



Simulation of Connector Assembly D

Date: Wednesday, March 9, 2016

Designer: Solidworks

Study name: Horizontal Stress Test on D both bend

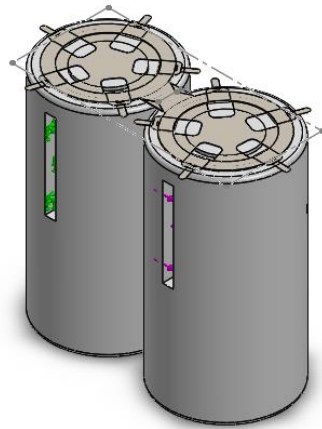
Analysis type: Static

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Model Information



Model name: Connector Assembly D
Current Configuration: Default

Solid Bodies

Document Name and Reference	Treated As	Volumetric Properties	Document Path/Date Modified
Cut-Extrude1 	Solid Body	Mass:0.048033 kg Volume:4.70912e-005 m ³ Density:1020 kg/m ³ Weight:0.470723 N	E:\Battery Connector\Parts\3D\Batter y D.SLDPRT Feb 20 09:34:17 2016
Cut-Extrude1 	Solid Body	Mass:0.048033 kg Volume:4.70912e-005 m ³ Density:1020 kg/m ³ Weight:0.470723 N	E:\Battery Connector\Parts\3D\Batter y D.SLDPRT Feb 20 09:34:17 2016



Study Properties


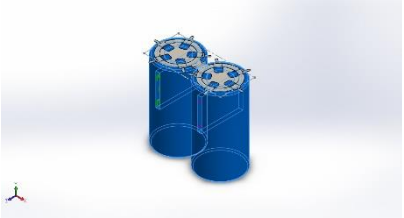
Study name	Horizontal Stress Test on D both bend
Analysis type	Static
Mesh type	Mixed Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	298 Kelvin
Include fluid pressure effects from SOLIDWORKS Flow Simulation	Off
Solver type	Automatic
Inplane Effect:	On
Soft Spring:	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 ²

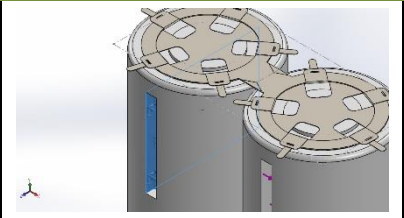


Material Properties

Model Reference	Properties	Components
	<p> Name: Nickel Model type: Linear Elastic Isotropic Default failure criterion: Unknown Yield strength: 5.9e+007 N/m² Tensile strength: 3.17e+008 N/m² Elastic modulus: 2.1e+011 N/m² Poisson's ratio: 0.31 Mass density: 8500 kg/m³ Shear modulus: 7.9e+010 N/m² Thermal expansion coefficient: 1.7e-005 /Kelvin </p>	<p> SolidBody 1(Flat-Pattern)(Barbell Connector D-1), SolidBody 1(Cut-Extrude3)(Star Connector D 3D-1), SolidBody 1(Cut-Extrude3)(Star Connector D 3D-2) </p>
Curve Data:N/A		
	<p> Name: ABS Model type: Linear Elastic Isotropic Default failure criterion: Unknown Tensile strength: 3e+007 N/m² Elastic modulus: 2e+009 N/m² Poisson's ratio: 0.394 Mass density: 1020 kg/m³ Shear modulus: 3.189e+008 N/m² </p>	<p> SolidBody 1(Cut-Extrude1)(Battery D-1), SolidBody 1(Cut-Extrude1)(Battery D-2) </p>
Curve Data:N/A		



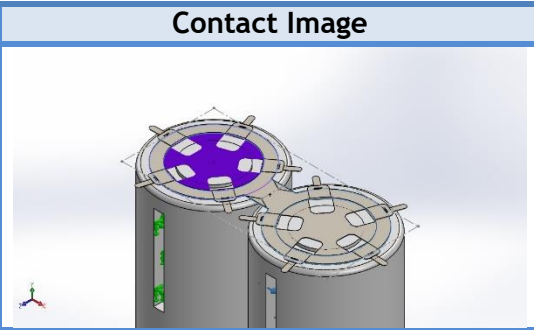
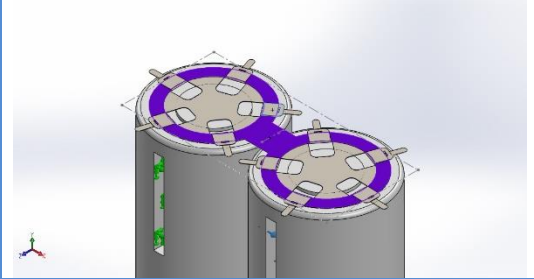
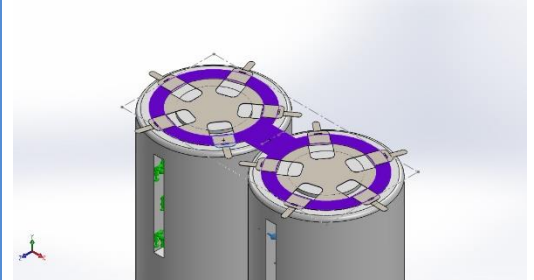
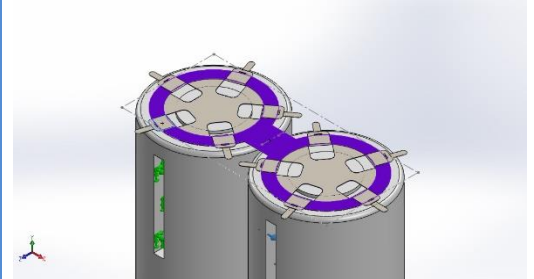
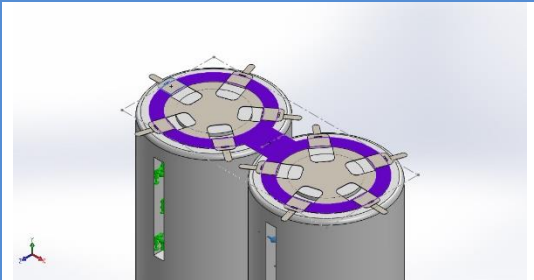
Loads and Fixtures

Fixture name	Fixture Image	Fixture Details		
Fixed-1		Entities: 1 face(s) Type: Fixed Geometry		
Resultant Forces				
Components	X	Y	Z	Resultant
Reaction force(N)	1.04924	-0.571523	0.00145505	1.1948
Reaction Moment(N.m)	0	0	0	1e-033

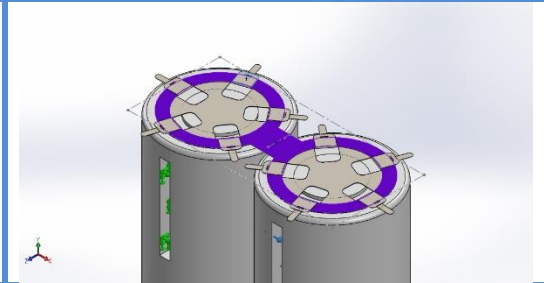
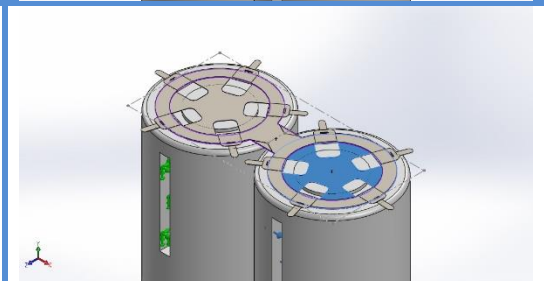
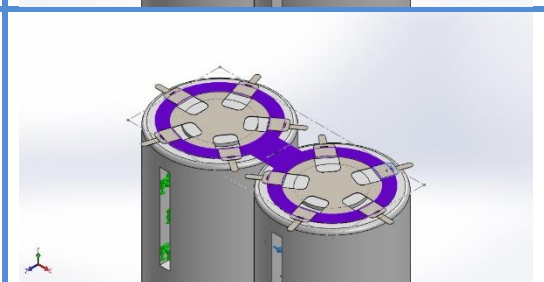
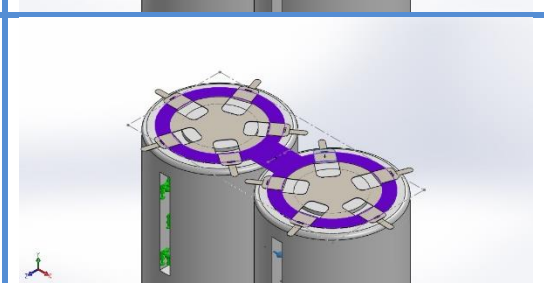
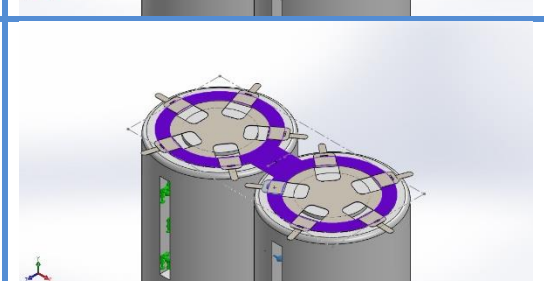
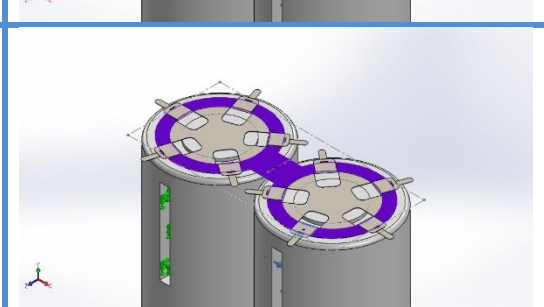
Load name	Load Image	Load Details
Force-1		Entities: 1 face(s) Type: Apply normal force Value: 200 N (44.9618 lbf)



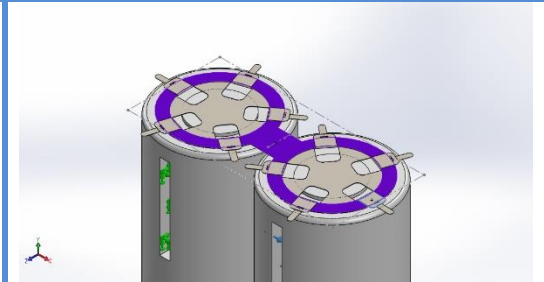
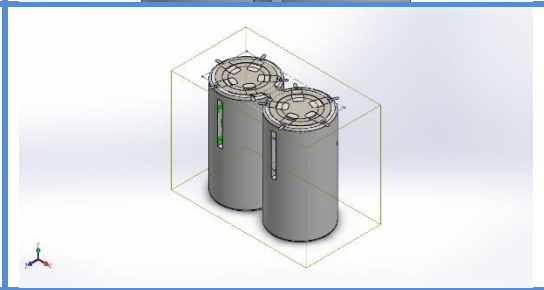
Contact Information

Contact	Contact Image	Contact Properties
Contact Set-463		<p>Type: Bonded contact pair</p> <p>Entites: 2 face(s)</p>
Contact Set-464		<p>Type: Bonded contact pair</p> <p>Entites: 2 face(s)</p>
Contact Set-465		<p>Type: Bonded contact pair</p> <p>Entites: 2 face(s)</p>
Contact Set-466		<p>Type: Bonded contact pair</p> <p>Entites: 2 face(s)</p>
Contact Set-467		<p>Type: Bonded contact pair</p> <p>Entites: 2 face(s)</p>



<p>Contact Set-468</p>		<p>Type: Bonded contact pair Entites: 2 face(s)</p>
<p>Contact Set-469</p>		<p>Type: Bonded contact pair Entites: 2 face(s)</p>
<p>Contact Set-470</p>		<p>Type: Bonded contact pair Entites: 2 face(s)</p>
<p>Contact Set-471</p>		<p>Type: Bonded contact pair Entites: 2 face(s)</p>
<p>Contact Set-472</p>		<p>Type: Bonded contact pair Entites: 2 face(s)</p>
<p>Contact Set-473</p>		<p>Type: Bonded contact pair Entites: 2 face(s)</p>



<p>Contact Set-474</p>		<p>Type: Bonded contact pair Entites: 2 face(s)</p>
<p>Global Contact</p>		<p>Type: Bonded Components: 1 component(s) Options: Compatible mesh</p>

Mesh information

Mesh type	Mixed Mesh
Mesher Used:	Blended curvature-based mesh
Jacobian points	4 Points
Jacobian check for shell	On
Maximum element size	6.71299 mm
Minimum element size	1.3426 mm
Mesh Quality	High
Remesh failed parts with incompatible mesh	Off

Mesh information - Details

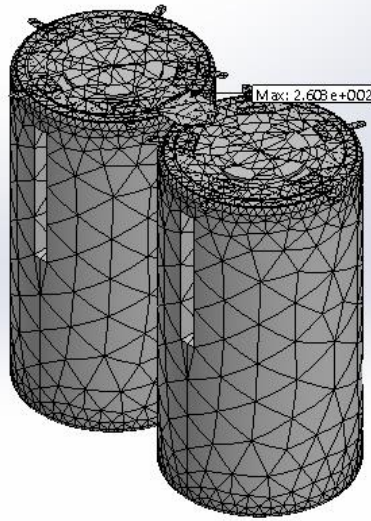
Total Nodes	18478
Total Elements	9901
Time to complete mesh(hh:mm:ss):	00:00:13
Computer name:	

Mesh Quality Plots

Name	Type	Min	Max
Mesh Quality1	Aspect Ratio	1.02631 Element: 732	260.784 Element: 16



Model name:Connector Assembly D
 Study name:Horizontal Stress Test on D both bend(-Default-)
 Plot type:Aspect ratio Mesh Quality1
 Global value: 1.02 631 to 2 60.784



Connector Assembly D-Horizontal Stress Test on D both bend-Mesh Quality-Mesh Quality1

Resultant Forces

Reaction forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	1.04924	-0.571523	0.00145505	1.1948

Reaction Moments

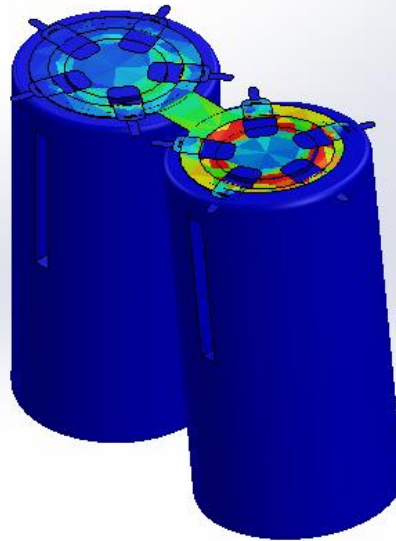
Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	1e-033



Study Results

Name	Type	Min	Max
Stress	INT: Stress Intensity(P1-P3)	0.00091772 MPa Or 0.000133104 ksi	302.77 MPa Or 43.913 ksi
		Element: 2994	Element: 255

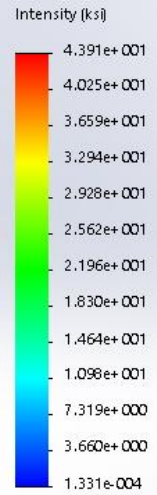
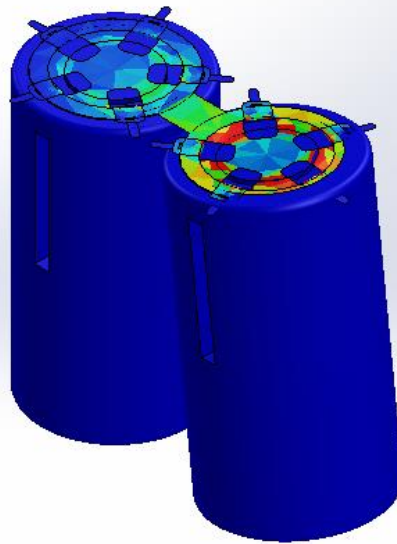
Model name: Connector Assembly D
 Study name: Horizontal Stress Test on D both bend(-Default)
 Plot type: Static element stress Stress1
 Deformation scale: 0.831269



Connector Assembly D-Horizontal Stress Test on D both bend-Stress-Stress (MPa)



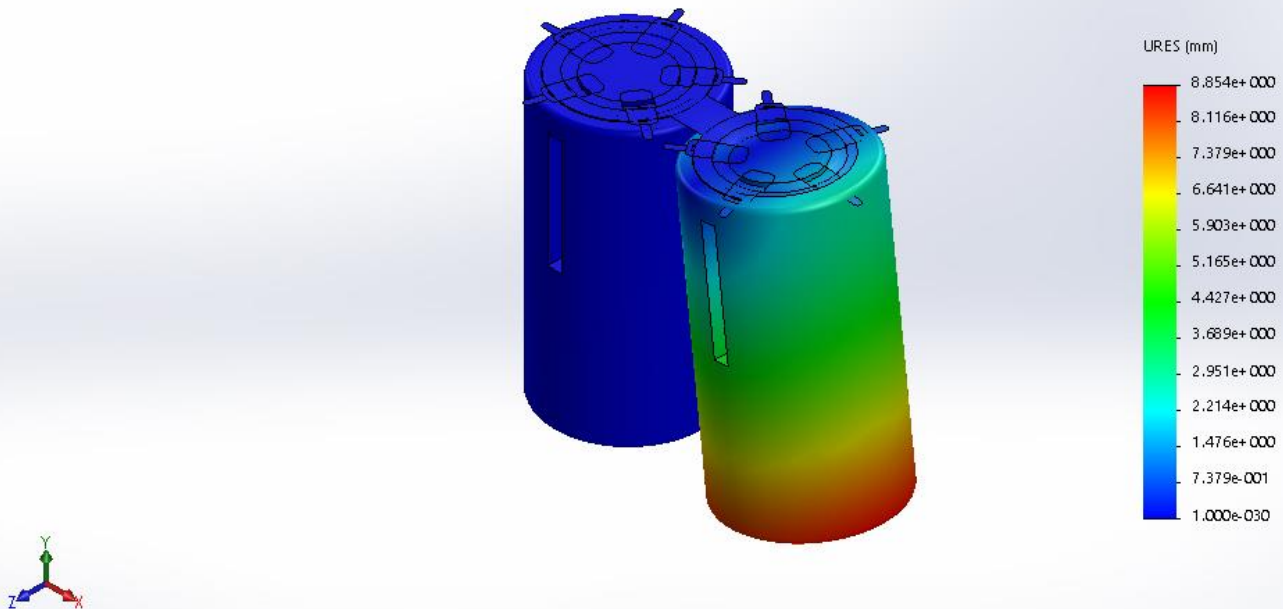
Model name: Connector Assembly D
 Study name: Horizontal Stress Test on D both bend(-Default)
 Plot type: Static element stress Stress1
 Deformation scale: 0.831269



Connector Assembly D-Horizontal Stress Test on D both bend-Stress-Stress (ksi)

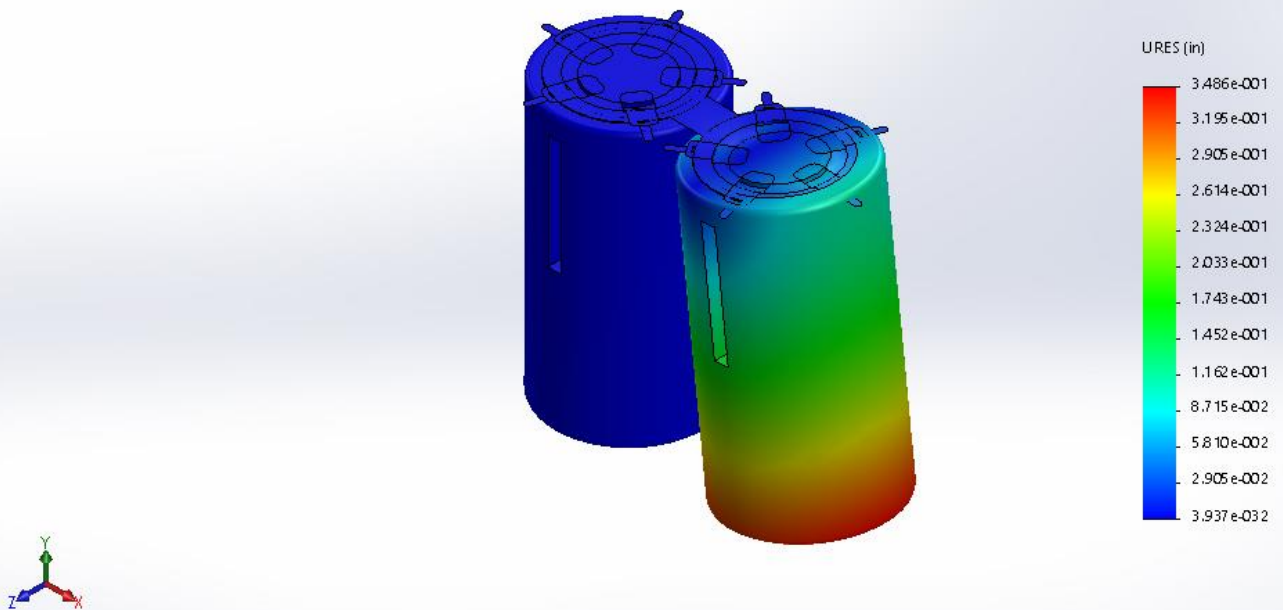
Name	Type	Min	Max
Displacement	URES: Resultant Displacement	0 mm Or 0 in Node: 10413	8.85426 mm Or 0.348593 in Node: 3261

Model name: Connector Assembly D
 Study name: Horizontal Stress Test on D both bend(-Default)
 Plot type: Static displacement: Displacement1
 Deformation scale: 0.831269



Connector Assembly D-Horizontal Stress Test on D both bend-Displacement-Displacement (mm)

Model name: Connector Assembly D
 Study name: Horizontal Stress Test on D both bend(-Default)
 Plot type: Static displacement: Displacement1
 Deformation scale: 0.831269

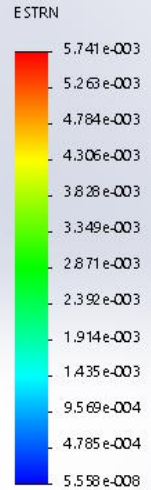
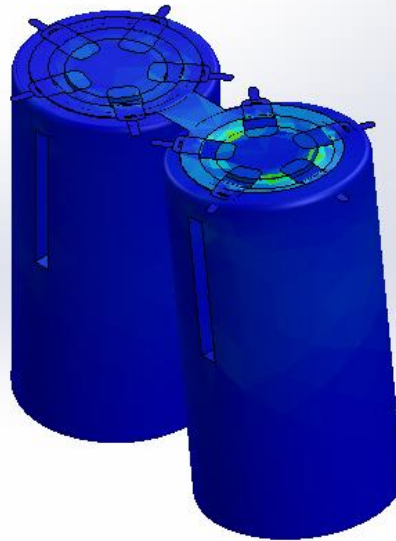


Connector Assembly D-Horizontal Stress Test on D both bend-Displacement-Displacement (in)



Name	Type	Min	Max
Strain	ESTRN: Equivalent Strain	5.55756e-008 Element: 554	0.00574137 Element: 380

Model name: Connector Assembly D
 Study name: Horizontal Stress Test on D both bend(-Default)
 Plot type: Static strain Strain1
 Deformation scale: 0.831269



Connector Assembly D-Horizontal Stress Test on D both bend-Strain-Strain

Conclusion

When a force of 200 N (44.9618 lbf) was applied on the setup (with outer tabs not folded to make a locking), the stress induced was within safe limits, thus making it suitable for operation even under 200N (44.9618 lbf) load.

