

Simulation of Connector Assembly D

Date: Monday, March 7, 2016

Designer: Solidworks

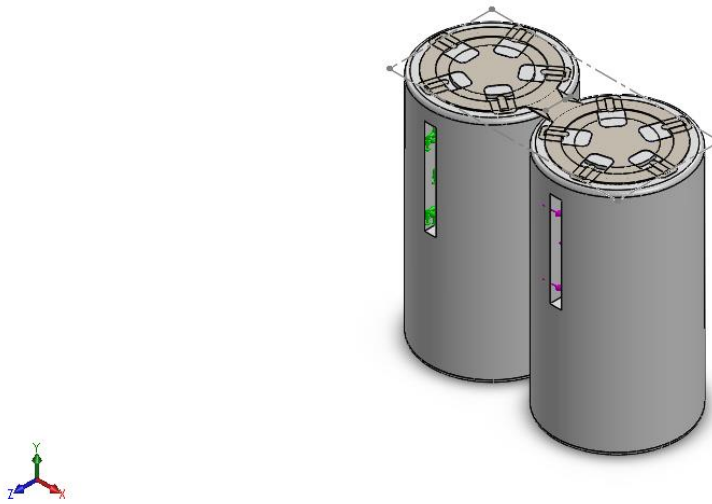
Study name: Horizontal Stress Test on D both bend

Analysis type: Static

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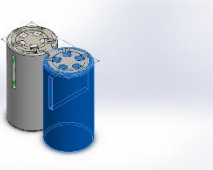
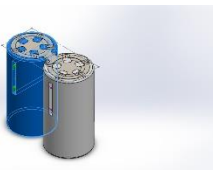
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Model Information



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\Batte ry 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\Batte ry D.SLDPRT Feb 20 09:34:17 2016



Study Properties


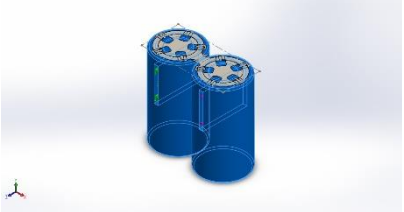
Study name	Horizontal Stress Test on D both bend
Analysis type	Static
Mesh type	Mixed Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	298 Kelvin
Include fluid pressure effects from SOLIDWORKS Flow Simulation	Off
Solver type	Automatic
Inplane Effect:	On
Soft Spring: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

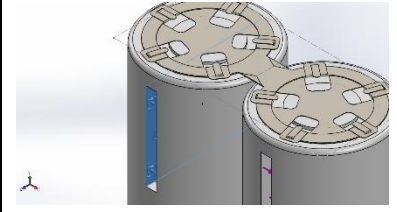


Material Properties

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(Fold2)(Star Connector D 3D-1), SolidBody 1(Fold2)(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		

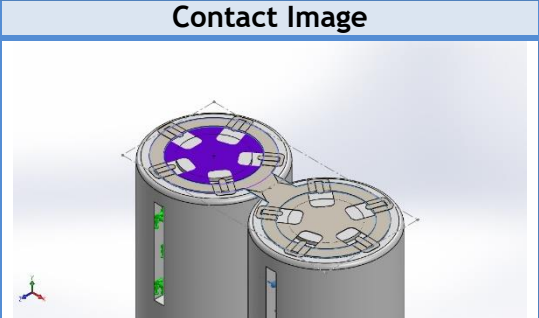
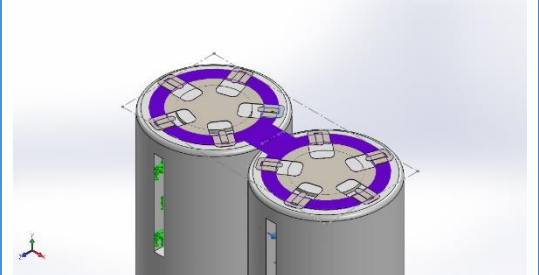
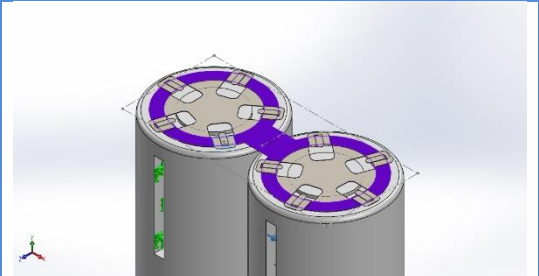
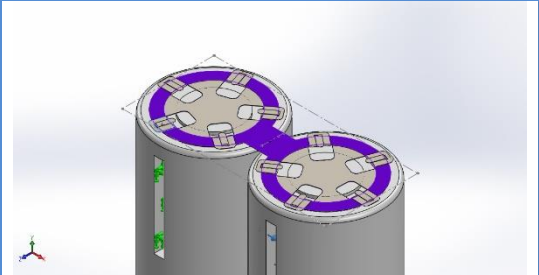
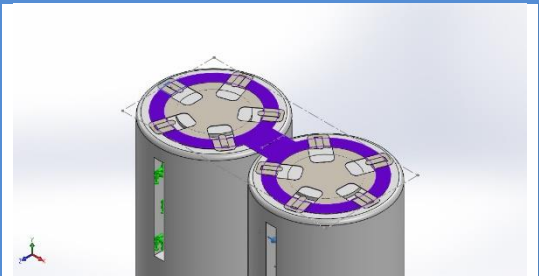


Loads and Fixtures

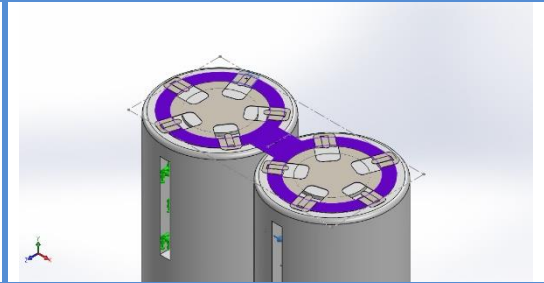
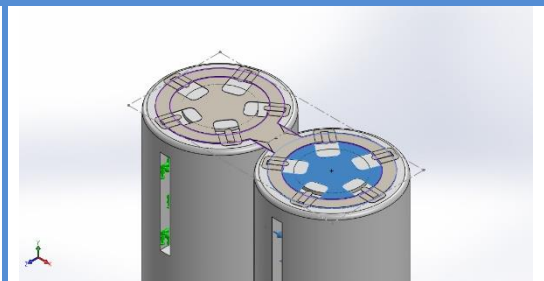
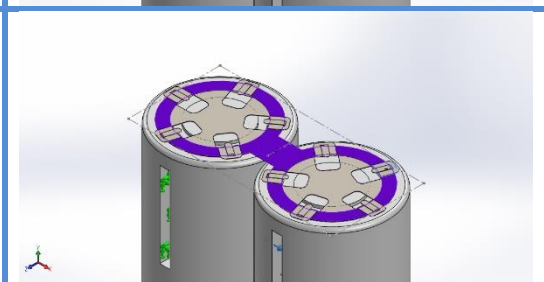
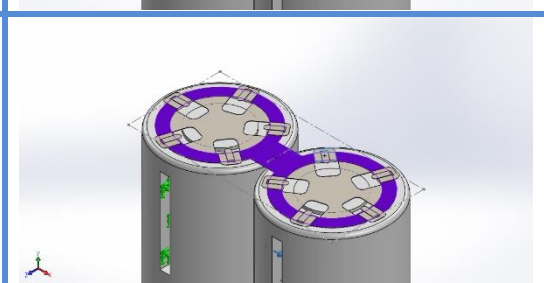
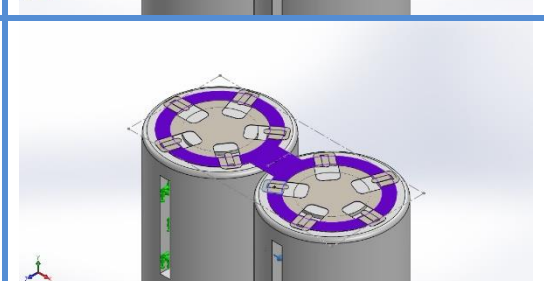
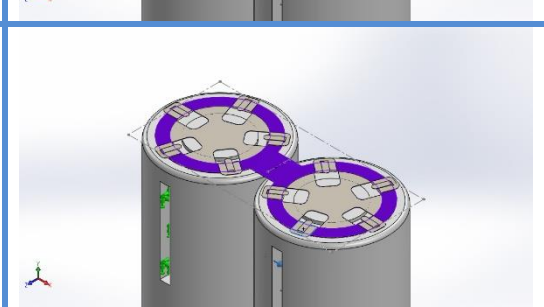
Fixture name	Fixture Image	Fixture Details		
Fixed-1		Entities: 1 face(s) Type: Fixed Geometry		
Resultant Forces				
Components	X	Y	Z	Resultant
Reaction force(N)	1.42582	0.105482	-0.00861268	1.42974
Reaction Moment(N.m)	0	0	0	1e-033

Load name	Load Image	Load Details
Force-1		Entities: 1 face(s) Type: Apply normal force Value: 300 N (67.4427 lbf)

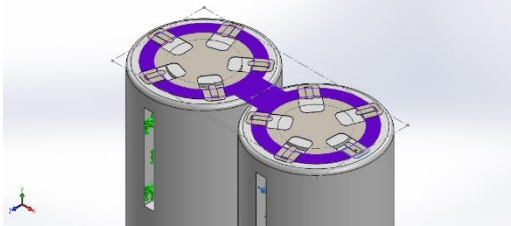
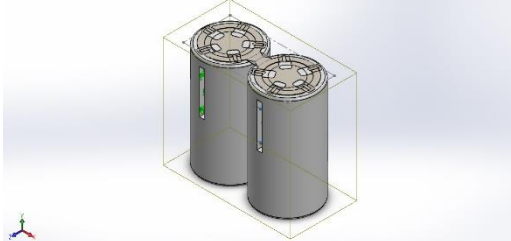
Contact Information

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



<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

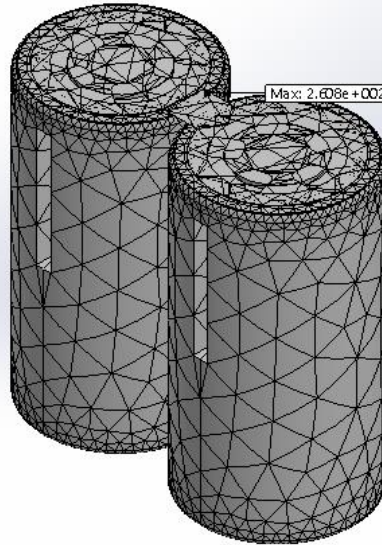
Total Nodes	16788
Total Elements	9213
Time to complete mesh(hh:mm:ss):	00:00:08
Computer name:	

Mesh Quality Plots

Name	Type	Min	Max
Mesh Quality1	Aspect Ratio	1.037 Element: 402	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: 1.037 to 260.784



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	1.42582	0.105482	-0.00861268	1.42974

Reaction Moments

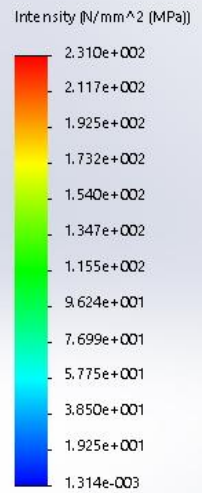
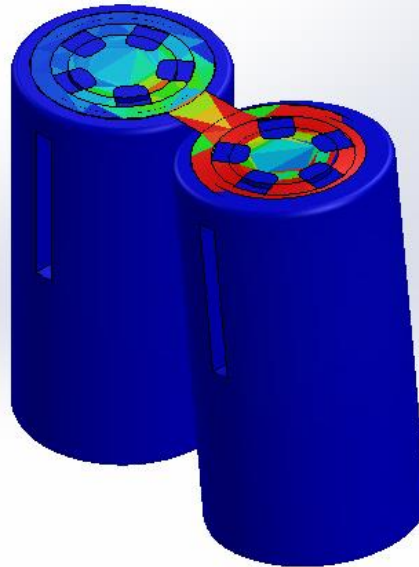
Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	1e-033



Study Results

Name	Type	Min	Max
Stress1	INT: Stress Intensity(P1-P3)	0.00131426 MPa Or 0.000190618 ksi	230.979 MPa Or 33.5006 ksi
		Element: 2306	Element: 130

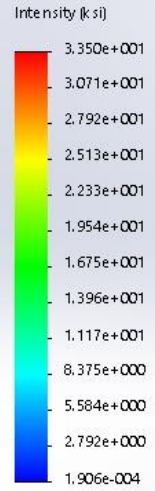
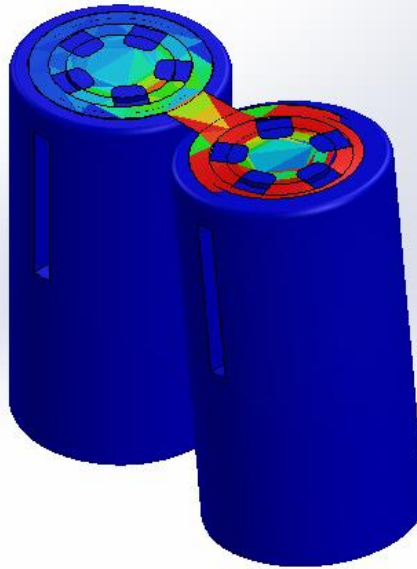
Model name: Connector Assembly D
 Study name: Horizontal Stress Test on D both bend(-Default-)
 Plot type: Static element stress Stress1
 Deformation scale: 0.568941



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



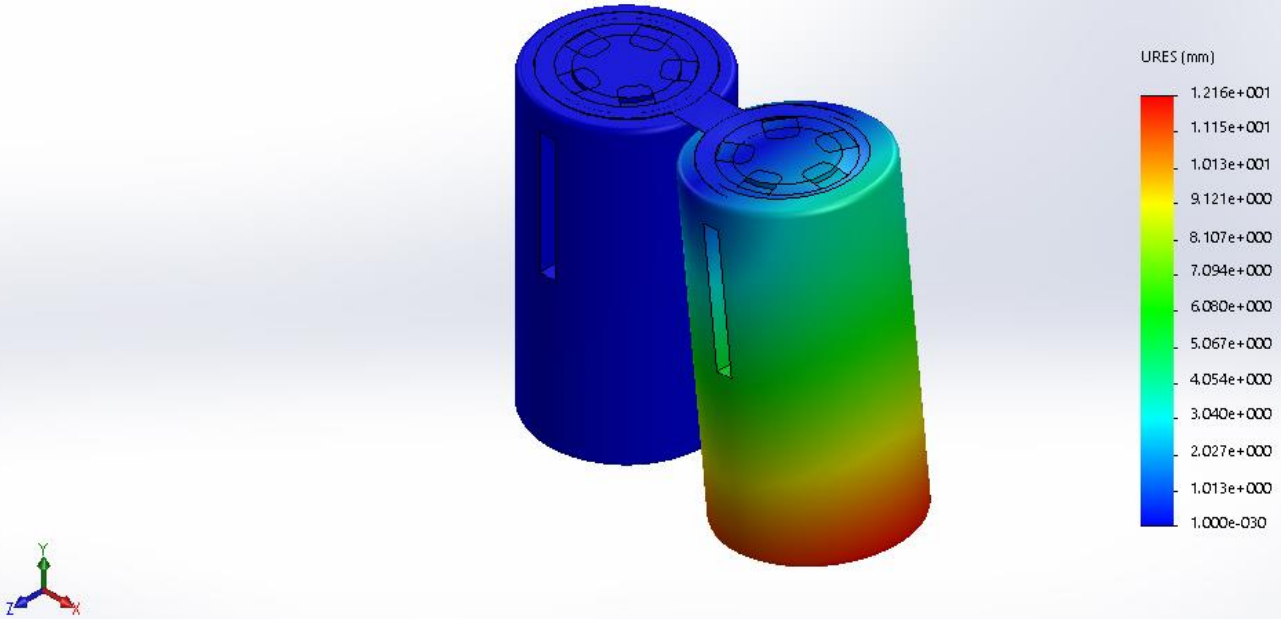
Model name: Connector Assembly D
 Study name: Horizontal Stress Test on D both bend(-Default-)
 Plot type: Static element stress Stress 1
 Deformation scale: 0.568941



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

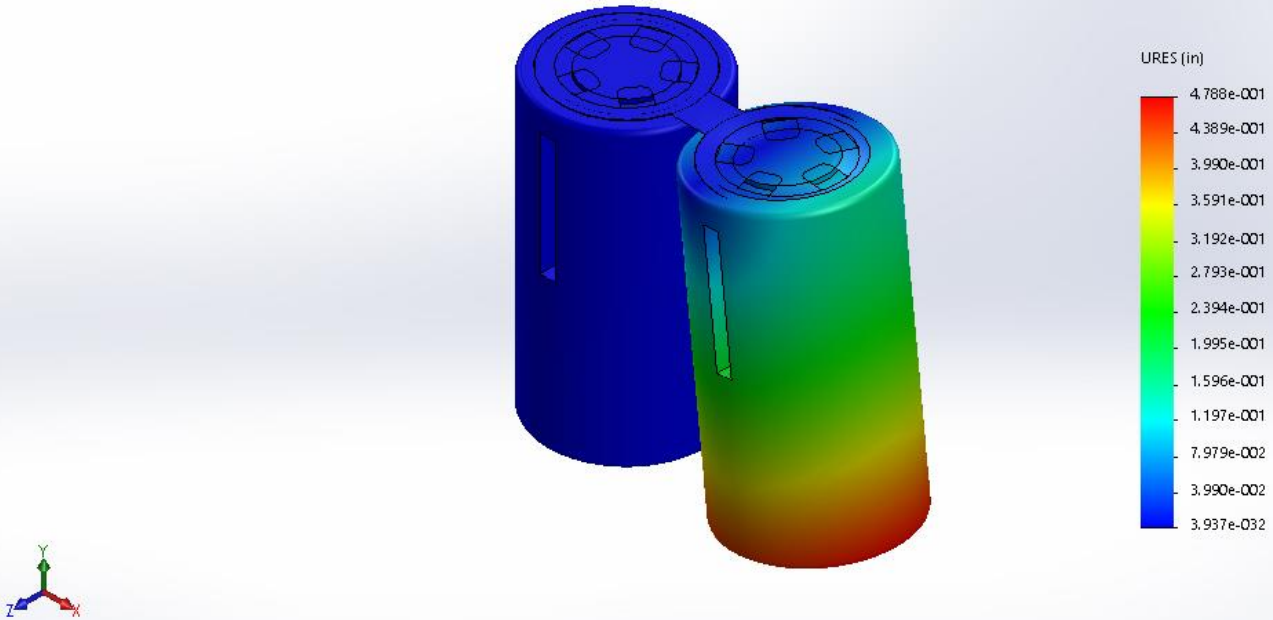
Name	Type	Min	Max
Displacement1	URES: Resultant Displacement	0 mm Or 0 in Node: 8723	12.1607 mm Or 0.478767 in Node: 4402

Model name: Connector Assembly D
Study name: Horizontal Stress Test on D both bend(-Default-)
Plot type: Static displacement: Displacement1
Deformation scale: 0.568941



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: 0.568941

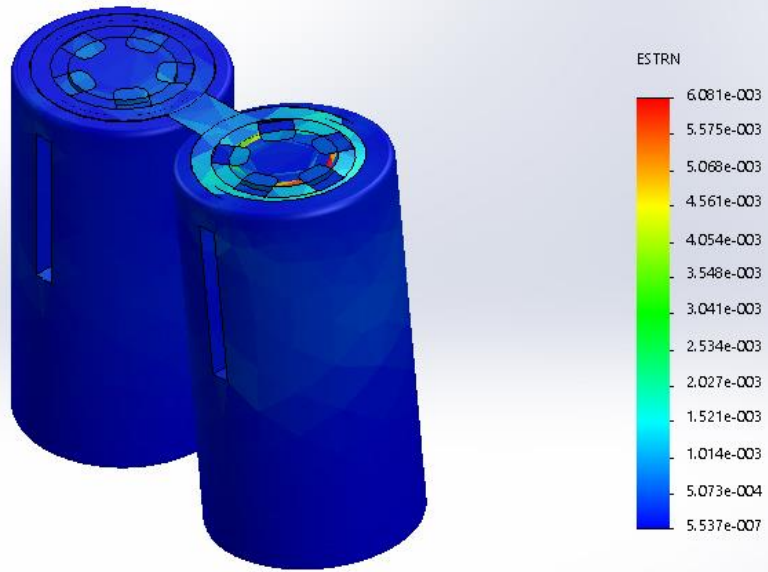


Connector Assembly D-Horizontal Stress Test on D both bend-Displacement-Displacement (in)



Name	Type	Min	Max
Strain	ESTRN: Equivalent Strain	5.537e-007 Element: 2306	0.00608128 Element: 130

Model name: Connector Assembly D
 Study name: Horizontal Stress Test on D both bend(-Default-)
 Plot type: Static strain Strain1
 Deformation scale: 0.568941



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

Conclusion

When installed according to the manufacturer's instructions (locking tab engaged), the subject connections withstood an applied force of 300 N with no discernible distortion.

