

CENTERLINE BRACKETS
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Simulation of CSP-0038-12

Date: Saturday, February 01, 2014
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Study name: CSP-0038-12
Analysis type: Static

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Description

INSTALLER BRACKET

PART NUMBER: CSP-0038-12
MATERIAL: ASTM A36
THICKNESS: 0.25 INCHES



Assumptions

Comments:

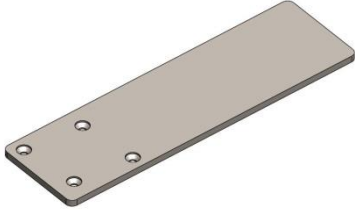
- 1) ANALYSIS IS VALID FOR THE CSP-0038-12 BRACKET ONLY
- 2) 315 LB LOAD IS DISTRIBUTED EVENLY OVER ENTIRE TOP OF BRACKET SURFACE
- 3) FASTENER ANALYSIS WAS NOT CONSIDERED
- 4) BRACKET MOUNTED TO INFINITELY STIFF COUNTERTOP (NO DEFLECTION OF COUNTERTOP)
- 5) BRACKET ANALYSIS CONSIDERED AN 8.00 INCH OVERHANGE ONLY
- 6) ALL RESULTS NEED TO BE VERIFIED BY PHYSICAL TESTING AS BOUNDARY CONDITIONS MAY VARY FROM INSTALLATION TO INSTALLATION

Units

Unit system:	IMPERIAL
Length/Displacement	IN
Temperature	N/A
Angular velocity	Rad/sec
Pressure/Stress	PSI



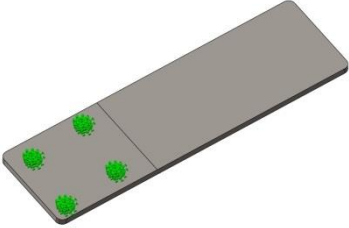
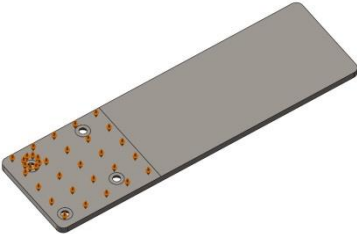
Material Properties

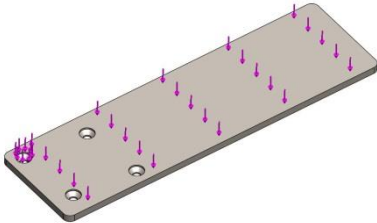
Model Reference	Properties	Components
	<p> Name: ASTM A36 Steel Model type: Linear Elastic Isotropic Default failure criterion: Max von Mises Stress Yield strength: 36259.43 PSI Tensile strength: 58015.1 PSI Elastic modulus: 29007547.53 PSI Poisson's ratio: 0.26 Mass density: 0.283599 LB/IN³ Shear modulus: 11501492.6 PSI </p>	

Comments:

CSP-0038-12 BRACKET IS MANUFACTURED ON CENTERLINE STEEL EQUIPMENT

Loads and Fixtures

Fixture name	Fixture Image	Fixture Details
Fixed-1		Entities: 4 face(s) Type: Fixed Geometry
Roller/Slider-1		Entities: 1 face(s) Type: Roller/Slider

Load name	Load Image	Load Details
Force-2		Entities: 1 face(s) Type: Apply normal force Value: 315 lbf

Mesh Information


Mesh type	Solid Mesh
Mesher Used:	Standard mesh
Jacobian points	4 Points
Maximum element size	0.083 in
Minimum element size	0.083 in
Mesh Quality	High

Mesh Information - Details

Total Nodes	250166
Total Elements	160333
Maximum Aspect Ratio	6.3738
% of elements with Aspect Ratio < 3	99.5
% of elements with Aspect Ratio > 10	0
% of distorted elements(Jacobian)	0
Time to complete mesh(hh:mm:ss):	00:00:16
Computer name:	N/A

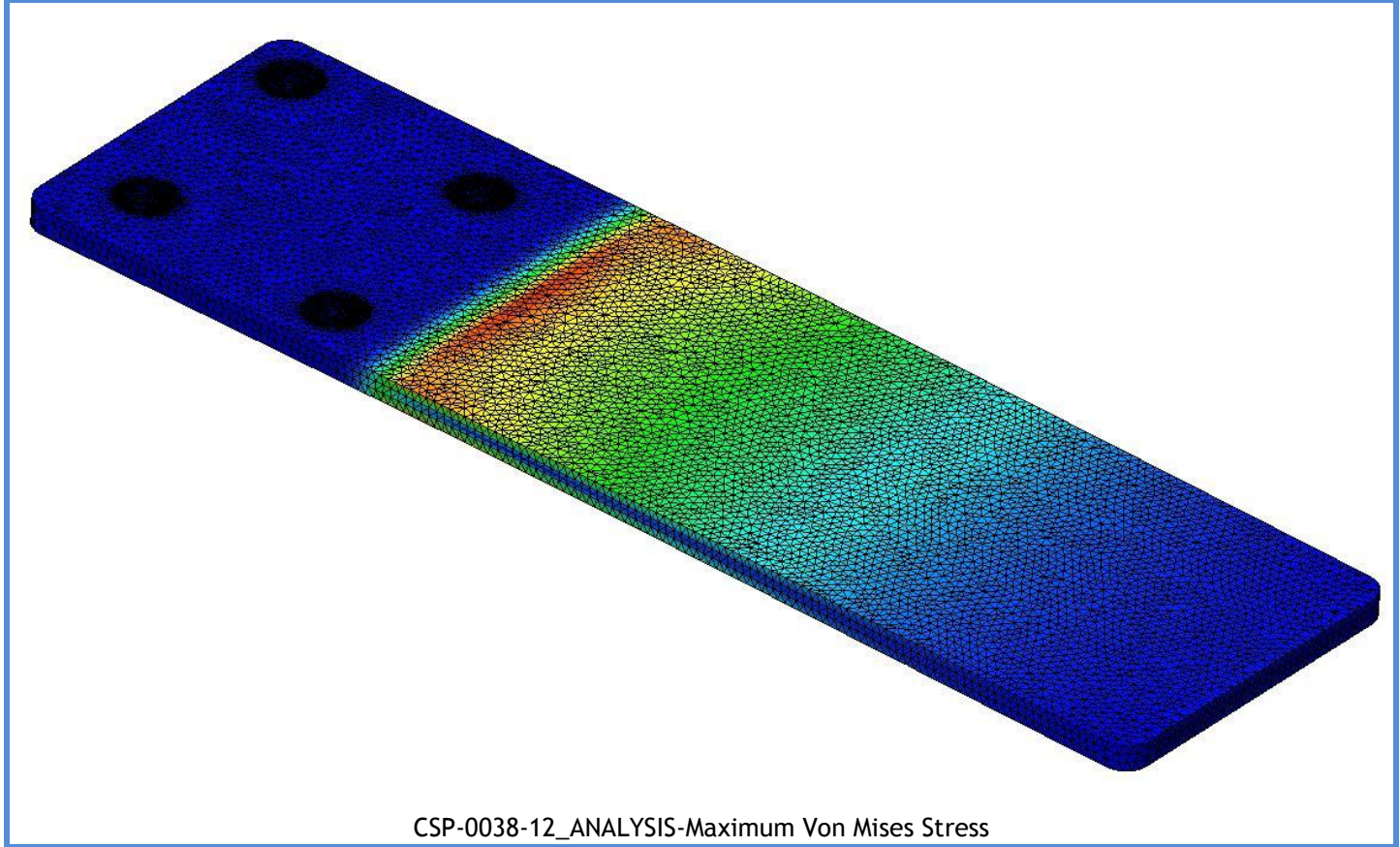


Mesh Control Information:

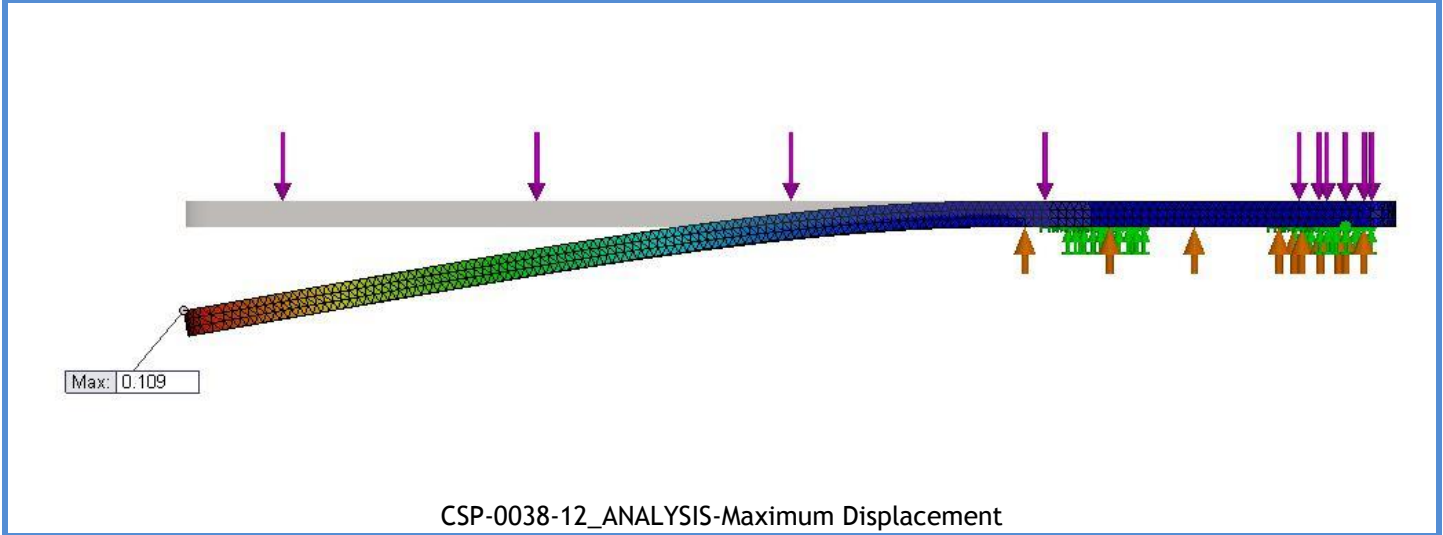
Mesh Control Name	Mesh Control Image	Mesh Control Details
Control-2		Entities: 12 face(s) Units: in Size: 0.02 Ratio: 1.5

Study Results

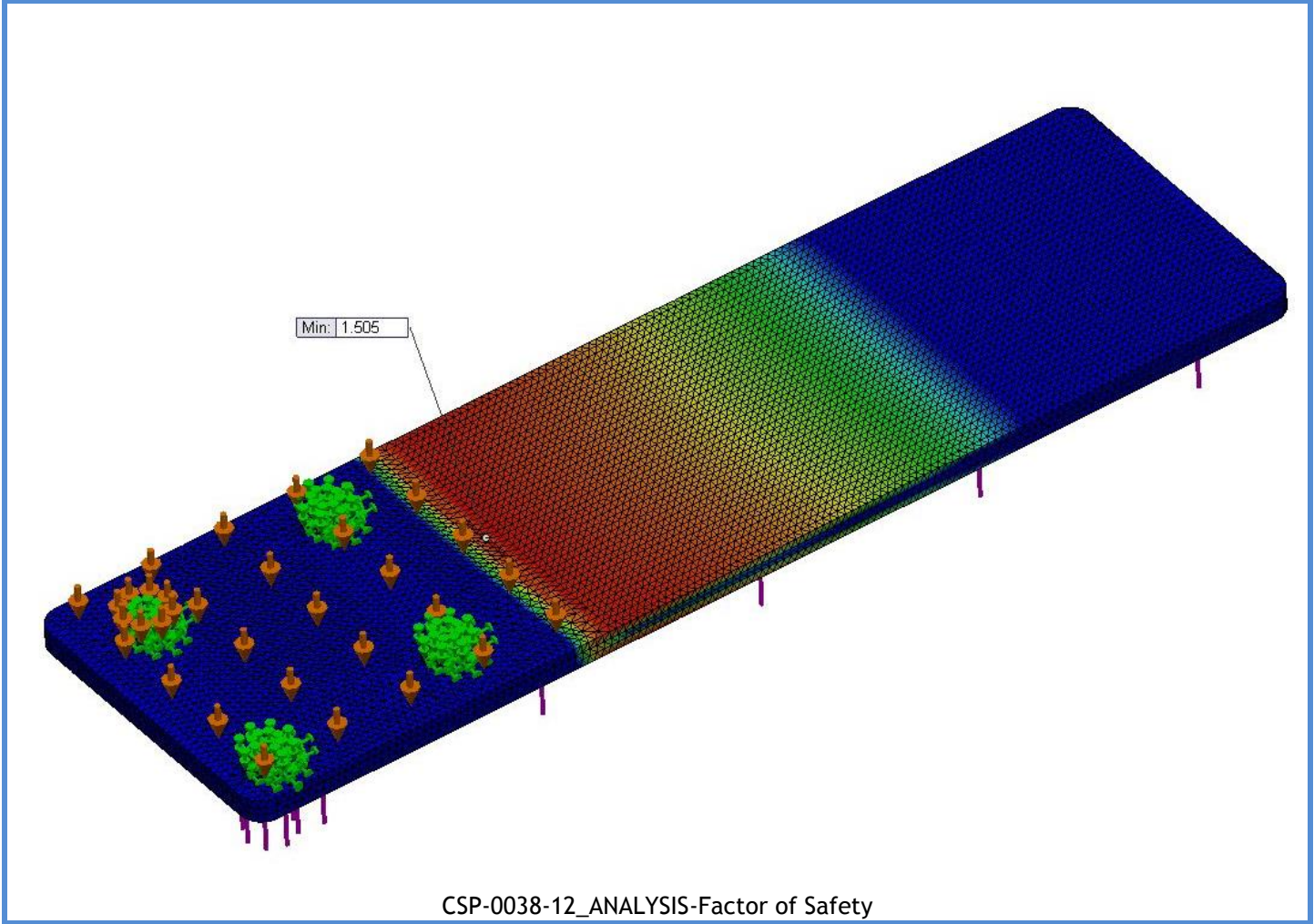
Name	Type	Min	Max
Stress	VON: von Mises Stress	0.434933 psi Node: 247550	24088.1 psi Node: 232279



Name	Type	Min	Max
Displacement	URES: Resultant Displacement	0 in Node: 1	0.108591 in Node: 178015



Name	Type	Min	Max
Factor of Safety	Automatic	1.50528 Node: 232279	83367.9 Node: 247550



Conclusion

Comments:

A DISTRIBUTED LOAD OF 315 LBS CAN BE SAFELY APPLIED TO THE TOP FACE OF THE BRACKET WITH A MAXIMUM DISPLACEMENT OF 0.109 INCH. THE SAFETY FACTOR FOR THE CSP-0038-12 BRACKET WITH A 315 LBS LOAD IS 1.5, THIS MEANS THAT NO PERMANENT DEFORMATION OF THE BRACKET WILL BE EXPERIENCED UNTIL A LOAD OF 472.50 LBS, OR GREATER, HAS BEEN APPLIED (ASSUMING SAME LOAD DISTRIBUTION). ONCE A LOAD OF 472.50 POUNDS OR GREATER HAS BEEN EXPERIENCED THE BRACKET WILL EXCEED ITS YIELD STRENGTH AND WILL EXPERIENCE PERMANENT DEFORMATION. DUE TO SMALL MATERIAL DIFFERENCES, MANUFACTURING INCONSISTENCIES, FASTENER TYPES, MOUNTING IMPERFECTIONS, ETC. CENTERLINE STEEL SUGGESTS THAT THE CSP-0038-12 BRACKET NEVER EXCEED A DISTRIBUTED LOAD OF 315 LBS.

FOR SOME CUSTOMERS MINIMIZING DEFLECTION IS PARAMOUNT. THE TABLE BELOW SHOWS THE CORRELATION OF LOAD (LBS) VS. DEFLECTION (INCHES). IF MINIMIZING DEFLECTION IS OF UTMOST IMPORTANCE, USE THE TABLE BELOW TO DETERMINE YOUR APPLICATIONS MAXIMUM LOADING PER BRACKET.

LOAD vs. DEFLECTION TABLE	
LOAD (lbs.)	DEFLECTION (inches)
17.5	.006
35	.012
70	.024
105	.036
140	.048
175	.060
210	.072
245	.084
280	.097
315	.109