

# Public Invention Oxygen Concentrator

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<https://github.com/PubInv/pioc>



# Project Objective

To create a scalable, open source oxygen concentrator for medical therapies in rugged environments.

# Project Requirements

## Technical

Deliver medical grade oxygen >90% FiO<sub>2</sub> at various target flow rates - 5, 20, 50LPM+.

## Regulatory

Documented sufficiently for a 3rd party to take to next stages.

## User Centric

Safe design, user friendly, easy servicing, multi-lingual touch screen.

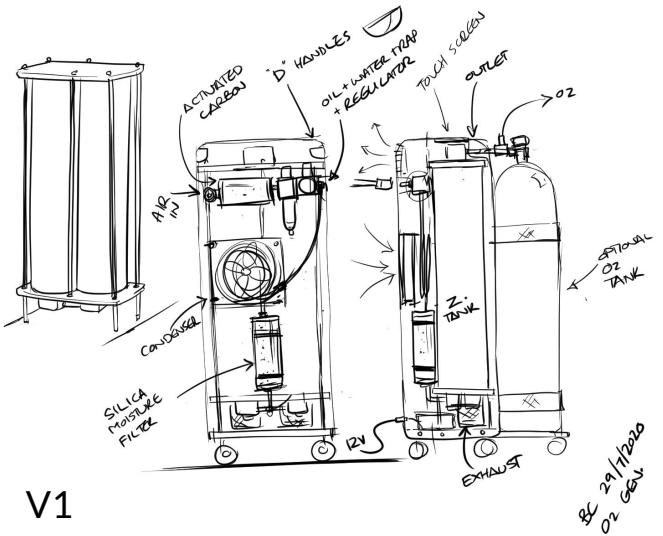
## Environment

Operate in remote field hospitals that are high temperature, high humidity and dusty.

## Manufacturing

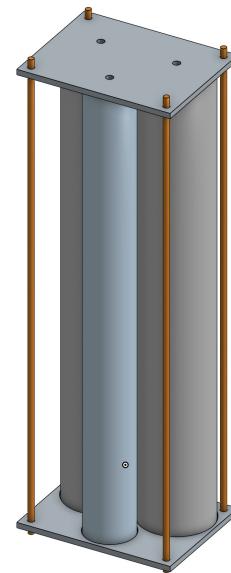
Can be locally made by leveraging existing industries and skills.

# Concept Design

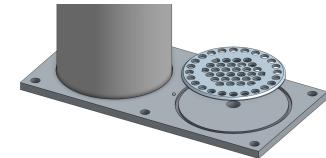
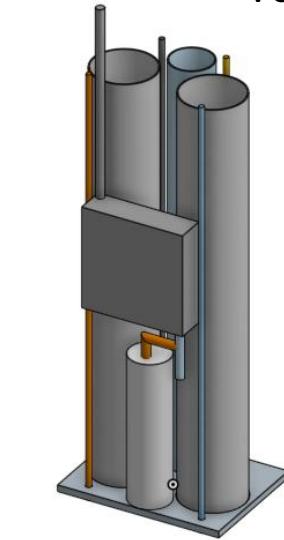


V1

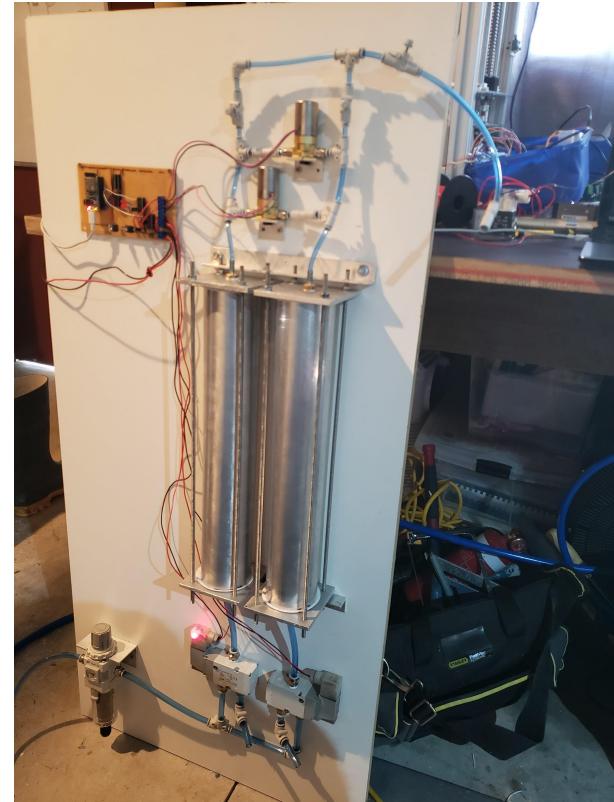
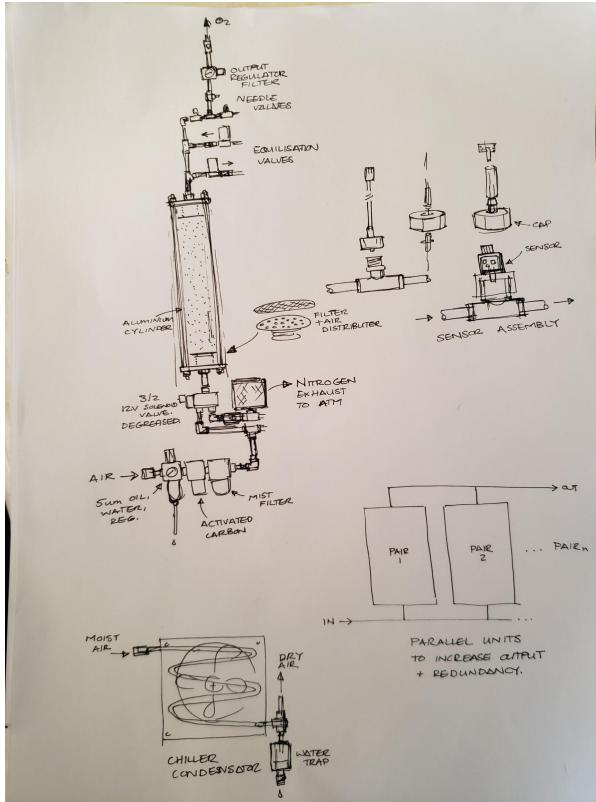
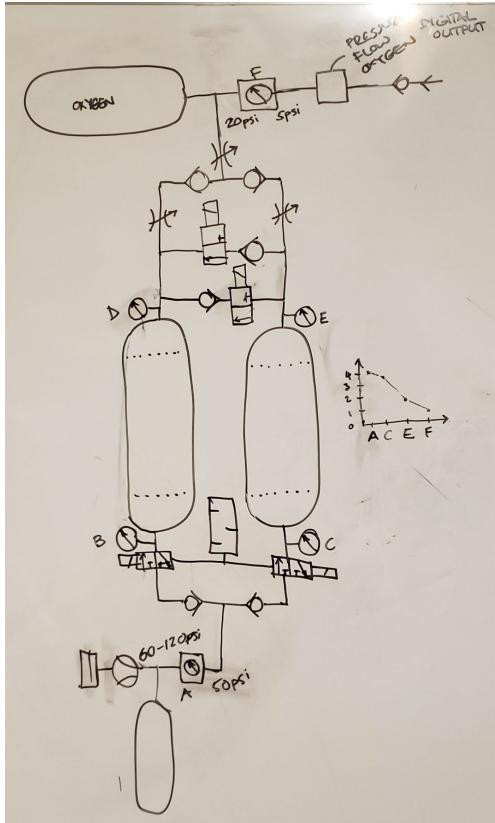
- Runs off 24V power supply and a compressed air source.
- Built in air filtration to produce medical grade air.
- Rugged plastic body with handles and wheels.
- Durable aluminium pressure vessels.
- Reliable, long-life parts that are easy to service.



V3

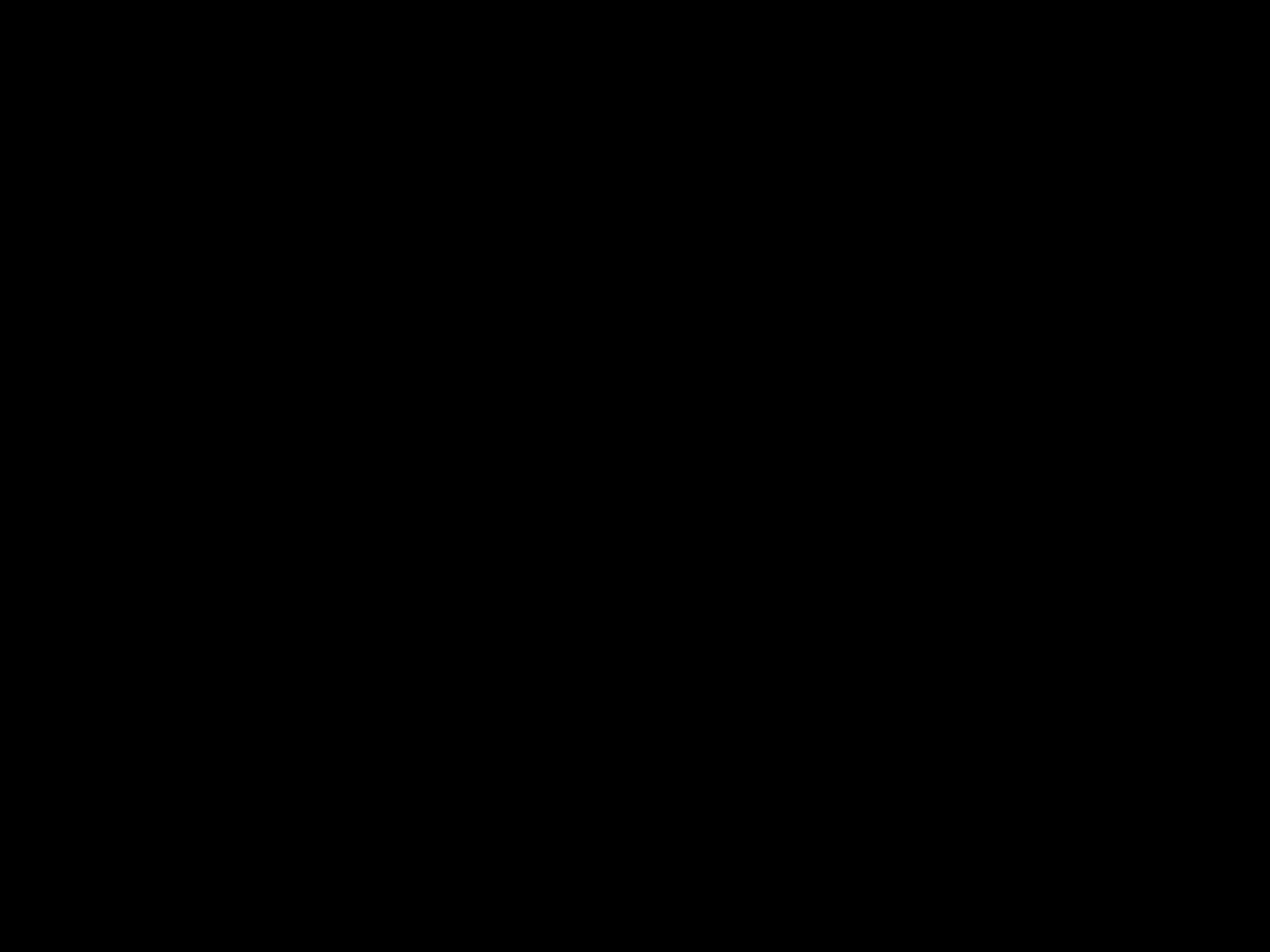


# Mechanical Design



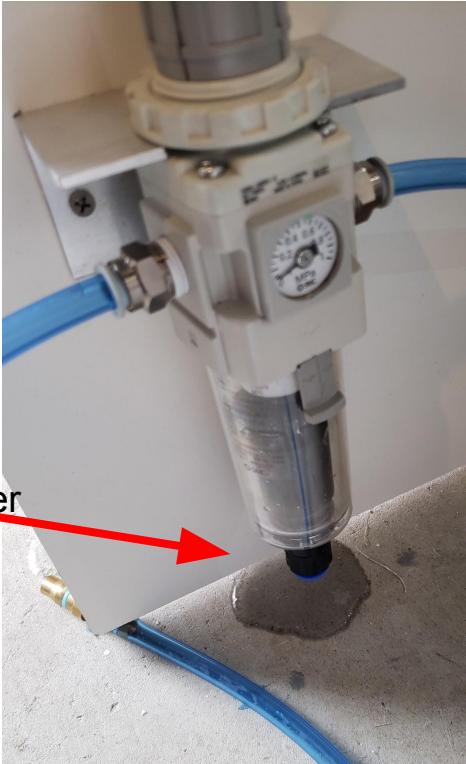
# Design Evolution





# Air Drying

Coalescing water trap



# Cylinder design and construction

Pressure and leak testing



Compressed  
silicone gasket

# Sieve Interior



Bottom sieve supported  
by aluminium ring

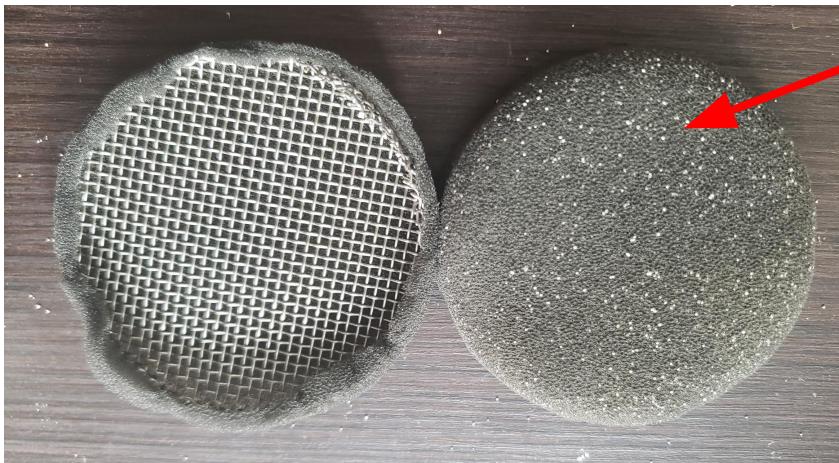


Filled with zeolite



Multi-layer foam filter on top

# Sieve Filters



First version filter  
with thin foam



Evidence of air  
entering at high  
velocity in the  
center



# Zeolite Dust

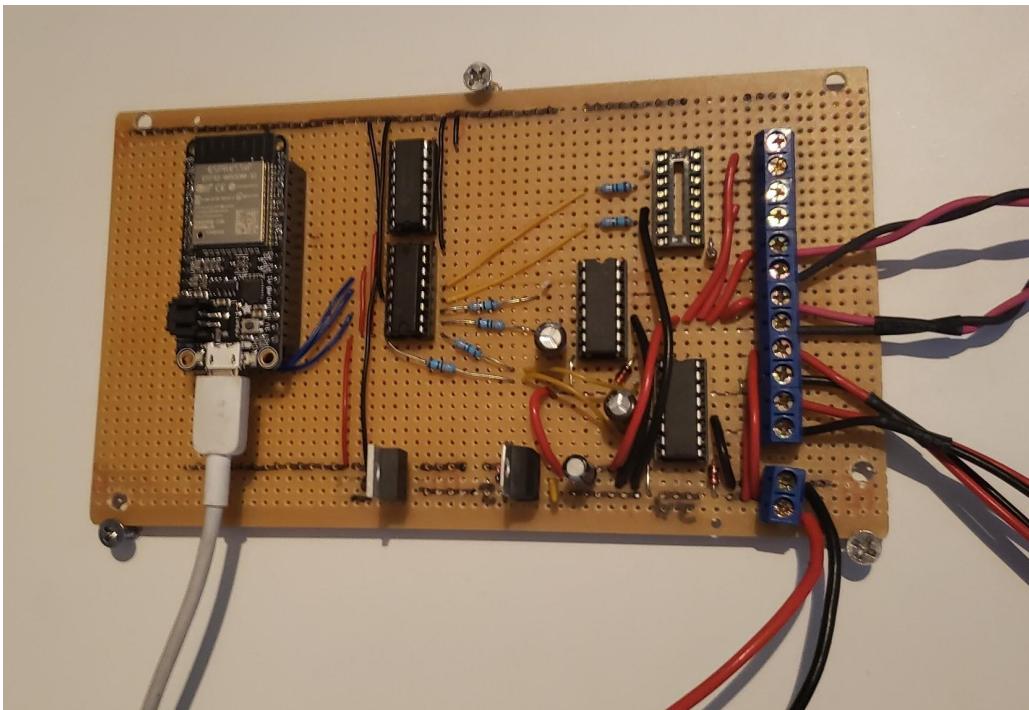
Valve spool  
contaminated  
with zeolite dust  
causing valve to  
stick



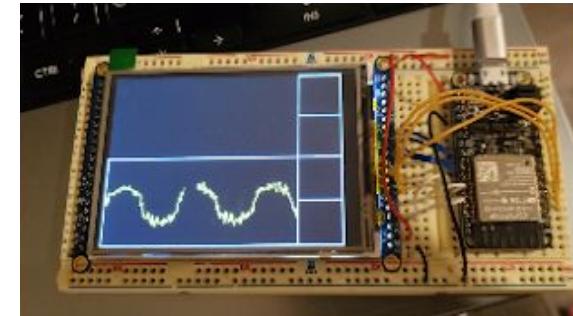
Fine dust on  
walls of sieve  
cylinder



# Electrical Design



- 24V input
- 12V and 5V voltage regulators
- Derated Toshiba solenoid drivers
- Shift registers out and in for expansion
- ESP32/ESP32S2
- Simple circuit board
- SPI touch screen



# Next Steps

- Sensor integration
- Touch screen development
- Filter optimization
- Gas quality testing
- Documentation
- Product design (housing)
- 10LPM standalone model

