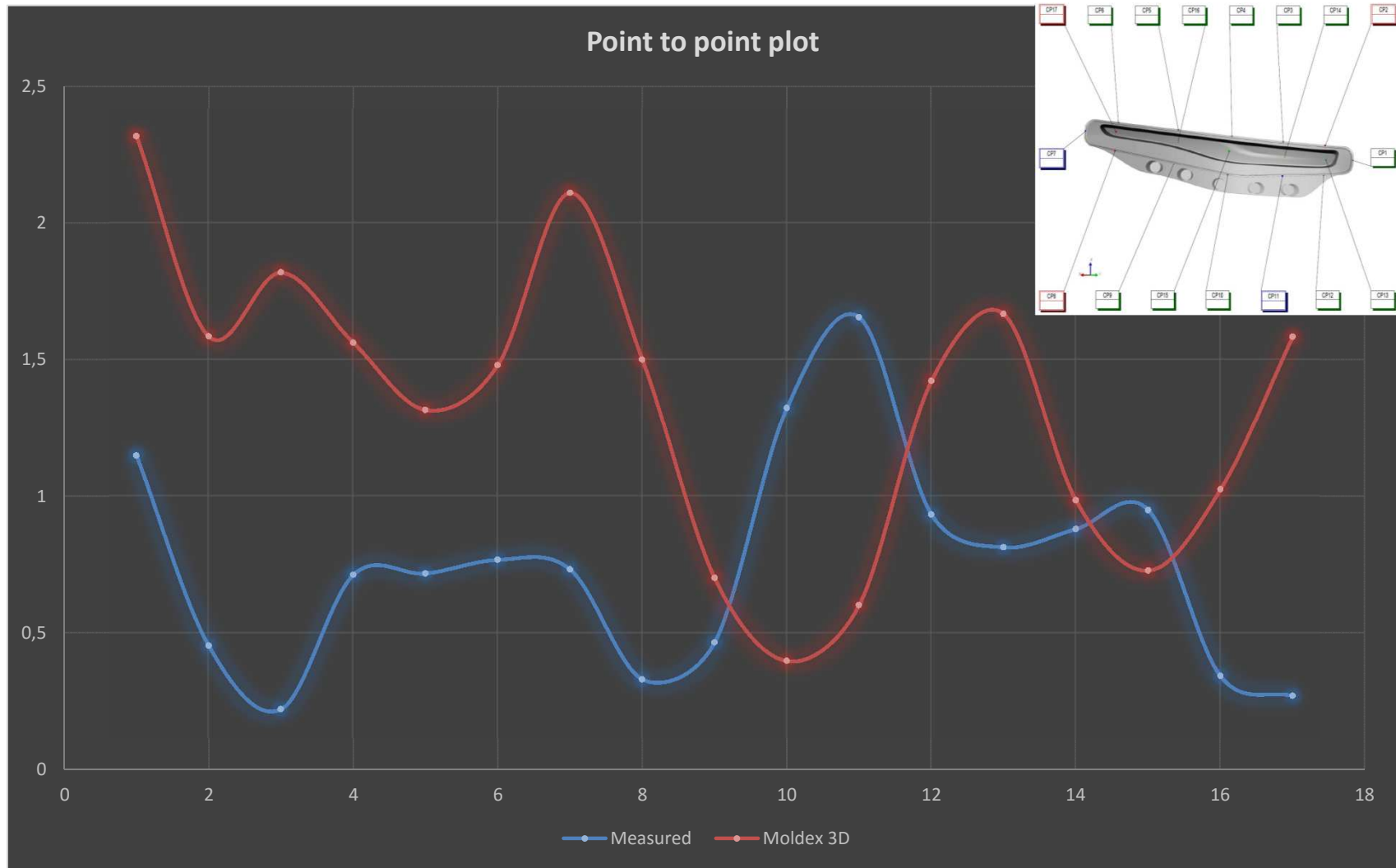
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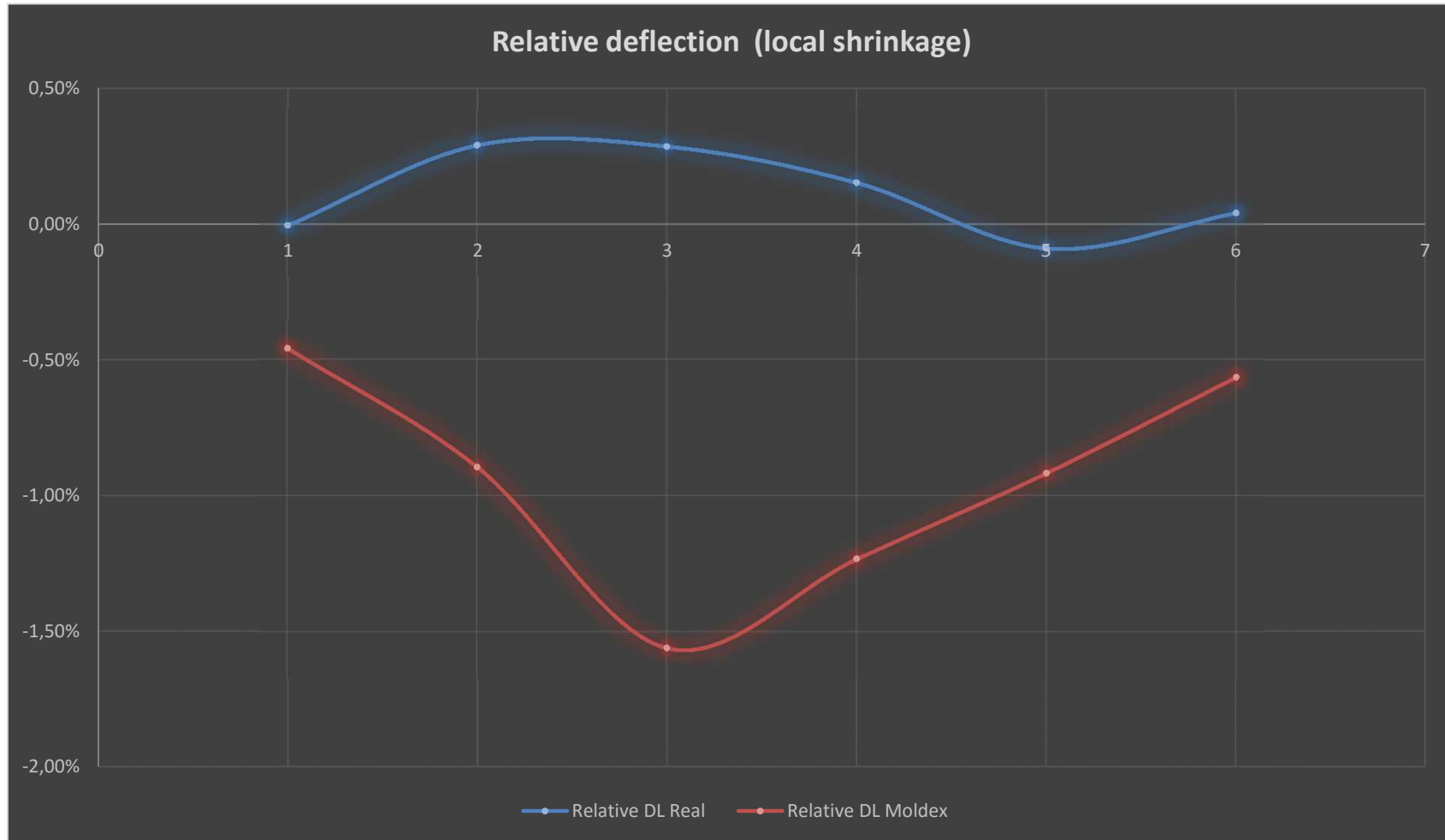


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Deflection comparison





Conclusion

Next:

- Material data
- HTC variation during packing
- Freezing conditions at gates
- Tool bending
- Pin movement management
- Benefit from mesh refinement





GRAZIE !!!