

# CONSTRUEREN VOOR PRODUCTIE

Assement door Joris Raaphorst

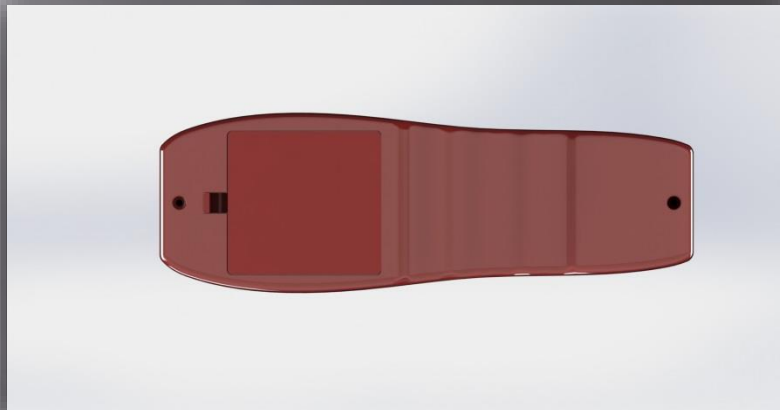
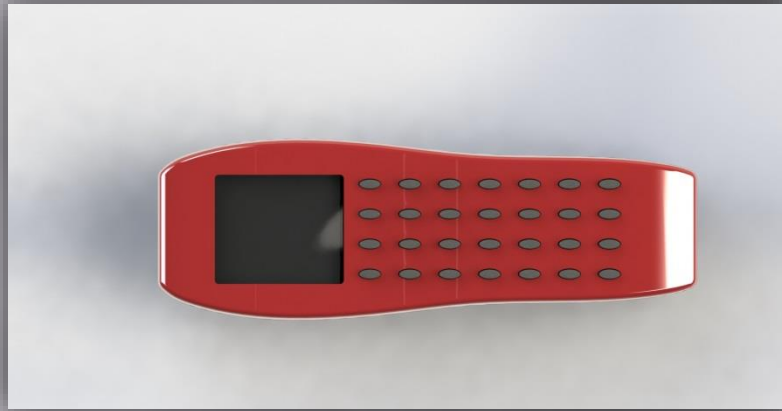
10-2-2015

S1055886

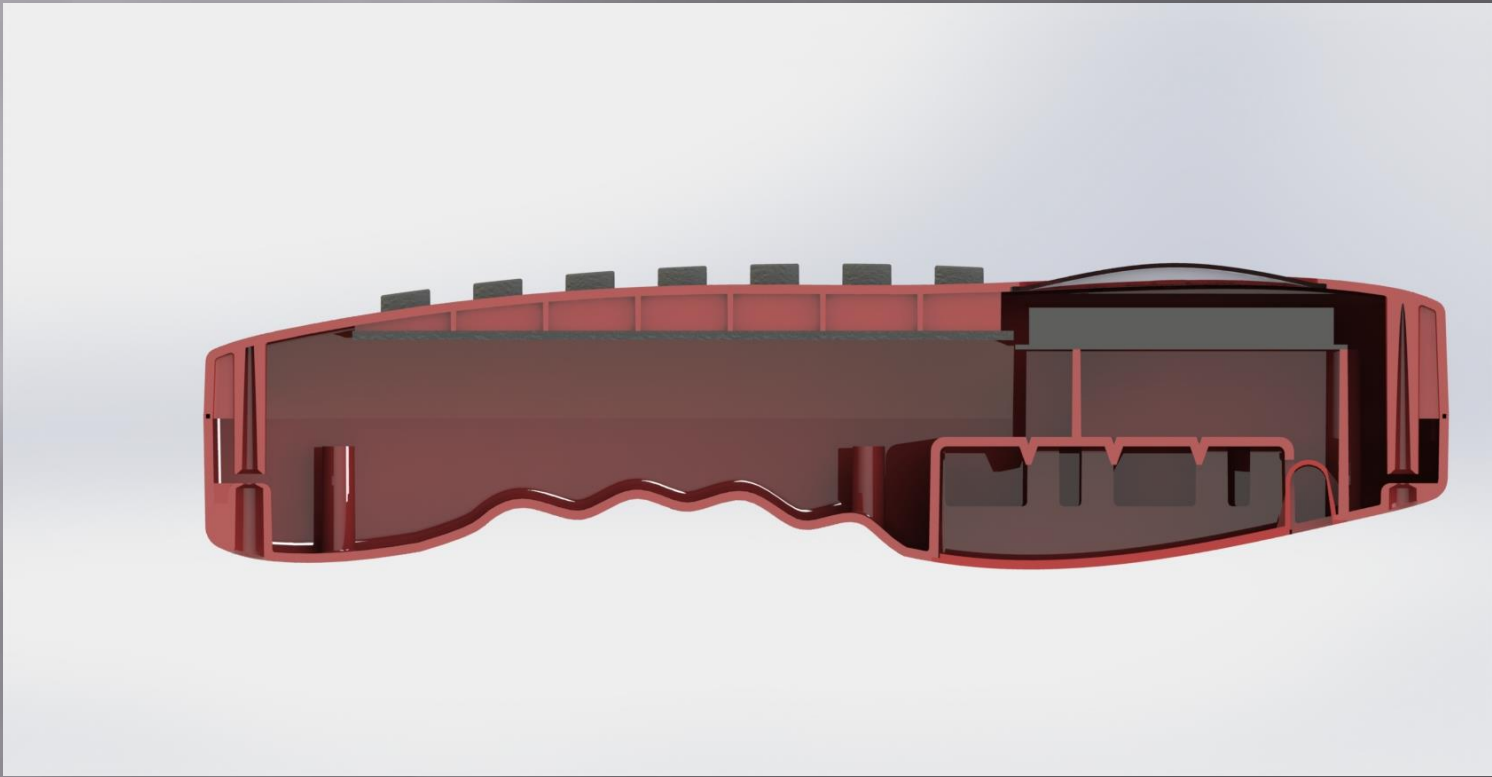
# Het ontwerp



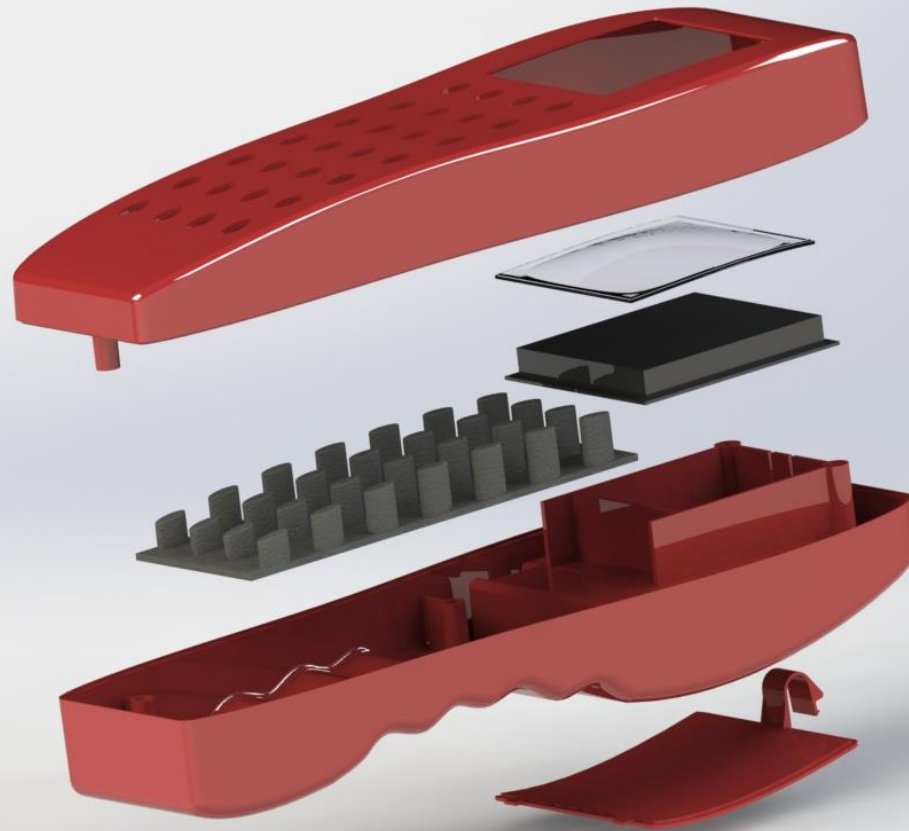
# Het ontwerp



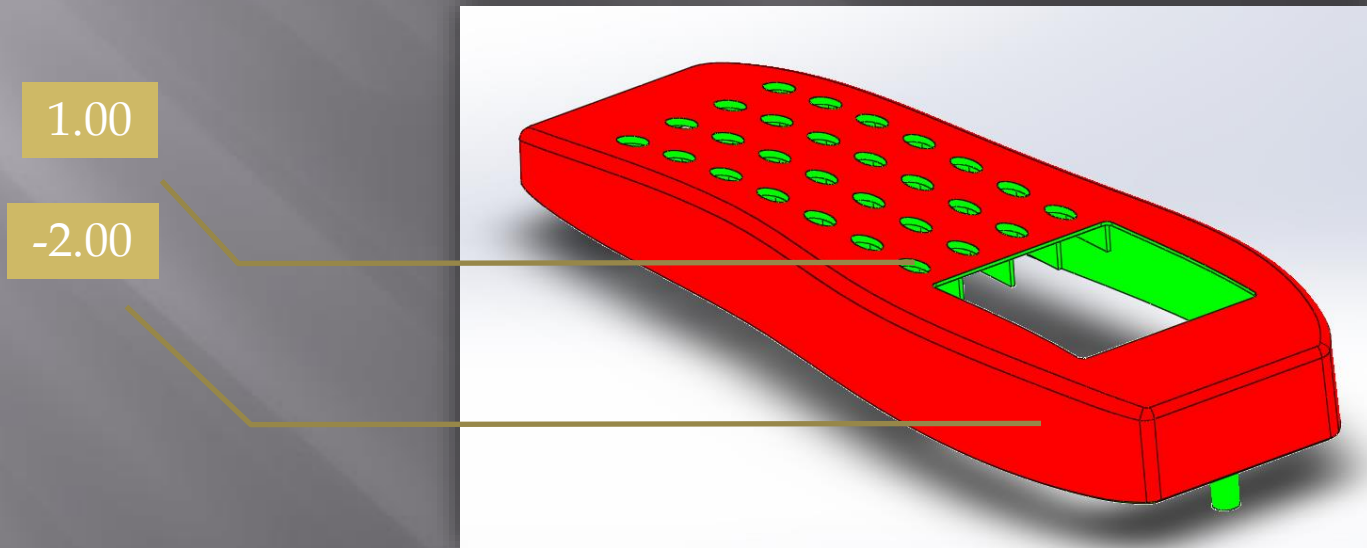
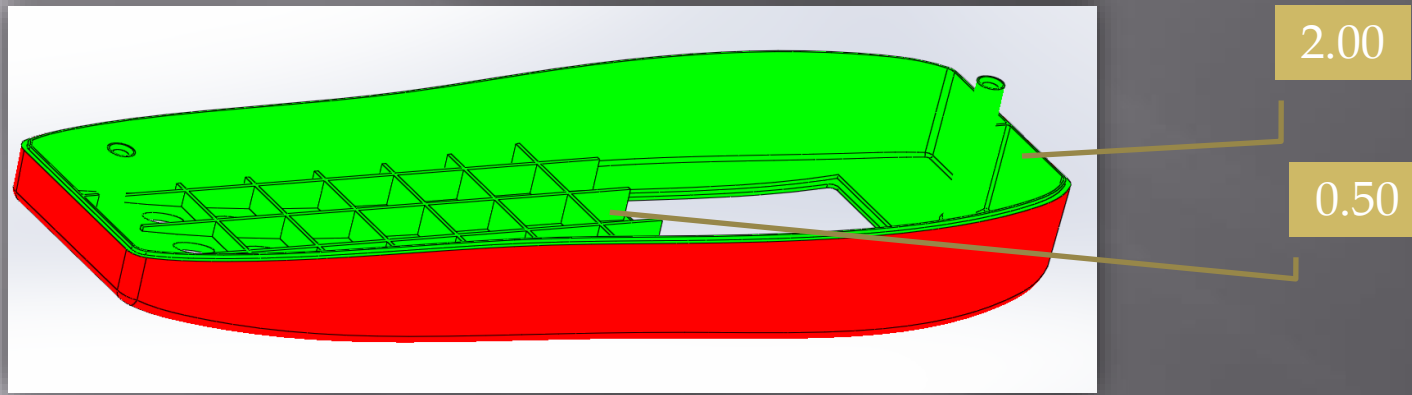
# Doorsnede



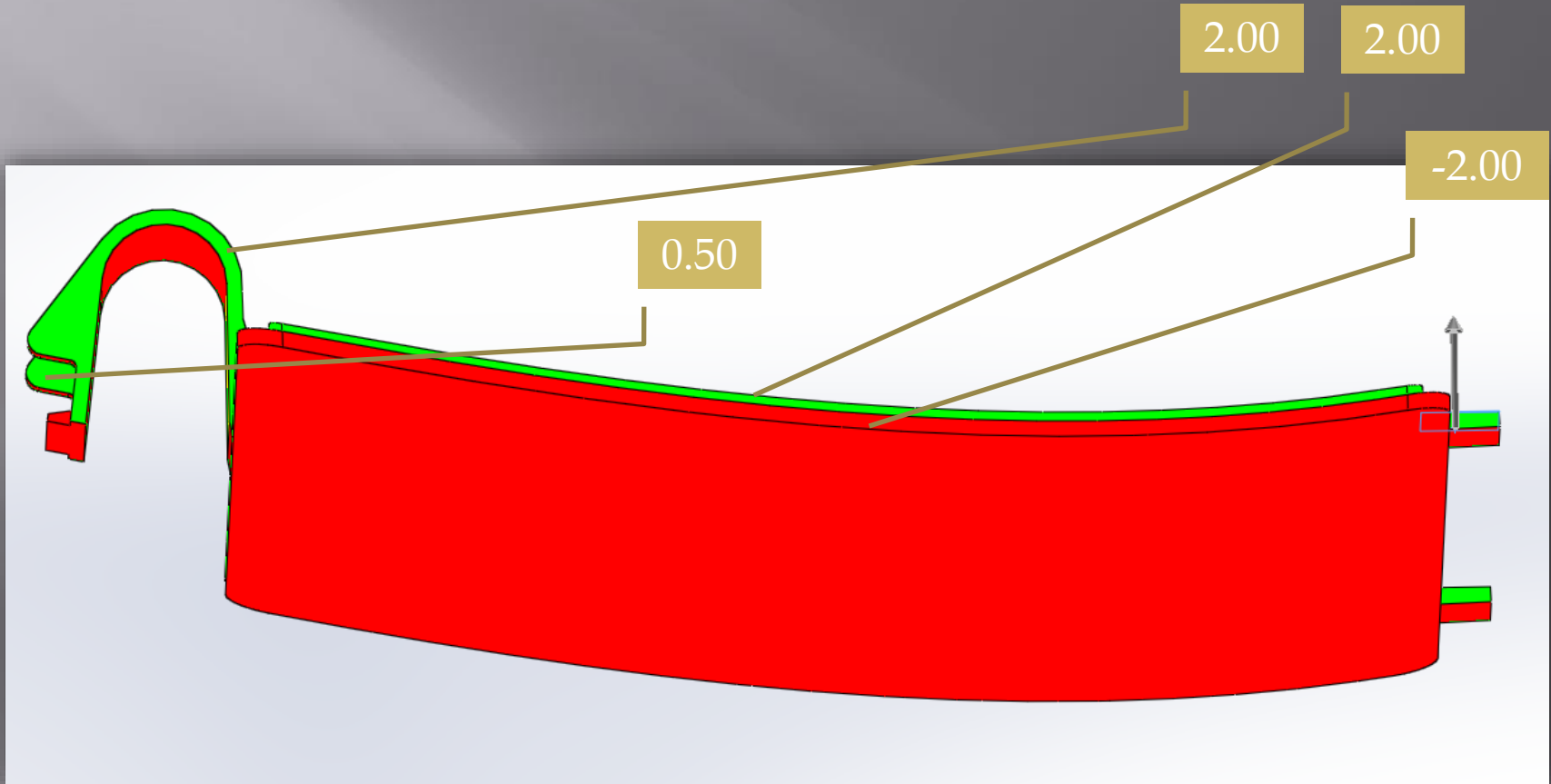
# Exploded view



# Matrijs deling/Draft analisis



# Matrijs deling/Draft analysis

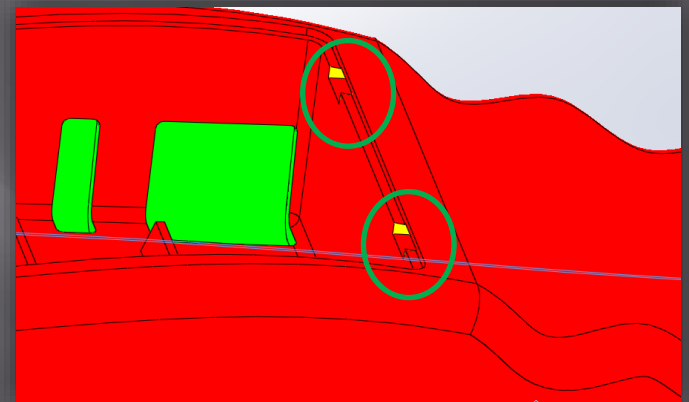
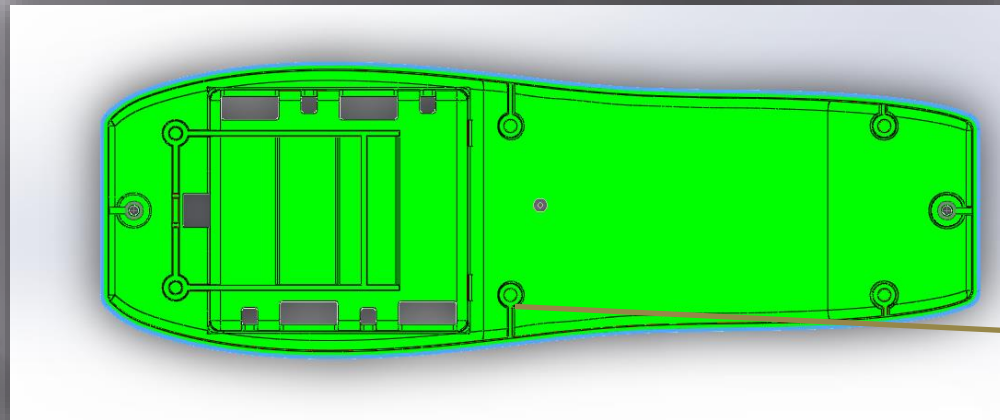
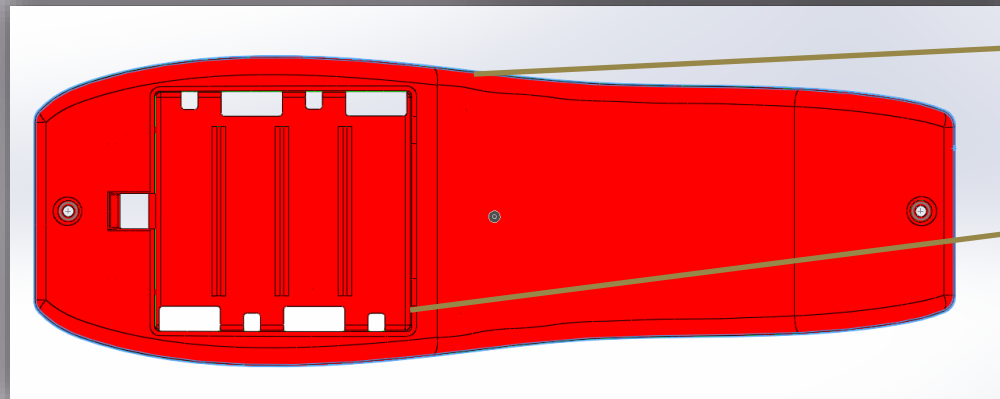


# Matrijs deling

-2.00

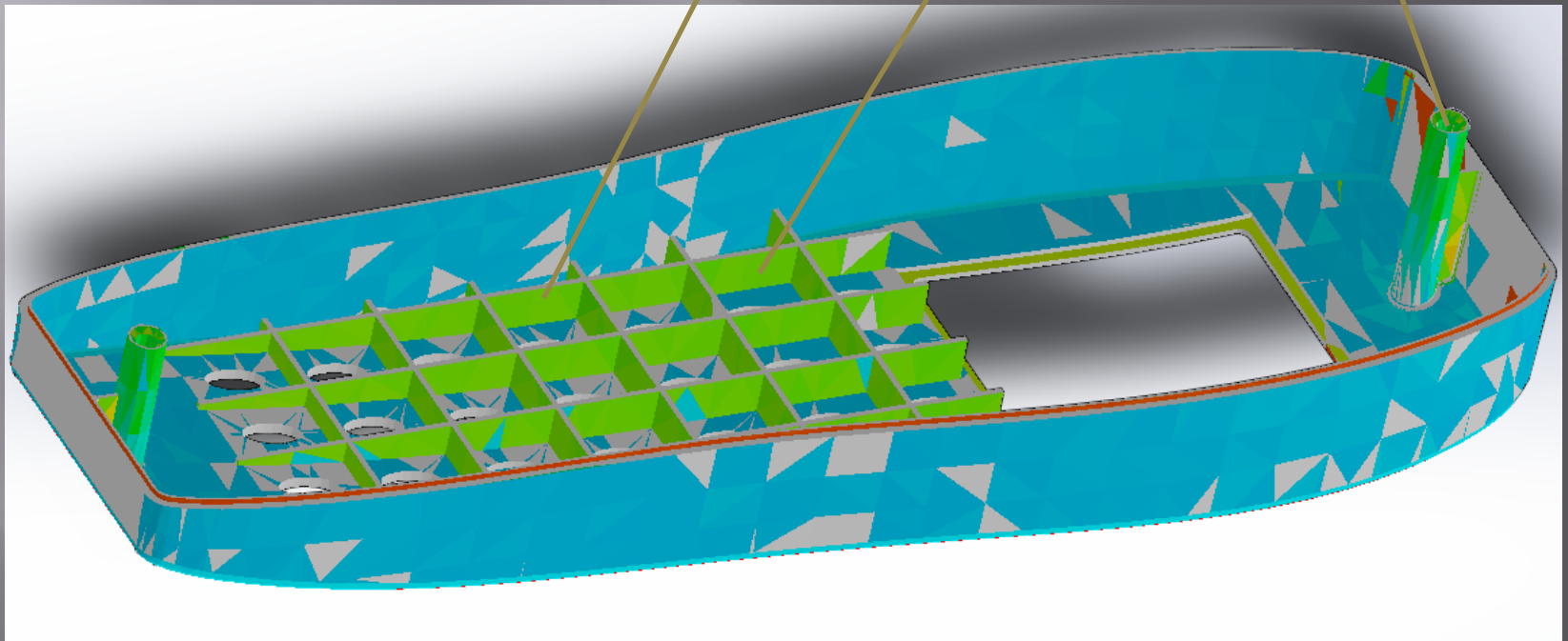
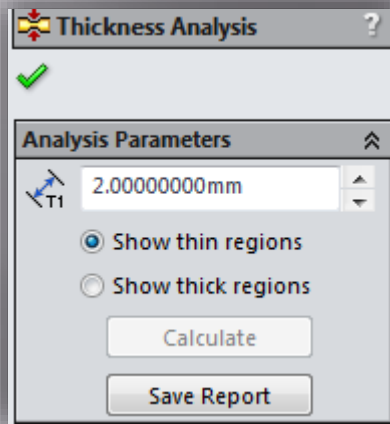
0.50

0.50

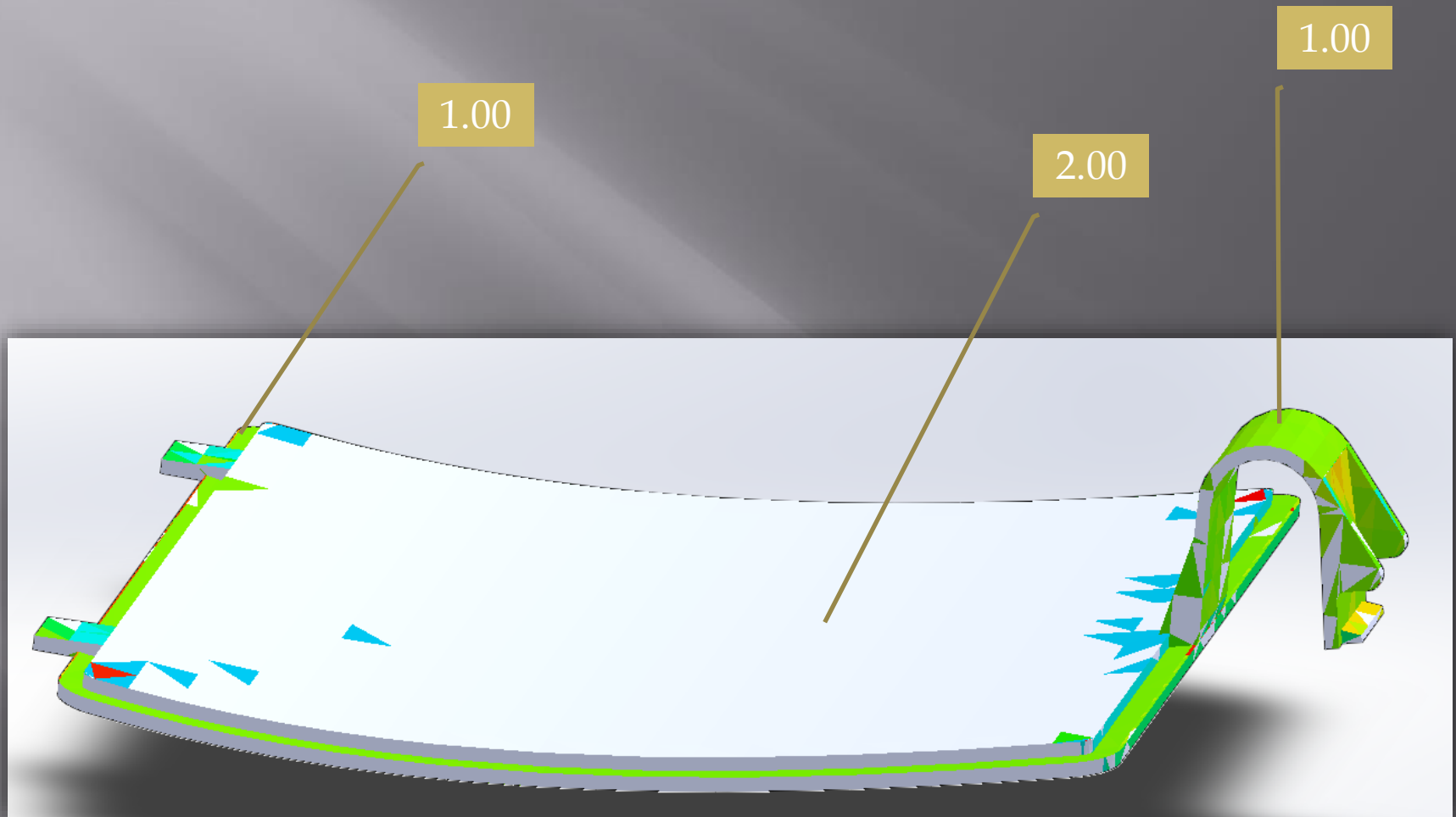




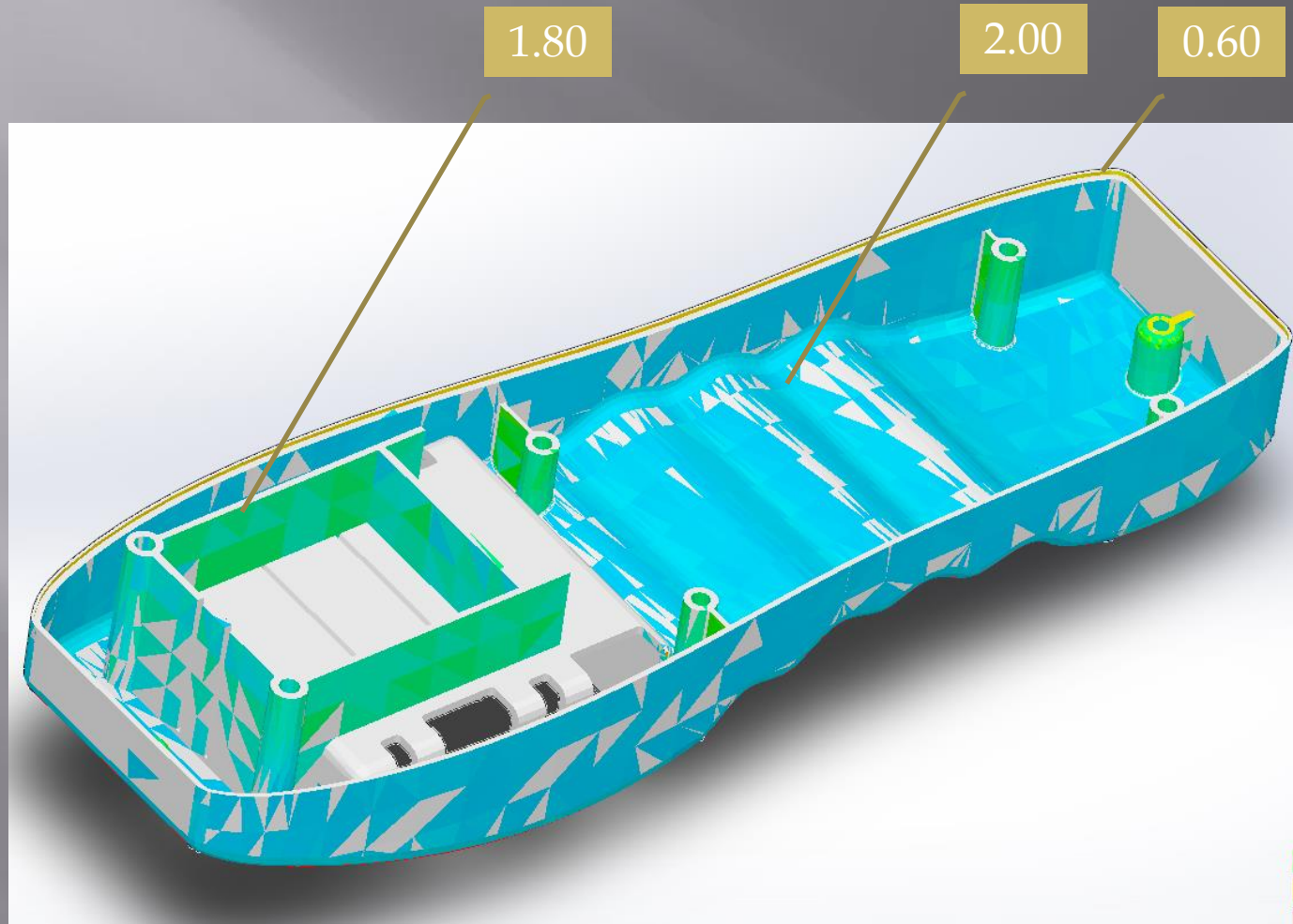
# Wanddicke



# Wanddicke

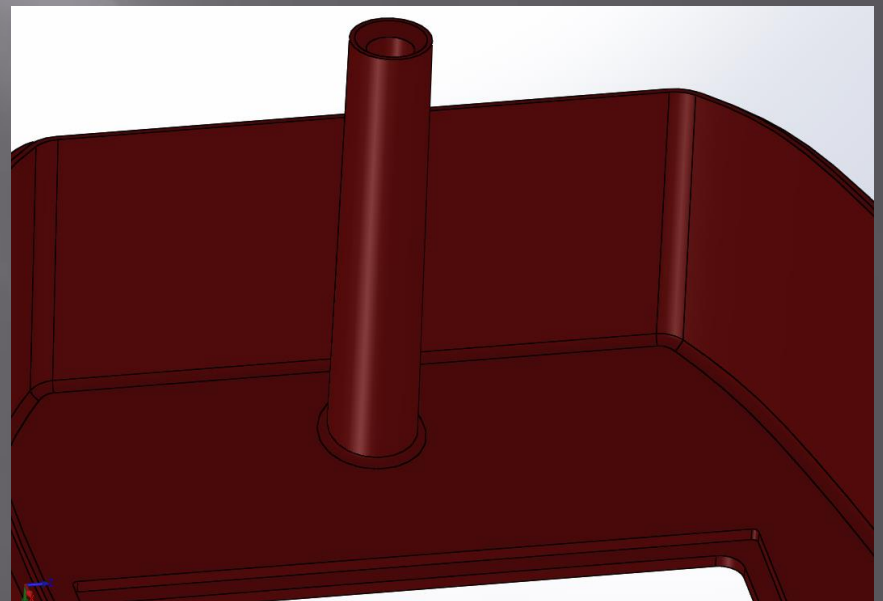
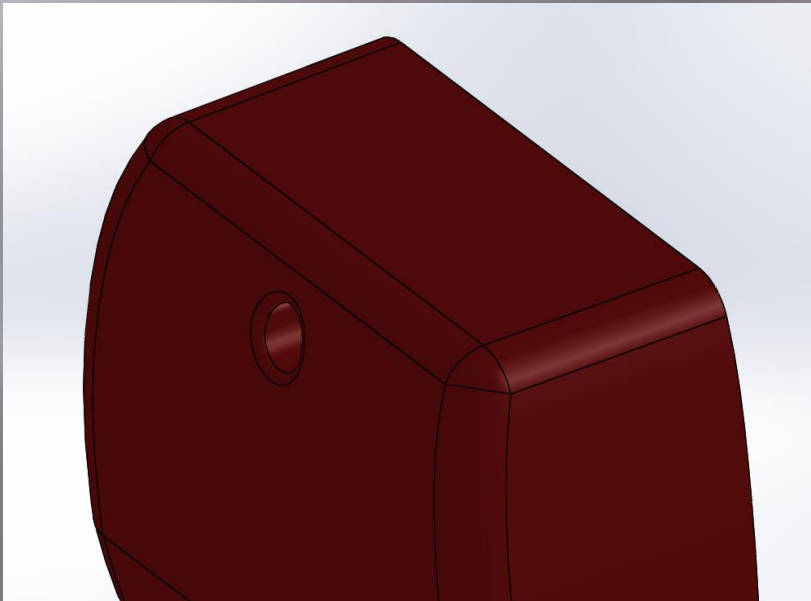


# Wanddichte

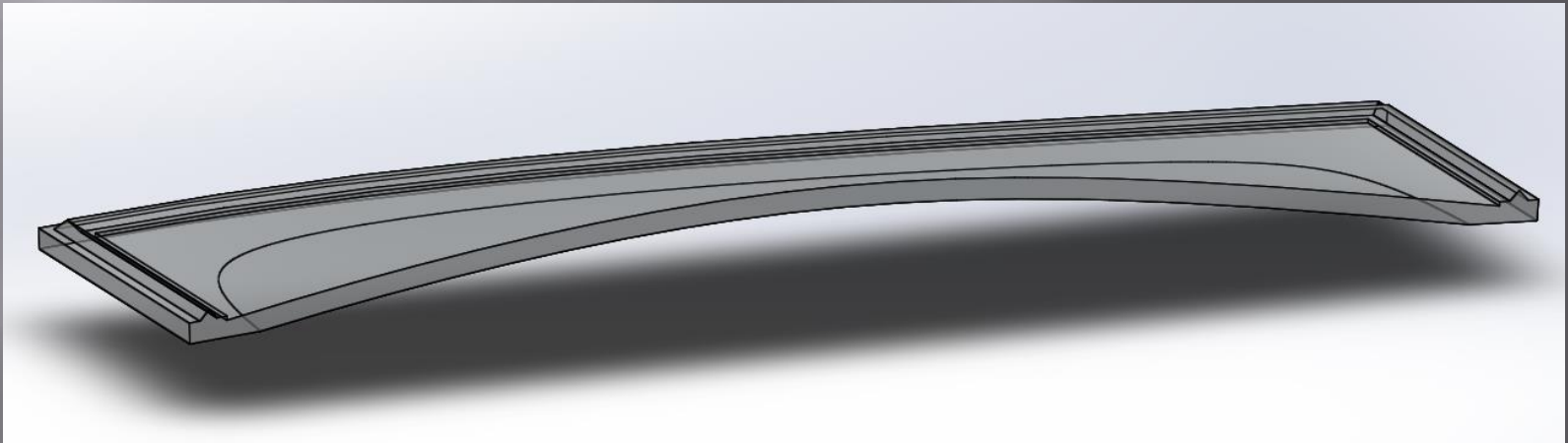


# Afronding

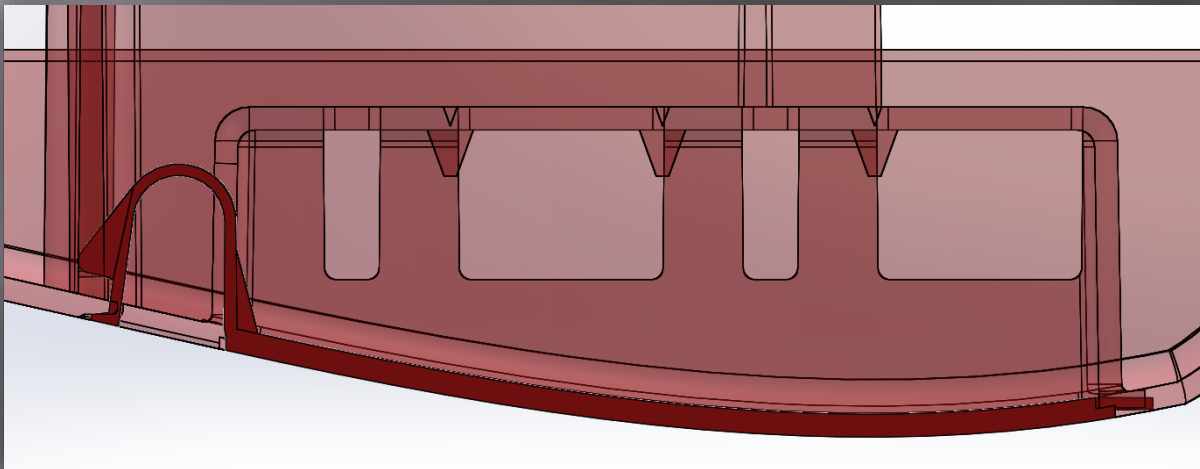
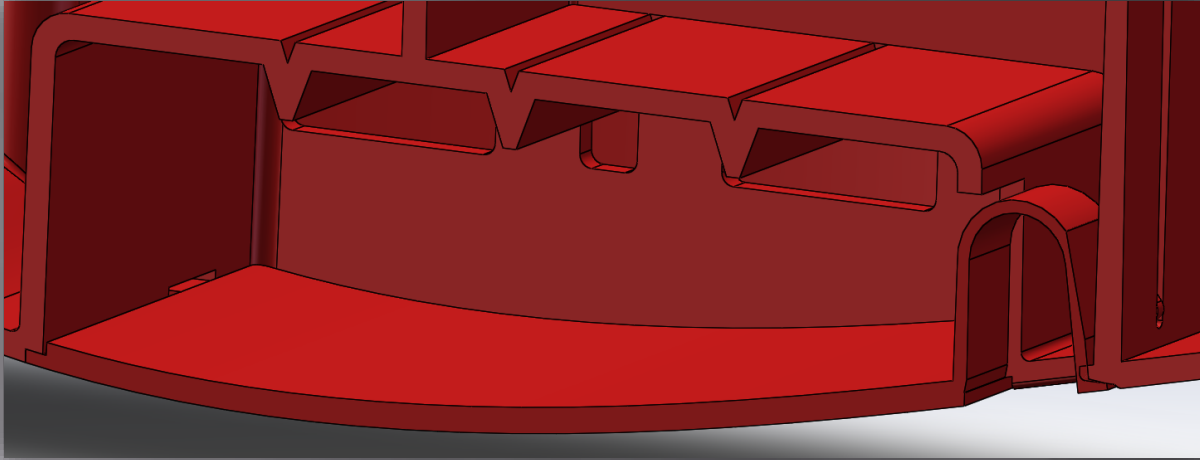
- ▣ Binnenkant heeft een afronding van 0,5 mm
- ▣ Buitenzijde heeft een afronding van 5 mm



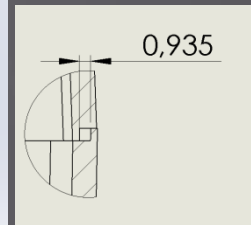
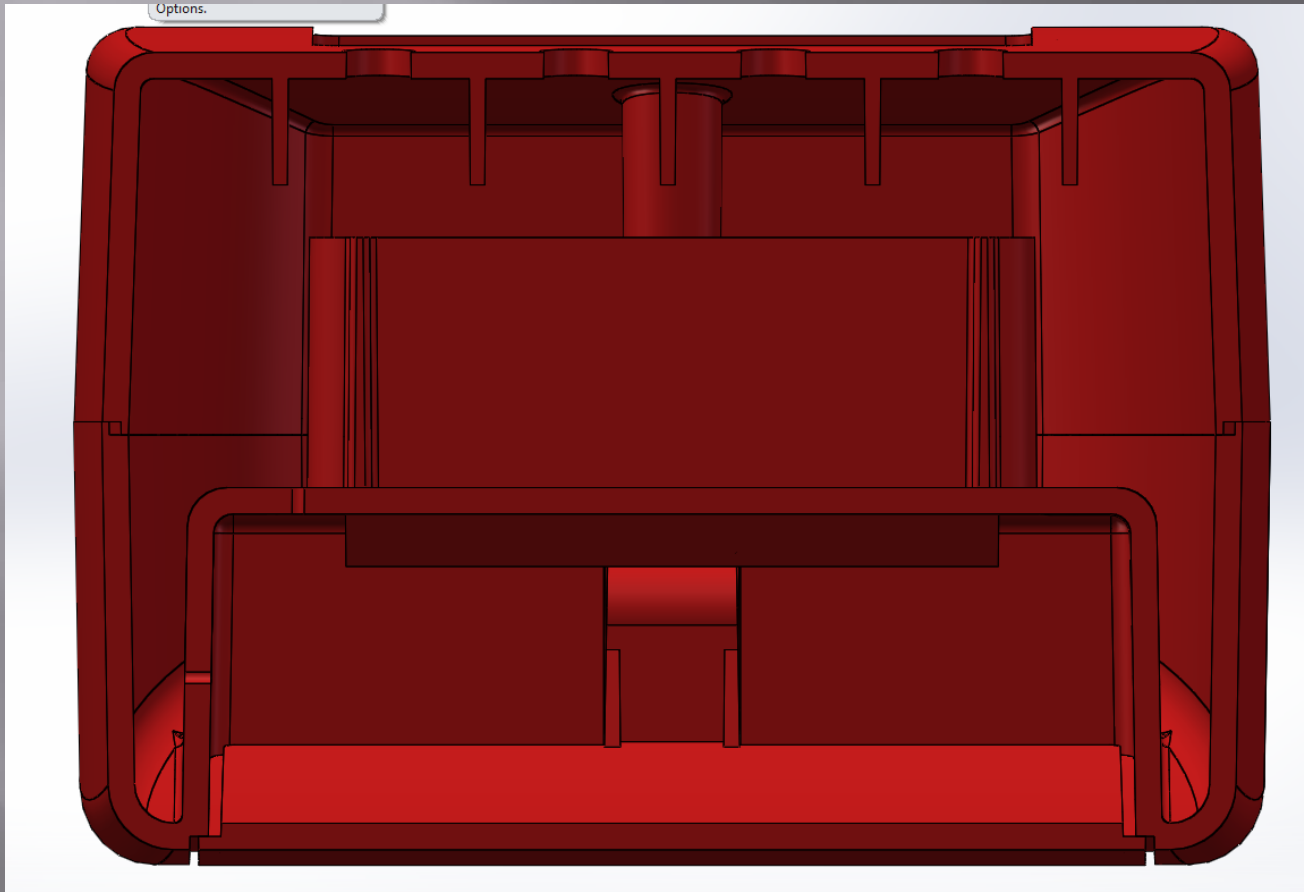
# Lasverbindung



# Klik verbinding



# Lip and groove





Design Study Measure Mass Section Sensor Statistics Check Geometry Analysis Import Diagnostics Deviation Analysis Zebra Stripes Curvature Draft Analysis Undercut Analysis Parting Line Analysis Symmetry Check Thickness Analysis Compare Documents Check Active D... SimulationXpress Analysis Wizard FloXpress Analysis Wizard DFMXpress Analysis Wizard DriveWork...

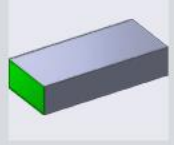
Features Sketch Surfaces Mold Tools Data Migration Direct Editing Evaluate DimXpert Office Products

**Fixture** ?

✓ ✗ ↵

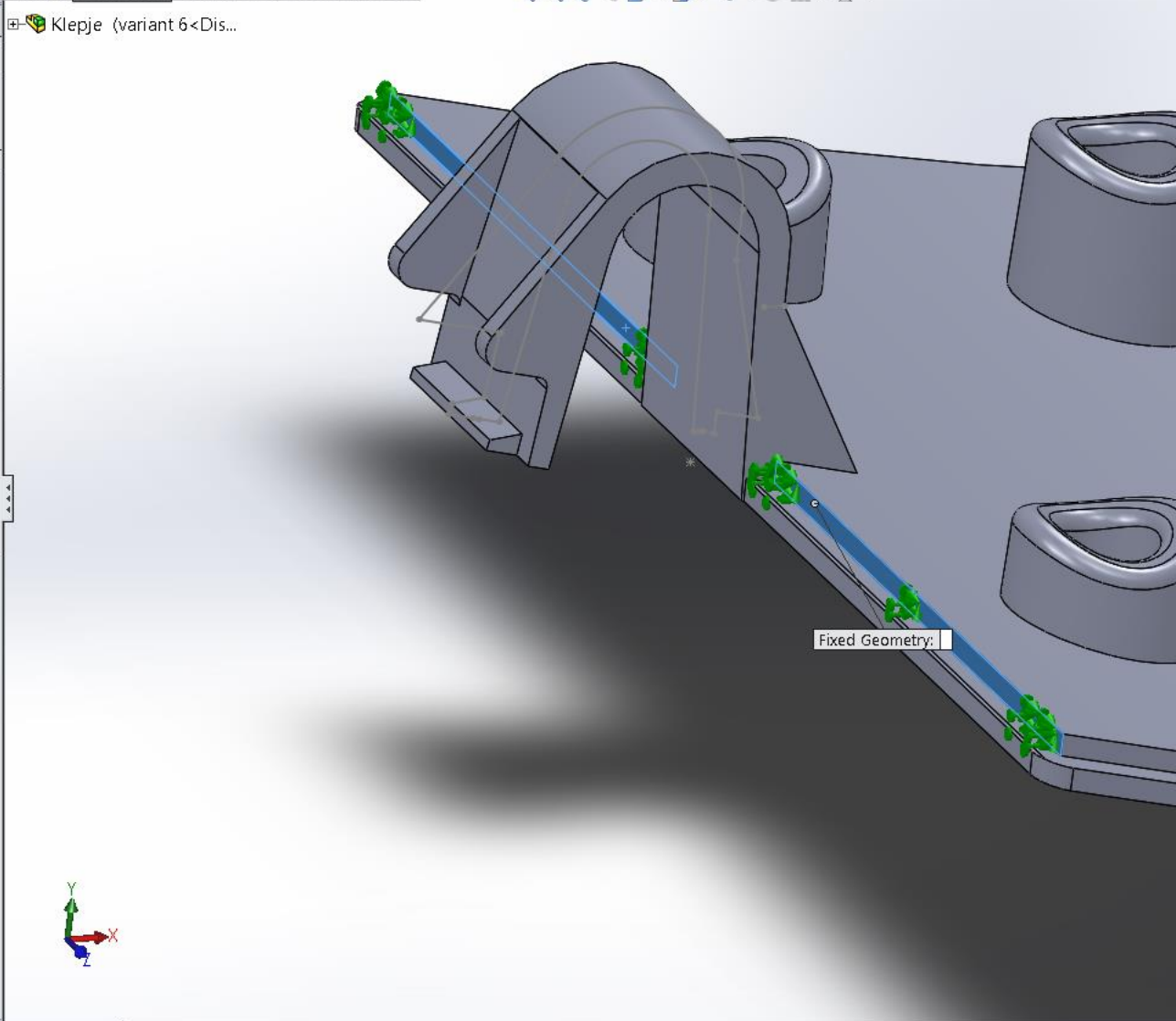
Type

**Example**



**Standard (Fixed Geometry)**

- Face<1>
- Face<2>



Model Motion Study 1 SimulationXpress Study



# Sterkteberekening (Force)

The screenshot displays the SolidWorks SimulationXpress environment. The main window shows a 3D model of a mechanical part with a force applied to its bottom surface. The force is represented by a blue arrow pointing downwards, with a label 'Force Value (N): 1'. The left sidebar contains the 'Force' property manager, where 'Face<1>' is selected, and the 'Normal' direction is chosen. The 'Type' is set to 'SI' with a value of '20' and units of 'N'. The 'Per item' option is selected. The right sidebar shows the 'SolidWorks SimulationXpress' task pane with a progress list: 1 Fixtures (checked), 2 Loads (checked), 3 Material, 4 Run, 5 Results, and 6 Optimize. Below the list, there is a warning message: 'Warning: These loads are assumed to be uniform and constant. What does this mean?' and buttons for 'Add a force', 'Add a pressure', 'Back', and 'Start Over'. The bottom status bar indicates 'Editing Part' and 'MMGS'.

**SOLIDWORKS** Klepje verbetering 2 \* Search SolidWorks Help

Auto Dimension Scheme Location Dimension Size Dimension Datum Geometric Tolerance Pattern Feature Show Tolerance Status TolAnalyst Study

Features Sketch Evaluate DimXpert Render Tools Office Products

Klepje verbetering 2 (varia...)

**Force**

Type

**Force**

Face<1>

Normal  
 Selected direction

SI

20 N

Reverse direction  
 Per item  
 Total

**SolidWorks SimulationXpress**

- 1 Fixtures ✓
- 2 Loads ✓
- 3 Material
- 4 Run
- 5 Results
- 6 Optimize

To simulate the loading on your part, you apply forces, pressures, or both. [Examples](#)

**Warning:** These loads are assumed to be uniform and constant. [What does this mean?](#)

➤ Add a force  
➤ Add a pressure

⬅ Back Start Over

Force Value (N): 1

Model Motion Study 1 SimulationXpress Study

Klepje verbetering 2 Editing Part MMGS 1242 9-2-2015

# Sterkte berekening (Material)

The screenshot displays the SolidWorks SimulationXpress environment. The main window shows a 3D model of a mechanical part with a curved top and a base. The part is supported by a base plate. The simulation setup includes:

- SimulationXpress Study (-varia):**
  - Klepje verbetering 2 (-ABS-):**
    - Fixtures:** Fixed-2
    - External Loads:** Force-2 (Per item: 20 N)

The right-hand panel, titled "SolidWorks SimulationXpress", shows the simulation progress:

- 1 Fixtures ✓
- 2 Loads ✓
- 3 Material** ✓
- 4 Run
- 5 Results
- 6 Optimize

The material assigned to this part is:

**ABS**

**Young's Modulus:**  
 $2e+009 \text{ N/m}^2$

**Yield Strength:**  
 $4.4e+007 \text{ N/m}^2$

Buttons: Change material, Next, Back, Start Over

The bottom status bar indicates "Editing Part" and "MMGS". The Windows taskbar at the bottom shows the system time as 12:52 on 9-2-2015.

# Doorbuiging

Model name: Klepje  
Study name: SimulationXpress Study(-variant 6-)  
Plot type: Static displacement Displacement  
Deformation scale: 3.92657

Benodigde verplaatsing  
1,5 mm

URES (mm)

2.966e+000
2.719e+000
2.472e+000
2.225e+000
1.978e+000
1.730e+000
1.483e+000
1.236e+000
9.888e-001
7.416e-001
4.944e-001
2.472e-001
1.000e-030

1 Fictures ✓  
2 Loads ✓  
3 Material ✓  
4 Run ✓  
5 Results ✓  
6 Optimize ✓

Results

- Show von Mises stress
- Show displacement
- Show where factor of safety (FOS) is below:

Based on the specified parameters, the lowest factor of safety(FOS) found in your design is 1.29273

Use these controls to view the animation.

- Play animation
- Stop animation
- Done viewing results

Back Start Over

Model | Motion Study 1 | SimulationXpress Study

SolidWorks Student Edition - Academic Use Only

Editing Part MMGS

0:27  
10-2-2015

# Max stress

Model name: Klepje  
Study name: SimulationXpress Study(-variant 6-)  
Plot type: Static nodal stress Stress  
Deformation scale: 3.92657

## Yield strenght 45 MPA

von Mises (N/m<sup>2</sup>)

3.481e+007

3.191e+007

2.901e+007

2.611e+007

2.321e+007

2.031e+007

1.740e+007

1.450e+007

1.160e+007

8.702e+006

5.802e+006

2.901e+006

4.181e+000

→ Yield strength 4.500e+007

1 Fixtures ✓  
2 Loads ✓  
3 Material ✓  
4 Run ✓  
5 Results ✓  
6 Optimize ✓

Results

- Show von Mises stress
- Show displacement
- Show where factor of safety (FOS) is below:

Based on the specified parameters, the lowest factor of safety(FOS) found in your design is 1.29273

Use these controls to view the animation.

- Play animation
- Stop animation
- Done viewing results

Back Start Over

SolidWorks Student Edition - Academic Use Only

0:27  
10-2-2015

# FOS

**SOLIDWORKS** File Edit View Insert Tools Window Help

Model name: Klepje  
Study name: SimulationXpress Study(-variant 6-)  
Plot type: Factor of Safety Factor of Safety  
Criterion : Max von Mises Stress  
Red < FOS = 1 < Blue

**SimulationXpress Study (-variant 6-)**  
Klepje (-ABS-)  
Fixtures  
Fixed-2  
External Loads  
Force-2 (Per item: 10 N)  
Results

**SimulationXpress Results**

- 1 Fixtures ✓
- 2 Loads ✓
- 3 Material ✓
- 4 Run ✓
- 5 Results ✓
- 6 Optimize ✓

Results

- Show von Mises stress
- Show displacement
- Show where factor of safety (FOS) is below:

Based on the specified parameters, the lowest factor of safety(FOS) found in your design is 1.29273

Use these controls to view the animation.

- Play animation
- Stop animation
- Done viewing results

Back Start Over

SolidWorks Student Edition - Academic Use Only

Editing Part MMGS 0:29 10-2-2015



# Conclusie

- ▣ Het klepje is sterk genoeg om de benodigde kracht te ontvangen die de klikvinger nodig heeft om ver genoeg te buigen.

# Toleranties

Nominaal maatgebied											
over	0	1	3	6	10	15	22	30	40	53	70
up to	1	3	6	10	15	22	30	40	53	70	90
A	$\pm 0.18$	$\pm 0.19$	$\pm 0.20$	$\pm 0.21$	$\pm 0.23$	$\pm 0.25$	$\pm 0.27$	$\pm 0.30$	$\pm 0.34$	$\pm 0.38$	$\pm 0.44$
B	$\pm 0.08$	$\pm 0.09$	$\pm 0.10$	$\pm 0.11$	$\pm 0.13$	$\pm 0.15$	$\pm 0.17$	$\pm 0.20$	$\pm 0.24$	$\pm 0.28$	$\pm 0.34$

over	90	120	160	200	250	315	400	500	630	800
up to	120	160	200	250	315	400	500	630	800	1000
A	$\pm 0.51$	$\pm 0.60$	$\pm 0.70$	$\pm 0.90$	$\pm 1.10$	$\pm 1.30$	$\pm 1.60$	$\pm 2.00$	$\pm 2.50$	$\pm 3.00$
B	$\pm 0.41$	$\pm 0.50$	$\pm 0.60$	$\pm 0.80$	$\pm 1.00$	$\pm 1.20$	$\pm 1.50$	$\pm 1.90$	$\pm 2.40$	$\pm 2.90$

