Exhaust ventilation in commercial and institutional kitchens

Updated May 2011

EPA 122/11: This guideline provides general information to operators of commercial and institutional kitchens on the removal of heat, particulate matter, cooking vapours and grease-laden steam to achieve a suitable working environment and to prevent insanitary conditions.

Introduction

Exhaust emissions from food processing areas should be discharged above the roof of the building in a way that prevents discomfort to occupants of nearby premises. The Environment Protection Authority (the EPA) expects that kitchens will incorporate best practice odour management to minimise and manage emissions and their potential impacts. You are referred to EPA Guideline *Odour Assessment Using Odour Source Modelling* (September 2003) for further information on this issue.

Legislation

The principal legislation addressing pollution in South Australia is the *Environment Protection Act 1993* (the Act). In particular, section 25 imposes the general environmental duty on all persons undertaking an activity that may pollute to take all reasonable and practicable measures to prevent or minimise any resulting environmental harm.

Kitchen operators must comply with legislative requirements administered by both the EPA and the Department for Administrative and Information Services (DAIS). The control of environmental pollution from a commercial or institutional kitchen is delegated to the EPA, while occupational aspects of the kitchen environment, such as ventilation of the work area and worker noise exposure, are the responsibility of DAIS.

Environment protection legislation also includes Environment Protection Policies (EPPs), which may outline both recommendations and mandatory requirements for the protection of a particular aspect of the environment, and provide greater detail than the Act.

Environment Protection (Air Quality) Policy 1994

Air pollution is primarily governed through the *Environment Protection (Air Quality) Policy 1994* (the Air Policy). Section 4 of the Air Policy requires that the best practicable means of control be used to minimise air pollution of any kind from any activity. There are also provisions in section 5 prohibiting the emission of dark smoke for a defined period. The Schedule to the Air Policy specifies maximum pollution levels.

Environment protection policies for noise

Kitchen operators must not allow excessive noise to be emitted from the premises, and the EPA may issue an environment protection order requiring that excessive noise be curtailed within a specified period. The *Environment Protection (Noise) Policy 2007* (Noise Policy) provides guidance on the noise levels that may be considered excessive under the Act. It should be noted that the Act requires site-specific issues be taken into account when determining noise levels that may be excessive.

Controls and mitigation

The objectives of effective exhaust ventilation in commercial and institutional kitchens are:

- removal of grease-laden steam
- removal of excess heat
- provision of a comfortable working environment for kitchen employees
- arrest and control of grease emissions, which can then be disposed of in a satisfactory manner
- prevention of deposits of grease and dirt on exposed surfaces of kitchen walls, ceilings and fittings
- dispersal of the exhaust gases to the atmosphere in a manner that will not give offence.

Guide for determining design of exhaust ventilation

An exhaust ventilation system will comprise a collecting hood, grease filters, motor operated fan, and a duct or chimney.

Hoods

The hood is to provide a holding area for rising grease-laden steam and gases until they are exhausted to the atmosphere by the fan. The exhaust hood should be designed for easy cleaning; the internal surfaces should be smooth and free from obstructions. Automatic self-cleaning hoods of approved design are acceptable.

Construction of hoods

An exhaust hood should be constructed of an impervious material. If built from carbon steel or stainless steel, the material thickness should be not less than 1.2 mm or 0.9 mm respectively. All joints are to be of satisfactory mechanical strength and grease tightness.

It is recommended that the depth of the hood should be not less than 600 mm, and that all internal surfaces should be vertical, or sloped at an angle not greater than 40 degrees from the vertical. A condensation gutter no less than 50 mm wide by 25 mm deep is to be provided around the inside of the hood and must be provided with a drainage facility. A drip pan under the lower edge of the filter is desirable. Wall-mounted hoods should be flush with the wall. The number of outlets necessary in the hood crown is related to the overall length of the hood. For hoods up to two metres in length, one outlet is usually provided; however, for larger hoods outlets should be spaced at no more than two-metre intervals.

Automatic self-cleaning hoods with in-built spray jets that direct detergent and hot washing water to the internal surface of the hood are recommended.

Exhaust fan and motor

The fan is to remove the gases collected in the canopy and provide an adequate intake of air across the face of the hood. Correct choice of a fan is most important; a fan supplier needs to know:

- air volume to be exhausted
- resistance to air flow caused by friction loss in ducting, filters, etc.
- motor construction—flame proofing, power rating and noise rating.

Exhaust duct and stack

The stack is to discharge the exhaust emissions to the atmosphere so as to avoid insanitary conditions or environmental nuisance. Exhaust emissions should be discharged in the following manner:

- The highest point of the stack should be at least three metres above the highest structure within thirty metres.
- Exhaust emissions should have an unimpeded flow and be discharged vertically.
- The exit velocity of the exhaust gases should be at least 10 m/sec.

Ducts

Ducts should be constructed of galvanised sheet iron at least 1.2 mm thick, or stainless steel at least 0.9 mm thick. The ductwork must be easily accessible for cleaning and maintenance. Clean-out doors need to be provided for every three metres and near each elbow, angle or duct junction; they should be of quick release design, built to finish flush with the inside of the duct, and be suitably sealed to prevent leakage.

It is recommended that the horizontal exhaust ducts be graded to a drainage point. Flexible connections are to be kept to a minimum and must be non-collapsible, grease proof and fire resistant.

The duct must be sized to ensure a minimum exhaust gas velocity of 10 m/sec.

All openings in walls, floors, ceilings or roof through which an exhaust duct passes should be proofed against the entry of vermin.

Grease filters

All exhaust hoods should be fitted with approved grease filters mounted in frames and in positions that enable convenient removal and replacement; they should be installed so as to prevent significant leakage of air around the filters.

The function of grease filters is to remove grease particles from the exhaust gases. Proprietary makes of grease filters comprise a honeycomb of corrugated aluminium sheet designed to collect the grease particles that come into contact with the metal surfaces. These filters are washable and need to be cleaned at regular intervals to maintain their efficiency. Failure to clean the filters will result in blocking and a severe reduction in exhaust air velocity.

Self audits

An environmental audit should be conducted every year to ensure that the kitchen is operating in accordance with environmental objectives and within legislative requirements. Implementing environmental complaint procedures and training staff to recognise and minimise environmental hazards are also good ways of achieving on-going plant monitoring.

Disclaimer

This publication is a guide only and does not necessarily provide adequate information in relation to every situation. This publication seeks to explain your possible obligations in a helpful and accessible way. In doing so, however, some detail may not be captured. It is important, therefore, that you seek information from the EPA itself regarding your possible obligations and, where appropriate, that you seek your own legal advice.

Further information

Legislation

Legislation may be viewed on the Internet at: <www.legislation.sa.gov.au>

Copies of legislation are available for purchase from:

Service SA Government Legislation Outlet	Telephone:	13 23 24
Adelaide Service SA Centre	Facsimile:	(08) 8204 1909
108 North Terrace	Website:	<shop.service.sa.gov.au>
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