Cell Construction

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Christophe's Test Cell

A working test cell utilizing a T33 water filter tube and a 3D printed base. Additional support for pressure, temperature sensors and pressurization gauges and safety valves.

Construction Method & Details

PDF Download: Procedure for manufacturing a standard tubular test cell (1).pdf

> Procedure for manufacturing a standard tubular test cell.

Parts List

T33 Water Filter Cartridge Housing	51oXO1VpUYL._AC_SX522_.jpg Image not found or type unknown	Example 1 Example 2
Waterproof cable gland M8*1.5.	Screenshot from 2022-06-29 21-32-23.png Image not found or type unknown	Example
Optional Nylon Pneumatic Blanking Plug 4mm Hose Tube Push Fit Connector Air Line	Screenshot from 2022-06-29 21-32-30.png Image not found or type unknown	

MPX5500DP PACKAGING SIP 6 pressure sensor.	Screenshot from 2022-06-29 21-32-35.png Image not found or type unknown	
6*4mm polyurethane pneumatic hose .	Screenshot from 2022-06-29 21-32-39.png Image not found or type unknown	
Various 1/4" BSP Thread Tee Type 3 Way Brass Pipe Fitting	Screenshot from 2022-06-29 21-32-45.png Image not found or type unknown	
Brass Hex Bushing Reducer Pipe Fitting 1/8” –> 1/4”	Screenshot from 2022-06-29 21-32-52.png Image not found or type unknown	
4mm Long Hose Barb x 1/4" Male BSP Thread Brass Barbed Pipe Fitting	Screenshot from 2022-06-29 21-32-57.png Image not found or type unknown	
0~30psi 0~2bar 40 Diameter Fuel Air Compressor Low Pressure Meter.	Screenshot from 2022-06-29 21-33-03.png Image not found or type unknown	
1/4" mini brass ball valve BSP male to female.	Screenshot from 2022-06-29 21-33-12.png Image not found or type unknown	
1/4'' 8KG BSP Air Compressor Safety Release Valve Pressure Relief	Screenshot from 2022-06-29 21-33-29.png Image not found or type unknown	
DS18b20 Stainless steel package Waterproof (These will have to be adapted to improve waterproofing see below)	Screenshot from 2022-06-29 21-33-34.png Image not found or type unknown	
Heat shrink tube	Screenshot from 2022-06-29 21-33-39.png Image not found or type unknown	

4mm Banana Plugs Socket Connector	Screenshot from 2022-06-29 21-33-44.png Image not found or type unknown	
Thread sealant	Screenshot from 2022-06-29 21-33-52.png Image not found or type unknown	
Teflon tape	Screenshot from 2022-06-29 21-33-57.png Image not found or type unknown	
Epoxy resin.		
Stainless steel tube 304L or 316L: Outer tube 16x2mm or 14x1mm ; 100mm length. Inner tube or rod ext diameter 10mm ; 110mm length. The goal is to get a 1 mm gap between outer and inner tube.	ZqyFDr5Sv2aNmcVR-download-3.jpeg Image not found or type unknown	
T33 cell : Bottom, Stand and cap spacer The bottom and the tubes cap spacer have been designed for 16x2mm outer tube and 10mm inner tube. Ask for different dimensions.	Screenshot from 2022-06-29 21-43-42.png Image not found or type unknown	ThingVerse STL

Sealing of the DS18b20 temperature sensor:

> The DS18b20 must be sealed with epoxy resin otherwise, the water will leak throw the cable due the pressure inside the cell chamber.

1- Remove the heat shrink tube protection.

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2 - Protect the stainless tube with masking tape and pour the tube with epoxy resin.

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3 - Once dry, remove the masking tape.

Screenshot from 2022-06-29 21-45-57.png

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4 – In order to keep it clean replace the heat shrink tube.

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5 – The DS18b20 is now ready to be used in a pressurized vessel.

Screenshot from 2022-06-29 21-48-27.png

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T33 Bottom waterproofing:

> In order to resist to the pressure and avoiding leaks, the bottom need to be filled with epoxy.
> The printing wall thickness needs to be 5 walls in order to get a strong threaded part.
> It needs only one 1st layer because it will be removed later. (But at least 1 layer for bed adhesion
> purpose). To improve bed adhesion, print with an additional skirt.

1 - Print the bottom.

> This type of infill is not necessary. Any kind of infill will allow epoxy to flow and pour the part.

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2 – Remove the bottom layer.

Screenshot from 2022-06-29 21-51-12.png

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3 – Pour the cap with epoxy resin.

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4 – Take care that the epoxy doesn't leak through the holes. In some cases, it will be useful to plug the orifices with silicone which can then be removed.

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5 – Allow it to harden completely before attempting to use it.

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6 – Install the different connections and fittings.

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Screenshot from 2022-06-30 17-05-59.png

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There’s many way to connect each components, here is an example of the parts I used:

Screenshot from 2022-06-30 17-06-07.png Image not found or type unknown	Screenshot from 2022-06-30 17-07-03.png Image not found or type unknown	Screenshot from 2022-06-30 17-06-44.p Image not found or type unknown
Screenshot from 2022-06-30 17-06-51.png Image not found or type unknown		Screenshot from 2022-06-30 17-06-3 Image not found or type unknown