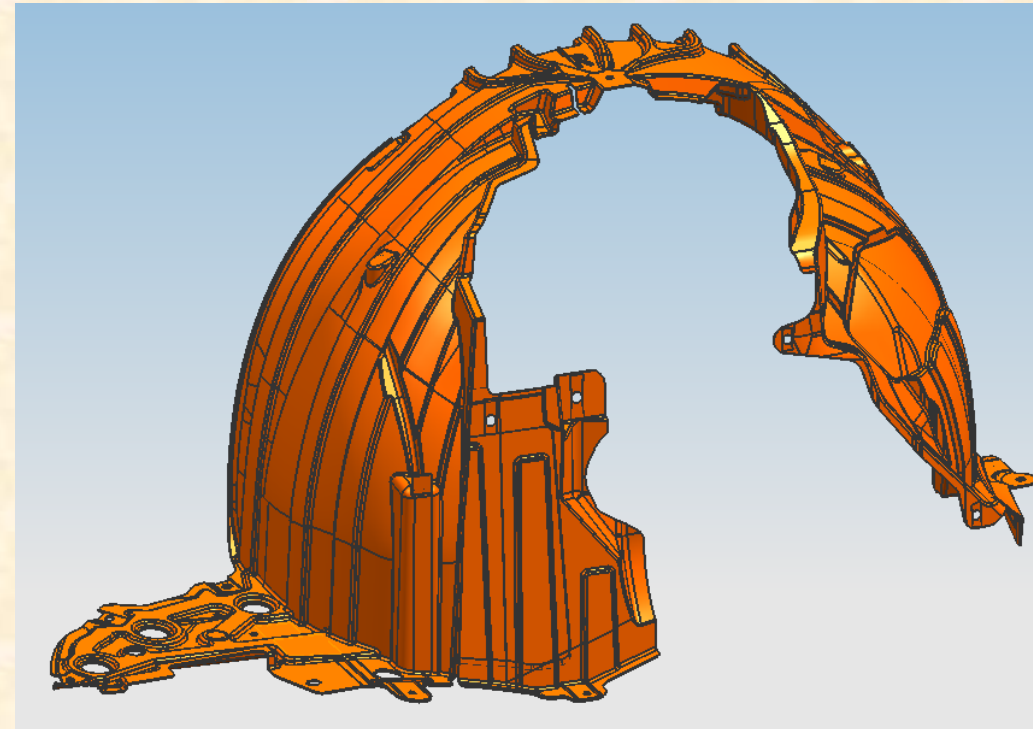


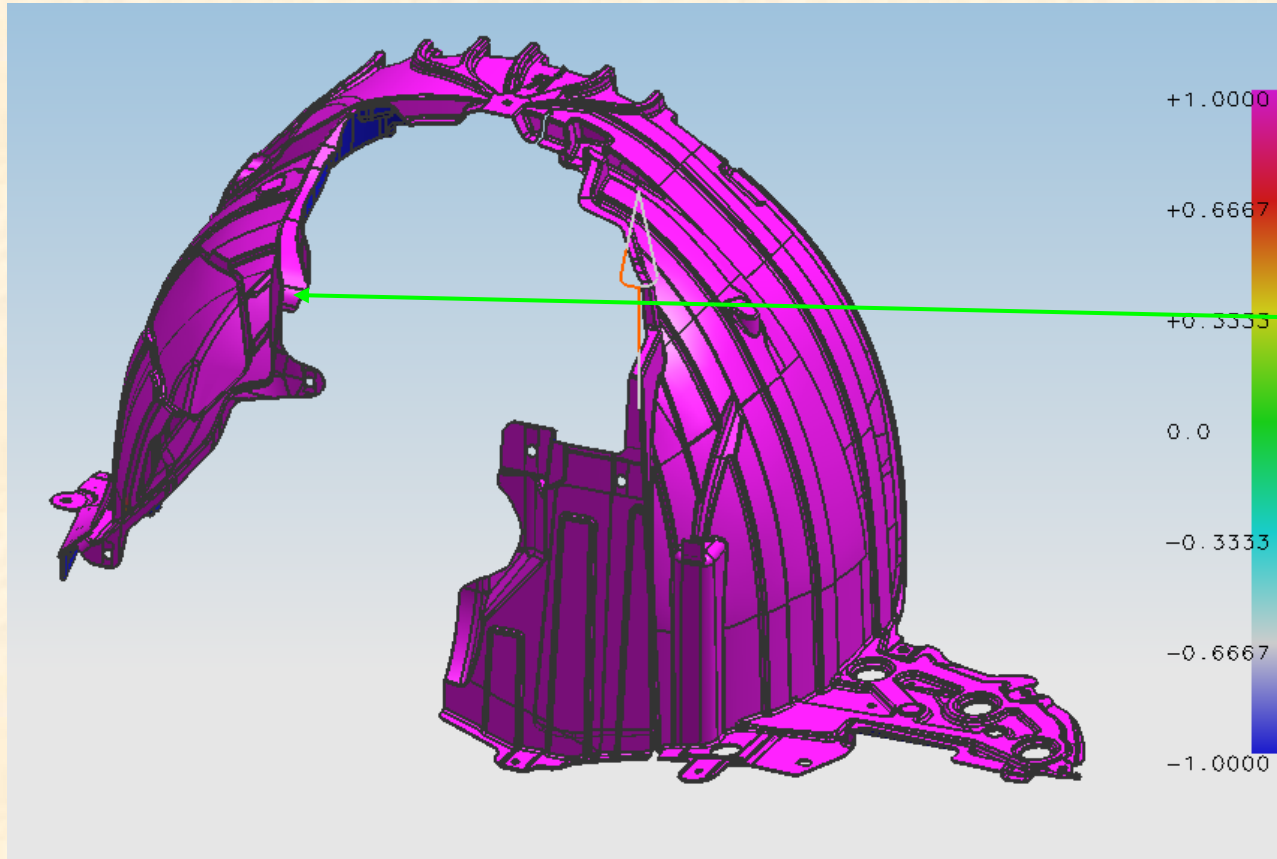
## — . Mold Information

- Project No.:
- Production Name: 63840
- Production No.: 63842 3AWOA
- Resin: PP
- Shrinkage: 1.01
- Cavity: 1+1(RH&LH)
- Mold base steel: S50C
- Cavity Steel: P20
- Core Steel: P20
- Surface Finish: 600#
- Product Size: 923\*598\*11mm
- Slide: 1(Cavity tunnel slider, oil cylinder drive )
- Lifter: NONE
- Nozzle: 14 drops
- Cycle time: 58S
- Mold life: 500,000
- Mold standard : MISUMI
- Leader time: 8 weeks
- Degree of difficulty : A

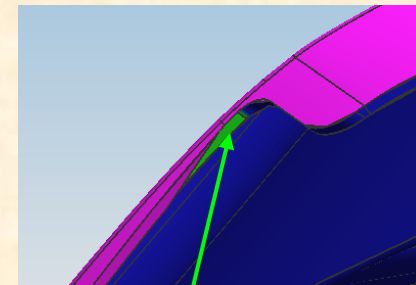
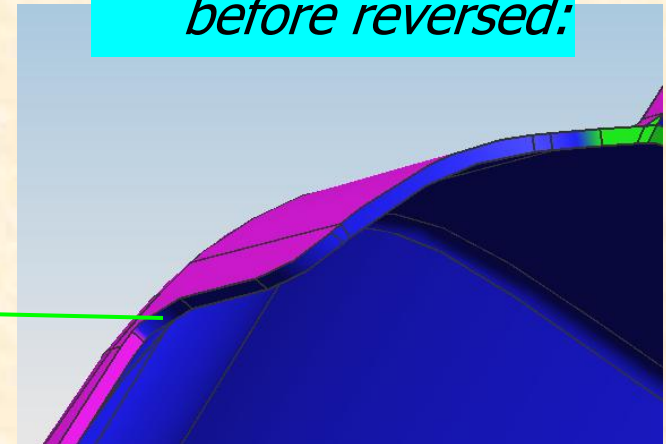
## Product Picture



## 二. Product Problems and Improvement

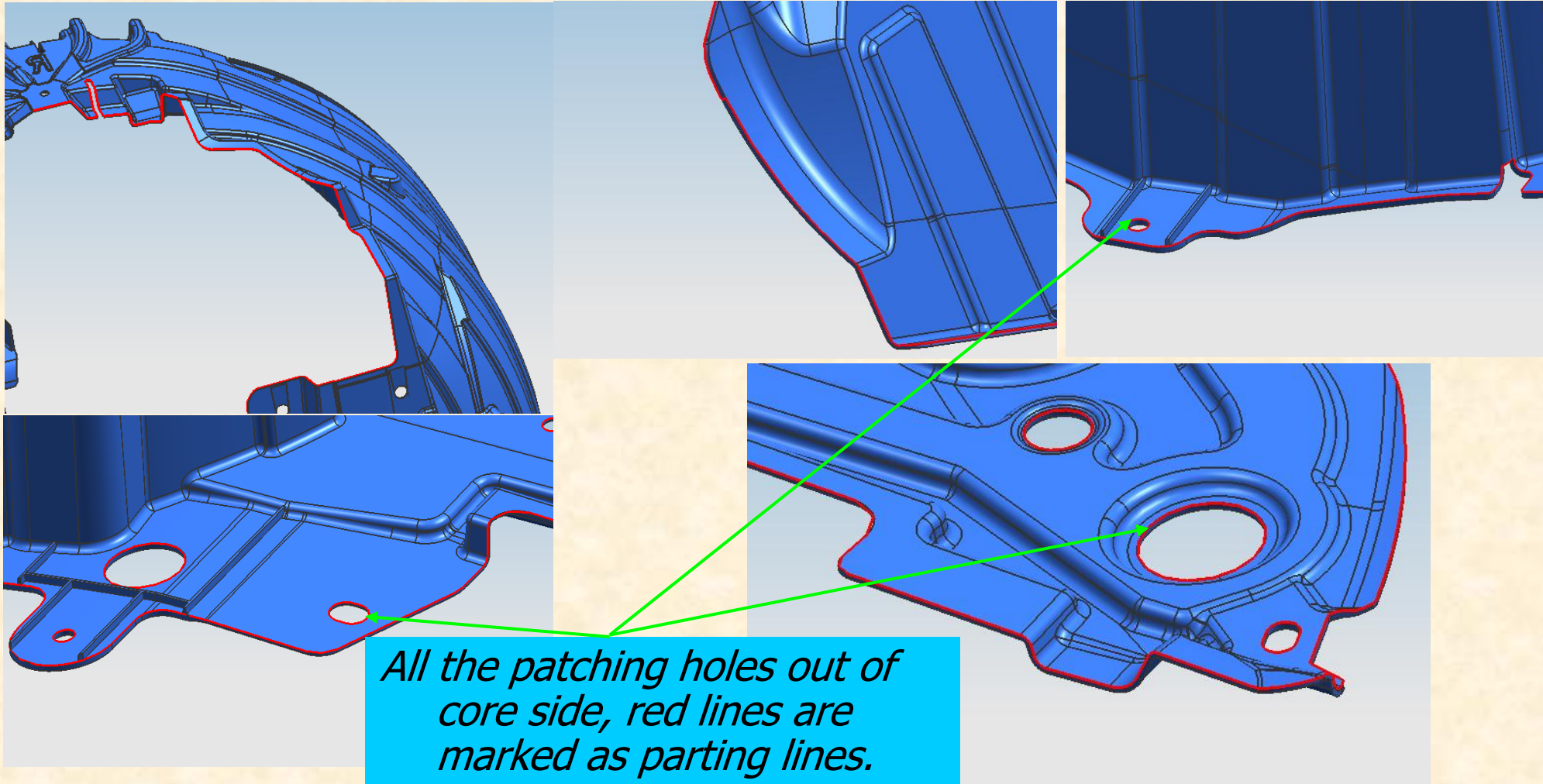


*Product undercut  
before reversed:*

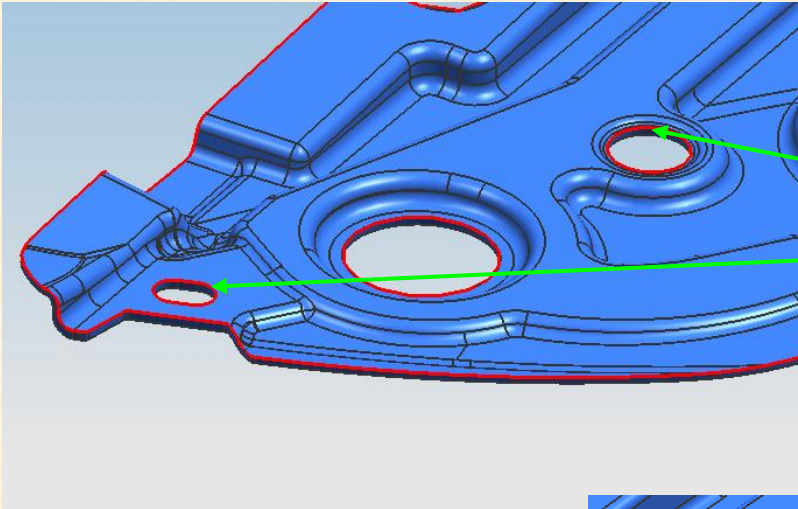


*Product glue reduced  
after improved*

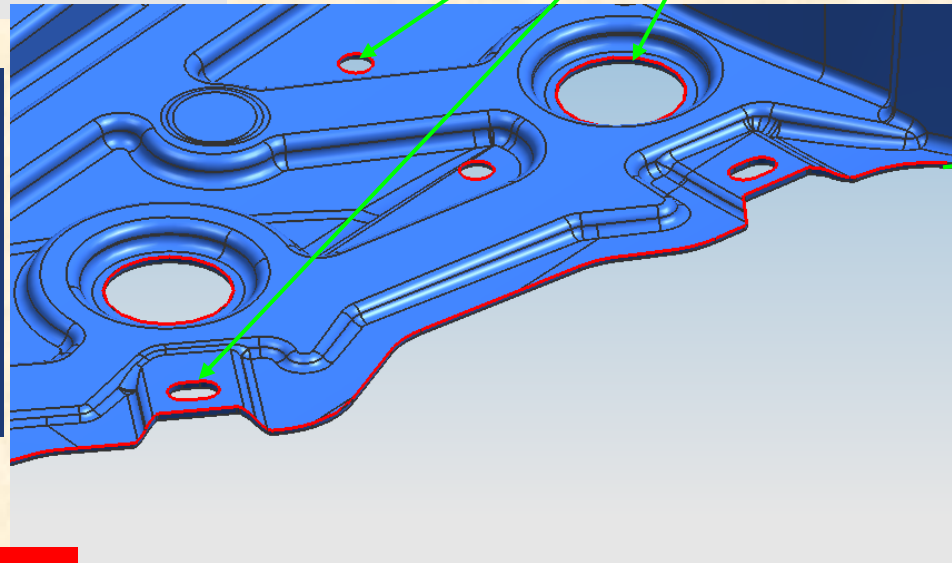
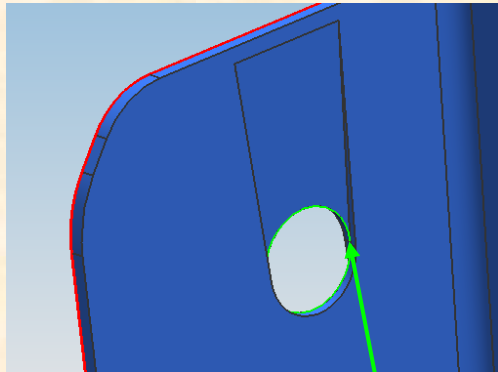
### 三. Parting Lines Analysis







*All the patching holes out of core side, red lines are marked as parting lines.*

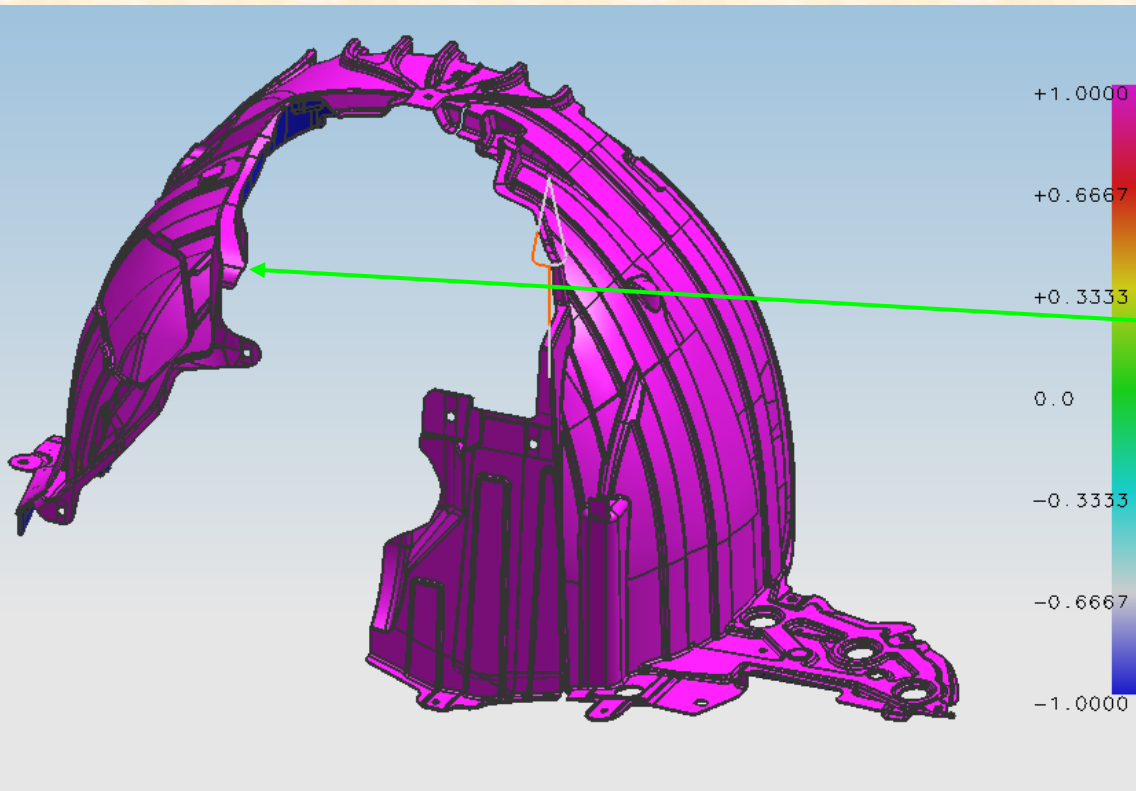


CAV  
P.L  
COR

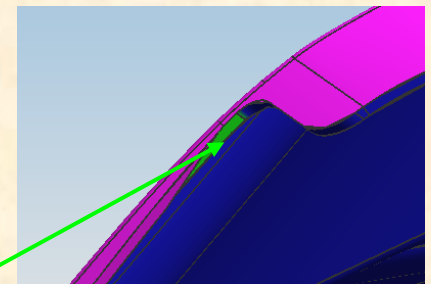
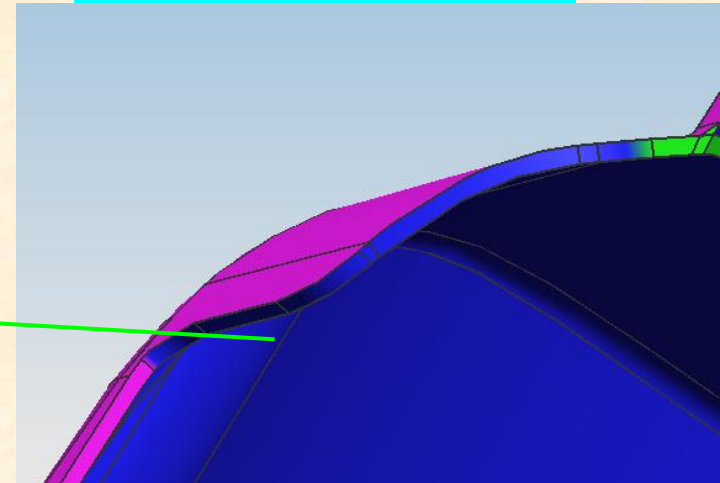
*Plugged holes (4 places), easy to rise burrs!*

## 四. Product Draft Analysis

### 1. Cavity Side :



*Product undercut before reversed:*

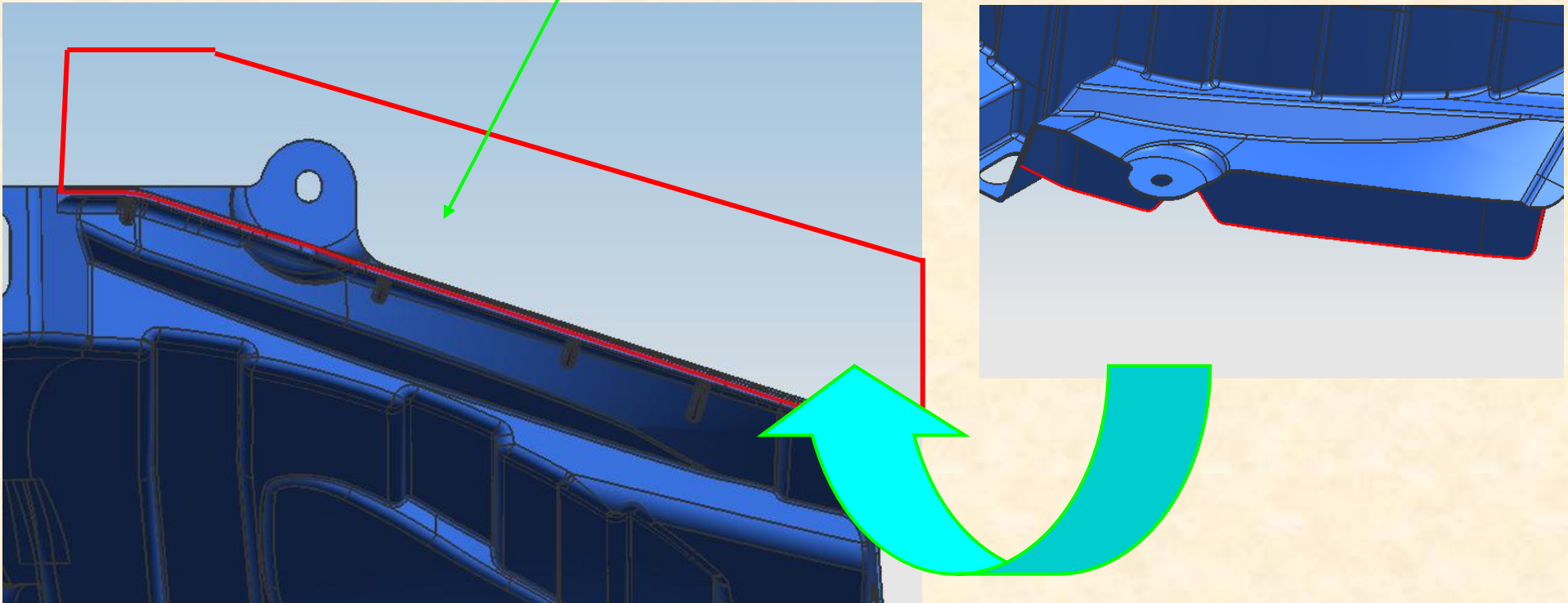


*Product glue reduced after improved*

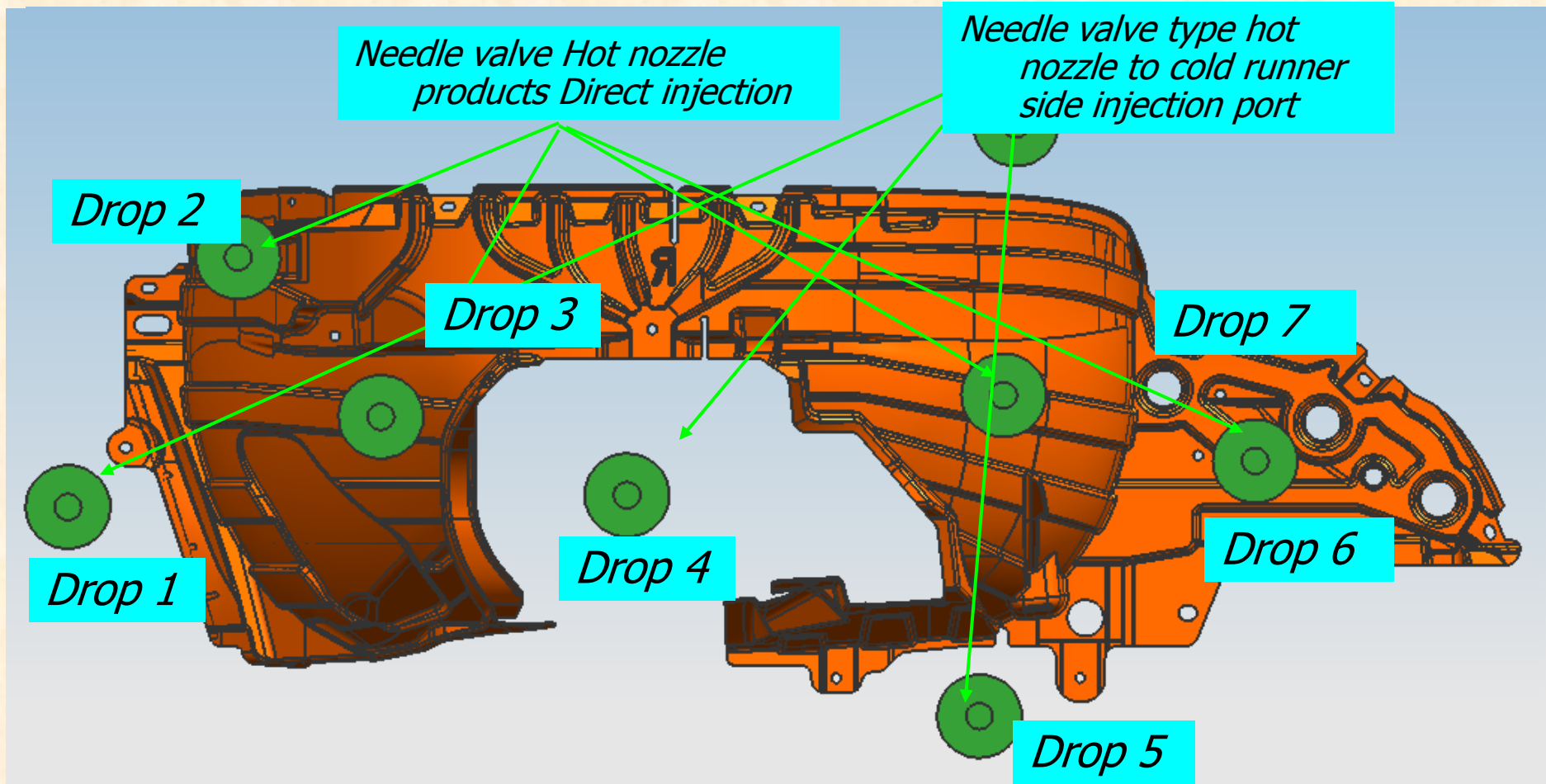
## 四. Product Draft Analysis

### 2. Core Side :

*core side inserts*

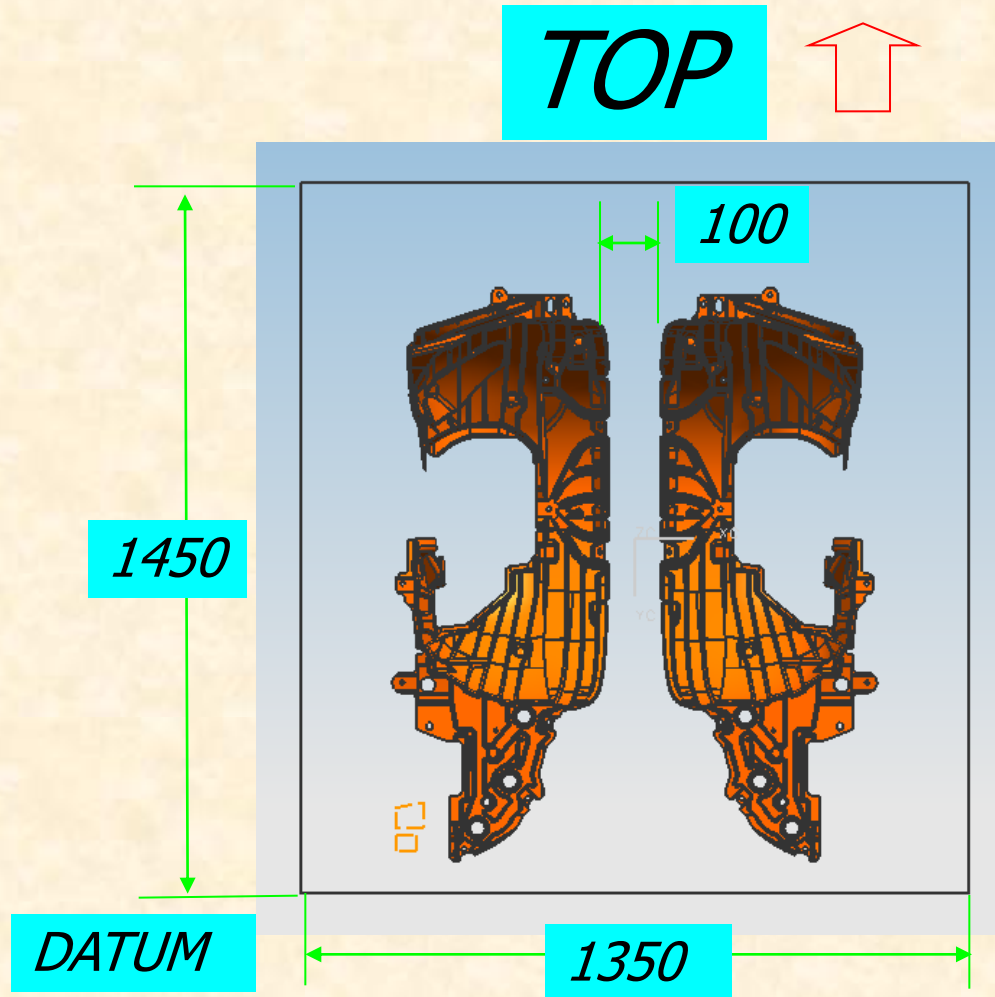


## 五. Way of Injection

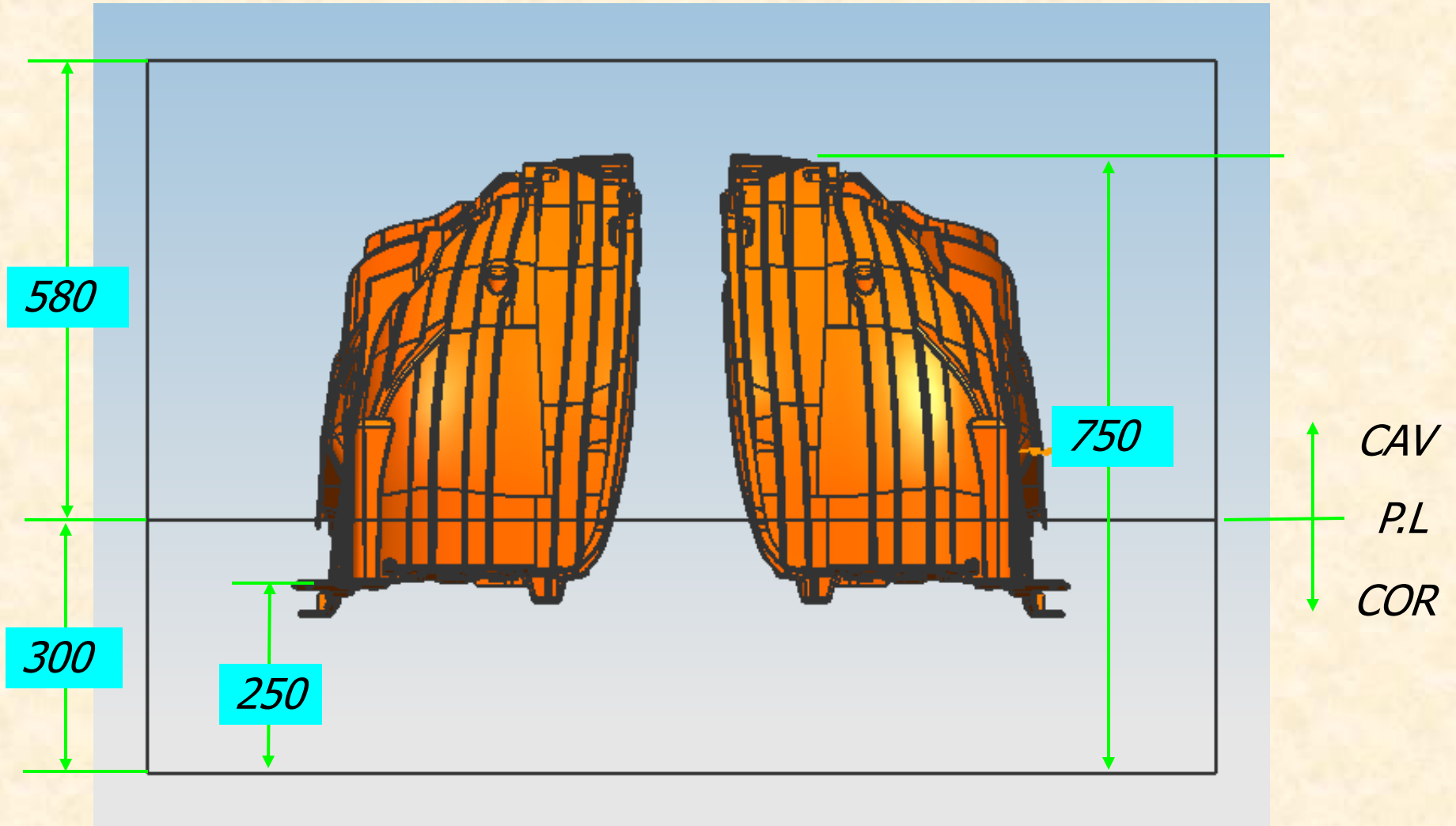


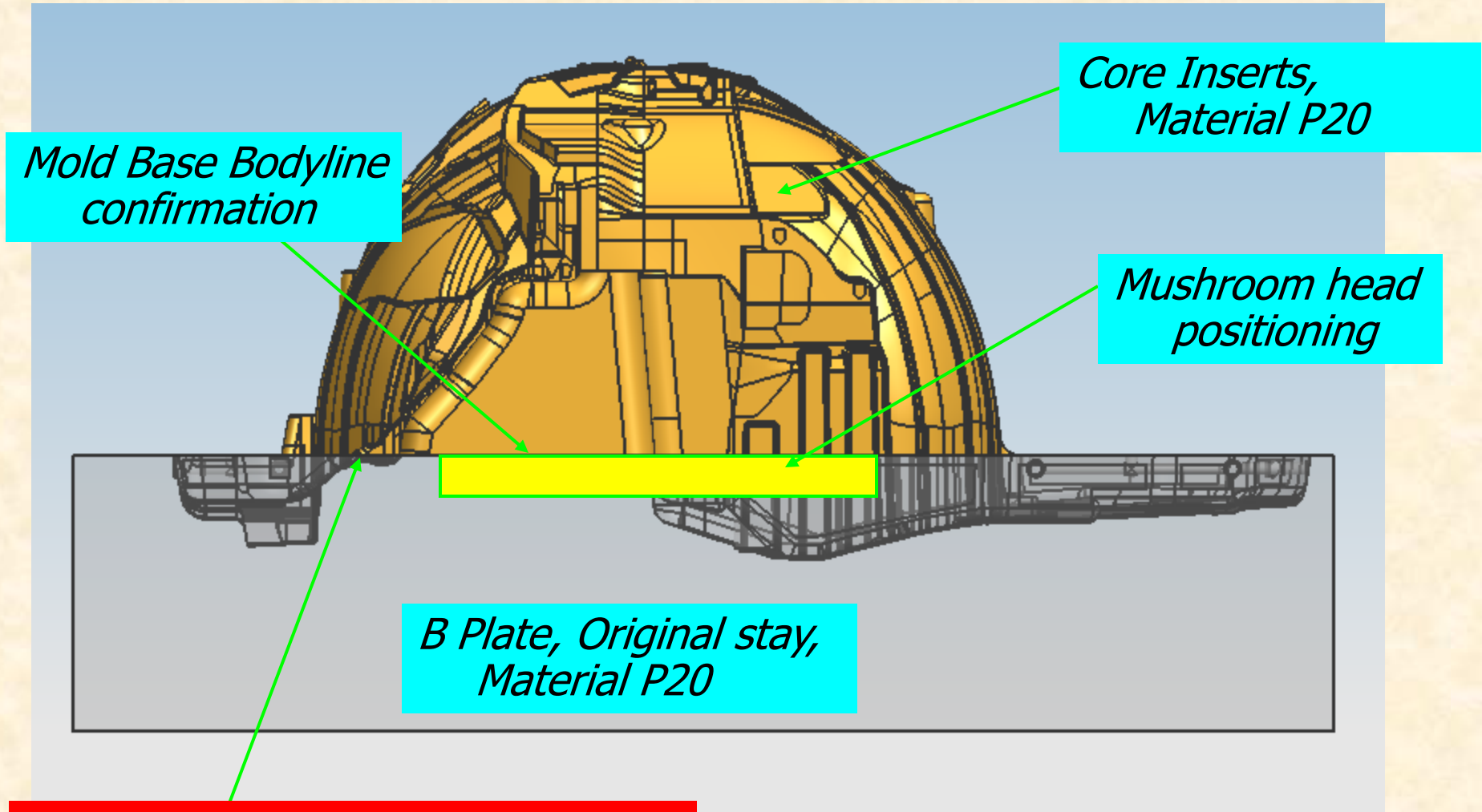


## 六. Layout and Cavity Size Mold Base Specifications

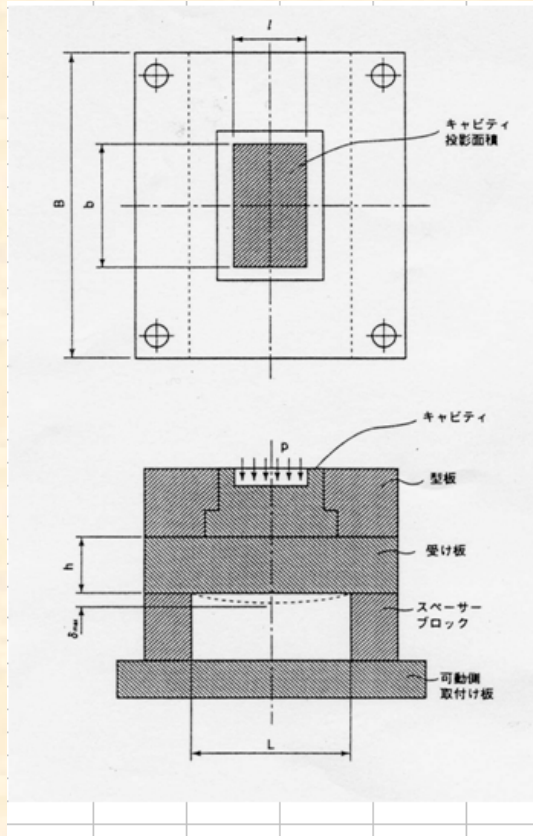








## 七. Calculation and Improvement of Bearing Plate Strength



製造番号	JF10068
63840	
B 主型の幅(mm)	1,450
L スペーサーブロック内側の間隔(mm)	900
h 製品下面の最小型厚(mm)	250
l 製品の長さ(mm)	700
b 製品の幅(mm)	1,000
p キャビティ内圧力(kgf/cm)	400
E 材料の縦弾性係数(kgf/cm)	2,300,000

サポート中央に設定		$\delta_{max} = \frac{5 \cdot p \cdot b \cdot L^4}{32 \cdot E \cdot B \cdot h^3}$
0.326338435		最大たわみ 0.786927
※0.2以下に型厚設定すること		0 mm hを厚くした場合
		修正たわみ 0.786927

E の値 (kgf/cm <sup>2</sup> )	
軟鋼 (S50C相当)	2,100,000
ブリード鋼 (SCM440系)	2,300,000
鋳鉄	1,050,000

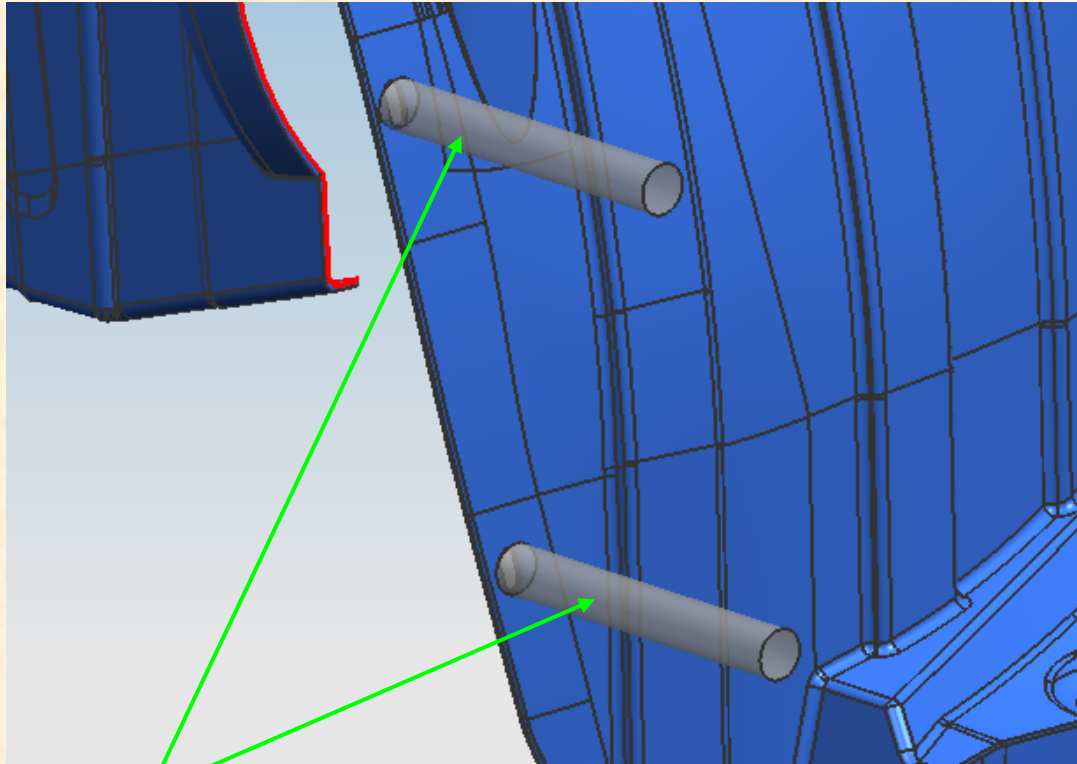
  

p キャビティ内圧力	
低目	200
	300
	350
	400 PP
	450
	500 ABS
	600

Bearing plate thickness 250

The bearing plate deformation must be controlled within 0.05mm, Design enough support pillars to improve deformation size

## 八. Structural Analysis



*2 product round hole cavity slides, oil cylinder drive,  
HPS brand! Two products share one cylinder*



## 九. Ejection Method

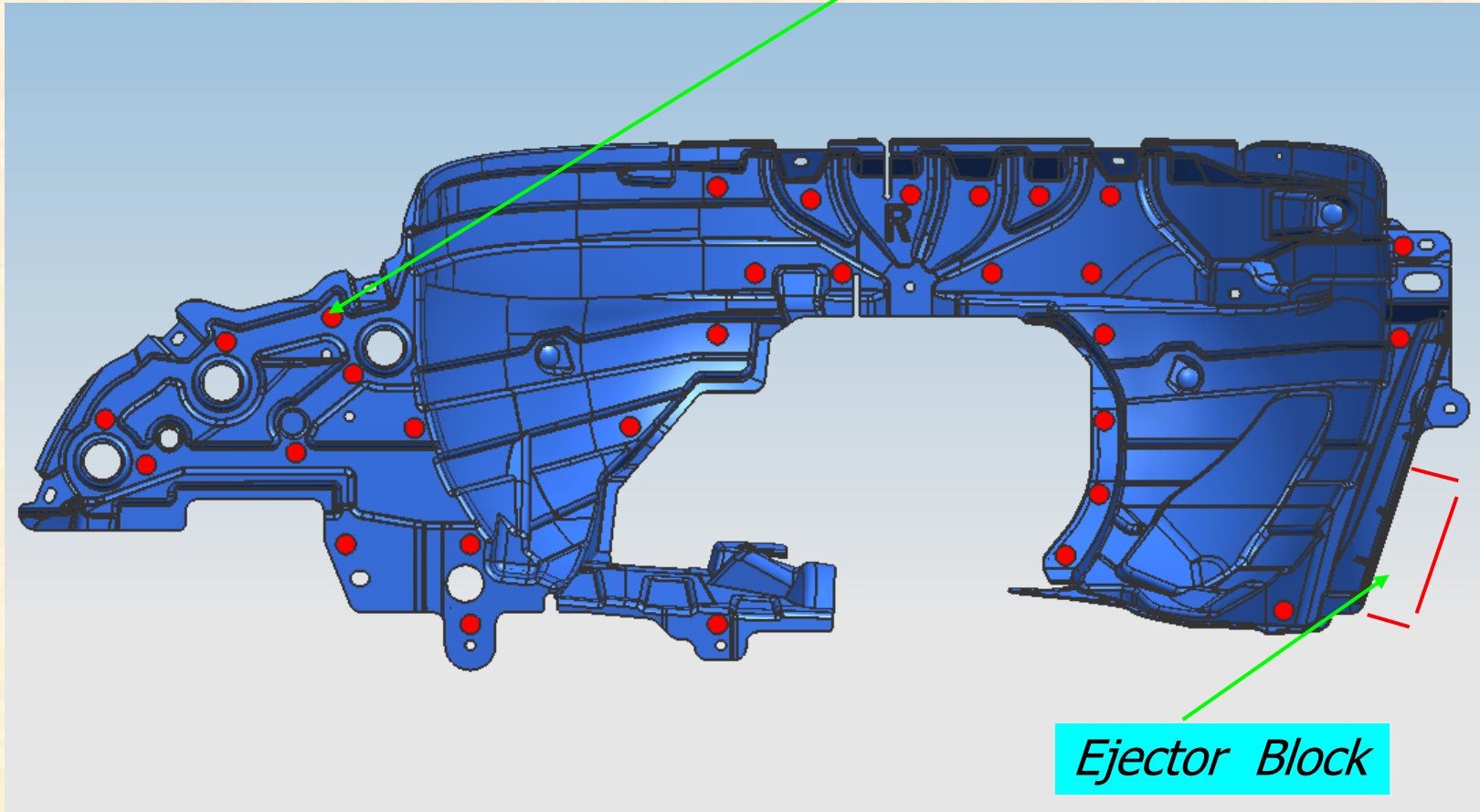
### Basic Information of Ejection:

- Product removal method: robot hand / automatic drop / suction tray
- Product ejection method: Ejector pin / Ejector Blade/ Ejector Sleeve / Straight Ejection / Slanting
- Ejection reset mode: Ejector Pull rod / Spring / Cylinder
- Thimble standard: MISUMI /PUNCH / HASCO / DME
- Limit switch standard: Normal / Schneider
- Cylinder standard: Domestic / MERKLE / HPS

## 九. Ejection Method

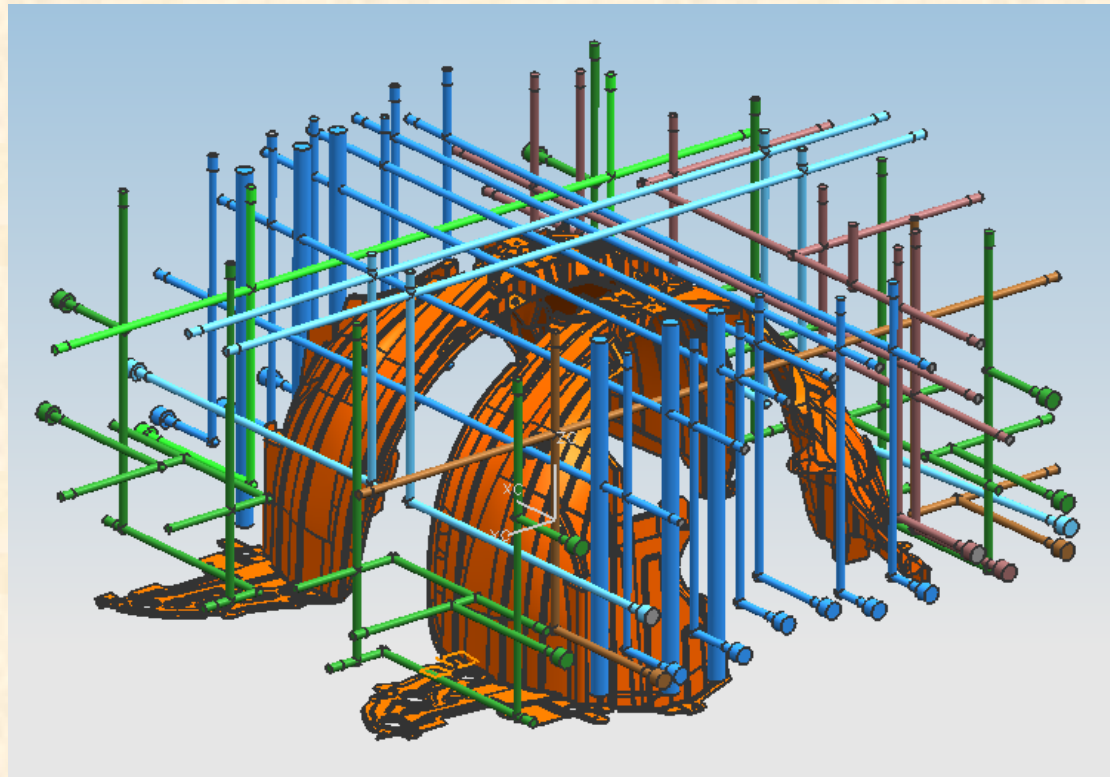
### Sketch Map of Ejection Layout:

*30-  $\phi$  16 round Ejector Pin, all Ejector Pins are sun-skid with texture.*

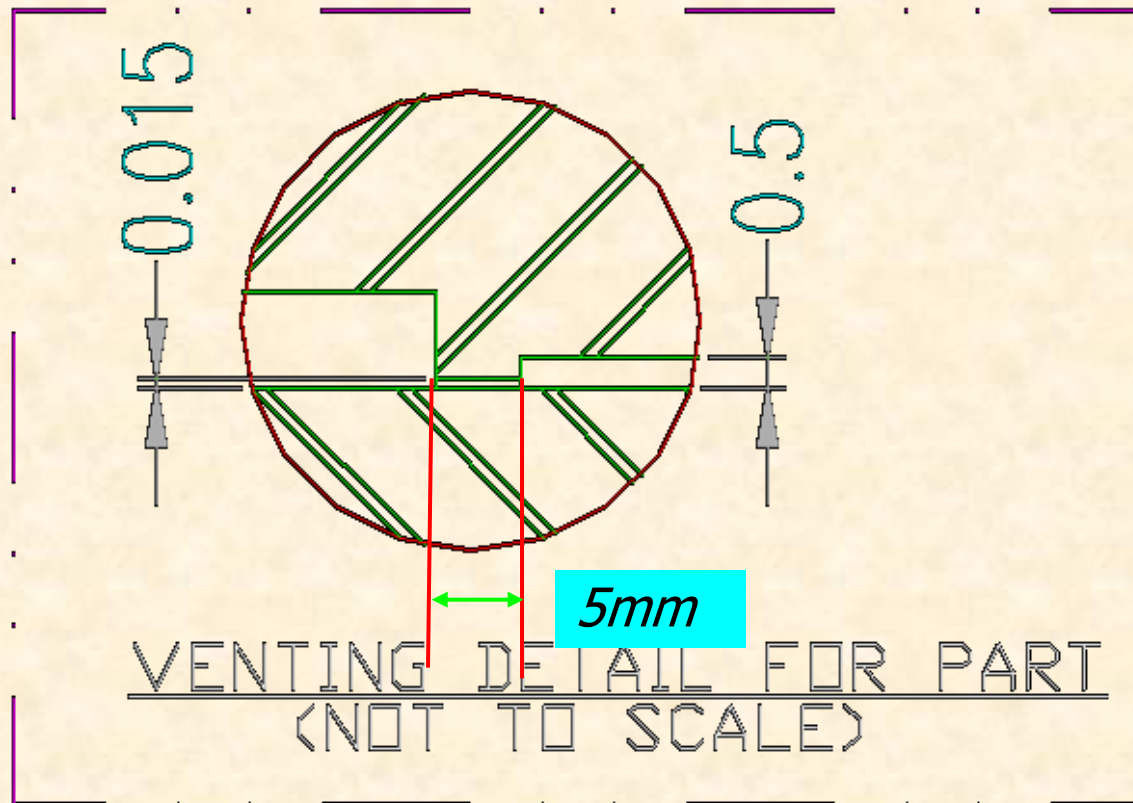


## †. Water Transport System

- Water nozzle model:
- Water nozzle Air hole size:  $\phi 30 \times 25$
- Water transport diameter:  $\phi 14$
- In and out water identification: IN OUT



## 十一. Product Circumference Exhaust





## 十二. Product Engraving and Date Code



### 十三. Machine Parameter

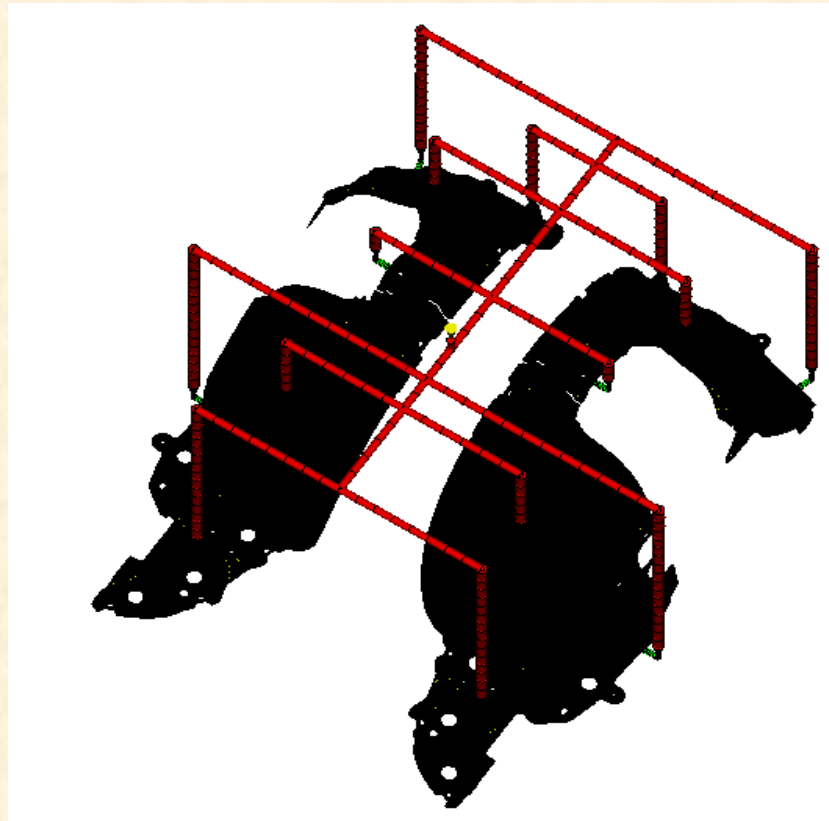
- Machine type and tonnage: 2000T
- Green column length and width: 1650\*1550mm
- Flange diameter:  $\phi$ 280mm
- Sprue Bushing radius: SR10mm
- Maximum opening amount: 1580mm
- Minimum/maximum mold thickness: 750/1600mm
- Ejector holes diameter:  $\phi$ 50mm
- Number of Ejector holes: 5
- Ejector joint thread specifications: M20
- Ejector center distance: 100mm
- The maximum amount of shots: 13000g

## 十四. Mold Flow Analysis

1. Gate Position, filling time
2. Air Traps
3. Weld lines
4. Volumetric Shrinkage
5. Deflection
6. Clamp Force

# Analysis Report

**CASE** *CAE report-NANBU-63843-20120410*  
*2011.04*

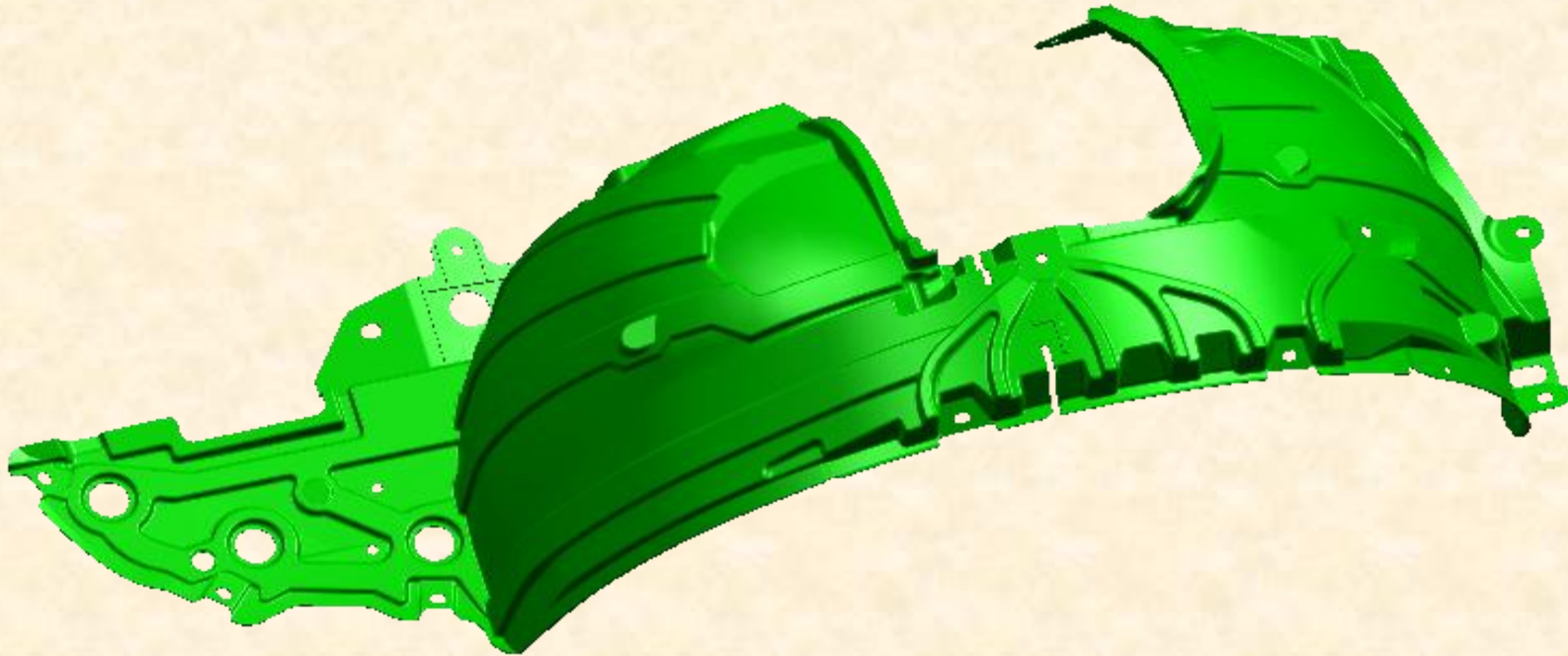




## ANALYSIS AIMS

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- ▶ To analysis original design and check flow, warp.

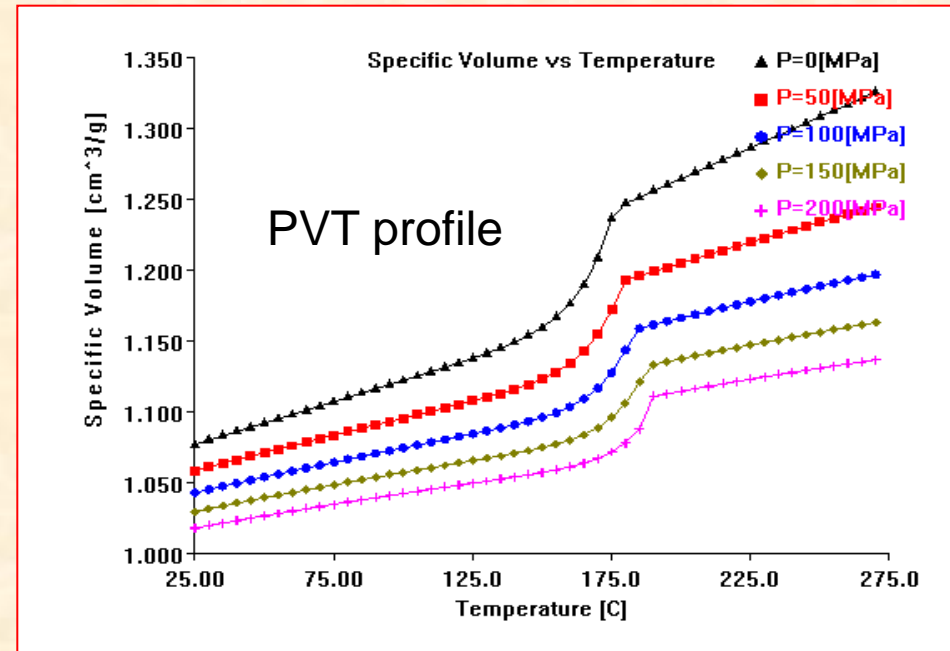
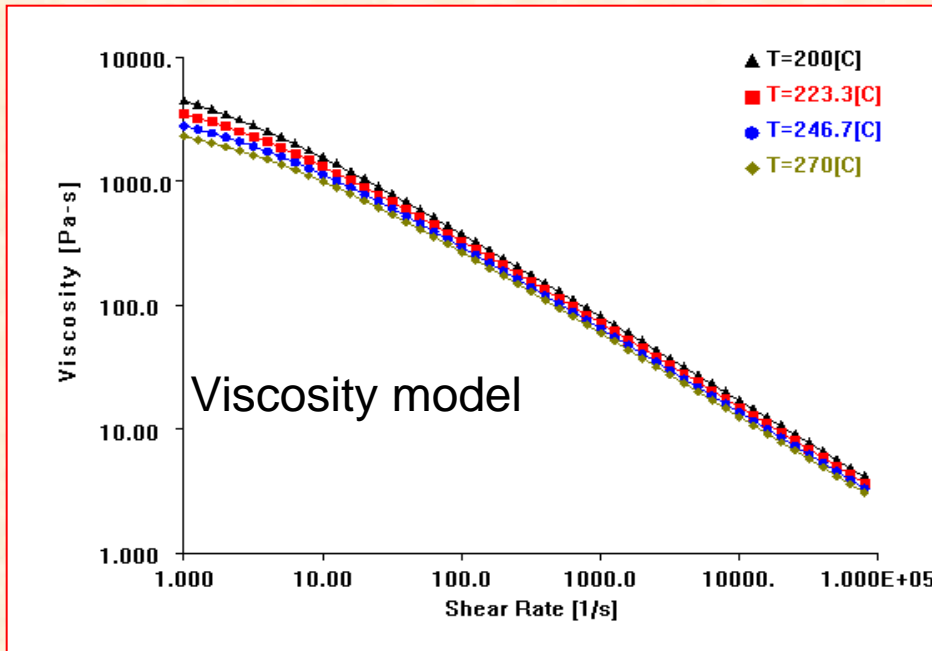


# Plastic Material Introduction

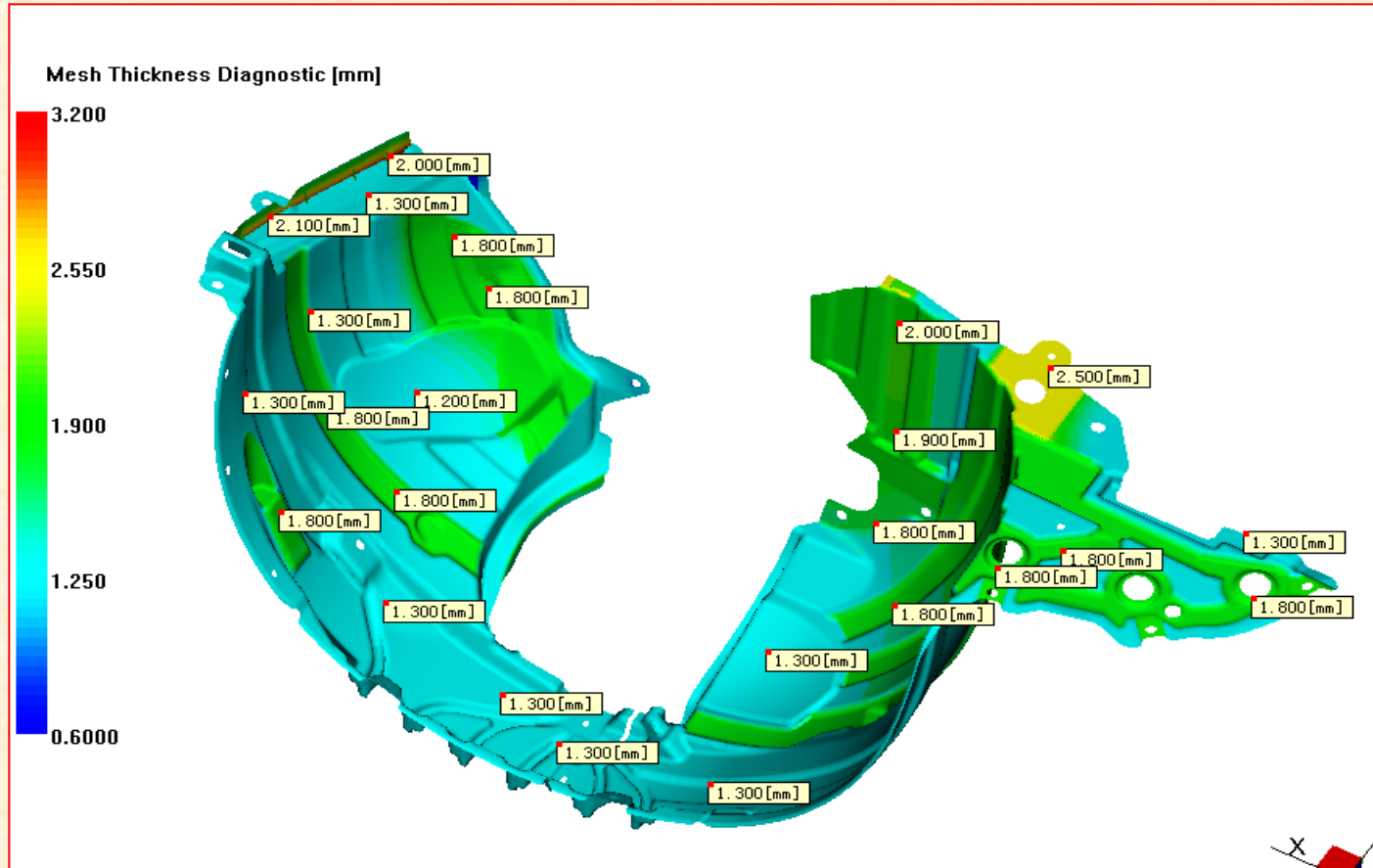
## PP Moplen HP400M: Basell Polyolefins Europe

(Material not found in library, selection of forming parameters of similar materials for analysis)

- |                                   |                 |                              |               |
|-----------------------------------|-----------------|------------------------------|---------------|
| 1. Melt Density                   | 0.77248 g/cu.cm | 7. Melt Temperature Minimum  | 200.0 deg.C   |
| 2. Solid Density                  | 0.92889 g/cu.cm | 8. Melt Temperature Maximum  | 270.0 deg.C   |
| 3. Ejection Temperature           | 95 deg.C        | 9. Mold Temperature Minimum  | 30.0 deg.C    |
| 4. Recommended Mold Temperature   | 40 deg.C        | 10. Mold Temperature Maximum | 50.0 deg.C    |
| 5. Recommended Melt Temperature   | 235 deg.C       | 11. Maximum Shear Rate       | 100000.00 1/s |
| 6. Absolute Max. Melt Temperature | 310 deg.C       | 12. Maximum Shear Stress     | 0.2500 MPa    |



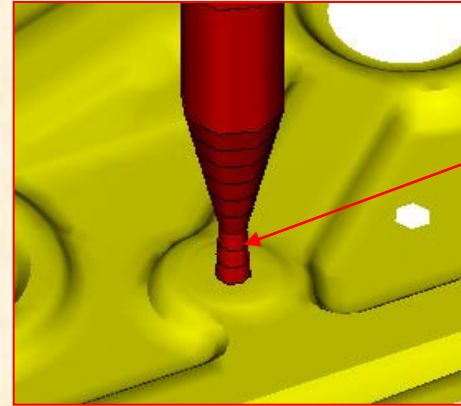
## Part Introduction



The mostly wall thickness of part is not uniform shown by picture. The thickness of the product is very thin. May be filled with difficulties

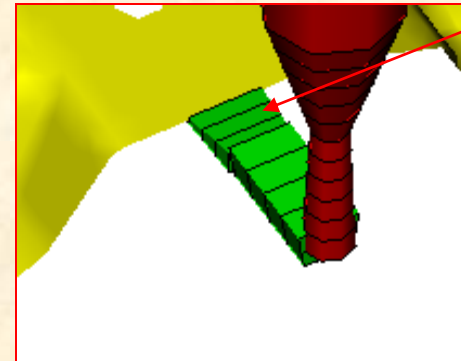
## Feed System Design

Note :the hot runners and the product is close.



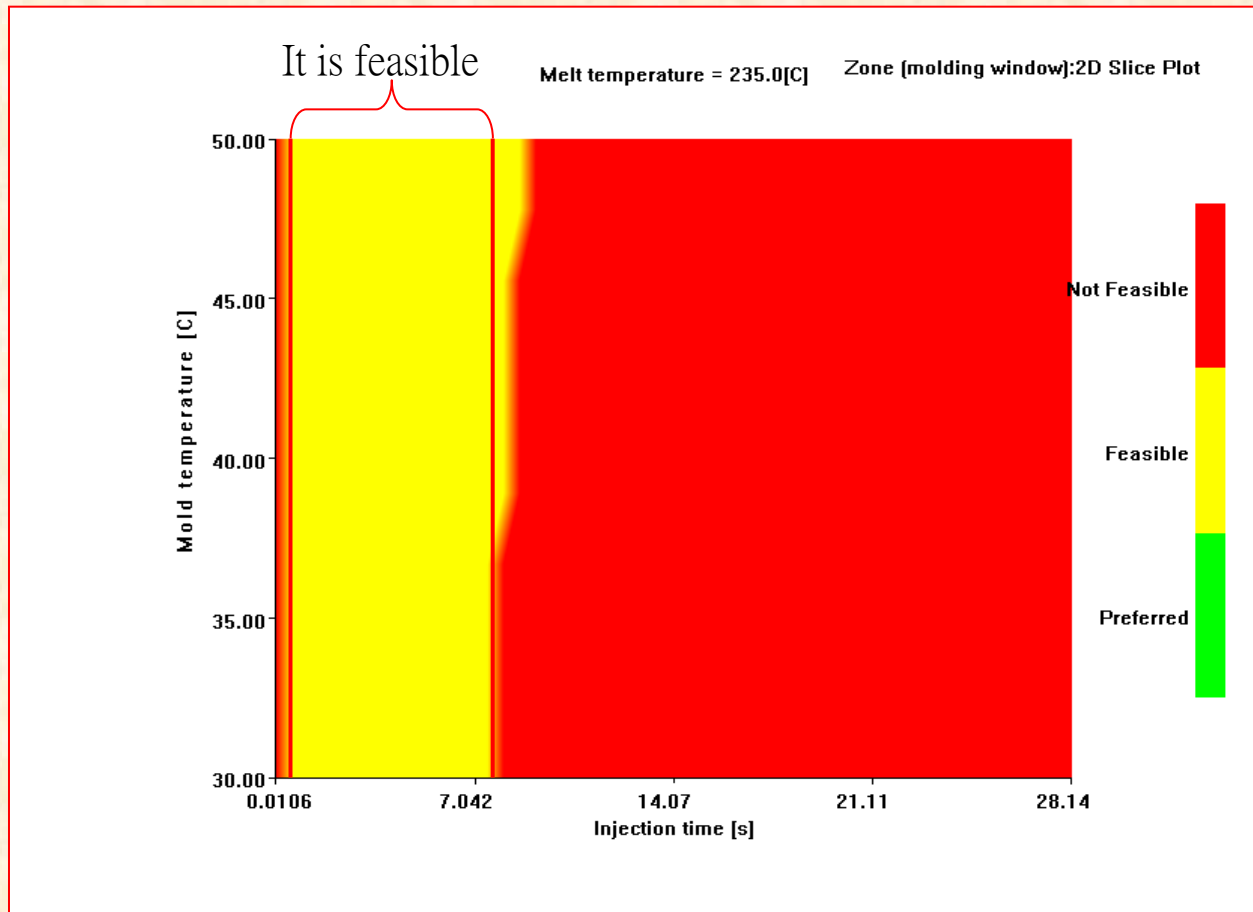
**All hot gate 6.0 mm**

**All edge gate 12.0X1.5 mm**



1+1 cavities, two plates mold, hot runner + cold gate , the size is shown by picture.

## Zone (molding window)



Suitable filling time range is the yellow area Shown by picture. So we suggest the fill time is 0~7 seconds.



## Processing Conditions

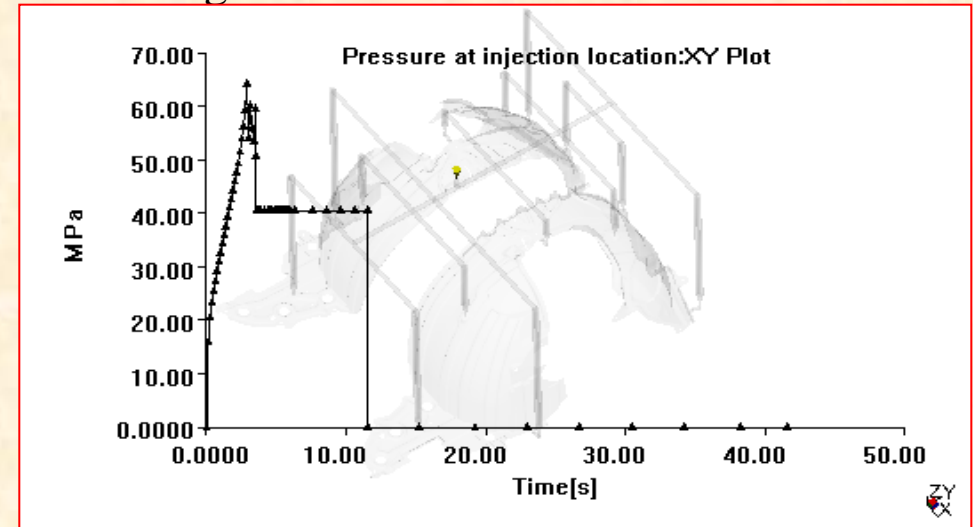
Filling Conditions :

Mold temperature : **40.00** deg.C

Melt temperature : **235.00** deg.C

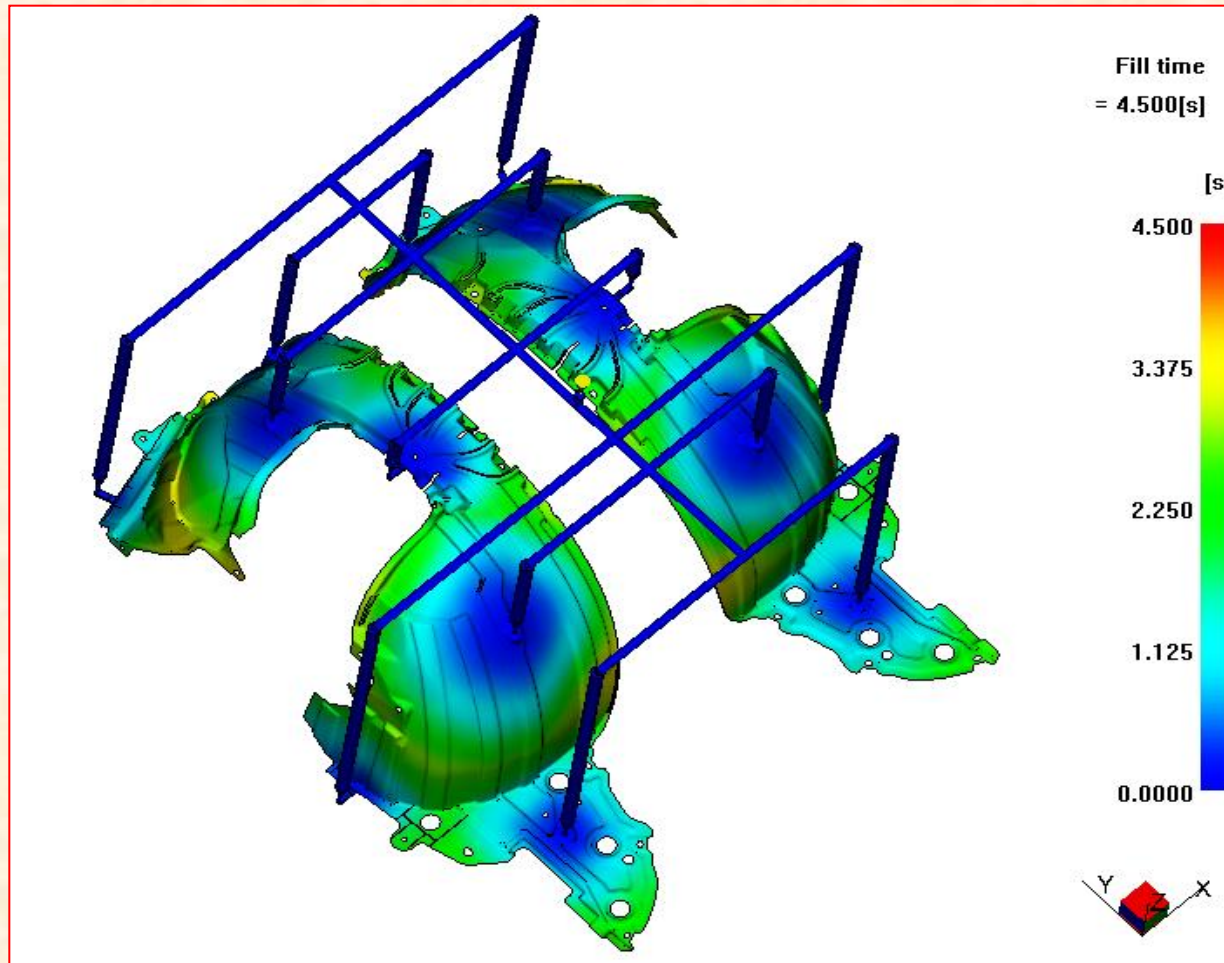
Injection time : **4.5**sec

Packing Profile :



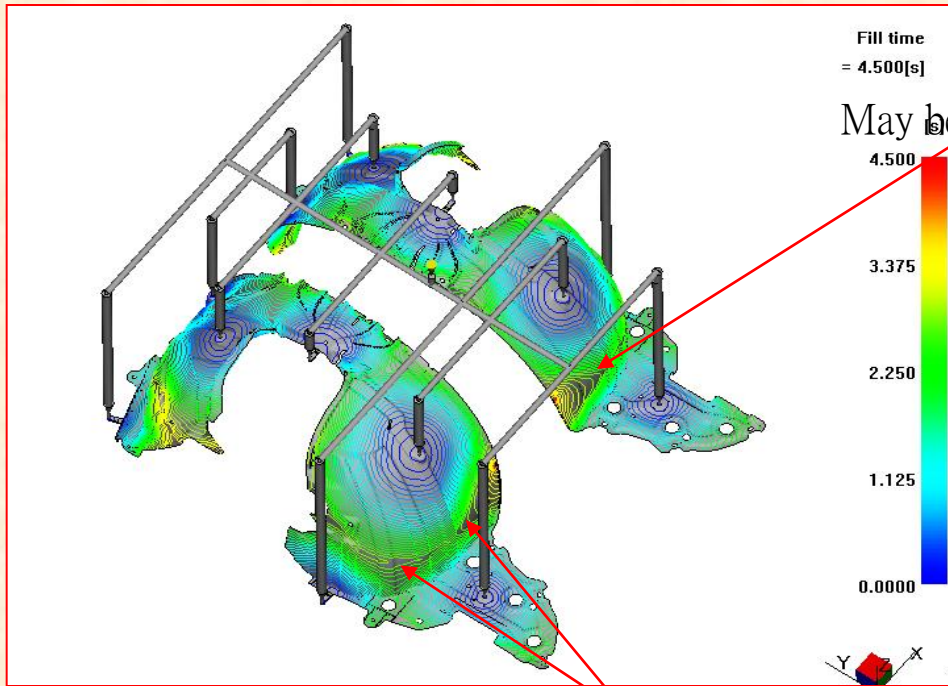
PRESSURE [MPa]	STEP DURATION [sec]
40.49	0.0
40.49	8.0

# Fill time

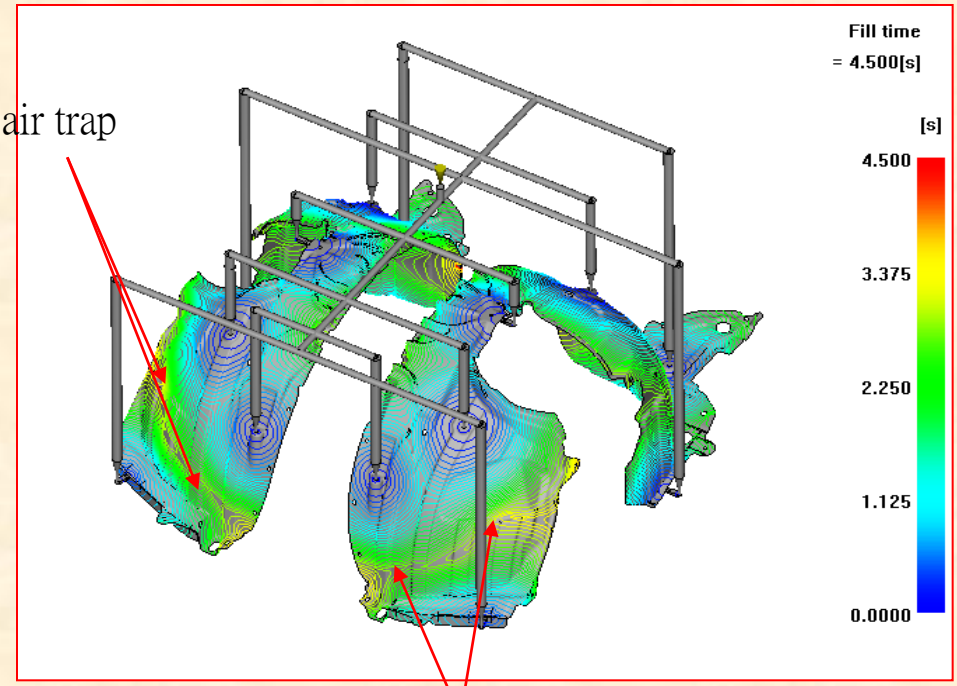


Shown by picture the flow status is balance.

## Fill time (contour)



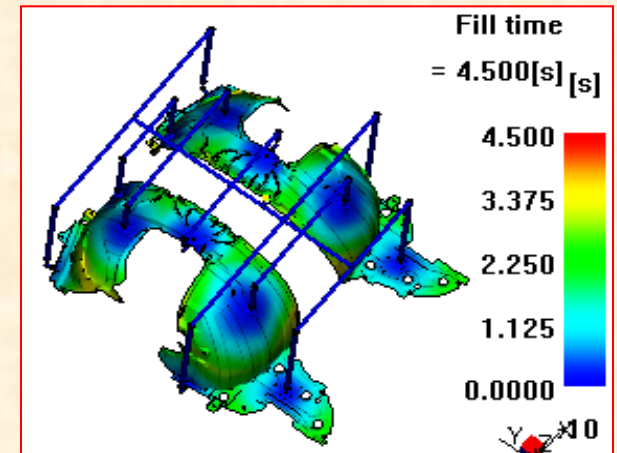
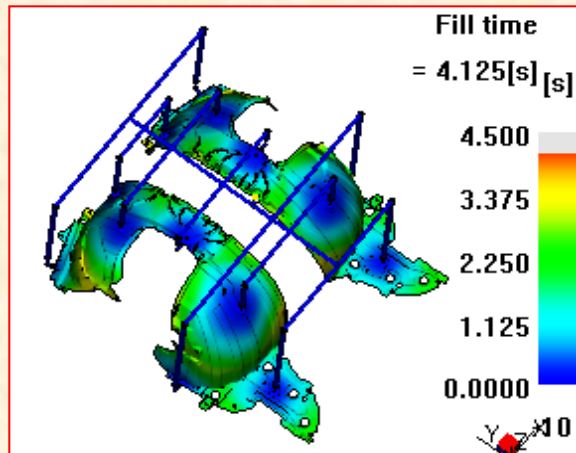
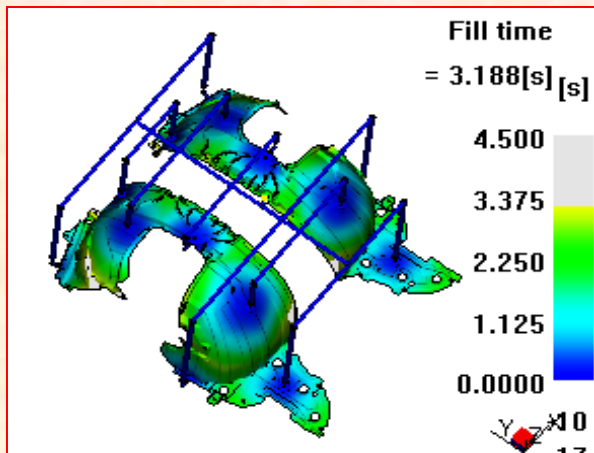
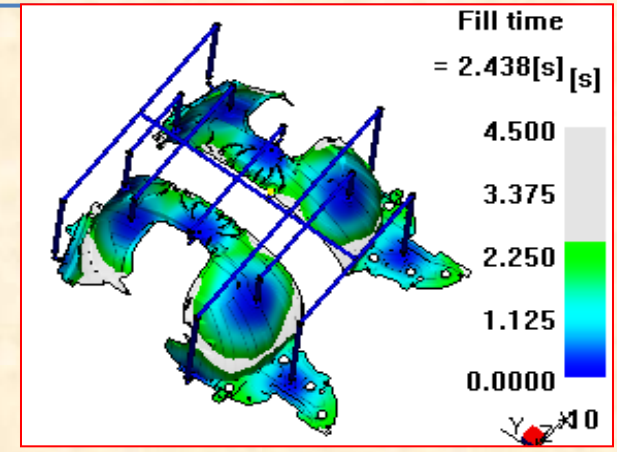
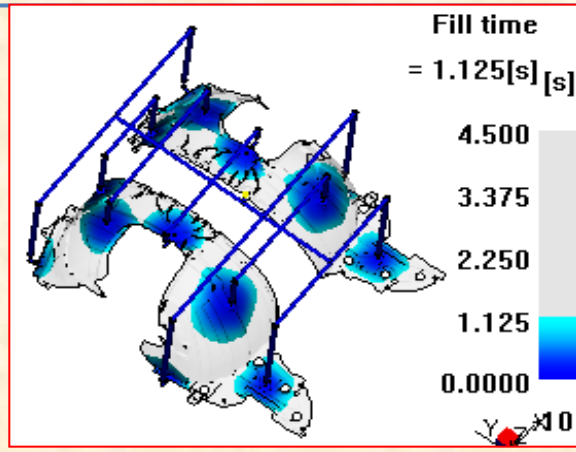
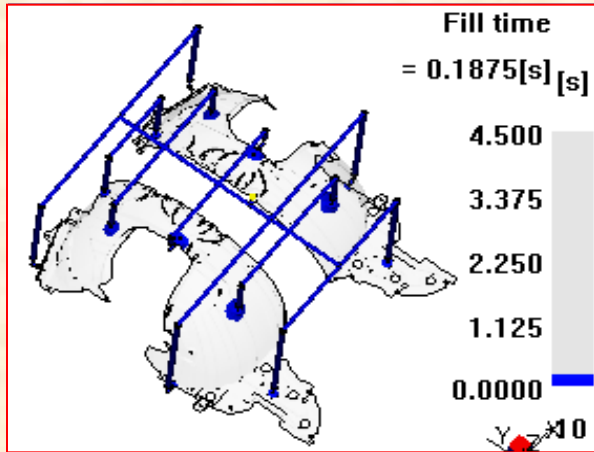
May be air trap



May be air trap

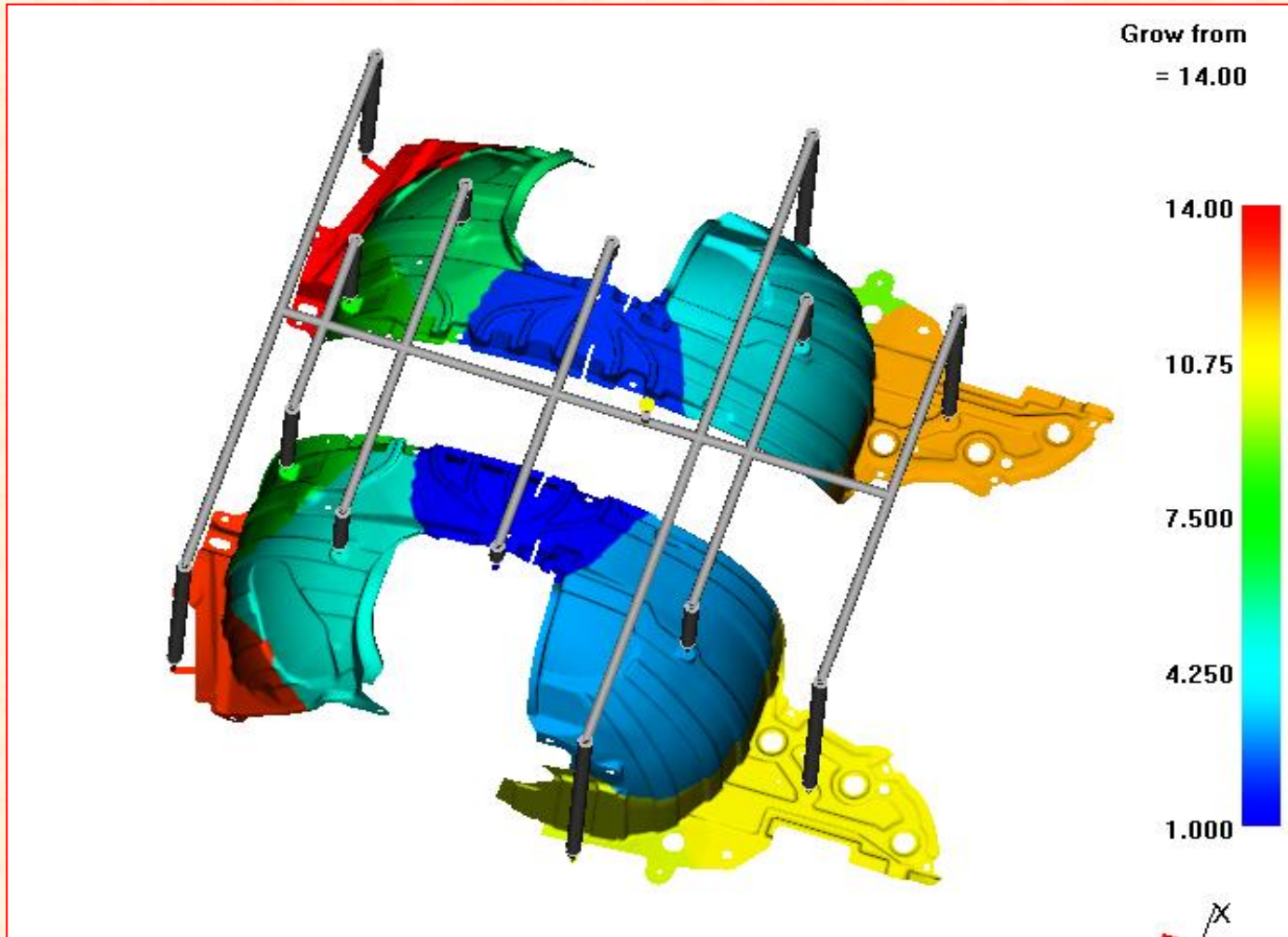
The contour distribute relatively uniformity Shown by picture , but there are some air traps ,please a tention to venting.

# Fill time series



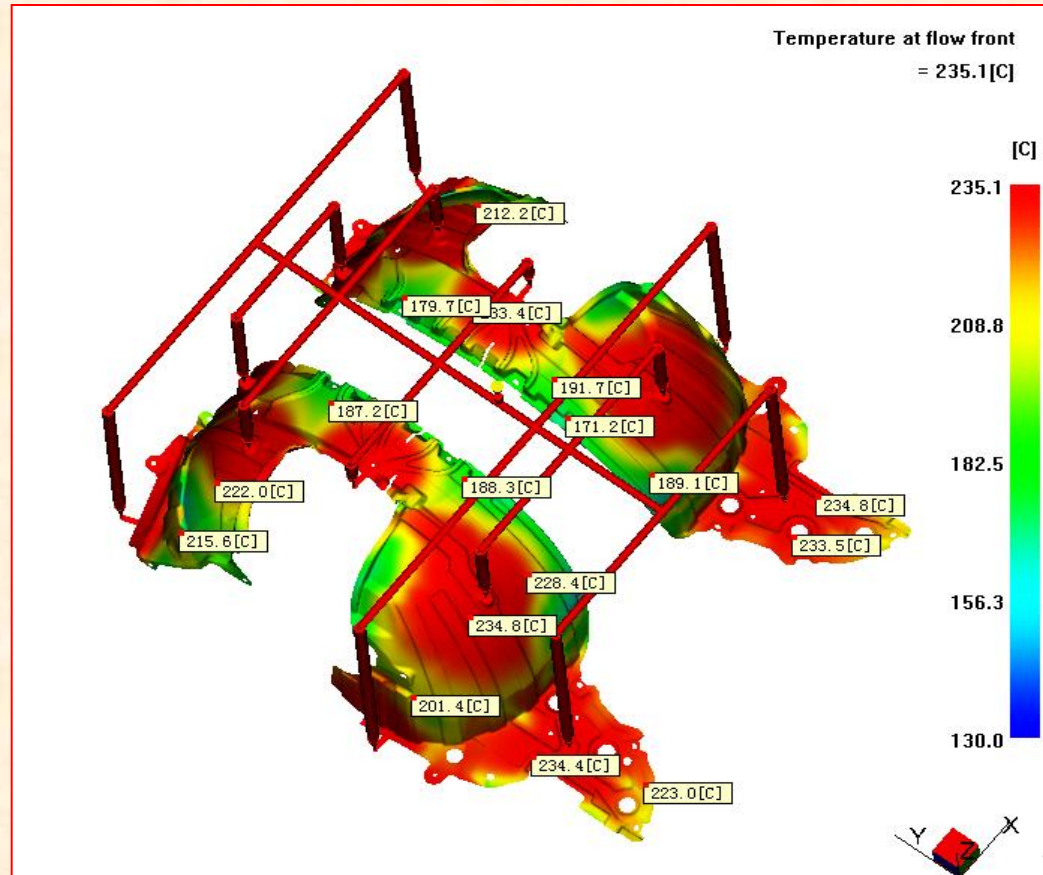


# Grow from



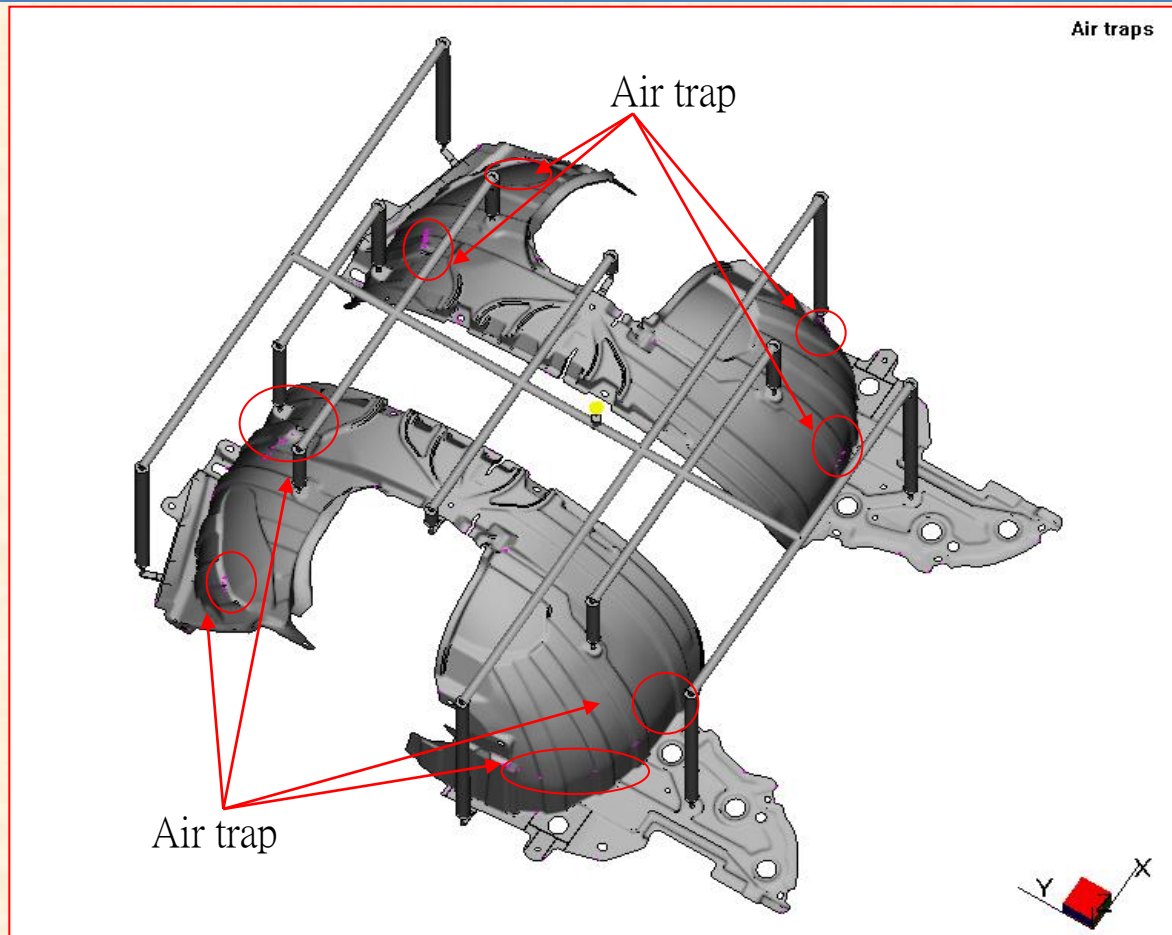


## Temperature at flow front



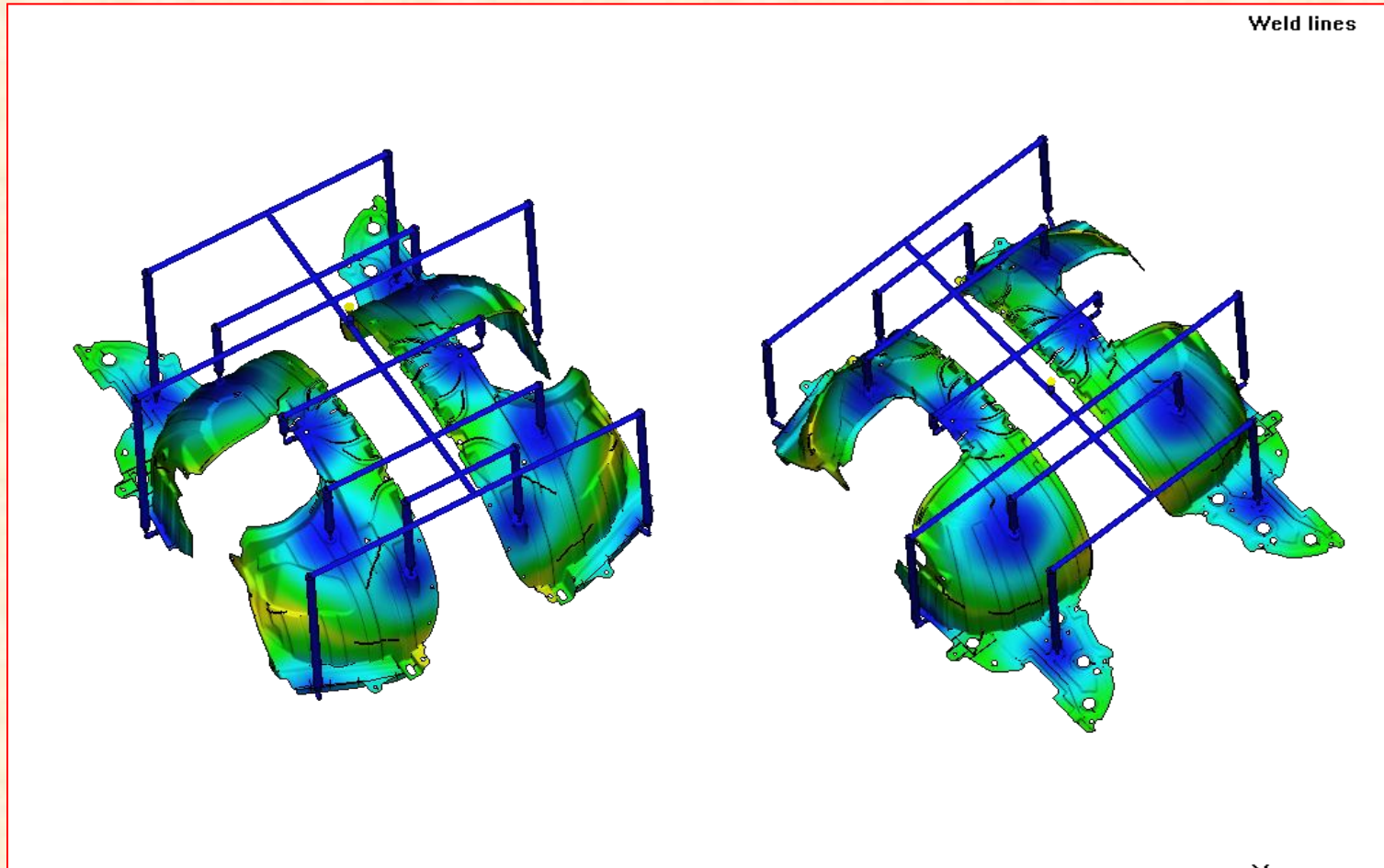
Near the gates of the temperature is very high, but Stay away from gates of temperature is very low. The extent of the temperature drop is very big, may be affect the forming quality.

## Air traps



The magenta circles are possible air traps shown by picture ,please attention venting.

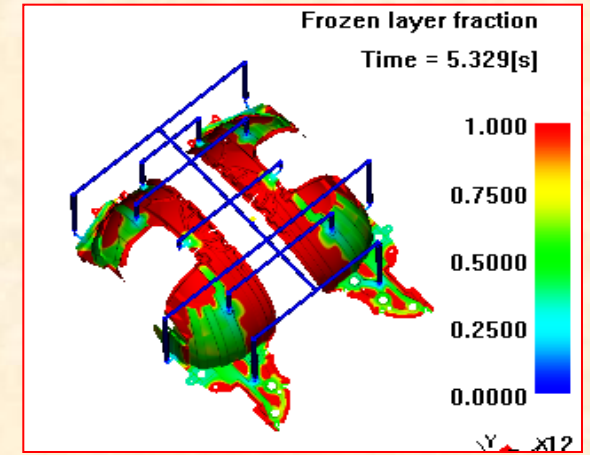
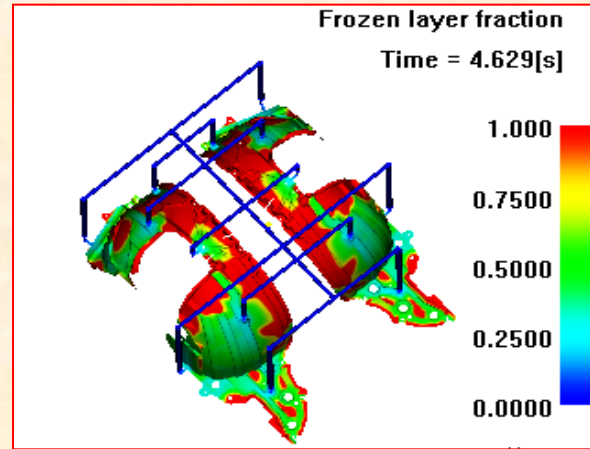
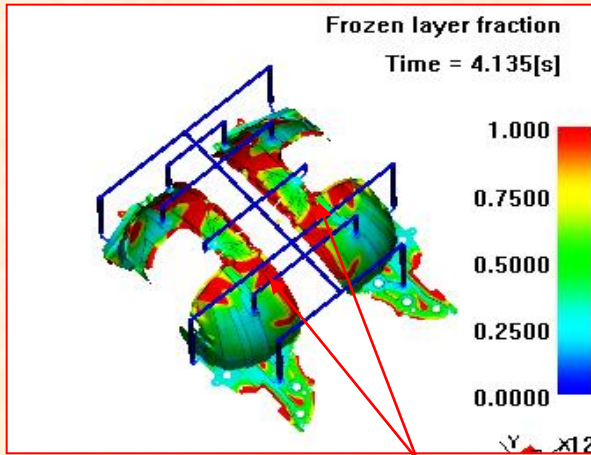
## Weld lines



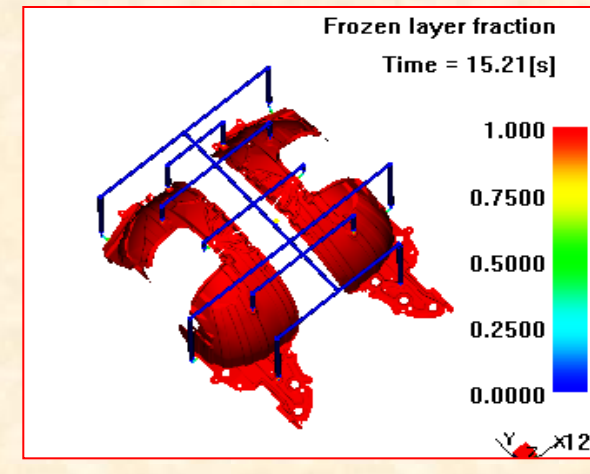
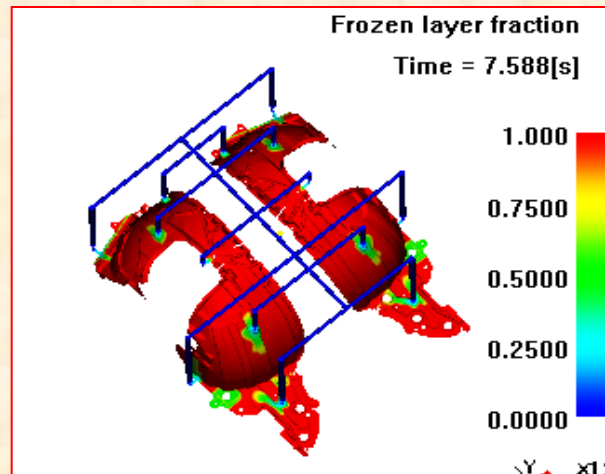
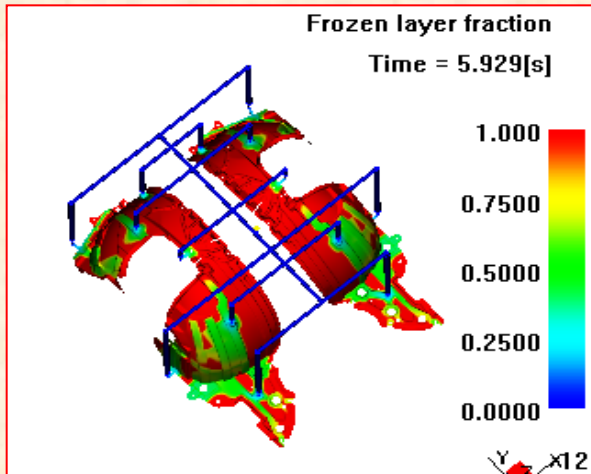
The black lines are possible weld lines. please attention to venting.



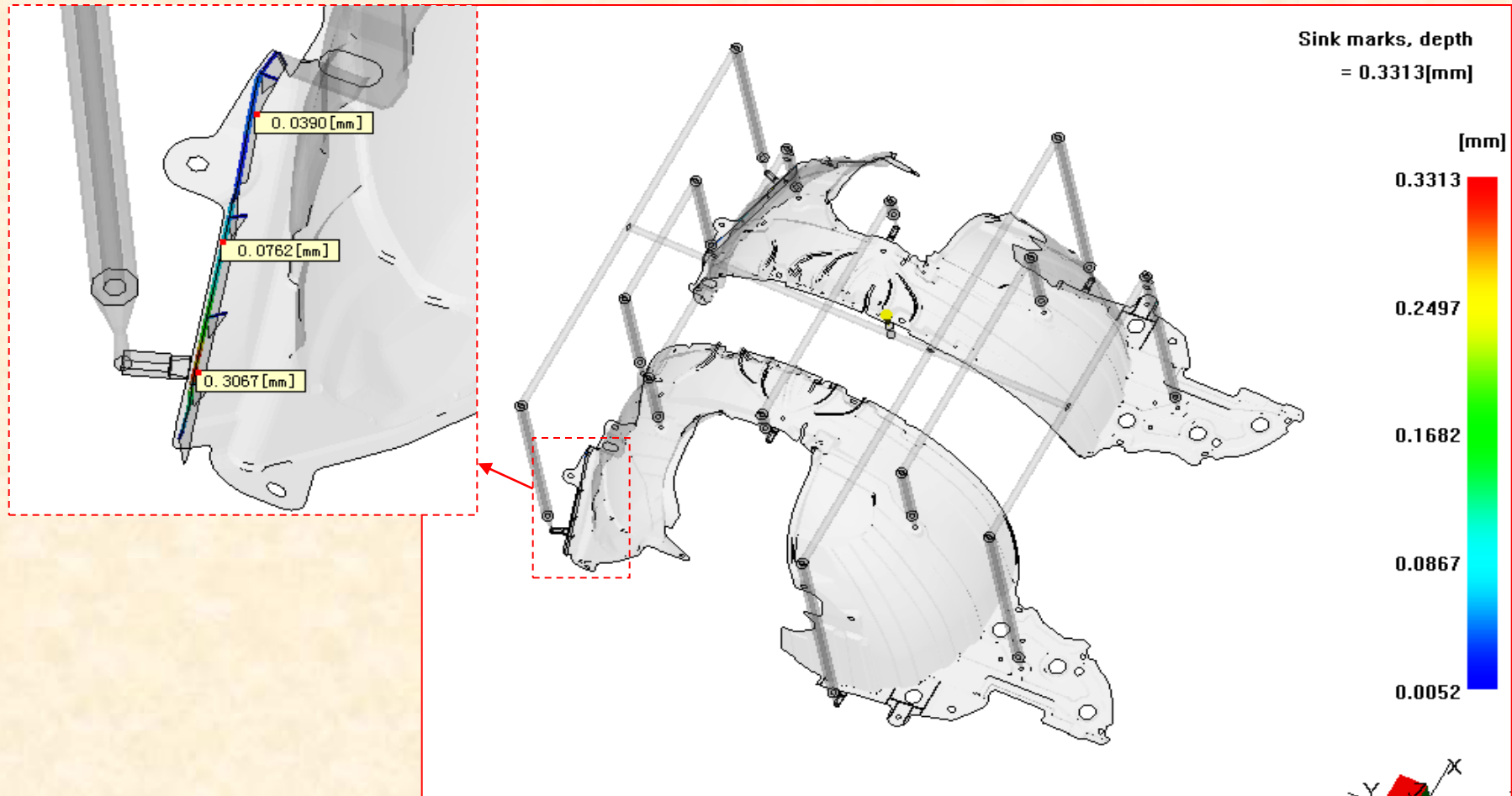
## Frozen layer fraction



After the end of the filling, the frozen layer fraction is very high. Attention to the fill speed control, prevent appear short shot.



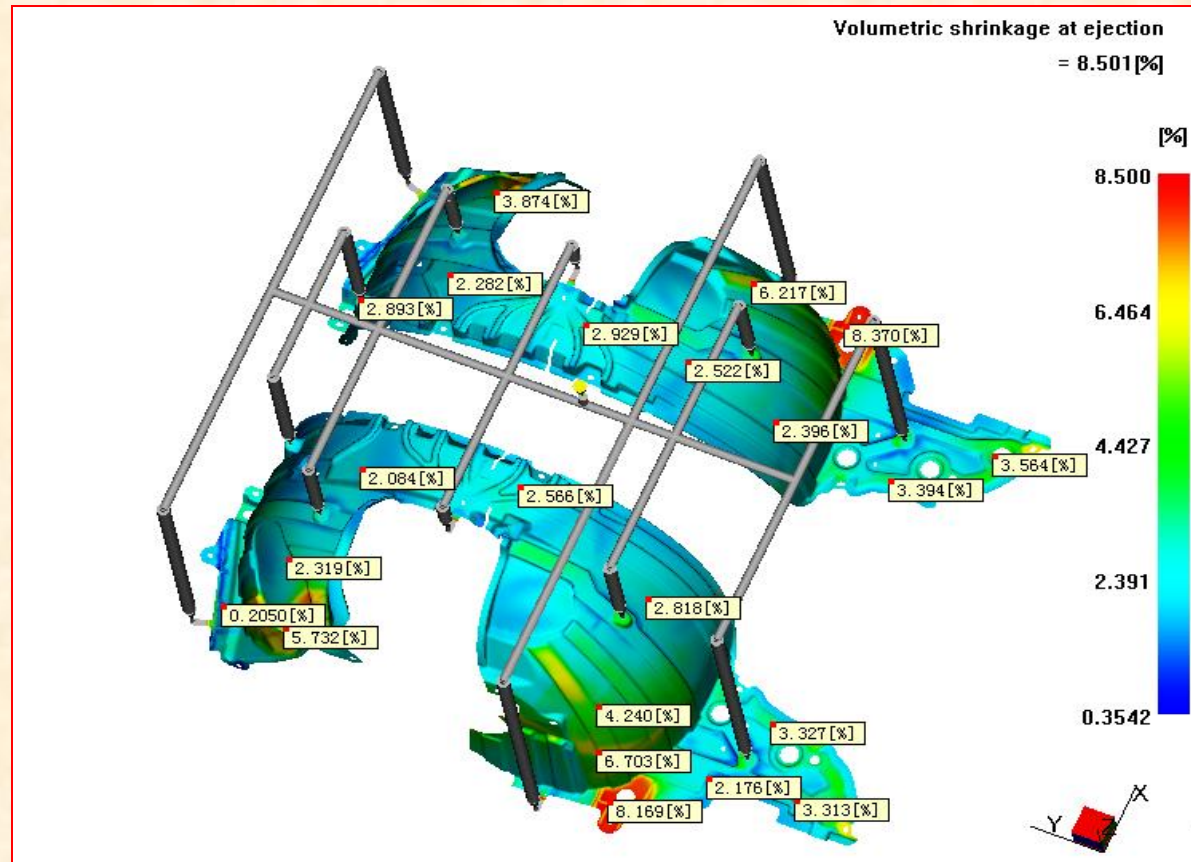
## Sink marks, depth



Sink mark is large, may be product the sink .

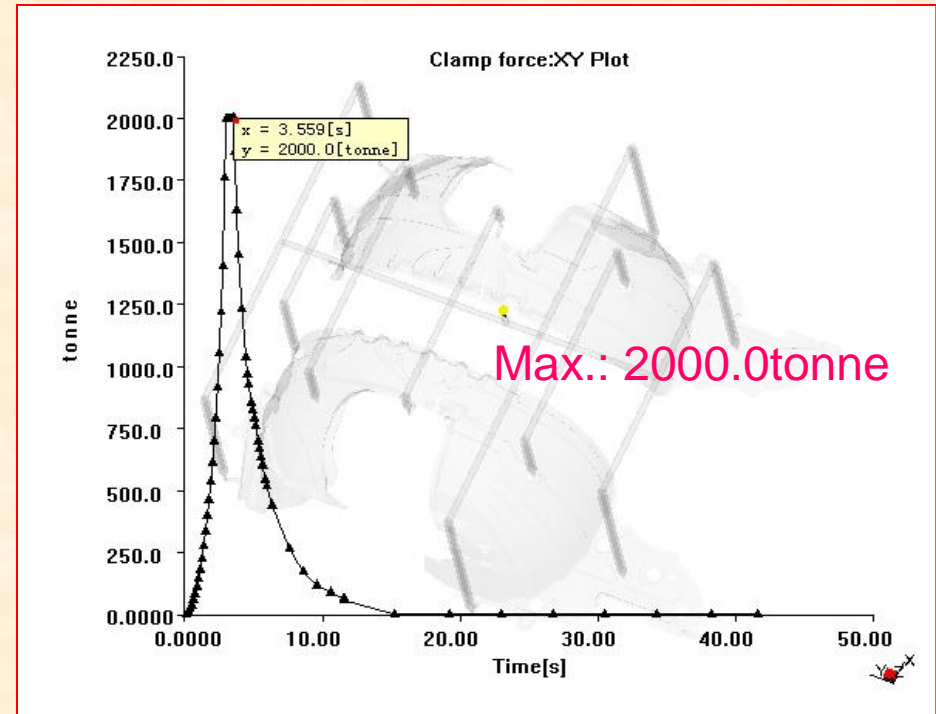
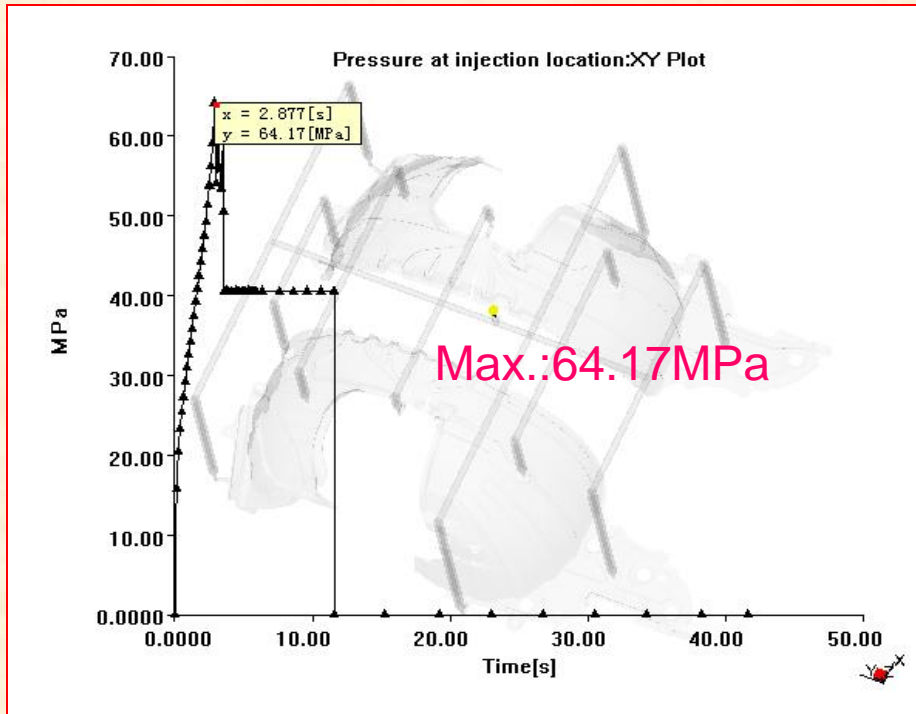


## Volumetric shrinkage at ejection



Volumetric shrinkage is imbalance show by picture, please attention the setting of packing.

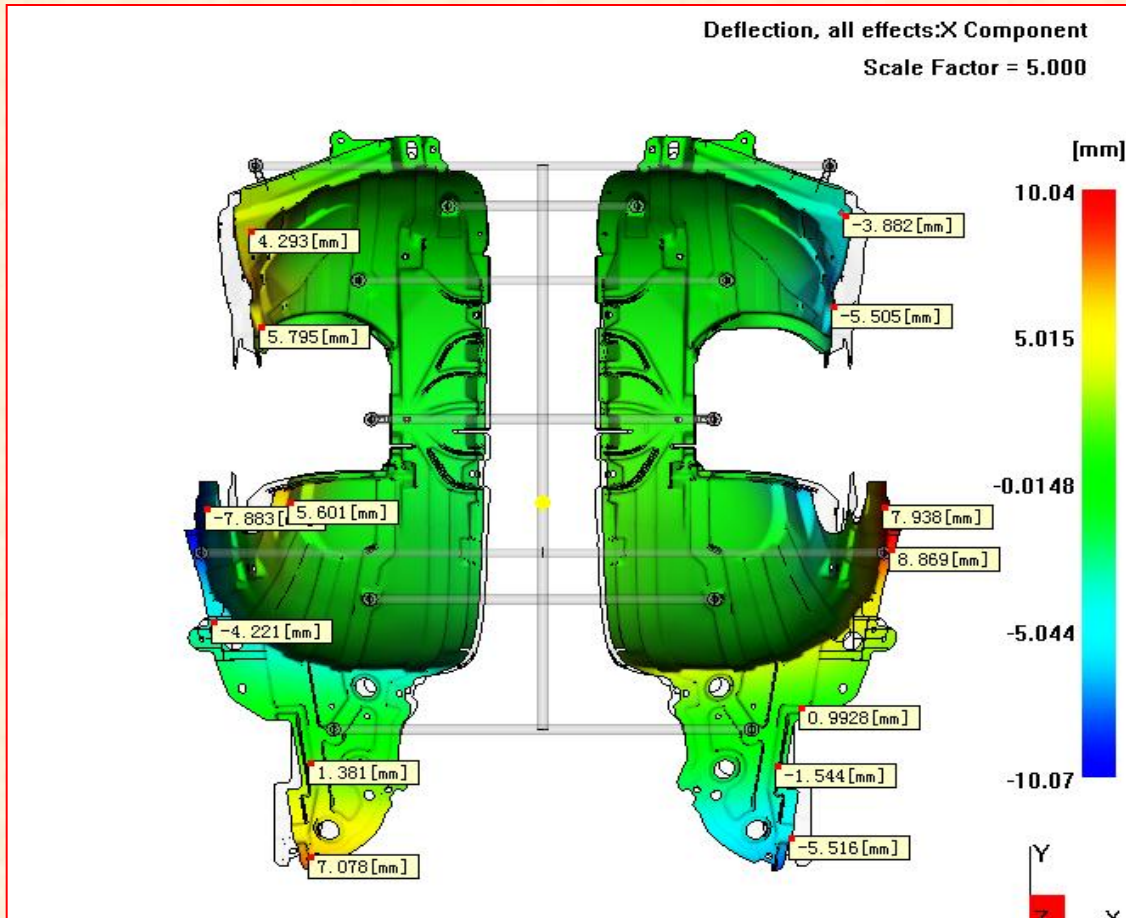
# Injection Pressure & Clamp Force



Pressure at injection location

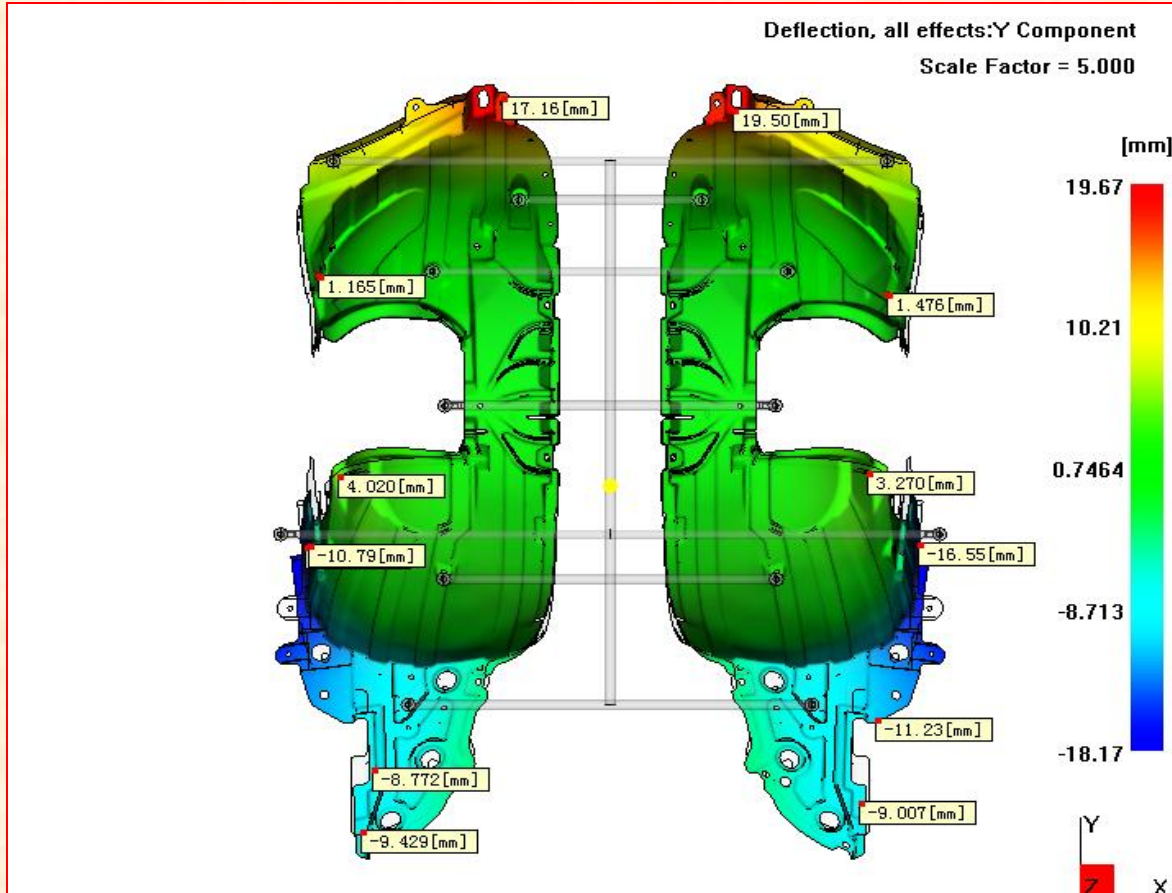
Clamp Force

## Deflection – X direction



Deflection of X direction is im  
balance, possible cause warp.

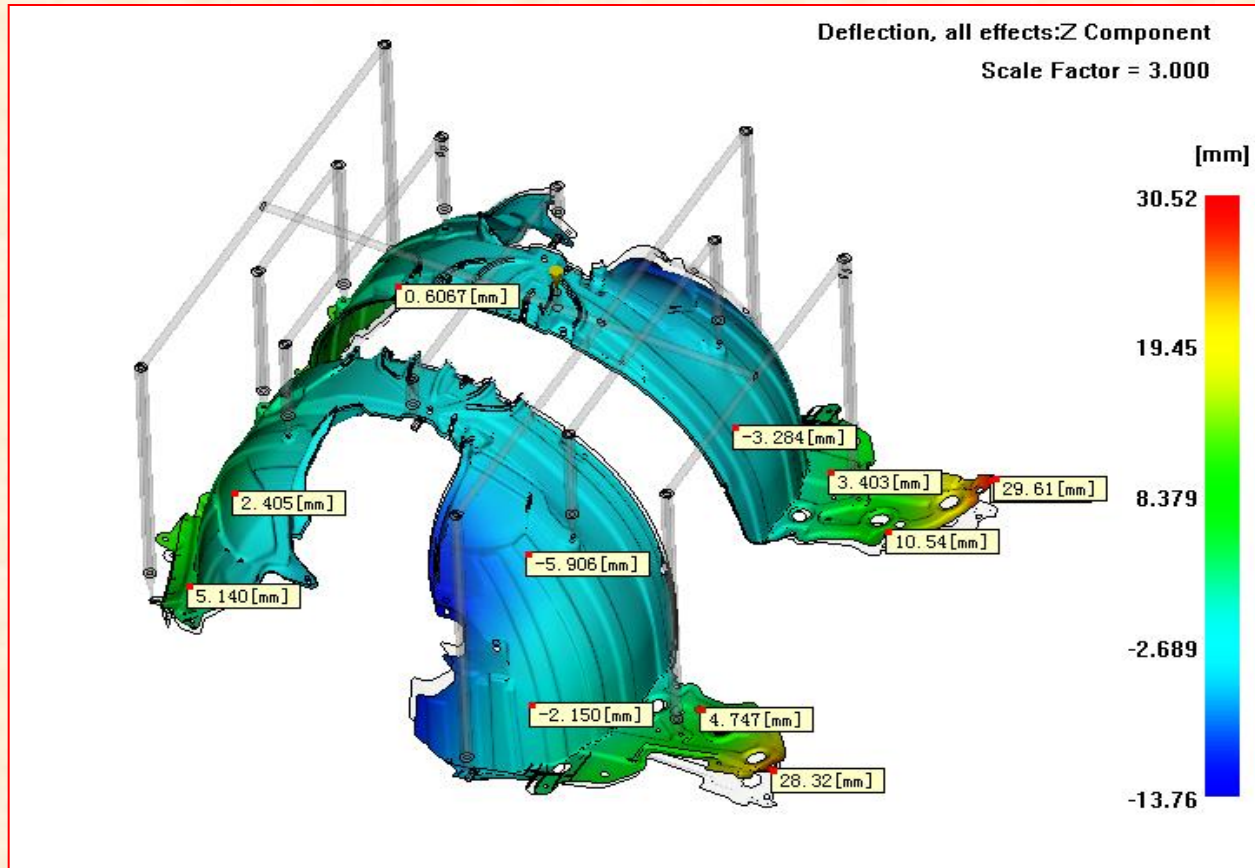
## Deflection – Y direction



Deflection of Y direction is imbalance, possible cause war p.



## Deflection - Z direction



Deflection of Z direction is imbalance, possible cause war p.



## Summary 1

---

Fill Time	4.500(s)
Maximum Injection Pressure	64.17 (MPa)
Total projected area	5963.0 (cm <sup>2</sup> )
Maximum Clamp force	2000.0 (tonne)
Maximum Flow rate	802.8 (cm <sup>3</sup> /s)
Part volume to be filled	1996.8 (cm <sup>3</sup> )

## Summary 2

---

The results :

- The flow status is balance, the injection and packing pressure is normal. But the clamp force is very large .
- The volumetric shrinkage is not uniform, please attention the setting of packing.
- Deflection of X&Y&Z direction is imbalance, possible cause warp.

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