

Run Tank Stand User Manual

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1 Scope

This document does not provide the engineering analysis behind the design, but instead just provides some insight into how to use the thing. If you are interested in a somewhat outdated analysis, search on the drive for my work term report that I wrote on the subject.

This document *does* discuss the water jacket and load cell.

2 Consumables/Replaceables Quick Reference Guide

1. O Rings are -360 and -366 size. You need at least two of each.
2. All bolts that touch the vertical columns are 1/4-20, and should be between 1 and 1.5 inches long, inclusive. For your sanity they should be fully threaded. By my count around 50 are required. Accordingly, about 100 washers and 50 nuts are needed.
3. The bolts connecting the base plate to the legs are 3/8-16. They need to be at least 2 inches long, plus or minus 0.25 (longer is ok just makes it progressively more annoying) The partially threaded 2" bolts with 1" threaded are good for this.
4. Screws for the feet are #10-24, and at least 2" long
5. Gaskets around the hose inlet and outlet adapters should be replaced as necessary. Any closed cell foam of a decent density will work, as will other decently thick gasket materials (1/8" ish thickness)

3 Full Bill of Materials

Work in progress

Item Name	Item Description	Suggested Source	Quantity
Columns	1.5"x1.5"x1/8" steel angle, 7.5 feet in length	E3	4
Top plate	1'x1'x1/8" steel plate	E3	1
Base plate	13"x24"x1/4" steel plate	E3	1
Legs	1"x1"x1/8" square tube	E3	2
Column support brackets	1.5"x1.5"x1/8" steel angle, 1.5" long	E3	4
Column stiffening plates	12"x3"x1/8" steel plate	E3	8
Top plate brackets	1.5"x1.5"x1/8" steel angle, 1.25" long	E3	4
Feet	Rubber bumper with unthreaded hole	McMaster-Carr ¹	4

¹<https://www.mcmaster.com/#9540k793/=1as9gh9>

Shield panels	12"x48"x1/4" polycarbonate sheet	E3	4
Feet fasteners	#10-24, min 2" long, with washers and nuts	E5	4
Leg fasteners	3/8-16, min 2" long, with washers and nuts	Wherever	4
All other fasteners	1/4-20, min 1" (ideally 1.5"), with washers and nuts	Wherever	56 (112 washers)
Water jacket sealing caps	Machined aluminum caps to seal between the water jacket shell and the run tank	Make it ourselves	2
Water jacket shell	6" OD/ 7.75" ID polycarbonate tube, 36" length	McMaster-Carr ²	1
Water jacket inlet adapter	3D printed custom shape	3D Print centre	1
Water jacket outlet adapter	3D printed custom shape	3D Print centre	1
O Ring - shell side	-366	McMaster-Carr ³	1
O Ring - tank side	-360	McMaster-Carr ⁴	1
Inlet and outlet adapter gaskets	Generic gasket material, around 1/8" thick	Any place of convenience ⁵	2
Hose clamps	8" ones for the adapters around the jacket, and minimum 1.5" ones for the hose-to-adapter connection	Home depot, McMaster-Carr ⁶	4 large, 2 small

²<https://www.mcmaster.com/#8585k59/=1aswn3e>

³<https://www.mcmaster.com/#9452k391/=1asx6f4>

⁴<https://www.mcmaster.com/#9452k516/=1as82k7>

⁵this may never need replacing, as the adapters *can* remain permanently attached to the water jacket shell. Original gaskets were from a foam sample supplied by Rogers Corp

⁶<https://www.mcmaster.com/#5011t43/=1atedgj>