УНИВЕРСИТЕТ ИТМО

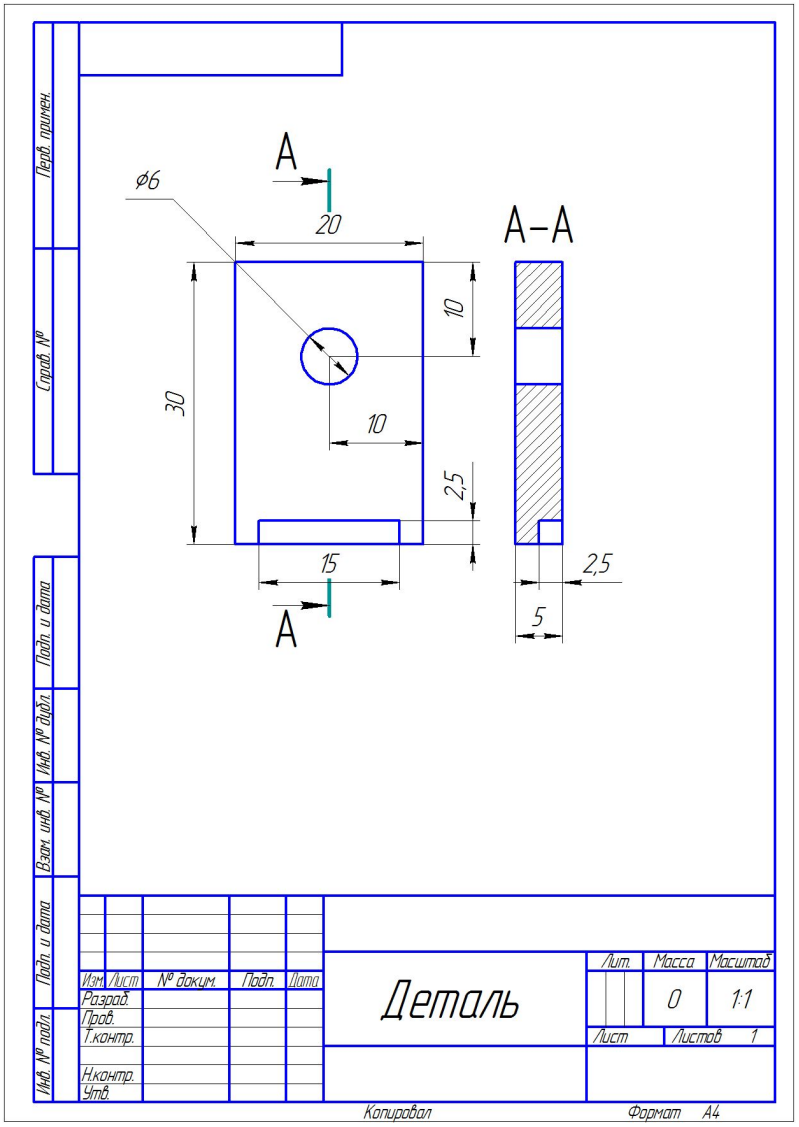
Кафедра Технологии приборостроения

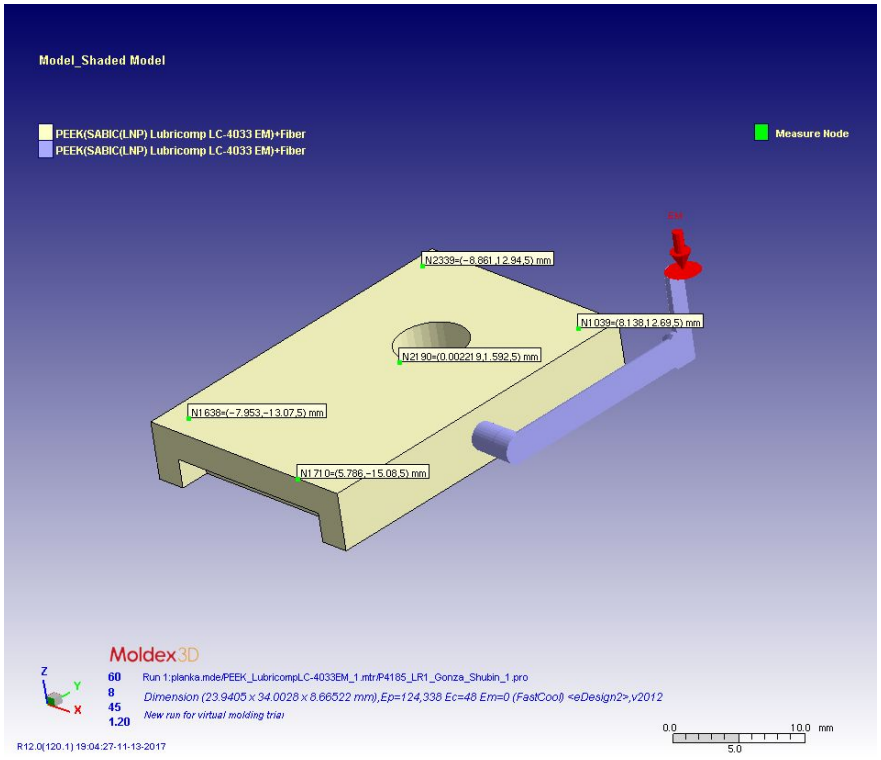
# Защита отчета по лабораторной работе по дисциплине "Моделирование приборов и производственных процессов"

Выполнили: ***Гонза Н., Шубин А.***, *гр. Р4185*

Санкт-Петербург, 2017

# Исследуемая модель



# Сетка и материал

**1.2. Mesh Summary**

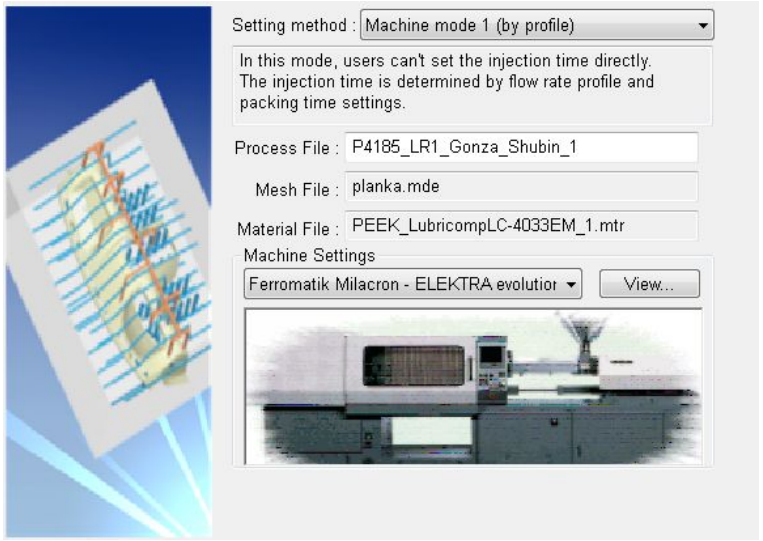
| | |
|---|---|
| **Mesh Type** | eDesign2 |
| **No. cooling channel** | 2 |
| **Part dimension** | 20.10 x 30.15 x 5.00 (mm) |
| **Mold dimension** | 92.00 x 90.00 x 27.00 (mm) |
| **Cavity(Part) volume** | 11.1797 (cc) |
| **Cold runner volume** | 0.270088 (cc) |
| **Element number** | 124338 |
| **Part elements** | 124338 |
| **Node number** | 126929 |

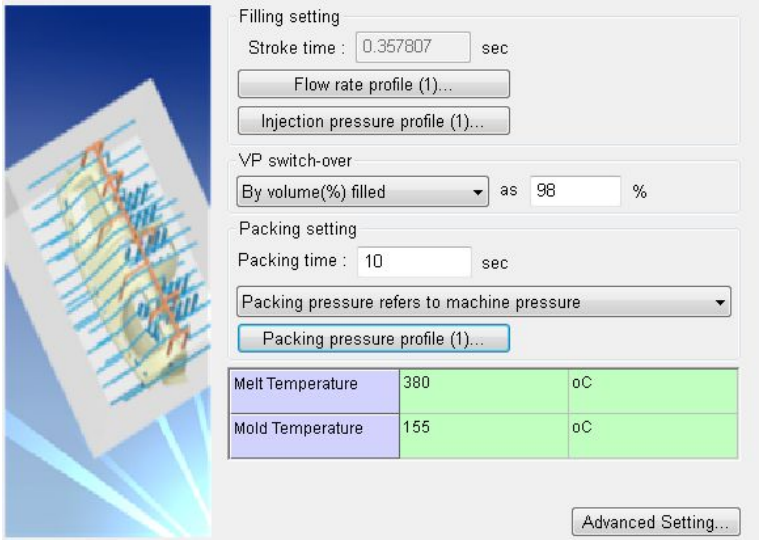
**1.3. Material Summary**

| | |
|---|---|
| **Material type** | Thermoplastic |
| **Generic name** | PEEK |
| **Supplier** | SABIC(LNP) |
| **Trade name** | Lubricomp LC-4033 EM |
| **MFI** | Unavailable |
| **Fiber percent** | 15.00 (%) |
| **Melt temperature range** | 360 - 400 (oC) |
| **Mold temperature range** | 140 - 170 (oC) |
| **Ejection temperature** | 313 (oC) |
| **Freeze temperature** | 333 (oC) |

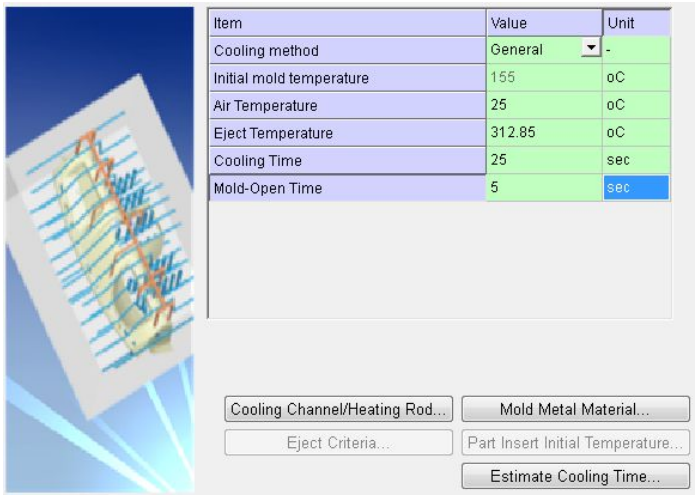
# Настройки первого расчета

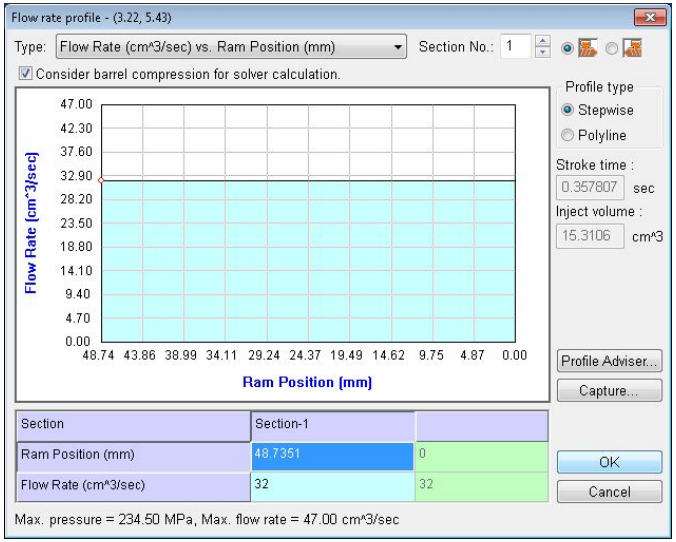
| | |
|---|---|
| **Process Summary** | |
| **Stroke Time** | 0.3578 (sec) |
| **Melt Temperature** | 380.0 (oC) |
| **Mold Temperature** | 155.0 (oC) |
| **Maximum Injection Pressure** | 234.50 (MPa) |
| **Injection Volume** | 11.4498 (cc) |
| **Packing Time** | 10.0000 (sec) |
| **Maximum Packing Pressure** | 234.50 (MPa) |
| **VP Switch by volume(%) filled** | 98.00 (%) |
| **Mold Opening Time** | 5.0000 (sec) |
| **Ejection temperature** | 312.9 (oC) |
| **Air Temperature** | 25.0 (oC) |

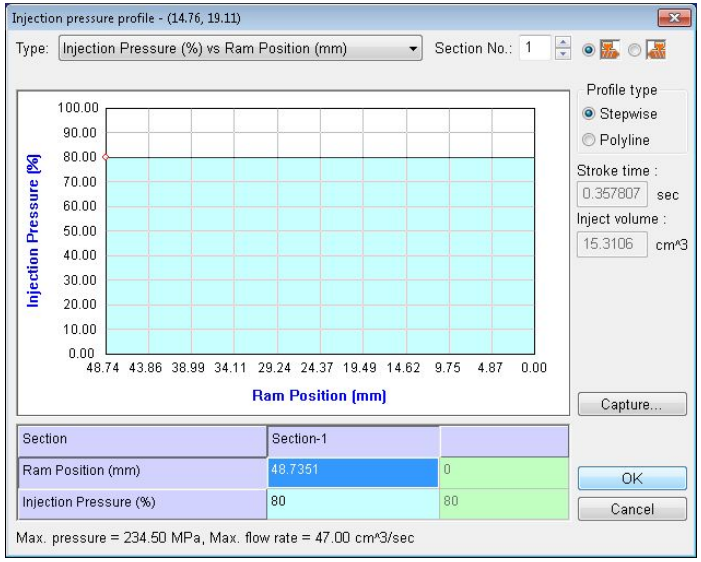


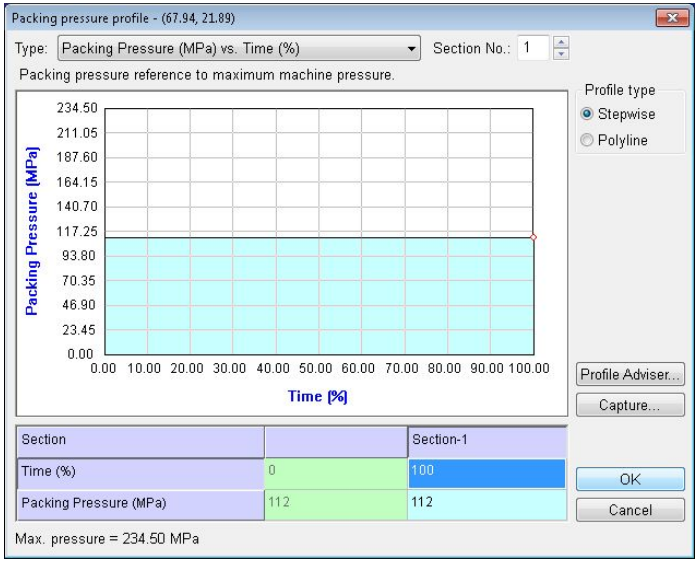



# Охлаждение и профили

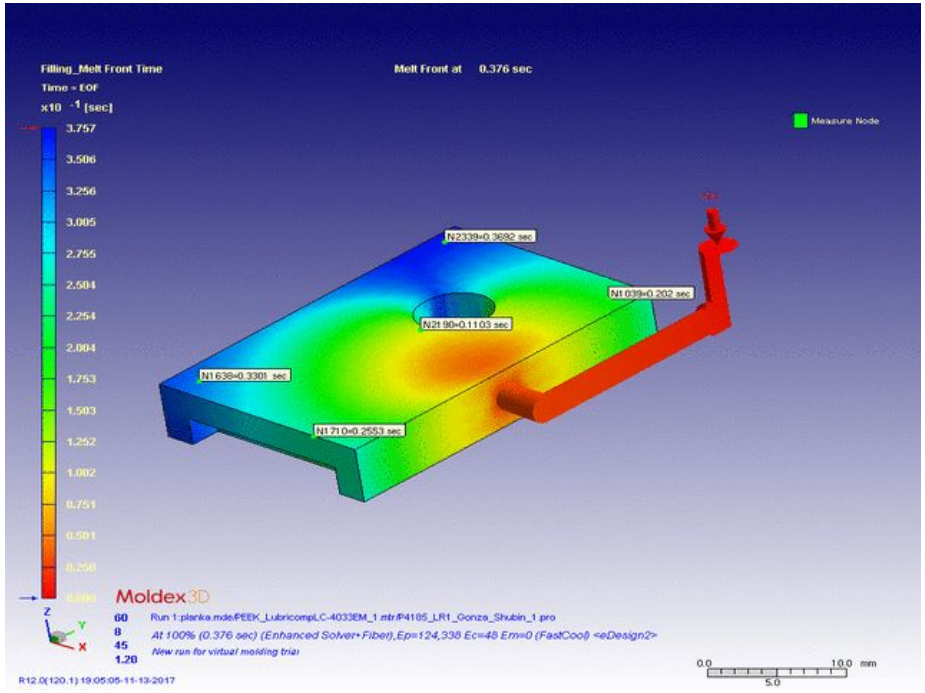


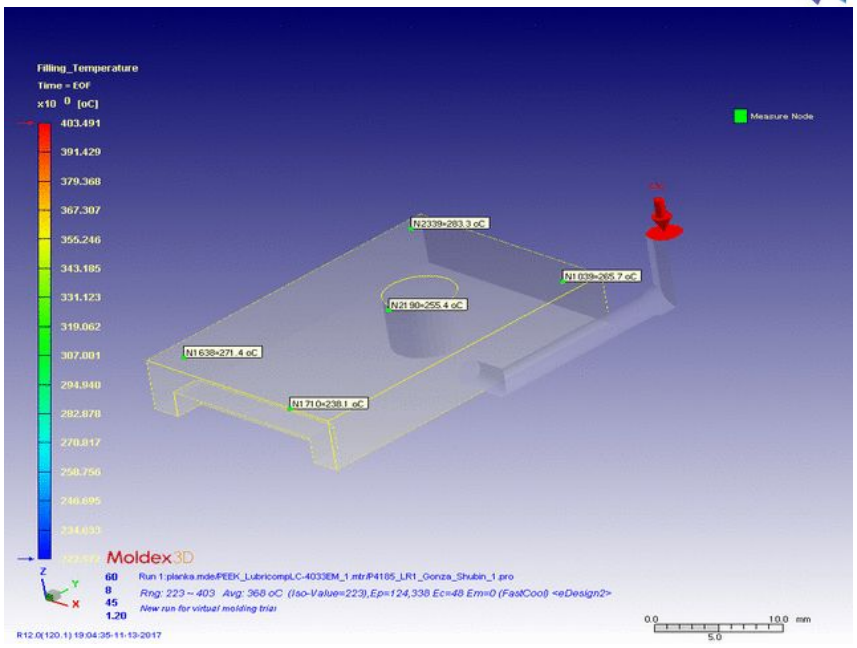



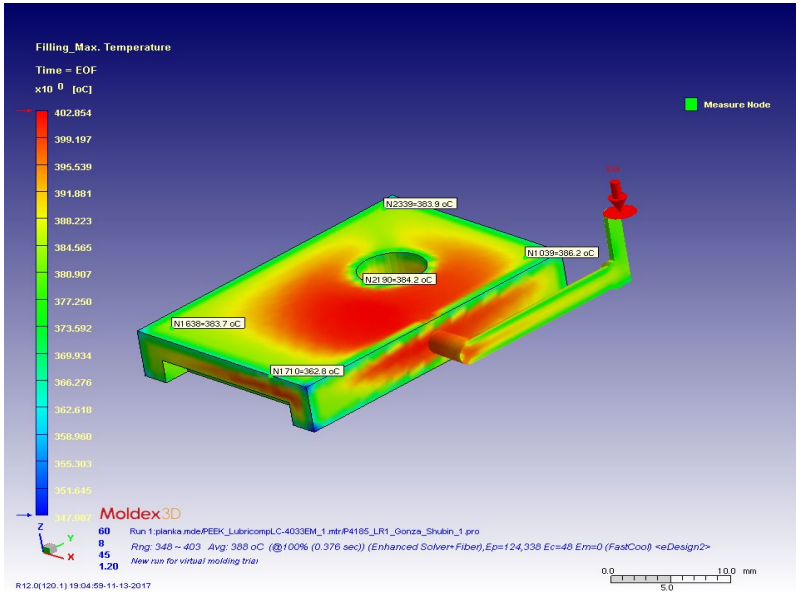



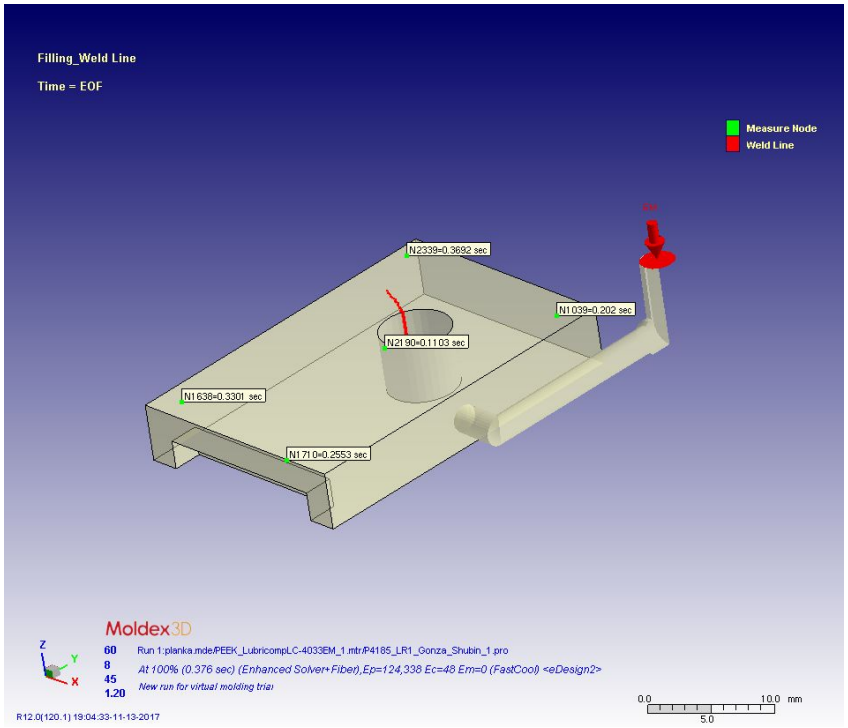
# Заполнение формы

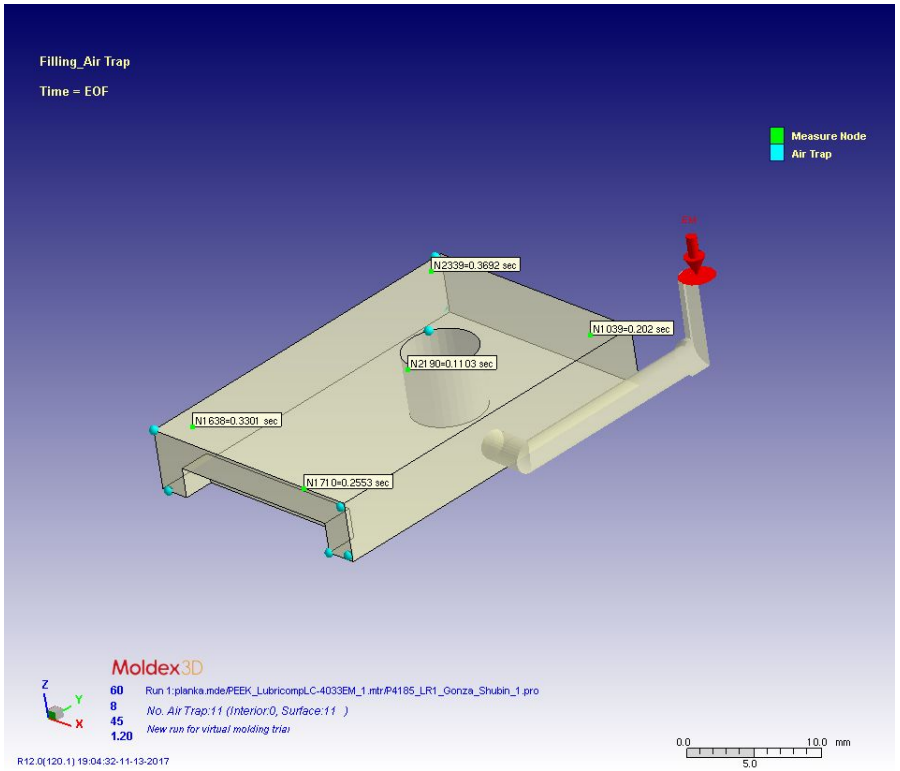


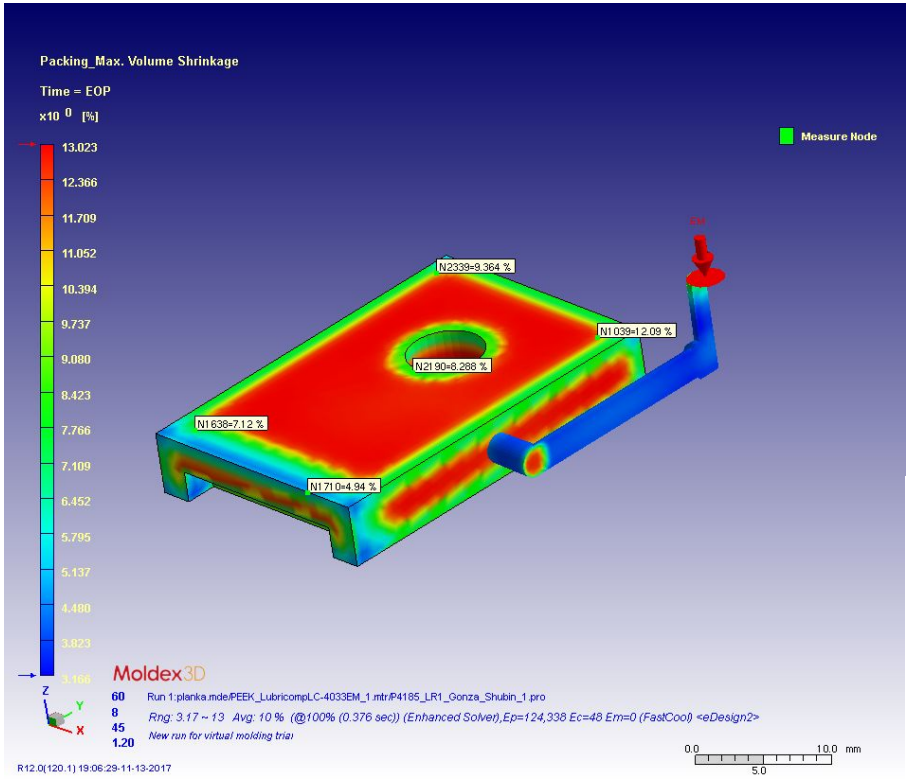



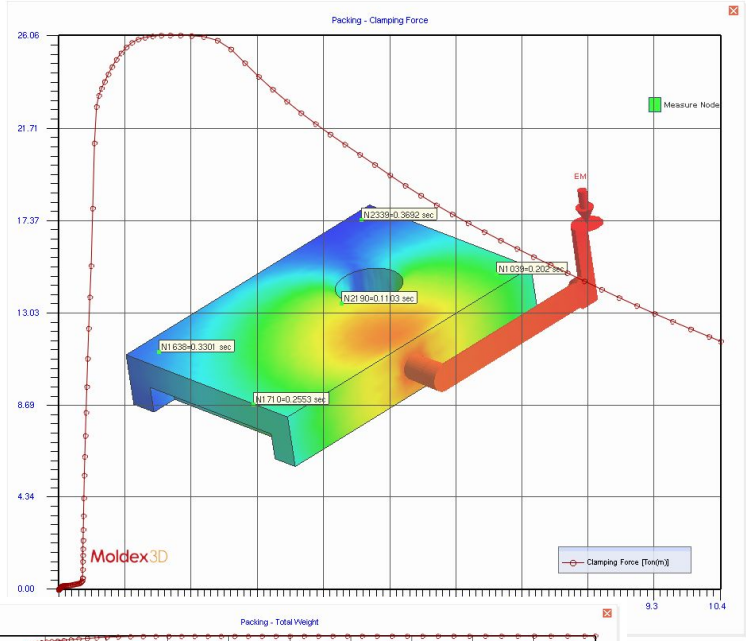
# Линия спая и воздушные ловушки

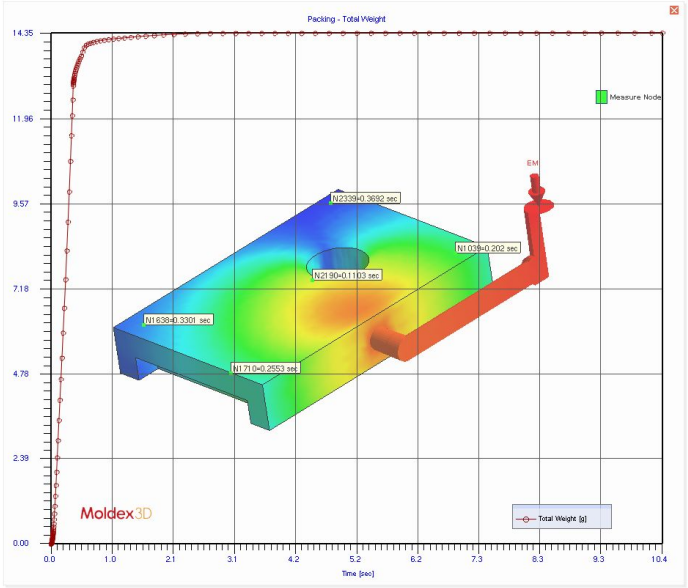


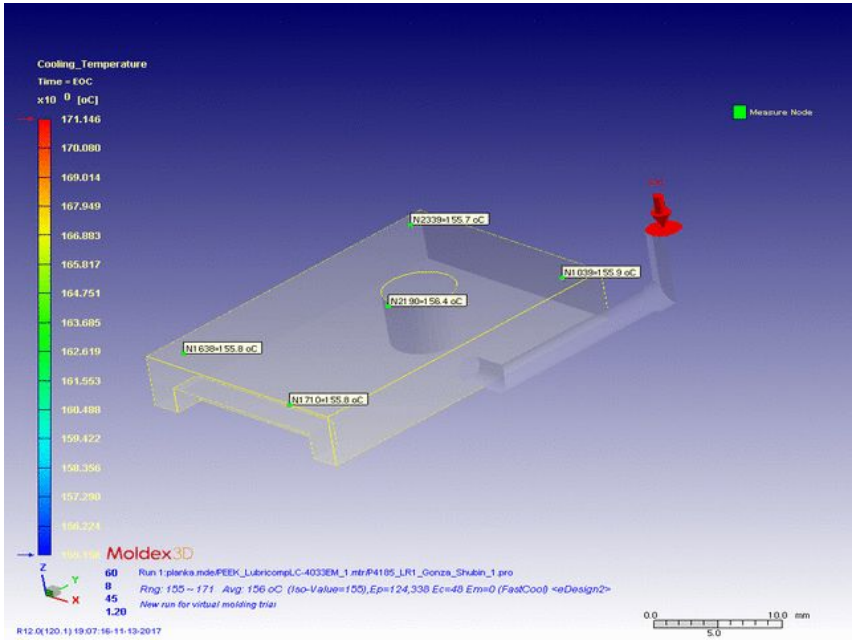
# Выдержка под давлени

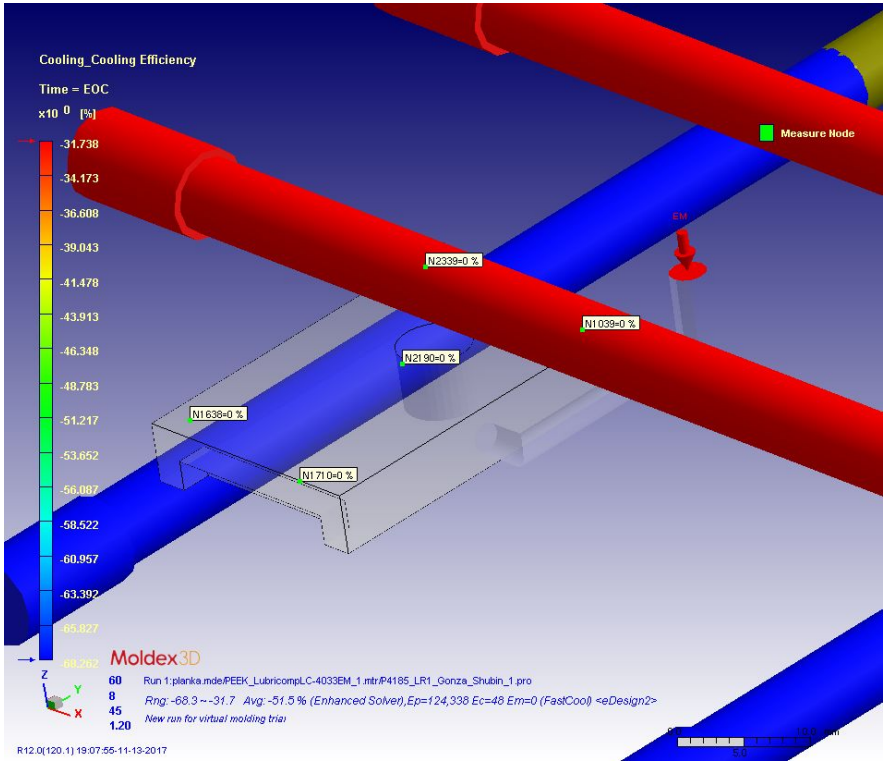


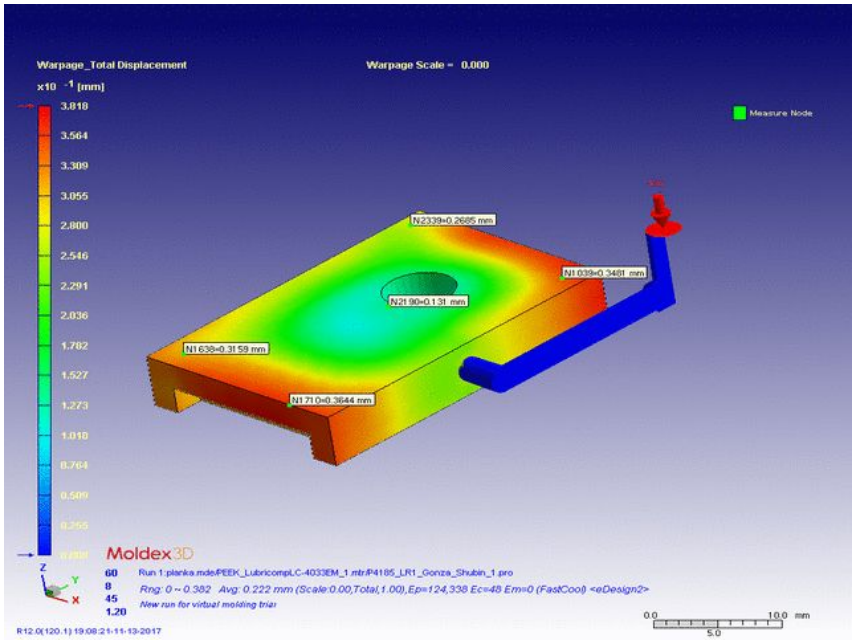



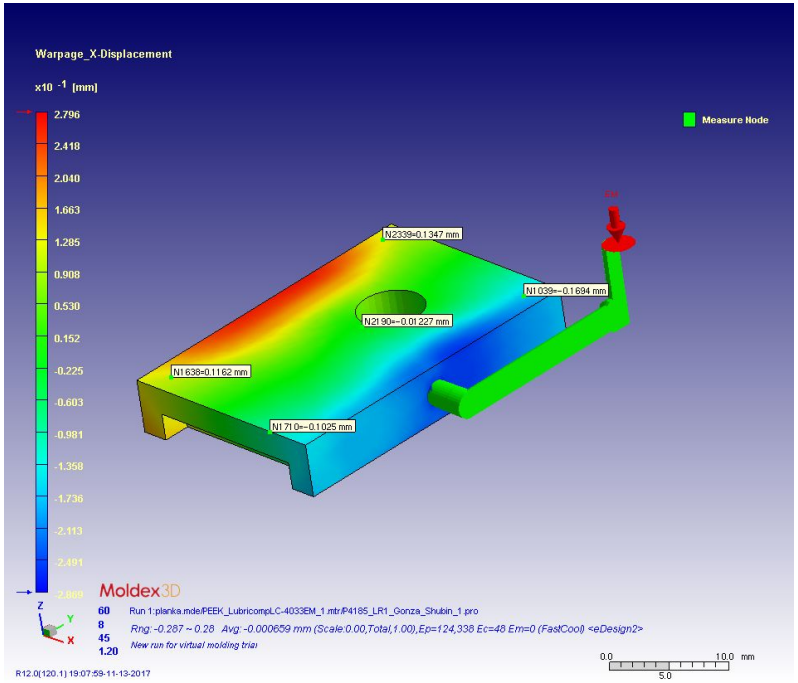
# Охлаждение


Cooling_Temperature
Time = EOC
x10 0 [oC]
171.146
170.080
169.014
167.949
166.883
165.817
164.751
163.685
162.619
161.553
160.488
159.422
158.356
157.290
156.224
Measure Node
N2338=155.7 oC
N1039=155.9 oC
N2190=156.4 oC
N1638=155.8 oC
N1710=155.8 oC
Moldex3D
Run 1:planka.mde/PEEK_LubricompLC-4033EM_1.mtr/P4185_LR1_Gonza_Shubin_1.pro
Rng: 155 ~ 171 Avg: 156 oC (Iso-Value=155),Ep=124,338 Ec=48 Em=0 (FastCool) <eDesign2>
New run for virtual molding trial
R12.0(120.1) 19:07:16-11-13-2017


Cooling_Cooling Efficiency
Time = EOC
x10 0 [%]
-31.738
-34.173
-36.608
-39.043
-41.478
-43.913
-46.348
-48.783
-51.217
-53.652
-56.087
-58.522
-60.957
-63.392
-65.827
-68.262
Measure Node
N2338=0 %
N1039=0 %
N2190=0 %
N1638=0 %
N1710=0 %
Moldex3D
Run 1:planka.mde/PEEK_LubricompLC-4033EM_1.mtr/P4185_LR1_Gonza_Shubin_1.pro
Rng: -68.3 ~ -31.7 Avg: -51.5 % (Enhanced Solver),Ep=124,338 Ec=48 Em=0 (FastCool) <eDesign2>
New run for virtual molding trial
R12.0(120.1) 19:07:55-11-13-2017

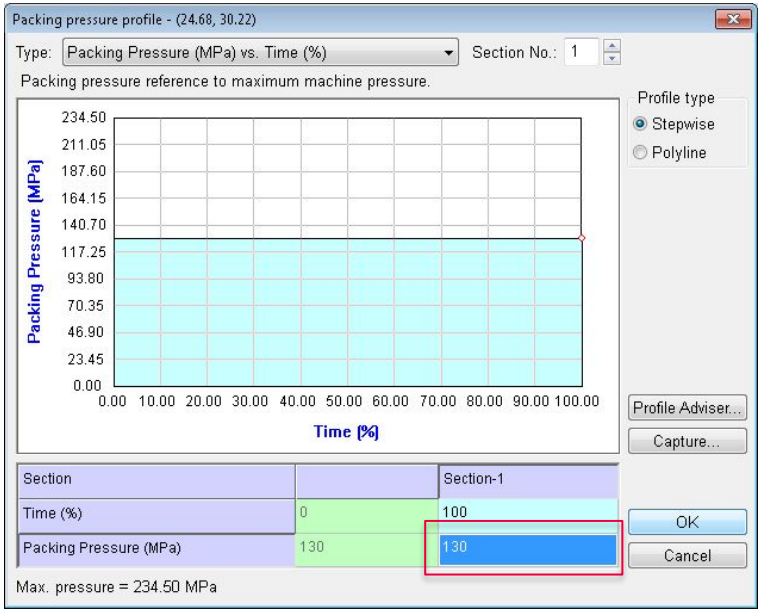
# Коробление


Warpage_Total Displacement
Warpage Scale = 0.000
x10 -1 [mm]
3.818
3.564
3.309
3.055
2.800
2.546
2.291
2.036
1.782
1.527
1.273
1.018
0.764
0.509
0.255
Measure Node
N2339=0.2685 mm
N1039=0.3481 mm
N2190=0.131 mm
N1638=0.3159 mm
N1710=0.3644 mm
Moldex3D
Run 1:planka.mde/PEEK_LubricompLC-4033EM_1.mtr/P4185_LR1_Gonza_Shubin_1.pro
Rng: 0 ~ 0.382 Avg: 0.222 mm (Scale:0.00,Total,1.00),Ep=124,338 Ec=48 Em=0 (FastCool) <eDesign2>
New run for virtual molding trial
R12.0(120.1) 19:08:21-11-13-2017
0.0
10.0 mm
5.0

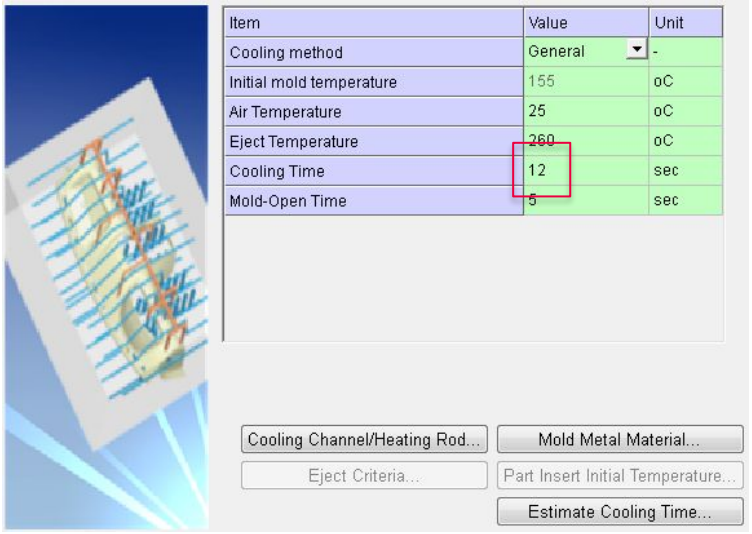

Warpage_X-Displacement
x10 -1 [mm]
2.796
2.418
2.040
1.663
1.285
0.908
0.530
0.152
-0.225
-0.603
-0.981
-1.358
-1.736
-2.113
-2.491
Measure Node
N2339=0.1347 mm
N1039=-0.1694 mm
N2190=-0.01227 mm
N1638=0.1162 mm
N1710=-0.1025 mm
Moldex3D
Run 1:planka.mde/PEEK_LubricompLC-4033EM_1.mtr/P4185_LR1_Gonza_Shubin_1.pro
Rng: -0.287 ~ 0.28 Avg: -0.000659 mm (Scale:0.00,Total,1.00),Ep=124,338 Ec=48 Em=0 (FastCool) <eDesign2>
New run for virtual molding trial
R12.0(120.1) 19:07:59-11-13-2017
0.0
10.0 mm
5.0

# Параметры второго расчета

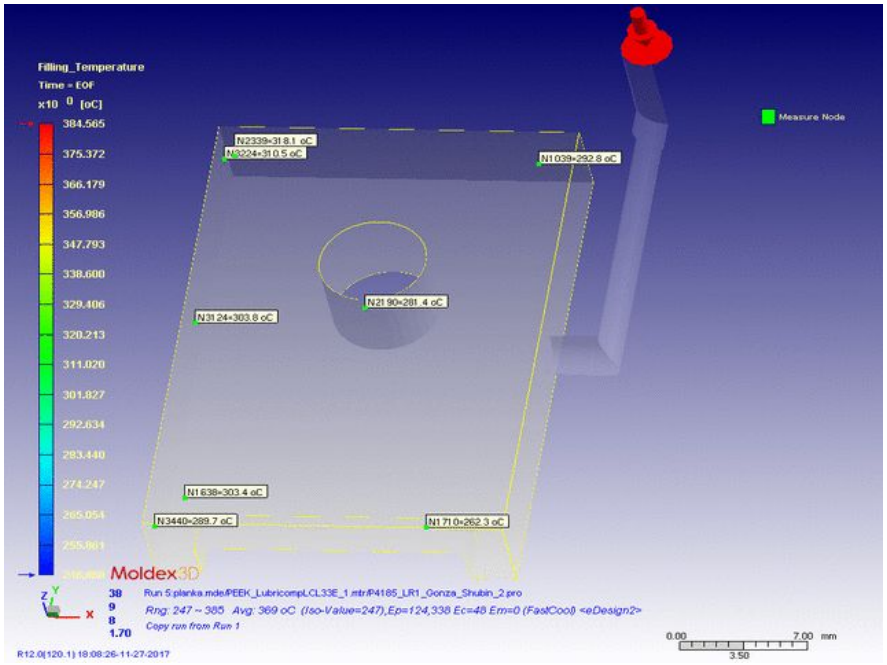
| Material Summary | |
|---|---|
| **Material type** | Thermoplastic |
| **Generic name** | PEEK |
| **Supplier** | SABIC(LNP) |
| **Trade name** | Lubricomp LCL33E |
| **MFI** | Unavailable |
| **Fiber percent** | 15.00 (%) |
| **Melt temperature range** | 365 - 405 (oC) |
| **Mold temperature range** | 135 - 160 (oC) |
| **Ejection temperature** | 274 (oC) |
| **Freeze temperature** | 294 (oC) |

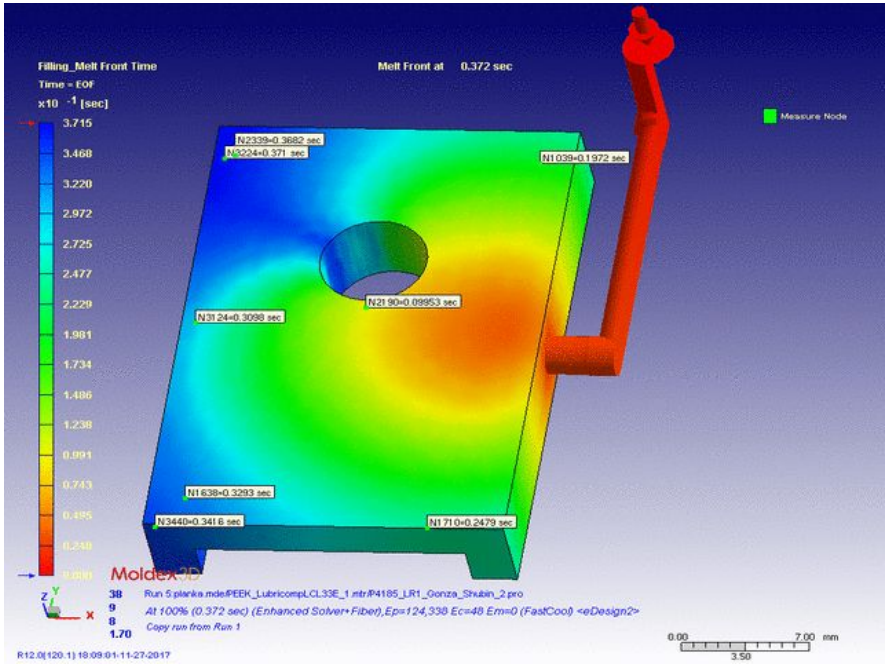



| Process Summary | |
|---|---|
| **Stroke Time** | 0.3578 (sec) |
| **Melt Temperature** | 375.0 (oC) |
| **Mold Temperature** | 155.0 (oC) |
| **Maximum Injection Pressure** | 234.50 (MPa) |
| **Injection Volume** | 11.4498 (cc) |
| **Packing Time** | 7.0000 (sec) |
| **Maximum Packing Pressure** | 234.50 (MPa) |
| **VP Switch by volume(%) filled** | 98.00 (%) |
| **Mold Opening Time** | 5.0000 (sec) |
| **Ejection temperature** | 260.0 (oC) |
| **Air Temperature** | 25.0 (oC) |

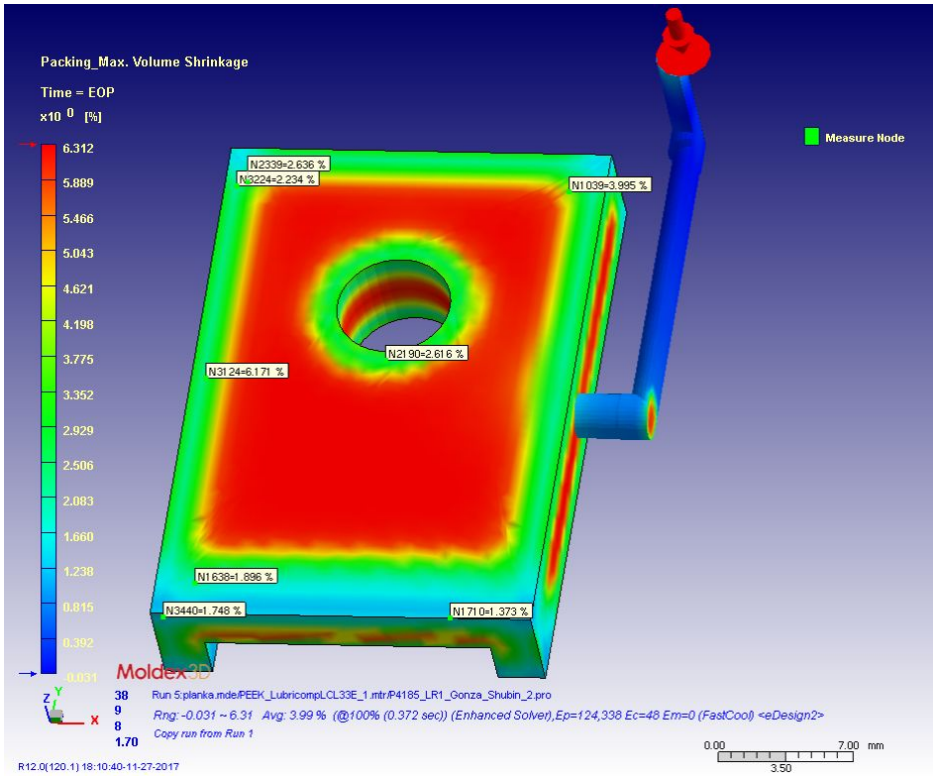


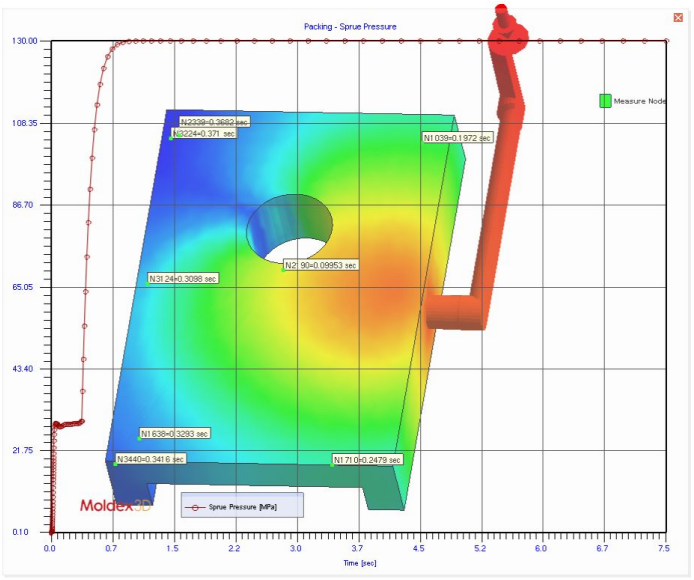
# Результаты второго расчета. Заполнение

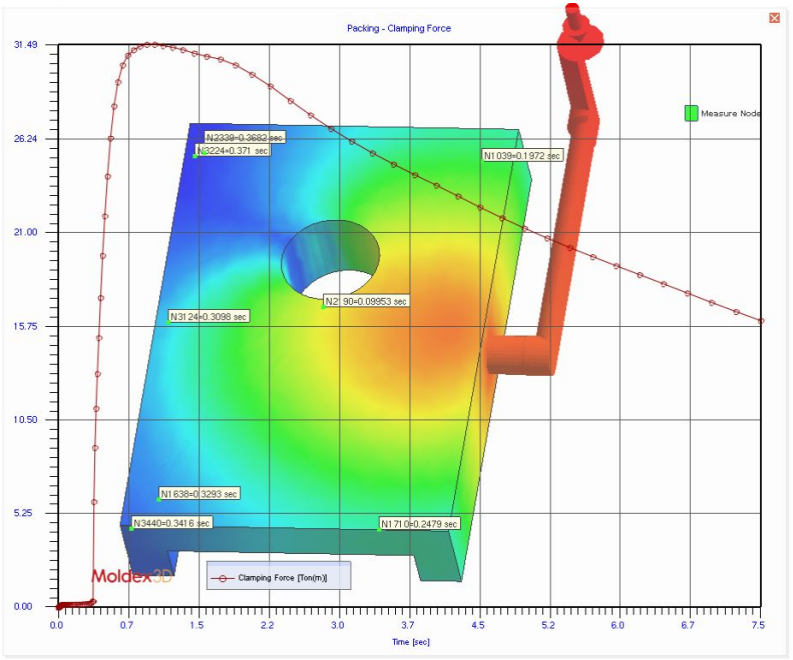


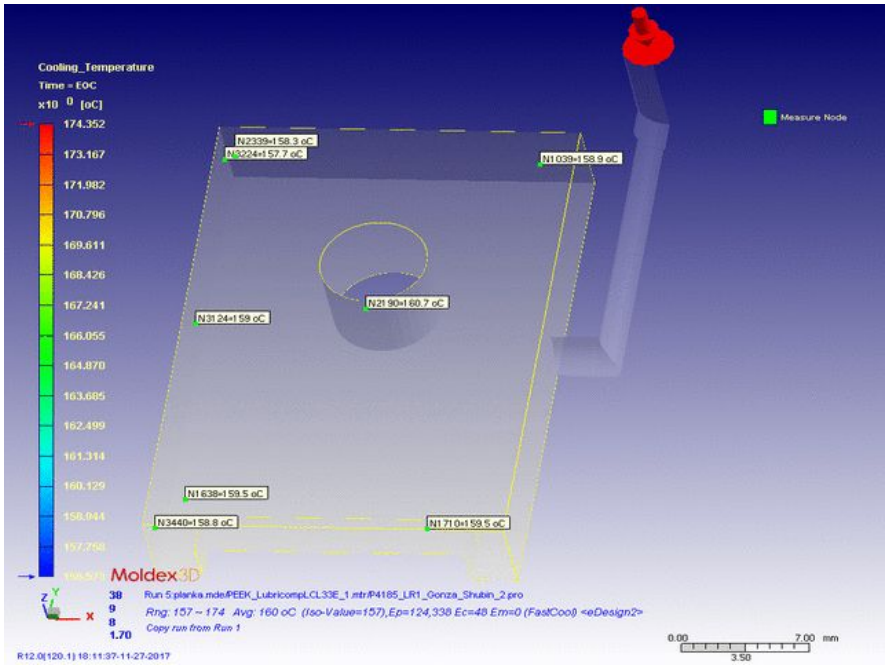
# Выдержка

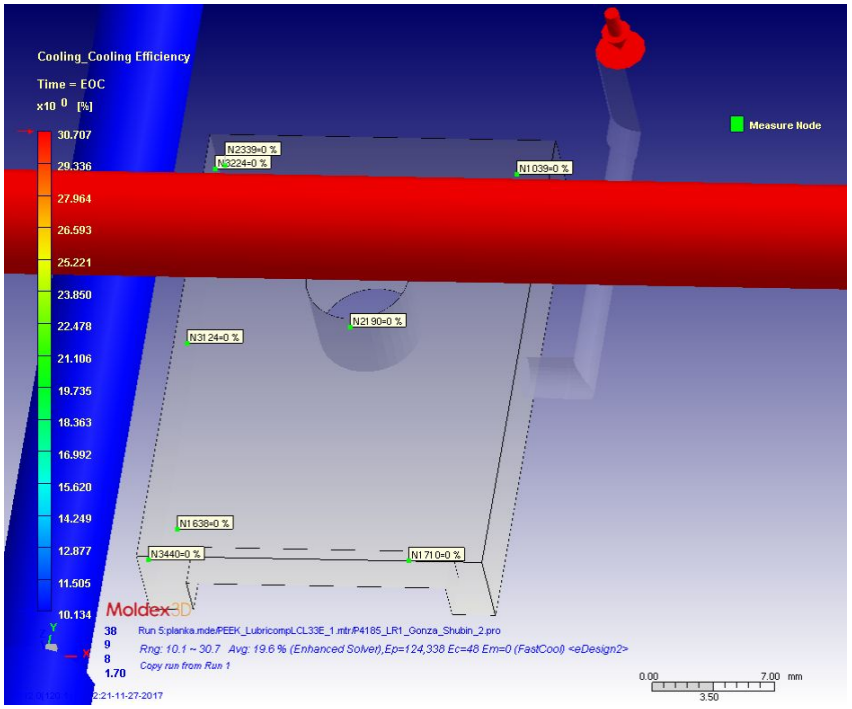

Packing_Max. Volume Shrinkage
Time = EOP
x10 0 [%]
6.312
5.889
5.466
5.043
4.621
4.198
3.775
3.352
2.929
2.506
2.083
1.660
1.238
0.815
0.392
-0.031
Measure Node
N2339=2.636 %
N3224=2.234 %
N1039=3.995 %
N2190=2.616 %
N3124=6.171 %
N1638=1.896 %
N3440=1.748 %
N1710=1.373 %
Moldex3D
38
9
8
1.70
Run 5:planka.mde/PEEK_LubricompLCL33E_1.mtr/P4185_LR1_Gonza_Shubin_2.pro
Rng: -0.031 ~ 6.31 Avg: 3.99 % (@100% (0.372 sec)) (Enhanced Solver),Ep=124,338 Ec=48 Em=0 (FastCool) <eDesign2>
Copy run from Run 1
0.00
7.00 mm
3.50
R12.0(120.1) 18:10:40-11-27-2017


Packing - Sprue Pressure
130.00
108.35
86.70
65.05
43.40
21.75
0.10
Measure Node
N2339=0.3682 sec
N3224=0.371 sec
N1039=0.1972 sec
N2190=0.09953 sec
N3124=0.3098 sec
N1638=0.3293 sec
N3440=0.3416 sec
N1710=0.2479 sec
Moldex3D
Sprue Pressure [MPa]
0.0
0.7
1.5
2.2
3.0
3.7
4.5
5.2
6.0
6.7
7.5
Time [sec]

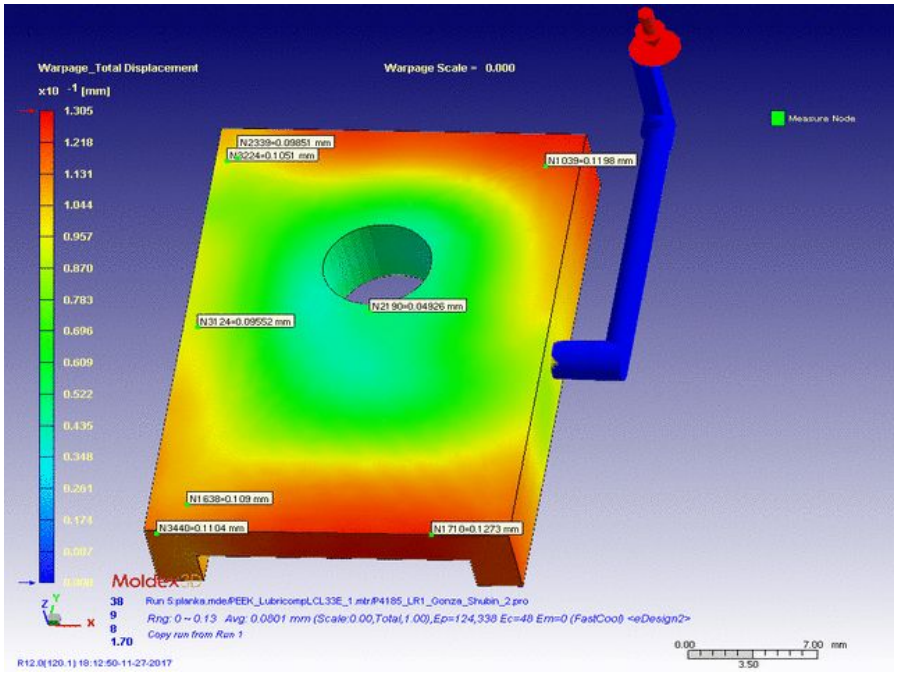

Packing - Clamping Force
31.49
26.24
21.00
15.75
10.50
5.25
0.00
Measure Node
N2339=0.3682 sec
N3224=0.371 sec
N1039=0.1972 sec
N2190=0.09953 sec
N3124=0.3098 sec
N1638=0.3293 sec
N3440=0.3416 sec
N1710=0.2479 sec
Moldex3D
Clamping Force [Ton(m)]
0.0
0.7
1.5
2.2
3.0
3.7
4.5
5.2
6.0
6.7
7.5
Time [sec]

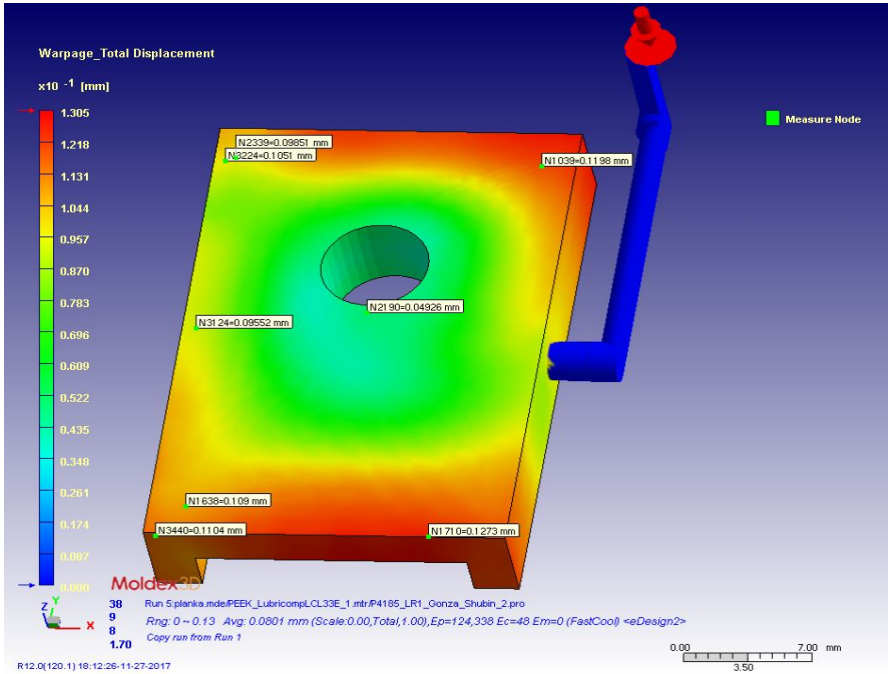
# Охлаждение


Cooling_Temperature
Time = EOC
x10 0 [oC]
174.352
173.167
171.982
170.796
169.611
168.426
167.241
166.055
164.870
163.685
162.499
161.314
160.129
158.944
157.758
Measure Node
N2339=158.3 oC
N3224=157.7 oC
N1039=158.9 oC
N2190=160.7 oC
N3124=159 oC
N1638=159.5 oC
N3440=158.8 oC
N1710=159.5 oC
Moldex3D
Run 5:planka.mde/PEEK_LubricompLCL33E_1.mtr/P4185_LR1_Gonza_Shubin_2.pro
Rng: 157 ~ 174 Avg: 160 oC (Iso-Value=157),Ep=124,338 Ec=48 Em=0 (FastCool) <eDesign2>
Copy run from Run 1
0.00
7.00 mm
3.50


Cooling_Cooling Efficiency
Time = EOC
x10 0 [%]
30.707
29.336
27.964
26.593
25.221
23.850
22.478
21.106
19.735
18.363
16.992
15.620
14.249
12.877
11.505
10.134
Measure Node
N2339=0 %
N3224=0 %
N1039=0 %
N2190=0 %
N3124=0 %
N1638=0 %
N3440=0 %
N1710=0 %
Moldex3D
Run 5:planka.mde/PEEK_LubricompLCL33E_1.mtr/P4185_LR1_Gonza_Shubin_2.pro
Rng: 10.1 ~ 30.7 Avg: 19.6 % (Enhanced Solver),Ep=124,338 Ec=48 Em=0 (FastCool) <eDesign2>
Copy run from Run 1
0.00
7.00 mm
3.50

# Коробление


Warpage_Total Displacement
Warpage Scale = 0.000
x10 -1 [mm]
1.305
1.218
1.131
1.044
0.957
0.870
0.783
0.696
0.609
0.522
0.435
0.348
0.261
0.174
0.087
0.000
Measure Node
N2339=0.09851 mm
N3224=0.1051 mm
N1039=0.1198 mm
N2190=0.04926 mm
N3124=0.09552 mm
N1638=0.109 mm
N3440=0.1104 mm
N1710=0.1273 mm
Moldex3D
Run 5:planka.mde/PEEK_LubricompLCL33E_1.mtr/P4185_LR1_Gonza_Shubin_2.pro
Rng: 0 ~ 0.13 Avg: 0.0801 mm (Scale:0.00,Total(1.00),Ep=124,338 Ec=48 Em=0 (FastCool) <eDesign2>
Copy run from Run 1
R12.0(120.1) 18:12:50-11-27-2017
0.00
7.00 mm
3.50


Warpage_Total Displacement
x10 -1 [mm]
1.305
1.218
1.131
1.044
0.957
0.870
0.783
0.696
0.609
0.522
0.435
0.348
0.261
0.174
0.087
0.000
Measure Node
N2339=0.09851 mm
N3224=0.1051 mm
N1039=0.1198 mm
N2190=0.04926 mm
N3124=0.09552 mm
N1638=0.109 mm
N3440=0.1104 mm
N1710=0.1273 mm
Moldex3D
Run 5:planka.mde/PEEK_LubricompLCL33E_1.mtr/P4185_LR1_Gonza_Shubin_2.pro
Rng: 0 ~ 0.13 Avg: 0.0801 mm (Scale:0.00,Total(1.00),Ep=124,338 Ec=48 Em=0 (FastCool) <eDesign2>
Copy run from Run 1
R12.0(120.1) 18:12:26-11-27-2017
0.00
7.00 mm
3.50

# Заключение