



Simulation of Connector Assembly Sub C

Date: Friday, February 26, 2016

Designer: Solidworks

Study name: Horizontal Stress Test in Sub C inner bend

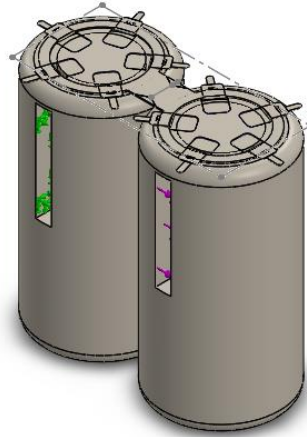
Analysis type: Static

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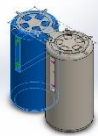



Model Information



Model name: Connector Assembly Sub C
Current Configuration: Default

Solid Bodies

Document Name and Reference	Treated As	Volumetric Properties	Document Path/Date Modified
Cut-Extrude2 	Solid Body	Mass:0.12997 kg Volume:1.52906e-005 m ³ Density:8500 kg/m ³ Weight:1.27371 N	E:\Battery Connector\Parts\3D\Batte ry Sub C.SLDPRT Feb 25 11:16:32 2016
Cut-Extrude2 	Solid Body	Mass:0.12997 kg Volume:1.52906e-005 m ³ Density:8500 kg/m ³ Weight:1.27371 N	E:\Battery Connector\Parts\3D\Batte ry Sub C.SLDPRT Feb 25 11:16:32 2016



Study Properties

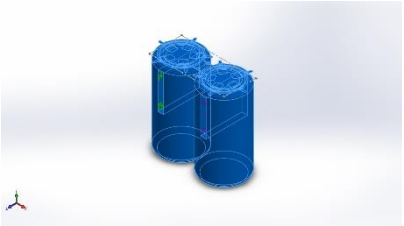
Study name	Horizontal Stress Test in Sub C inner bend
Analysis type	Static
Mesh type	Mixed Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	298 Kelvin
Include fluid pressure effects from SOLIDWORKS Flow Simulation	Off
Solver type	Automatic
Inplane Effect:	Off
Soft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

Units

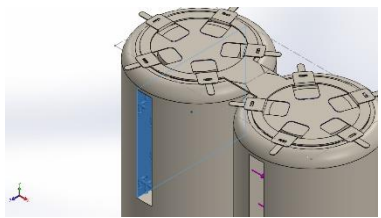
Unit system:	SI (MKS)
Length/Displacement	mm
Temperature	Kelvin
Angular velocity	Rad/sec
Pressure/Stress	N/m ²



Material Properties

Model Reference	Properties	Components
	Name: Nickel Model type: Linear Elastic Isotropic Default failure criterion: Unknown Yield strength: 5.9e+007 N/m ² Tensile strength: 3.17e+008 N/m ² Elastic modulus: 2.1e+011 N/m ² Poisson's ratio: 0.31 Mass density: 8500 kg/m ³ Shear modulus: 7.9e+010 N/m ² Thermal expansion coefficient: 1.7e-005 /Kelvin	SolidBody 1(Flat-Pattern)(Barbell Connector Sub C-1), SolidBody 1(Cut-Extrude2)(Battery Sub C-1), SolidBody 1(Cut-Extrude2)(Battery Sub C-2), SolidBody 1(Cut-Extrude3)(Star Connector Sub C 3D-3), SolidBody 1(Cut-Extrude3)(Star Connector Sub C 3D-4)
Curve Data:N/A		

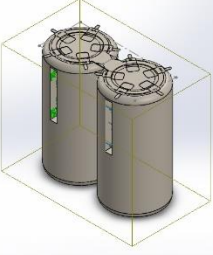
Loads and Fixtures

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)	-0.999997	7.12927e-007	-2.59024e-009	0.999997
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: 1 N



Contact Information

Contact	Contact Image	Contact Properties
Global Contact		Type: Bonded Components: 1 component(s) Options: 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	4.06673 mm
Minimum element size	0.813347 mm
Mesh Quality	High
Remesh failed parts with incompatible mesh	Off

Mesh information - Details

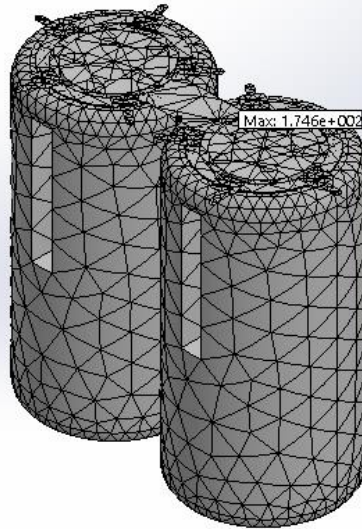
Total Nodes	14296
Total Elements	7780
Time to complete mesh(hh:mm:ss):	00:00:13
Computer name:	

Mesh Quality Plots

Name	Type	Min	Max
Mesh Quality1	Aspect Ratio	1.00638 Element: 702	174.61 Element: 7



Model name:Connector Assembly Sub C
 Study name:Horizontal Stress Test in Sub C inner bend(Default-)
 Plot type: Aspect ratio Mesh Quality1
 Global value: 1.00638 to 174.61



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

Resultant Forces

Reaction forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	-0.999997	7.12927e-007	-2.59024e-009	0.999997

Reaction Moments

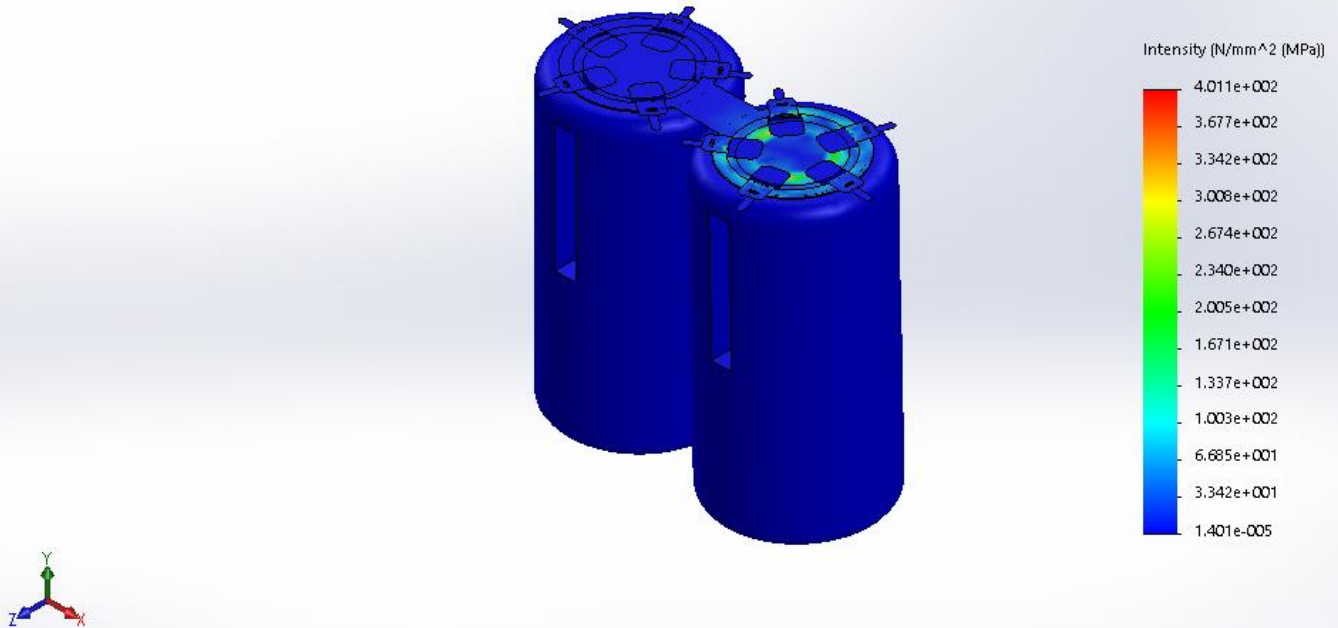
Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	1e-033



Study Results

Name	Type	Min	Max
Stress1 (MPa)	INT: Stress Intensity(P1-P3)	1.40082e-005 N/mm ² (MPa) Node: 3549	401.094 N/mm ² (MPa) Node: 1476

Model name:Connector Assembly Sub C
Study name:Horizontal Stress Test in Sub C inner bend(-Default-)
Plot type: Static nodal stress Stress1
Deformation scale: 1

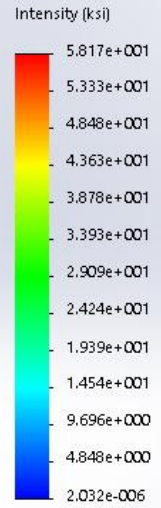
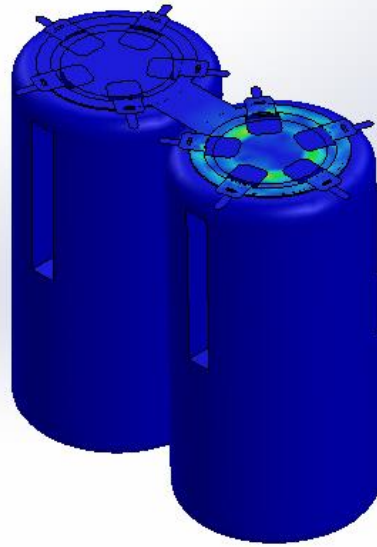


Connector Assembly Sub C-Horizontal Stress Test in Sub C inner bend-Stress-Stress1



Name	Type	Min	Max
Stress1 (ksi)	INT: Stress Intensity(P1-P3)	2.03171e-006 ksi Node: 3549	58.1738 ksi Node: 1476

Model name:Connector Assembly Sub C
 Study name:Horizontal Stress Test in Sub C inner bend(-Default-)
 Plot type: Static nodal stress Stress1
 Deformation scale: 1

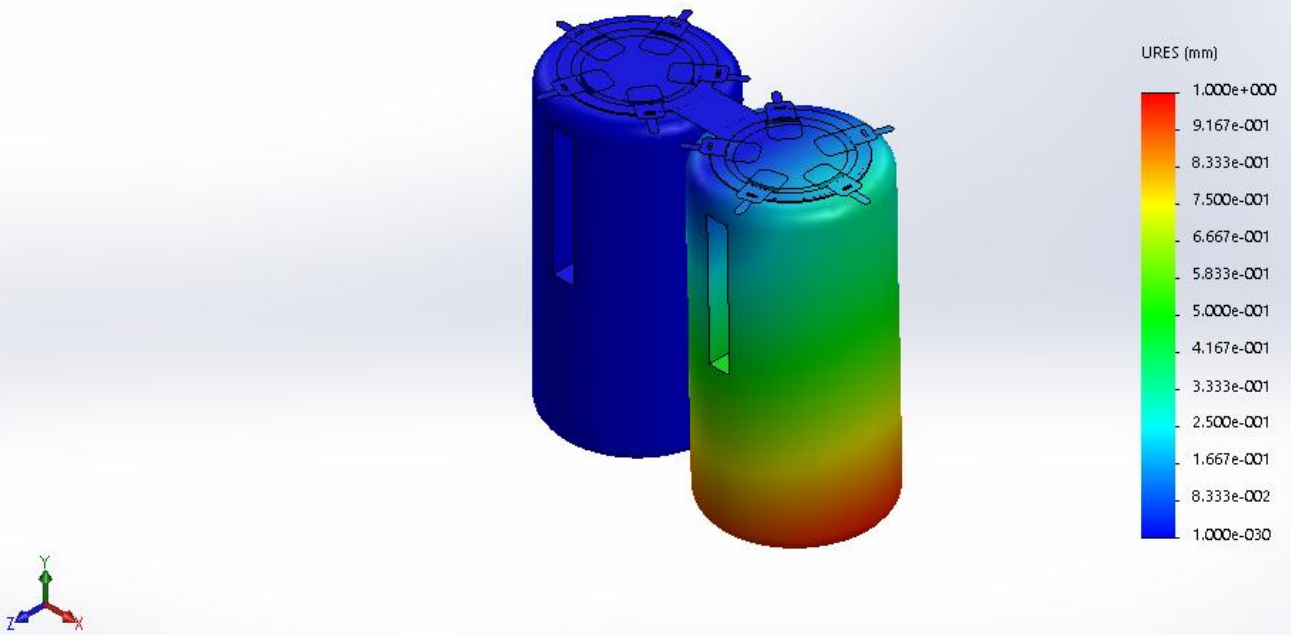


Connector Assembly Sub C-Horizontal Stress Test in Sub C inner bend-Stress-Stress1



Name	Type	Min	Max
Displacement1 (mm)	URES: Resultant Displacement	0 mm Node: 2582	1.00001 mm Node: 9358

Model name: Connector Assembly Sub C
 Study name: Horizontal Stress Test in Sub C inner bend(-Default-)
 Plot type: Static displacement Displacement1
 Deformation scale: 1

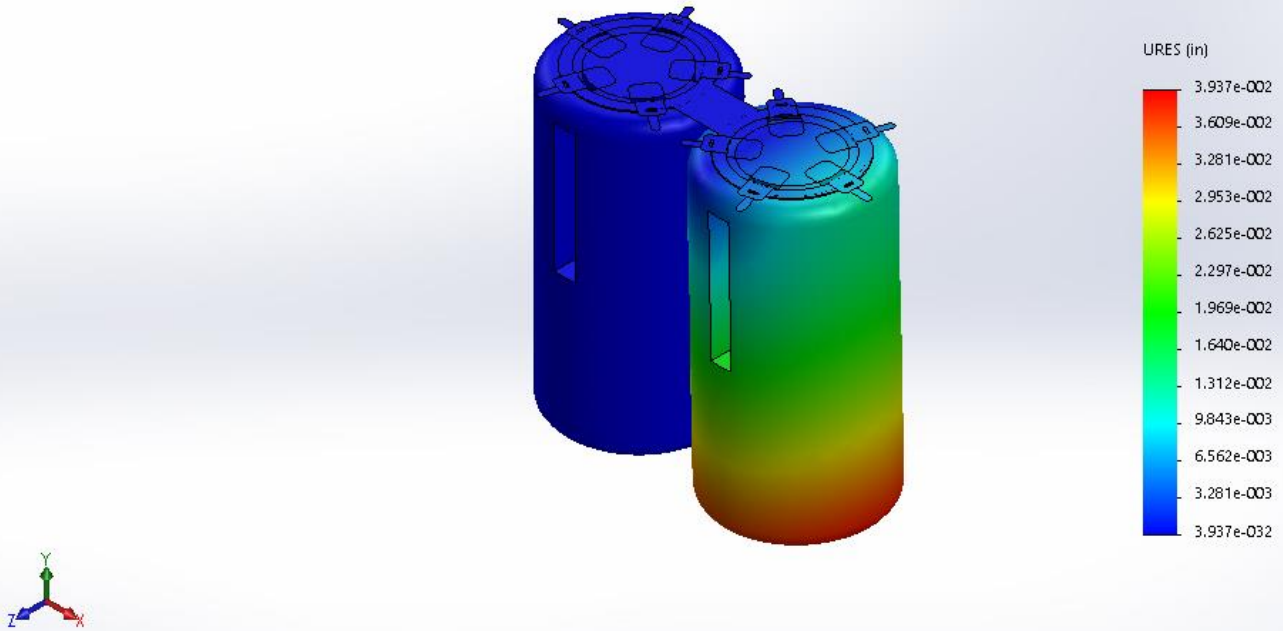


Connector Assembly Sub C-Horizontal Stress Test in Sub C inner bend-Displacement-Displacement1



Name	Type	Min	Max
Displacement1 (in)	URES: Resultant Displacement	0 in Node: 2582	0.0393707 in Node: 9358

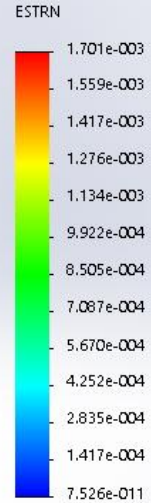
Model name: Connector Assembly Sub C
 Study name: Horizontal Stress Test in Sub C inner bend(-Default-)
 Plot type: Static displacement Displacement1
 Deformation scale: 1



Connector Assembly Sub C-Horizontal Stress Test in Sub C inner bend-Displacement-Displacement1

Name	Type	Min	Max
Strain1	ESTRN: Equivalent Strain	7.52558e-011 Element: 4196	0.00170095 Element: 829

Model name: Connector Assembly Sub C
 Study name: Horizontal Stress Test in Sub C inner bend(-Default-)
 Plot type: Static strain Strain1
 Deformation scale: 1



Connector Assembly Sub C-Horizontal Stress Test in Sub C inner bend-Strain-Strain1

Conclusion

With only inner tabs bent, the force of 10 N induces a stress of 401.1 Mpa in the setup. This when viewed under practical loading conditions reflect ample room for safe working of the connector assembly.

