

# Validation testing of 1-MCP - protocol

## Required materials

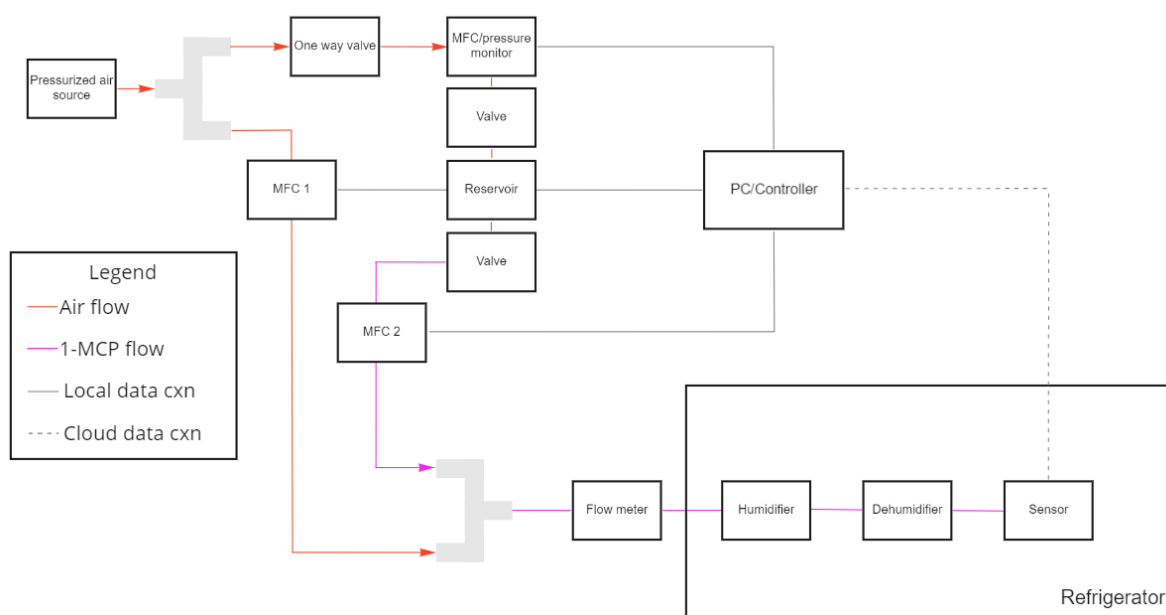
### Equipment

- Balance
- 1L Reservoir rated to withstand pressure of 26 PSI (e.g. 1L glass bottle modified to accept push-fit connectors, e.g. Nalgene Top Works Closure)
- Pressurized air source
- 3x Mass flow controllers capable of regulating flow in the region 1-50 sccm, or equivalent and PC or local controller
- Flow meter
- Tubing and push-fit connectors
- 2x Glass or plastic vial (20 mL capacity) with septum seal or closure modified to accept push-fit connectors
- 2x mechanical valves
- (optional) refrigerator
- (optional) small glass vial (5 mL capacity)
- (optional) Roller for solution mixing (e.g. Cole-Parmer-Stuart SRT9)

### Consumables

- 1-methylcyclopropene (CAS 3100-04-7), isolated in  $\alpha$ -cyclodextrin powder (CAS 10016-20-3) (we purchase from BOC Sciences)
- $\text{CaCl}_2$  salt (CAS 10043-52-4)
- DI water
- (optional)  $\alpha$ -cyclodextrin powder

## Schematic



## **Protocol**

### **Preparation of 1-MCP reservoir**

1. (optional). Prepare a 1:4 dilution of the 1-MCP powder in  $\alpha$ -cyclodextrin in a small glass vial. Once combined, the powders will need to be agitated over an extended time to ensure very even dilution. This can be done by placing the vial containing the mixture on a roller for 3 days.
2. Place ~50 mL of DI water in the reservoir.
3. Weight out 63.75 mg of the diluted powder (or 12.75 mg of undiluted powder) and place in the reservoir.
4. Rapidly seal the reservoir, including ensuring that the outputs from the closure are sealed using the valves.
5. Connect the reservoir in the position indicated in the schematic. Ensure that the MFC controlling the output is set to 0, then open the valves.
6. Using the pressurized air supply, pressurize the reservoir until the pressure monitor reads 26 PSI.
7. Close the input valve.

### **Preparation of humidifier**

1. Pierce two holes in the septum seal.
2. Insert inlet and outlet tubing through the septum. Ensure that the inlet is located lower in the body of the vial than the outlet.
3. Fill the vial with 10 mL of DI water. Ensure that both inlet and outlet are above the level of the liquid.

### **Preparation of dehumidifier**

1. Pierce two holes in the septum seal.
2. Insert inlet and outlet tubing through the septum. Ensure that the inlet is located lower in the body of the vial than the outlet.
3. Fill the vial with 10 g of  $\text{CaCl}_2$ . Ensure that both inlet and outlet are clear from obstruction.

### **Conducting exposure**

1. Conduct exposures according to the protocol below. Using the ratios outlined will result in alternating exposure to 1-MCP at a concentration of 1,000 ppb, as validated by GC-FID. Steps 1&2 can be repeated as often as required.

Step	Duration (min)	MFC1 (sccm)	MFC2 (sccm)	[1-MCP] (ppb)
0	60	50	0	0
1	12	50	0	0
2	3	49	1	1,000