Possum1 Chimney Probe

Mountain Air Engineering
mtnaireng.com
Updated 23 October 2025

The Possum1 chimney probe is part of the Possum1 portable emission sampling system. The chimney probe is used for sampling emissions from chimneys and exhaust stacks, either from a porthole or the exhaust outlet. The probe assembly includes nozzles, diluters, filter holders, cyclone, pitot tube, and thermocouple. The probe kit also includes soft tubing (to connect to the sensor box), cleaning kit, assembly tools, spare parts, and carrying case. The probe provides the following inputs to the sensor box: an undiluted sample, a diluted sample for the optical PM sensor, a diluted sample for two parallel filter holders, differential pressure from the pitot tube, and temperature from the thermocouple.

The chimney probe can be configured for many different sampling applications. The following figures and tables show some possible configurations. The probe kit contains two types of diluters: 1. a simple tee dilution mixer, and 2. a sheath air dilution mixer. All configurations use the same 12” long dilution mixing tube immediately downstream of the mixer.

Isokinetic sampling can be achieved by measuring the stack velocity with the pitot tube and choosing a nozzle with appropriate inside diameter so the inlet velocity matches the stack velocity. Further adjustments to the nozzle inlet velocity can be made by adjusting the undiluted sample train flow rate. The nozzles can be cut to length for a particular application to account for the chimney diameter and rain cap offset.

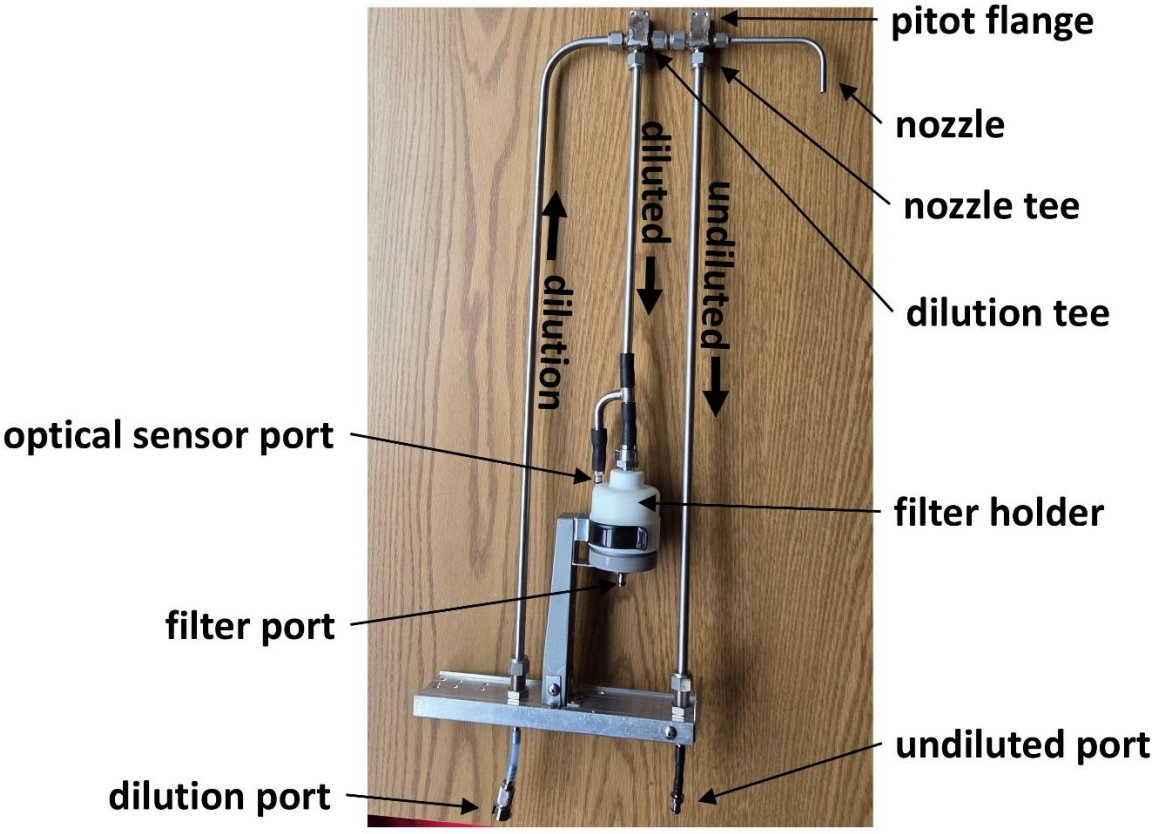


Figure 1: Basic probe assembly, one filter holder, without cyclone or pitot tube.

Specifications

Nozzles: OD: 0.25” – 0.375”, ID : 0.18” – 0.30”, various lengths.

Diluters: 1. Simple tee and 2. sheath air annulus. Dilution mixing tube ID = 0.305”, L = 12”.

Undiluted sample train: Outlet port = Colder MC male quick-connect. Recommended flow = 0 – 3 lpm.

Diluted sample train: Outlet port = Colder MC male quick-connect. Recommended flow = 0 – 3 lpm.

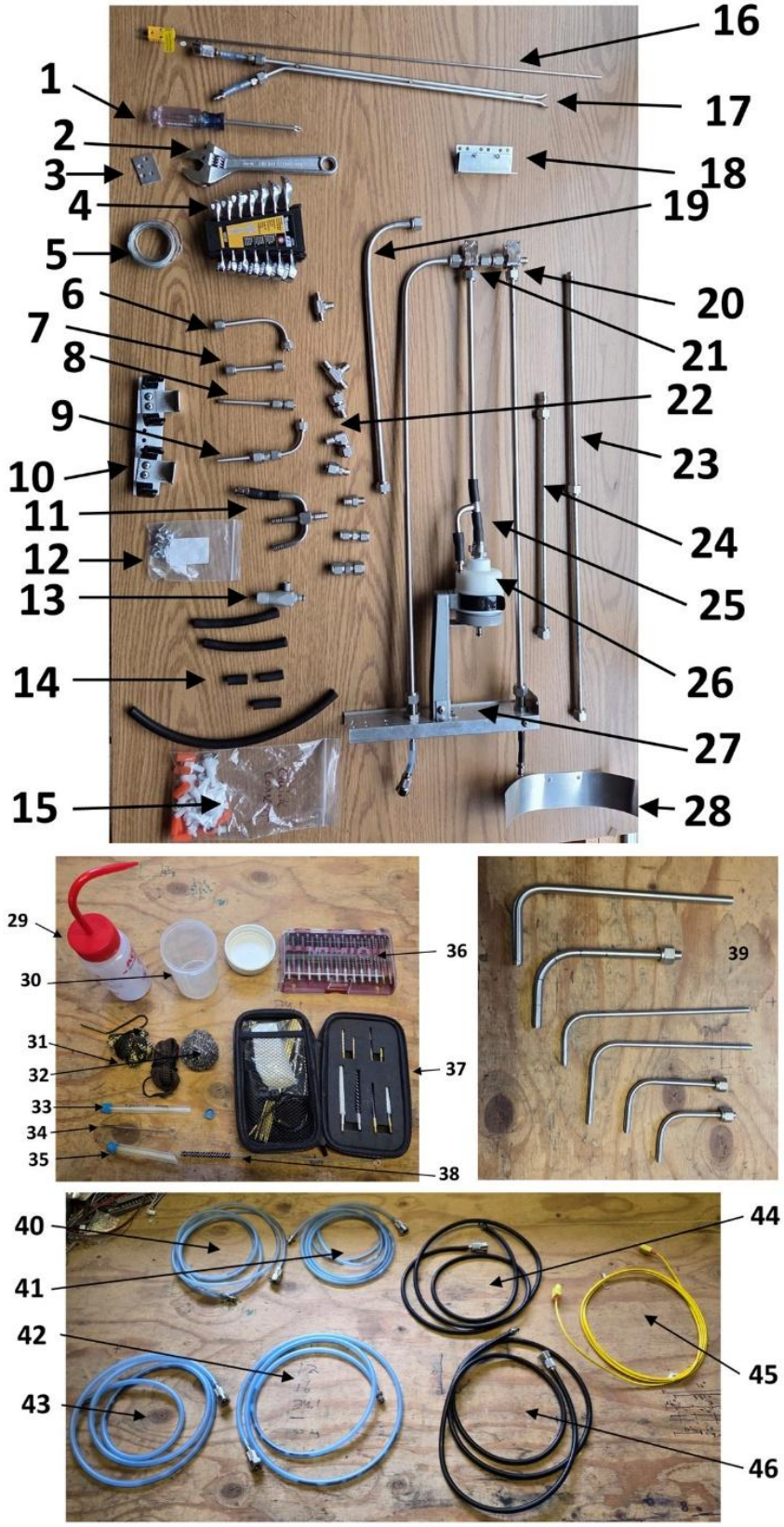
Cyclone: 2.5 um cut-point @ 3 lpm, URG-2000-30EQ

Filter holders: 47mm, URG-200-30-RAF, Outlet port = Colder MC male quick connect, Inlet port = Colder LC female quick-connect. Recommended flow = 0 – 3 lpm.

Dilution air train: Inlet port = Colder MC female quick-connect. Recommended flow = 0 – 3 lpm.

Pitot tube: Type S, ¼” OD, Outlet ports = Colder MC quick connects (+ = male, - = female)

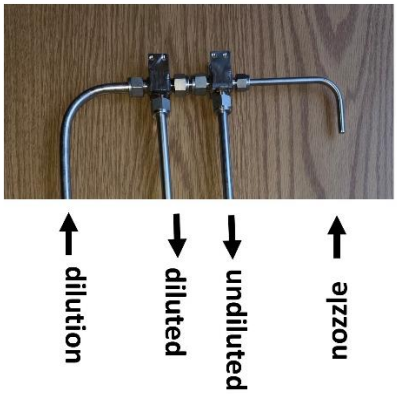
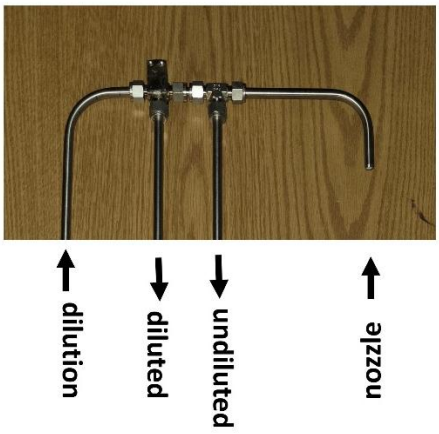
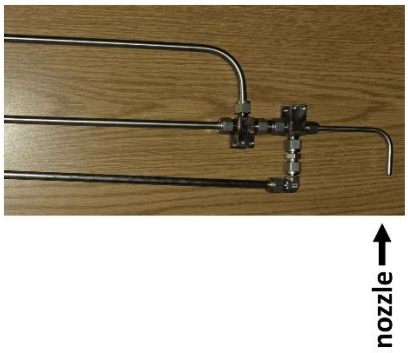
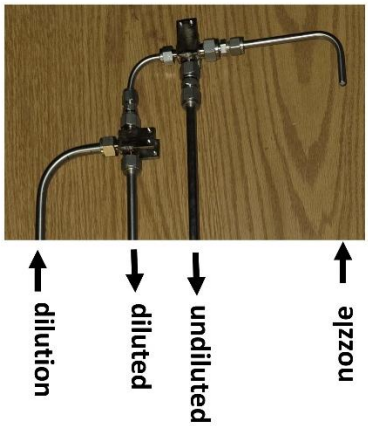
Thermocouple: Type K mini, 24” length, 1/8”



1	Phillips screw driver	
2	Adjustable wrench	
3	Spacer for short probe	
4	Wrench set	
5	wire	
6	¼" OD straight connector tube	
7	¼" OD bent connector tube	
8	Sheath air diluter for horizontal probe	
9	Sheath air diluter for vertical probe	
10	Double filter holder clips	
11	3-way splitter for double filter holders	
12	#10x32 machine screws	
13	Cyclone, 2.5 um @3 lpm	
14	Spare conductive tubing, OD: ½", ID: ¼" and 3/8"	
15	Spare quick-connect fittings	
16	Type K thermocouple probe, 24" length	
17	Type-S pitot tube, 18" length	
18	Pitot tube mounting clamp	
19	Short dilution tube	
20	Nozzle tee	
21	Dilution tee	
22	Spare fittings for various configurations	
23	Long undiluted tube	
24	Short undiluted tube	
25	2-way splitter for single filter holder	
26	Filter holder, 47mm, URG-2000-30-RAF	
27	Probe base	
28	Chimney brace	
29	Acetone squirt bottle	Cleaning kit
30	Acetone container	Cleaning kit
31	Bore snakes	Cleaning kit
32	Abrasive pad	Cleaning kit
33	Case for cyclone brush	Cleaning kit
34	Cyclone brush	Cleaning kit
35	Case for ¼" brush	Cleaning kit
36	Nylon brush set	Cleaning kit
37	Cleaning rod kit	Cleaning kit
38	¼" brush	Cleaning kit
39	Nozzle set	
40	Pitot tube soft tube, 5 ft	
41	Pitot tube soft tube, 5 ft	
42	Filter 1 soft tube, 5 ft	
43	Filter 2 soft tube, 5 ft	
44	Thermocouple extension cord, 10 ft	
45	Undiluted soft tube, 5 ft	
46	Diluted soft tube, 5 ft	
47	Heat shield (not pictured)	
48	Carrying case (not pictured)	

Figure 2: Full chimney probe kit including the parts, cleaning kit, nozzle set, and connecting tubes

Table 1: Sampling Head Configurations

1 Simple tee dilution mixer ¼” OD nozzle	
2 Simple tee dilution mixer 3/8” OD nozzle	
3 Simple tee dilution mixer Horizontal ¼” OD nozzle	
4 Sheath air dilution mixer 3/8” OD nozzle tee ¼” or 3/8” OD nozzle	

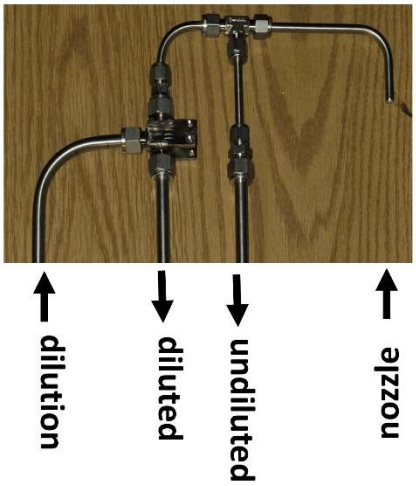
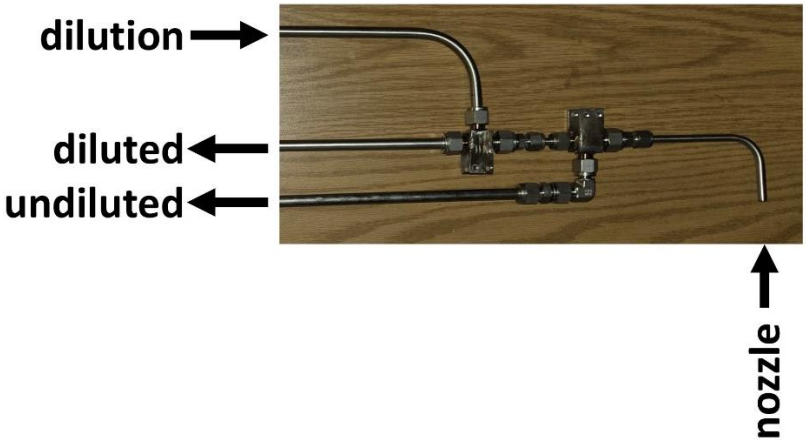
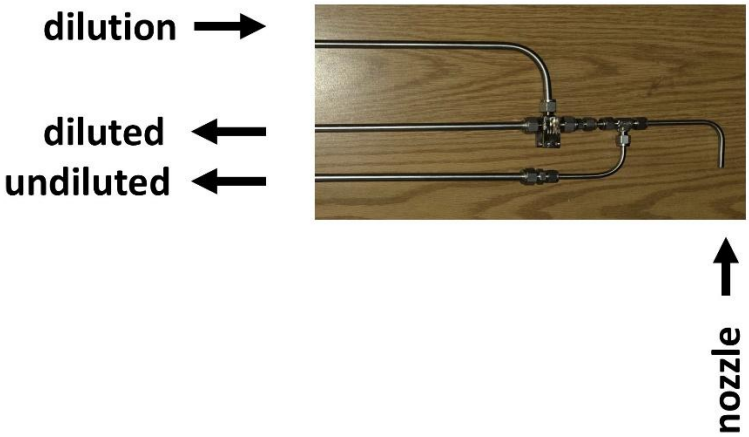
5 Sheath air dilution mixer ¼” OD nozzle tee ¼” OD nozzle	
6 Sheath air dilution mixer Horizontal 3/8” OD nozzle tee ¼” or 3/8” OD nozzle	
7 Sheath air dilution mixer Horizontal ¼” OD nozzle tee ¼” OD nozzle	

Table 2: Filter Holder Configurations

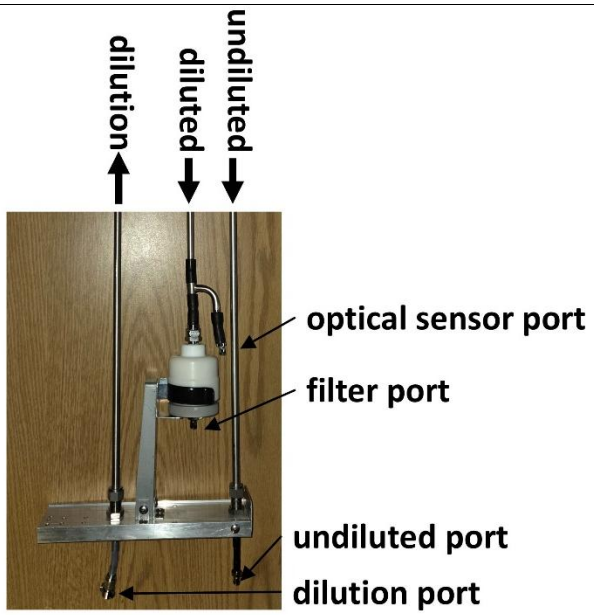
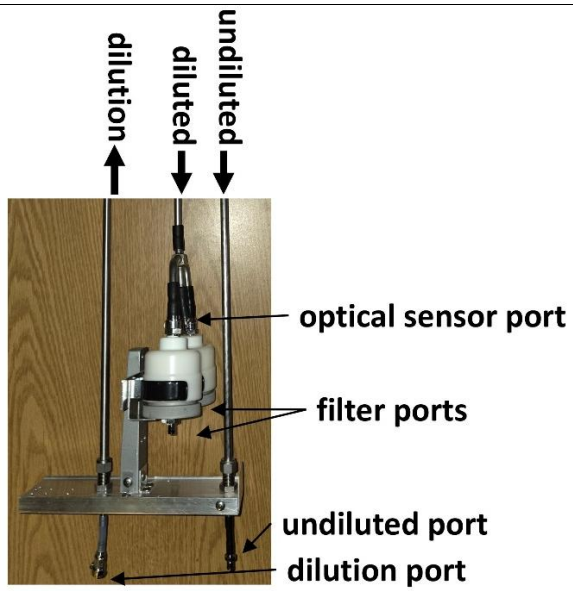
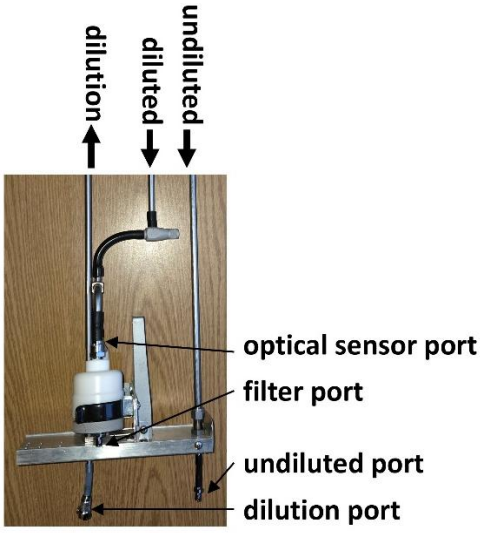
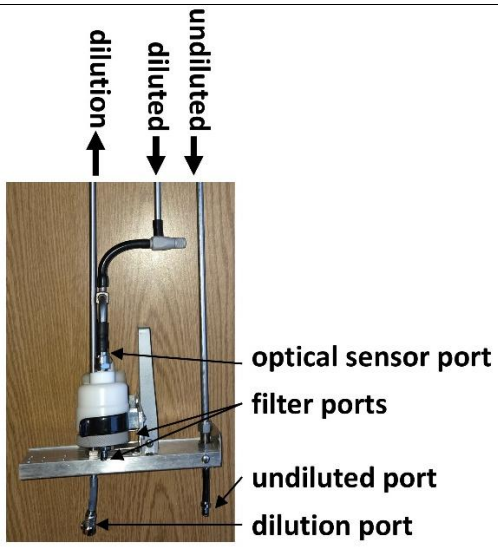
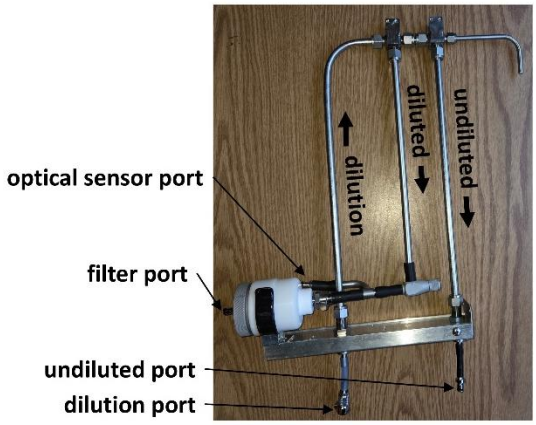
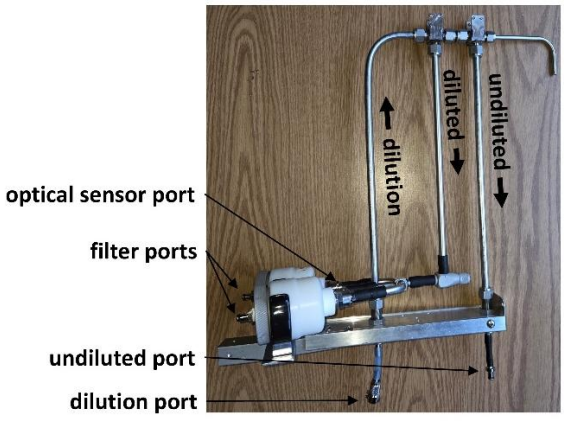
	1 filter holder	2 filter holders
1 Without Cyclone Tall		
2 With Cyclone Tall		
3 With Cyclone Short		

Figure 3: Pitot tube assembly including the mounting clamp, type-S pitot tube, and thermocouple. The positive pressure port has a male quick connect fitting. The negative pressure port has a female quick connect fitting.

Figure 4: The chimney brace stabilizes the probe and provides an adjustable offset between the probe and the chimney to account for the size of the chimney cap. The brace can be strapped to the chimney with wire.

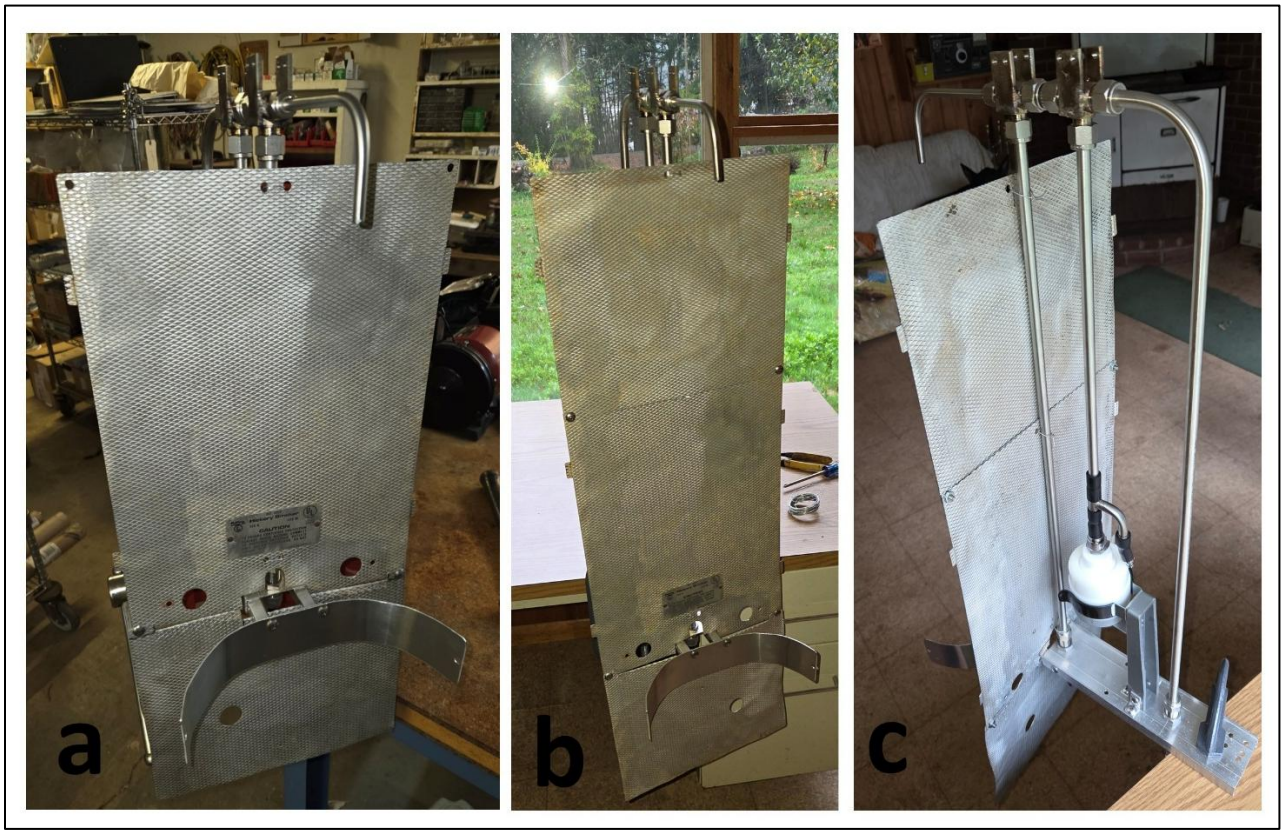


Figure 5: The heat shield can be attached to the probe with wire for sampling from uninsulated chimneys. a: Heat shield and chimney brace for short probe configuration. b: Heat shield and chimney brace for long probe configuration. c: Back side of heat shield for long probe configuration.

Operating instructions

1. Assemble probe
2. Leak test
3. Use probe
4. Cleaning: Disassemble probe. Wash stainless steel parts with acetone rinse and nylon brushes. Do not get acetone on O-rings of quick connects, cyclone, and filter holders. Blow out soft tubing with compressed air.