



Simulation of Connector Assembly AA

Date: Tuesday, March 1, 2016

Designer: Solidworks

Study name: Horizontal Stress in AA both tab fold

Analysis type: Static

Table of Contents



Model Information	2
Study Properties.....	3
Units.....	3
Material Properties	4
Loads and Fixtures	4
Contact Information	5
Mesh information.....	6
Resultant Forces.....	7
Study Results.....	8
Conclusion	11

Model Information



Model name: Connector Assembly AA
Current Configuration: Default

Solid Bodies

Document Name and Reference	Treated As	Volumetric Properties	Document Path/Date Modified
Cut-Extrude2 	Solid Body	Mass:0.0630182 kg Volume:7.4139e-006 m ³ Density:8500 kg/m ³ Weight:0.617578 N	E:\Battery Connector\Parts\3D\Batter y AA.SLDPRT Feb 14 08:05:46 2016
Cut-Extrude2 	Solid Body	Mass:0.0630182 kg Volume:7.4139e-006 m ³ Density:8500 kg/m ³ Weight:0.617578 N	E:\Battery Connector\Parts\3D\Batter y AA.SLDPRT Feb 14 08:05:46 2016



Study Properties

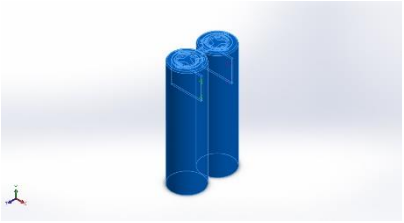
Study name	Horizontal Stress in AA both tab fold
Analysis type	Static
Mesh type	Mixed Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	298 Kelvin
Include fluid pressure effects from SOLIDWORKS Flow Simulation	Off
Solver type	Automatic
Inplane Effect:	Off
Soft Spring:	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

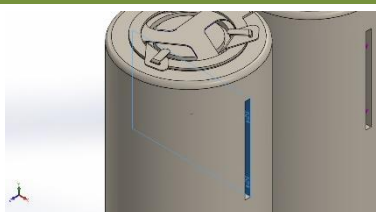
Unit system:	SI (MKS)
Length/Displacement	mm
Temperature	Kelvin
Angular velocity	Rad/sec
Pressure/Stress	N/m ²

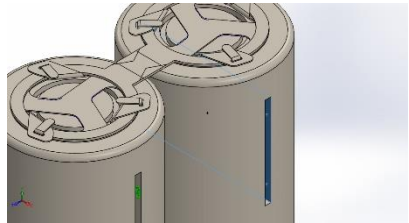


Material Properties

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(Cut-Extrude1)(Barbell Connector AA-2), SolidBody 1(Cut-Extrude2)(Battery AA-1), SolidBody 1(Cut-Extrude2)(Battery AA-2), SolidBody 1(Fold3)(Star Connector AA 3D-1), SolidBody 1(Fold3)(Star Connector AA 3D-2)
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)	-2.16067e-007	3.73125e-005	-4.71608	4.71608
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: 9.5 N (2.13568 lbf)



Contact Information

Contact	Contact Image	Contact Properties
Global Contact	 A 3D CAD model showing two cylindrical components bonded together. The components are positioned side-by-side, with their top surfaces facing each other. A thin layer of material is visible between them, indicating a bonded contact. The model is shown within a wireframe bounding box.	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	3.19494 mm
Minimum element size	0.638989 mm
Mesh Quality	High
Remesh failed parts with incompatible mesh	Off

Mesh information - Details

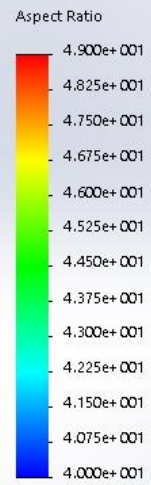
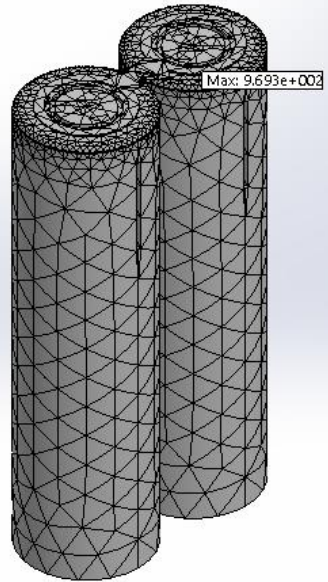
Total Nodes	13033
Total Elements	7458
Time to complete mesh(hh:mm:ss):	00:00:10
Computer name:	

Mesh Quality Plots

Name	Type	Min	Max
Mesh Quality1	Aspect Ratio	1 Element: 153	969.336 Element: 37



Model name: Connector Assembly AA
 Study name: Horizontal Stress in AA both tab fold(-Default-)
 Plot type: Aspect ratio Mesh Quality1
 Global value: 1 to 969.336



Connector Assembly AA-Horizontal Stress in AA both tab fold-Mesh Quality-Mesh Quality1

Resultant Forces

Reaction forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	-2.16067e-007	3.73125e-005	-4.71608	4.71608

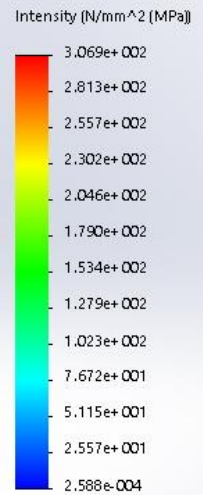
Reaction Moments

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)	0.000258823 MPa Or 3.75391e-005 ksi	306.874 MPa Or 44.5083 ksi
		Node: 9237	Node: 542

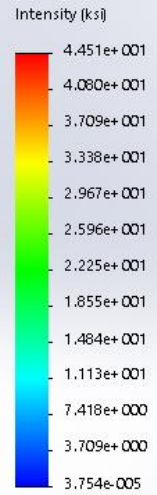
Model name: Connector Assembly AA
 Study name: Horizontal Stress in AA both tab fold(-Default-)
 Plot type: Static nodal stress: Stress1
 Deformation scale: 1



Connector Assembly AA-Horizontal Stress in AA both tab fold-Stress-Stress (MPa)



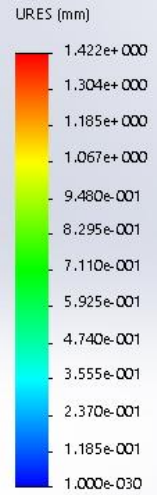
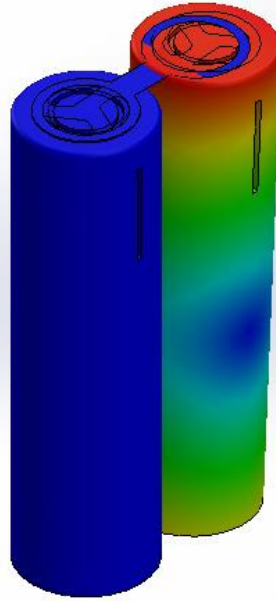
Model name: Connector Assembly AA
 Study name: Horizontal Stress in AA both tab fold-(Default-)
 Plot type: Static nodal stress Stress1
 Deformation scale: 1



Connector Assembly AA-Horizontal Stress in AA both tab fold-Stress-Stress (ksi)

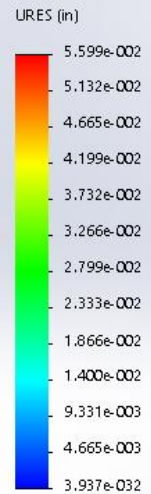
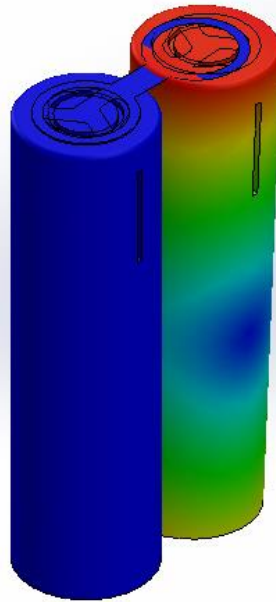
Name	Type	Min	Max
Displacement	URES: Resultant Displacement	0 mm Or 0 in	1.42202 mm Or 0.0559852 in
		Node: 729	Node: 7876

Model name: Connector Assembly AA
Study name: Horizontal Stress in AA both tab fold(-Default-)
Plot type: Static displacement: Displacement1
Deformation scale: 1



Connector Assembly AA-Horizontal Stress in AA both tab fold-Displacement-Displacement (mm)

Model name: Connector Assembly AA
Study name: Horizontal Stress in AA both tab fold(-Default-)
Plot type: Static displacement: Displacement1
Deformation scale: 1

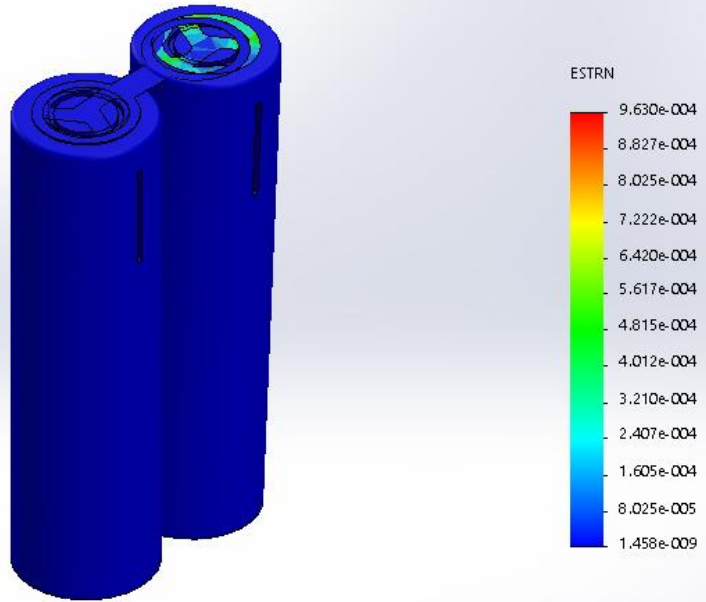


Connector Assembly AA-Horizontal Stress in AA both tab fold-Displacement-Displacement (in)



Name	Type	Min	Max
Strain	ESTRN: Equivalent Strain	1.45822e-009 Element: 6943	0.00096298 Element: 246

Model name: Connector Assembly AA
 Study name: Horizontal Stress in AA both tab fold(-Default-)
 Plot type: Static strain Strain1
 Deformation scale: 1



Connector Assembly AA-Horizontal Stress in AA both tab fold-Strain-Strain

Conclusion

The connector assembly has induced a maximum stress of 306.874 MPa (44.5083 ksi) under the load of 9.5 N (2.13568 lbf). This gives satisfactory performance as the maximum permissible tensile strength is 317 Mpa. Further the maximum material displacement is 1.42202 mm (0.0559852 in) which is allowable.

