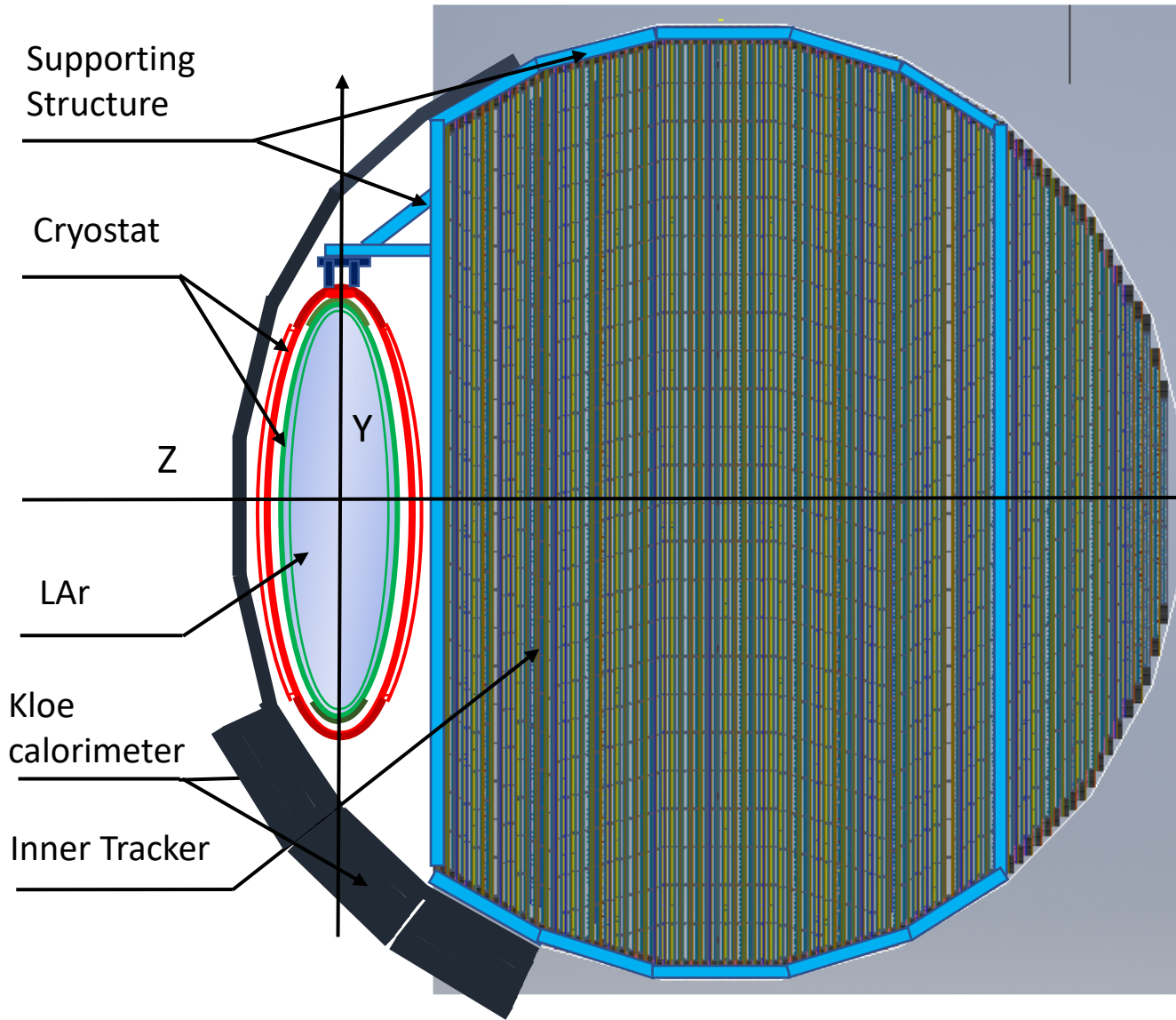


LAr Cryostat inside SAND



LAr Cryostat $V = 1 \text{ m}^3 \text{ min}$

Inside $P = 2,5/ 3 \text{ bar}$

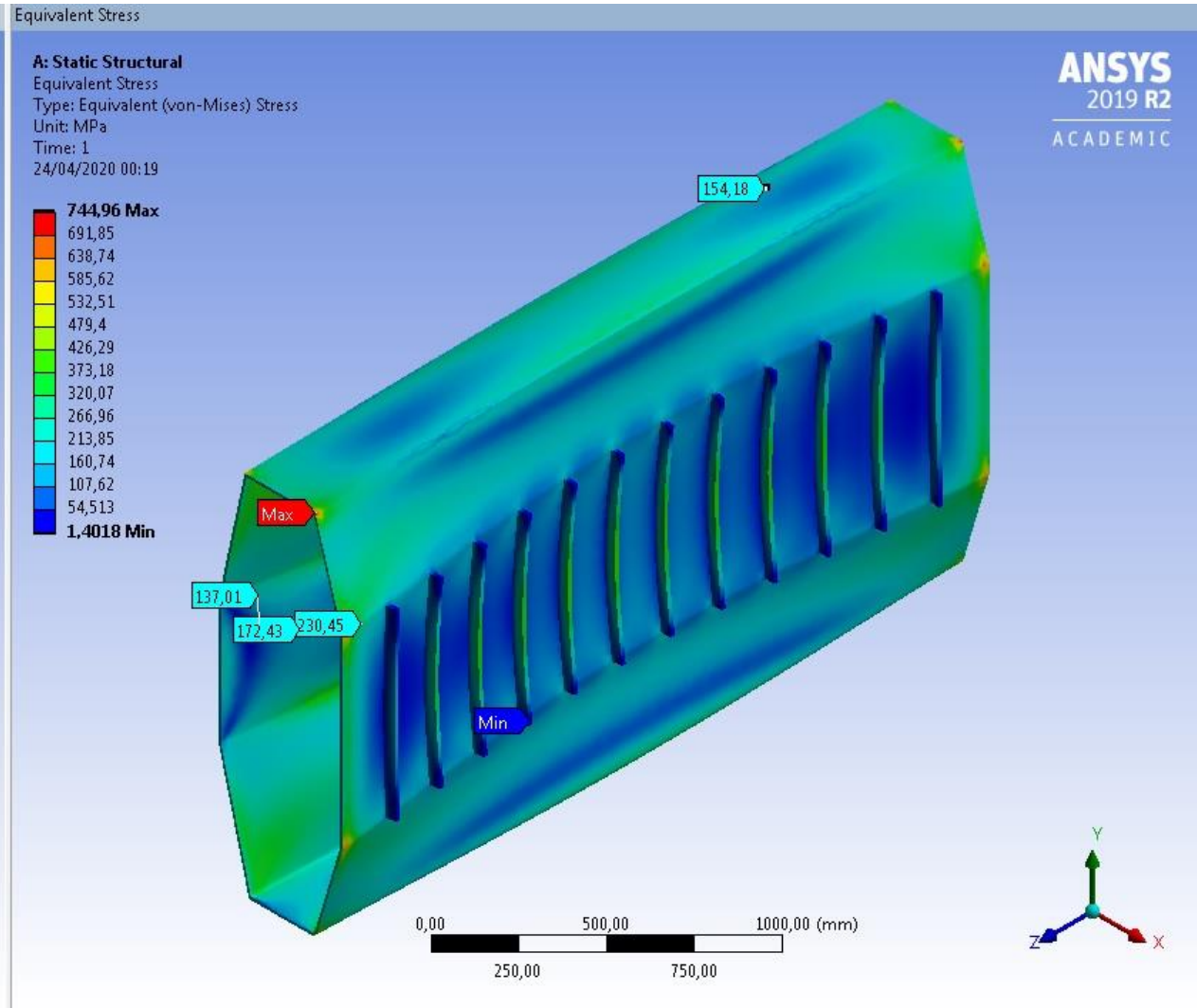
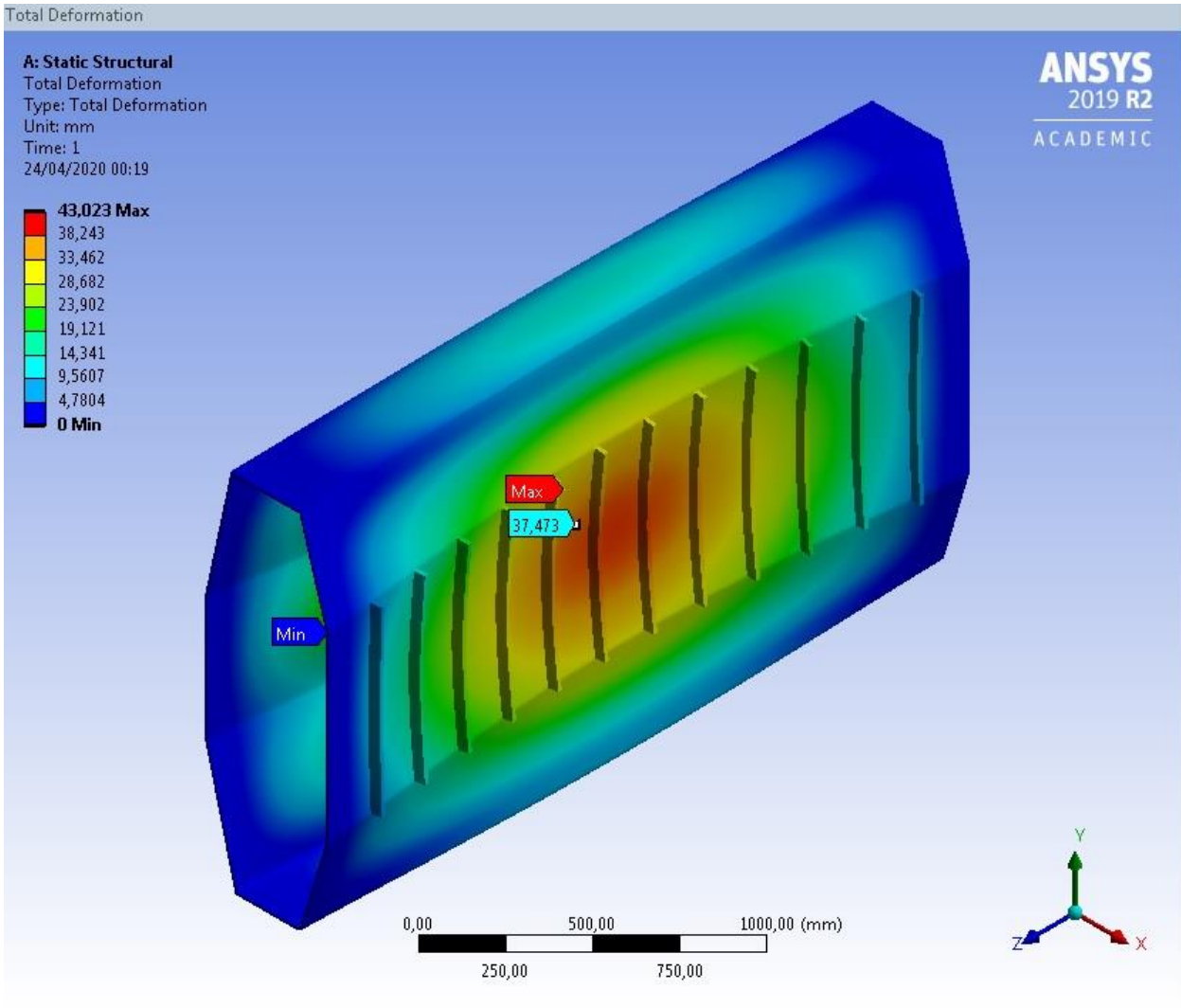
Sup insulated and vacuum

As **Thin** as possible

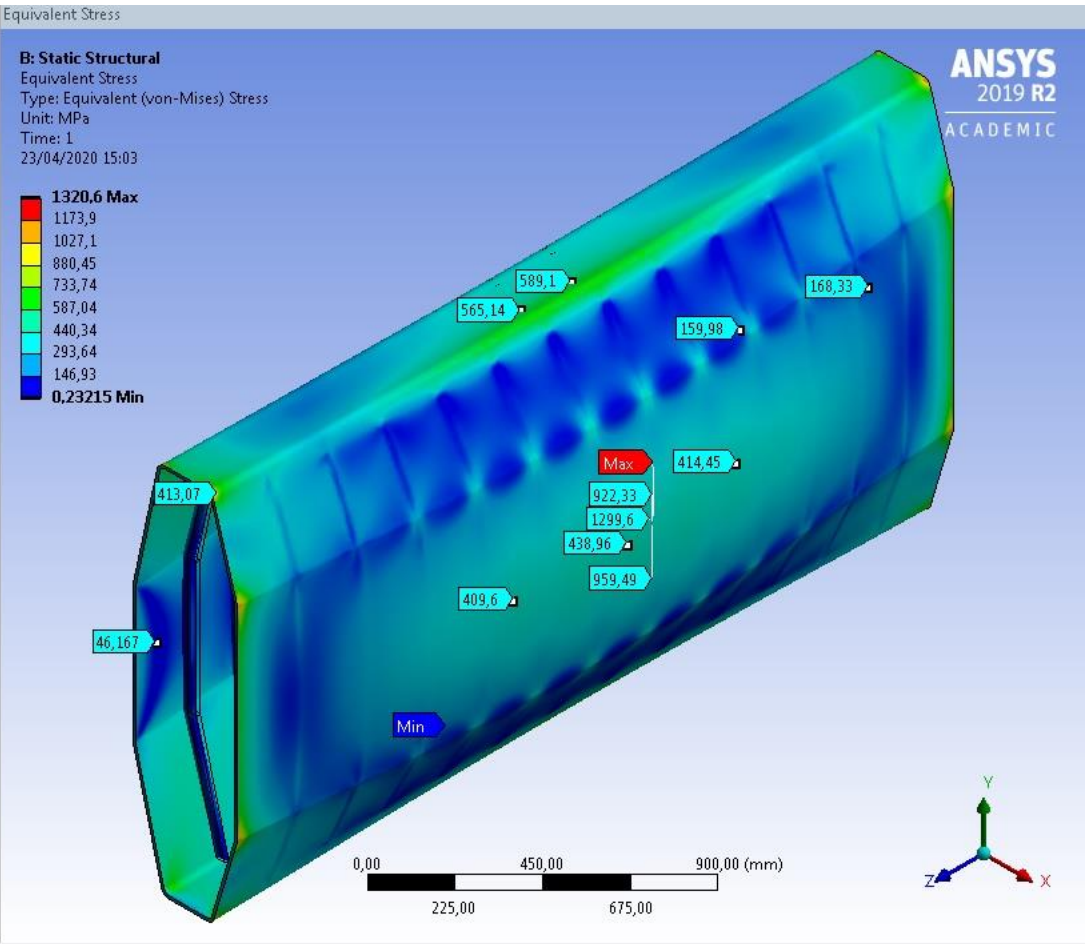
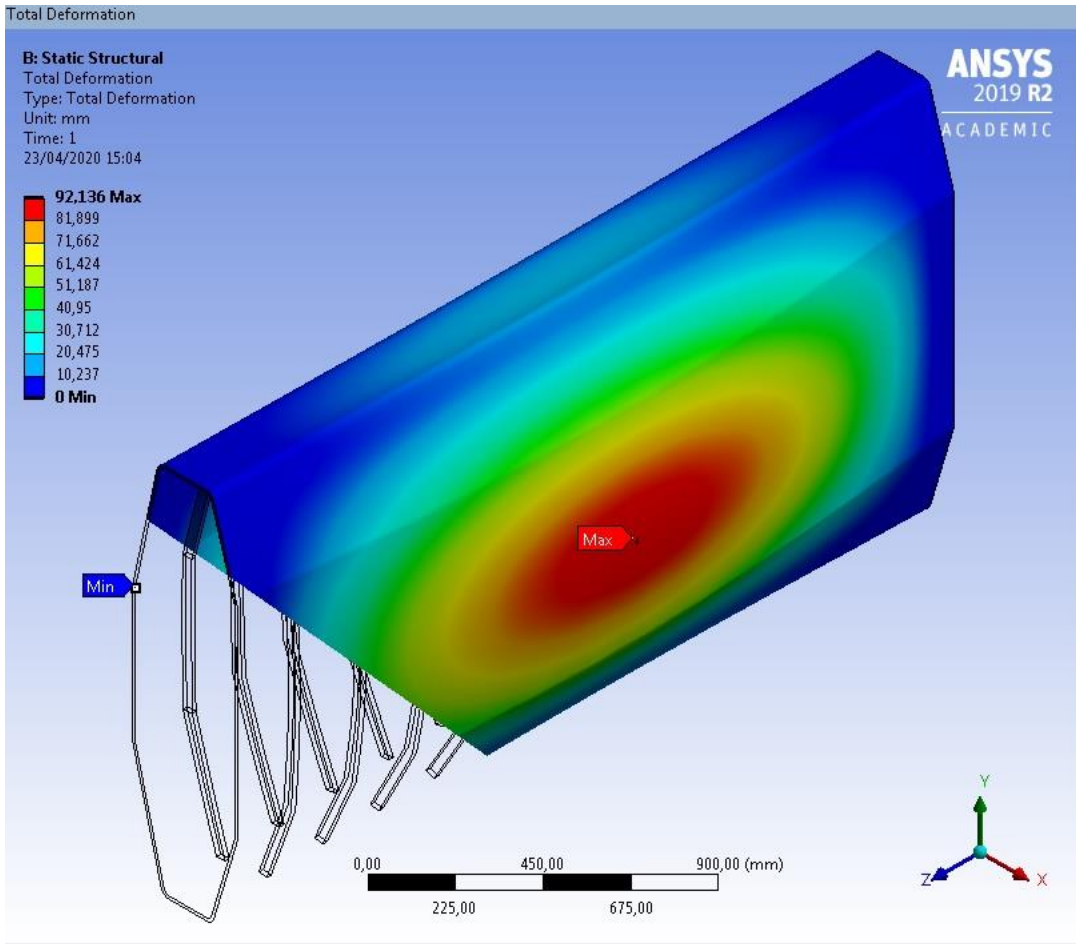
Not too large in Z

Openable (detectors inside)

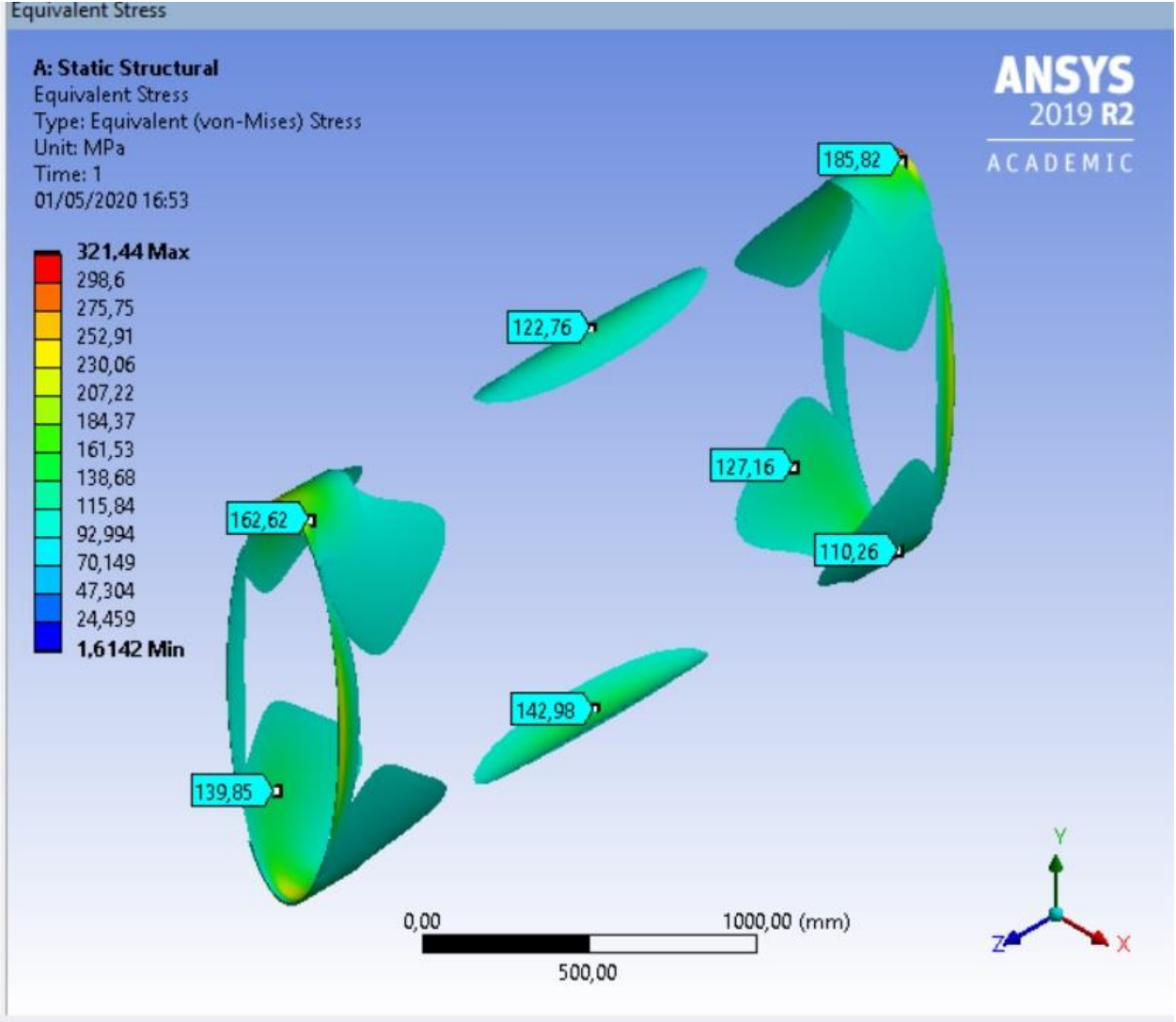
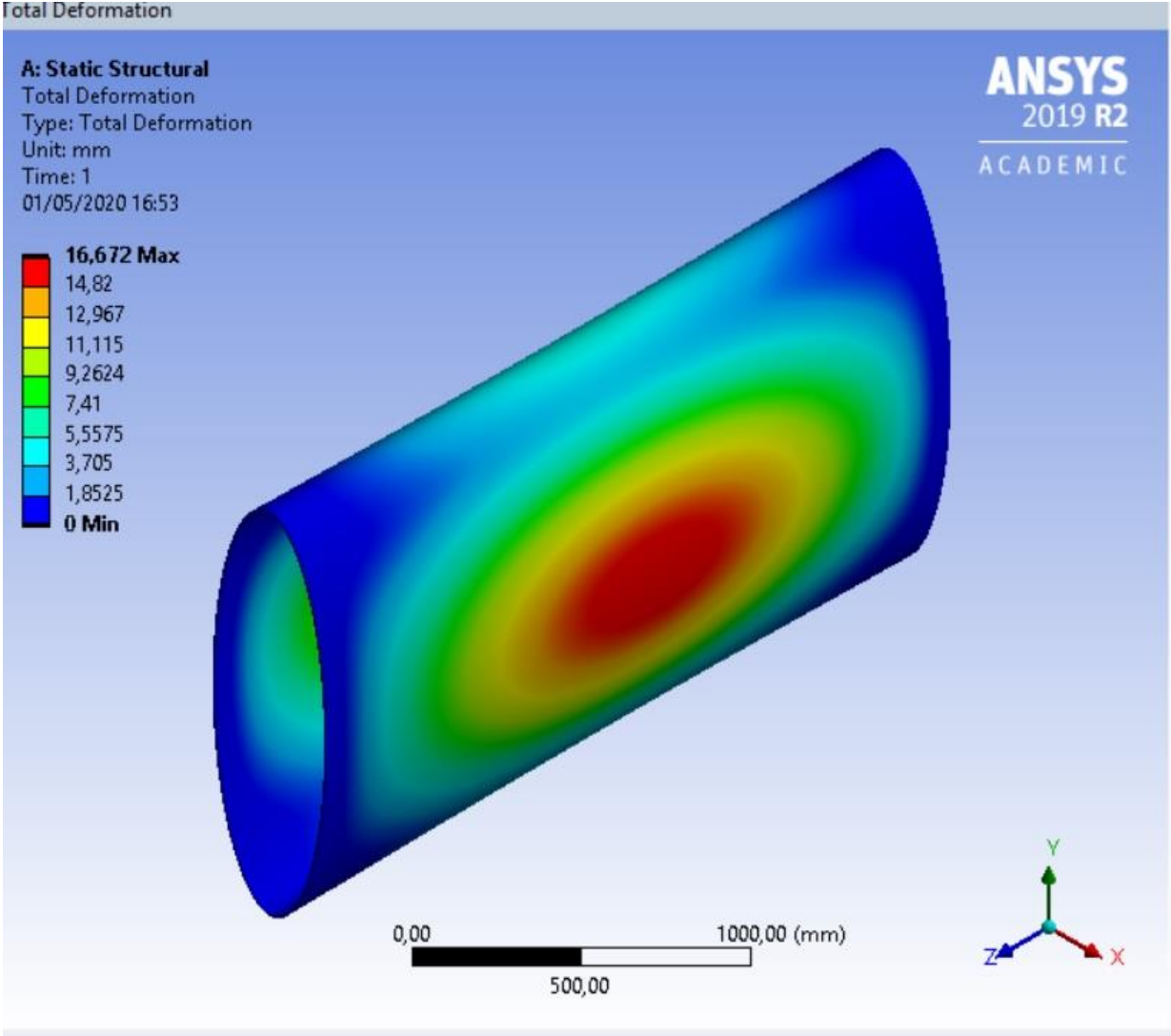
One single Cryostat: outer vessel (Alu) 2.5 m long - Mechanical stresses too high



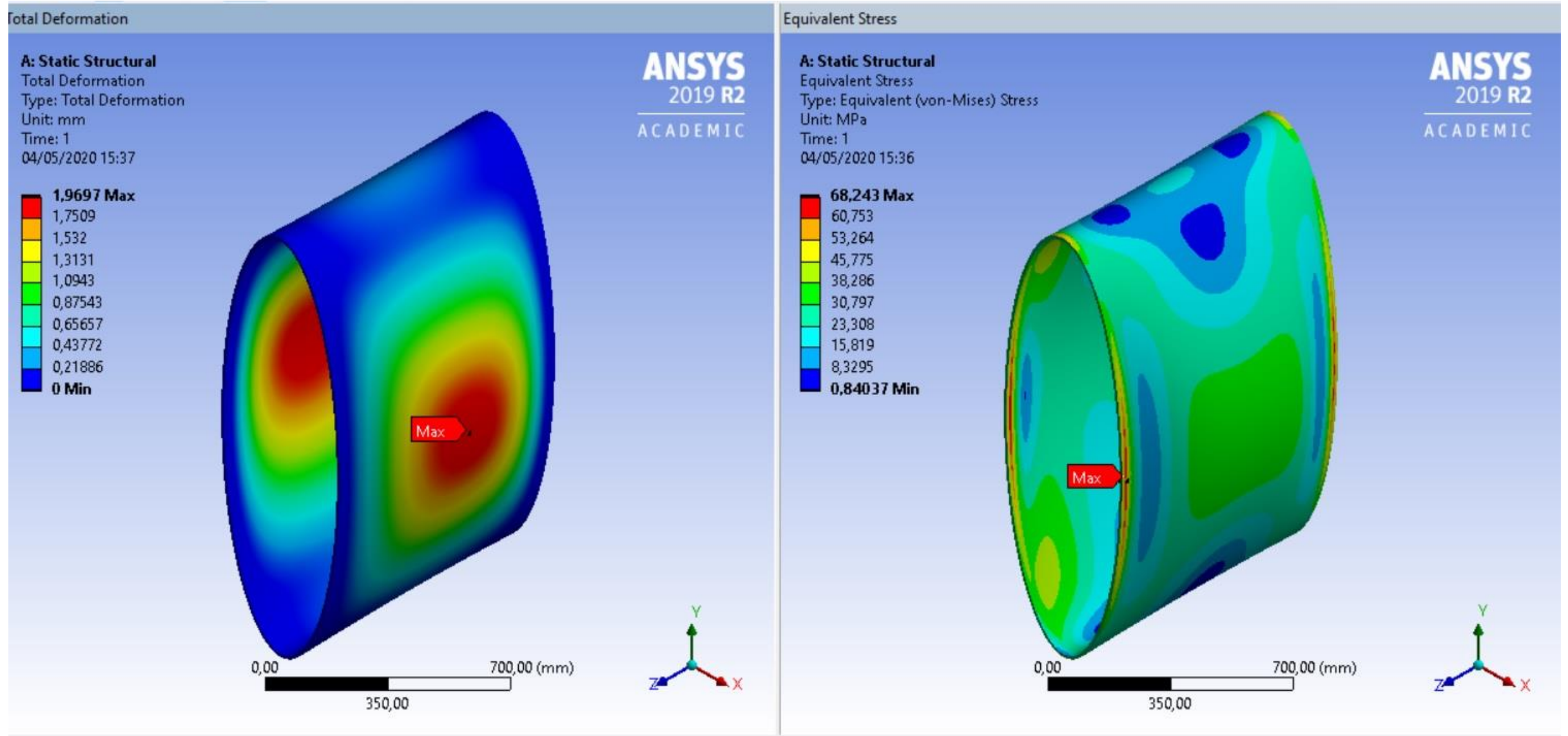
One single Cryostat: Inner vessel (Alu) 2.0 m long - Stresses too high



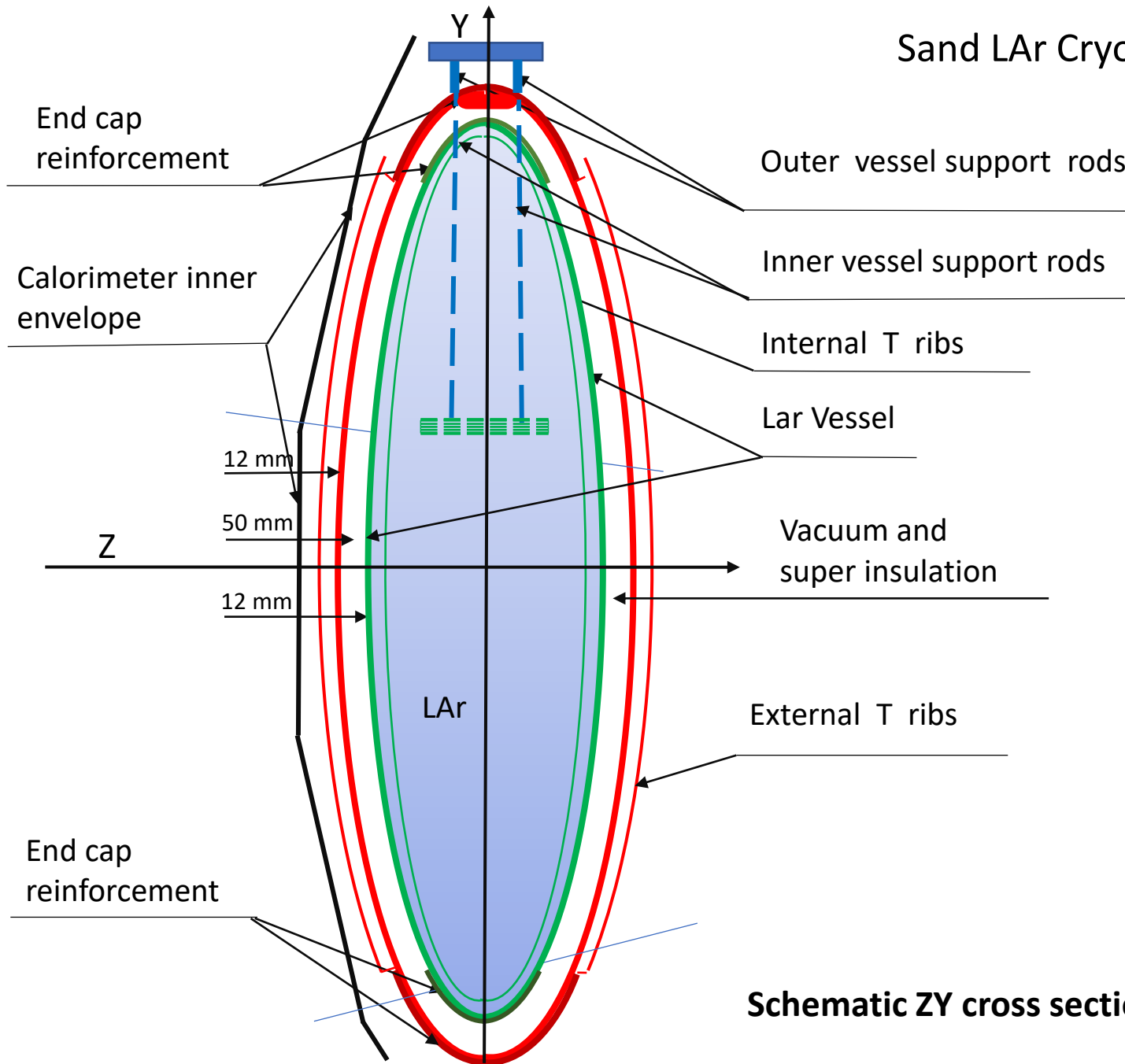
Elliptical cross section - Inner vessel: improves but stresses still too high



Elliptical cross section - Half length: stresses in a manageable range



Sand LAr Cryostat



Dimensions: mm

Ext Vessel
Thickness 12

$A_y = 1577$ $A_x = 594$ $L = 1480$

$Vol = 1,14 \text{ m}^3$

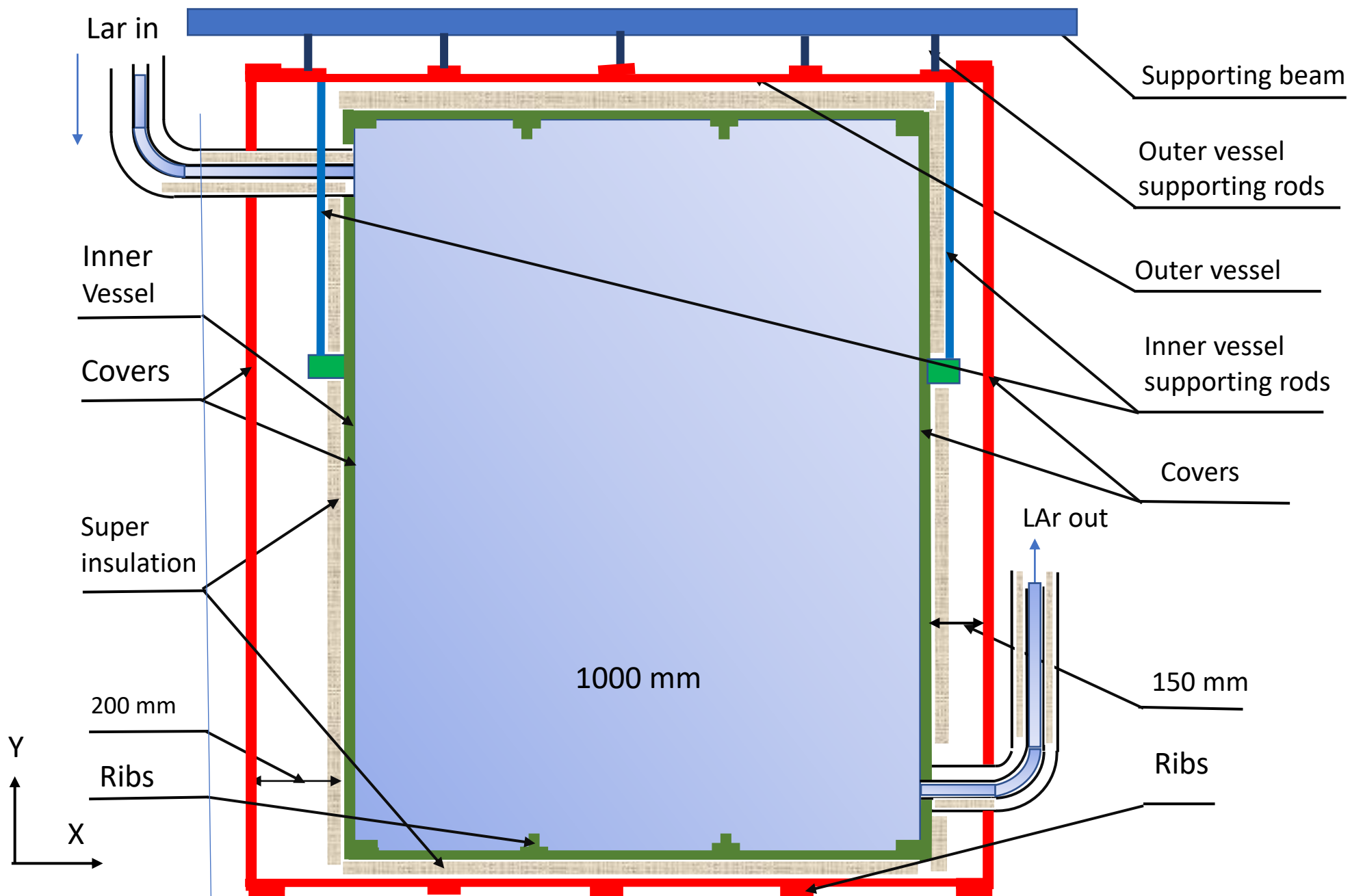
Int Vessel
Thickness 12

$A_y = 1456$ $A_x = 475$ $L = 1000$

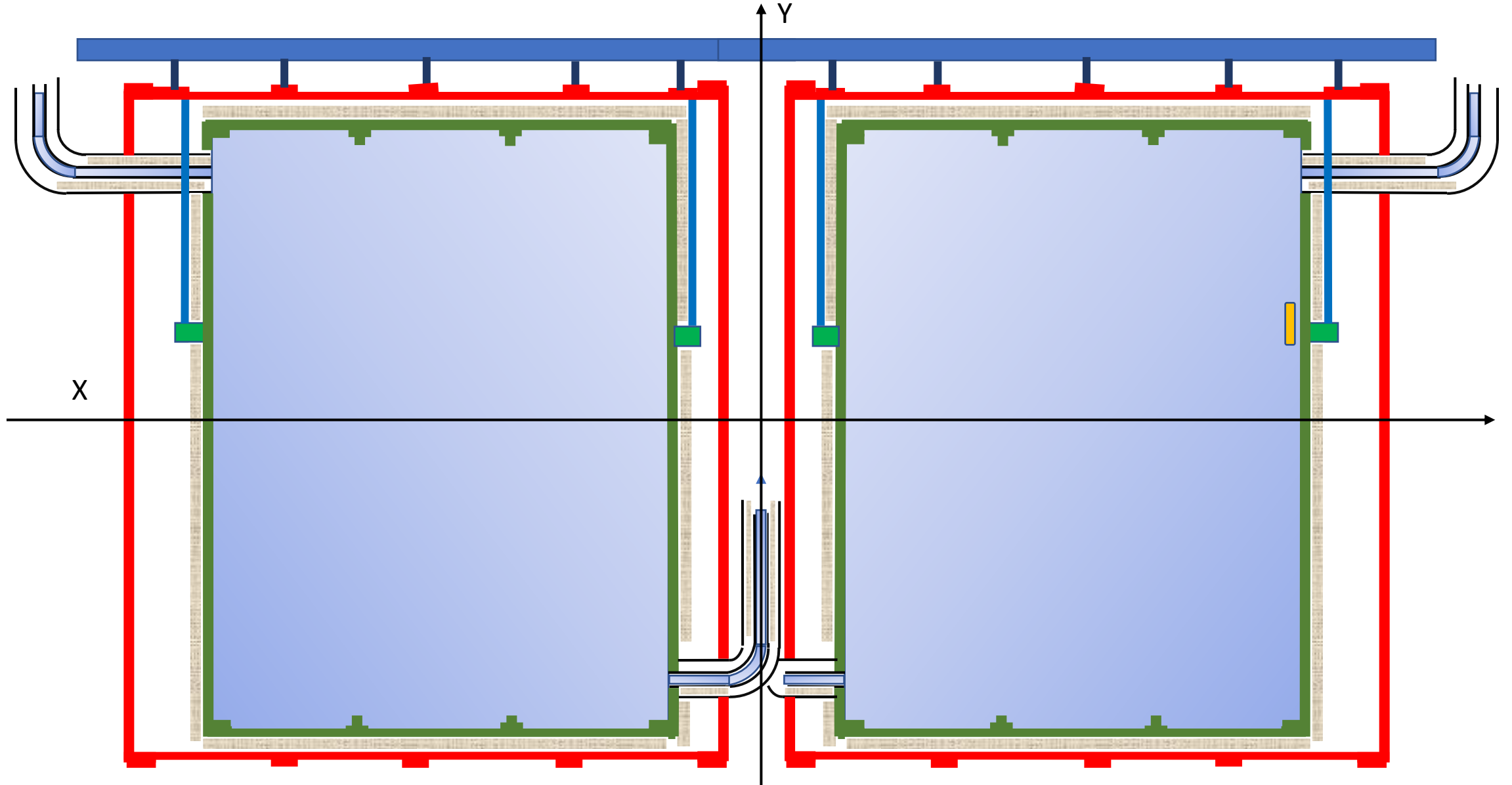
$Vol = 0,546 \text{ m}^3$

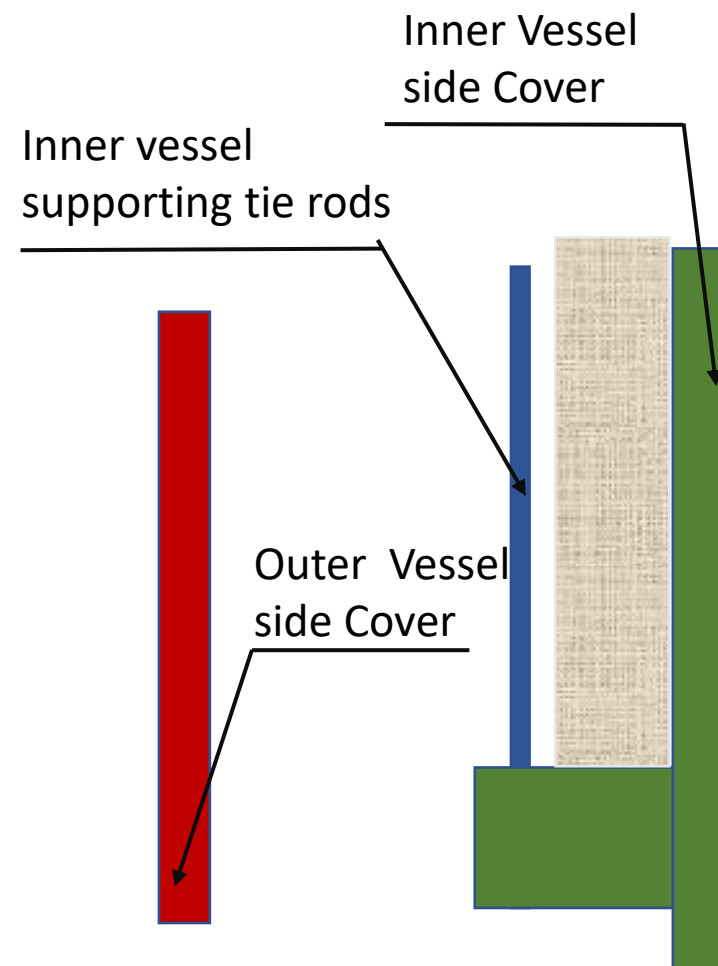
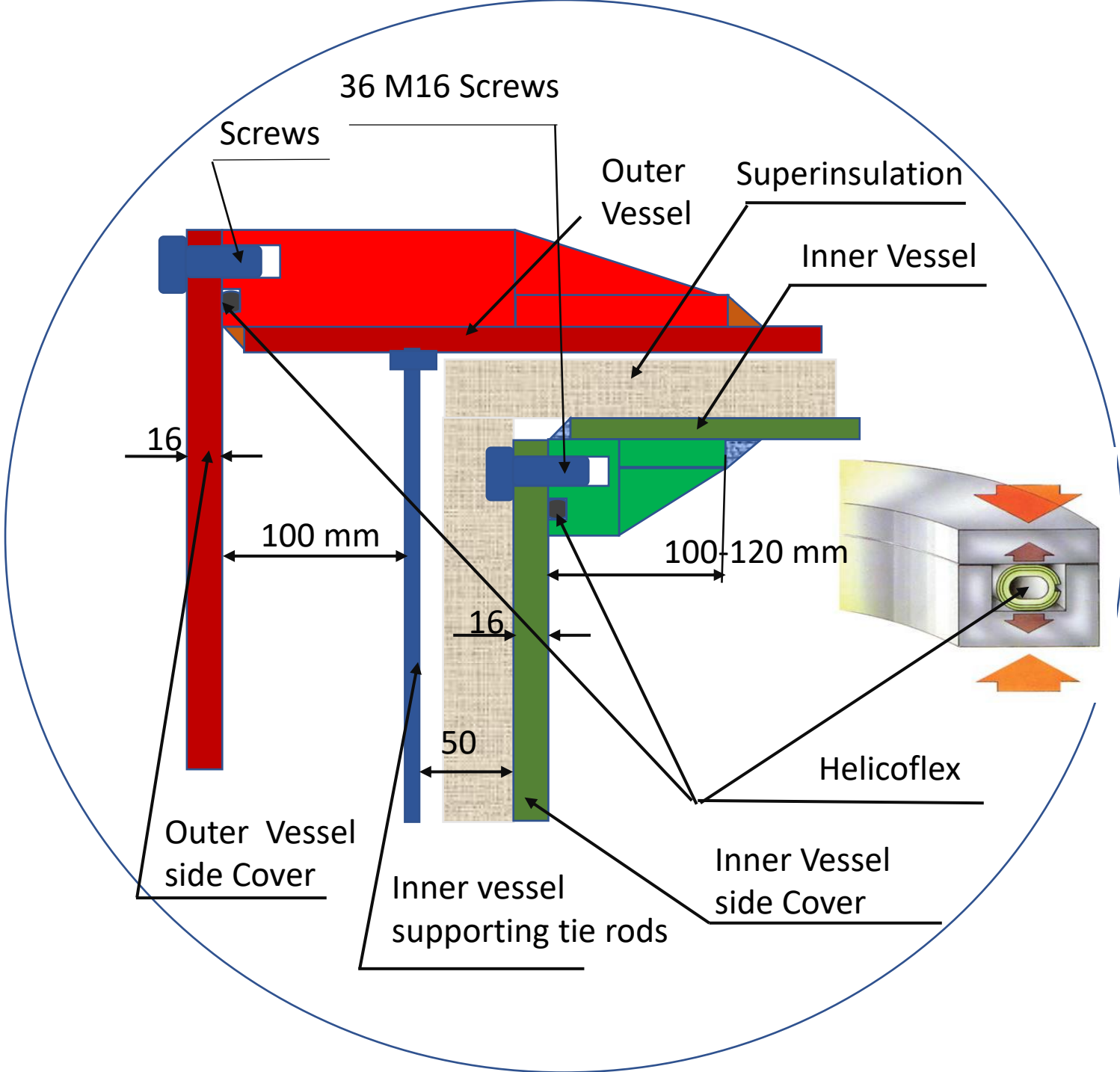
Schematic ZY cross section

Schematic XY cross section



Complete Detector - Two Cryostats



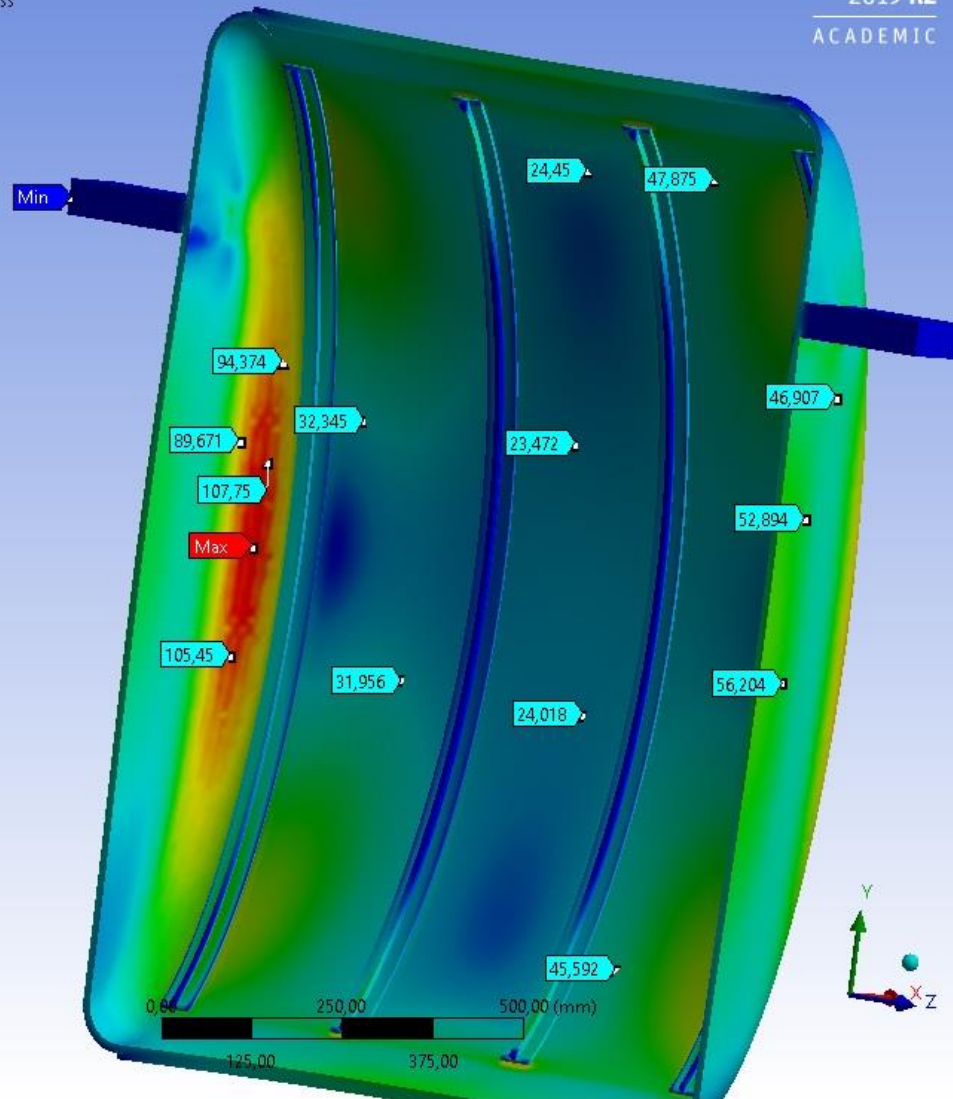


Inner Vessel P = 2,5 bar

A: Static Structural
Equivalent Stress
Type: Equivalent (von-Mises) Stress
Unit: MPa
Time: 1
11/06/2020 18:07

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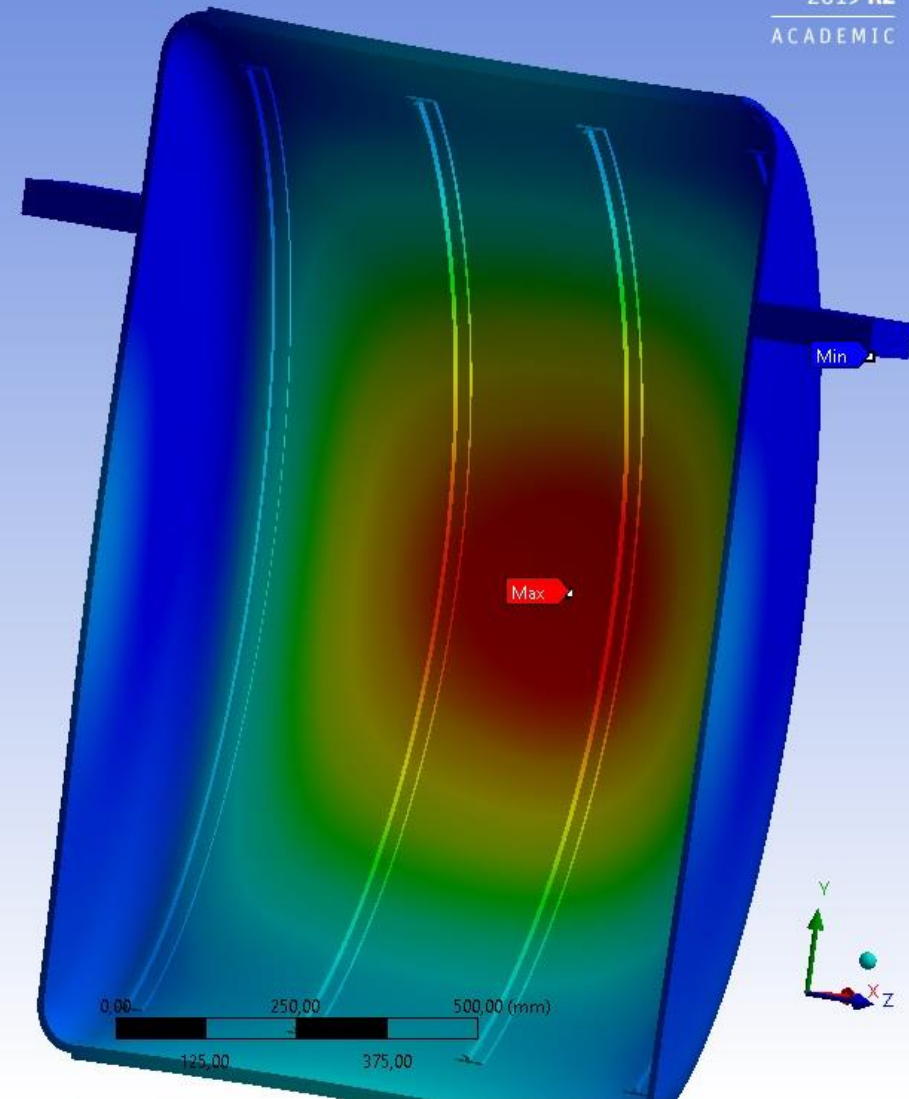
118,04 Max
104,93
91,823
78,717
65,61
52,504
39,397
26,291
13,185
0,078105 Min



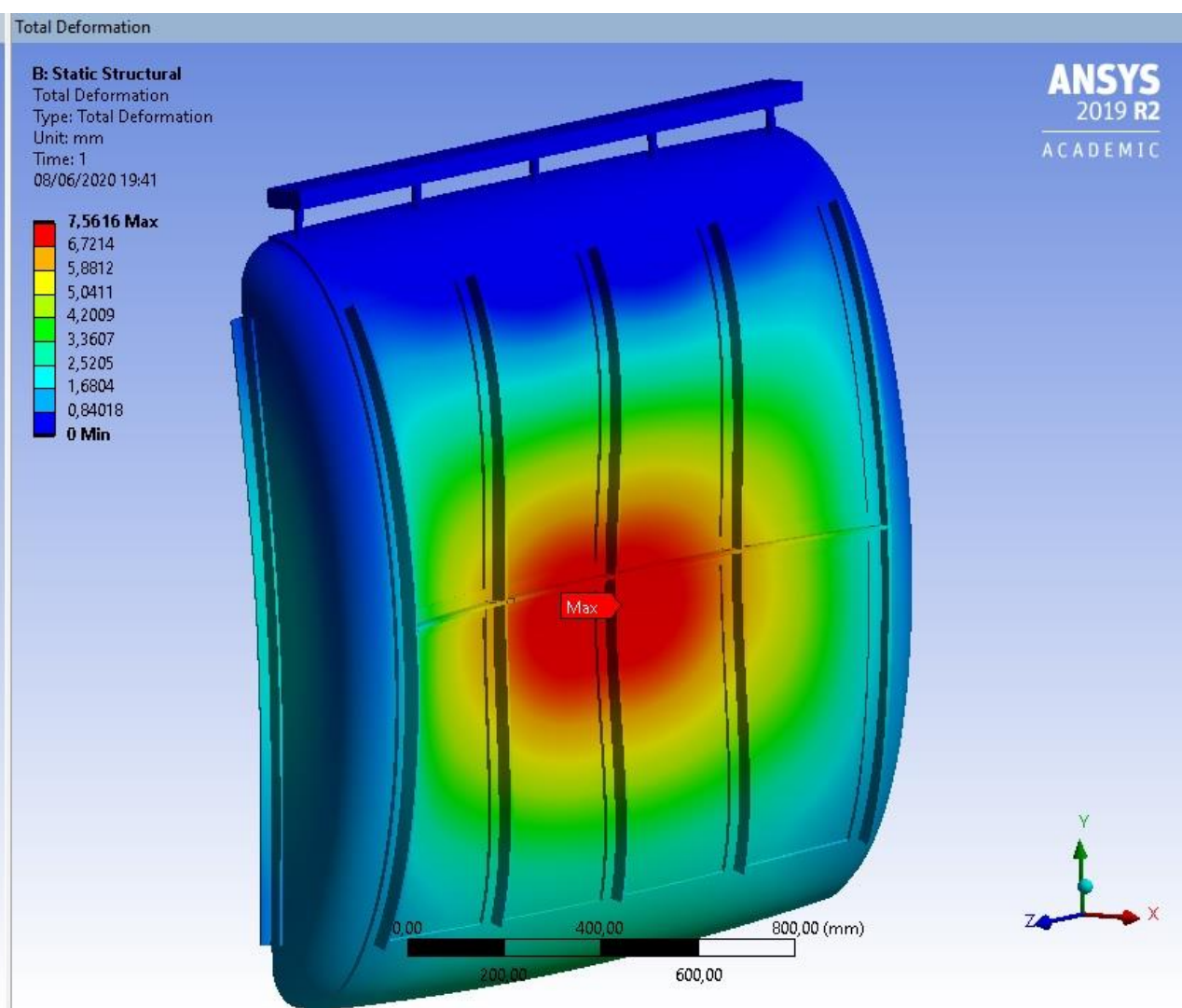
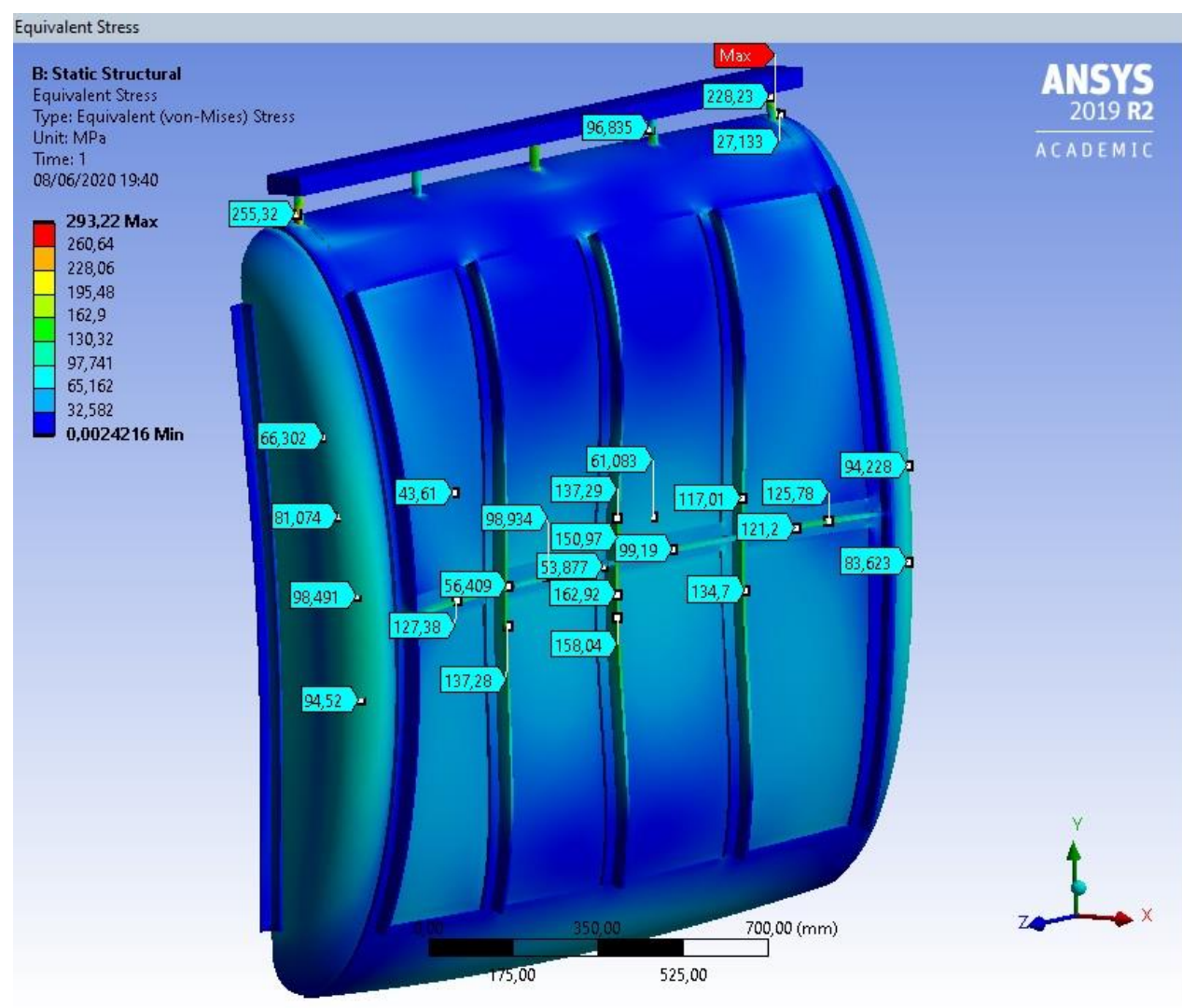
A: Static Structural
Total Deformation
Type: Total Deformation
Unit: mm
Time: 1
11/06/2020 18:07

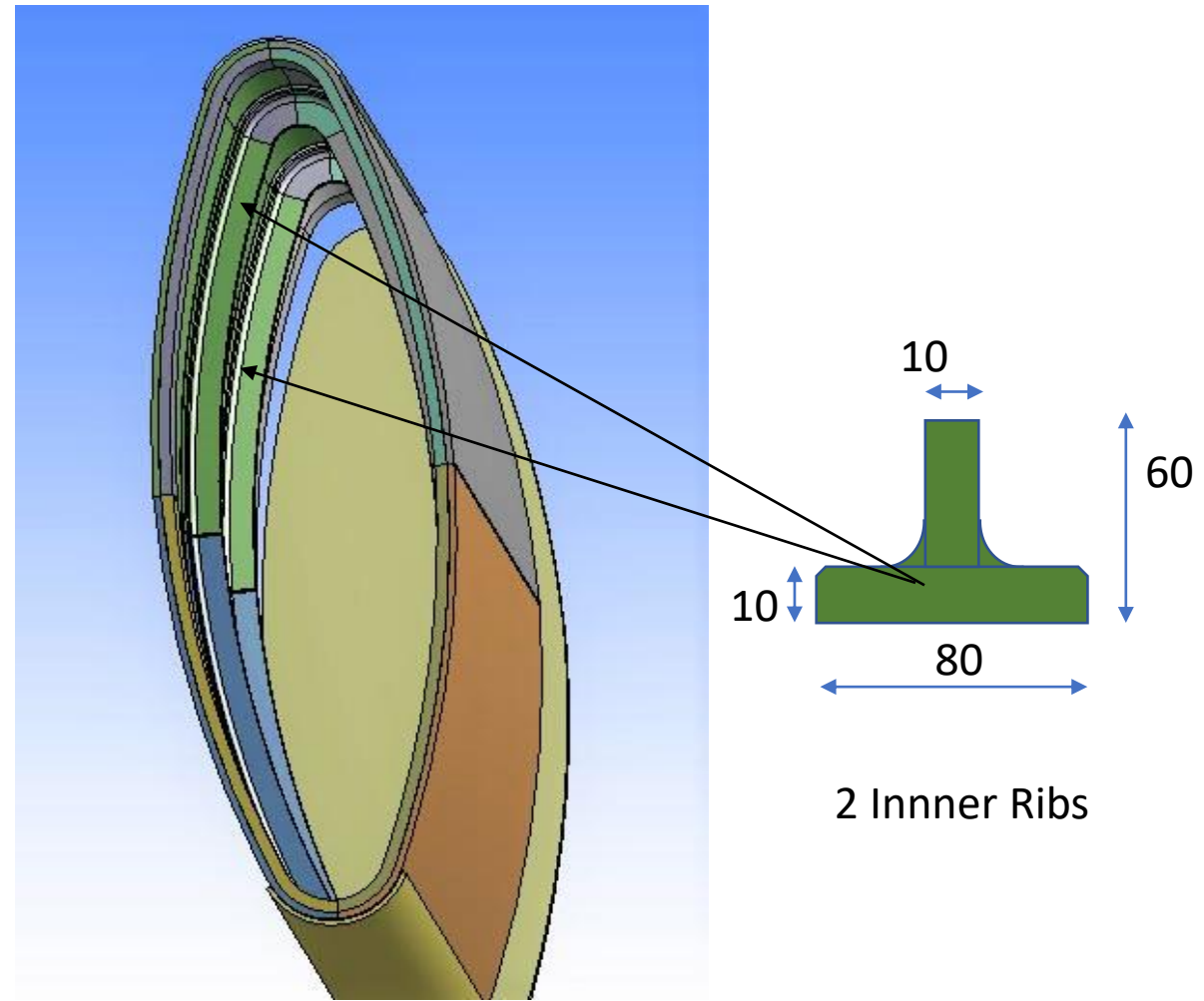
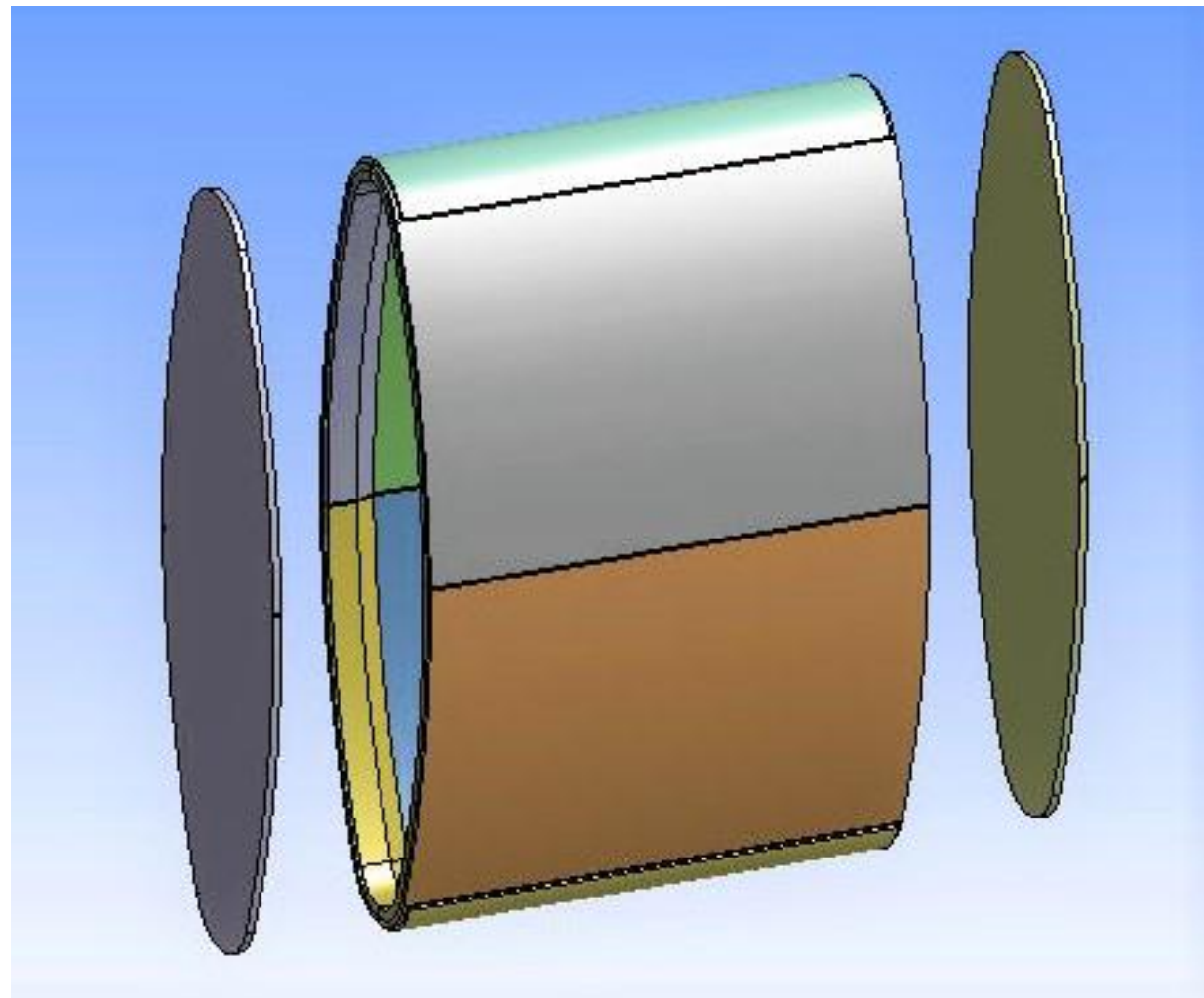
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4,7934 Max
4,2608
3,7282
3,1956
2,663
2,1304
1,5978
1,0652
0,5326
0 Min

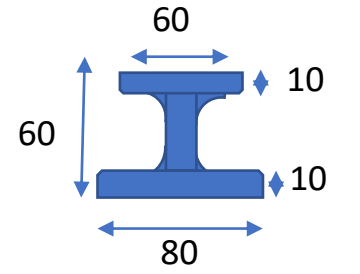
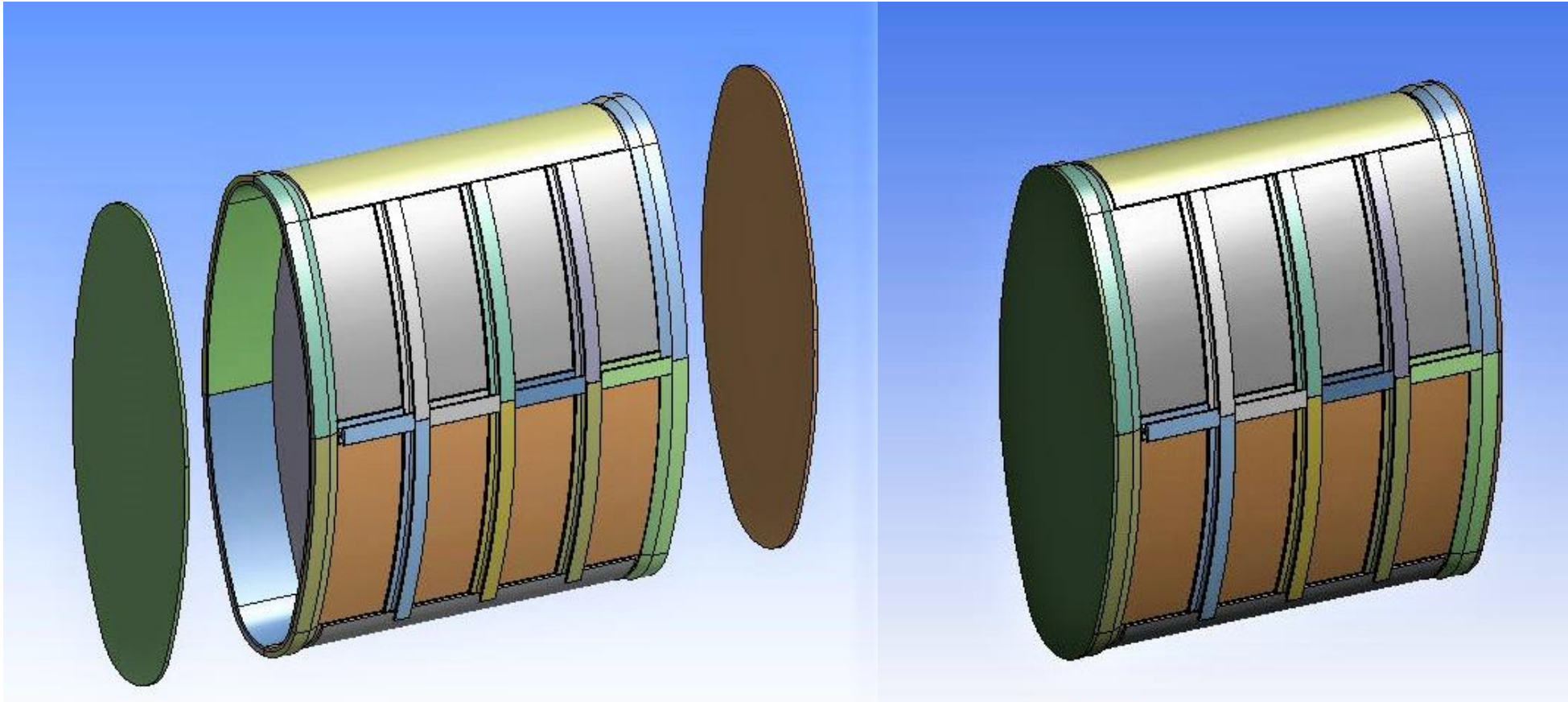


Ext Vessel P =2.0 bar version 1





Alu Inner Vessel (12mm thick)

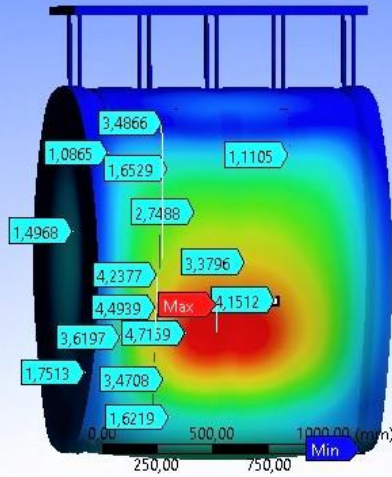
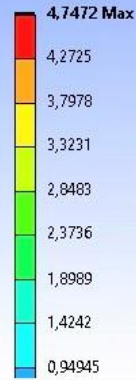


Outer vessel
Ribs

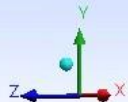
Alu outer vessel (12mm thick)

Total Deformation

E: vessel-est.CF3I
Total Deformation
Type: Total Deformation
Unit: mm
Time: 1
21/12/2020 17:05

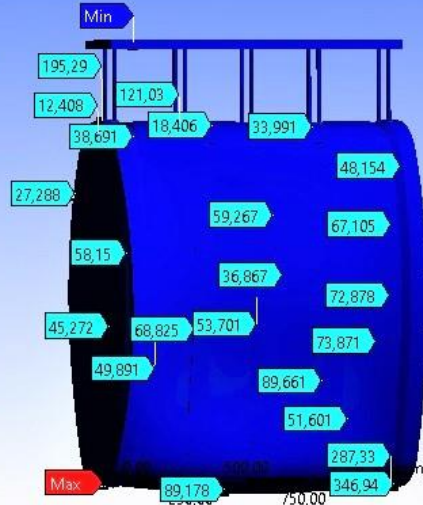
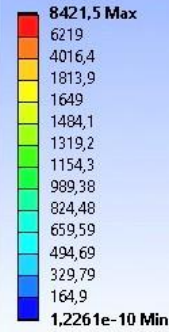


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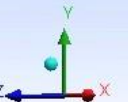


Equivalent Stress

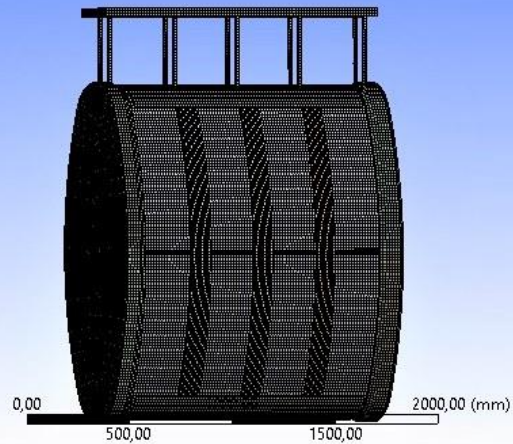
E: vessel-est.CF3I
Equivalent Stress
Type: Equivalent (von-Mises) Stress (Unaveraged)
Unit: MPa
Time: 1
21/12/2020 17:05



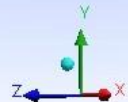
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Mesh

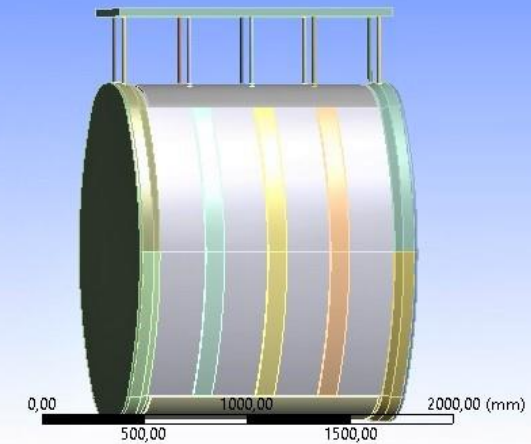


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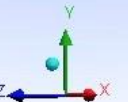


Geometry

Geometry
21/12/2020 17:05

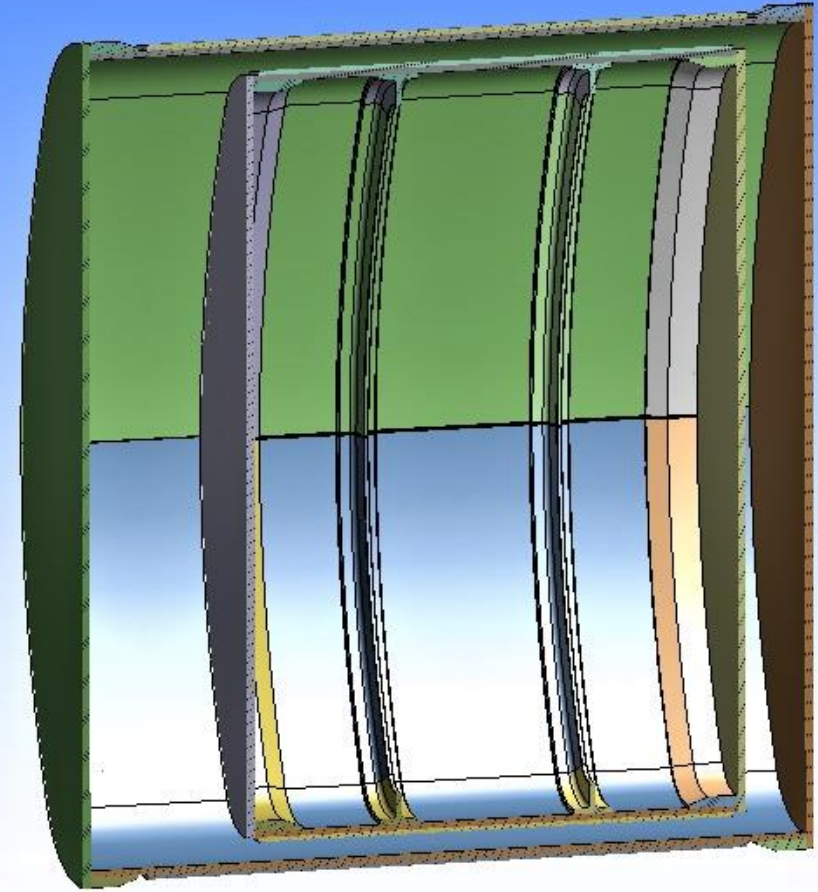
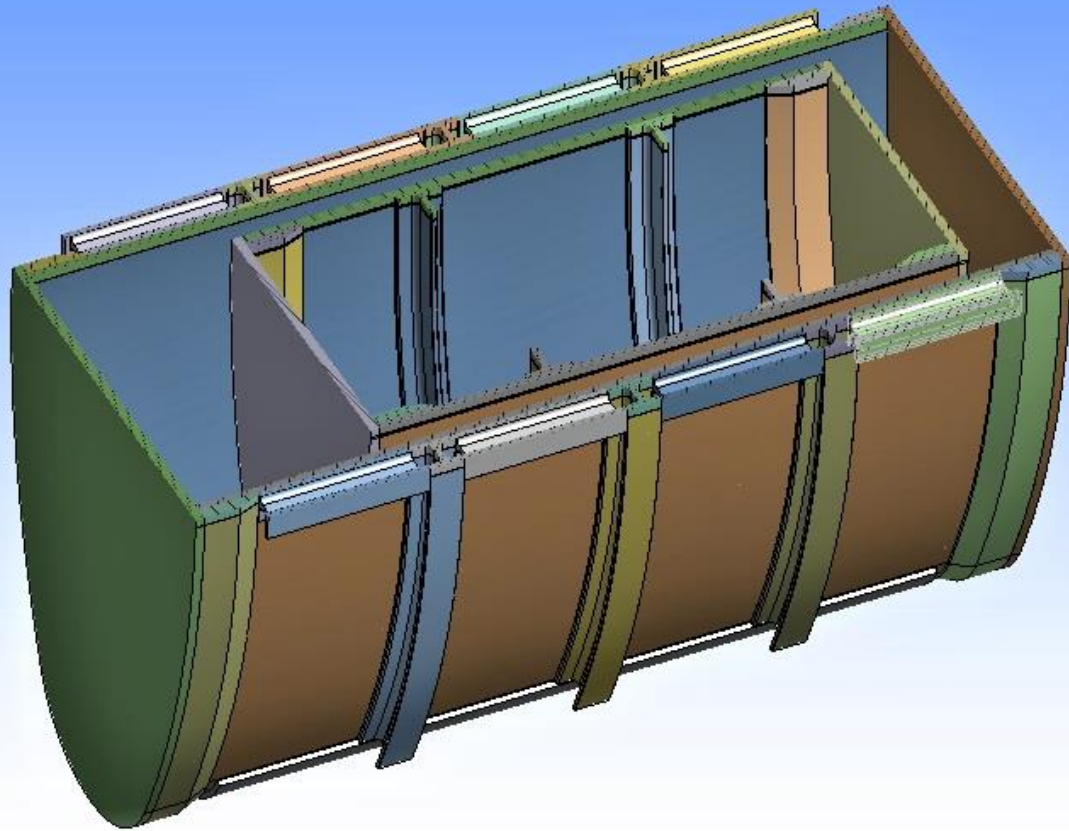


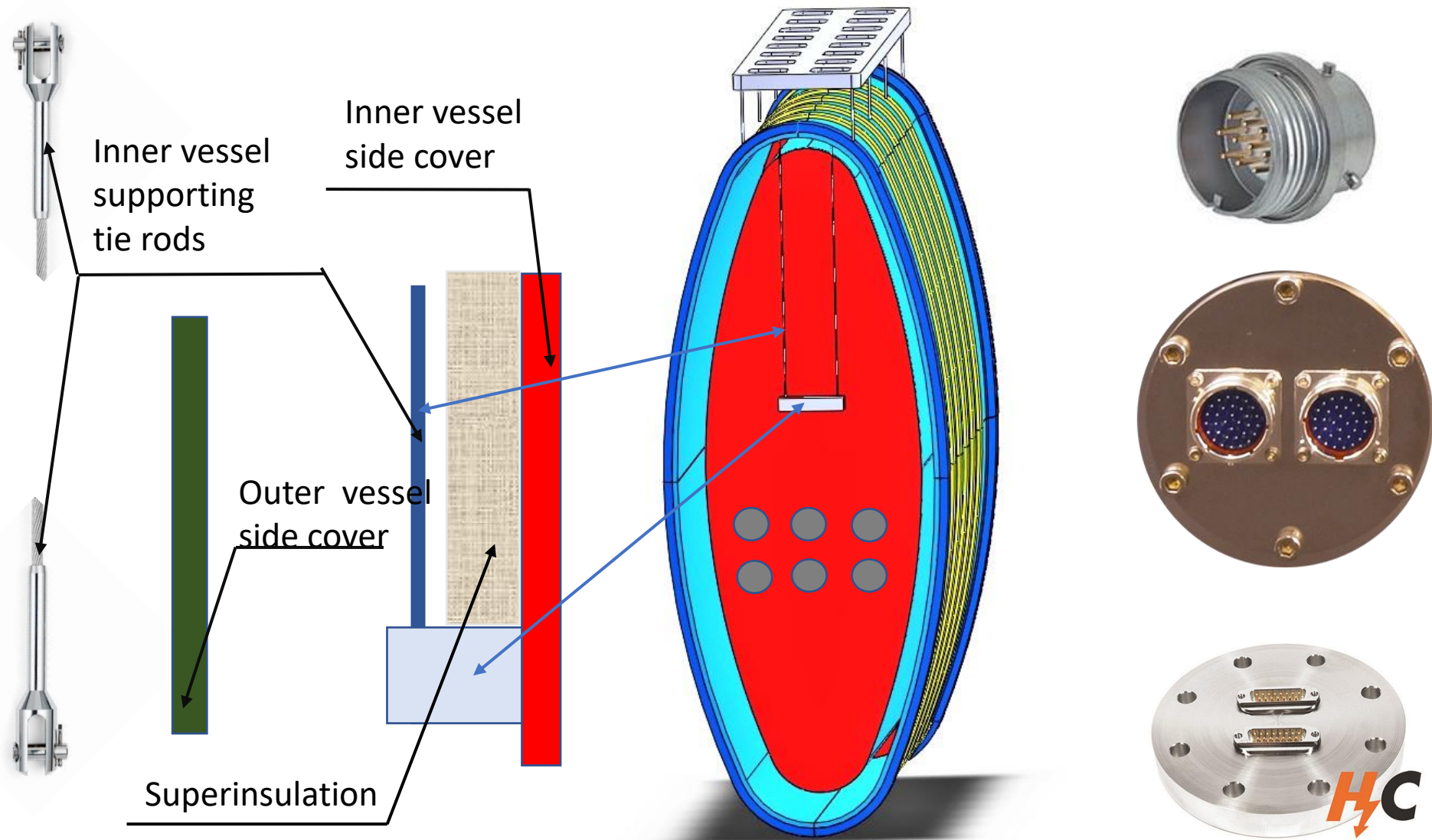
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Carbon Fiber Outer Vessel (3bars)

Cryostat cross sections





Inner vessel hanging system and cover view