

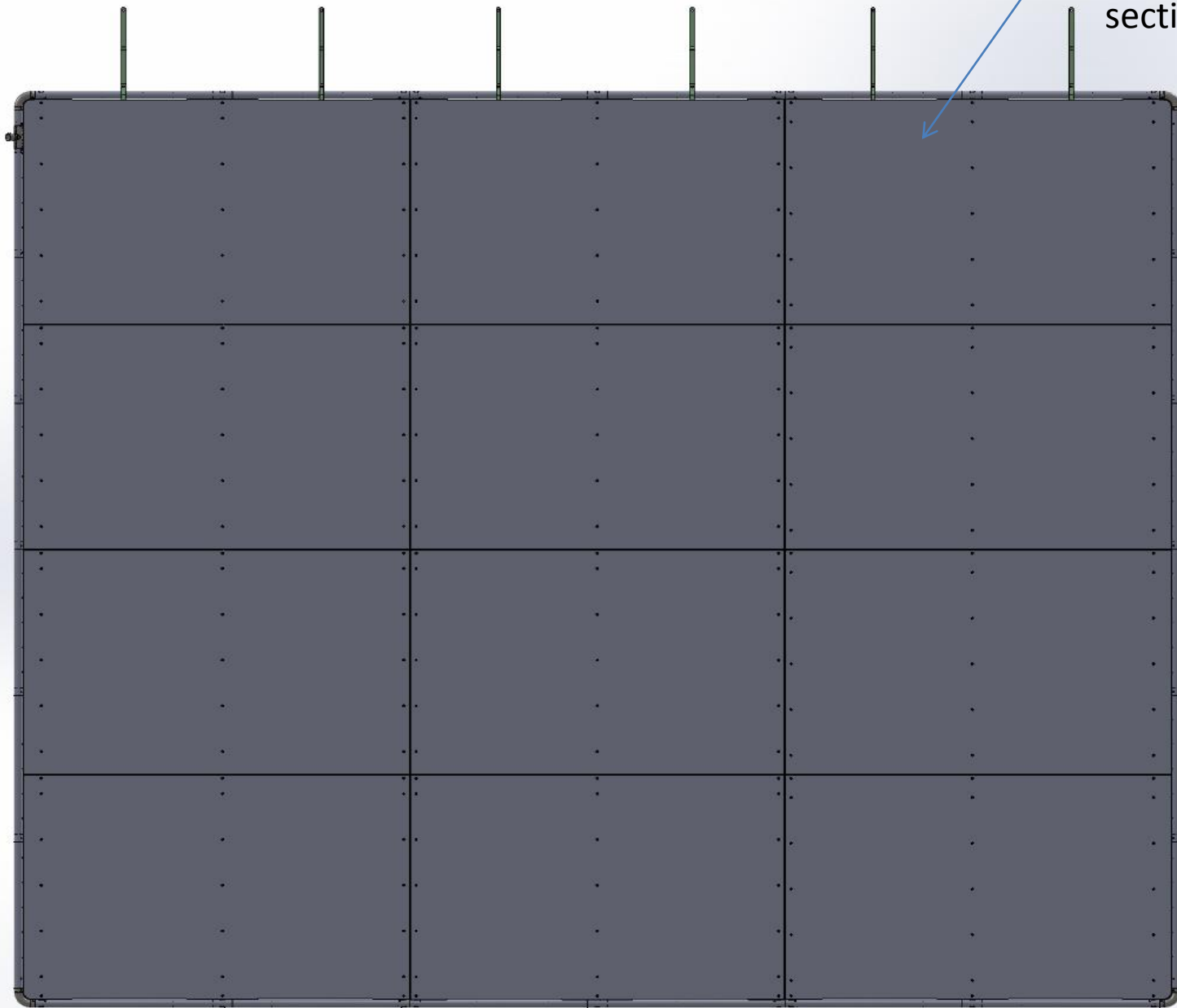
CPA Micarta Based

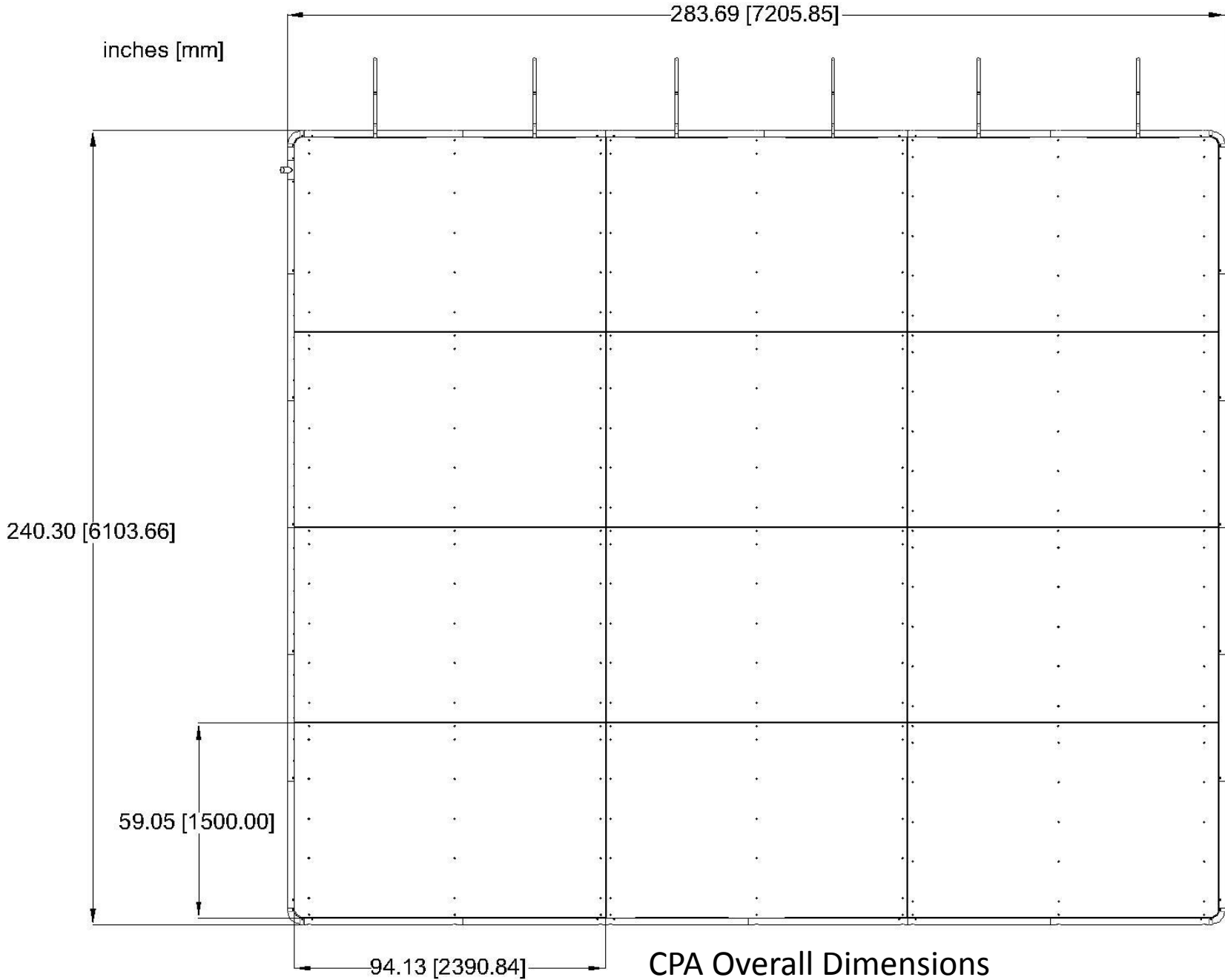
Rahul Sharma / Bill Sands

The present design shown in this document is based on the use of Micarta as the base material this will likely change the design will work with G-10 or other materials with minor changes due to material strengths.

24 Panel 3 section Micarta CPA Weight ~ 1400 lbs.

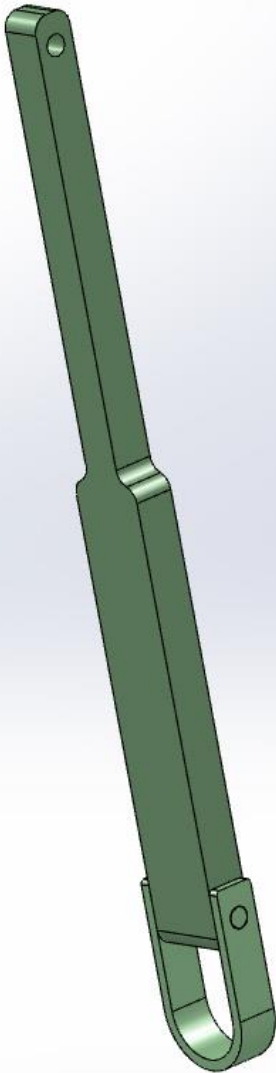
12 parallel plate sections

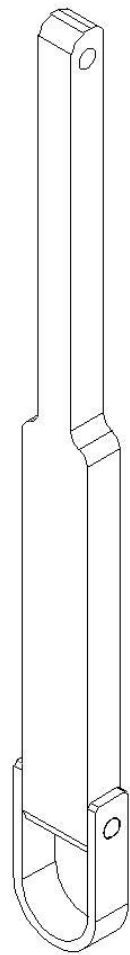




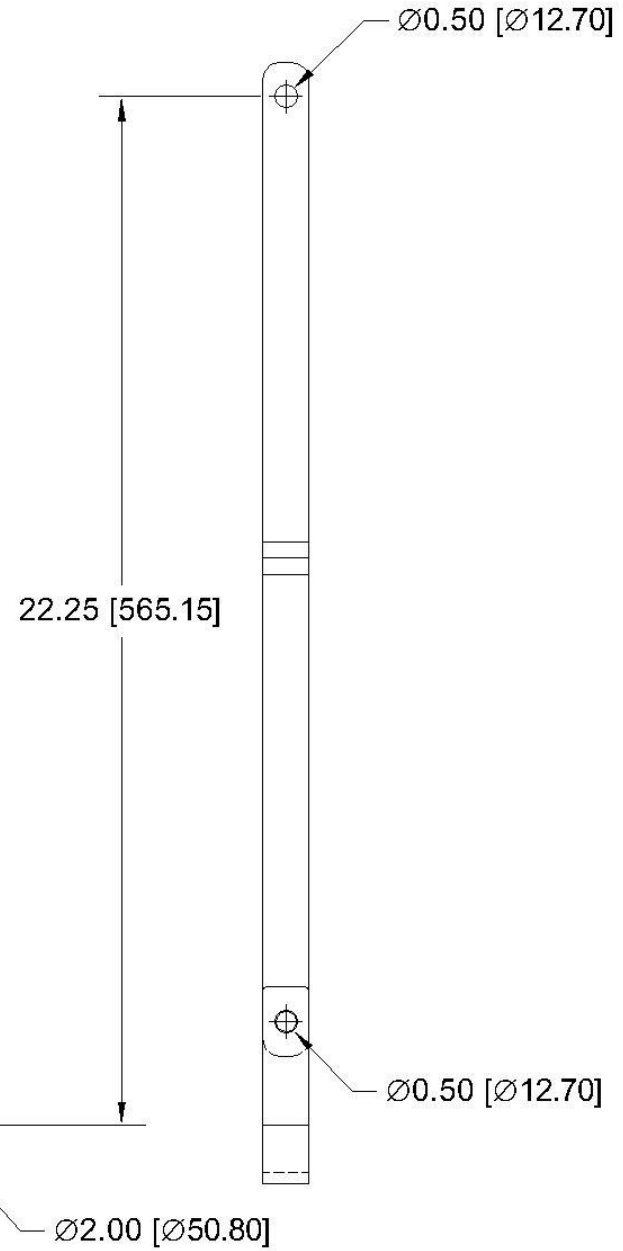
CPA Overall Dimensions

Main Hanger G-10
6 Pcs. Required



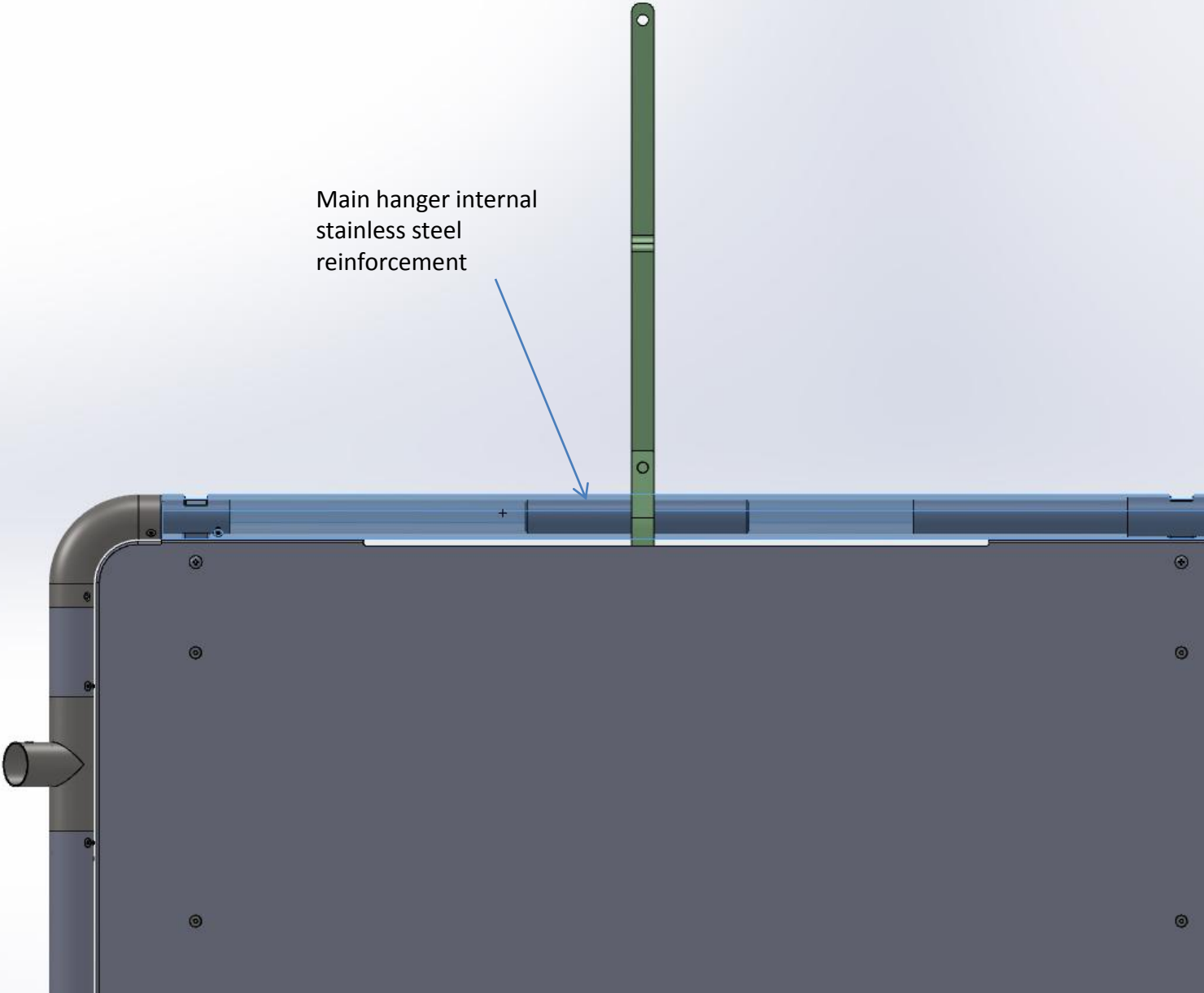


inches [mm]

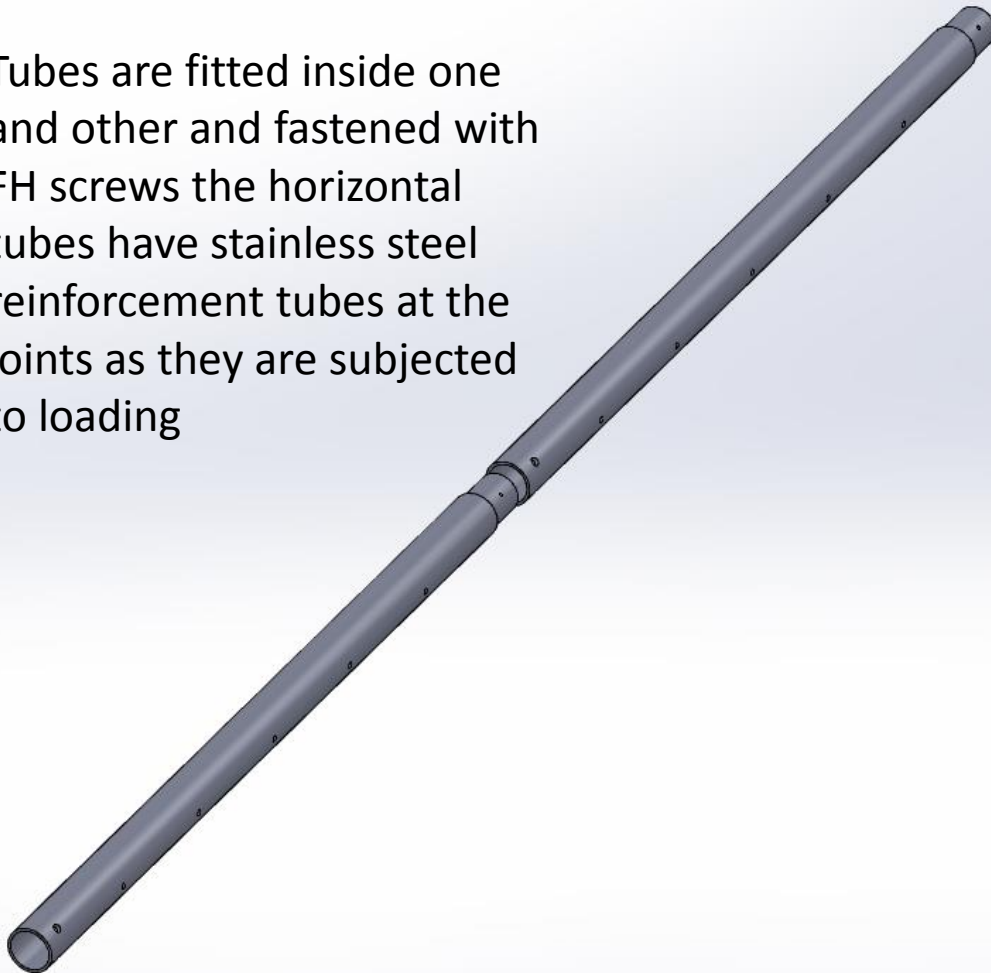


Main Hanger Dimensions

Main hanger internal stainless steel reinforcement



Tubes are fitted inside one and other and fastened with FH screws the horizontal tubes have stainless steel reinforcement tubes at the joints as they are subjected to loading



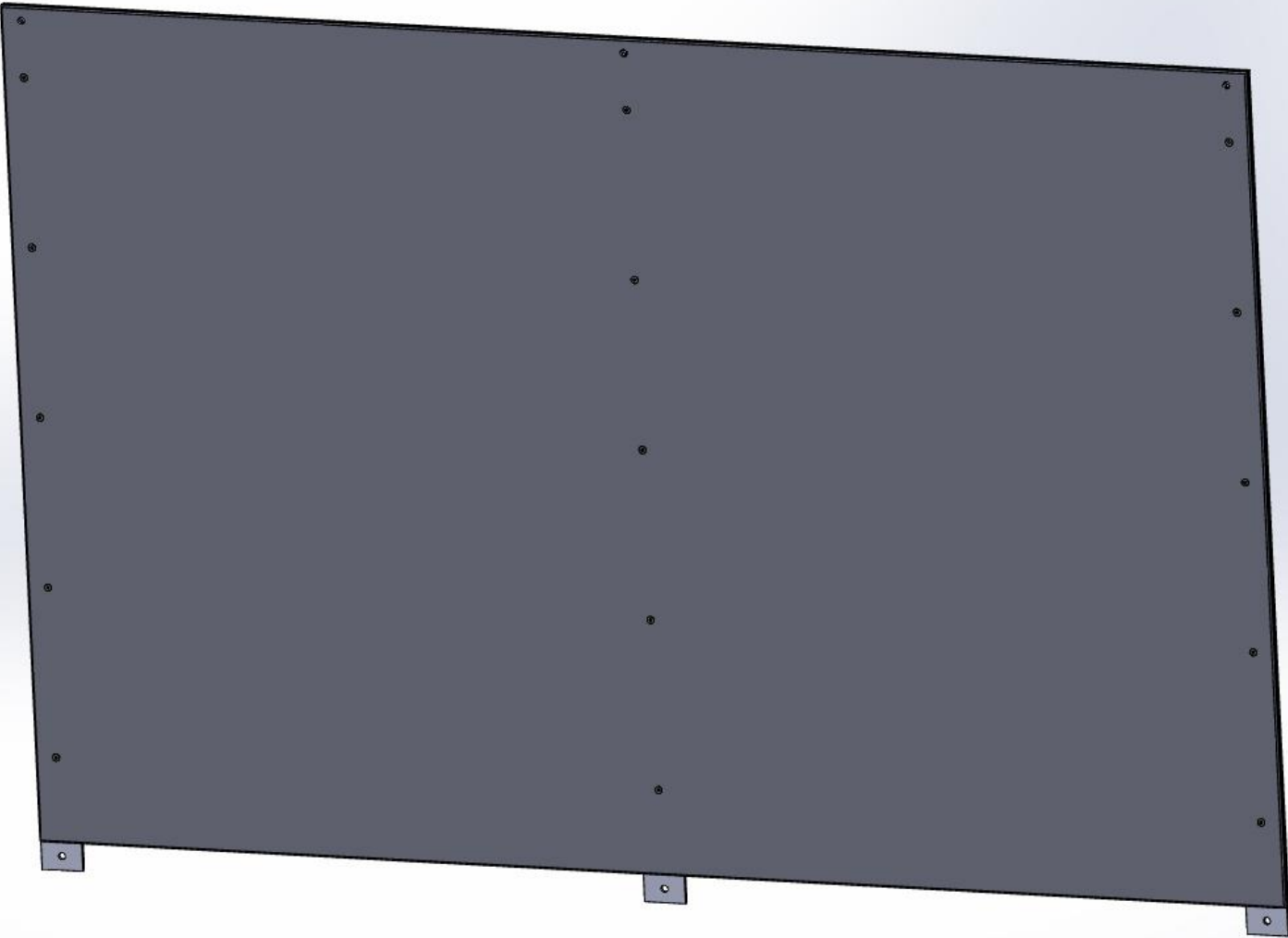
Each vertical section consists of 2 tubes and 3 stainless steel hangers to support a column of 4 parallel plate sections



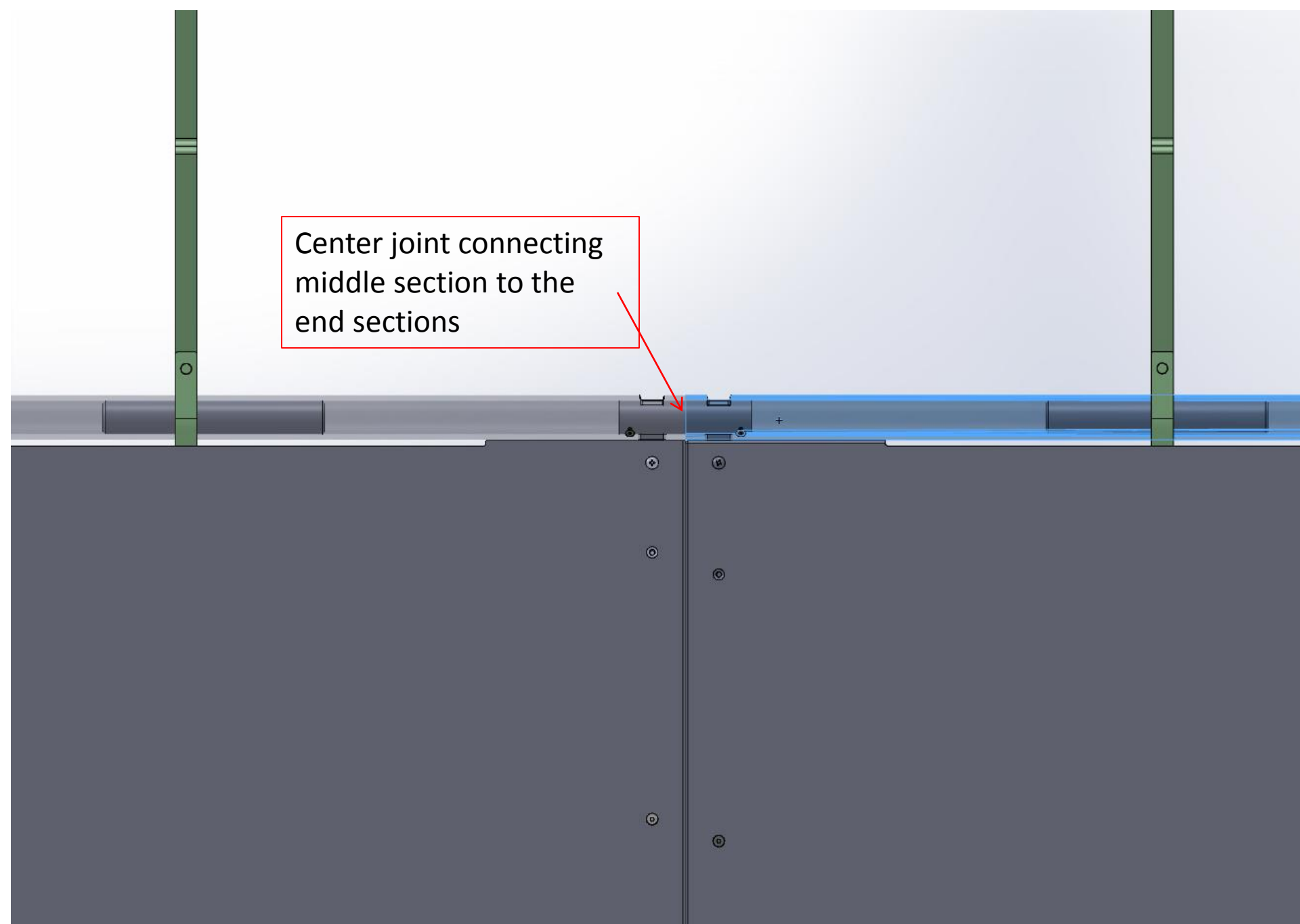
Parallel plates are connected to 3" wide strips with tapped holes to connect the panels



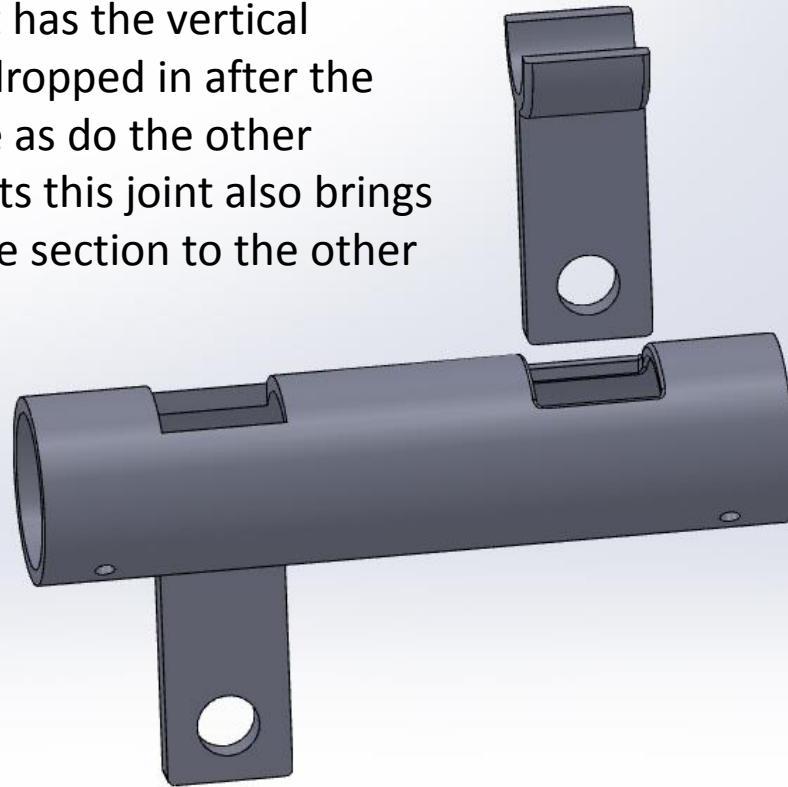
Example of a 2 plane middle section weight ~100 lbs.



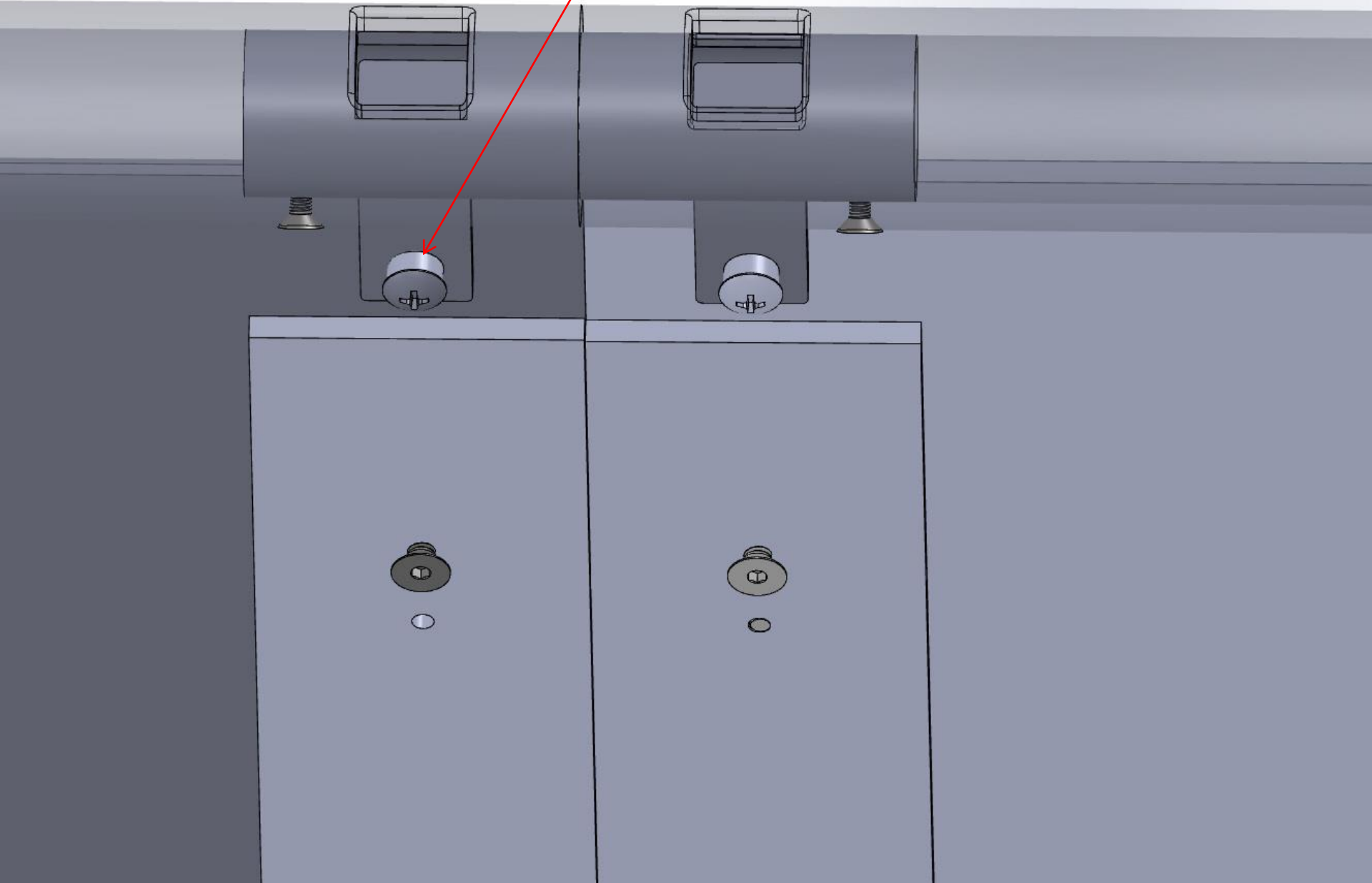
Center joint connecting
middle section to the
end sections



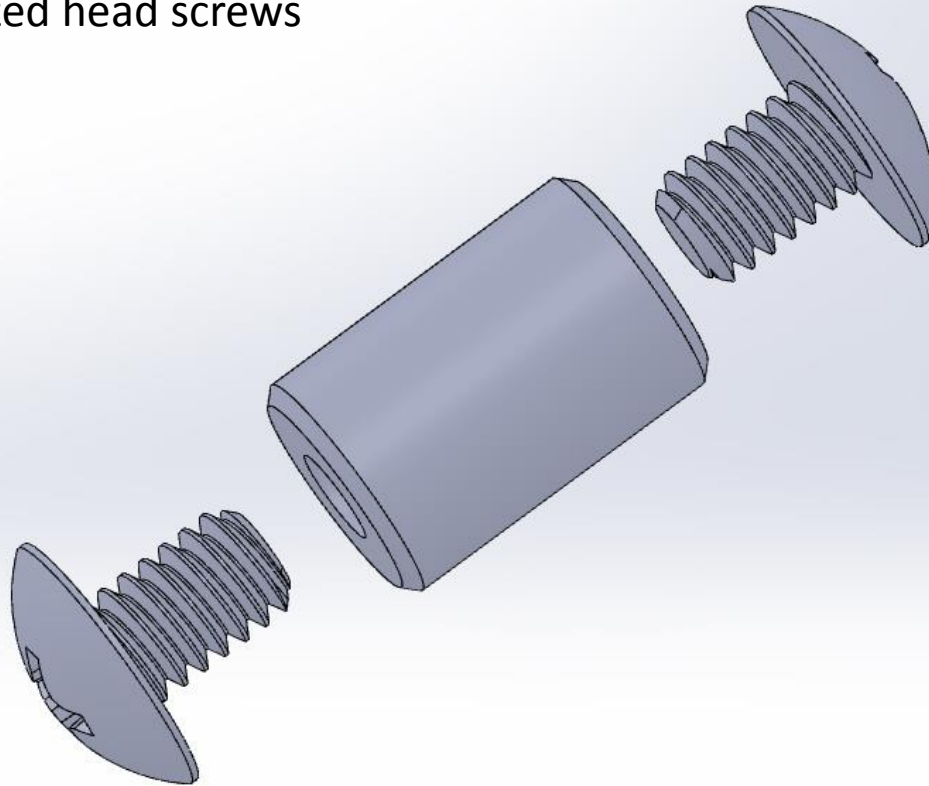
Center joint has the vertical connector dropped in after the tube is slide as do the other vertical joints this joint also brings HV from one section to the other

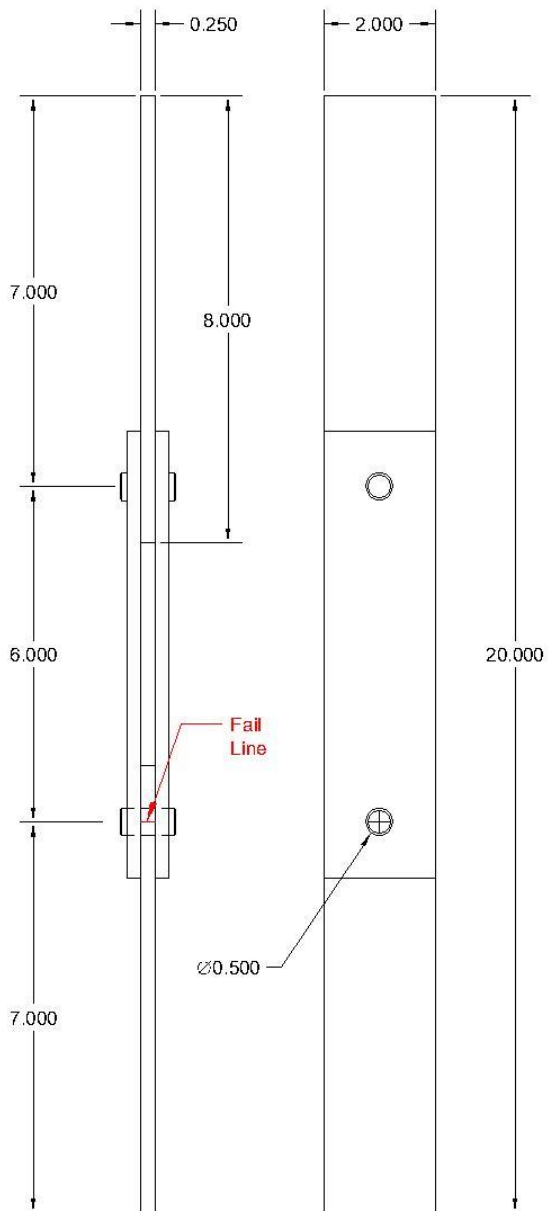


½" tapped pins connect the vertical sections



Shear pin connection pin
and oversized head screws





Micarta tensile test

The CPA panels are pinned together in a double shear configuration the part failed in tension at 3250 pounds which is well within the limits needed

10/6/2015.

Am. Struts.		Load #	KSI
G-10 X	0.095 x 0.950	2566	28.4
G-10 Y	0.095 x 1.025	2267	23.3
B - X	0.130 x 0.990	1211	9.4
B - No.	0.130 x 0.980	1472	11.6

LN₂ -

G-10 X	0.095 x 1.040	2478	25.1
G-10 Y	0.095 x 1.015	2535	26.3
B-X	0.130 x 0.990	1339	10.4
BNo	0.130 x 0.995	1479	11.4

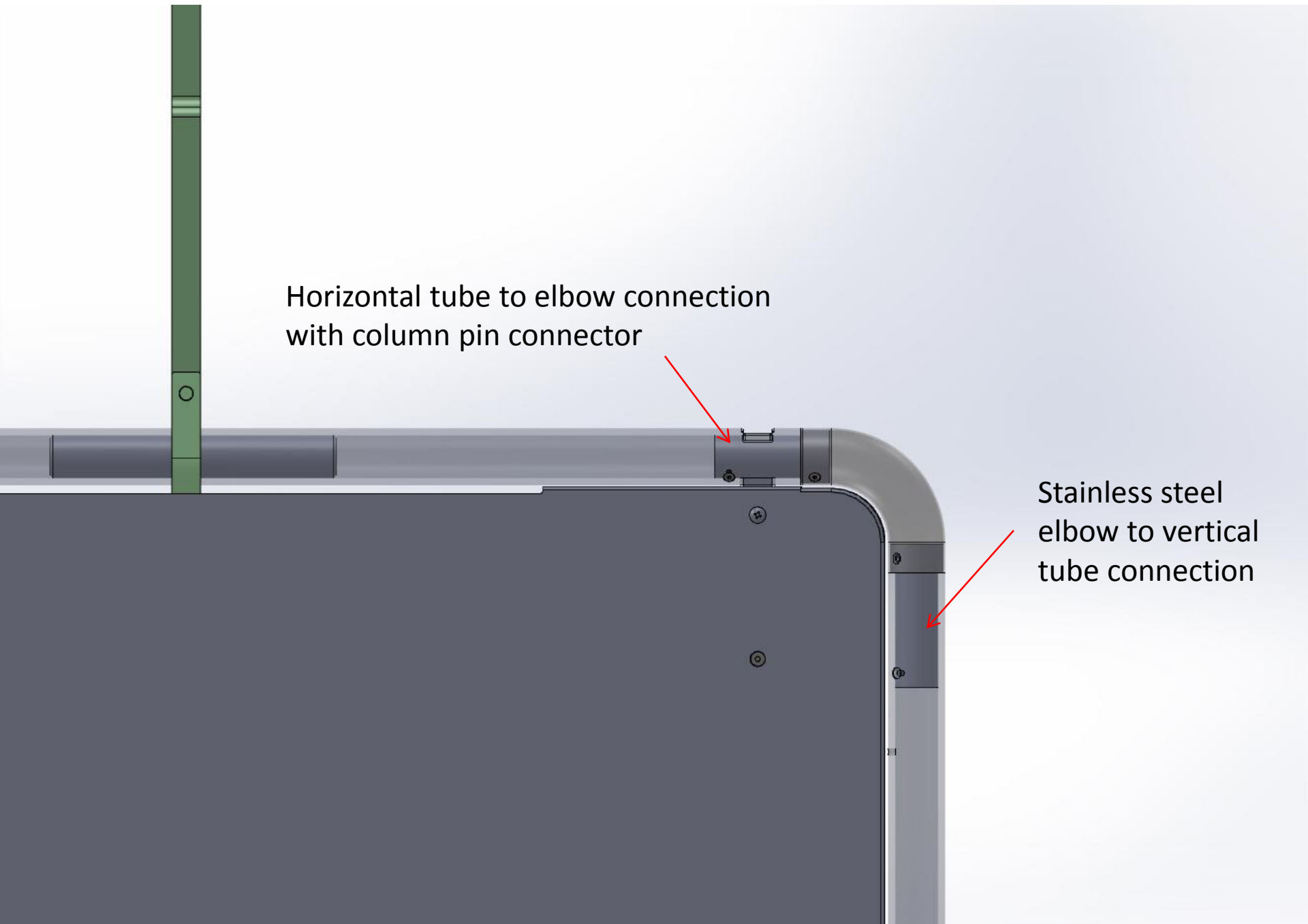
10/7/2015. Dog Bone Samples.

Am Struts.		Load #	KSI
G-10 X1	0.095 x 0.984	2314	24.7
G-10 Y1	0.095 x 0.987	1906	20.3
Bench X1	0.128 x 0.960	1153	9.4
Bench Y1	0.128 x 0.980	1128	9.0

LN₂.

G-10 X2	0.092 x 0.972	2279	25.5
G10 Y2	0.095 x 0.978	2115	22.8
Bench X2	0.128 x 0.960	1350	11.0
Bench Y2	0.130 x 1.015	1499	11.4

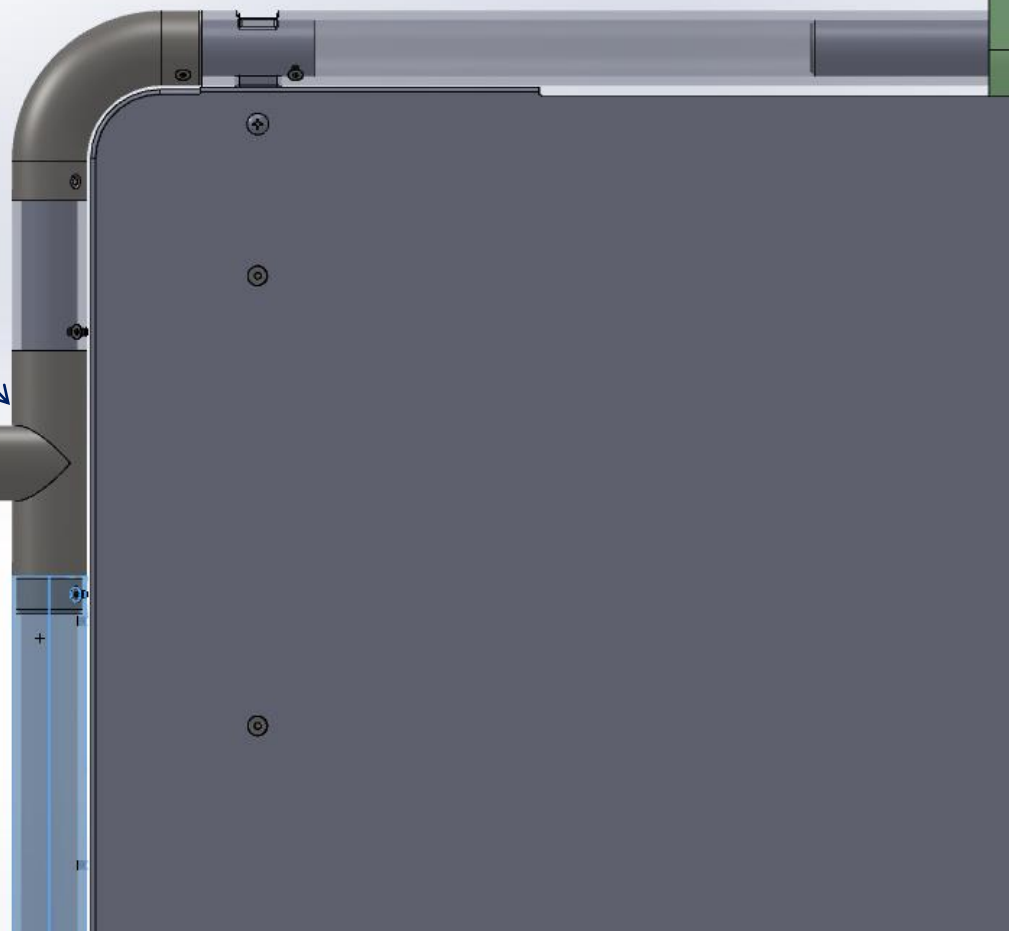
Cryo testing of the Micarta and G-10 demonstrate that the tensile strengths in both materials do rather well in a cryo state



Horizontal tube to elbow connection
with column pin connector

Stainless steel
elbow to vertical
tube connection

Swivel tee for HV connection





Slots cut into top and bottom panels to allow liquid argon flow between panels

Conclusion

- This document demonstrates that this is a viable design for construction of the CPA the design will likely need to be tweaked with a change in material.