

Stress Analysis Report



Analyzed File:	PE-SANIFOS-610-TANK-V2.ipt
Autodesk Inventor Version:	2012 (Build 160160000, 160)
Creation Date:	24/08/2021, 2:31 PM
Simulation Author:	PE
Summary:	

▣ Project Info (iProperties)

▣ Summary

Title	SANIFOS 610
Subject	FEA TESTING TO AS/NZS 1546.1:2008
Author	PE
Manager	Daryl Perusic
Company	Perusic Engineering

▣ Project

Part Number	PE-SANIFOS-610-TANK-V2
Designer	PE
Cost	\$0.00
Date Created	24/07/2021

▣ Status

Design Status	WorkInProgress
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▣ Physical

Material	LLDPE Linear Low Density Polyethylene
Density	0.936 g/cm ³
Mass	7.91588 kg
Area	2421430 mm ²
Volume	8457130 mm ³
Center of Gravity	x=279.221 mm y=278.562 mm z=521.099 mm

Note: Physical values could be different from Physical values used by FEA reported below.

☐ **Simulation: LATERAL LOADS AS/NZS 1546.1:2008**

APPENDIX H

General objective and settings:

Design Objective	Single Point
Simulation Type	Static Analysis
Last Modification Date	24/08/2021, 12:03 PM
Detect and Eliminate Rigid Body Modes	No

Advanced settings:

Avg. Element Size (fraction of model diameter)	0.1
Min. Element Size (fraction of avg. size)	0.15
Grading Factor	1.8
Max. Turn Angle	60 deg
Create Curved Mesh Elements	Yes

☐ **Material(s)**

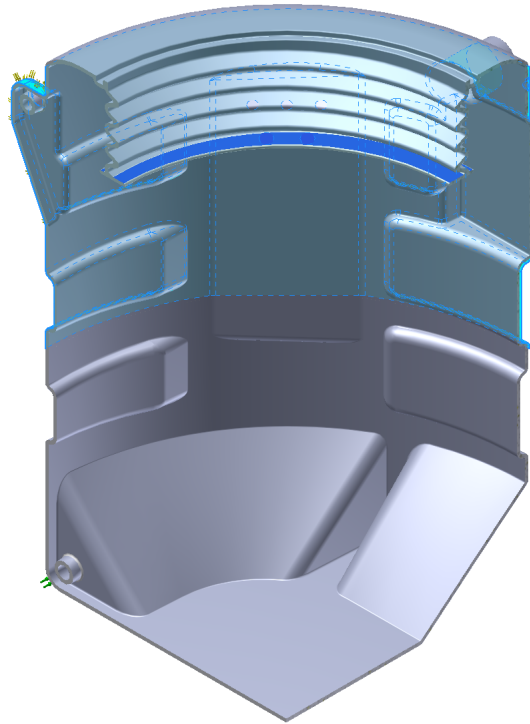
Name	LLDPE Linear Low Density Polyethylene	
General	Mass Density	0.936 g/cm ³
	Yield Strength	20 MPa
	Ultimate Tensile Strength	32 MPa
Stress	Young's Modulus	0.2 GPa
	Poisson's Ratio	0.41 ul
	Shear Modulus	0.070922 GPa
Stress Thermal	Expansion Coefficient	0.00018 ul/c
	Thermal Conductivity	0.225 W/(m K)
	Specific Heat	3182 J/(kg c)
Part Name(s)	PE-SANIFOS-610-TANK-V2.ipt	

☐ **Operating conditions**

☐ **Pressure:0.5m 5.5kPa**

Load Type	Pressure
Magnitude	0.798 psi

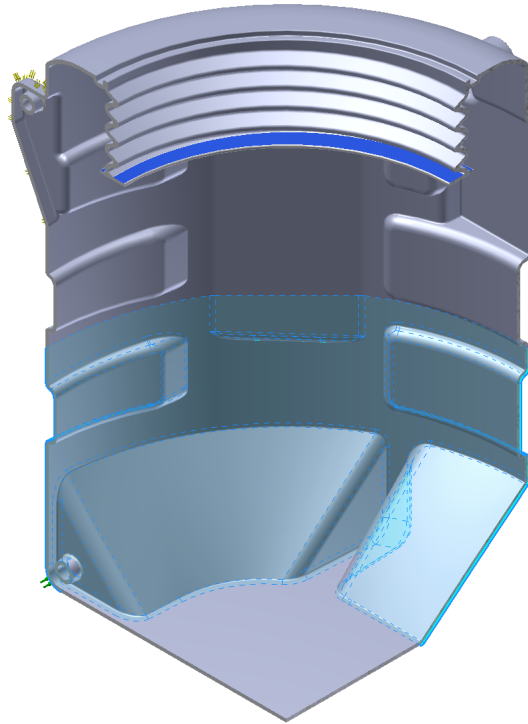
☐ **Selected Face(s)**



☐ **Pressure:1.0m 11kPa**

Load Type	Pressure
Magnitude	0.011 MPa

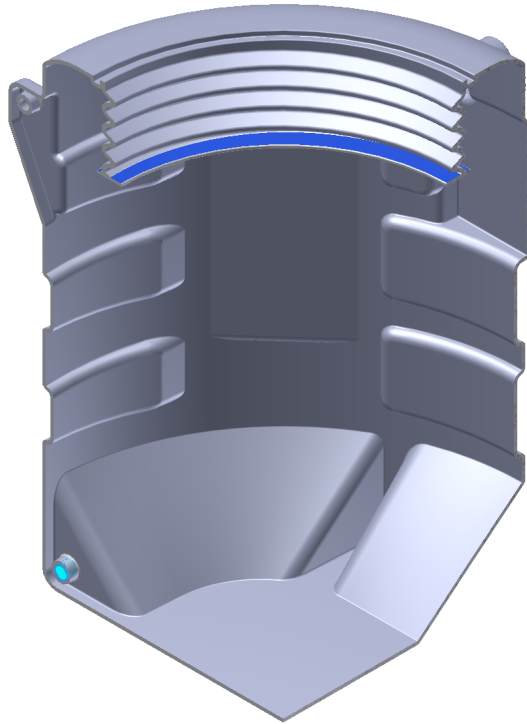
☐ **Selected Face(s)**



☐ **Fixed Constraint: PIN**

Constraint Type Fixed Constraint

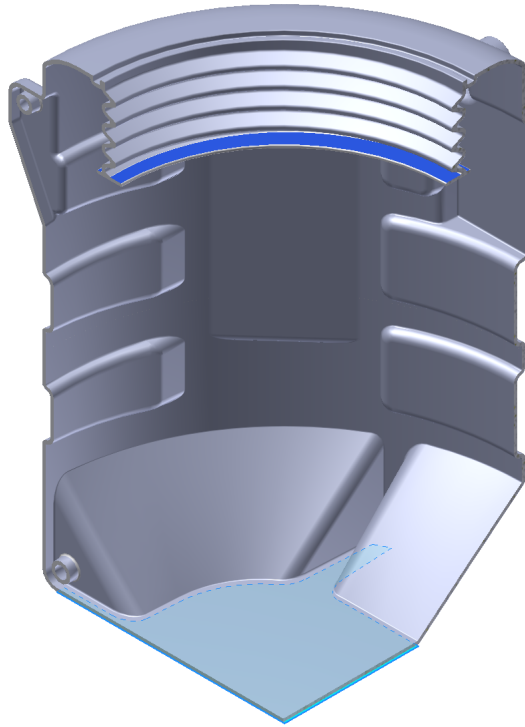
☐ **Selected Face(s)**



☐ **Frictionless Constraint: BASE**

Constraint Type Frictionless Constraint

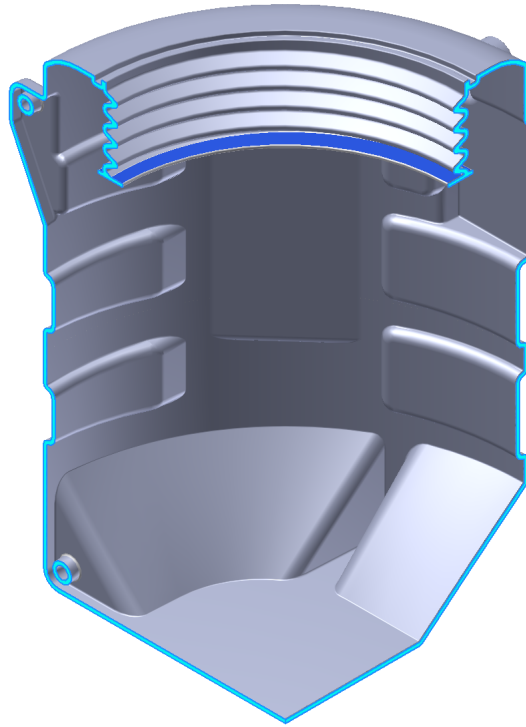
☐ **Selected Face(s)**



☐ **Frictionless Constraint: QUADRANT**

Constraint Type Frictionless Constraint

☐ **Selected Face(s)**



Results

Reaction Force and Moment on Constraints

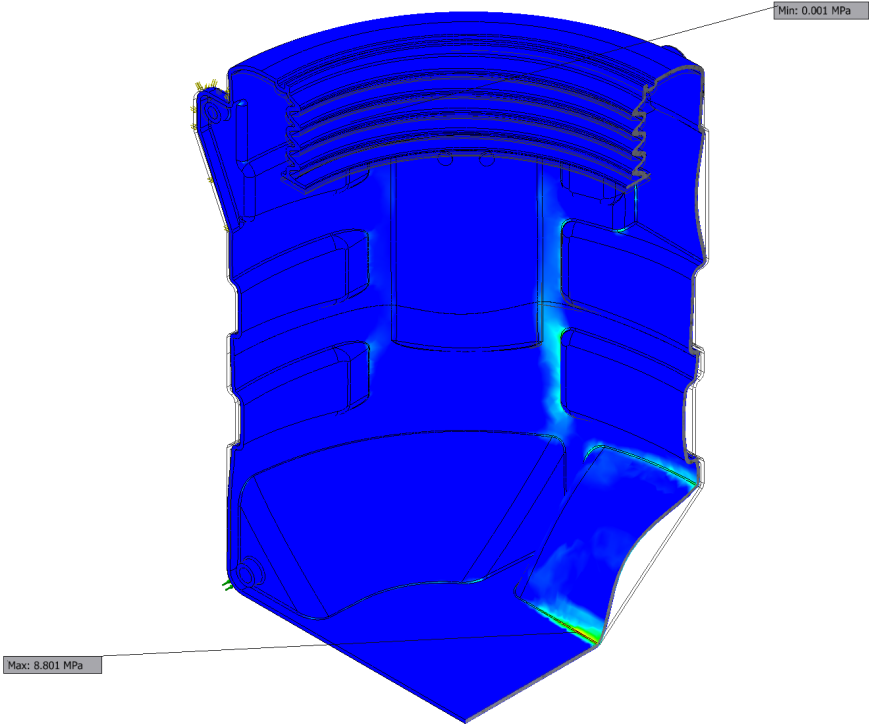
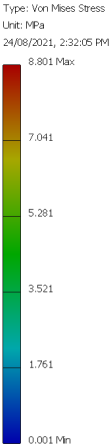
Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)
Fixed Constraint: PIN	427.383 N	-14.4631 N	4.83668 N m	-3.58088 N m
		139.722 N		3.04444 N m
		-403.639 N		1.14115 N m
Frictionless Constraint: BASE	750.086 N	62.8097 N	240.471 N m	-40.522 N m
		16.4309 N		237.005 N m
		-747.271 N		-3.60094 N m
Frictionless Constraint: QUADRANT	4902.02 N	3637.07 N	399.079 N m	214.258 N m
		3286.57 N		-312.39 N m
		6.7364 N		125.58 N m

Result Summary

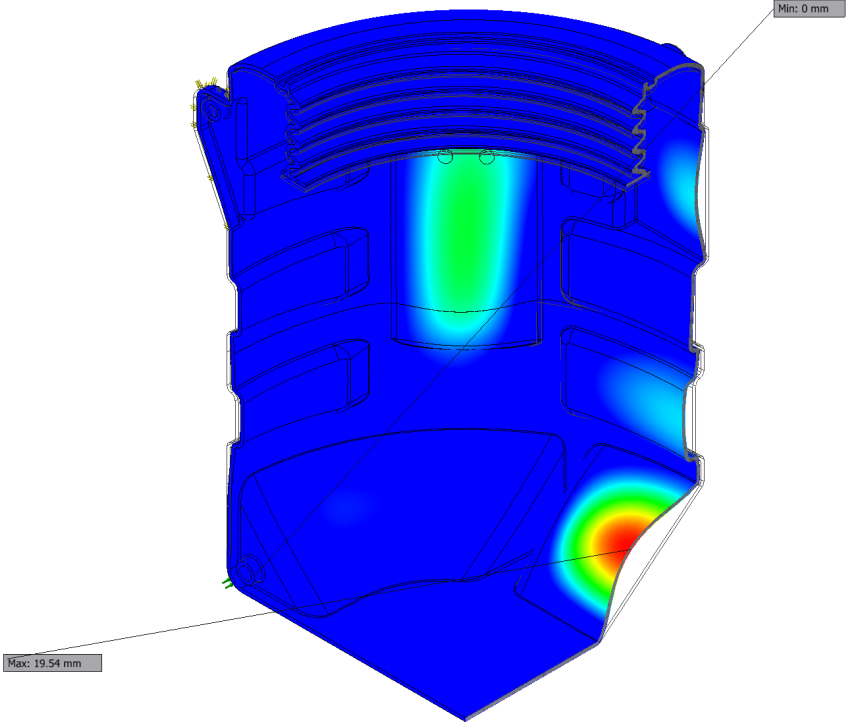
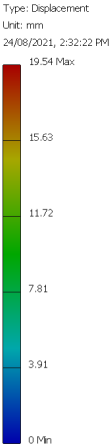
Name	Minimum	Maximum
Volume	8457400 mm ³	
Mass	7.91612 kg	
Von Mises Stress	0.000672327 MPa	8.80054 MPa
Displacement	0 mm	19.5374 mm
Safety Factor	2.80755 ul	15 ul
Equivalent Strain	0.00000316002 ul	0.042043 ul

Figures

Von Mises Stress

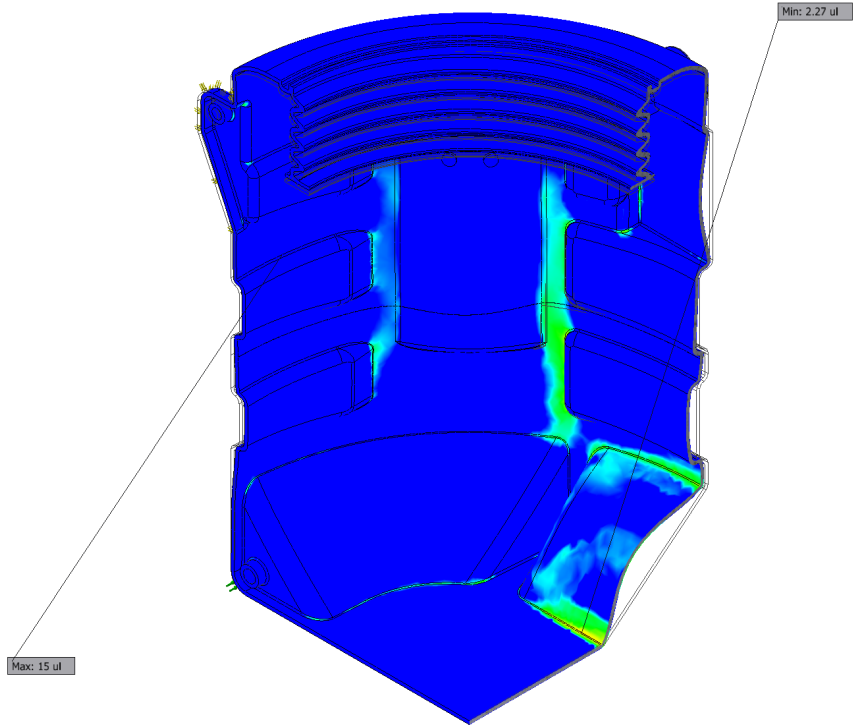
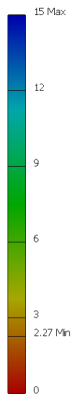


Displacement



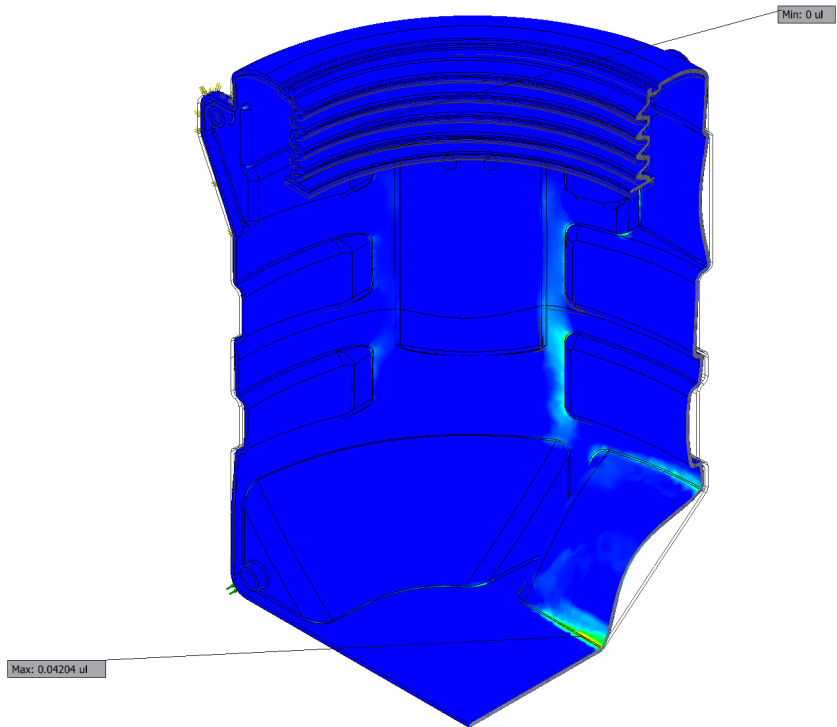
Safety Factor

Type: Safety Factor
Unit: ul
24/08/2021, 2:32:13 PM



Equivalent Strain

Type: Equivalent Strain
Unit: ul
24/08/2021, 2:32:32 PM



☐ **Simulation: HYDROSTATIC UPLIFT LOADS AS/NZS:1546.1:2008**

General objective and settings:

Design Objective	Single Point
Simulation Type	Static Analysis
Last Modification Date	24/08/2021, 11:11 AM
Detect and Eliminate Rigid Body Modes	No

Advanced settings:

Avg. Element Size (fraction of model diameter)	0.1
Min. Element Size (fraction of avg. size)	0.15
Grading Factor	1.8
Max. Turn Angle	60 deg
Create Curved Mesh Elements	Yes

☐ **Material(s)**

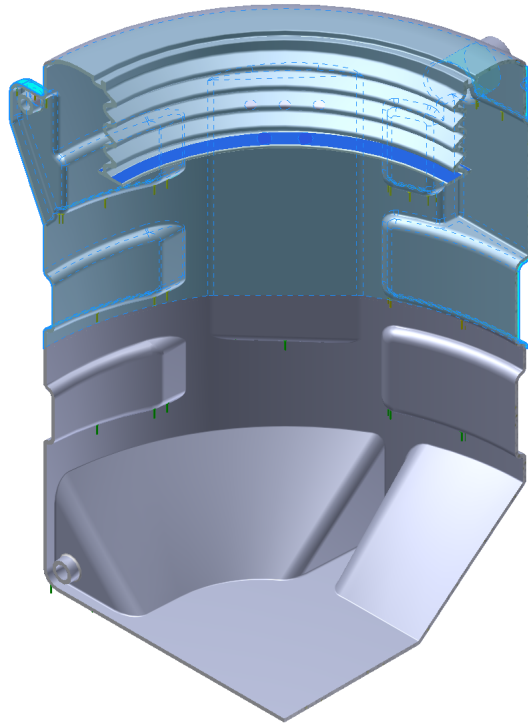
Name	LLDPE Linear Low Density Polyethylene	
General	Mass Density	0.936 g/cm ³
	Yield Strength	20 MPa
	Ultimate Tensile Strength	32 MPa
Stress	Young's Modulus	0.2 GPa
	Poisson's Ratio	0.41 ul
	Shear Modulus	0.070922 GPa
Stress Thermal	Expansion Coefficient	0.00018 ul/c
	Thermal Conductivity	0.225 W/(m K)
	Specific Heat	3182 J/(kg c)
Part Name(s)	PE-SANIFOS-610-TANK-V2.ipt	

☐ **Operating conditions**

☐ **Force:0.5m 4.905 kPa**

Load Type	Force
Magnitude	956.475 N
Vector X	0.000 N
Vector Y	0.000 N
Vector Z	956.475 N

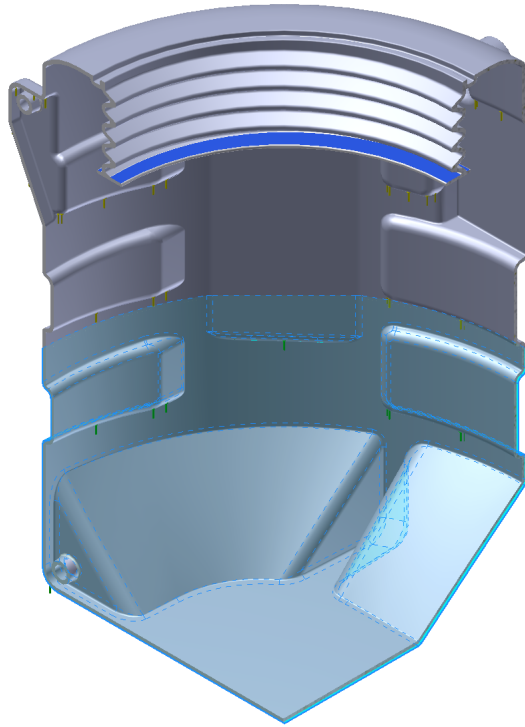
☐ **Selected Face(s)**



☐ **Force:1.0m 9.810 kPa**

Load Type	Force
Magnitude	1912.950 N
Vector X	0.000 N
Vector Y	0.000 N
Vector Z	1912.950 N

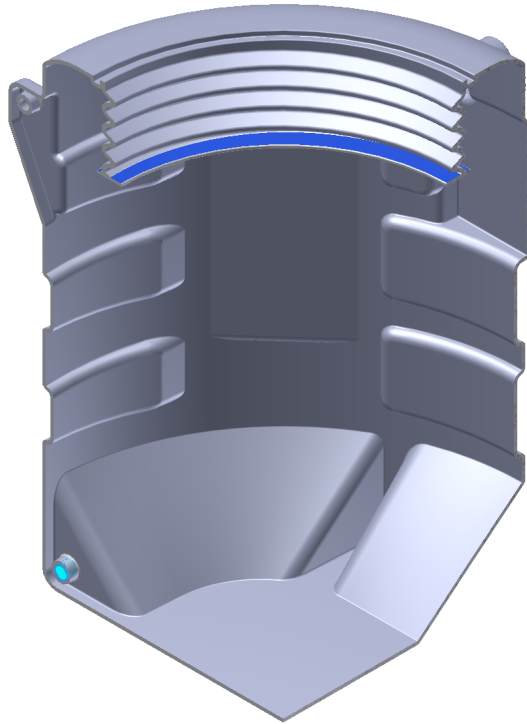
☐ **Selected Face(s)**



☐ **Fixed Constraint: PIN**

Constraint Type Fixed Constraint

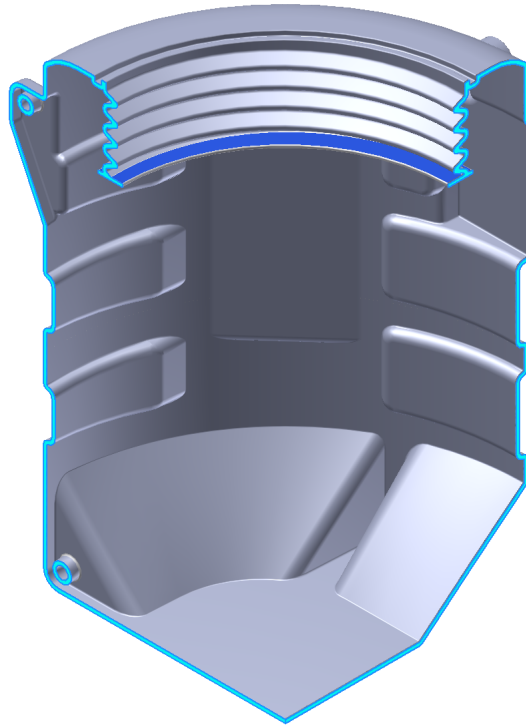
☐ **Selected Face(s)**



☐ **Frictionless Constraint: QUADRANT**

Constraint Type Frictionless Constraint

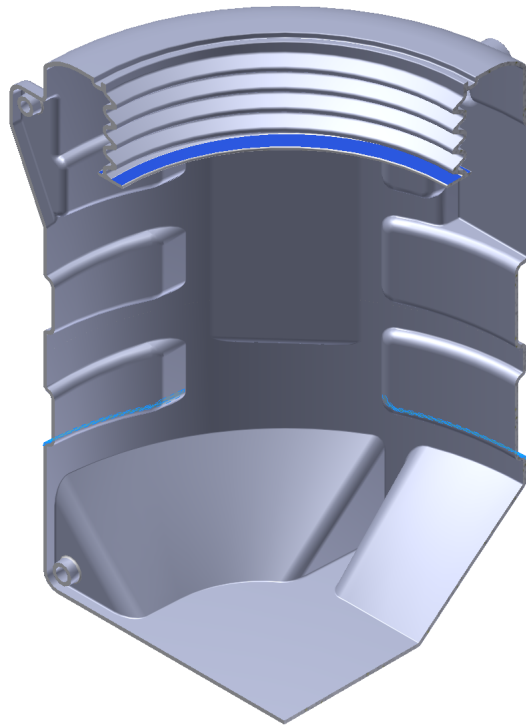
☐ **Selected Face(s)**



☐ **Frictionless Constraint: CONCRETE**

Constraint Type Frictionless Constraint

☐ **Selected Face(s)**



Results

Reaction Force and Moment on Constraints

Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)
Fixed Constraint: PIN	440.477 N	-1.13343 N	11.7074 N m	11.1573 N m
		-283.44 N		2.62074 N m
		-337.165 N		-2.38964 N m
Frictionless Constraint: QUADRANT	267.063 N	131.994 N	197.509 N m	178.243 N m
		232.123 N		-78.1011 N m
		-4.35276 N		-33.7565 N m
Frictionless Constraint: CONCRETE	2532.63 N	-130.944 N	101.094 N m	0 N m
		51.8725 N		97.5105 N m
		-2528.71 N		-26.6767 N m

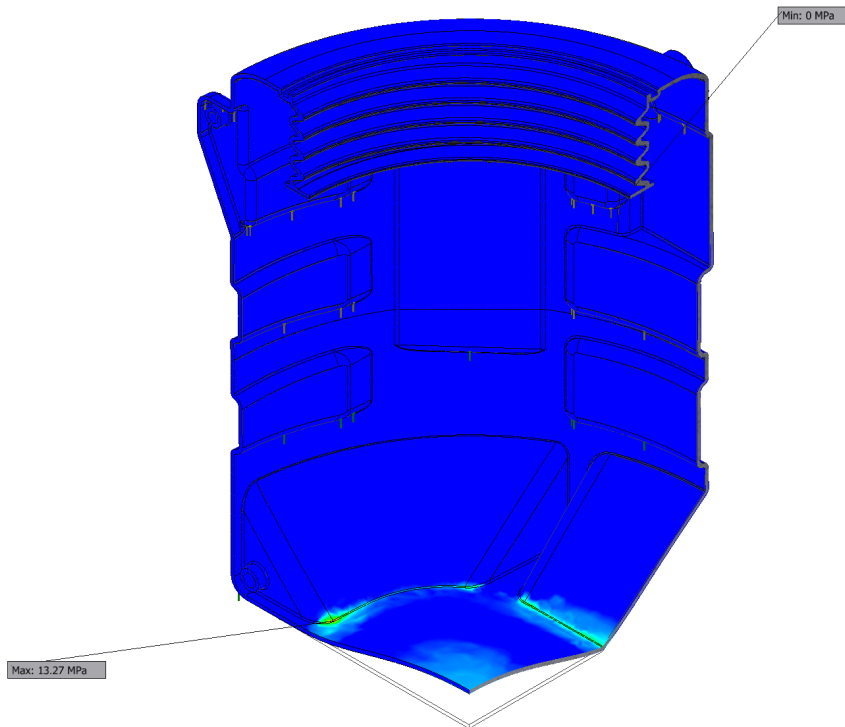
Result Summary

Name	Minimum	Maximum
Volume	8457400 mm ³	
Mass	7.91612 kg	
Von Mises Stress	0.0000509244 MPa	13.2679 MPa
Displacement	0 mm	118.354 mm
Safety Factor	1.72699 ul	15 ul
Equivalent Strain	0.000000239502 ul	0.0637143 ul

Figures

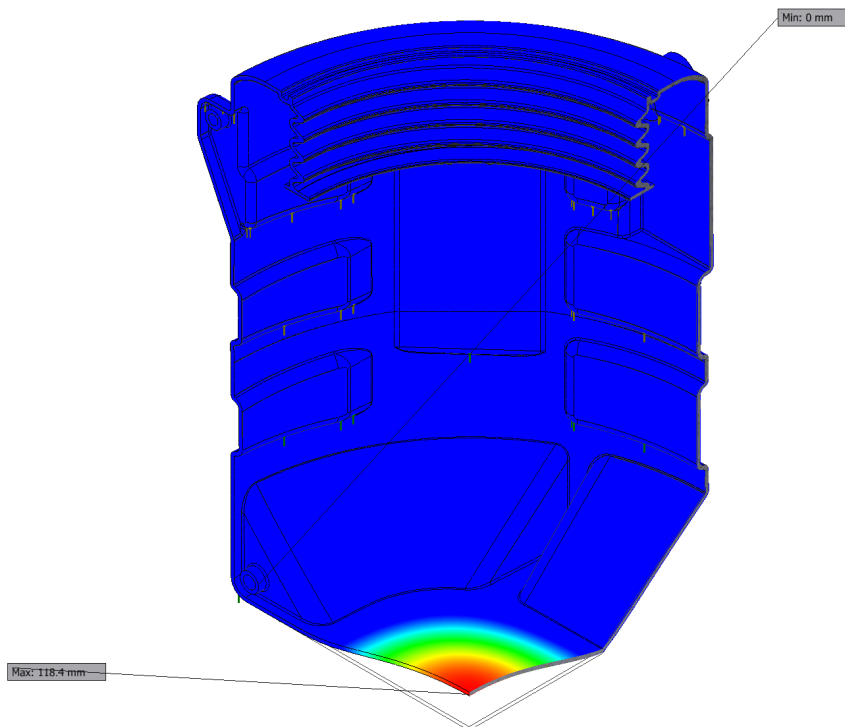
Von Mises Stress

Type: Von Mises Stress
Unit: MPa
24/08/2021, 2:32:48 PM
13.27 Max



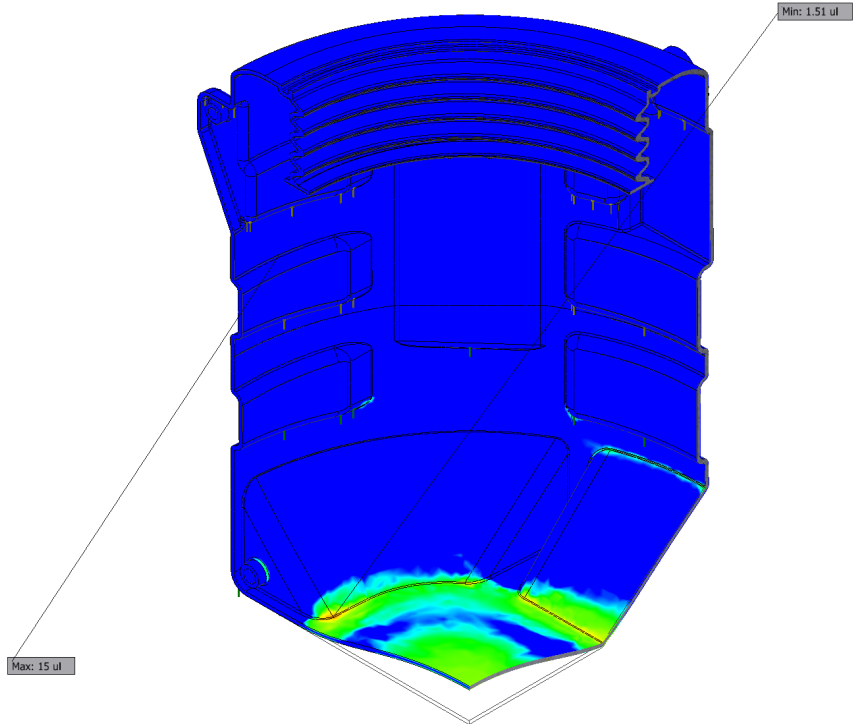
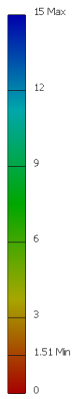
Displacement

Type: Displacement
Unit: mm
24/08/2021, 2:33:07 PM
118.4 Max



Safety Factor

Type: Safety Factor
Unit: ul
24/08/2021, 2:32:57 PM



Equivalent Strain

Type: Equivalent Strain
Unit: ul
24/08/2021, 2:33:15 PM

