Gas Information Sheet No. 17

Ventilation for gas equipment and appliances

This information sheet is in two parts. All clause and table references refer to AS/NZS 5601.1:2013 Gas installations.

**Part 1** covers the ventilation requirements for gas equipment. Gas equipment means a meter, a regulator or a gas pressure-raising device.

**Part 2** covers ventilation requirements for gas appliances. It further describes the variation of ventilation requirements for gas appliance installations in buildings that were approved for construction prior to the adoption of Standard AS/NZS 5601.1:2013 and after the adoption of Standard AS/NZS 5601.1:2013.

Providing ventilation is an essential part of gas installation work, and it is the responsibility of the installer to ensure that the ventilation requirements expressed in AS/NZS 5601.1:2013 Gas Installations, are met. Ventilation is required in every situation where gas appliances or gas equipment are installed.

Failure to provide adequate ventilation is an offence under the Gas Safety Act 1997 and can lead to serious incidents, including carbon monoxide poisoning.

Ventilation needs are determined by:
- the type of gas appliance or gas equipment being installed
- the method of flueing appliances
- the effect of air extraction systems on the operation of gas appliances or gas equipment
- the means of obtaining ventilation and extraction (natural, mechanical or both)
- how ventilation will be maintained.

**Part 1 – Gas equipment ventilation**

**Ventilation types**

Natural ventilation to outside of the building

For natural ventilation of gas equipment always provide two permanent openings directly to the outside of the building. Calculate the minimum free ventilation area for each opening and deduct the allowance for adventitious ventilation (see Clause 5.13.2.1). For enclosures containing meters or regulators use the formula in Clause 5.13.2.2. For pressure-raising devices use the formula provided in Clause 5.13.2.3.

Natural ventilation via an adjacent room

Where the ventilation is to an adjacent room, the adjacent room shall be non-habitable and the free area of each opening shall be twice the requirements of ventilation to the outside (AS/NZS 5601.1:2013 Clause 5.13.2). These requirements shall apply to all subsequent rooms until a room is ventilated to outside. That room shall be ventilated in accordance with the requirements of ventilation to the outside Clause 5.13.2.
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Mechanical ventilation

Mechanical ventilation, for enclosures, should be directed to the outside of the building. Fan motors shall be remote from the exhaust duct (indirect drive) or be rated to operate in a Zone 1 hazardous area (see AS/NZS 60079.10.1).

Where a combination of natural and mechanical ventilation is used, the exhaust air shall be provided by mechanical means, and no open flued gas appliance shall be installed in the enclosure.

Table 5.8, in AS/NZS 5601.1:2013, explains the safety requirements (including interlocks and alarms) for mechanical ventilation in the event of ventilation failure. This applies to gas equipment or a combination of gas equipment and gas appliances within an enclosure.

Location of openings

Locate ventilation openings such that all parts of the enclosed area receive adequate ventilation.

For natural ventilation the openings shall be located to ensure the distance between the top of the upper opening and the ceiling of the enclosure, and the distance between the base of the bottom opening and the floor of the enclosure does not exceed 5% of the height of the enclosure.

The location of ventilation openings for mechanical ventilation is the same as for natural ventilation.

Part 2 – Gas appliance ventilation

Gas appliances shall have adequate ventilation for complete combustion of gas, proper operation of the flue and to maintain the temperature of the immediate surroundings at safe limits, under normal operating conditions. Air movement systems must not affect the operation of gas appliances.

Gas appliance ventilation prior to AS/NZS 5601.1:2013

This section refers to new gas appliance installations within buildings that were approved for construction prior to the adoption of Standard AS/NZS 5601.1:2013 Gas installations.

Where an appliance, which is not a room-sealed type appliance, is to be installed in a room, the room shall be ventilated to ensure proper operation of the appliance and the flueing system and to maintain safe ambient conditions.

Natural ventilation

Provide two permanent openings directly to the outside of the building. Calculate the minimum free ventilation area for each opening (see Clause 6.4.4.3).

Natural ventilation via an adjacent room

Natural ventilation through a single adjacent room

Ventilation openings are required between the appliance room and the adjacent room. If the total input of the appliances is no more than 3 MJ/h per cubic metre of the total volume of the enclosure and rooms, the ventilation opening of the adjacent room direct to outside, is not required. (see Clause 6.4.4.4).
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Natural ventilation through multiple adjacent rooms

Ventilation openings are required between the appliance room and the first adjacent room. Ventilation openings between the first and subsequent adjacent rooms are required until a subsequent room is ventilated directly to the outside or the total input of the appliances is no more than 3 MJ/h per cubic metre of the total volume of the enclosure and rooms, the ventilation opening in the adjacent room, direct to outside is not required. (see Clause 6.4.4.4).

Location of openings

Two permanent openings shall be provided. There is an upper opening and a lower opening. For flued appliances it is sufficient to locate the openings such that there is air flow across the area.

For flueless appliances the top and bottom openings must be correctly located such that the top of the top opening and the bottom of the bottom opening is not more than 5% of the room height from the ceiling and the floor respectively.

Gas appliance ventilation after AS/NZS 5601.1:2013

This section of the information sheet refers to new gas appliance installations within buildings that were approved for construction after to the adoption of Standard AS/NZS 5601.1:2013 Gas installations.

General requirements

Where a gas appliance or gas appliances (other than a room-sealed type) are installed in a room, an enclosure, a residential garage or a plant room that room or enclosure shall be ventilated to ensure proper operation of the gas appliance(s) and the flueing system, and to maintain safe ambient conditions. Such ventilation may be achieved by natural or mechanical means.

In the case of natural ventilation, the requirements for all appliances other than flueless space heaters are specified in Table 6.2 with the methodology and examples given in Clause 6.4.5.3. The requirements for flueless space heaters are specified in Clause 6.4.6. Table 6.2, Clause 6.4.5.3 and Clause 6.4.6 apply unless otherwise specified in Clause 6.10. In the case of mechanical ventilation, the requirements are specified in Clause 6.4.8, unless otherwise specified in Clause 6.10.

As room-sealed appliances draw the air required for combustion from outside the building, ventilation of the space is not required to ensure their proper operation but may be required to avoid excessive rises in ambient temperatures in the space.

Notes:

1. If the appliance(s) have the potential to interact with mechanical extraction ventilation (for example, kitchen range hoods and exhaust fans in toilets and bathrooms), compliance with Clause 6.3.1 is also required.
2. Commissioning procedures (see Clause 6.11.4) require that installations be tested to ensure the adequacy of ventilation and that other mechanical air supply or exhaust equipment does not have an adverse effect on appliance safety and performance.
3. In the case of room-sealed Type B appliances the amount of ventilation required needs to be assessed (see Clause 2.6.5).
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Appliance in a residential garage

An appliance in a residential garage shall comply with Clauses 6.4.4 or 6.4.5 with the additional requirement that the ventilation shall be directly to outside. No allowance shall be made for adventitious ventilation.

**Note:** Refer to Clause 6.3.10 regarding appliance location in a garage.

Mechanical ventilation

Where the air supply to gas appliances is to be provided by mechanical means, it shall be drawn directly from the outside of the building in accordance with Table 6.3.

Where appliances are in a space served by mechanical ventilation, the installation shall be designed and tested to ensure compliance with Clause 6.3.1.

Interlock for air supply to gas appliance

Where the required air supply to a gas appliance relies on a mechanical system, there shall be an interlock to cause the gas supply to the appliance(s) to be shut off upon failure of the mechanical air supply system. The interlock sensor shall fail-safe.

Air heating gas appliance in a confined space

Where an air-heating gas appliance is installed in a confined space, the heated and returned air shall be ducted and separated from air for combustion and draught diverter dilution.

Combustion and dilution air for a gas appliance with an open flue

Where a gas appliance has an atmospheric burner, air to the burner(s) and the draught diverter shall be from the same air space.

Further information

For further information please contact the Gas Safety Technical Information Line on 1800 652 563.