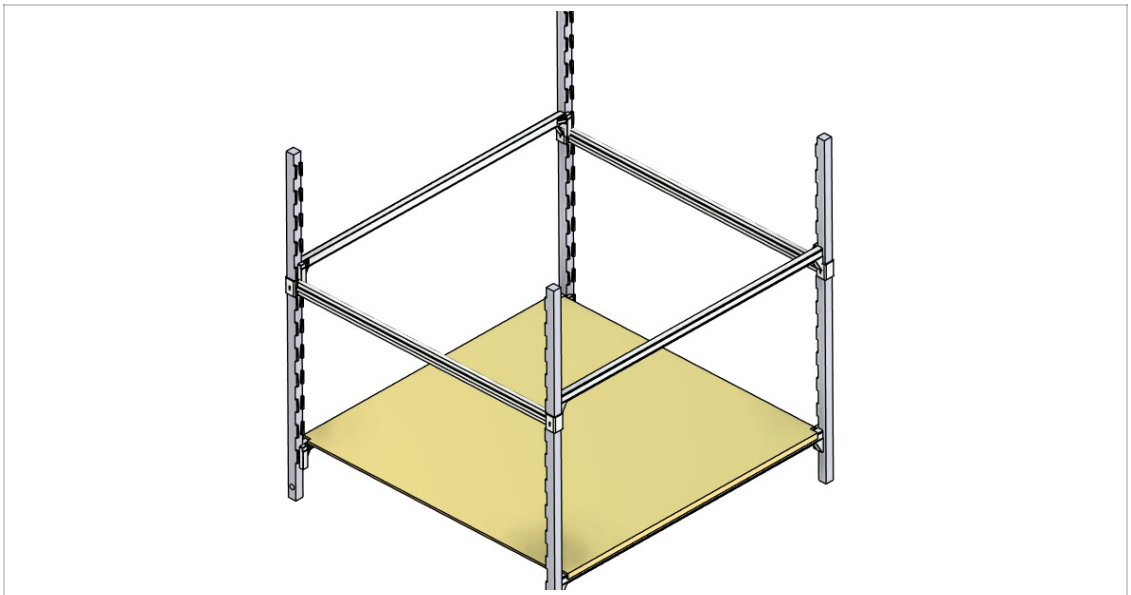
Study Report

AUTODESK



Analyzed File	final test v2 v1	Version	Autodesk Fusion (2604.1.48)
Creation Date	2025-10-26, 10:52:42	Author	User
Summary	final simulation v2		

Report Properties

Report Properties	
Title	Studies
Author	User

Simulation Model 1

Study 1 - Static Stress

Study Properties

Study Properties	
Study Type	Static Stress
Last Modification Date	2025-10-26, 10:11:42

Study Setup

Settings	
General	
Contact Tolerance	0.10 mm
Remove Rigid Body Modes	No
Mesh	
Average Element Size (% of model size) - Solids	10
Scale Mesh Size Per Part	No
Average Element Size (absolute value)	-
Element Order	Parabolic
Create Curved Mesh Elements	Yes
Max. Turn Angle on Curves (Deg.)	60
Max. Adjacent Mesh Size Ratio	1.5
Max. Aspect Ratio	10

Minimum Element Size (% of average size)	20
Adaptive Mesh Refinement	
Number of Refinement Steps	0
Results Convergence Tolerance (%)	20
Portion of Elements to Refine (%)	10
Results for Baseline Accuracy	von Mises Stress

Materials	
Brass	
Components	
Component	Strength
4th v6:1/Final Tray support v1:1/Final tray support v1:1	Yield Strength
Properties	
Density	8.490E-06 kg / mm^3
Young's Modulus	97000.00 MPa
Poisson's Ratio	0.31
Yield Strength	124.00 MPa
Ultimate Tensile Strength	338.00 MPa
Thermal Conductivity	0.115 W / (mm C)
Thermal Expansion Coefficient	2.050E-05 / C
Specific Heat	380.00 J / (kg C)
Plastic	
Components	
Component	Strength
4th v6:1/3rd Simulation v4 (1):1/Side_Shel lock Final v1 (1):1/Other Side Shelf Lock v1 (1):1	Yield Strength
4th v6:1/3rd Simulation v4:1/Side_Shel lock Final v1:1/Other Side Shelf Lock v1 (2):1	Yield Strength
Properties	
Density	1.290E-06 kg / mm^3
Young's Modulus	709.00 MPa
Poisson's Ratio	0.40
Yield Strength	30.00 MPa
Ultimate Tensile Strength	40.00 MPa
Thermal Conductivity	2.500E-04 W / (mm C)
Thermal Expansion Coefficient	4.190E-05 / C
Specific Heat	1750.00 J / (kg C)
Steel	
Components	
Component	Strength
4th v6:1/3rd Simulation v4 (1):1/Smalle-Leg-Finalr v1 (1) (1):1	Yield Strength
4th v6:1/3rd Simulation v4 (1):1/Smalle-Leg-Finalr v1 (2) (1):1	Yield Strength
4th v6:1/3rd Simulation v4:1/Smalle-Leg-Finalr v1 (1):1	Yield Strength
4th v6:1/3rd Simulation v4:1/Smalle-Leg-Finalr v1 (2):1	Yield Strength
4th v6:1/Small Leg - Plug final v1 (1):1/Smalle-Leg-Finalr v1 (4):1	Yield Strength
4th v6:1/Small Leg - Plug final v1 (2):1/Smalle-Leg-Finalr v1:1	Yield Strength
4th v6:1/Small Leg - Plug final v1 (2):2/Smalle-Leg-Finalr v1:1	Yield Strength
4th v6:1/Small Leg - Plug final v1:1/Smalle-Leg-Finalr v1 (3):1	Yield Strength
Properties	
Density	7.850E-06 kg / mm^3
Young's Modulus	210000.00 MPa
Poisson's Ratio	0.30

Yield Strength	207.00 MPa
Ultimate Tensile Strength	345.00 MPa
Thermal Conductivity	0.056 W / (mm C)
Thermal Expansion Coefficient	1.200E-05 / C
Specific Heat	480.00 J / (kg C)

ABS Plastic

Components

Component	Strength
4th v6:1/Plug in play Final v1:1/Final Top lock v1:1	Yield Strength
4th v6:1/Plug in play Final v1:2/Final Top lock v1:1	Yield Strength
4th v6:1/Side_Shel lock Final v1 (2):1/Other Side Shelf Lock v1:1	Yield Strength
4th v6:1/Side_Shel lock Final v1 (2):2/Other Side Shelf Lock v1:1	Yield Strength

Properties

Density	1.060E-06 kg / mm^3
Young's Modulus	2240.00 MPa
Poisson's Ratio	0.38
Yield Strength	20.00 MPa
Ultimate Tensile Strength	29.60 MPa
Thermal Conductivity	1.600E-04 W / (mm C)
Thermal Expansion Coefficient	8.570E-05 / C
Specific Heat	1500.00 J / (kg C)

Contacts

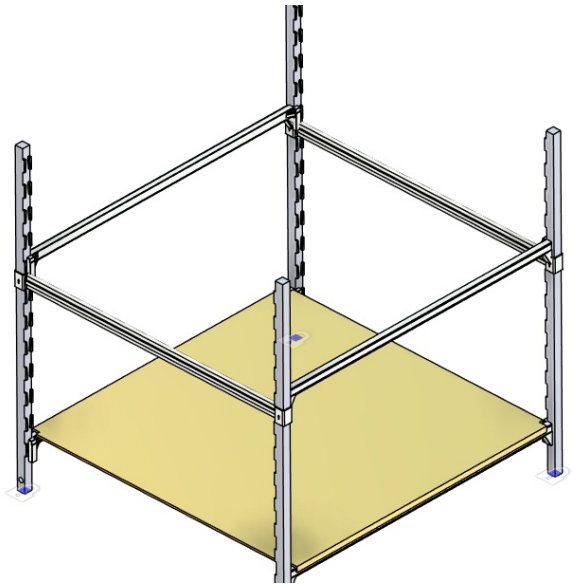
Contact Type	Contact Set	Penetration Type	Bodies	Entities
Bonded				
	Bonded1	Symmetric	[Body1 Smalle-Leg-Finalr v1 (4):1||Body1 Other Side Shelf Lock v1:1]	[Face 133||Face 123]
	Bonded2	Symmetric	[Body1 Smalle-Leg-Finalr v1 (4):1||Body1 Other Side Shelf Lock v1:1]	[Face 12||Face 118]
	Bonded3	Symmetric	[Body1 Smalle-Leg-Finalr v1 (4):1||Body1 Other Side Shelf Lock v1:1]	[Face 4||Face 15]
	Bonded4	Symmetric	[Body1 Smalle-Leg-Finalr v1 (3):1||Body1 Other Side Shelf Lock v1:1]	[Face 120||Face 144]
	Bonded5	Symmetric	[Body1 Smalle-Leg-Finalr v1 (3):1||Body1 Other Side Shelf Lock v1:1]	[Face 119||Face 241]
	Bonded6	Symmetric	[Body1 Smalle-Leg-Finalr v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 118||Face 144]
	Bonded7	Symmetric	[Body1 Smalle-Leg-Finalr v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 117||Face 241]
	Bonded8	Symmetric	[Body1 Smalle-Leg-Finalr v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 107||Face 118]
	Bonded9	Symmetric	[Body1 Smalle-Leg-Finalr v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 2||Face 15]
	Bonded10	Symmetric	[Body1 Final Top lock v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 157||Face 241]
	Bonded11	Symmetric	[Body1 Final Top lock v1:1||Body1 Smalle-Leg-Finalr v1:1]	[Face 139||Face 5]
	Bonded12	Symmetric	[Body1 Final Top lock v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 126||Face 121]

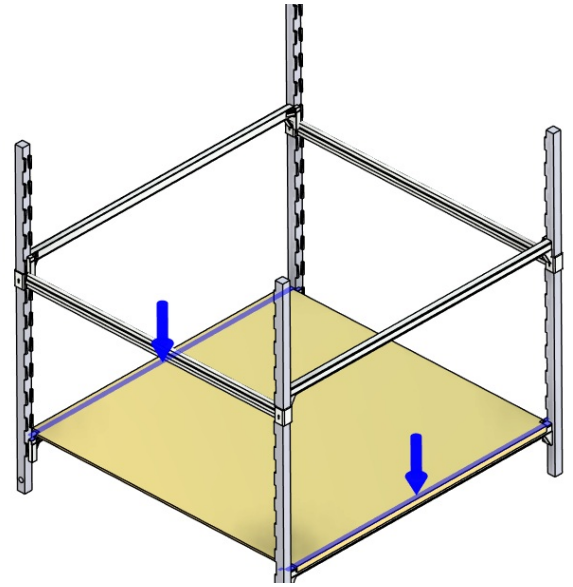
Bonded13	Symmetric	[Body1 Final Top lock v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 113||Face 121]
Bonded14	Symmetric	[Body1 Final Top lock v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 112||Face 121]
Bonded15	Symmetric	[Body1 Final Top lock v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 89||Face 12]
Bonded16	Symmetric	[Body1 Final Top lock v1:1||Body1 Smalle-Leg-Finalr v1:1]	[Face 39||Face 5]
Bonded17	Symmetric	[Body1 Final Top lock v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 154||Face 121]
Bonded18	Symmetric	[Body1 Final Top lock v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 153||Face 121]
Bonded19	Symmetric	[Body1 Final Top lock v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 142||Face 121]
Bonded20	Symmetric	[Body1 Final Top lock v1:1||Body1 Smalle-Leg-Finalr v1 (4):1]	[Face 139||Face 7]
Bonded21	Symmetric	[Body1 Final Top lock v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 135||Face 12]
Bonded22	Symmetric	[Body1 Final Top lock v1:1||Body1 Other Side Shelf Lock v1:1]	[Face 81||Face 227]
Bonded23	Symmetric	[Body1 Final Top lock v1:1||Body1 Smalle-Leg-Finalr v1 (3):1]	[Face 39||Face 5]
Bonded24	Symmetric	[Body1 Other Side Shelf Lock v1 (1):1||Body1 Final tray support v1:1]	[Face 263||Face 5]
Bonded25	Symmetric	[Body1 Other Side Shelf Lock v1 (1):1||Body1 Smalle-Leg-Finalr v1 (1) (1):1]	[Face 247||Face 330]
Bonded26	Symmetric	[Body1 Other Side Shelf Lock v1 (1):1||Body1 Smalle-Leg-Finalr v1 (1) (1):1]	[Face 144||Face 139]
Bonded27	Symmetric	[Body1 Other Side Shelf Lock v1 (1):1||Body1 Smalle-Leg-Finalr v1 (1) (1):1]	[Face 133||Face 141]
Bonded28	Symmetric	[Body1 Other Side Shelf Lock v1 (1):1||Body1 Smalle-Leg-Finalr v1 (2) (1):1]	[Face 123||Face 148]
Bonded29	Symmetric	[Body1 Other Side Shelf Lock v1 (1):1||Body1 Smalle-Leg-Finalr v1 (2) (1):1]	[Face 118||Face 146]
Bonded30	Symmetric	[Body1 Other Side Shelf Lock v1 (1):1||Body1 Smalle-Leg-Finalr v1 (2) (1):1]	[Face 12||Face 324]
Bonded31	Symmetric	[Body1 Other Side Shelf Lock v1 (2):1||Body1 Final tray support v1:1]	[Face 263||Face 5]
Bonded32	Symmetric	[Body1 Other Side Shelf Lock v1 (2):1||Body1 Smalle-Leg-Finalr v1 (1):1]	[Face 247||Face 326]
Bonded33	Symmetric	[Body1 Other Side Shelf Lock v1 (2):1||Body1 Smalle-Leg-Finalr v1 (1):1]	[Face 144||Face 135]
Bonded34	Symmetric	[Body1 Other Side Shelf Lock v1 (2):1||Body1 Smalle-Leg-Finalr v1 (1):1]	[Face 133||Face 137]
Bonded35	Symmetric	[Body1 Other Side Shelf Lock v1 (2):1||Body1 Smalle-Leg-Finalr v1 (2):1]	[Face 123||Face 152]
Bonded36	Symmetric	[Body1 Other Side Shelf Lock v1 (2):1||Body1 Smalle-Leg-Finalr v1 (2):1]	[Face 118||Face 150]
		[Body1 Other Side Shelf Lock v1	[Face 117||Face

	Bonded37	Symmetric	(2):1||Body1 Smalle-Leg-Finalr v1 (2):1]	151]
	Bonded38	Symmetric	[Body1 Other Side Shelf Lock v1 (2):1||Body1 Smalle-Leg-Finalr v1 (2):1]	[Face 12||Face 328]
	[M] Bonded39	Symmetric	[Body1 Smalle-Leg-Finalr v1 (3):1||Body1 Smalle-Leg-Finalr v1 (1) (1):1]	[Face 6||Face 332]

Mesh	
Type	Solids
Nodes	687811
Elements	411072

Load Case1

Constraints	
Fixed1	
	
Type	Fixed
Ux	Fixed
Uy	Fixed
Uz	Fixed

Loads	
Force1	
	
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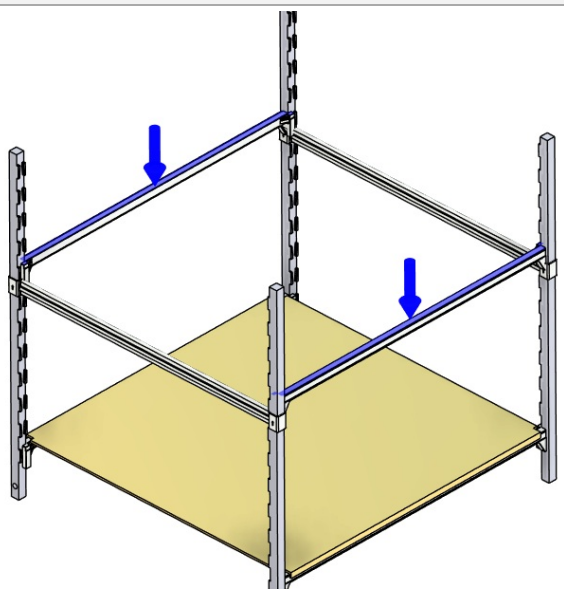
Magnitude	2000.00 N
X Value	0.00 N

Y Value	0.00 N
Z Value	-2000.00 N
Force Per Entity	No

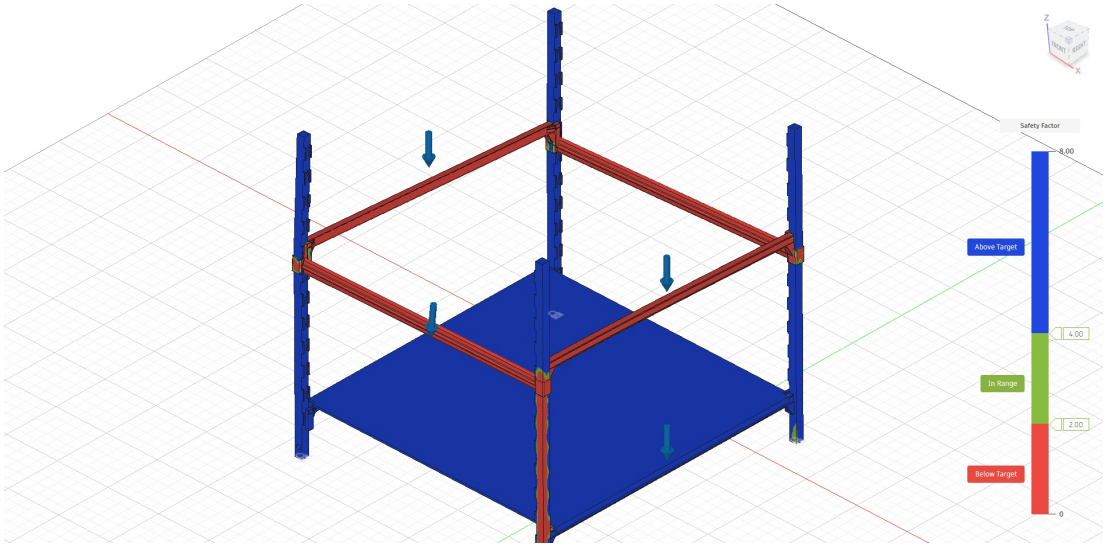
Force2



Type	Force
Magnitude	2500.00 N
X Value	0.00 N
Y Value	0.00 N
Z Value	-2500.00 N
Force Per Entity	No

Load Case1 - Guided Results

Safety Factor



With the analysis criteria in this study setup, the design is expected to bend permanently or break.

Below Safety Factor Target

Validate your study setup

- Check the loads are not set too high
- Check the mesh refinement and consider increasing it in areas of high stress
- Confirm your Safety Factor requirement
- If the Displacement result shows high displacement, consider running a Nonlinear study to gain more insight

Check other results

- Examine the Below target Result visualization to see where the weakest areas are
- Check the stress result to see if, and where, the material might yield
- Check the displacement result to see how far from its original alignment the model has moved
- Look at other results, such as reaction forces to check your study set up, or strain to check your material performance

Strengthen weak areas

- Add more material to weak areas

Next Steps	• Select a material with a higher yield strength • Stiffen the design • Modify the shape with a Generative Design study
	Generate alternative designs • Add more material to weak areas • Select a material with a higher yield strength • Stiffen the design • Modify the shape with a Generative Design study
	Meets Safety Factor Target
	Validate your study setup • Check the loads are not set too high • Check the mesh refinement and consider increasing it in areas of high stress • Confirm your Safety Factor requirement • If the Displacement result shows high displacement, consider running a Nonlinear study to gain more insight
	Check other results • Examine the Below target Result visualization to see where the weakest areas are • Check the stress result to see if, and where, the material might yield • Check the displacement result to see how far from its original alignment the model has moved • Look at other results, such as reaction forces to check your study set up, or strain to check your material performance
	Above Safety Factor Limit
	Validate your study setup • Check the loads are not set too high • Check the mesh refinement and consider increasing it in areas of high stress • Confirm your Safety Factor requirement • If the Displacement result shows high displacement, consider running a Nonlinear study to gain more insight
	Check other results • Examine the Below target Result visualization to see where the weakest areas are • Check the stress result to see if, and where, the material might yield • Check the displacement result to see how far from its original alignment the model has moved • Look at other results, such as reaction forces to check your study set up, or strain to check your material performance
	Lightweight the design • Set a Safety Factor upper limit to find where material can be removed • Remove material from areas that exceed the Safety Factor upper limit
	Generate alternative designs • In the Generative Design workspace, create design modifications • Remove unnecessary material using a Shape Optimization study

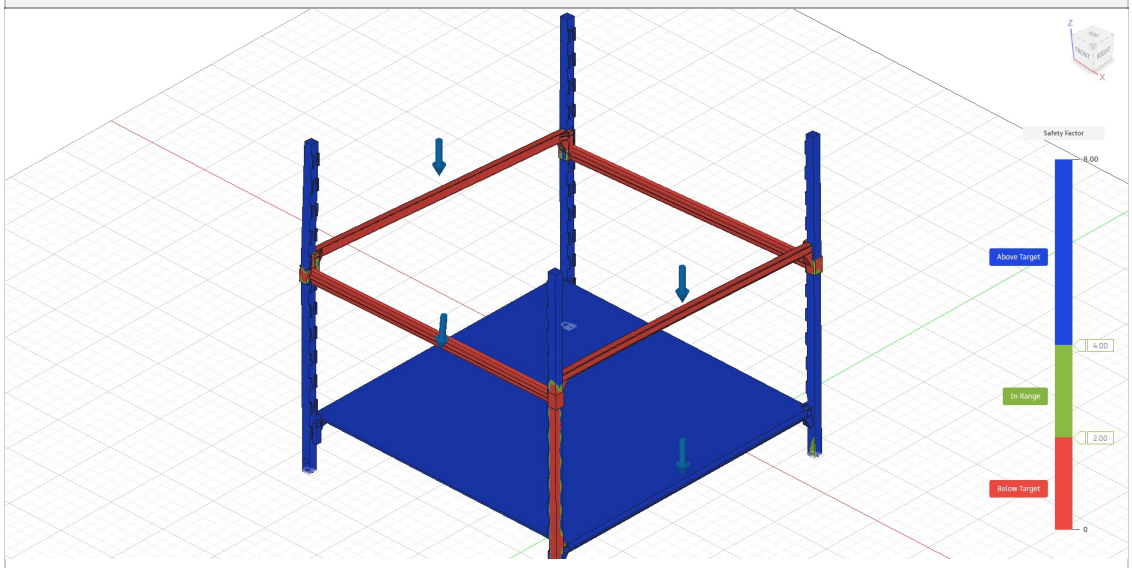
Load Case1 - Results

Result Summary			
Result type	Sub-result	Minimum	Maximum
Safety Factor			
	Safety Factor	0.013	6.551E+08
Stress			
	Von Mises	3.16E-07 MPa	9,660.627 MPa
	1st Principal	−1,190.121 MPa	5,034.265 MPa
	3rd Principal	−10,979.378 MPa	1,323.566 MPa
	Normal XX	−2,995.668 MPa	3,387.006 MPa
	Normal YY	−2,984.084 MPa	2,958.686 MPa
	Normal ZZ	−9,657.714 MPa	5,027.283 MPa
	Shear XY	−2,319.667 MPa	4,983.03 MPa
	Shear YZ	−2,175.772 MPa	3,305.949 MPa
	Shear XZ	−2,896.122 MPa	1,436.068 MPa
Displacement			
	Total	0 mm	9,556.123 mm
	X	−1,888.883 mm	524.064 mm
	Y	−381.324 mm	2,736.349 mm
	Z	−9,006.306 mm	19.078 mm
Reaction Force			
	Total	0 N	24,761.822 N

	X	−10,061.554 N	6,135.327 N
	Y	−5,323.141 N	5,810.859 N
	Z	−21,274.209 N	23,744.033 N
Strain			
	Equivalent	1.838E-12	1.018
	1st Principal	−2.702E-04	0.898
	3rd Principal	−1.125	9.382E-08
	Normal XX	−0.387	0.36
	Normal YY	−0.351	0.733
	Normal ZZ	−0.287	0.131
	Shear XY	−0.454	0.819
	Shear YZ	−0.584	0.494
	Shear XZ	−0.267	0.581
Contact Pressure			
	Total	0 MPa	10,263.755 MPa
	X	−2,629.225 MPa	1,912.005 MPa
	Y	−4,983.03 MPa	2,584.856 MPa
	Z	−9,657.714 MPa	5,027.283 MPa
Contact Force			
	Total	0 N	44,590.859 N
	X	−9,097.831 N	14,720.034 N
	Y	−24,682.287 N	34,796.688 N
	Z	−35,052.707 N	39,006.781 N

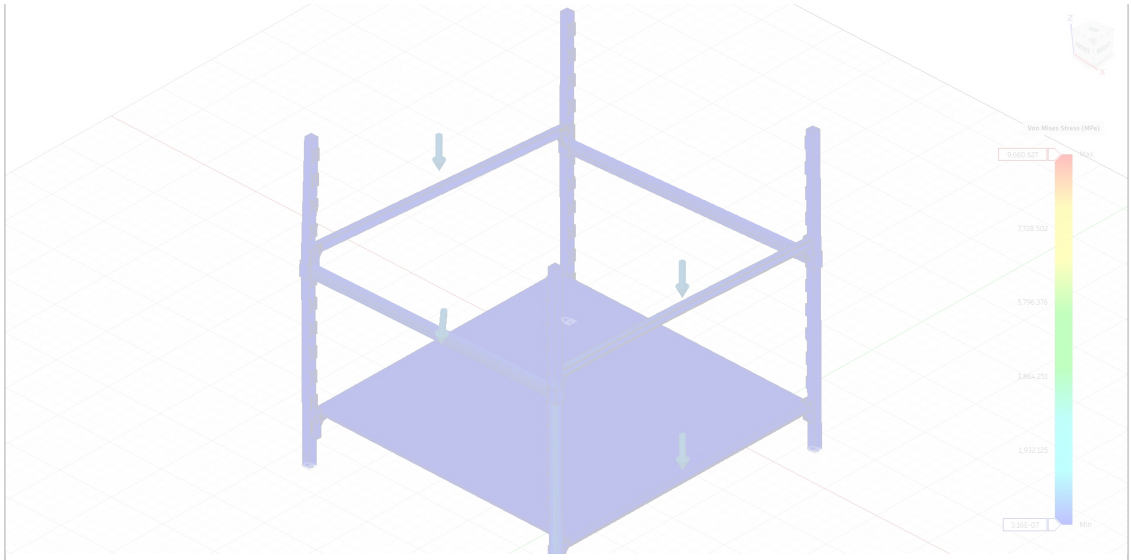
Safety Factor

Safety Factor

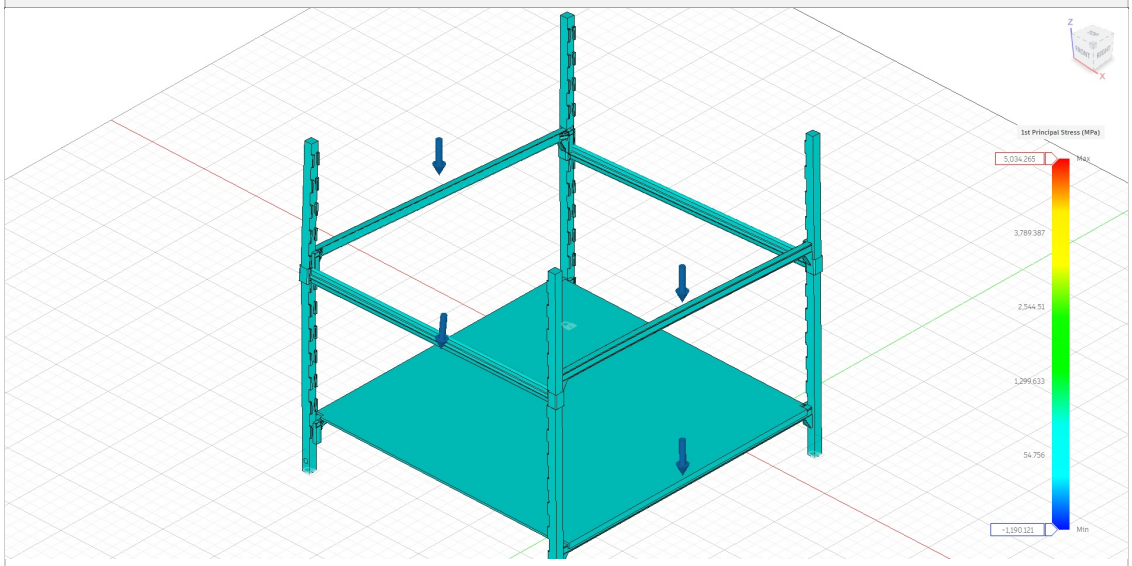


Stress

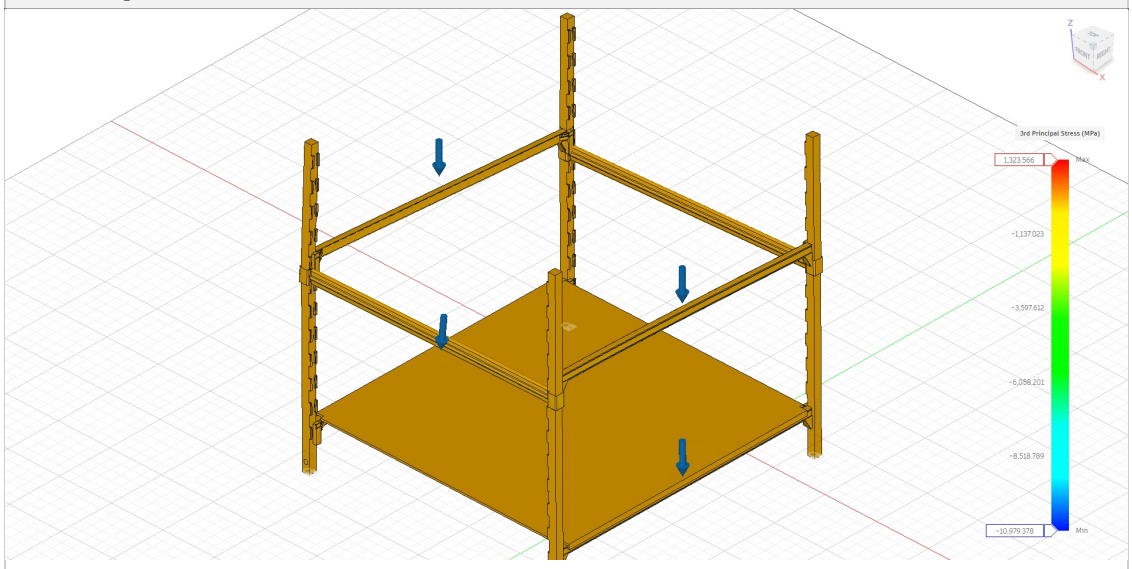
Von Mises



1st Principal

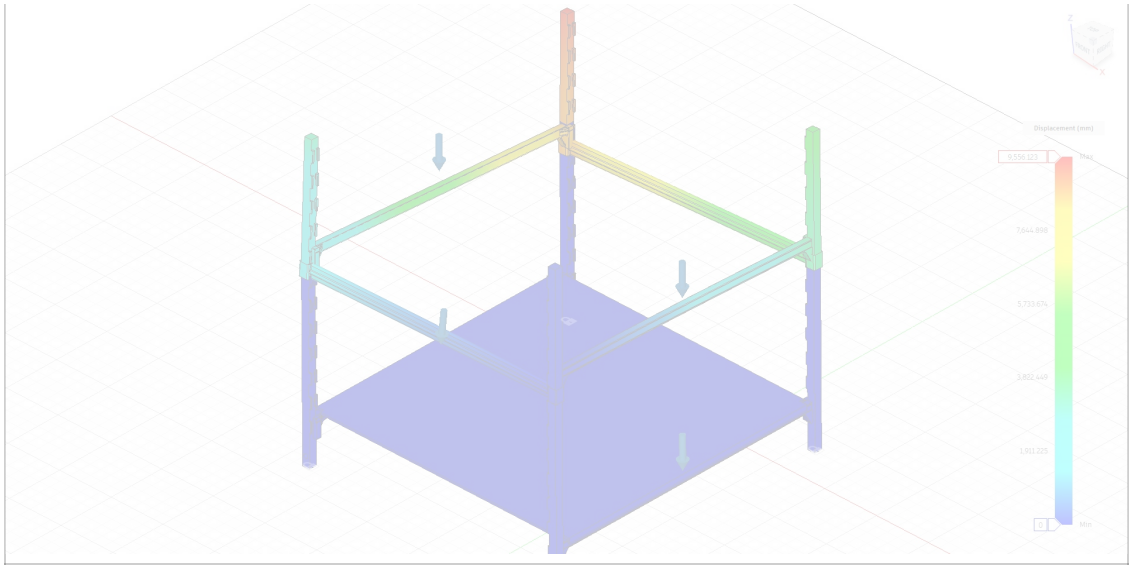


3rd Principal



Displacement

Total


Displacement (mm)
9,556.123
Max
7,644.898
5,733.674
3,822.449
1,911.225
0
Min