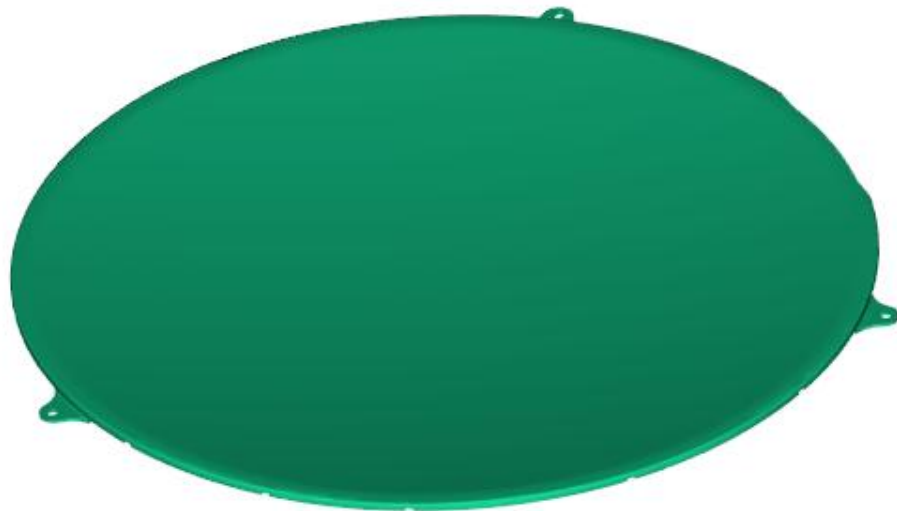


Part Name: Heat Shield

Number :A02512501

Project DATE :2024.01.25

Document No.



Product material

Moldflow material

描述	推荐工艺	流变属性	热属性	pvT 属性
系列	STYRENICS (PS, SAN, SBR, ...)			
牌号	Lustran SAN 31			
制造商	Styrolution			
链接				
材料名称缩写	SAN			
材料类型	Amorphous			
数据来源	Manufacturer (Styrolution) : pvT-Supplem			
上次修改日期	08-AUG-13			
测试日期				
数据状态	Non-Confidential			
材料 ID	5856			
等级代码	CM5856			
供应商代码	INEOSABS			
纤维/填充物	未填充			

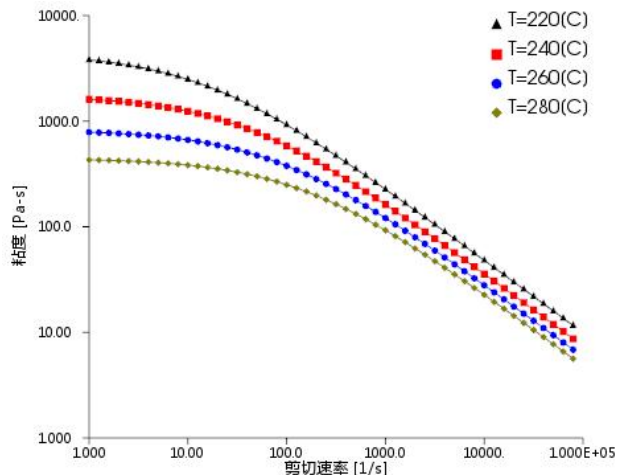
描述	推荐工艺	流变属性	热属性	pvT 属性
模具表面温度	80		C	
熔体温度	260		C	
模具温度范围 (推荐)				
最小值	60		C	
最大值	85		C	
熔体温度范围 (推荐)				
最小值	220		C	
最大值	280		C	
绝对最大熔体温度	305		C	
顶出温度	105		C	
查看顶出				
最大剪切应力	0.33		MPa	
最大剪切速率	50000		1/s	

*Same material used for moldflow

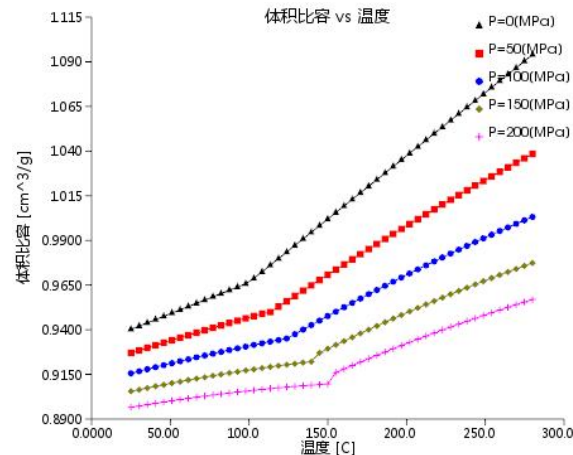
■ The material data from supplier is in moldflow database and shown in the pictures below

Material Property			
SAN Lustran SAN 31		Melt Temperature Range (°C)	220-280
Solid Density (g/cm ³)	1.0635	Mold Temperature Range (°C)	60-85
Maximum Shear Rate (1/s)	50000	Ejection Temperature (°C)	105
Maximum Shear Stress (MPa)	0.33	Absolute Maximum Melt Temperature (°C)	305
MFR (g/10min) (230 °C/3.8Kg)	7.5	Recommended Melt Temperature (°C)	260
Filler	-----	Recommended Mold Temperature (°C)	80

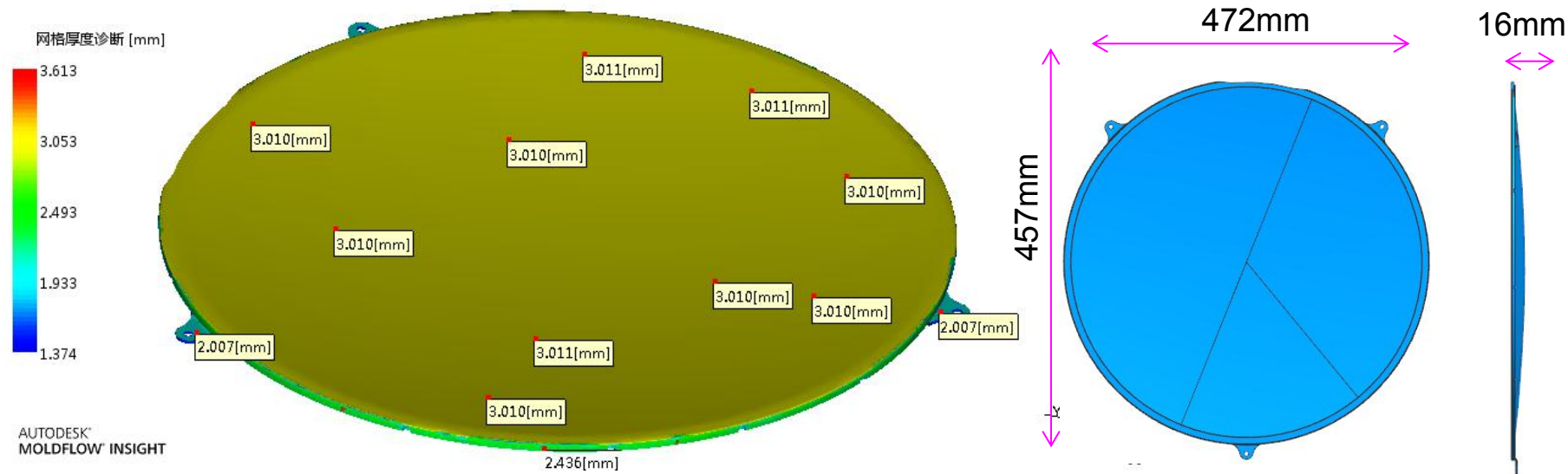
Rheology :



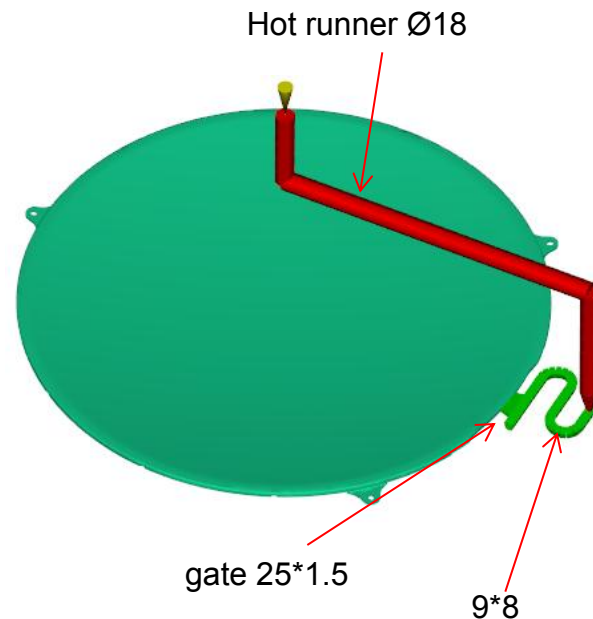
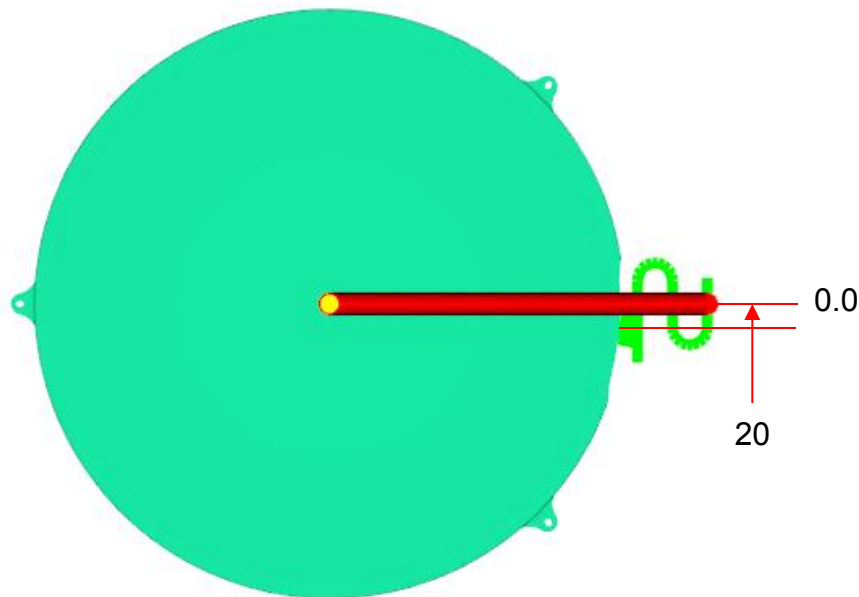
PVT properties :



CAD File / Version / Date 3D	
Part Volume	499(1cav)cm ³
Polymer	SAN
Mold Temp	80[deg.c]
Melt Temp	260 [deg.c]
Fill Time	3s
Pack Time	15s
Cool Time	20s
Actual of cavities	1*1
Type of analyses	Cool+Fill+Flow + Warp
Velocity/Pressure Transfer (% volume)	98
Packing Pressure/Time	65MPa/10s
Project Area	1664(1 cav)cm ²



- This above plot used different color to show the thickness of this part.
- We can see that: the average thickness of this part is uniform.



- The mold is the hot runner.
- The runner layout was based on the drawing.

- Specification: the type of model used for this analysis are 2D meshes

三角形

实体计数:

三角形	36724
已连接的节点	18358
连通区域	1

不可见三角形 0

面积:

(不包括模具镶块和冷却管道)

表面面积: 3375.7 cm²

按单元类型统计的体积:

三角形: 499.72 cm³

纵横比:

最大	平均	最小
16.53	1.57	1.15

边细节:

自由边	0
共用边	55086
多重边	0

取向细节:

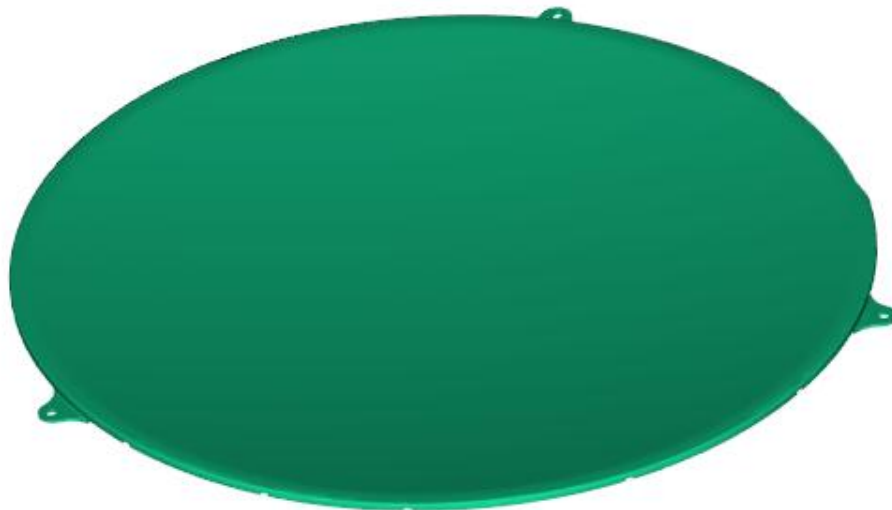
配向不正确的单元	0
----------	---

交叉点细节:

相交单元	0
完全重叠单元	0

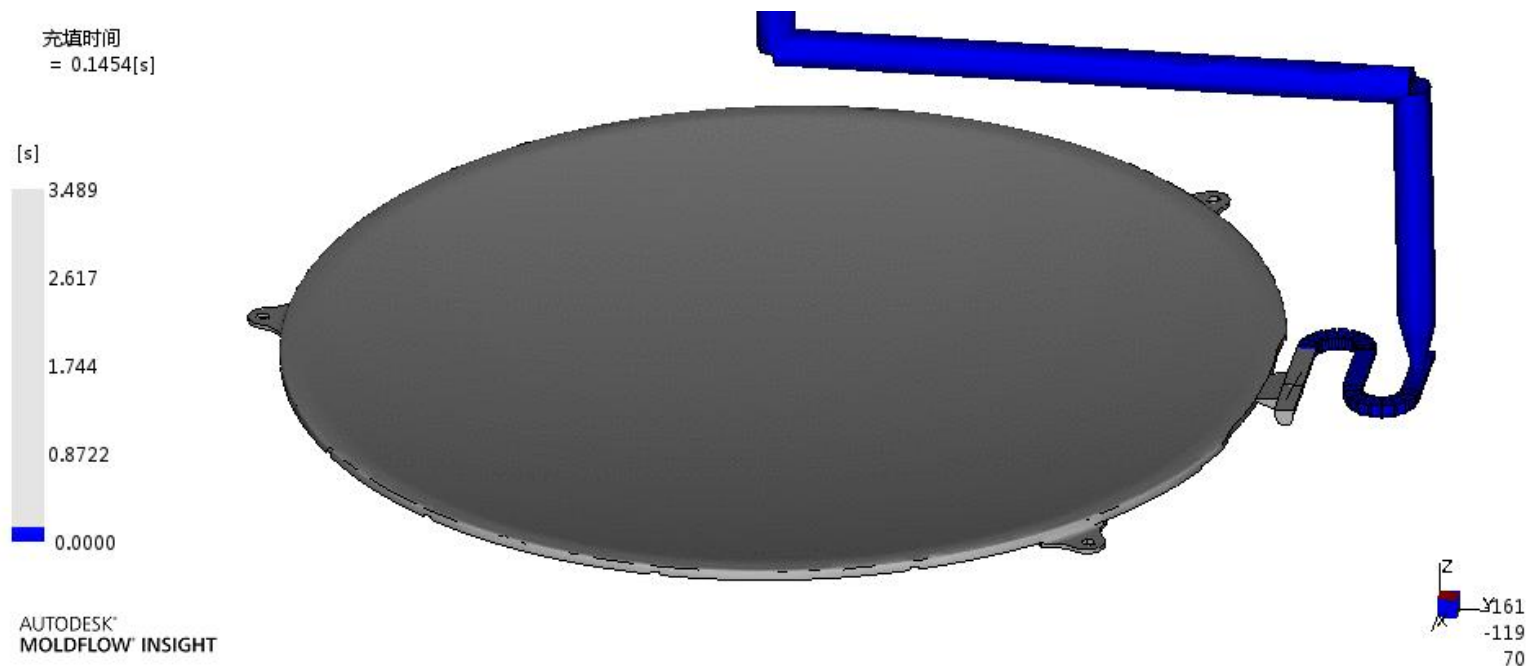
匹配百分比:

匹配百分比	97.7%
相互百分比	97.9%



- Fill time is about: 3.4 sec.

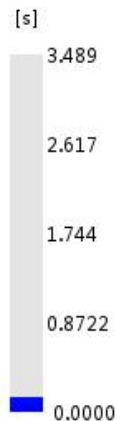
Shift+F5, you will see the animated flow



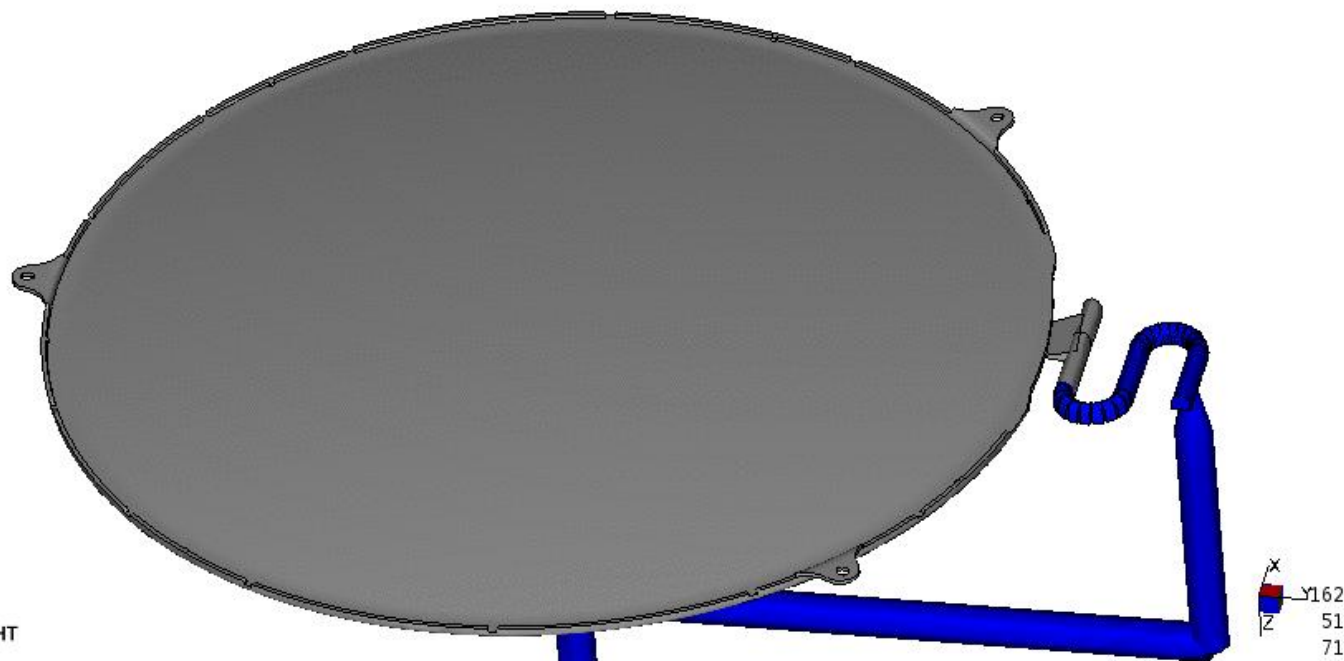
- Fill time is about: 3.4 sec.

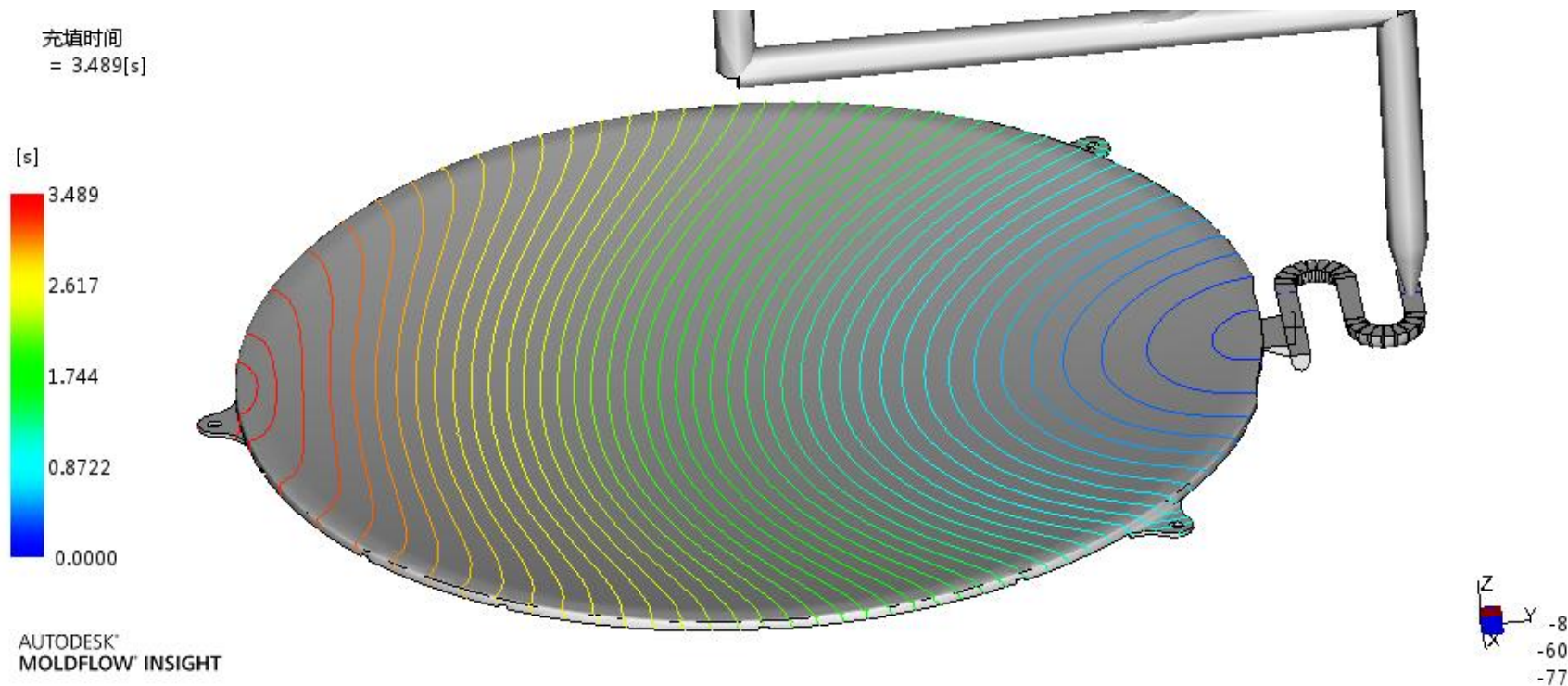
Shift+F5, you will see the animated flow

充填时间
= 0.1454[s]

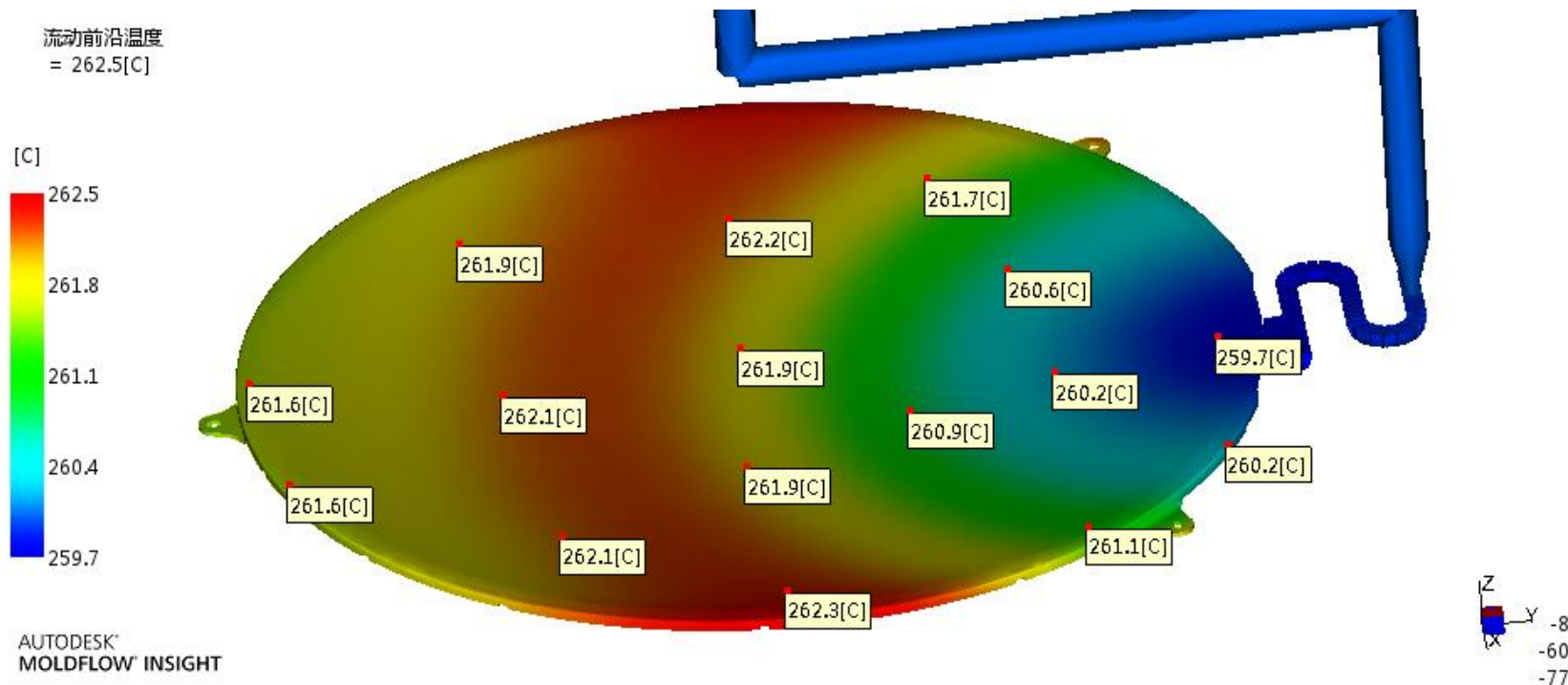


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MOLDFLOW® INSIGHT





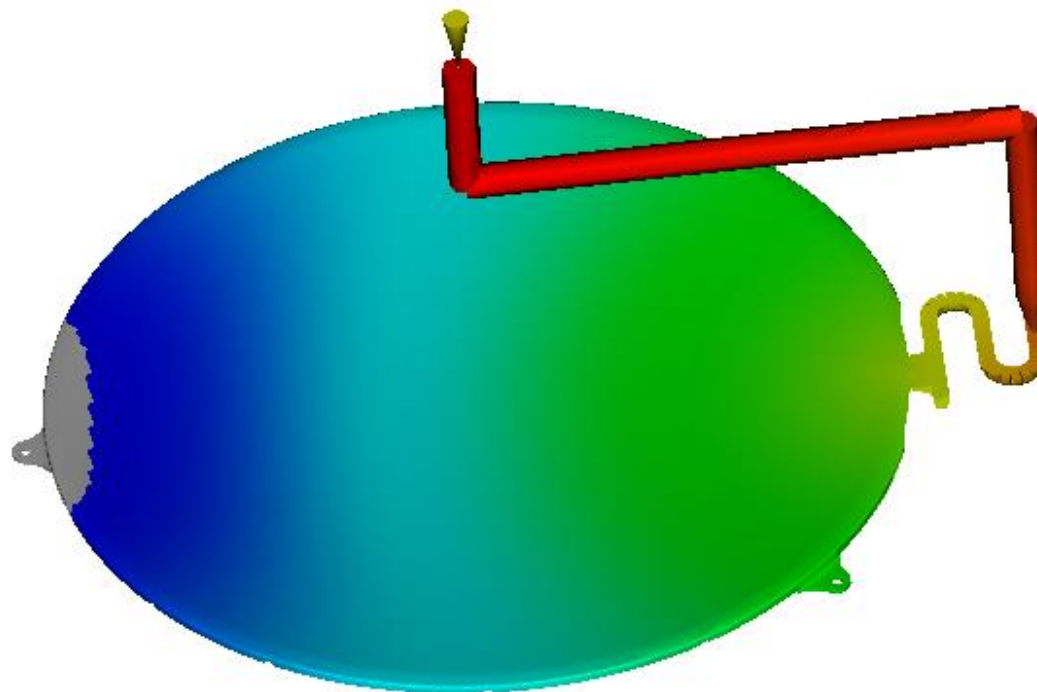
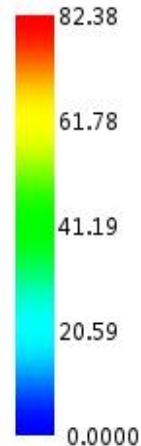
- The area with dense lines in the above picture represents the area with lower flow velocity; and the area with sparse lines represents the area with higher flow velocity.



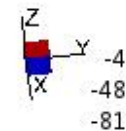
- Above figure showed the temperature at the part. Melt enters cavity at 260C
- The polymer recommended temperature range: 220-280C
- From above plot we can see that the temperature drop on the part in this polymer recommend rang.

速度/压力切换时的压力
= 82.38[MPa]

[MPa]



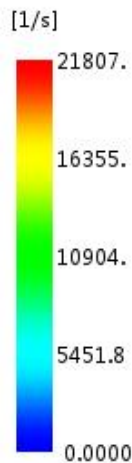
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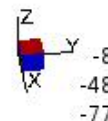
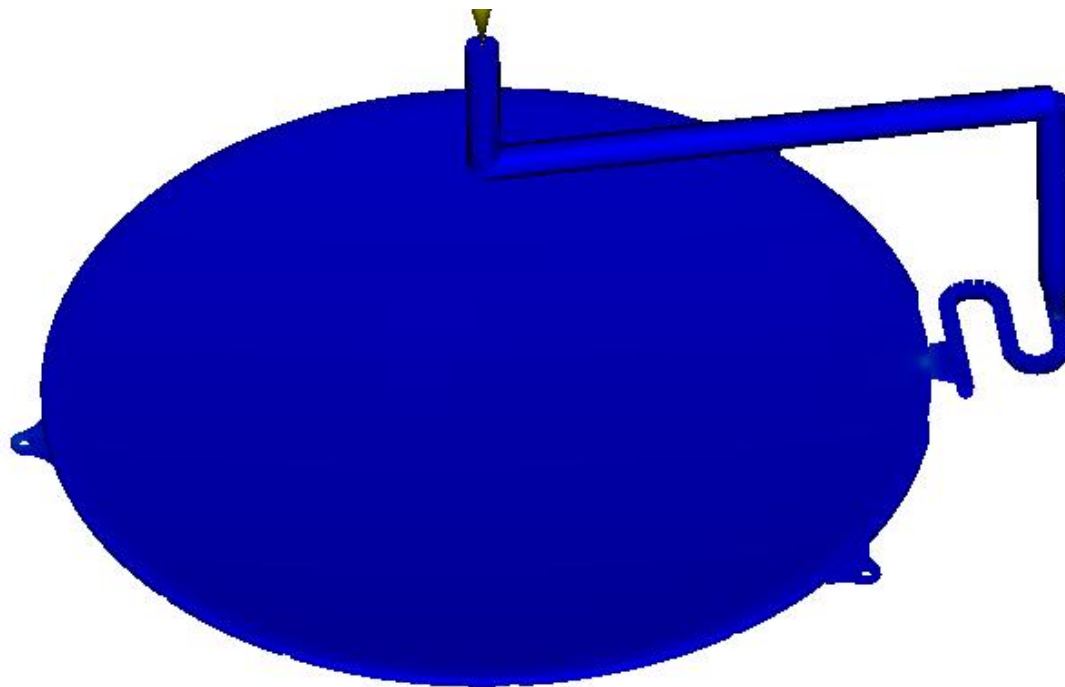
- Above figure shows the pressure distribution through the flow path inside the mold, at the V/P switchover of the filling phase.

- The maximum shear rate is 500001/s which in the recommended material database of moldflow.
- The maximum value in the gate area is 21807 1/s when fulfilled.

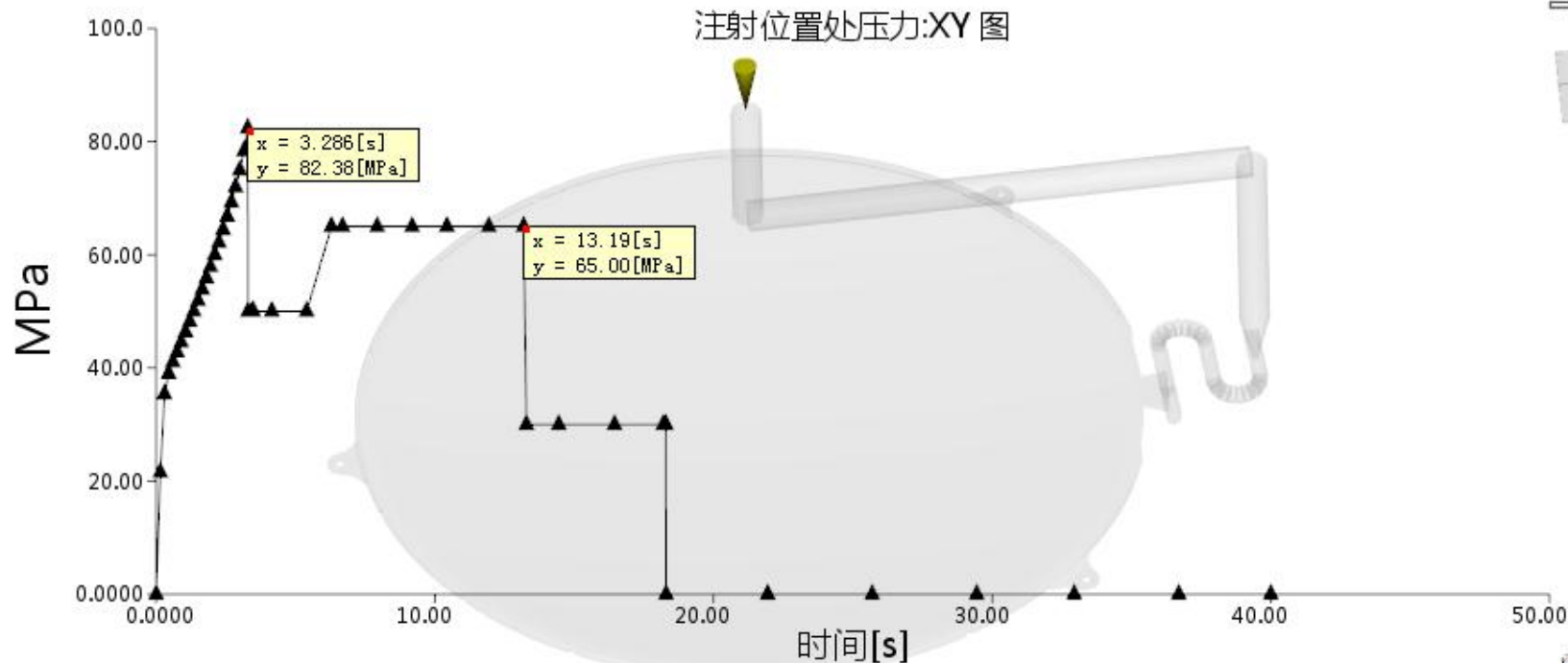
时间 = 3.489[s]



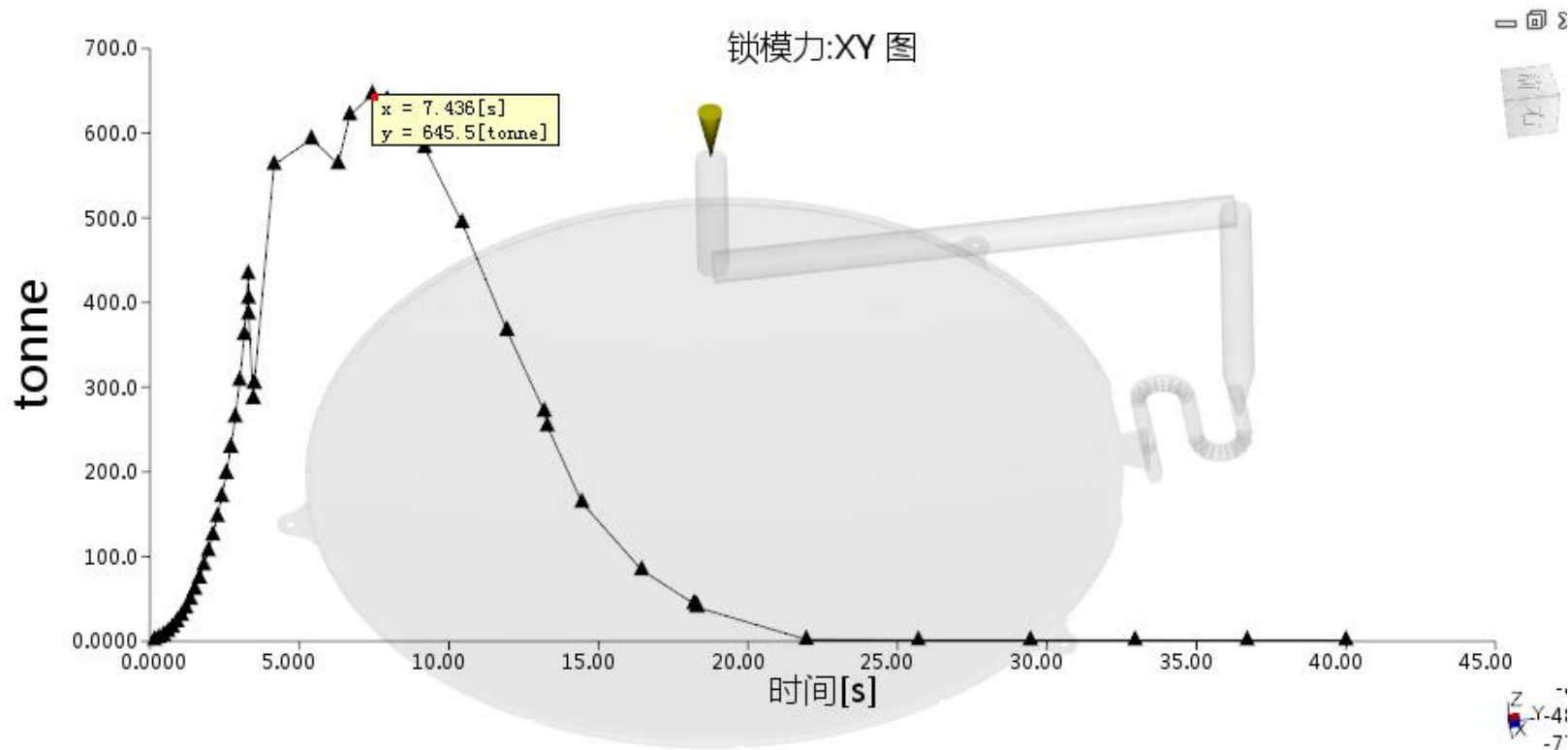
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- The maximum value is 82.38Mpa, Injection pressure specified at Packing is 65Mpa
- The filling pressure are within moldflow recommend value which can acceptable.

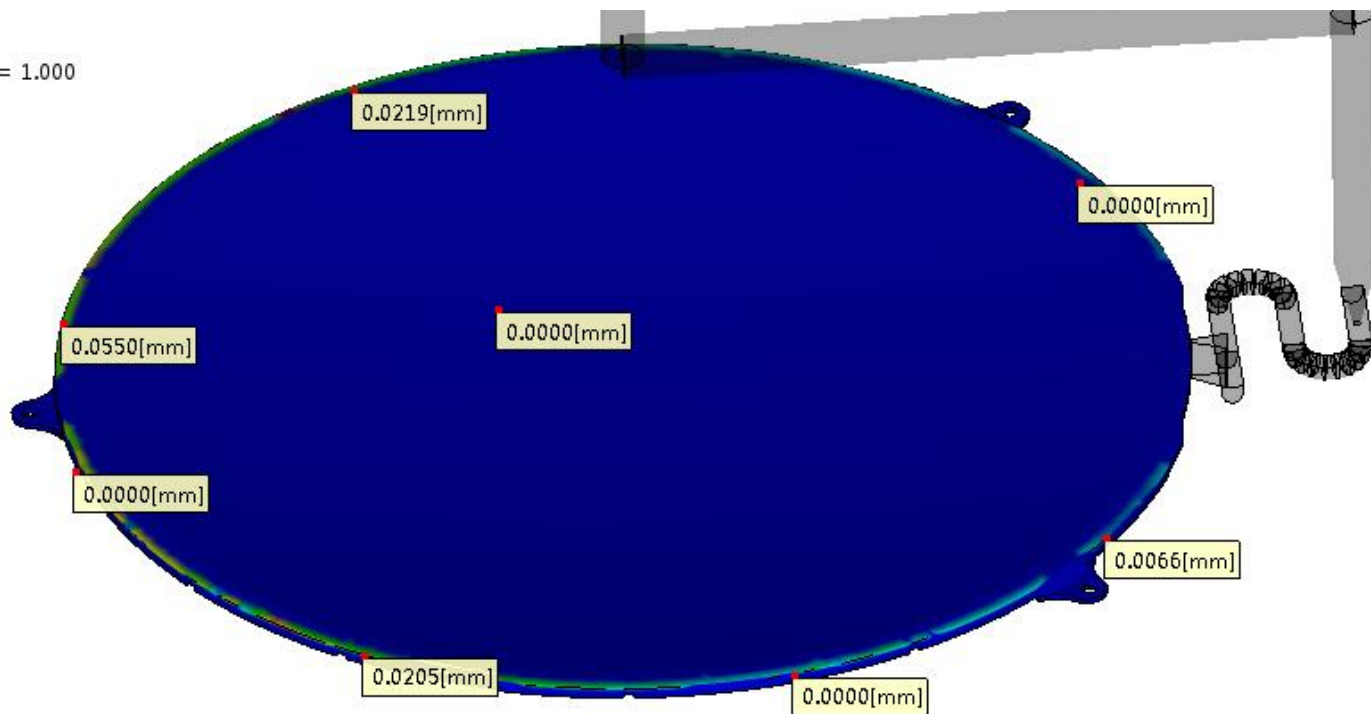
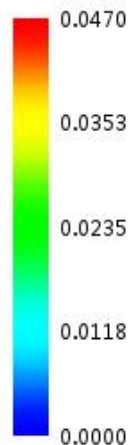


- The maximum clamp force is 645.5 ton.

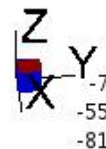


缩痕估算
比例因子 = 1.000

[mm]



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MOLDFLOW[®] INSIGHT

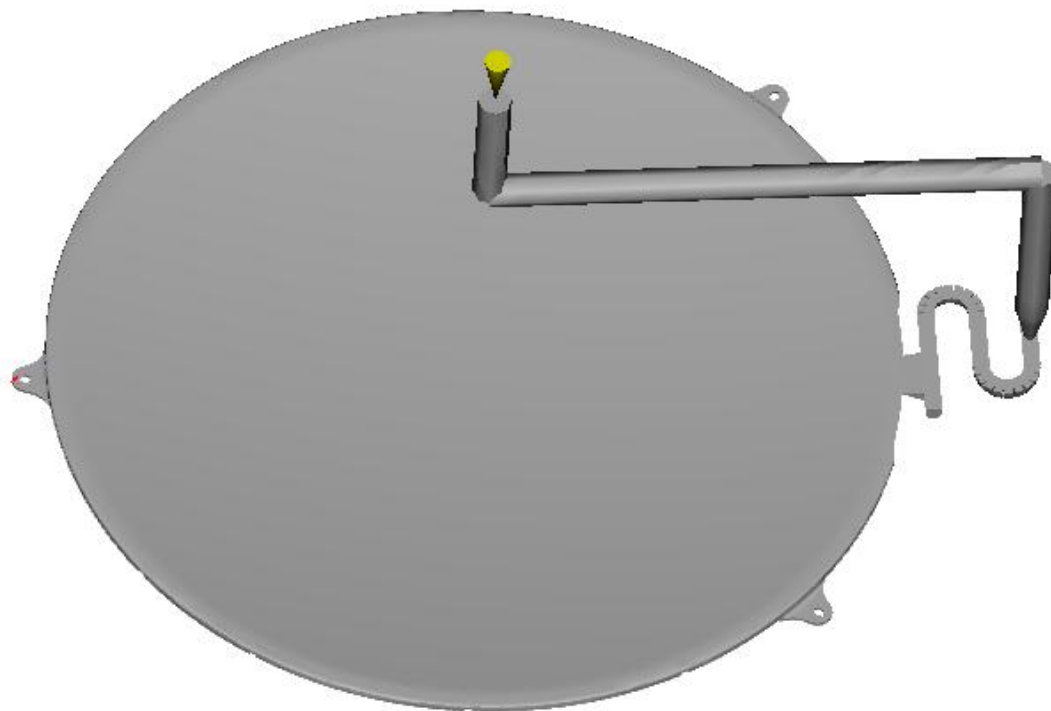


熔接线
= 135.0[deg]

[deg]



AUTODESK[®]
MOLDFLOW[®] INSIGHT



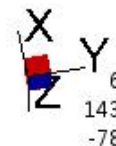
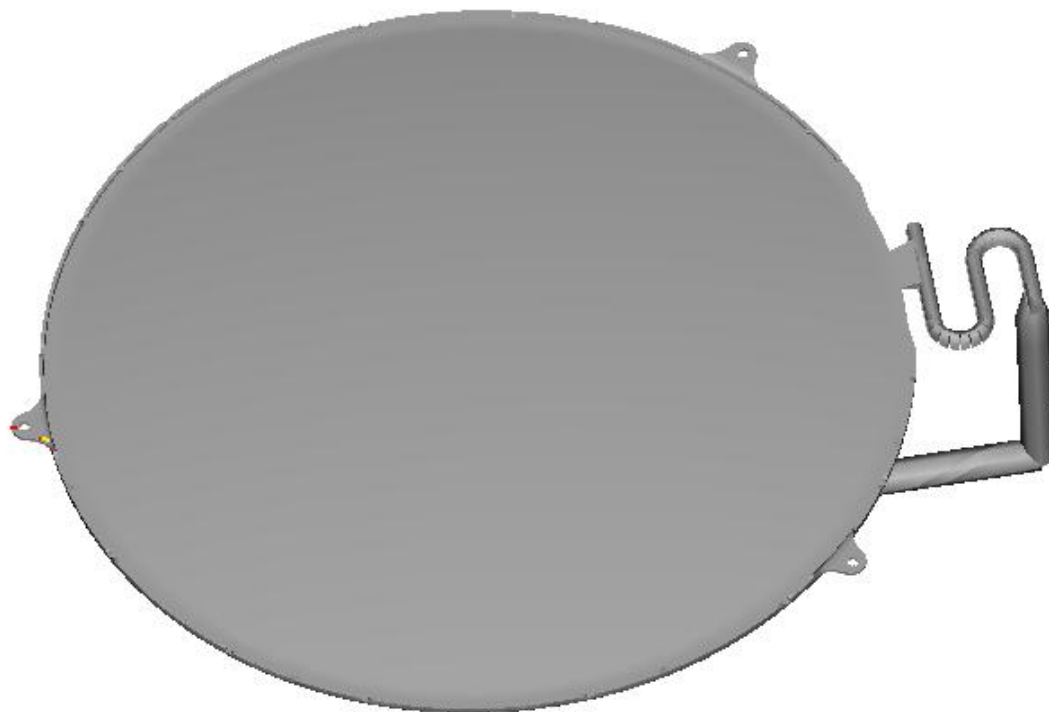
Z
Y
X
-5
-36
-85

熔接线
= 135.0[deg]

[deg]

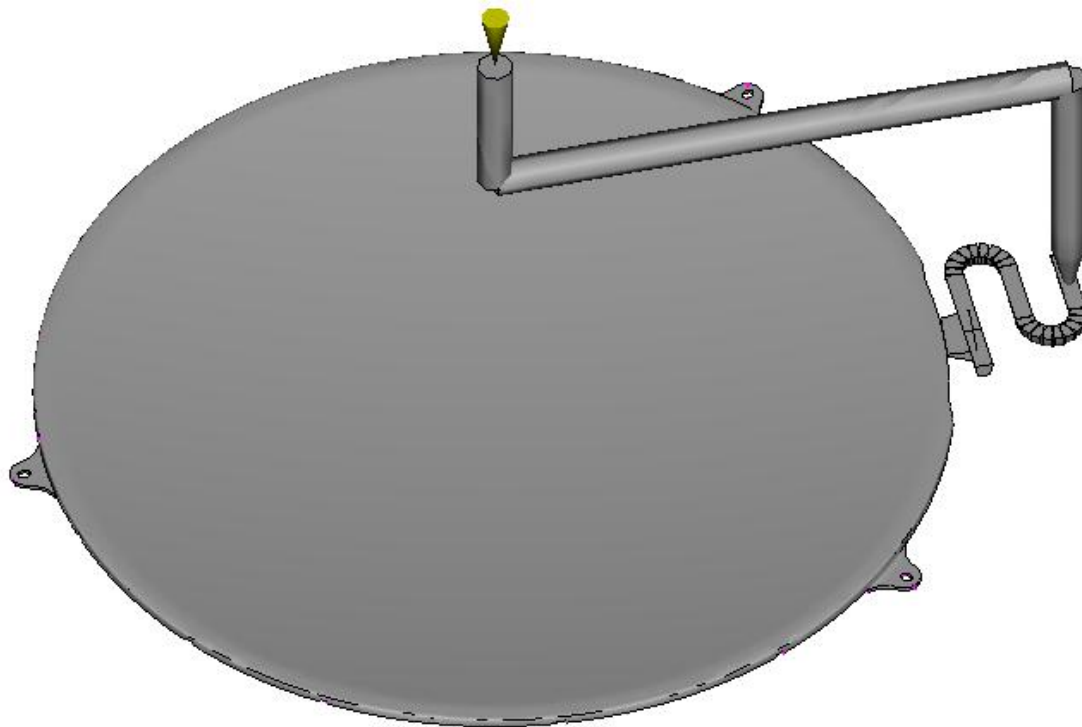


AUTODESK[®]
MOLDFLOW[®] INSIGHT



- The result shows areas of the cavity that may require additional venting, it should be viewed in combination with the filling pattern result.

气穴



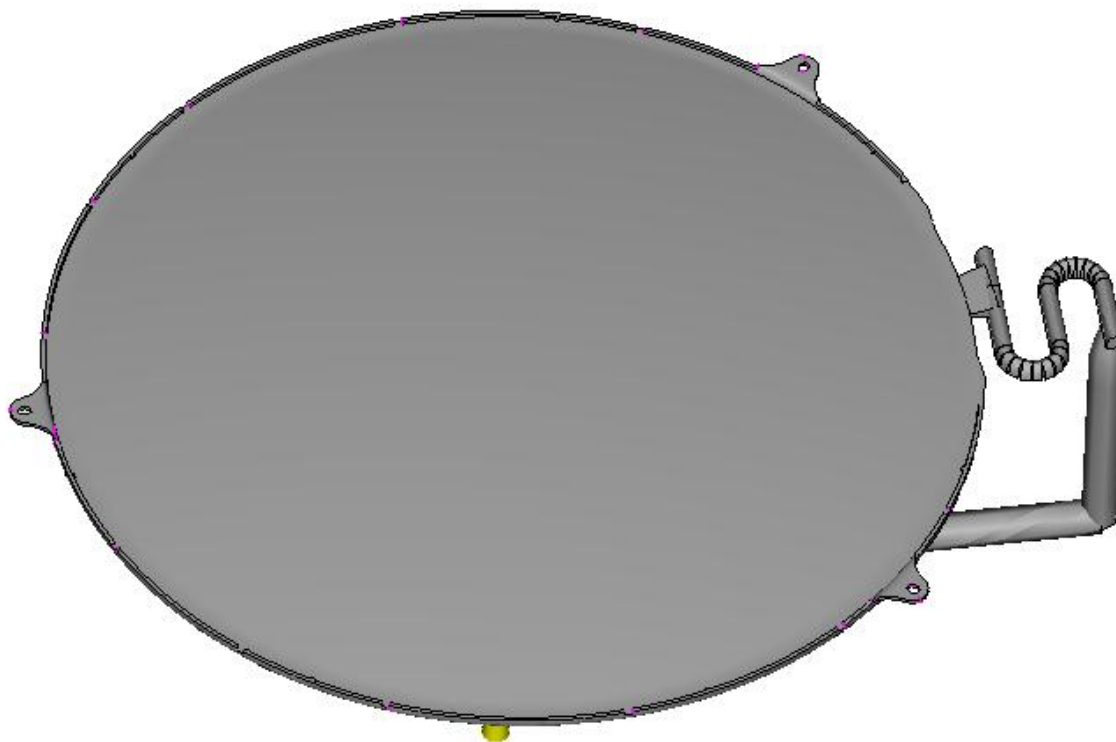
AUTODESK®
MOLDFLOW® INSIGHT

Z
Y
X
-12
-42
-72

- Air traps locations mark in red spot color.
- Most of the air trapped appear at the edge and the top of part that is easy to vent.

- The result shows areas of the cavity that may require additional venting, it should be viewed in combination with the filling pattern result.

气穴



AUTODESK
MOLDFLOW INSIGHT

X
Y
Z
10
140
-78

- Air traps locations mark in red spot color.
- Most of the air trapped appear at the edge and the top of part that is easy to vent.

顶出时的体积收缩率
= 8.095[%]

[%]

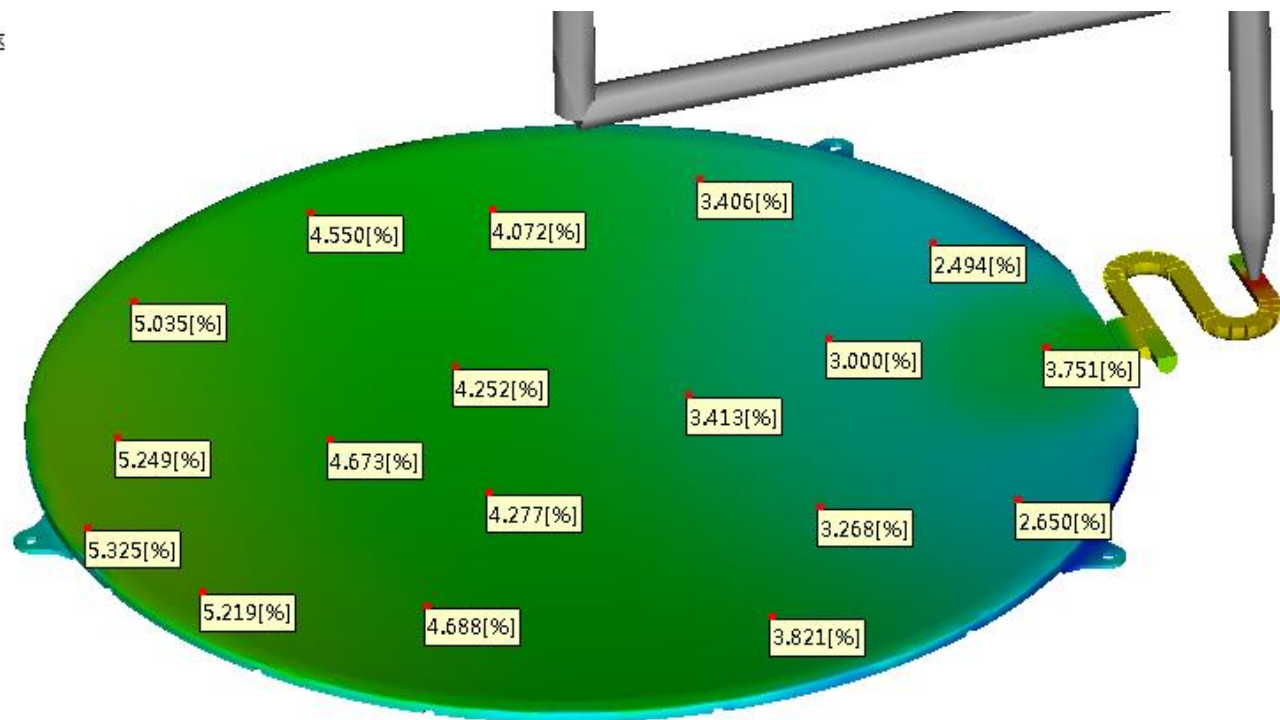
8.095

6.212

4.328

2.444

0.5606

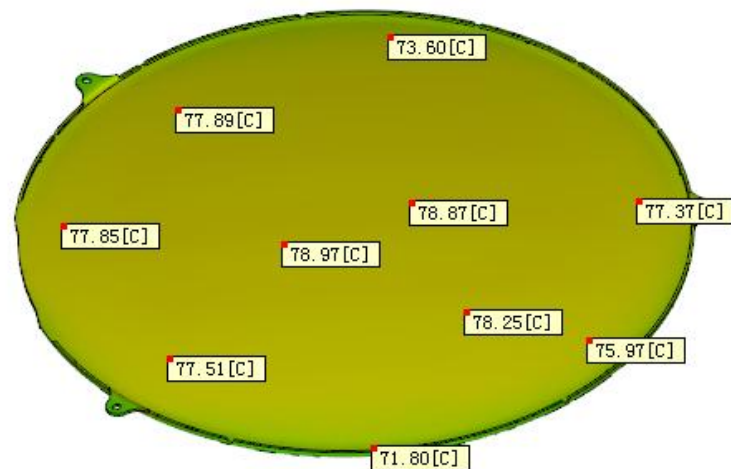
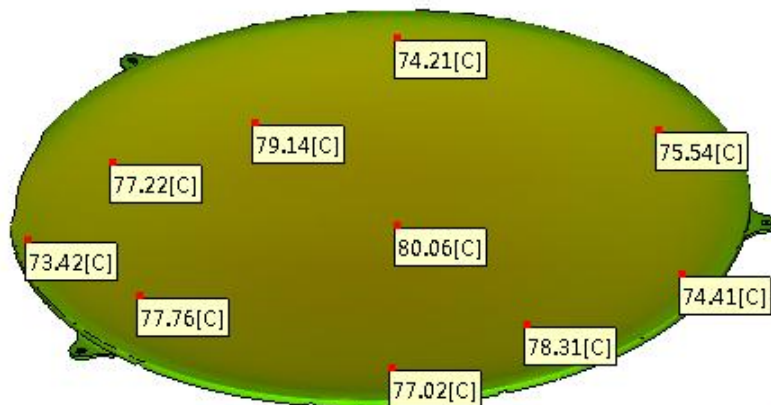


AUTODESK[®]
MOLDFLOW[®] INSIGHT

Z
Y
X
-27
-54
-56

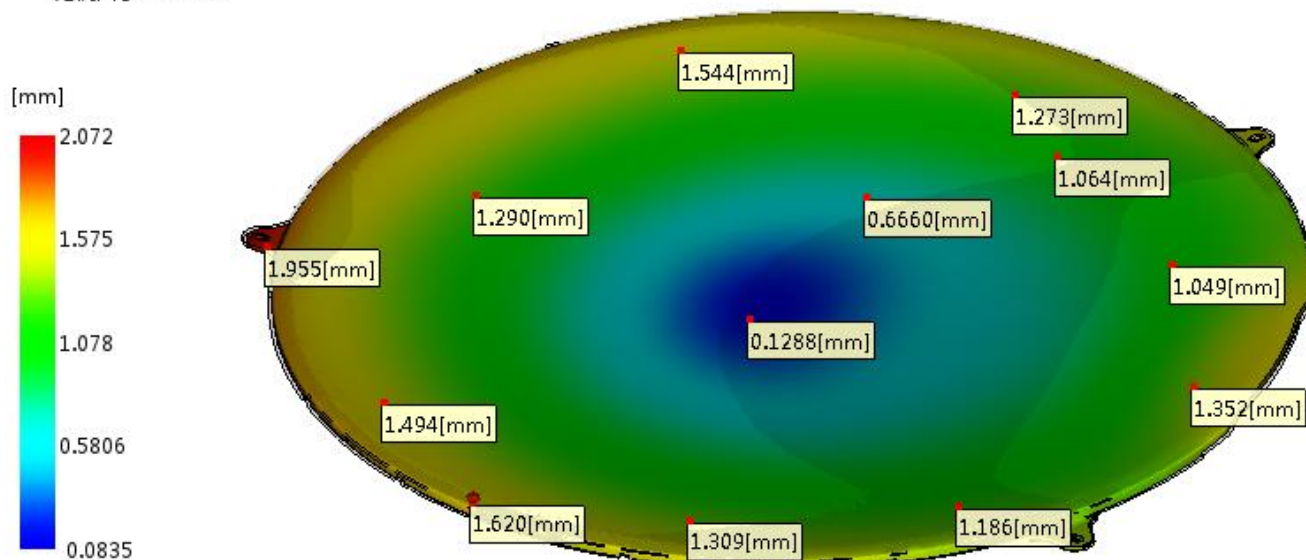
温度, 模具
= 94.68[C]

[C]

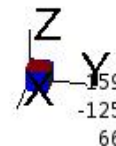


- Note : The undeformed part display transparent

变形, 所有效应变形
比例因子 = 1.000



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MOLDFLOW[®] INSIGHT

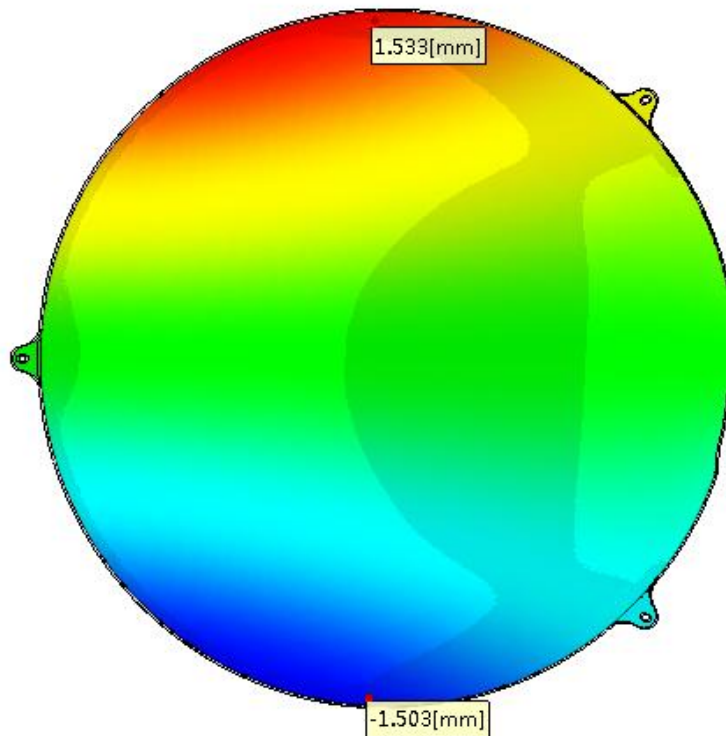


- The maximum shrinkage and deflection value is about 2.072mm.

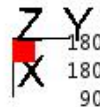
- Note : The undeformed part display transparent

变形，所有效应X 方向
比例因子 = 1.000

[mm]



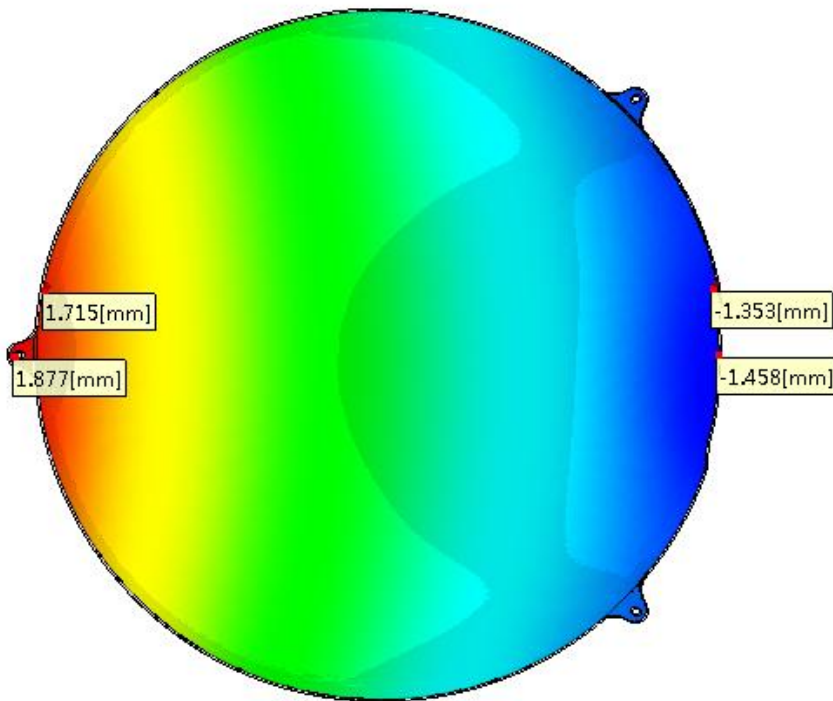
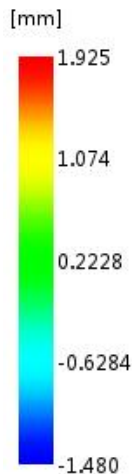
AUTODESK
MOLDFLOW INSIGHT



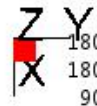
- The black arrow indicates the shrinkage and deflection moved inward about 1.627mm.
- The red arrow indicates the shrinkage and deflection moved inward about 1.668 mm.

- Note : The undeformed part display transparent

变形，所有效应:Y 方向
比例因子 = 1.000



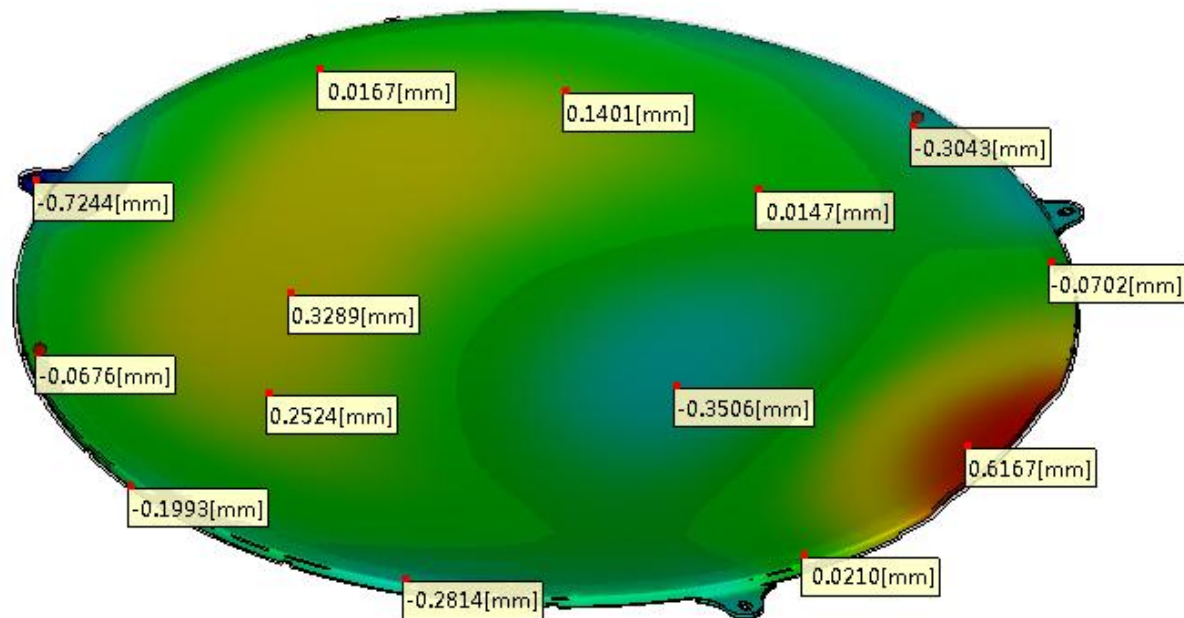
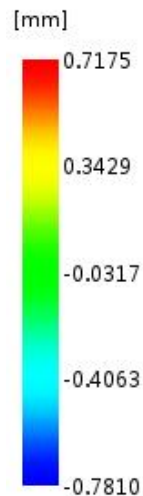
AUTODESK[®]
MOLDFLOW[®] INSIGHT



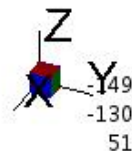
- The black arrow indicates the **shrinkage and deflection** moved inward about 1.480mm.
- The red arrow indicates the **shrinkage and deflection** moved outward about 1.925mm.

- Note : The undeformed part display transparent

变形, 所有效应: Z 方向
比例因子 = 1.000



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- The black arrow indicates the shrinkage and deflection moved downward about 0.7810mm.
- The red arrow indicates the shrinkage and deflection moved upward about 0.7175mm.

Fill time	Injection pressure	Volumetric shrinkage	Shrinkage and deflection : X Component	Shrinkage and deflection : Y Component	Shrinkage and deflection : Z Component
3.4s	82.38Mpa	0.58~8.0%	-1.627~ 1.668mm	- 1.480~1.925mm	-0.7810~0.7175mm

From the above analysis :

- The cycle time is about: 3.5(filling) + 15(packing) + 21.5(cooling) +8(open & eject & close) =48sec
- This part will not have filling problem due to the pressure are within the moldflow recommed range.
- No weld lines appear at this part(refer page 17)
- Most of the air trapped appear at the edge and top of part that is easy to vent. (refer page 19)
- sink mark may appear on the surface of part. (refer page 16)
- This part have small uneven shrinkage at the X direction, the different volumetric shrinkage result in the defect.