Gas Information Sheet No. 38

Using Carbon Monoxide Detection Equipment to Check Gas Appliances for Spillage

This information sheet provides gasfitters with guidelines for testing domestic gas appliances for carbon monoxide (CO) spillage using CO measuring equipment.

Note: Some gas appliances may spill other products of combustion such as carbon dioxide (CO_2) and yet not produce and spill CO. Although not toxic like CO it is still important to check for spillage of these other products of combustion. If in doubt then check at the draught diverter using a smoke producing device and conduct a visual inspection of heat exchangers for cracks. A CO/CO_2 analyser is also a useful piece of equipment.

Always follow the manufacturer's instructions for the correct use of your testing equipment. Before testing ensure your equipment has been calibrated within the past 12 months using test gases that are NATA traceable or equivalent. Your equipment supplier should be able to assist you with this requirement. Refer to ***Gas Information Sheet No.37, Carbon Monoxide Measuring Equipment*** for more details.

Australian Standards

Australian Standards for gas space heating appliances, indirect gas-fired ducted air-heaters and Type 2 decorative effect gas appliances require that:

> *There shall be no leakage or spillage of combustion products from the combustion circuit or draught diverter of an open flued appliance at 5 minutes after ignition when the appliance is operated at nominal gas consumption.*
>
> *For Type 1 decorative effect gas appliances installed in an existing fireplace spillage shall not occur 10 minutes after ignition when operated at nominal gas consumption.*

Furthermore:

> *Gas space heaters, indirect gas-fired ducted heaters and Type 2 decorative effect appliances shall be so constructed that there is no leakage of circulating air into the heat exchanger or of flue products into the circulating air system.*

Carbon monoxide testing method for flued appliances

The sealing of buildings to achieve higher energy efficiency is impacting in particular on the presence of adventitious openings required by open flued gas appliances to operate safely.

Testing for CO gas spillage from open flued gas appliances must be carried out in two tests.

Test 1 Operate exhaust fans and conduct a smoke test with the appliance not in operation to establish if a negative pressure environment exists.

Test 2 Operate the appliance while operating exhaust fans and test for spillage.

Carry out these tests in the order shown otherwise you will not know whether the fault lies with negative pressure when extraction fans are operating or with the appliance installation.

Note: While carrying out spillage testing, take readings of your exposure to CO gas. Measure the CO levels where you are located. This information will allow you to calculate your average CO exposure for an eight hour period. Refer to ***Gas Information Sheet 44, Carbon monoxide safe working level***.

Open flued indoor gas appliances other than Type 1 decorative effect appliances

Test 1 - Test for a negative pressure environment

a) Close external doors and windows and open or close internal doors to achieve the greatest negative pressure effect.

b) Activate all extraction fans.

c) Using smoke matches, incense sticks or any other suitable smoke producing device check that smoke is not drawn away from the appliance draught diverter or from appliance openings for the intake of combustion air.

d) If smoke is drawn away from the appliance in Step c) then open a window in the room where the appliance is installed in order to overcome the negative pressure.

Note: If a window is opened during testing to overcome a negative pressure then additional ventilation, equivalent to the area of the open window, must be provided.

The appliance must be isolated until additional permanent ventilation is provided.

e) Proceed to Test 2.

Energy Safe Victoria
ABN 27 462 247 657

Level 3 Building 2
4 Riverside Quay
Southbank Victoria
3006

PO Box 262
Collins Street West
Victoria 8007

Phone (03) 9203 9700
Fax (03) 9686 2197
Web www.esv.vic.gov.au

Issued: 06/16
Supersedes: 08/14

Gas Information Sheet No. 38

Test 2 - Test for CO spillage with the appliance and exhaust fans operating

a) Turn on your detection equipment and take a background reading in the room in which the appliance is situated. Record the CO reading. A background CO reading may be present due to other sources such as cookers or from the smoke test.

b) ***With exhaust fans still in operation*** switch on the appliance and adjust to the highest setting of the burner and appliance fan (if fitted).

c) Place the CO detection equipment sampling probe at all locations where leakage or spillage of combustion products can occur including the draught diverter relief openings, heat exchanger joints, flue connection and the base of flue product collection hoods.

Note: When sampling at the draught diverter opening please ensure that the sampling probe is positioned adjacent to the opening and not inside the draught diverter.

d) Continue monitoring for leakage or spillage and in particular record the readings taken after the appliance has been operating for 5 minutes. The CO reading recorded after the appliance has been operating for 5 minutes should not exceed the background reading in the room.

Note: You may need to re-check the CO background level as it may have risen due to the initial spillage from the appliance at start up.

e) If no CO spillage is detected then testing is completed.

f) If however CO spillage is detected then you will need to switch off the exhaust fans and restart the appliance from a cold start.

i. If there is CO spillage after 5 minutes without a negative pressure environment then check for faults with the appliance or flue. If faults cannot be found or rectified then the appliance must be isolated and it is recommended to contact the appliance manufacturer.

ii. If there is no CO spillage after 5 minutes then a negative pressure remained when conducting Test 2 and the window in Test 1 was not opened far enough. Switch on exhaust fans once again and open the window further until CO spillage ceases.

If a window is opened during testing to overcome a negative pressure then additional ventilation equivalent to the area of the open window must be provided. The appliance must be isolated until additional permanent ventilation is provided.

Open flued Type 1 decorative effect appliances

Follow the same procedures as for Open Flued Indoor Gas Appliances above, except that the appliance is operated for 10 minutes before checking for CO spillage.

Central heating units

Discharge of spillage from central heating units located outside the building, in the roof or under floor may in many cases go unnoticed. What may be found is CO being drawn into the building where the heat exchanger has cracked or seals within the combustion chamber have been damaged.

a) If the appliance is an open flued appliance, and installed indoors, then follow the testing procedures for open flued gas appliances first.

b) For all central heater appliances, note the background CO level. Operate the heater and place the detection equipment sampling probe in the air stream of a duct outlet (floor register or ceiling register). Monitor for CO for a further 10 minutes.

If the CO level exceeds the background level then the appliance is leaking or spilling CO and must be isolated.

If any cracks or openings within the heat exchanger of the central heater are evident, combustion products that contain CO may be dispersed throughout the building.

Note: As the heat exchanger heats up, and cracks and openings expand, more combustion products may enter the supply air stream and flow into the building.

Room sealed space heaters

a) Check the background CO levels.

b) Operate the appliance for 10 minutes and then check for CO at the appliance.

Always check the lower levels of room sealed gas space heaters as these appliances may incorporate a condensate drain at the base of the heat exchanger and this could be an area where combustion products may discharge into the building. The CO level should not exceed the background level.

Further information

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