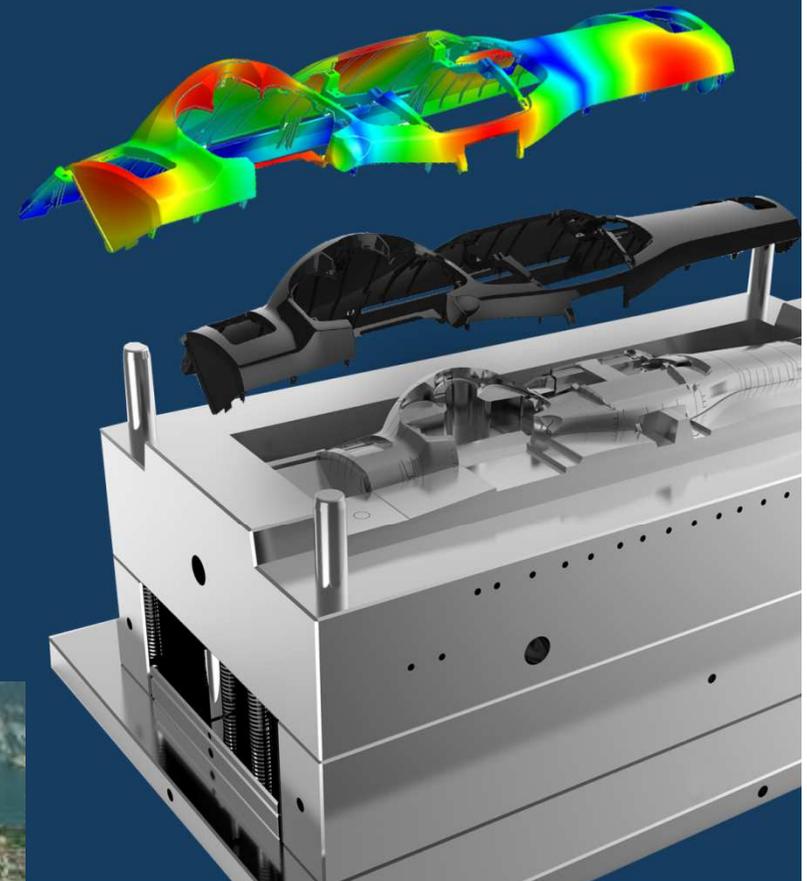


Moldex3D

Thin wall cosmetic application & Deflection reduction : a FLEXflow story

HRSflow
Pavan Nicola



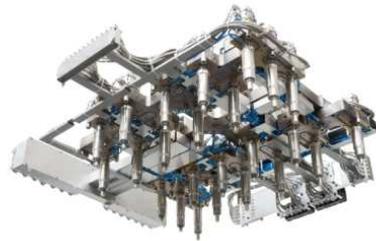
MID Molding Innovation Day 2018, Italy

14 June, 2018

Hotel dei Parchi del Garda, Lazise, Italy

Company Structure

Moldex3D



AUTOMOTIVE



EXTERIOR



LIGHTING



INTERIOR



UNDERHOOD

APPLIANCES



DOMESTIC APPLIANCES



TECHNICAL APPLICATIONS



HOUSEWARE



LOGISTICS & ENVIROMENTAL

LIGHTING



LIGHTING

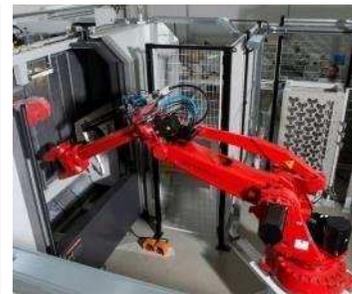
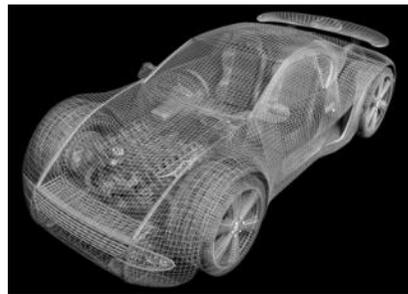


GLAZING

HRSflow: a Worldwide partner

Moldex3D

- **Around 14.000** Systems delivered in 2017
- **42.000** Drops produced in 2017
- **More than 2000** Customers
- **More than 1100** End users
- **More than 140** Designers in 10 countries



HRSflow: a Worldwide partner

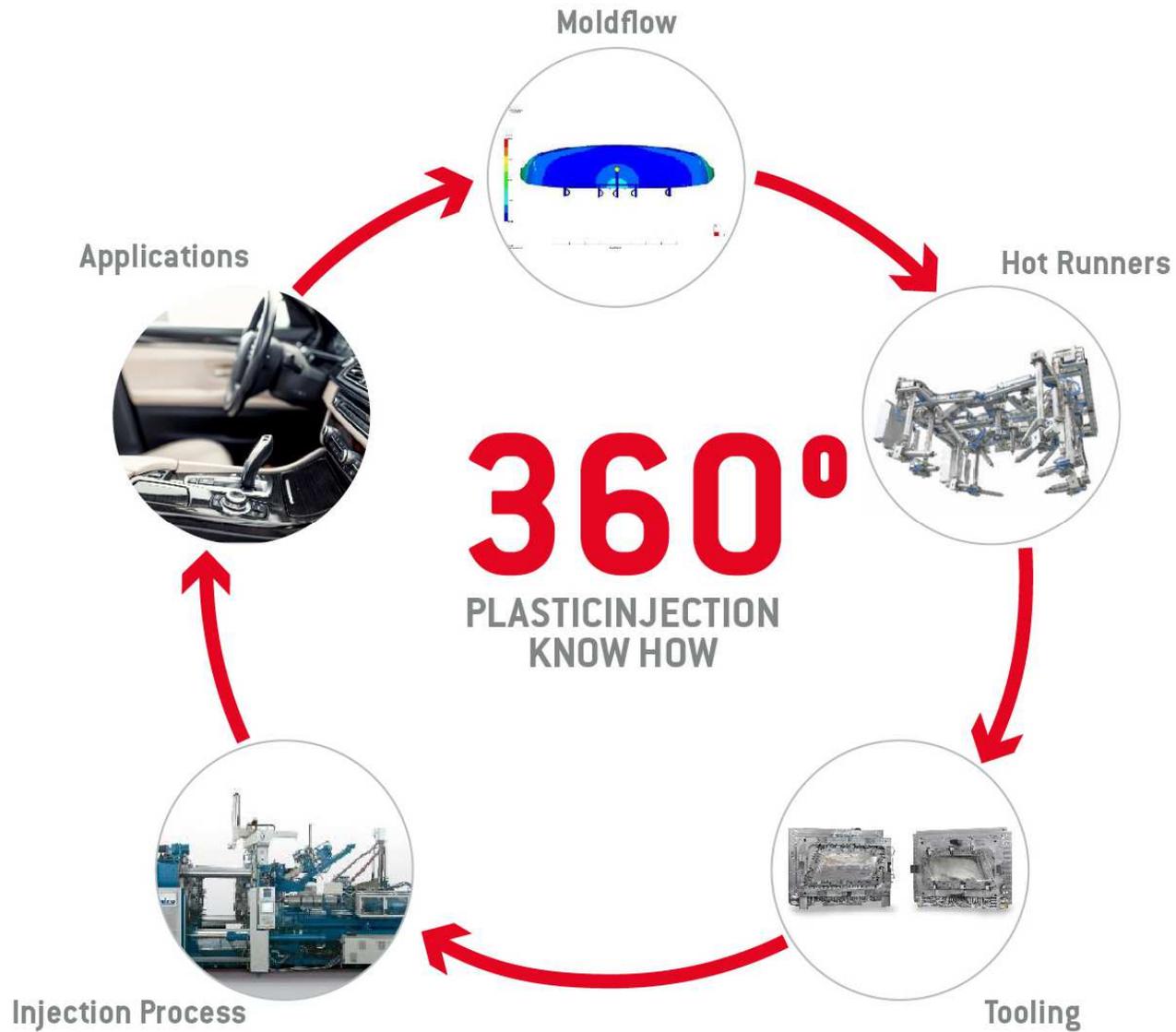
Moldex3D

- **15** Plastic engineers in the world
- **5** Teams on different jet lags
- **More than 1800** Simulation projects in 2017
- **Certification of Outstanding Partner**
- **Expert Certification**



HRSflow Advanced Development

Moldex3D



Our worldwide production plants

Moldex3D

Italy - San Polo di Piave
50km north of Venice



China – Hangzhou
175km south west of Shanghai



USA- Michigan – Grand Rapids
250km west of Detroit



3  PRODUCTION PLANTS

/52

 SALES/SERVICE BRANCHES AND OFFICES

Case Introduction

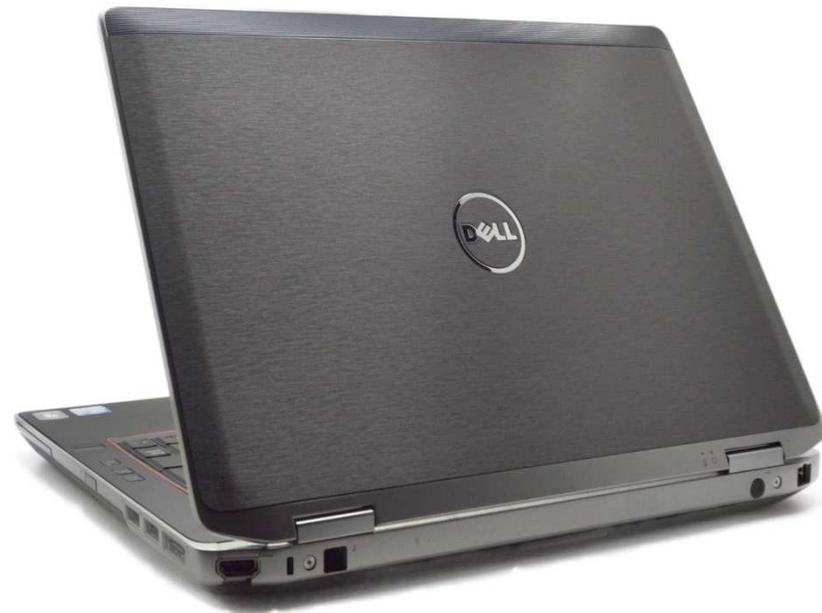
Project description

FLEXflow Laptop cover application

Moldex3D

Introduction – status quo

- Electronic applications are very demanding in order to achieve high structural performances and very low weight.
- More and more the wall thickness is reduced
- Aesthetical surface (mix of matt and glossy surface)
- Function integration



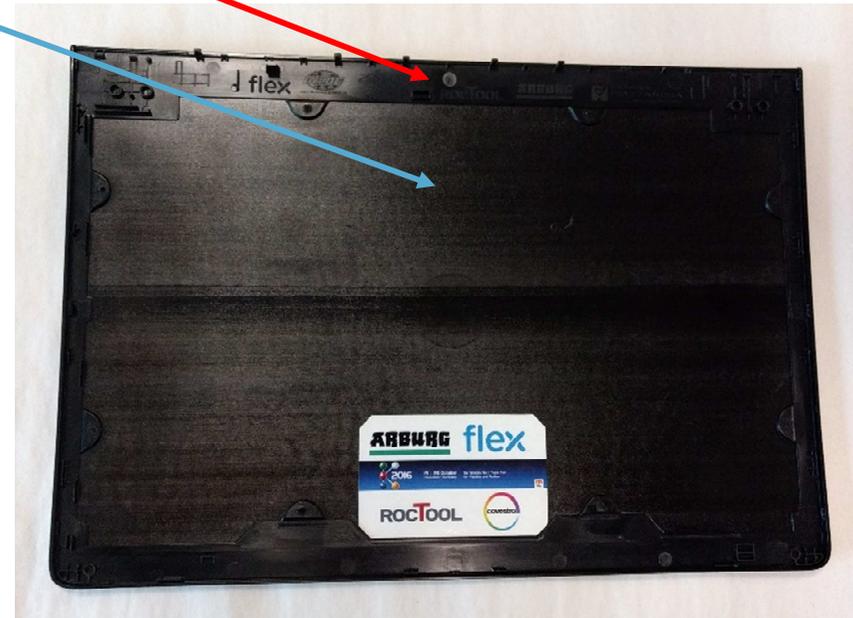
FLEXflow Laptop cover application

Currently industry standards for A-Cover is to use 2 steps process:

- 1 Part in PC CF 20 (or thermoset CF reinforced)
- 1 part in PC GF 50

This implies

- 6 to 10 tips for the hot runner (per shot)
- 1,8÷2 mm thickness
- Stiffness is provided by the CF
- Antenna area is done with GF
- 2 steps process – non continuous
- Expensive – cycle time – Complexity



FLEXflow Laptop cover application

Moldex3D

Project details

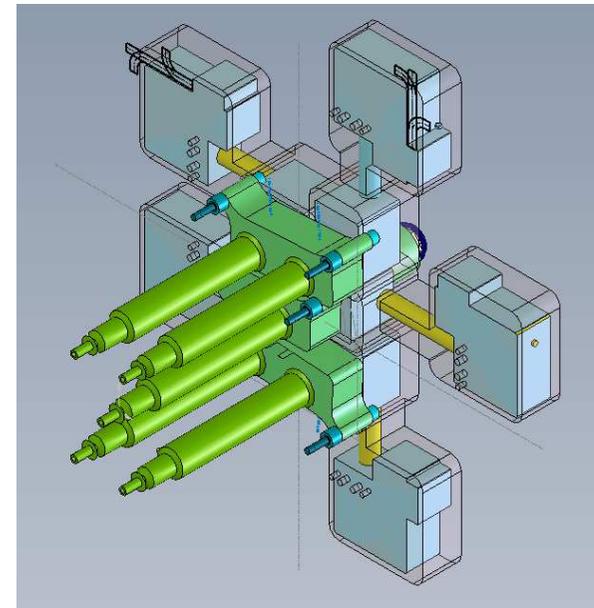
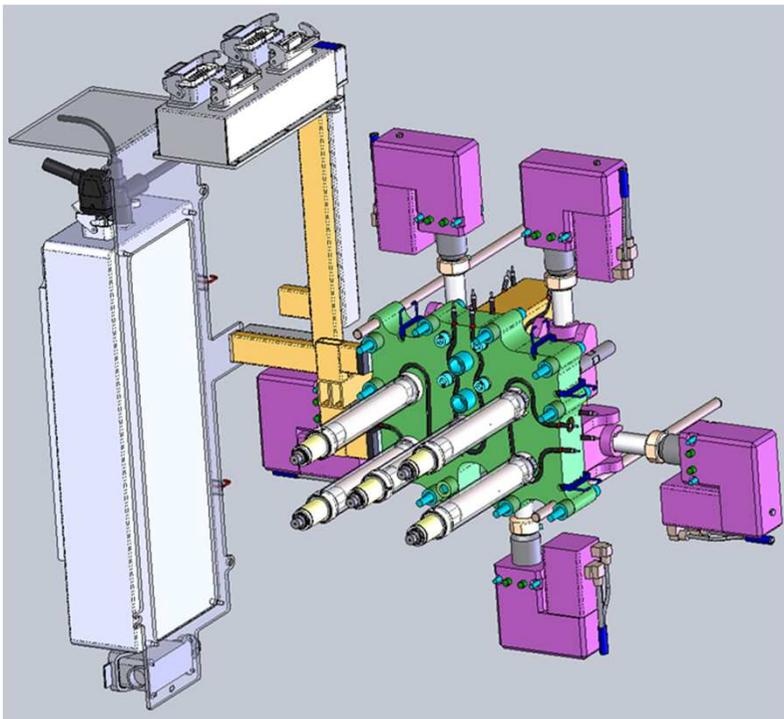
- A Cover 14"
- Thickness range between 1.5 to 1.7 mm
- Dimensions : 232 *335*7,3 mm
- Material: PC 50% GF
- Hot Runner system: 5 FLEXflow drops
- Special Features: Surface Effect produced in one shot as combination of high gloss and low gloss surface
- Special Features: FLEXflow One for high flatness
- Special Features: Combine in one shot radio transparency and stiffness
- Partnered with: FLEX, KraussMaffei, Roctool, Sabic



FLEXflow Laptop cover application

Tool details

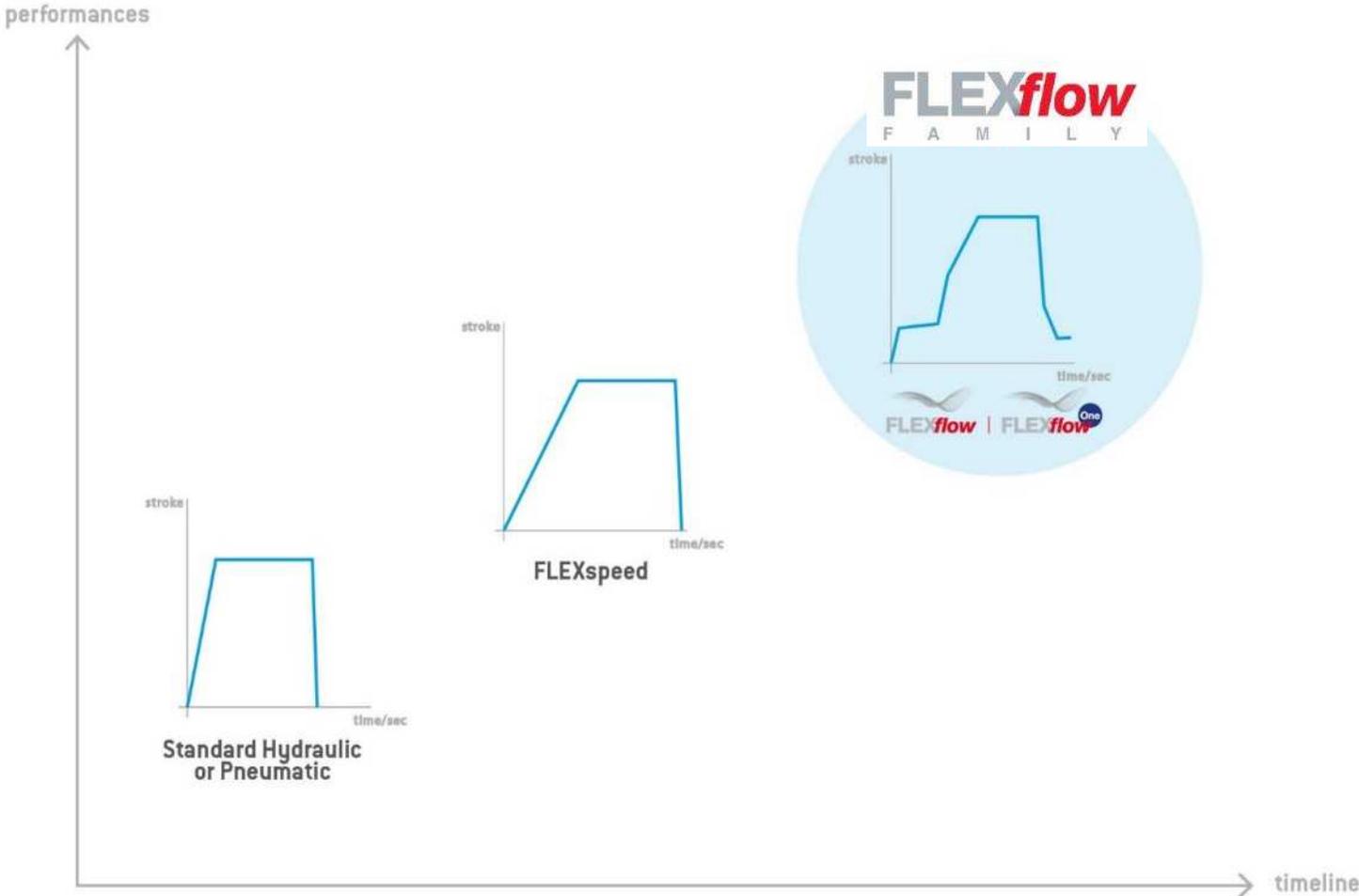
- Hot Runner system cascade by HRS (5 drops – Ma serie)
- Conical valve gate with end ring through the cavity
- Electric motors for valve gate control – FLEXflow One technology



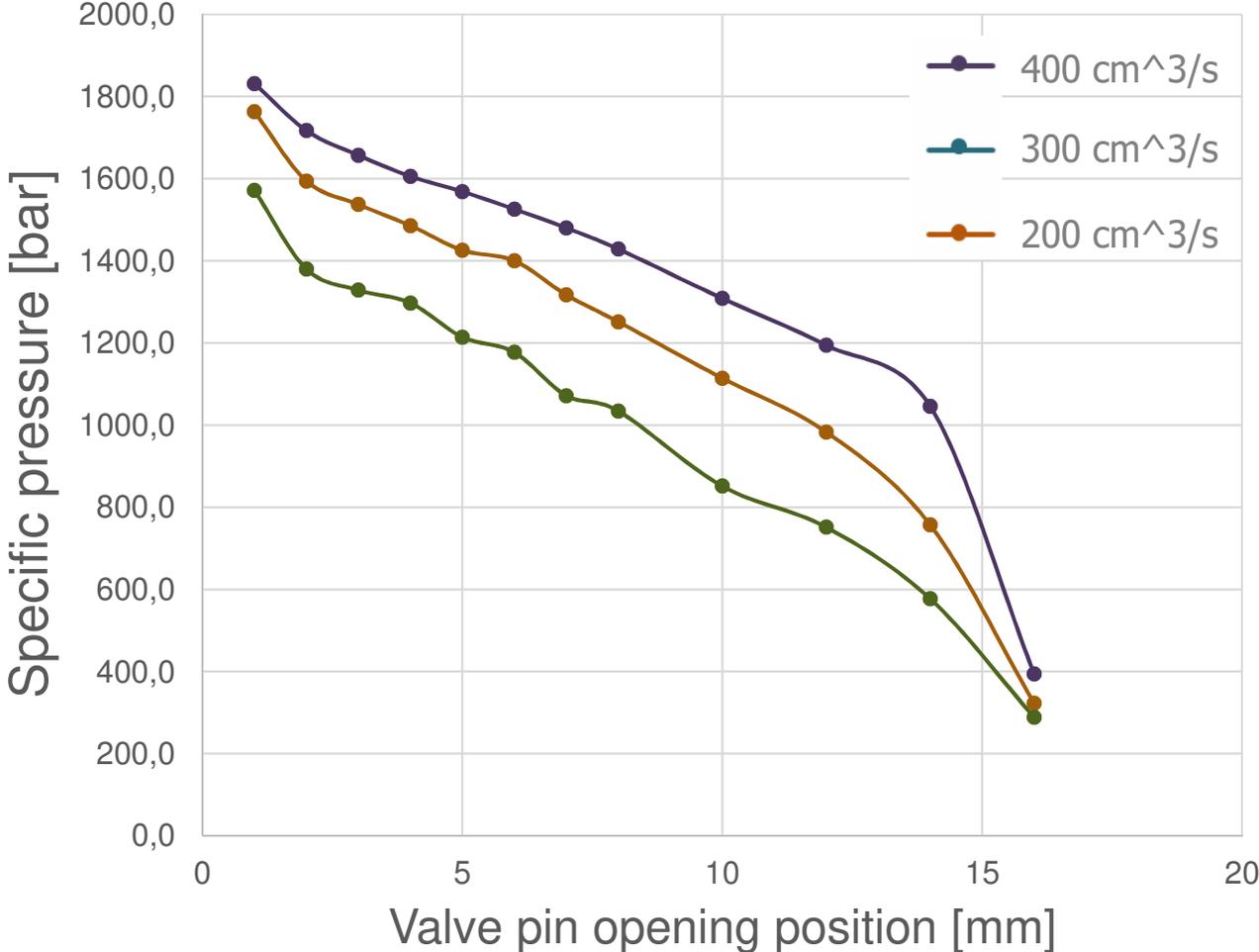
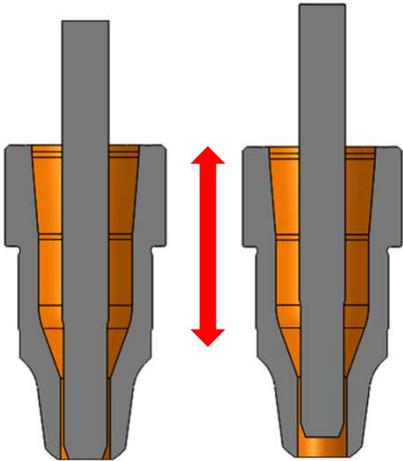
FLEXflow Introduction

How it works

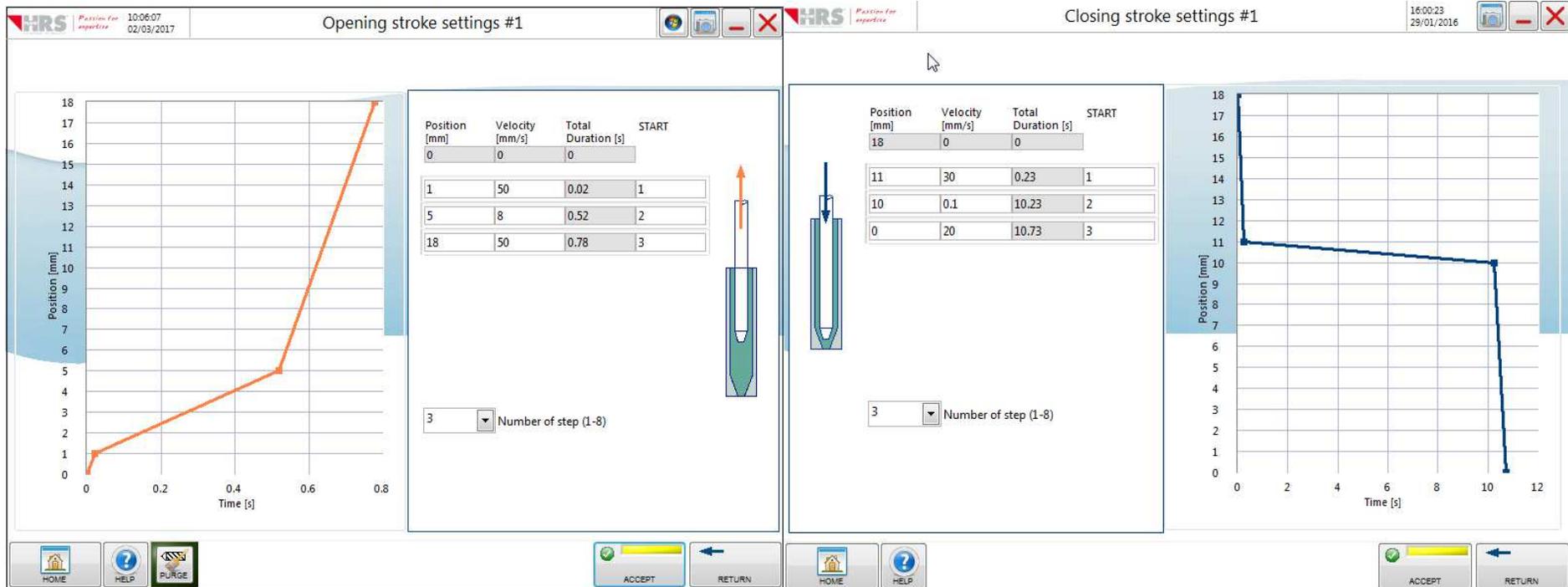
FLEXflow: how it works



FLEXflow: how it works



FLEXflow: how it works



Opening and closing settings - Max 8 steps can be setted

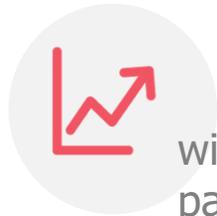
Sequence parameters based on **time** or **screw position** or **pressure value** in the cavity

Possibility to handle up to 2 different injection units on the same IMM.

FLEXflow: how it works



aesthetical quality improvement



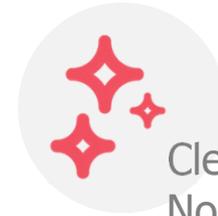
wider process window parameters



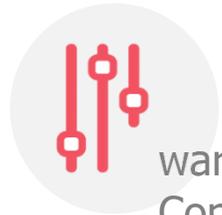
clamping force reduction



Less maintenance & spare parts



Clean Operation:
No Water
No oil
No cooling



warpage Control - reduction

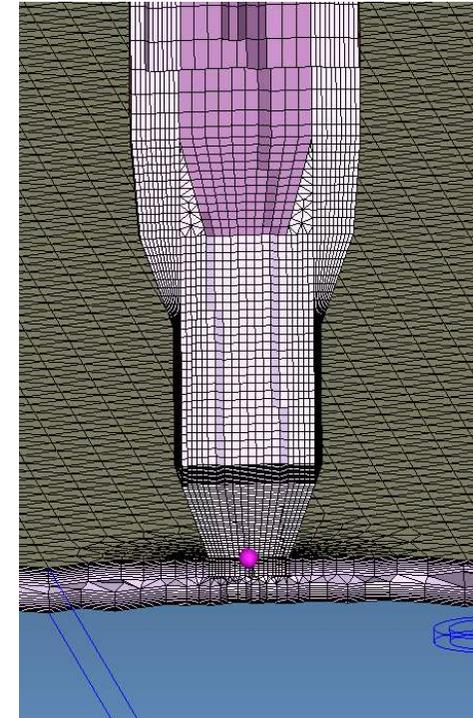
Moldex 3D Simulation

Input and Results

Moldex 3D Laptop cover simulation



Modelling	
Mesh type	BLM 10
Mesh size runner	~745600
Mesh size part	~1670800
Volume runner	317.1 cm ³
Volume part	137.1 cm ³



Moldex 3D Laptop cover simulation

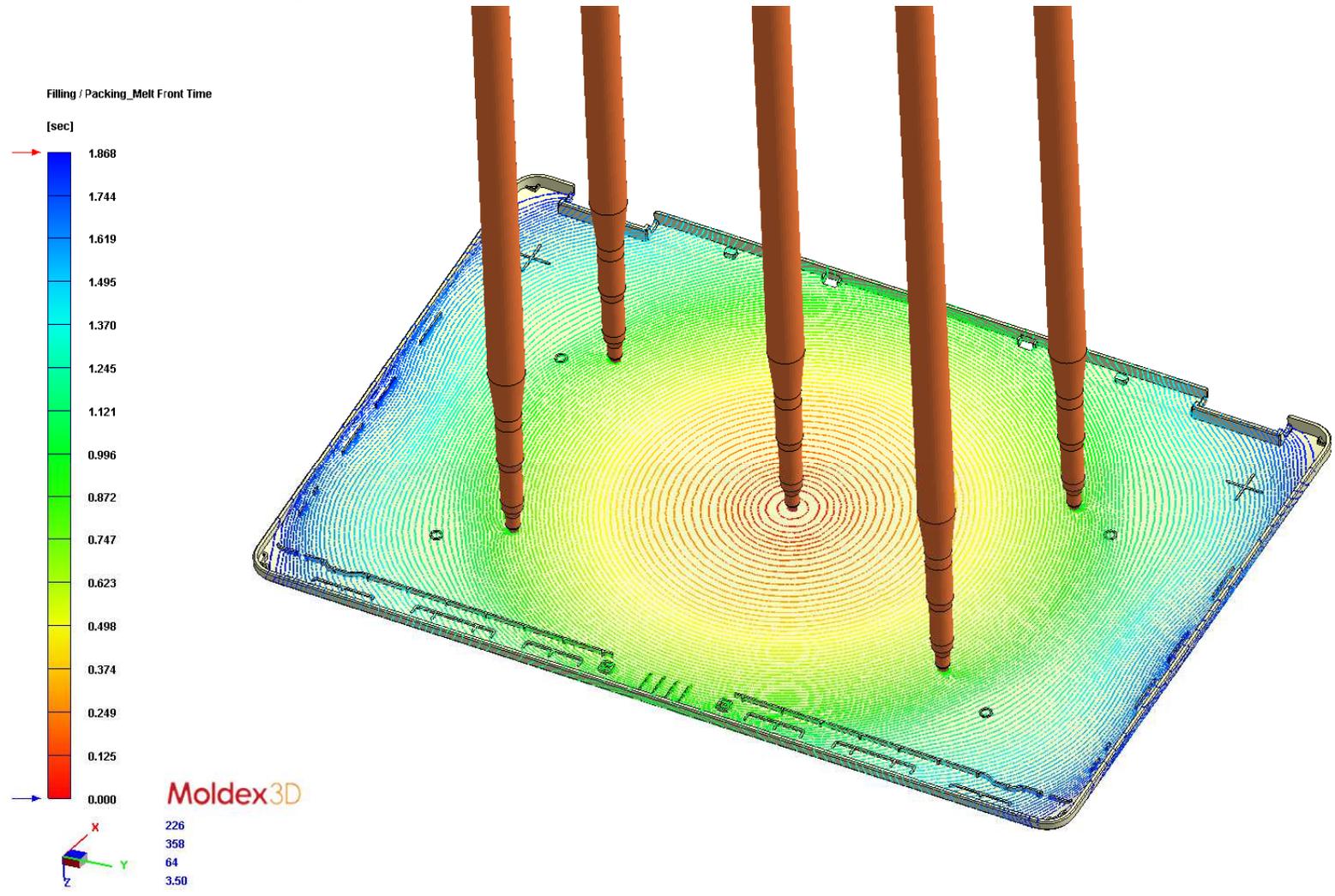


Material Information	
Generic name	PC
Supplier	SABIC Innovative Plastics
Trade name	THERMOCOMP D551
Fiber percent	50% Glass Fiber Filled
Melt temperature range	285 - 310 (°C)
Mold temperature range	80 - 95 (°C)
Freeze temperature	96 (°C)

Moldex 3D Laptop cover simulation



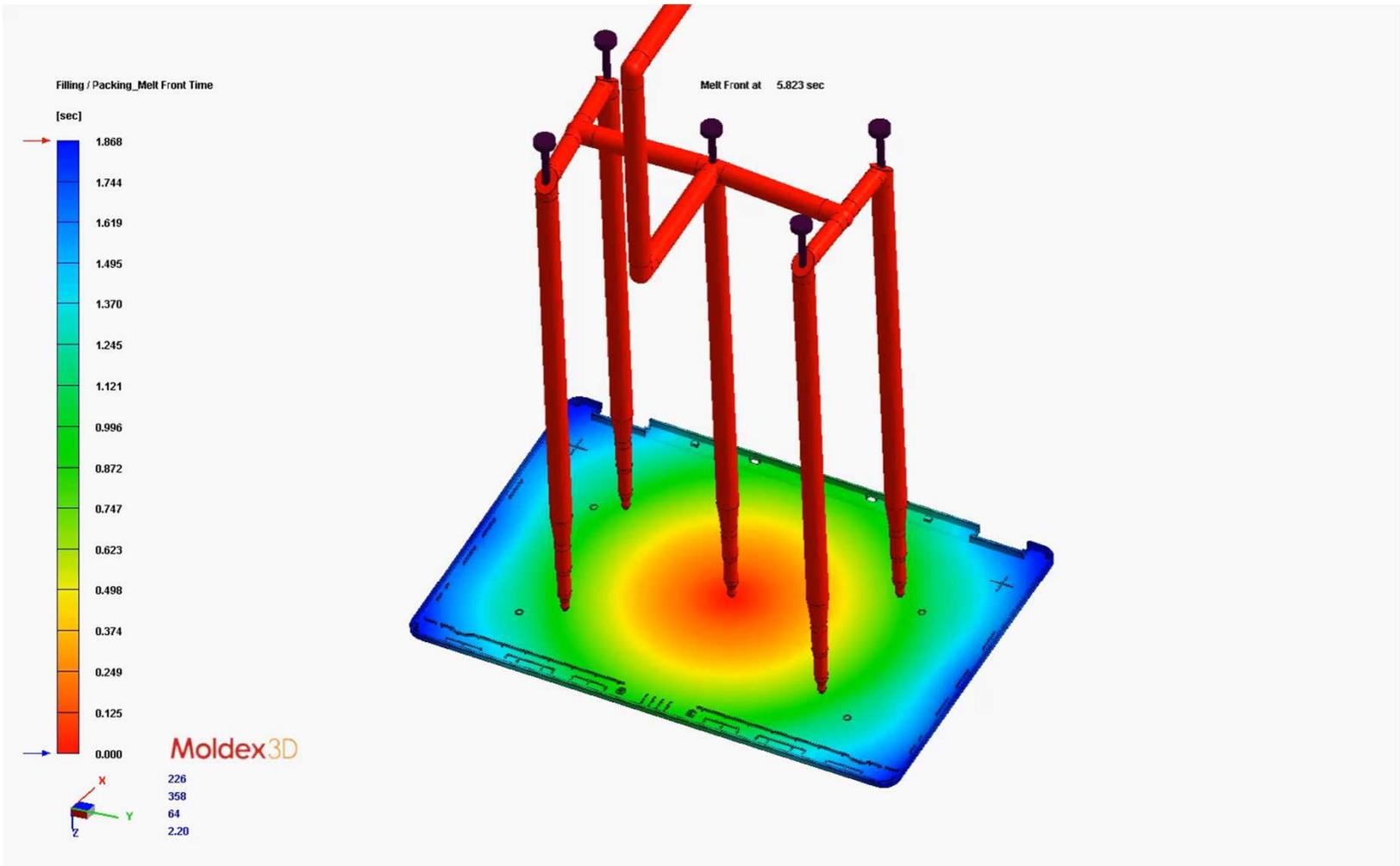
Fill and cooling



Moldex 3D Laptop cover simulation



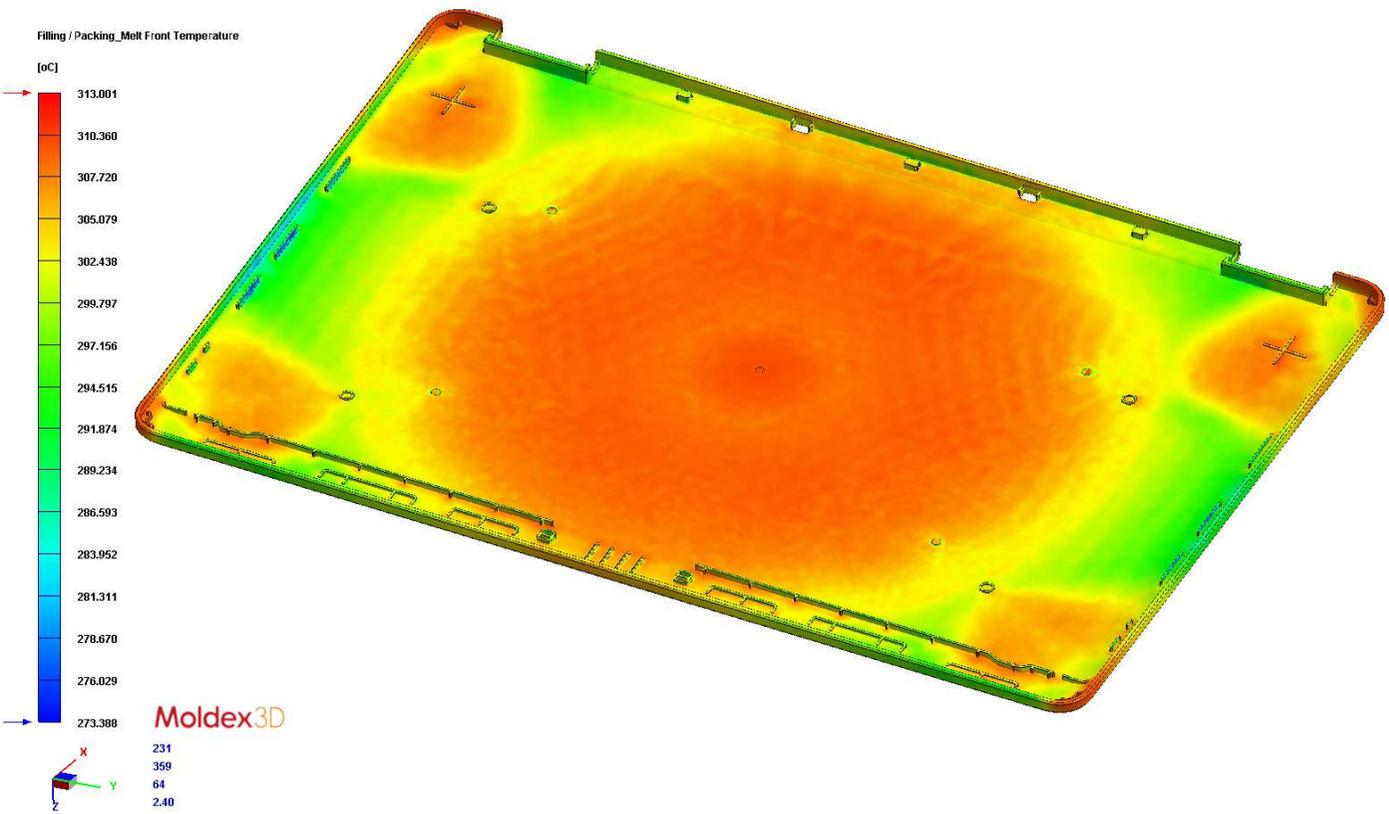
animation



Moldex 3D Laptop cover simulation



temperature

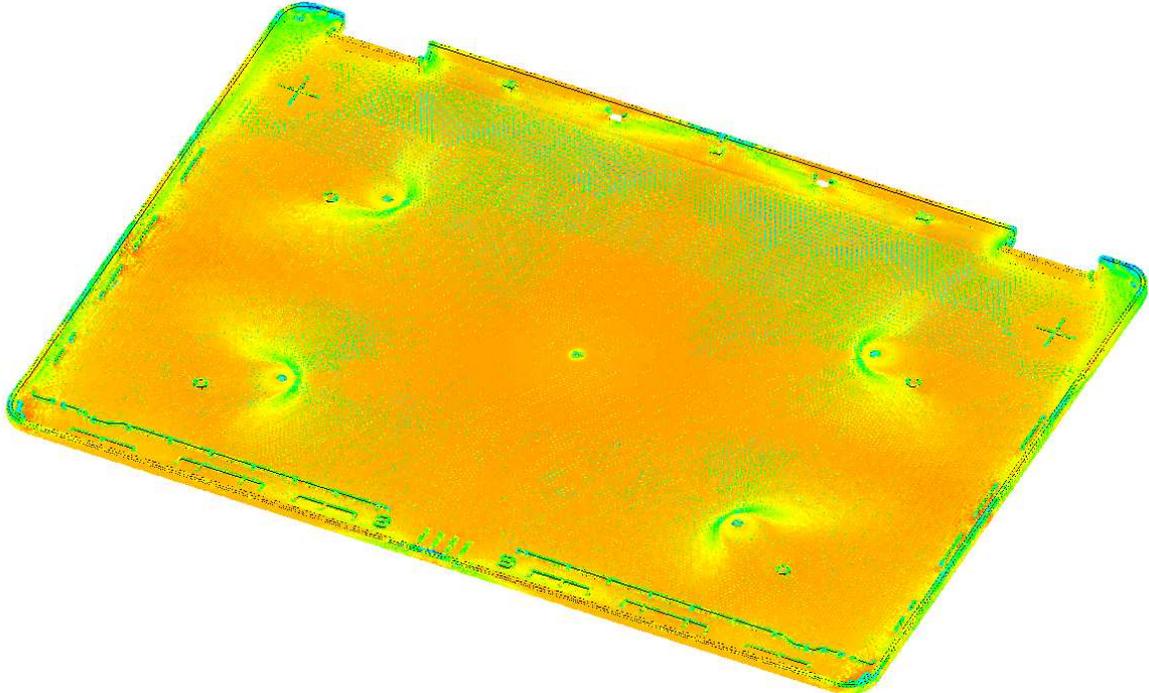
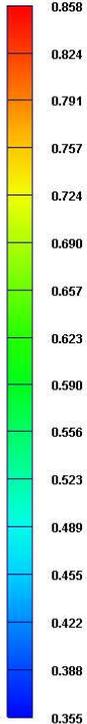


Moldex 3D Laptop cover simulation



Filling / Packing_Fiber Orientation

[-]



Moldex3D

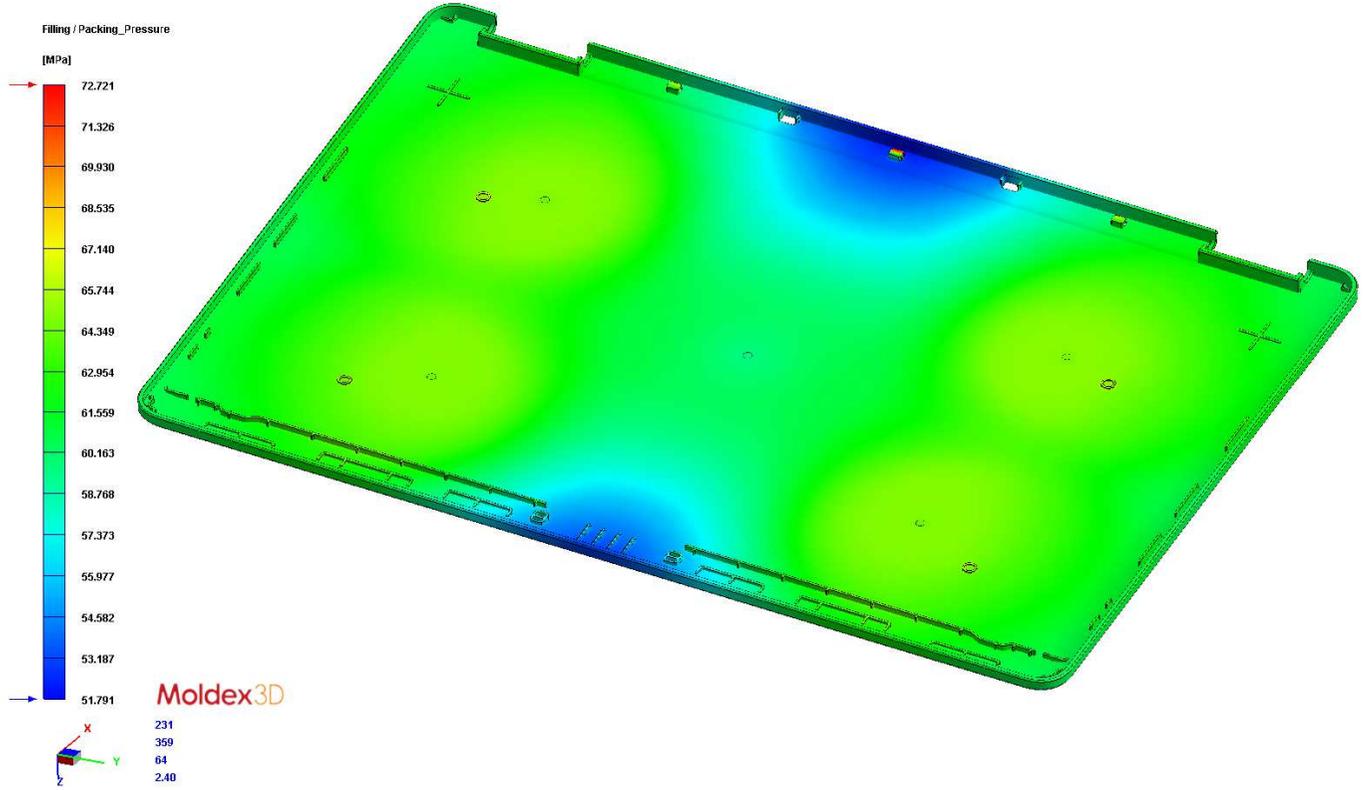


227
358
64
2.35

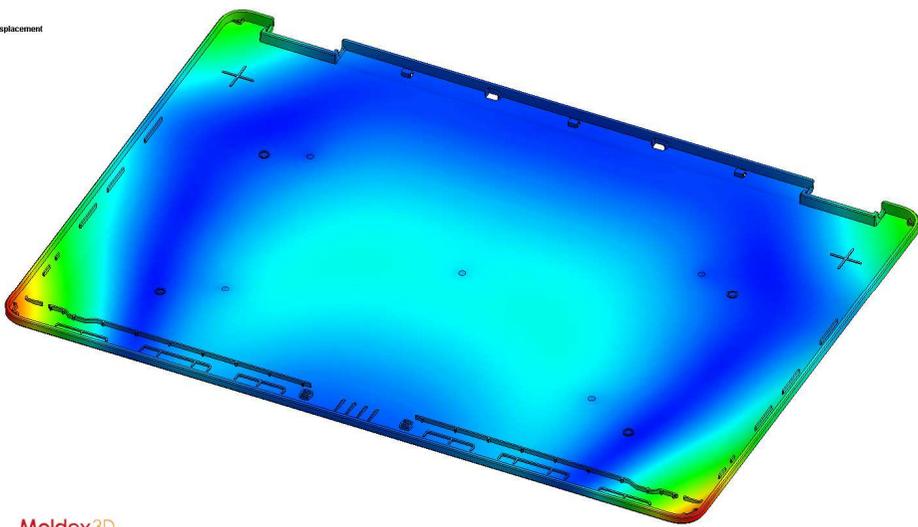
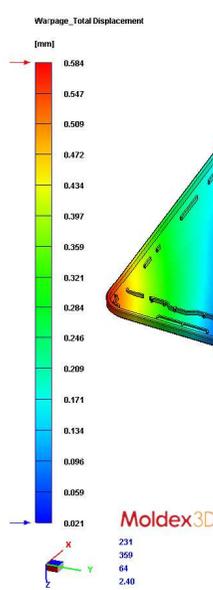
Moldex 3D Laptop cover simulation



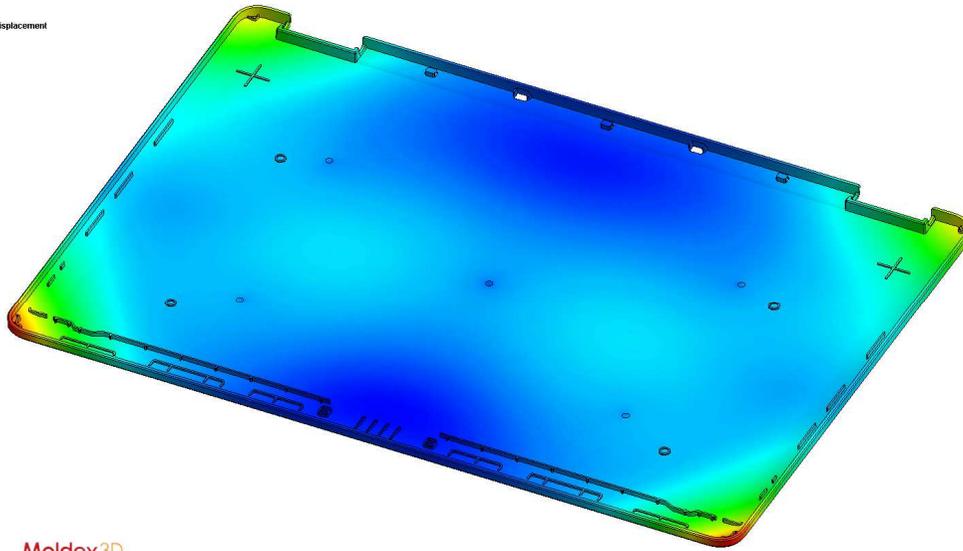
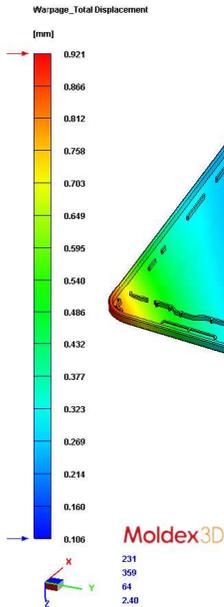
Pressure and SN



Moldex 3D Laptop cover simulation



Deflection



Acknowledgement and Conclusion

Question time

Conclusion

This application project shows:

- performance of FLEXflow to be simulated accurately with Moldex 3D
- FLEXflow technology can be applied also on high filled material (PC 50%GF) in a thin wall component (1,7 mm)
- Sequential molding and FLEXflow optimization gives a strong contribute for warpage control
- Cycle time and cost reduction can be reached on current production with a more comprehensive approach involving main contributors on part and process design

FLEXflow Laptop cover application

Moldex3D

Partnership

ROCTOOL

سابک
sabik

flex™

FLOW HRS™
HOTRUNNER TECHNOLOGY

Krauss Maffei



Thank You

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