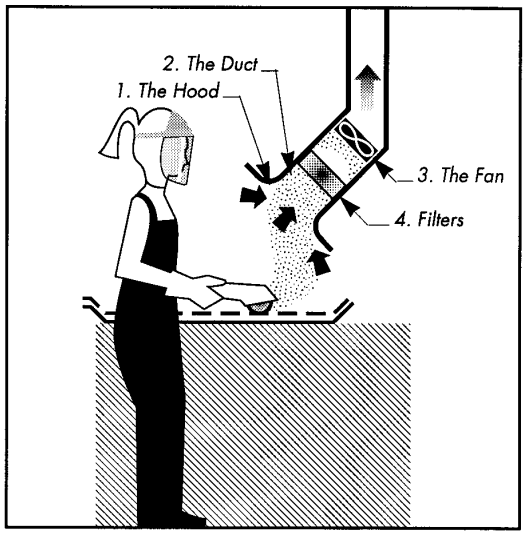
Government of South Australia
SAFEGUARDS
Workplace Services Department for Administrative and Information Services

GS 42 LOCAL EXHAUST VENTILATION



INTRODUCTION

Local exhaust ventilation provides a positive means of removing airborne contaminants from the working environment by capturing them at their source.

INDICATIONS FOR USE

Local exhaust ventilation is required when employee exposure to an airborne emission is not satisfactorily controlled by dilution or general ventilation. Factors contributing to the need for local exhaust ventilation include the following:

- contaminants which are relatively hazardous
- high emission levels (which are likely to need excessive volumes of air to control airborne concentrations using dilution ventilation)
- location of the employee in the immediate vicinity of the emission
- emissions that are intermittent or emission rates which vary with time
- extended duration of potential employee exposure to emissions (making the less desirable alternative of personal protective equipment unacceptable due to discomfort, cost of consumables, etc.
- emission sources that are relatively fixed (rather than mobile)
- legislation requiring exhaust ventilation.

DESIGN

The effectiveness and efficiency of local exhaust ventilation systems vary markedly depending on design parameters. Engineering expertise is usually necessary to achieve the optimal design for effective and economical operation.

IMPORTANT DESIGN PRINCIPLES

1. *The Hood*
   The process should be enclosed as much as practicable. Where an enclosed design cannot be used, an efficient flange should be incorporated. In the following diagrams, flange design (a) is the most efficient, grading to (d) which is the least efficient.
   The hood should be located as close as practicable to the process.
   The hood should not draw contaminated air through the breathing zone of the employee (a frequent problem with canopy hoods).
2. *The Ducts*
   Ducts should be as short and straight as practicable. If bends or changes in diameter are necessary, they should be gradual to minimise resistance to airflow.
   Ducts should be self-cleaning and accessible for inspection and maintenance.
3. *The Fan*
   The fan type and capacity need to be individually specified for each ventilation system design. Centrifugal fans are generally best for high pressures and axial fans are more suitable for low pressure, high volume applications.
4. *Filters and Collection Devices*
   The type and specification of filtration and collection equipment will depend on various factors relating to the contaminant, the process and environmental considerations.
   Exhaust ventilation systems which recirculate filtered air back into the workplace atmosphere must be designed to be capable of capturing all hazardous contaminants.
   Appropriate cleaning/maintenance procedures must be devised and strictly implemented.

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