

# Simulation of 12" x13" plate

Date: Sunday, December 09, 2012  
Designer: Solidworks  
Study name: SimulationXpress Study  
Analysis type: Static

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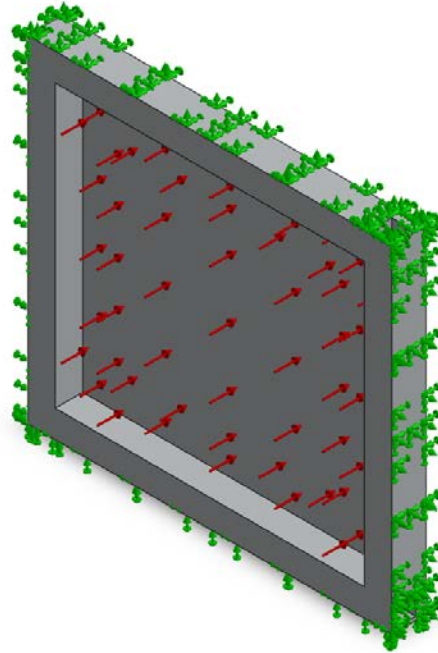
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## Description

The following is a case study on the 12"x13" wall plate designed for the HABEX Environmental Thermal Vacuum Chamber. The simulation involves a 14psi pressure along the face of one of the wall chambers. The temperature is assumed to be room temperature. A further study should be done at -60C. This is an informal study.

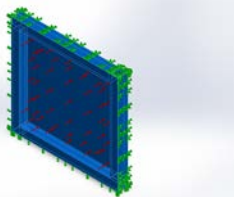
# Assumptions

## Model Information

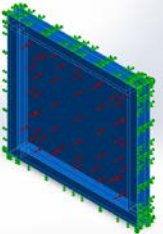


Model name: 12\_13\_plate  
Current Configuration: Default

### Solid Bodies

Document Name and Reference	Treated As	Volumetric Properties	Document Path/Date Modified
Cut-Extrude4 	Solid Body	Mass:2.73006 kg Volume:0.001011113 m <sup>3</sup> Density:2700 kg/m <sup>3</sup> Weight:26.7546 N	12_13_plate.SLDPRT Dec 09 18:05:35 2012

## Material Properties

Model Reference	Properties	Components
	<p>Name: 6061 Alloy            Model type: Linear Elastic Isotropic            Default failure criterion: Max von Mises Stress            Yield strength: 5.51485e+007 N/m<sup>2</sup>            Tensile strength: 1.24084e+008 N/m<sup>2</sup></p>	SolidBody 1(Cut-Extrude4)(12_13_plate)

## Loads and Fixtures

Fixture name	Fixture Image	Fixture Details
Fixed-1		<p>Entities: 4 face(s)            Type: Fixed Geometry</p>

Load name	Load Image	Load Details
Pressure-1		<p>Entities: 1 face(s)            Type: Normal to selected face            Value: 14            Units: psi</p>

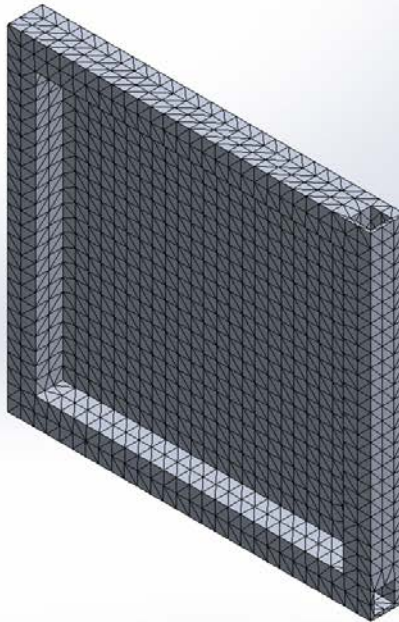
## Mesh Information

Mesh type	Solid Mesh
Mesher Used:	Standard mesh
Automatic Transition:	Off
Include Mesh Auto Loops:	Off
Jacobian points	4 Points
Element Size	0.477232 in
Tolerance	0.0238616 in
Mesh Quality	High

## Mesh Information - Details

Total Nodes	16863
Total Elements	8599
Maximum Aspect Ratio	8.8359
% of elements with Aspect Ratio < 3	58
% of elements with Aspect Ratio > 10	0
% of distorted elements(Jacobian)	0
Time to complete mesh(hh:mm:ss):	00:00:03
Computer name:	ARKO-PC

Model name: 12\_13\_plate  
 Study name: SimulationXpress Study  
 Mesh type: Solid mesh

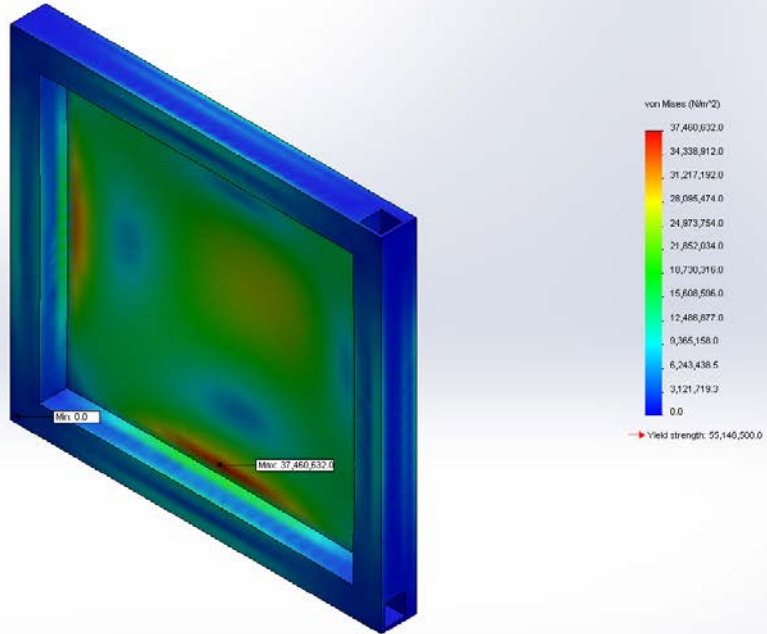




# Study Results

Name	Type	Min	Max
Stress	VON: von Mises Stress	0.00638973 N/m <sup>2</sup> Node: 16659	3.74606e+007 N/m <sup>2</sup> Node: 12041

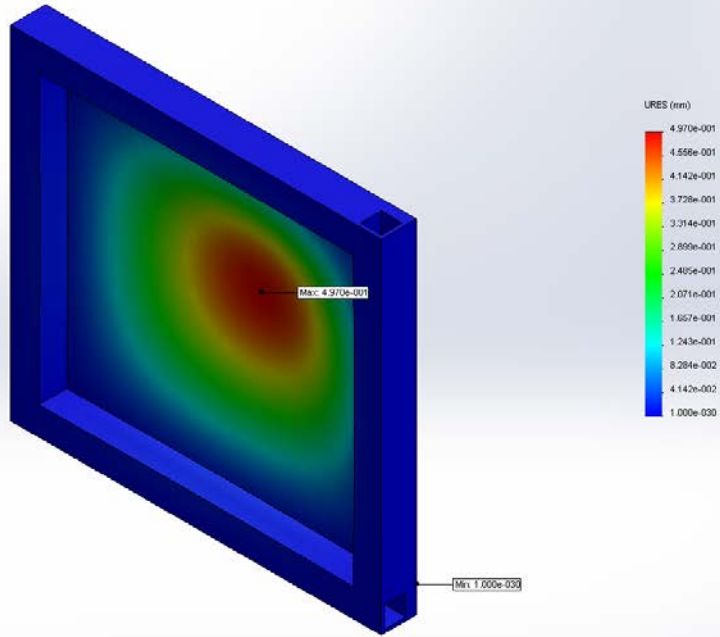
Model name: 12\_13\_plate  
 Study name: SimulationXpress Study  
 Plot type: Static nodal stress Stress  
 Deformation scale: 87.7112



12\_13\_plate-SimulationXpress Study-Stress-Stress

Name	Type	Min	Max
Displacement	URES: Resultant Displacement	0 mm Node: 1	0.497037 mm Node: 10813

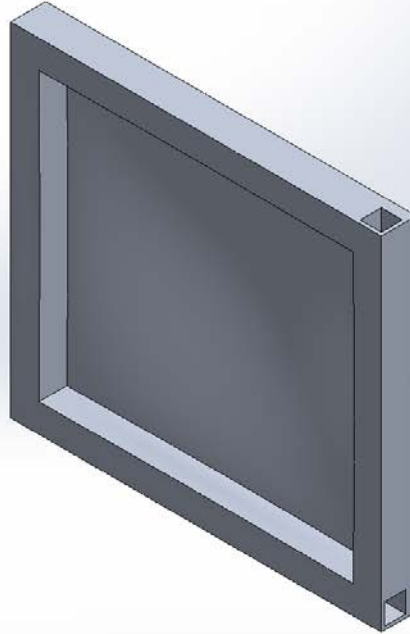
Model name: 12\_13\_plate  
Study name: SimulationXpress Study  
Plot type: Stress-displacement Displacement  
Deformation scale: 67.7112



12\_13\_plate-SimulationXpress Study-Displacement-Displacement

Name	Type
Deformation	Deformed Shape

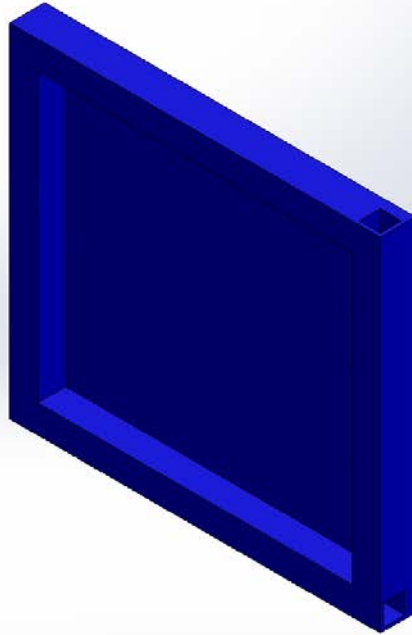
Model name: 12\_13\_plate  
Study name: SimulationXpress Study  
Plot type: Deformed Shape Deformation  
Deformation scale: 67.7112



12\_13\_plate-SimulationXpress Study-Displacement-Deformation

Name	Type	Min	Max
Factor of Safety	Max von Mises Stress	1.47217 Node: 12041	8.6308e+009 Node: 16659

Model name: 12\_13\_plate  
 Study name: SimulationXpress Study  
 Plot type: Factor of Safety Factor of Safety  
 Criterion: Max von Mises Stress  
 Red = FOS = 1 - Blue



12\_13\_plate-SimulationXpress Study-Factor of Safety-Factor of Safety

## Conclusion