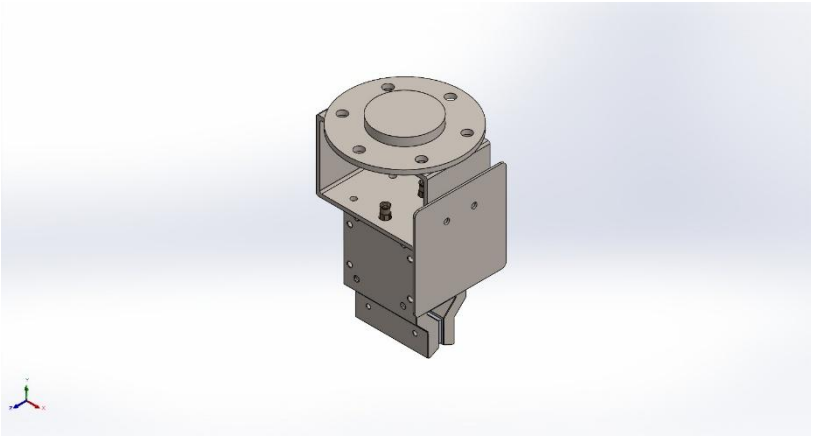


# Simulation of EndEffector(1 Gripper)_v1.1

**Date:** 16 January 2025
**Designer:** Solidworks
**Study name:** Static 2
**Analysis type:** Static

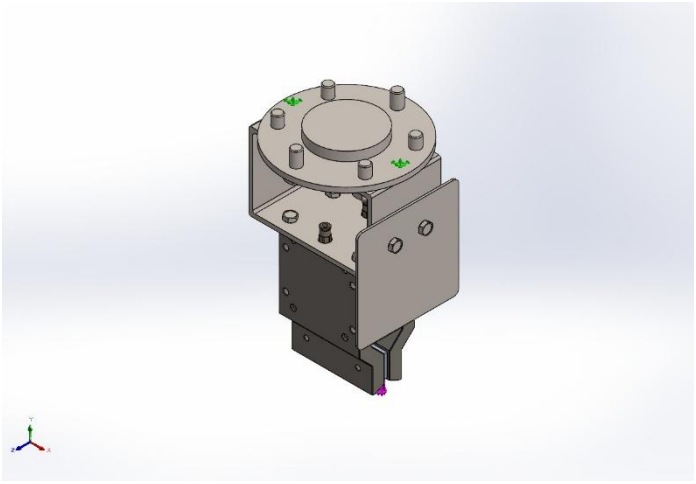
## Table of Contents



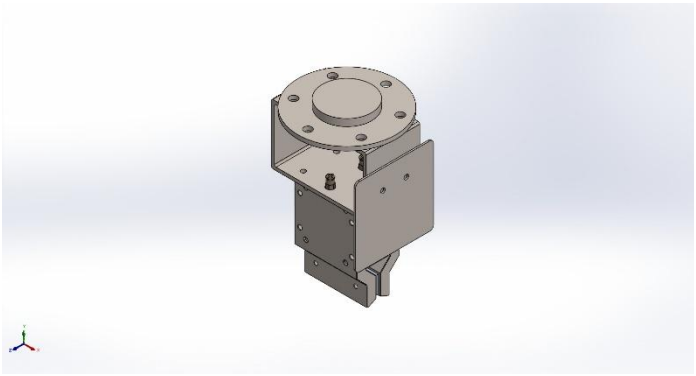
## Description

No Data

## Assumptions

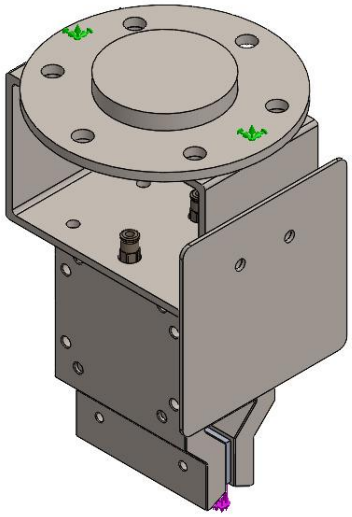


Original Model



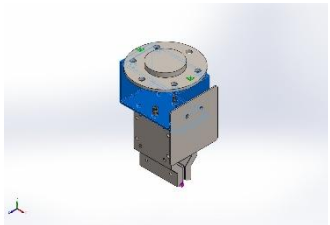
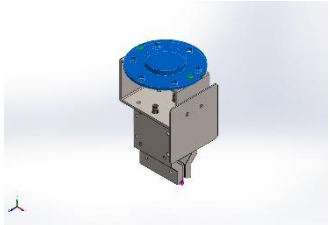
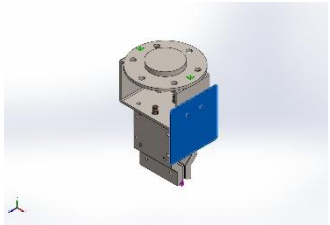
Model Analyzed

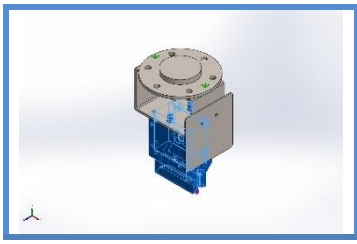
## Model Information



**Model name:** EndEffector(1 Gripper)_v1.1
**Current Configuration:** Default

## Solid Bodies

| Document Name and Reference | Treated As | Volumetric Properties | Document Path/Date Modified |
|---|---|---|---|
| Fillet3  | Solid Body | **Mass:0.818301 kg**<br>**Volume:0.000102288 m^3**<br>**Density:8,000 kg/m^3**<br>**Weight:8.01935 N** | **C:\Users\maxit\Desktop\Master\ROBO.666\CAD\End Effector\2 tool\v1.1\EndEffector(1Gripper)_v1.1_Angle.SLDPRT**<br>Jan 3 13:48:46 2025 |
| CirPattern1  | Solid Body | **Mass:0.696466 kg**<br>**Volume:8.70582e-05 m^3**<br>**Density:8,000 kg/m^3**<br>**Weight:6.82537 N** | **C:\Users\maxit\Desktop\Master\ROBO.666\CAD\End Effector\2 tool\v1.1\EndEffector(1Gripper)_v1.1_Flange.SLDPRT**<br>Jan 3 10:35:46 2025 |
| Fillet1  | Solid Body | **Mass:0.158752 kg**<br>**Volume:1.9844e-05 m^3**<br>**Density:8,000 kg/m^3**<br>**Weight:1.55577 N** | **C:\Users\maxit\Desktop\Master\ROBO.666\CAD\End Effector\2 tool\v1.1\EndEffector(1Gripper)_v1.1_PushPlate.SLDPRT**<br>Jan 3 10:35:47 2025 |
| Imported1 | Solid Body | **Mass:3.20251 kg**<br>**Volume:0.000400314 m^3**<br>**Density:8,000 kg/m^3**<br>**Weight:31.3846 N** | **C:\Users\maxit\Desktop\Master\ROBO.666\CAD\End Effector\MRP-20NK_3d-** |

| | | | |
|---|---|---|---|
|  | | | **model\MRP-20NK 3d-model.SLDPRT**<br>Oct 16 18:01:32 2024 |

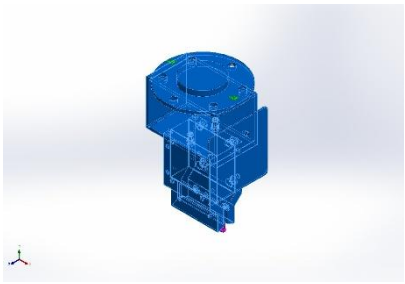
## Study Properties

| | |
|---|---|
| **Study name** | Static 2 |
| **Analysis type** | Static |
| **Mesh type** | Solid Mesh |
| **Thermal Effect:** | On |
| **Thermal option** | Include temperature loads |
| **Zero strain temperature** | 298 Kelvin |
| **Include fluid pressure effects from SOLIDWORKS Flow Simulation** | Off |
| **Solver type** | Automatic |
| **Inplane Effect:** | Off |
| **Soft Spring:** | Off |
| **Inertial Relief:** | Off |
| **Incompatible bonding options** | Automatic |
| **Large displacement** | Off |
| **Compute free body forces** | On |
| **Friction** | Off |
| **Use Adaptive Method:** | Off |
| **Result folder** | SOLIDWORKS document (C:\Users\maxit\Desktop\Master\ROBO.666\CAD\End Effector\2 tool\v1.1) |

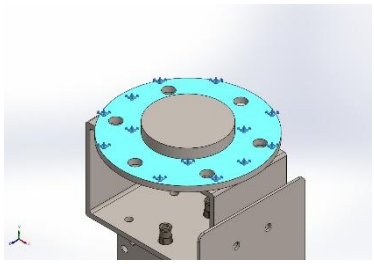
## Units

| | |
|---|---|
| **Unit system:** | SI (MKS) |
| **Length/Displacement** | mm |
| **Temperature** | Kelvin |
| **Angular velocity** | Rad/sec |
| **Pressure/Stress** | N/mm^2 (MPa) |

## Material Properties

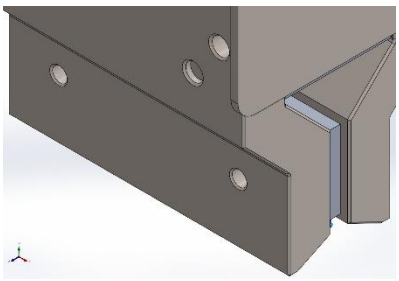
| Model Reference | Properties | Components |
|---|---|---|
|  | **Name:** AISI 316 Stainless Steel Sheet (SS)<br>**Model type:** Linear Elastic Isotropic<br>**Default failure criterion:** Max von Mises Stress<br>**Yield strength:** 172.369 N/mm^2<br>**Tensile strength:** 580 N/mm^2<br>**Elastic modulus:** 193,000 N/mm^2<br>**Poisson's ratio:** 0.27<br>**Mass density:** 8 g/cm^3<br>**Thermal expansion coefficient:** 1.6e-05 /Kelvin | SolidBody 1(Ø6.0 (Fillet3)(EndEffector(1Gripper)_v1.1_Angle-1), SolidBody 1(CirPattern1)(EndEffector(1 Gripper)_v1.1_Flange-1), SolidBody 1(Fillet1)(EndEffector(1Gripper)_v1.1_PushPlate-1), SolidBody 1(Imported1)(MRP-20NK 3d-model-1) |
| Curve Data:N/A | | |

## Loads and Fixtures

| Fixture name | Fixture Image | Fixture Details |
|---|---|---|
| Fixed-1 |  | **Entities:** 1 face(s)<br>**Type:** Fixed Geometry |

**Resultant Forces**

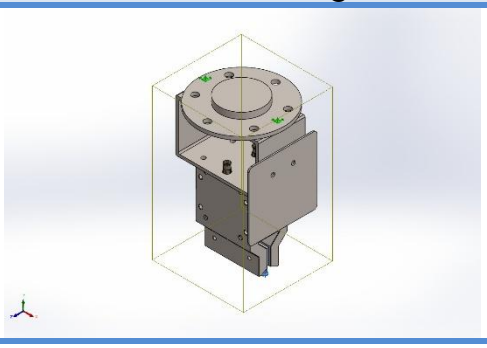
| Components | X | Y | Z | Resultant |
|---|---|---|---|---|
| Reaction force(N) | -0.000782201 | 330.004 | 0.000882256 | 330.004 |
| Reaction Moment(N.m) | 0 | 0 | 0 | 0 |

| Load name | Load Image | Load Details |
|---|---|---|
| Force-2 |  | **Entities:** 1 face(s)<br>**Type:** Apply normal force<br>**Value:** -330 N |

## Connector Definitions

No Data

## Interaction Information

| Interaction | Interaction Image | Interaction Properties |
|---|---|---|
| Global Interaction |  | **Type:** Bonded<br>**Components:** 1 component(s)<br>**Options:** Independent mesh |

## Mesh information

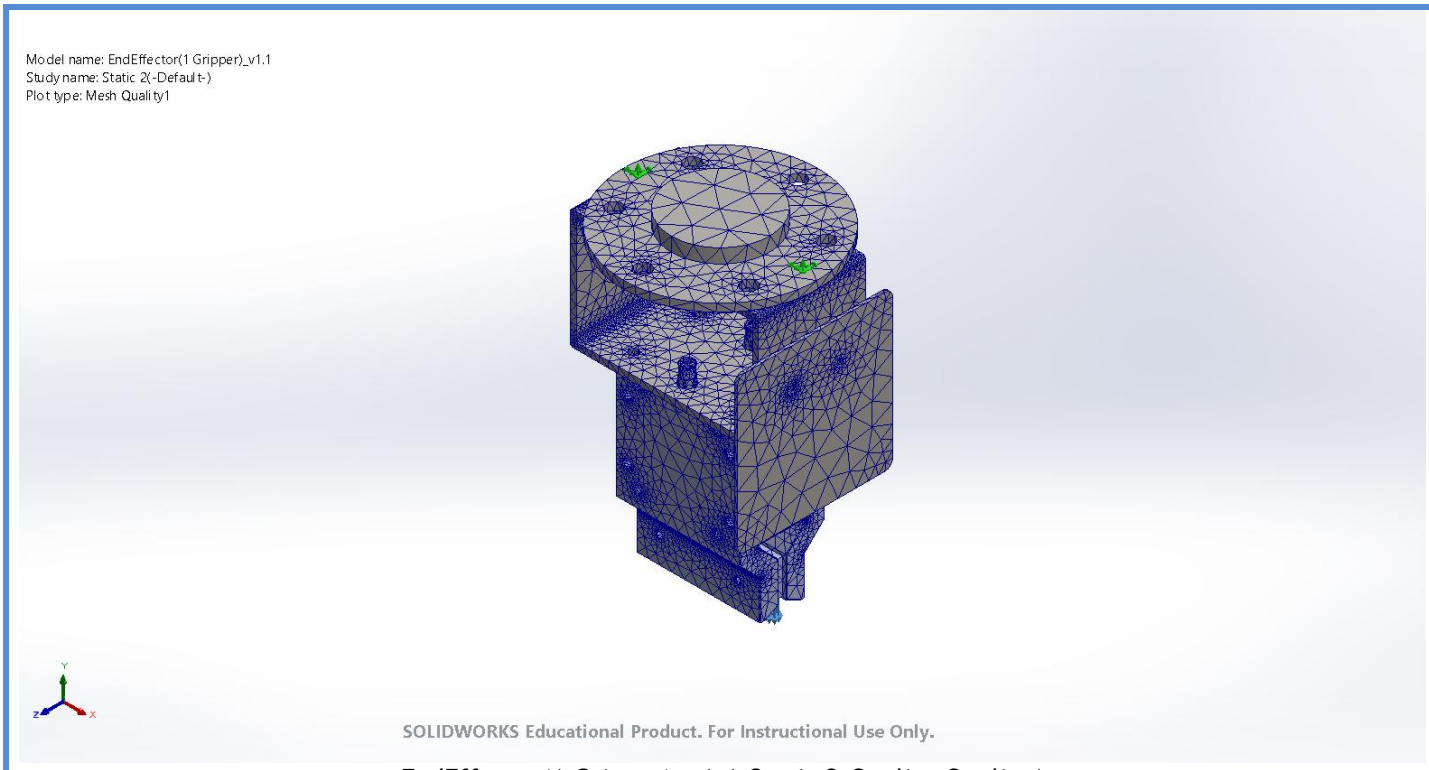
| | |
|---|---|
| **Mesh type** | Solid Mesh |
| **Mesher Used:** | Blended curvature-based mesh |
| **Jacobian points for High quality mesh** | 16 Points |
| **Maximum element size** | 17.1627 mm |
| **Minimum element size** | 0.858136 mm |
| **Mesh Quality** | High |
| **Remesh failed parts independently** | Off |
| **Reuse mesh for identical parts in an assembly (Blended curvature-based mesher only)** | Off |

## Mesh information - Details

| | |
|---|---|
| **Total Nodes** | 156551 |
| **Total Elements** | 98801 |
| **Maximum Aspect Ratio** | 160.87 |
| **% of elements with Aspect Ratio < 3** | 93.6 |
| **Percentage of elements with Aspect Ratio > 10** | 0.778 |
| **Percentage of distorted elements** | 0 |
| **Time to complete mesh(hh;mm;ss):** | 00:00:11 |
| **Computer name:** | |

## Mesh Quality Plots

| Name | Type | Min | Max |
|---|---|---|---|
| Quality1 | Mesh | - | - |




EndEffector(1 Gripper)_v1.1-Static 2-Quality-Quality1

## Sensor Details

No Data

## Resultant Forces

### Reaction forces

| Selection set | Units | Sum X | Sum Y | Sum Z | Resultant |
|---|---|---|---|---|---|
| Entire Model | N | -0.000782201 | 330.004 | 0.000882256 | 330.004 |

### Reaction Moments

| Selection set | Units | Sum X | Sum Y | Sum Z | Resultant |
|---|---|---|---|---|---|
| Entire Model | N.m | 0 | 0 | 0 | 0 |

### Free body forces

| Selection set | Units | Sum X | Sum Y | Sum Z | Resultant |
|---|---|---|---|---|---|
| Entire Model | N | -0.0350005 | -0.115992 | 0.0932249 | 0.152873 |

### Free body moments

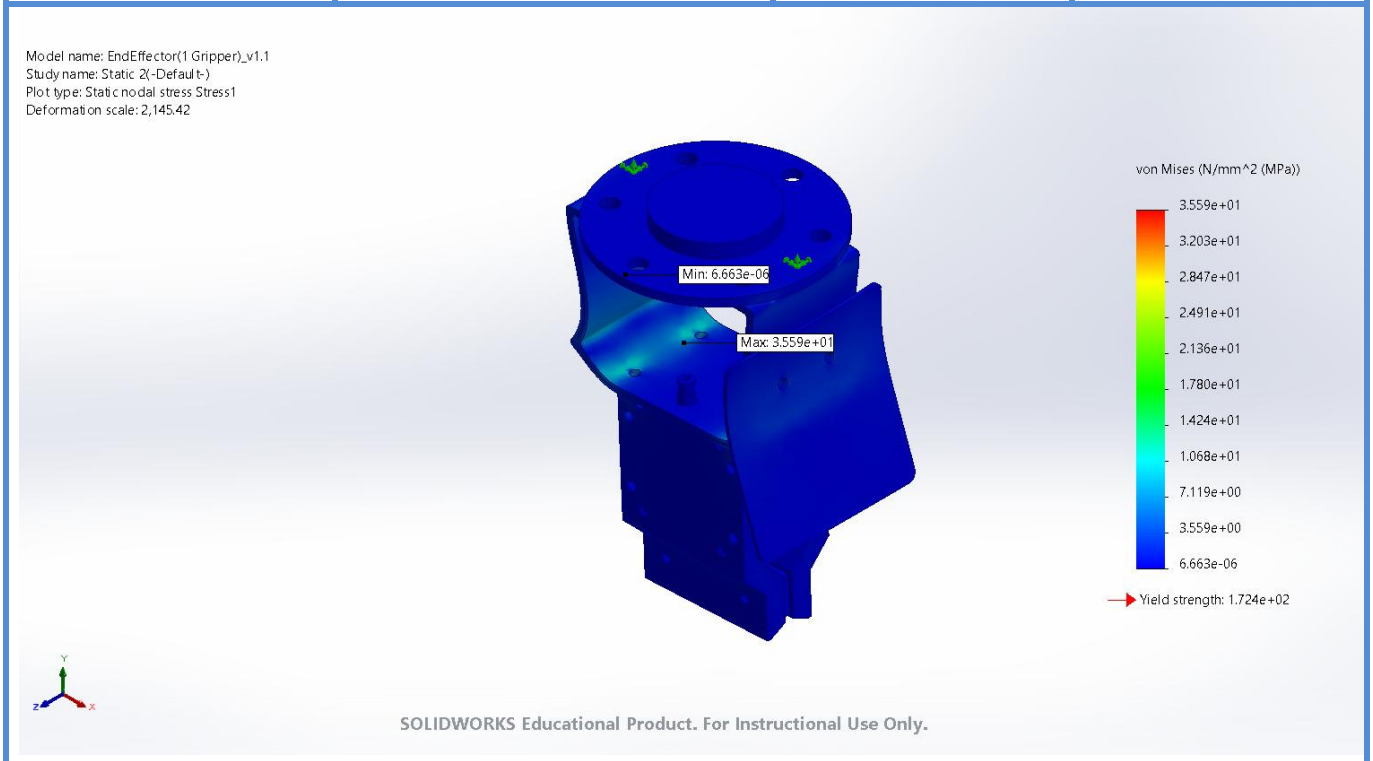
| Selection set | Units | Sum X | Sum Y | Sum Z | Resultant |
|---|---|---|---|---|---|
| Entire Model | N.m | 0 | 0 | 0 | 1e-33 |

## Beams

No Data

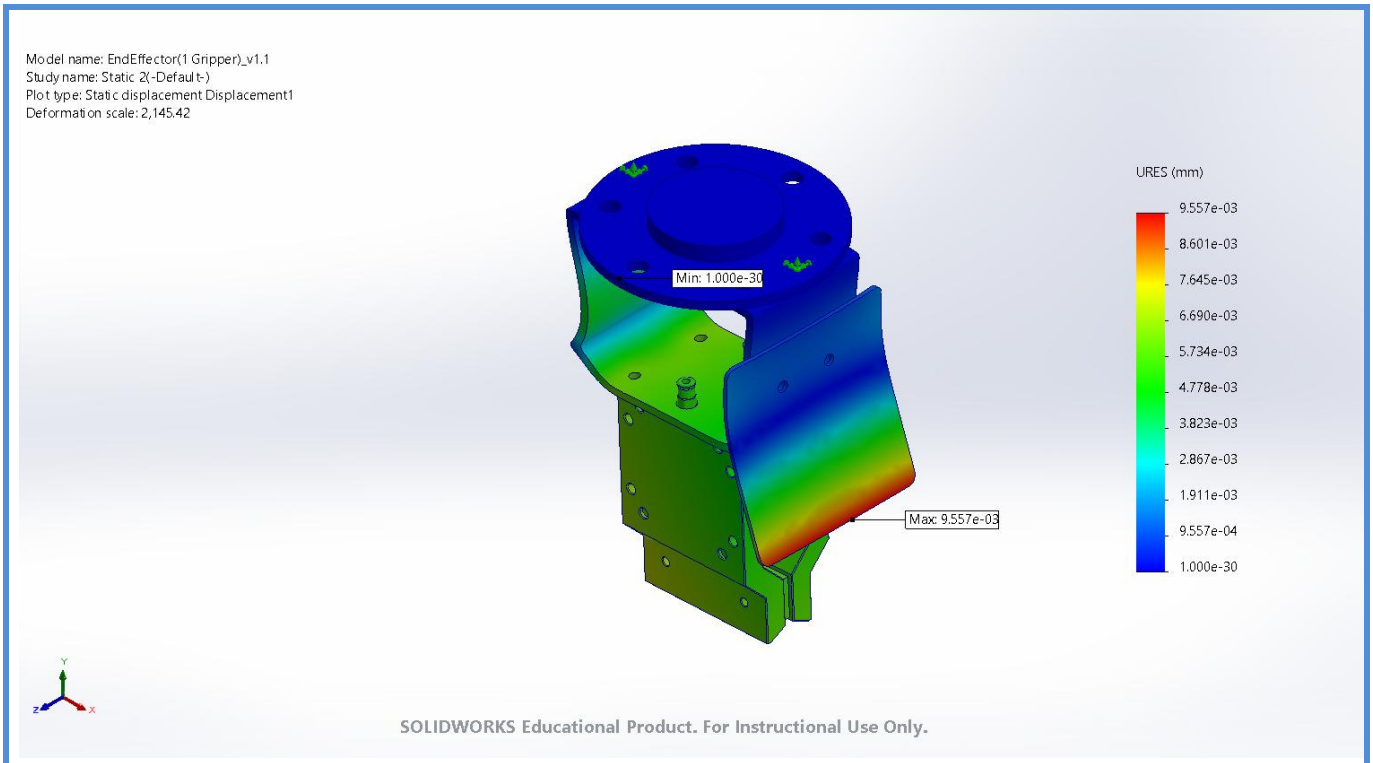
## Study Results

| Name | Type | Min | Max |
|---|---|---|---|
| Stress1 | VON: von Mises Stress | 6.663e-06N/mm^2 (MPa)<br>Node: 41665 | 3.559e+01N/mm^2 (MPa)<br>Node: 70963 |



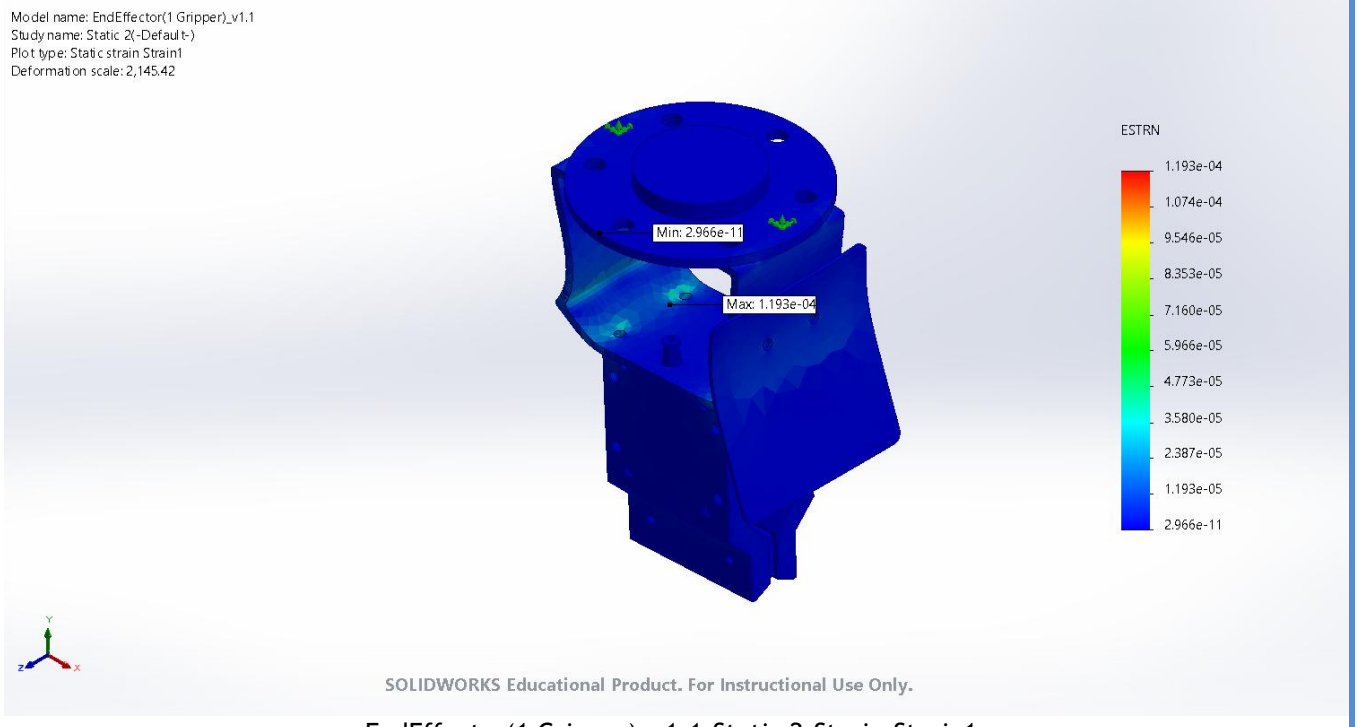

EndEffector(1 Gripper)_v1.1-Static 2-Stress-Stress1

| Name | Type | Min | Max |
|---|---|---|---|
| Displacement1 | URES: Resultant Displacement | 0.000e+00mm<br>Node: 38395 | 9.557e-03mm<br>Node: 44212 |



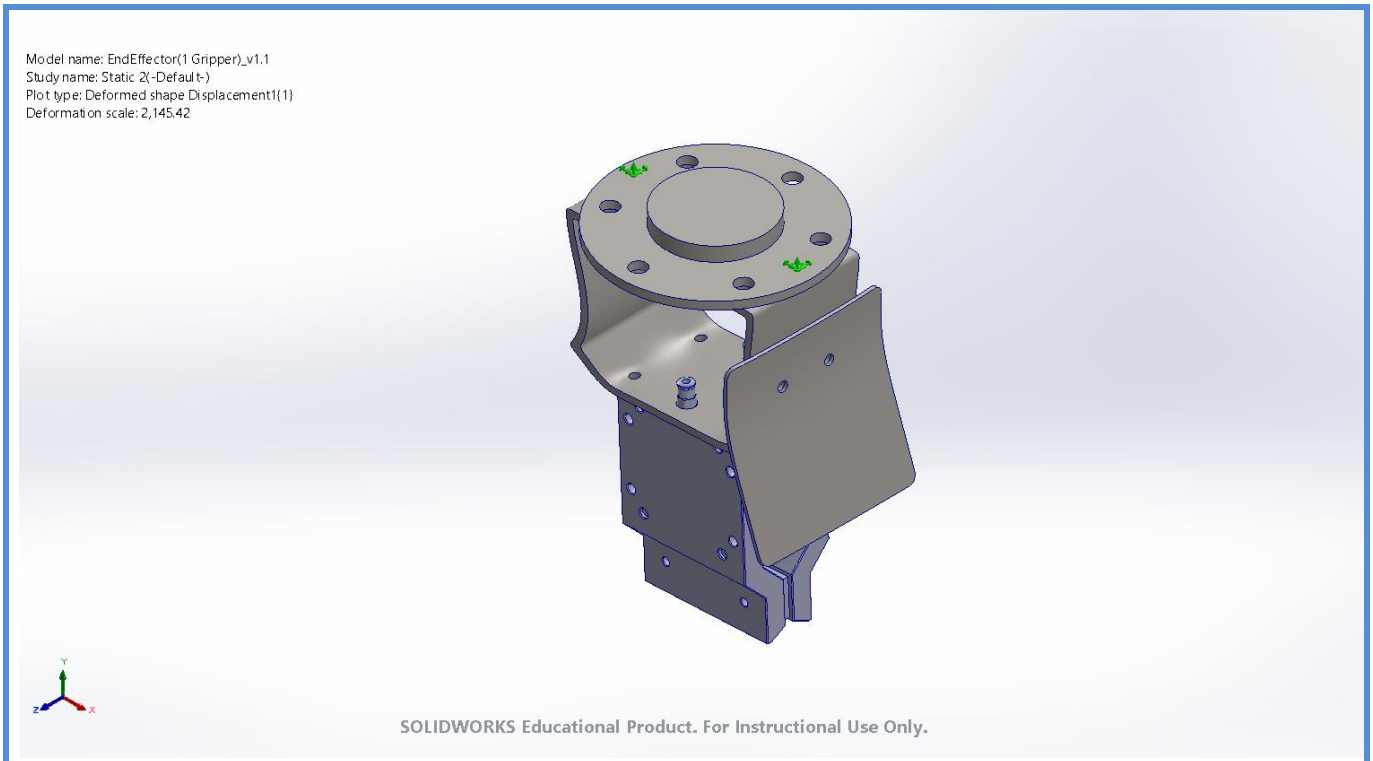

EndEffector(1 Gripper)_v1.1-Static 2-Displacement-Displacement1

| Name | Type | Min | Max |
|---|---|---|---|
| Strain1 | ESTRN: Equivalent Strain | 2.966e-11<br>Element: 23828 | 1.193e-04<br>Element: 55349 |




EndEffector(1 Gripper)_v1.1-Static 2-Strain-Strain1

| Name | Type |
|---|---|
| Displacement1{1} | Deformed shape |




EndEffector(1 Gripper)_v1.1-Static 2-Displacement-Displacement1{1}

## Conclusion