

# Simulation of Connector Assembly C

**Date:** Sunday, March 6, 2016

**Designer:** Solidworks

**Study name:** Horizontal Stress Test on C inner bend

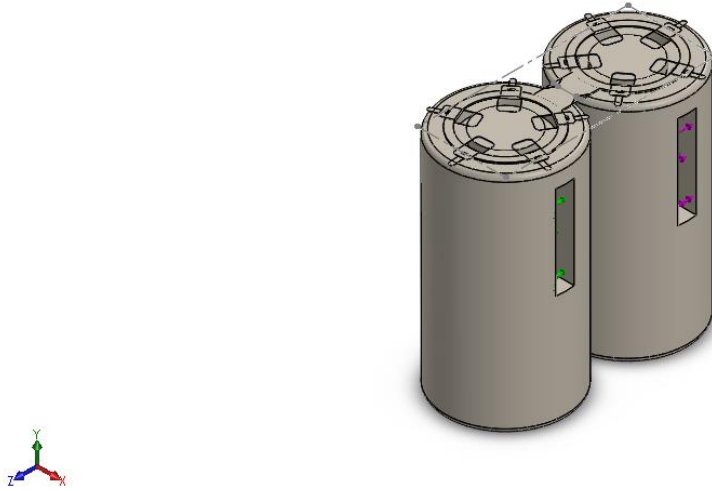
**Analysis type:** Static

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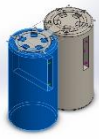



## Model Information



Model name: Connector Assembly C  
Current Configuration: Default

### Solid Bodies

Document Name and Reference	Treated As	Volumetric Properties	Document Path/Date Modified
Cut-Extrude1 	Solid Body	Mass:0.19404 kg Volume:2.28282e-005 m <sup>3</sup> Density:8500 kg/m <sup>3</sup> Weight:1.90159 N	E:\Battery Connector\Parts\3D\Batter y C.SLDPRT Feb 18 10:32:52 2016
Cut-Extrude1 	Solid Body	Mass:0.19404 kg Volume:2.28282e-005 m <sup>3</sup> Density:8500 kg/m <sup>3</sup> Weight:1.90159 N	E:\Battery Connector\Parts\3D\Batter y C.SLDPRT Feb 18 10:32:52 2016



## Study Properties

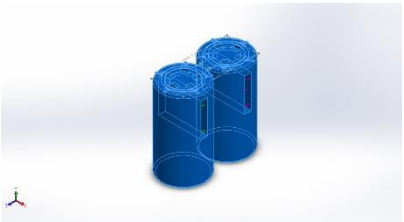
Study name	Horizontal Stress Test on C inner bend
Analysis type	Static
Mesh type	Mixed Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	298 Kelvin
Include fluid pressure effects from SOLIDWORKS Flow Simulation	Off
Solver type	Automatic
Inplane Effect:	Off
Soft Spring:	On
Inertial Relief:	On
Incompatible bonding options	Automatic
Large displacement	Off
Compute free body forces	Off
Friction	Off
Use Adaptive Method:	Off
Result folder	SOLIDWORKS document (E:\Battery Connector\Assembly)

## Units

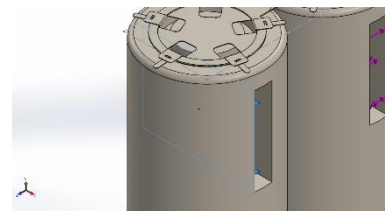
Unit system:	SI (MKS)
Length/Displacement	mm
Temperature	Kelvin
Angular velocity	Rad/sec
Pressure/Stress	N/m <sup>2</sup>

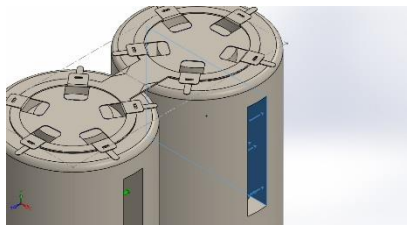


## Material Properties

Model Reference	Properties	Components
	<b>Name:</b> Nickel <b>Model type:</b> Linear Elastic Isotropic <b>Default failure criterion:</b> Unknown <b>Yield strength:</b> 5.9e+007 N/m <sup>2</sup> <b>Tensile strength:</b> 3.17e+008 N/m <sup>2</sup> <b>Elastic modulus:</b> 2.1e+011 N/m <sup>2</sup> <b>Poisson's ratio:</b> 0.31 <b>Mass density:</b> 8500 kg/m <sup>3</sup> <b>Shear modulus:</b> 7.9e+010 N/m <sup>2</sup> <b>Thermal expansion coefficient:</b> 1.7e-005 /Kelvin	SolidBody 1(Flat-Pattern)(Barbell Connector C-1), SolidBody 1(Cut-Extrude1)(Battery C-1), SolidBody 1(Cut-Extrude1)(Battery C-2), SolidBody 1(Cut-Extrude3)(Star Connector C 3D-1), SolidBody 1(Cut-Extrude3)(Star Connector C 3D-2)
Curve Data:N/A		

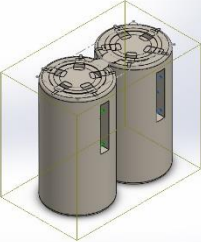
## Loads and Fixtures

Fixture name	Fixture Image	Fixture Details		
Fixed-1		<b>Entities:</b> 1 face(s) <b>Type:</b> Fixed Geometry		
<b>Resultant Forces</b>				
<b>Components</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>Resultant</b>
Reaction force(N)	-0.0238344	-0.184543	-5.83676	5.83973
Reaction Moment(N.m)	0	0	0	1e-033

Load name	Load Image	Load Details
Force-1		<b>Entities:</b> 1 face(s) <b>Type:</b> Apply normal force <b>Value:</b> 170 N (38.2175 lbf)



## Contact Information

Contact	Contact Image	Contact Properties
Global Contact		<b>Type:</b> Bonded <b>Components:</b> 1 component(s) <b>Options:</b> Compatible mesh



## Mesh information

Mesh type	Mixed Mesh
Mesher Used:	Blended curvature-based mesh
Jacobian points	4 Points
Jacobian check for shell	On
Maximum element size	5.00541 mm
Minimum element size	1.00108 mm
Mesh Quality	High
Remesh failed parts with incompatible mesh	Off

## Mesh information - Details

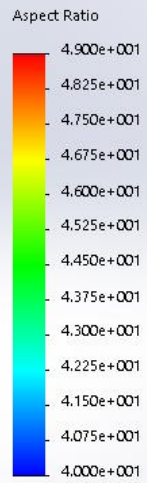
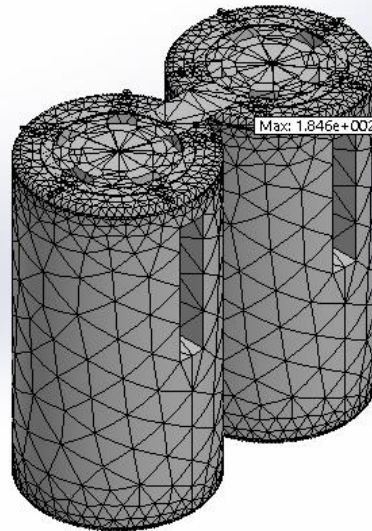
Total Nodes	20043
Total Elements	10876
Time to complete mesh(hh:mm:ss):	00:00:14
Computer name:	

## Mesh Quality Plots

Name	Type	Min	Max
Mesh Quality1	Aspect Ratio	1.02489 Element: 868	184.625 Element: 3



Model name:Connector Assembly C  
 Study name:Horizontal Stress Test on C inner bend(-Default-)  
 Plot type:Aspect ratio Mesh Quality1  
 Global value: 1.02489 to 184.625



Connector Assembly C-Horizontal Stress Test on C inner bend-Mesh Quality-Mesh Quality1

## Resultant Forces

### Reaction forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	-0.0238344	-0.184543	-5.83676	5.83973

### Reaction Moments

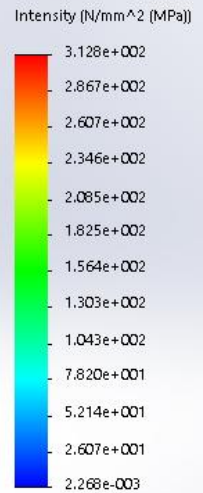
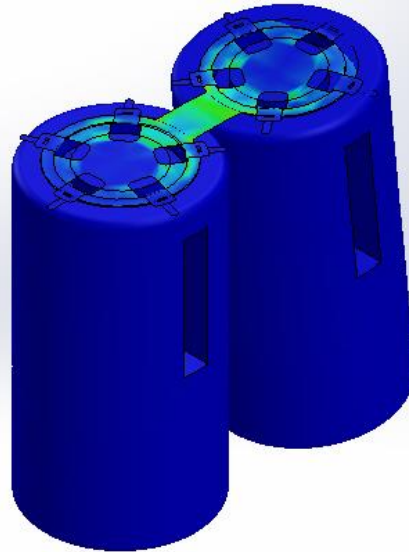
Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	1e-033



## Study Results

Name	Type	Min	Max
Stress1	INT: Stress Intensity(P1-P3)	0.00226837 MPa Or 0.000328999 ksi	312.808 MPa Or 45.369 ksi
		Node: 3806	Node: 288

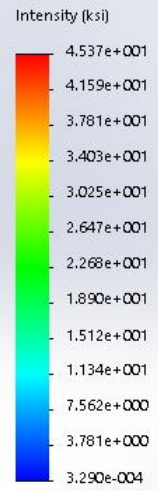
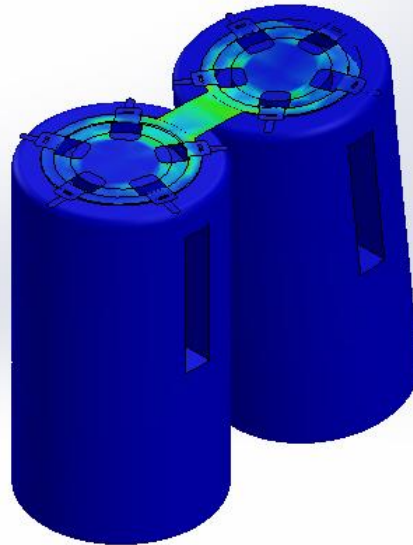
Model name: Connector Assembly C  
 Study name: Horizontal Stress Test on C inner bend(-Default-)  
 Plot type: Static nodal stress Stress1  
 Deformation scale: 7.79872



Connector Assembly C-Horizontal Stress Test on C inner bend-Stress-Stress (MPa)



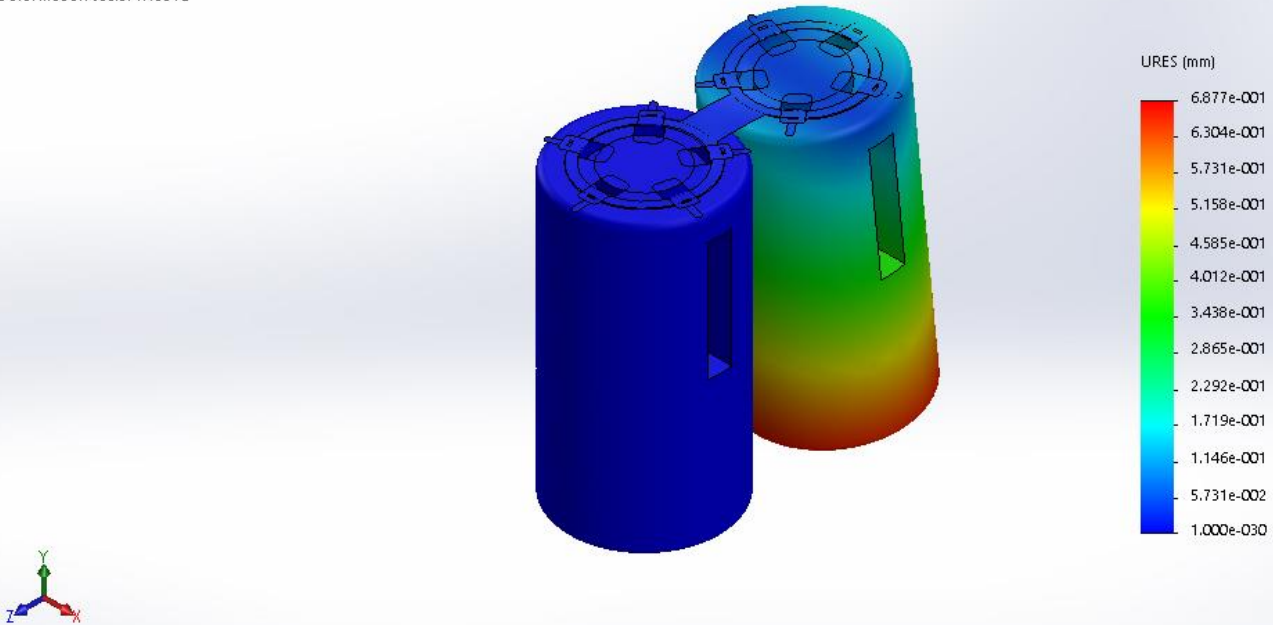
Model name: Connector Assembly C  
 Study name: Horizontal Stress Test on C inner bend(-Default-)  
 Plot type: Static nodal stress Stress1  
 Deformation scale: 7.79872



Connector Assembly C-Horizontal Stress Test on C inner bend-Stress-Stress (ksi)

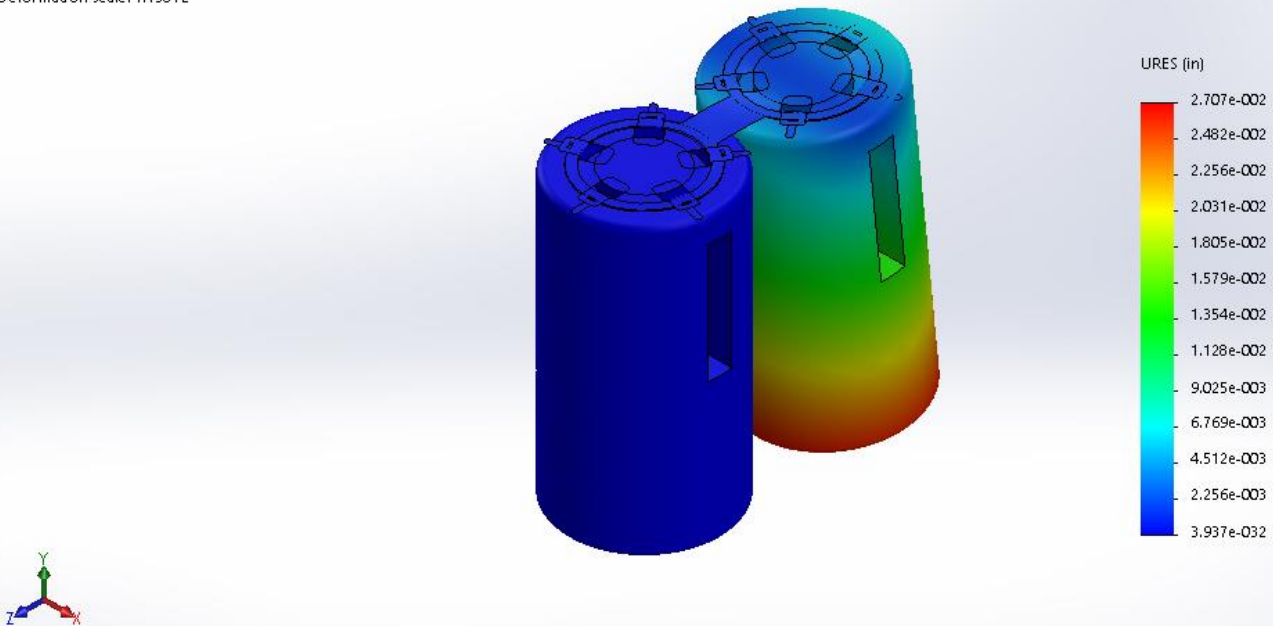
Name	Type	Min	Max
Displacement1	URES: Resultant Displacement	0 mm Or 0 in Node: 2336	0.687691 mm Or 0.0270744 in Node: 11306

Model name: Connector Assembly C  
Study name: Horizontal Stress Test on C inner bend(-Default-)  
Plot type: Static displacement Displacement1  
Deformation scale: 7.79872



Connector Assembly C-Horizontal Stress Test on C inner bend-Displacement-Displacement (mm)

Model name: Connector Assembly C  
Study name: Horizontal Stress Test on C inner bend(-Default-)  
Plot type: Static displacement Displacement1  
Deformation scale: 7.79872

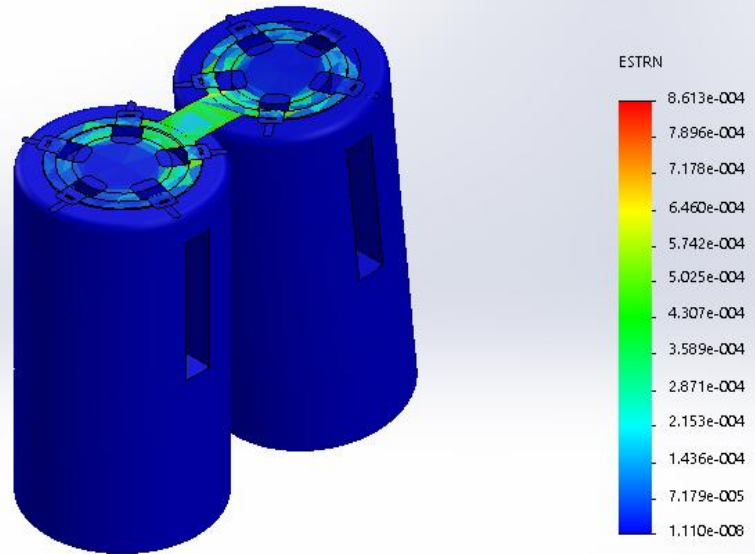


Connector Assembly C-Horizontal Stress Test on C inner bend-Displacement-Displacement (in)



Name	Type	Min	Max
Strain1	ESTRN: Equivalent Strain	1.10957e-008 Element: 3333	0.00086134 Element: 355

Model name: Connector Assembly C  
 Study name: Horizontal Stress Test on C inner bend(-Default)  
 Plot type: Static strain Strain1  
 Deformation scale: 7.79872



Connector Assembly C-Horizontal Stress Test on C inner bend-Strain-Strain1

## Conclusion

With application of 170 N (38.2175 lbf) force induced a stress of 312.808 MPa (45.369 ksi) material displacement of 0.687691 mm (0.0270744 in) in the connector assembly. So it can be concluded that the setup will safely handle a load of 170 N (38.2175 lbf).

