

# Apparatus for the Disposal of Waste Gases

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## Introduction

Many common chemical processes produce noxious gas phases that can accumulate in the laboratory, resulting in nuisance odours and potentially harmful atmospheres. This document outlines the design of a simple apparatus intended to conduct gases and vapours into the sewer system and/or atmosphere outside the laboratory.

*NOTE:* The apparatus has not been designed to safely dispose of extreme poisons or environmentally hazardous reaction products. The usual amount of caution should be taken in such situations.

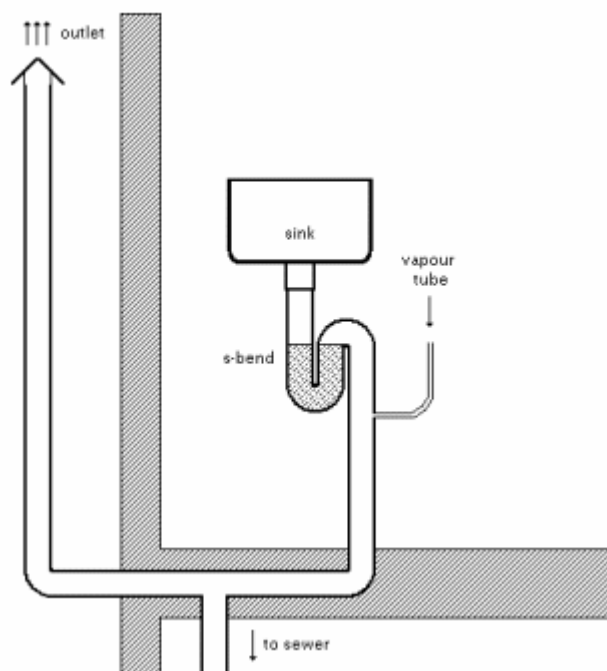


Figure 1 – positioning of vapour exit tube in DWV system

As can be seen in Figure 1, the resultant vapour from a reaction flask or condenser is injected into the drain system below the s-bend of a sink or other DWV (Drain Waste & Vent) entry point. In effect the outlet stack becomes a large condenser. Gases escape to the atmosphere while vapours condense and exit through the drain pipe.

### Prerequisites

- 20mm of 8mm  $\varnothing$  Tube (e.g. automotive fuel tubing)
- 20mm of 6mm  $\varnothing$  Tube (e.g. automotive fuel filter inlet with flange)
- 2000mm of 10mm  $\varnothing$  Tube
- Ball Valve (e.g. from petrol syphon)
- Superglue
- Contact Adhesive
- Utility Knife
- Drill
- 7mm (1/4") Drill Bit

### Instructions

1. Cut 20mm of 8mm tubing from an automotive tube, of the kind that is used between a fuel filter and carburettor. Resistance to petroleum or solvents is not particularly important in construction of the apparatus but this tubing is the correct size to fit into the vinyl tube.



Figure 2 – utility knife used to cut 8mm  $\varnothing$  automotive tubing

2. Cut 20mm of the 6mm tube from the inlet on a fuel filter (the small type used on some older Toyota vehicles). It is suited to this application since the flange that is integral to the inlet helps to stop it from becoming lodged inside the 8mm tube.
3. Apply superglue to the 6mm tube and insert it into the 8mm tube.
4. Insert the 8mm tube into the 10mm tube. It should fit tightly and not require any adhesive.



Figure 3 – 6mm Ø fuel filter inlet is glued into tube

5. Liberally apply contact adhesive to the notch around the top of the ball valve. If this step is omitted some vapour may escape the apparatus when it is in operation (see the diagram in figure 5 for detail of how such valves are constructed).

Any appropriate device of similar shape and size could be substituted for the ball valve here, such as a simple plastic ring of correct diameter. The valve used in this example was chosen because it fits well into 24/40 glass joints and has been observed to help prevent 'suckback'.



Figure 4 –adhesive is applied to upper notch in ball valve



Figure 5 – ball valve cross-section

6. Drill a hole into the drain pipe to which the outlet will be connected. The hole must be drilled after an s-bend to prevent vapours escaping through the sink.



Figure 6 – hole drilled on upper side of pipe, after s-bend

7. Place the end of the tube into the hole, so that the 6mm tube end fits snugly into the drain pipe. The assembly is complete.



Figure 7 – the exit tubing in position



Figure 8 – evaporation with odour control

### Variations

- The apparatus could be employed in conjunction with an aspirator
- Instead of a 6mm outlet to the DWV system, a 9mm outlet could be employed with the correct hole size drilled into the outlet pipe, and adaptor to suit.
- The tube can optionally be glued into place in the drain with contact adhesive.
- An alternative is to place the exit hose through the s-bend of a toilet. This suffices for applications that only require temporary odour control rather than permanent installation.