



GAS APPLIANCES
TECHNICAL GUIDANCE BULLETIN

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| Bulletin Number: | 18 |
| Bulletin Date: | 14 May 2021 |
| Product Type: | Open flued gas space heaters |
| Relevant Standard(s): | AS 5263.1.3 2021 <i>Gas appliances, Part 1.3: Gas space heating appliances</i> |
| Relevant Clause(s) | Section 5 – additional requirement |
| Subject: | Additional requirements for open flued gas space heaters |

Guidance to be provided:

Additional Requirements

An open flued gas space heater shall not permit the ongoing release of combustion products into a room when subjected to a sustained negative room pressure condition when tested in accordance with Appendix A, as follows:

- (a) The CO/CO₂ ratio of combustion products when measured at the draught diverter opening(s) or relief opening or any other location from where combustion products could spill into the room shall not exceed 0.02 after 10 minutes of operation or the appliance shall shut down.
- (b) The appliance shall not spill combustion products for more than 15 minutes.
- (c) The appliance shall not shut down automatically when subjected to a negative room pressure for less than 5 minutes.

Note: The purpose of this requirement is to prevent nuisance shutdowns.

- (d) Shut down of the appliance shall cause non-volatile lockout. Any manual reset shall not be possible without the use of a tool.
- (e) There shall be no flame abnormality.
- (f) The CO concentration in the test room or test room extraction system shall not exceed 90 ppm during the test.
- (g) The functionality that enables safety shut down under the negative room pressure shall withstand 1,000 cycles of operation, without failure.

Note: Where a defined component achieves a minimum of 1,000 cycles and it conforms to a relevant standard, then the complete appliance does not need to be subjected to this cycle test.

- (h) Where an appliance is power flued or has a fan assisted combustion system, failure of the fan or impairment of fan performance shall not result in spillage of combustion products under the requirements of this Bulletin.

Note: Impairment of fan performance is intended to simulate the effects of greater negative pressure.

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| Reason: | <p>Open flued gas space heaters are designed to be installed in rooms with sufficient ventilation to provide air for combustion and to offset any negative pressure from exhaust fans. Over time homes have become increasingly well sealed due to improvements in efficiency requirements and increasing consumer awareness. The reduction in ventilation combined with more powerful exhaust fans increases the risk that open flued gas space heaters are exposed to negative pressure, which can result in ongoing spillage of combustion products into the living area.</p> <p>Open flued gas space heaters are not compatible with modern homes and additional requirements are necessary to ensure open flued gas space heaters will shut down safely when exposed to persistent negative pressures.</p> |
| Action(s): | <p>Conformity assessment bodies are to ensure that open flued gas space heaters comply with the above additional requirements when assessing product type for certification.</p> <p>A note shall be added to the related entry in the GTRC National Certification Database for each certification that has been assessed to these requirements.</p> |
| Transition: | <ol style="list-style-type: none">1. For all new applications for certification made after the date of this bulletin, this bulletin must be adhered to immediately.2. For existing certifications and applications received prior to the date of this bulletin, products must comply with this bulletin before 1 January 2022. After this date certifications that do not meet the requirements of this bulletin must be suspended or cancelled. |
| Result: | <p>The safety of open flued gas space heaters will be improved and the risk to health from spillage of combustion products will be reduced.</p> |
| Proposed Revision(s) to Standard(s): | <p>AS/NZS5263.1.3 is currently under revision to include the above requirements in the next update, at which time the requirements of the standard will apply and will supersede this bulletin.</p> |



Appendix A – Test Method

SHUTDOWN UNDER NEGATIVE ROOM PRESSURE

A.1 Scope

This test method sets out the procedure to assess the operation of an appliance when subjected to a sustained negative room pressure.

A.2 Principle

The appliance is installed in a test room. A negative pressure differential is established in the room relative to outside of the room using mechanical ventilation, the appliance is tested under this condition and also when the negative pressure is established with the appliance running. The appliance is operated and is monitored to determine the period of time taken for it to shut down under a negative room pressure condition in the event of spillage.

A.3 Materials

A supply of appropriate test gas (see Clause 3.1 of AS/NZS5263.1.3) at normal test gas pressure shall be used.

A.4 Apparatus

The following apparatus shall be used:

- (a) Equipment as specified in Appendix F of AS/NZS5263.0.
- (b) A room with a volume between 30m³ and 40m³ with a nominal height of between 2.0m to 3.0m. The room is calibrated to an air change rate of 10 ± 0.5 Air Changes per Hour (ACH) @ 50 Pa negative room pressure without the appliance installed. Penetrations for consumer piping, other services (excluding the appliance flue) and test equipment shall be present during the calibration and these penetrations shall be sealed. A means to avoid stratification of room air shall be incorporated.
- (c) Carbon monoxide analyser, calibrated to give accurate and reproducible results.
- (d) Carbon dioxide analyser, calibrated to give accurate and reproducible results.
- (e) Flue gas sampling probes of stainless steel.
- (f) A means of measuring pressure accurate to ±0.5 Pa or better and ranging up to at least 50 Pa.
- (g) A means of developing a differential negative pressure from inside to outside of the room to achieve 0 to 20Pa or a flow rate up to 250 L/s with the appliance installed.
- (h) A means to measure the air extraction rate from the test room, calibrated to give accurate and reproducible results.
- (i) Suitable timing device.
- (j) Sufficient flue length to terminate outside the test room, or the minimum length specified by the manufacturer, whichever is the greater. The flue shall be terminated with a cowl recommended by the manufacturer or a cowl complying with AS4566 if none is recommended.

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A.5 Preparation of apparatus

The apparatus shall be prepared as follows:

- (a) Install the appliance in accordance with Clause 3.2 of AS/NZS5263.1.3 at one end of the room on the narrowest wall.

Note: Where the manufacturer's instructions allow installation in a chimney or for the appliance to be inbuilt then the test structure should simulate this installation.

- (b) Position the point of extraction in the opposite wall relative to the appliance at a high level and provide a means to ensure that the discharge air does not recirculate into the test room.
- (c) Ensure that the flames can be readily observed from outside the room whilst the appliance is under test and that the functioning of the appliance can be monitored.
- (d) Place the flue gas sampling probe in a position where a representative sample of the flue product entering the room from the draught diverter or relief opening or any other location from where combustion products could spill into the room can be obtained. For appliances with multiple draught diverter outlets, samples should be taken from all outlets and averaged.

Note: Care should be taken to ensure that a sample representing the average CO/CO₂ is taken.

- (e) Place a CO sampling probe and a means to detect the differential room pressure at a point 2.5m in front of the appliance and 1.2m from the floor.
- (f) Position a CO and CO₂ sampling probe to monitor the air being extracted from the room.

A.6 Procedure

The procedure shall be as follows:

- (a) Generate a negative pressure differential of 20Pa between the inside and outside of the room. If an extraction air flow in excess of 250 L/s is required to obtain the stated pressure then testing shall be carried out at a maximum air flow of 250 L/s.
- (b) Operate the appliance from a cold condition at maximum gas consumption with normal test gas pressure at the appliance inlet and with the appliance convection fan operating at its highest setting where this can be manually controlled.

Note: It may be necessary to enter and exit the room to operate the appliance when manual controls are used, with the test room door open for a minimum time only whilst entering or exiting the test room.

- (c) Determine whether combustion products are entering the room. If no spillage is detected proceed to step (g).
- (d) Measure and continually record the CO and CO₂ concentrations.
- (e) Continue the test until either—
 - (i) the CO concentration in the test room or test room extraction system reaches 90 ppm; or
 - (ii) the main burner goes into safety shutdown; or
 - (iii) flame abnormality is observed; or

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(iv) the CO/CO₂ ratio exceeds 0.02 at the draught diverter or relief opening or any other location from which combustion products could spill into the room, after the first 10 minutes; or

(v) 15 minutes is reached.

(f) In the event of the appliance shutting down, record the time taken for this to occur. Confirm that lockout cannot be reset without the use of a tool.

(g) Where the appliance incorporates gas or convection fan turn-down setting or modulating controls, reset the appliance if necessary and repeat Steps (c) to (f) at the lowest setting. Allow the appliance and the room to cool to ambient temperature before repeating each test.

Note: Where the appliance will function with the convection fan in the “OFF” condition this is to be considered as the lowest fan setting.

(h) Turn off the means of extraction.

(i) In the event of a lockout condition reset the appliance.

(j) Operate the appliance at maximum gas consumption with normal test gas pressure at the appliance inlet for up to 1 h or until thermal equilibrium is reached with the test room door open. Ensure the appliance convection fan is operating at its highest setting.

Note: it may be necessary to render the appliance thermostat inoperative.

(k) Close the test room door.

(l) Operate the means of extraction and gradually increase the differential pressure between the inside and outside of the room up to 20Pa in steps not greater than 1 Pa, until combustion products spillage is first detected. If an extraction air flow in excess of 250 L/s is required to obtain the stated pressure then testing shall be carried out at a maximum air flow of 250 L/s. If no spillage is detected proceed to step (q).

Note: A scan across the range may be used to identify where products of combustion start spilling into the test room to determine an appropriate starting point for the 1 Pa steps.

(m) Record the differential pressure and flow rate and start the timing device.

(n) Observe the operation of the appliance.

(o) Measure and continually record the CO and CO₂ concentrations.

(p) Continue the test until either—

(i) the CO concentration in the test room or test room extraction system reaches 90 ppm; or

(ii) the main burner goes into safety shutdown; or

(iii) flame abnormality is observed; or

(iv) the CO/CO₂ ratio exceeds 0.02 at the draught diverter or relief opening or any other location from which combustion products could spill into the room after the first 10 minutes; or

(v) 15 minutes is reached.

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- (q) In the event of the appliance shutting down record the time taken for this to occur.
- (r) Where the appliance incorporates gas or convection fan turn-down setting or modulating controls, reset the appliance if necessary and repeat Steps (l) to (q) at the lowest setting.

Note: Where the appliance will function with the convection fan in the “OFF” condition this is to be considered as the lowest fan setting.

- (s) Where an appliance is power flued or has a fan assisted combustion system, repeat steps (a) to (r) with impairment of fan performance.

A.7 Test report

All relevant observations shall be reported, including the following:

- (a) All CO and CO₂ recordings.
- (b) The maximum CO/CO₂ ratio.
- (c) Any flame abnormality.
- (d) The room differential pressure (and extraction system flow rate as applicable).
- (e) Time for safety shut down.
- (f) Whether the means for reset requires the use of a tool.