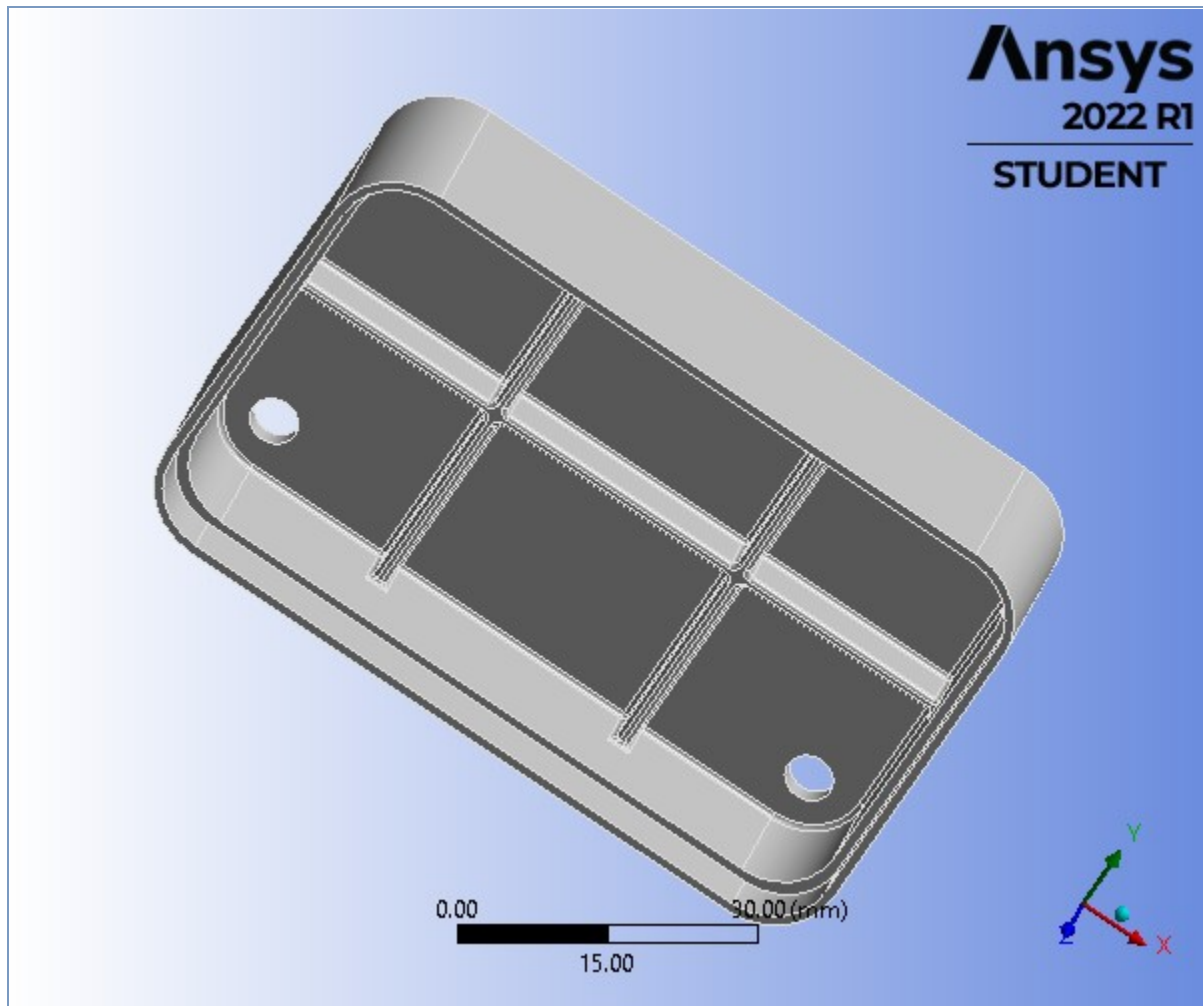




## Project\*

First Saved	Tuesday, July 5, 2022
Last Saved	Tuesday, July 5, 2022
Product Version	2022 R1
Save Project Before Solution	No
Save Project After Solution	No



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## Units

**TABLE 1**

Unit System	Metric (mm, kg, N, s, mV, mA) Degrees rad/s Celsius
Angle	Degrees
Rotational Velocity	rad/s
Temperature	Celsius

## Model (A4)

**TABLE 2**

**Model (A4) > Geometry Imports**

Object Name	<i>Geometry Imports</i>
State	Solved

**TABLE 3**

**Model (A4) > Geometry Imports > Geometry Import (A3)**

Object Name	<i>Geometry Import (A3)</i>
State	Solved
<b>Definition</b>	
Source	D:\CURSO-ANSYS\Mechanical-Linear\Modulo2\Inputfile_Mechanical_Modulo2\Cap_fillet.stp
Type	Step
<b>Basic Geometry Options</b>	
Solid Bodies	Yes
Surface Bodies	Yes

Line Bodies	No
Parameters	Independent
Parameter Key	ANS;DS
Attributes	No
Attribute Key	SDFEA;DDM
Named Selections	No
Named Selection Key	NS
Material Properties	No
<b>Advanced Geometry Options</b>	
Use Associativity	Yes
Coordinate Systems	No
Coordinate System Key	
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Compare Parts Tolerance	Tight
Analysis Type	3-D
Mixed Import Resolution	None
Import Facet Quality	Source
Clean Bodies On Import	No
Stitch Surfaces On Import	Program Tolerance
Stitch Tolerance	0.0000001
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

## Geometry

**TABLE 4**  
**Model (A4) > Geometry**

Object Name	<i>Geometry</i>
State	Fully Defined
<b>Definition</b>	
Source	D:\CURSO-ANSYS\Mechanical-Linear\Modulo2\Inputfile_Mechanical_Modulo2\Cap_fillet.stp
Type	Step
Length Unit	Meters
Element Control	Program Controlled
Display Style	Body Color
<b>Bounding Box</b>	
Length X	80. mm
Length Y	50. mm
Length Z	20. mm
<b>Properties</b>	
Volume	19817 mm <sup>3</sup>
Mass	0.15557 kg
Scale Factor Value	1.
<b>Statistics</b>	
Bodies	1
Active Bodies	1
Nodes	23385

Elements	12634
Mesh Metric	None
<b>Update Options</b>	
Assign Default Material	No
<b>Basic Geometry Options</b>	
Solid Bodies	Yes
Surface Bodies	Yes
Line Bodies	No
Parameters	Independent
Parameter Key	ANS;DS
Attributes	No
Named Selections	No
Material Properties	No
<b>Advanced Geometry Options</b>	
Use Associativity	Yes
Coordinate Systems	No
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Analysis Type	3-D
Mixed Import Resolution	None
Import Facet Quality	Source
Clean Bodies On Import	No
Stitch Surfaces On Import	Program Tolerance
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

**TABLE 5**  
**Model (A4) > Geometry > Parts**

Object Name	Cap_fillet-FreeParts 1
State	Meshed
<b>Graphics Properties</b>	
Visible	Yes
Transparency	1
<b>Definition</b>	
Suppressed	No
Stiffness Behavior	Flexible
Coordinate System	Default Coordinate System
Reference Temperature	By Environment
Treatment	None
<b>Material</b>	
Assignment	Structural Steel
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
<b>Bounding Box</b>	
Length X	80. mm
Length Y	50. mm
Length Z	20. mm
<b>Properties</b>	
Volume	19817 mm <sup>3</sup>

Mass	0.15557 kg
Centroid X	39.995 mm
Centroid Y	25.016 mm
Centroid Z	4.9514 mm
Moment of Inertia Ip1	46.583 kg·mm <sup>2</sup>
Moment of Inertia Ip2	101.06 kg·mm <sup>2</sup>
Moment of Inertia Ip3	139.69 kg·mm <sup>2</sup>
<b>Statistics</b>	
Nodes	23385
Elements	12634
Mesh Metric	None

**TABLE 6**  
**Model (A4) > Materials**

Object Name	<i>Materials</i>
State	Fully Defined
<b>Statistics</b>	
Materials	2
Material Assignments	0

## Coordinate Systems

**TABLE 7**  
**Model (A4) > Coordinate Systems > Coordinate System**

Object Name	<i>Global Coordinate System</i>
State	Fully Defined
<b>Definition</b>	
Type	Cartesian
Coordinate System ID	0.
<b>Origin</b>	
Origin X	0. mm
Origin Y	0. mm
Origin Z	0. mm
<b>Directional Vectors</b>	
X Axis Data	[ 1. 0. 0. ]
Y Axis Data	[ 0. 1. 0. ]
Z Axis Data	[ 0. 0. 1. ]

## Mesh

**TABLE 8**  
**Model (A4) > Mesh**

Object Name	<i>Mesh</i>
State	Solved
<b>Display</b>	
Display Style	Use Geometry Setting
<b>Defaults</b>	
Physics Preference	Mechanical
Element Order	Program Controlled
Element Size	Default
<b>Sizing</b>	
Use Adaptive Sizing	Yes

Resolution	Default (2)
Mesh Defeaturing	Yes
Defeature Size	Default
Transition	Fast
Span Angle Center	Coarse
Initial Size Seed	Assembly
Bounding Box Diagonal	96.437 mm
Average Surface Area	103.26 mm <sup>2</sup>
Minimum Edge Length	0.5 mm
<b>Quality</b>	
Check Mesh Quality	Yes, Errors
Error Limits	Aggressive Mechanical
Target Element Quality	Default (5.e-002)
Smoothing	Medium
Mesh Metric	None
<b>Inflation</b>	
Use Automatic Inflation	None
Inflation Option	Smooth Transition
Transition Ratio	0.272
Maximum Layers	5
Growth Rate	1.2
Inflation Algorithm	Pre
View Advanced Options	No
<b>Advanced</b>	
Number of CPUs for Parallel Part Meshing	Program Controlled
Straight Sided Elements	No
Rigid Body Behavior	Dimensionally Reduced
Triangle Surface Mesher	Program Controlled
Topology Checking	Yes
Pinch Tolerance	Please Define
Generate Pinch on Refresh	No
<b>Statistics</b>	
Nodes	23385
Elements	12634

## Static Structural (A5)

**TABLE 9**  
**Model (A4) > Analysis**

Object Name	<i>Static Structural (A5)</i>
State	Solved
<b>Definition</b>	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	Mechanical APDL
<b>Options</b>	
Environment Temperature	22. °C
Generate Input Only	No

**TABLE 10**  
**Model (A4) > Static Structural (A5) > Analysis Settings**

Object Name	<i>Analysis Settings</i>
-------------	--------------------------

State	Fully Defined
<b>Step Controls</b>	
Number Of Steps	1.
Current Step Number	1.
Step End Time	1. s
Auto Time Stepping	Program Controlled
<b>Solver Controls</b>	
Solver Type	Program Controlled
Weak Springs	Off
Solver Pivot Checking	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Quasi-Static Solution	Off
<b>Rotordynamics Controls</b>	
Coriolis Effect	Off
<b>Restart Controls</b>	
Generate Restart Points	Program Controlled
Retain Files After Full Solve	No
Combine Restart Files	Program Controlled
<b>Nonlinear Controls</b>	
Newton-Raphson Option	Program Controlled
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Stabilization	Program Controlled
<b>Advanced</b>	
Inverse Option	No
Contact Split (DMP)	Off
<b>Output Controls</b>	
Stress	Yes
Surface Stress	No
Back Stress	No
Strain	Yes
Contact Data	Yes
Nonlinear Data	No
Nodal Forces	No
Volume and Energy	Yes
Euler Angles	Yes
General Miscellaneous	No
Contact Miscellaneous	No
Store Results At	All Time Points
Result File Compression	Program Controlled
<b>Analysis Data Management</b>	
Solver Files Directory	D:\CURSO-ANSYS\Mechanical-Linear\Modulo2\main_files\dp0\SYS\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save MAPDL db	No
Contact Summary	Program Controlled
Delete Unneeded Files	Yes
Nonlinear Solution	No

Solver Units	Active System
Solver Unit System	mm

**TABLE 11**  
**Model (A4) > Static Structural (A5) > Loads**

Object Name	Pressure	Frictionless Support	Frictionless Support 2
State	Fully Defined		
Scope			
Scoping Method	Geometry Selection		
Geometry	17 Faces	4 Faces	9 Faces
Definition			
Type	Pressure	Frictionless Support	
Define By	Normal To		
Applied By	Surface Effect		
Loaded Area	Deformed		
Magnitude	1.1 MPa (ramped)		
Suppressed	No		

## Solution (A6)

**TABLE 12**  
**Model (A4) > Static Structural (A5) > Solution**

Object Name	Solution (A6)
State	Solved
<b>Adaptive Mesh Refinement</b>	
Max Refinement Loops	1.
Refinement Depth	2.
<b>Information</b>	
Status	Done
MAPDL Elapsed Time	12. s
MAPDL Memory Used	367. MB
MAPDL Result File Size	8.4375 MB
<b>Post Processing</b>	
Beam Section Results	No
On Demand Stress/Strain	No

**TABLE 13**  
**Model (A4) > Static Structural (A5) > Solution (A6) > Solution Information**

Object Name	Solution Information
State	Solved
<b>Solution Information</b>	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Identify Element Violations	0
Update Interval	2.5 s
Display Points	All
<b>FE Connection Visibility</b>	
Activate Visibility	Yes
Display	All FE Connectors
Draw Connections Attached To	All Nodes
Line Color	Connection Type
Visible on Results	No

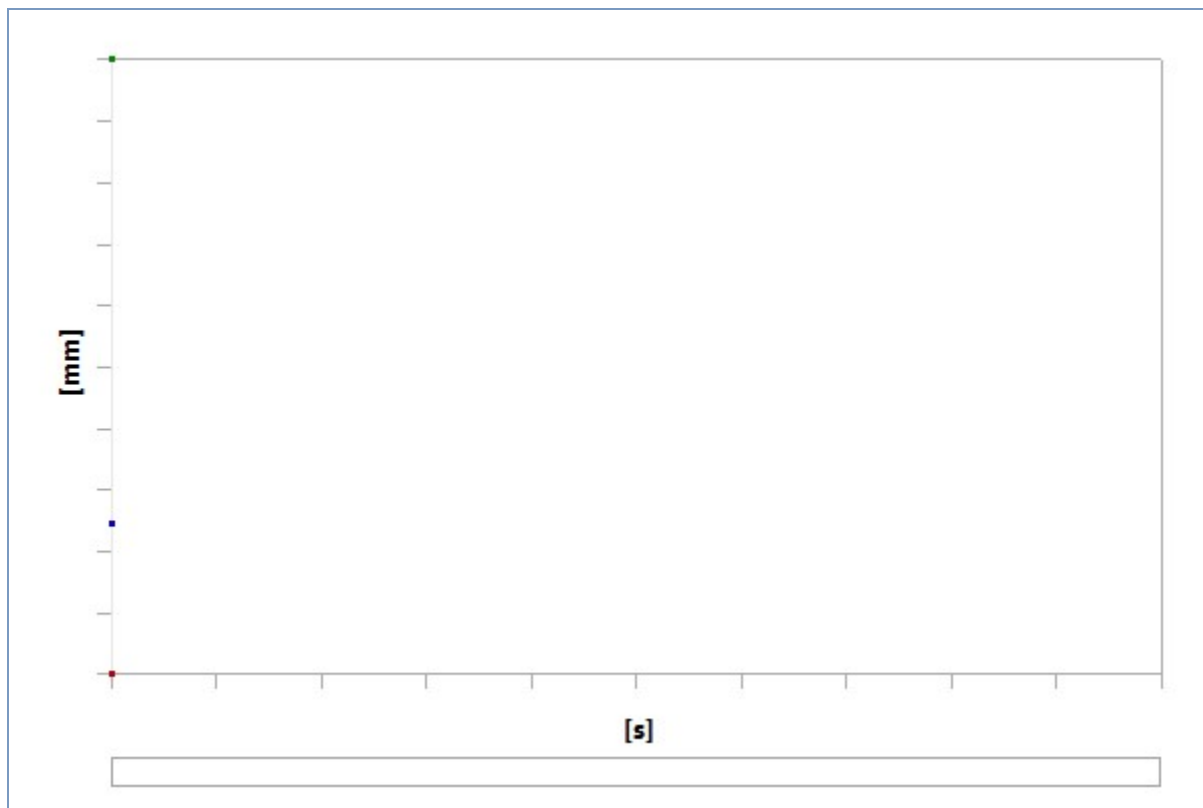


Line Thickness	Single
Display Type	Lines

**TABLE 14**  
**Model (A4) > Static Structural (A5) > Solution (A6) > Results**

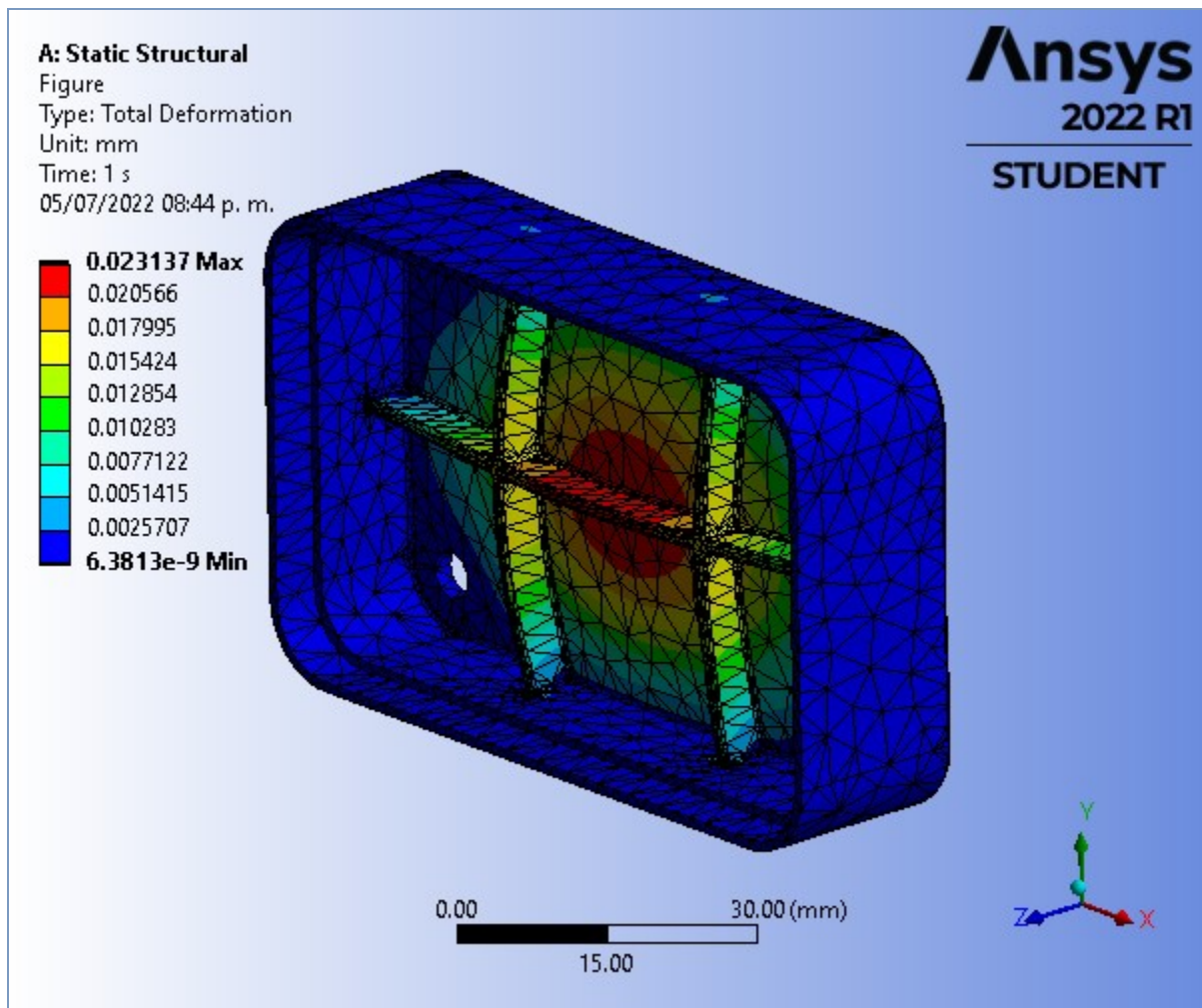
Object Name	Total Deformation	Equivalent Stress	Volume
State	Solved		
Scope			
Scoping Method	Geometry Selection		
Geometry	All Bodies		
Definition			
Type	Total Deformation	Equivalent (von-Mises) Stress	Volume
By	Time		
Display Time	First	Last	
Calculate Time History	Yes		
Identifier			
Suppressed	No		
Results			
Minimum	6.3813e-009 mm	0.12046 MPa	2.2297e-003 mm³
Maximum	2.3137e-002 mm	301.19 MPa	17.987 mm³
Average	5.6213e-003 mm	23.047 MPa	
Minimum Occurs On	Cap_fillet-Parts 1		
Maximum Occurs On	Cap_fillet-Parts 1		
Total			19822 mm³
Information			
Time	1. s		
Load Step	1		
Substep	1		
Iteration Number	1		
Integration Point Results			
Display Option		Averaged	
Average Across Bodies		No	

**FIGURE 1**  
**Model (A4) > Static Structural (A5) > Solution (A6) > Total Deformation**

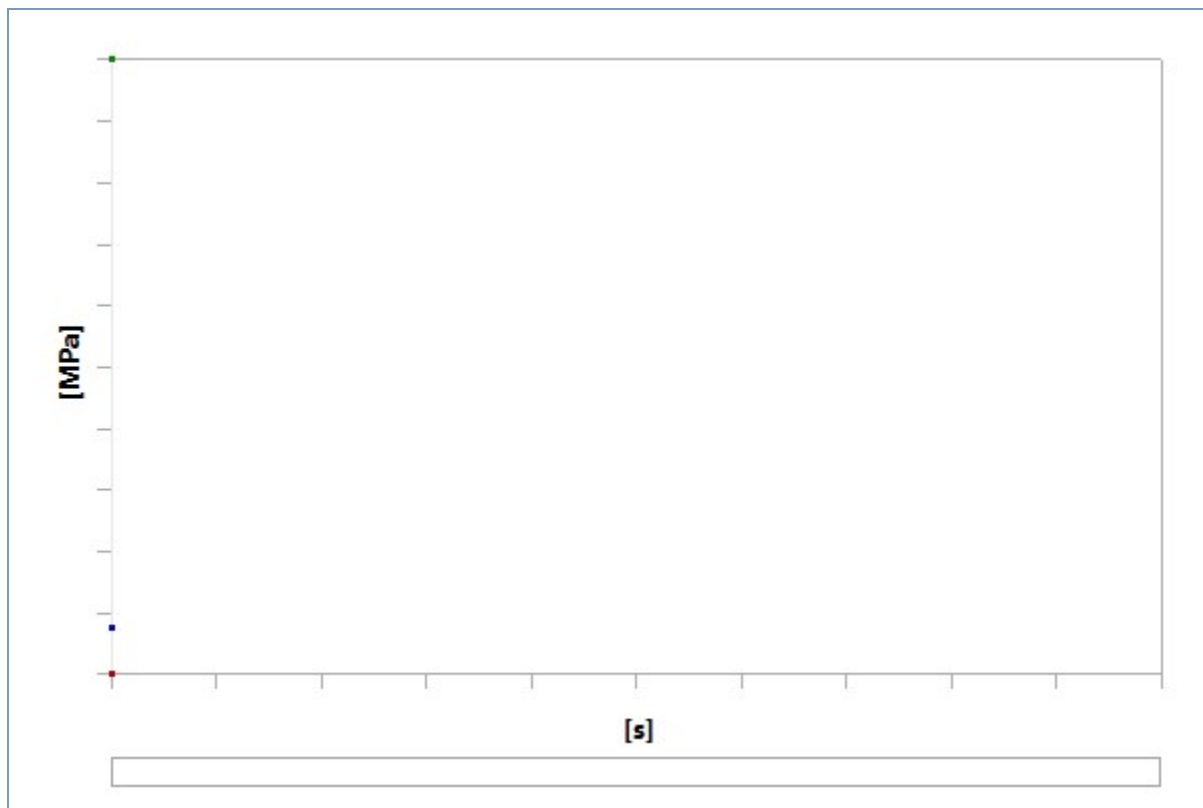
**TABLE 15****Model (A4) > Static Structural (A5) > Solution (A6) > Total Deformation**

Time [s]	Minimum [mm]	Maximum [mm]	Average [mm]
1.	6.3813e-009	2.3137e-002	5.6213e-003

**FIGURE 2****Model (A4) > Static Structural (A5) > Solution (A6) > Total Deformation > Figure  
Deformacion con 1.1 MPa**



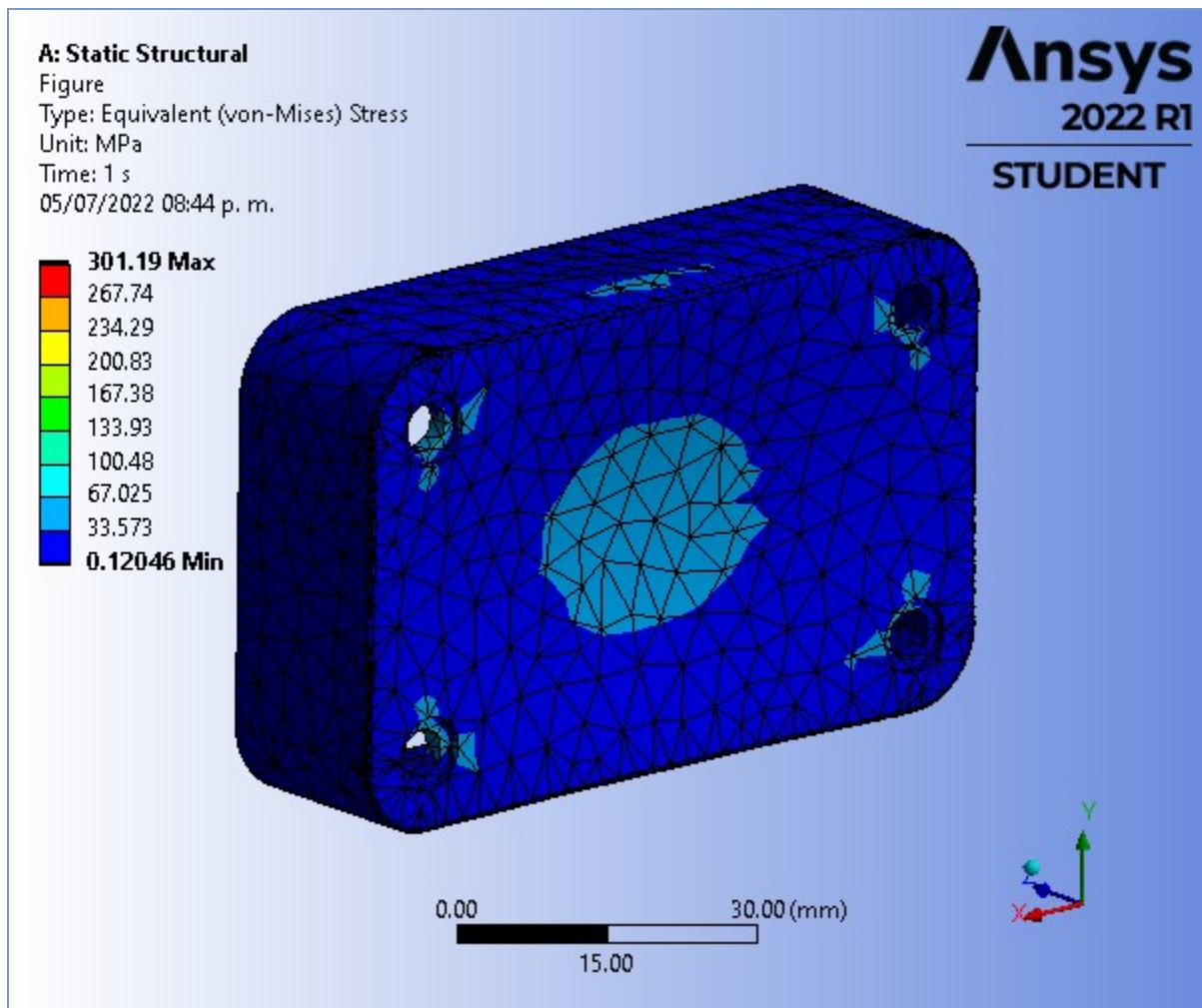
**FIGURE 3**  
**Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress**



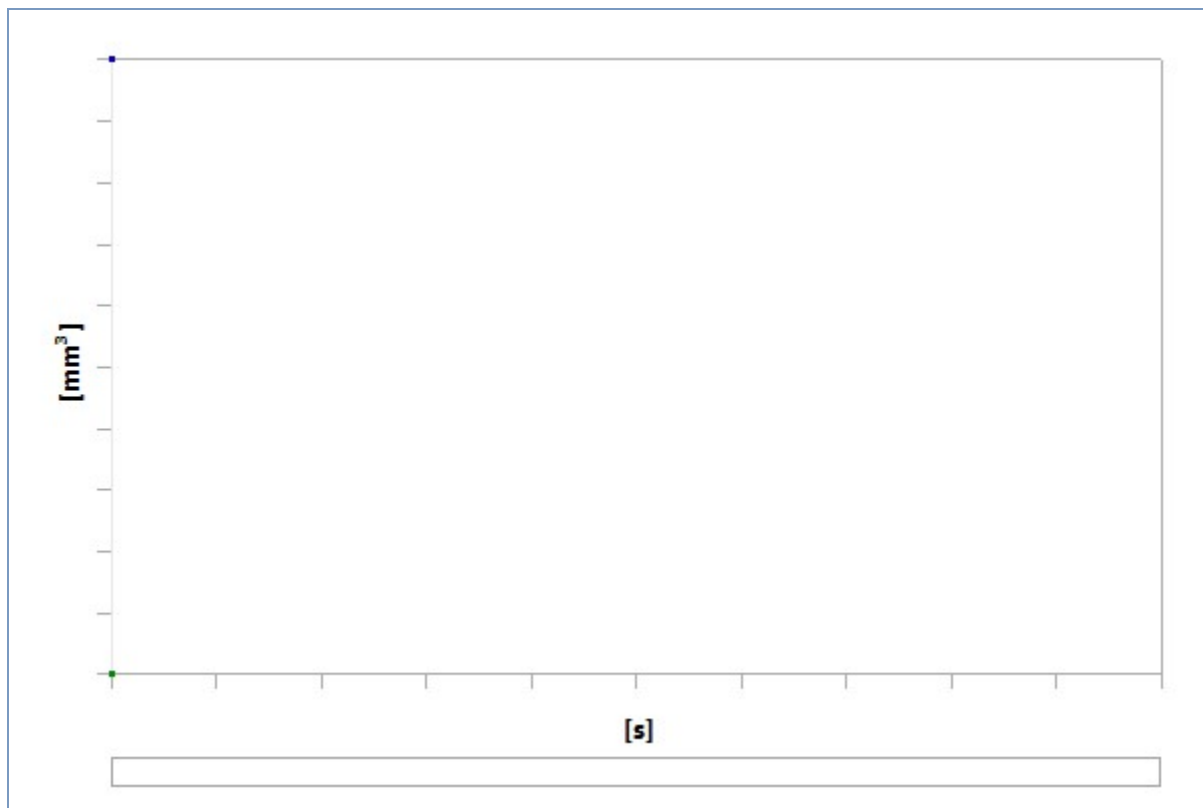
**TABLE 16**  
**Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress**

Time [s]	Minimum [MPa]	Maximum [MPa]	Average [MPa]
1.	0.12046	301.19	23.047

**FIGURE 4**  
**Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress > Figure**



**FIGURE 5**  
Model (A4) > Static Structural (A5) > Solution (A6) > Volume

**TABLE 17****Model (A4) > Static Structural (A5) > Solution (A6) > Volume**

Time [s]	Minimum [mm <sup>3</sup> ]	Maximum [mm <sup>3</sup> ]	Total [mm <sup>3</sup> ]
1.	2.2297e-003	17.987	19822

**TABLE 18****Model (A4) > Static Structural (A5) > Solution (A6) > Stress Safety Tools**

Object Name	<i>Stress Tool</i>
State	Solved
<b>Definition</b>	
Theory	Max Equivalent Stress
Stress Limit Type	Tensile Yield Per Material

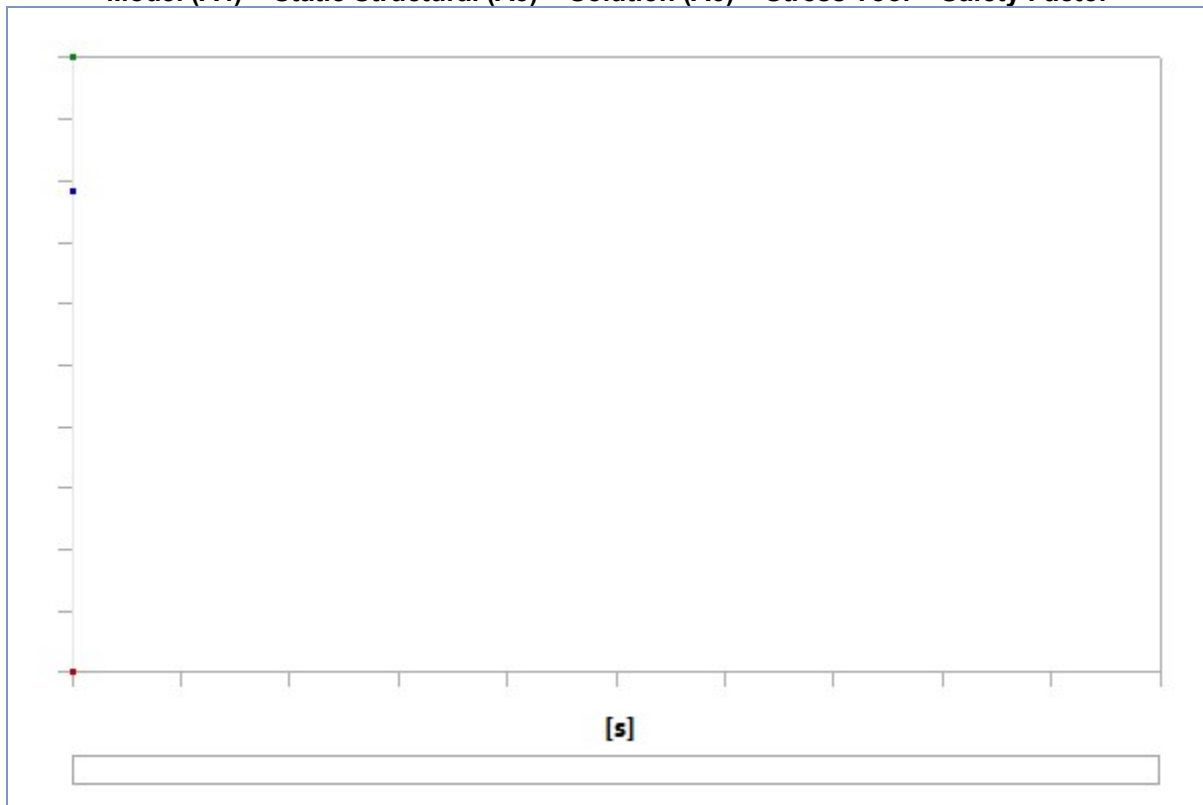
**TABLE 19****Model (A4) > Static Structural (A5) > Solution (A6) > Stress Tool > Results**

Object Name	<i>Safety Factor</i>
State	Solved
<b>Scope</b>	
Scoping Method	Geometry Selection
Geometry	All Bodies
<b>Definition</b>	
Type	Safety Factor
By	Time
Display Time	Last
Calculate Time History	Yes
Identifier	
Suppressed	No
<b>Integration Point Results</b>	

Display Option	Averaged
Average Across Bodies	No
<b>Results</b>	
Minimum	0.83004
Minimum Occurs On	Cap_fillets-FreeParts 1
<b>Information</b>	
Time	1. s
Load Step	1
Substep	1
Iteration Number	1

**FIGURE 6**

**Model (A4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Factor**

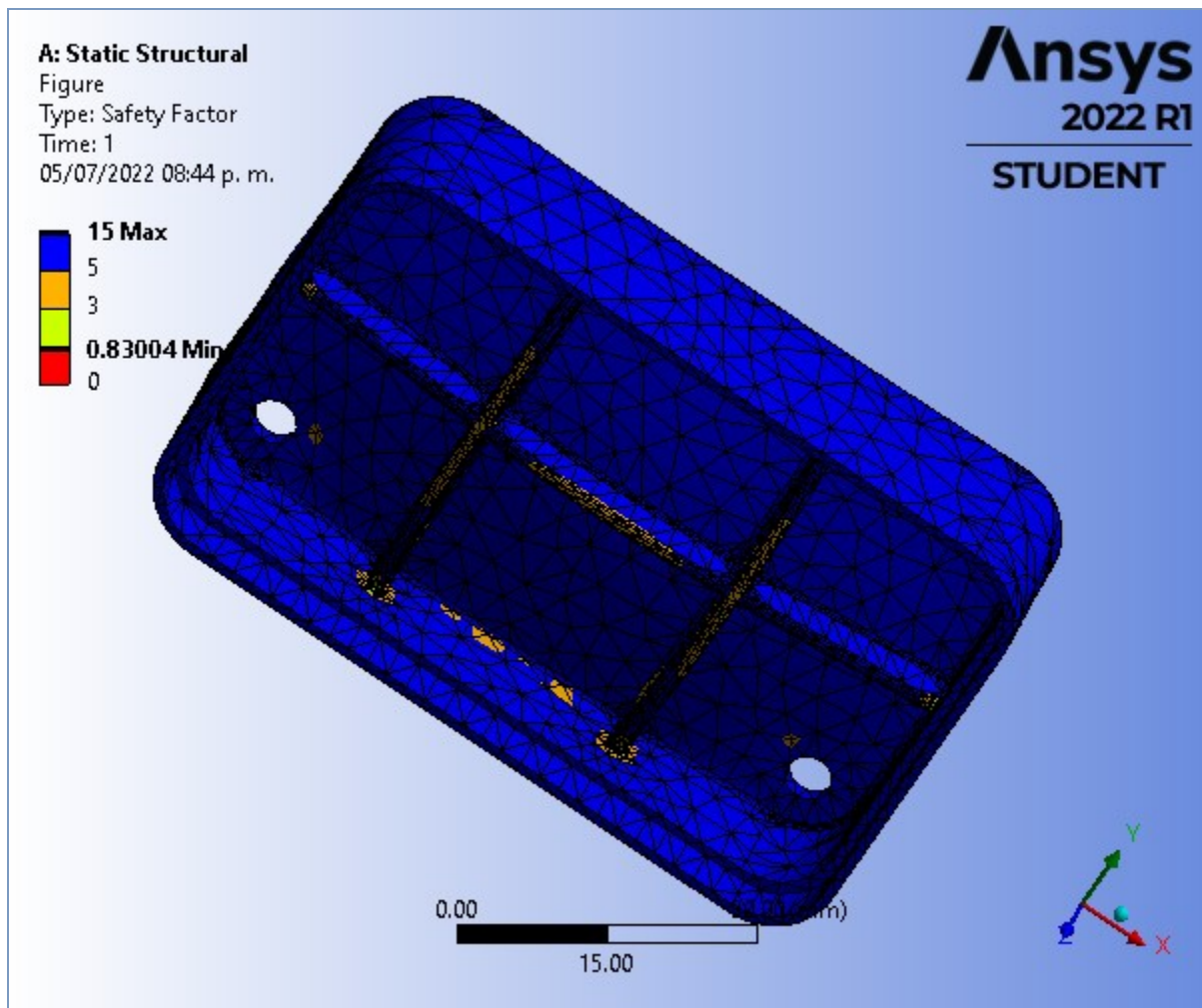
**TABLE 20**

**Model (A4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Factor**

Time [s]	Minimum	Maximum	Average
1.	0.83004	15.	11.92

**FIGURE 7**

**Model (A4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Factor > Figure**



## Material Data

### Structural Steel

**TABLE 21**  
**Structural Steel > Constants**

Density	7.85e-006 kg mm <sup>-3</sup>
Coefficient of Thermal Expansion	1.2e-005 C <sup>-1</sup>
Specific Heat	4.34e+005 mJ kg <sup>-1</sup> C <sup>-1</sup>
Thermal Conductivity	6.05e-002 W mm <sup>-1</sup> C <sup>-1</sup>
Resistivity	1.7e-004 ohm mm

**TABLE 22**  
**Structural Steel > Color**

Red	Green	Blue
132	139	179

**TABLE 23**  
**Structural Steel > Compressive Ultimate Strength**

Compressive Ultimate Strength MPa
0



**TABLE 24**  
**Structural Steel > Compressive Yield Strength**

Compressive Yield Strength MPa
250

**TABLE 25**  
**Structural Steel > Tensile Yield Strength**

Tensile Yield Strength MPa
250

**TABLE 26**  
**Structural Steel > Tensile Ultimate Strength**

Tensile Ultimate Strength MPa
460

**TABLE 27**  
**Structural Steel > Isotropic Secant Coefficient of Thermal Expansion**

Zero-Thermal-Strain Reference Temperature C
22

**TABLE 28**  
**Structural Steel > S-N Curve**

Alternating Stress MPa	Cycles	Mean Stress MPa
3999	10	0
2827	20	0
1896	50	0
1413	100	0
1069	200	0
441	2000	0
262	10000	0
214	20000	0
138	1.e+005	0
114	2.e+005	0
86.2	1.e+006	0

**TABLE 29**  
**Structural Steel > Strain-Life Parameters**

Strength Coefficient MPa	Strength Exponent	Ductility Coefficient	Ductility Exponent	Cyclic Strength Coefficient MPa	Cyclic Strain Hardening Exponent
920	-0.106	0.213	-0.47	1000	0.2

**TABLE 30**  
**Structural Steel > Isotropic Elasticity**

Young's Modulus MPa	Poisson's Ratio	Bulk Modulus MPa	Shear Modulus MPa	Temperature C
2.e+005	0.3	1.6667e+005	76923	

**TABLE 31**  
**Structural Steel > Isotropic Relative Permeability**

Relative Permeability
10000