GAS APPLIANCES
TECHNICAL GUIDANCE BULLETIN

Bulletin Number:	010
Bulletin Date:	1 January 2017
Product Type:	Portable butane stoves incorporating enclosed gas cartridges
Relevant Standard(s):	AS 2658-2008 (Incorporating Amendment Nos. 1, 2 & 3)
Relevant Clause(s)	2.12 Temperature hazards, 3.7 Additional requirements for cookers with enclosed gas cartridges, 3.7.1 Overpressure protection
Subject:	Safety requirements for portable "lunchbox" cookers

Guidance to be provided:

This bulletin, when read in addition to AS 2658, specifies the minimum safety requirements for portable butane stoves incorporating enclosed gas cartridges (Also known as "lunchbox cookers").

Clauses marked as (New requirement) are additional requirements deemed necessary in order to assure the safety of this product type.

Clauses marked (Replace) are to supersede the indicated clause in AS 2658.

(Replace) Clause 2.12.6 & 2.12.7 Temperature hazards – Gas cartridge safety

When tested in accordance with *Addendum 1*:

a) the measured temperature recorded on the upper surface of the gas cartridge must not exceed 70°C;
b) The pressure in the cartridge must not exceed 450 kPa; and,
c) The overpressure protection device must not operate to shut off the flow of gas.

(Replace) Clause 3.7.1 Overpressure protection

Portable cooking appliances that incorporate an enclosed gas cartridge must be fitted with two independent over pressure protection devices as follows:

a) A Primary Overpressure Protection Device to eject the cartridge which results in shut off of the gas supply, at a pressure between 450 to 550kPa; and
b) A Secondary Over Pressure Protection Device to shut off the flow of gas at a pressure between 550 to 650kPa is provided such that any leakage passed the device is less than 1mL/min.

The over pressure protection devices must not restore the gas flow automatically.

Compliance is to be determined by testing in accordance with *Addendum 2*.

(New Requirement) Gas cartridge compartment

The base of the gas cartridge compartment must have no openings.

(New requirement) Pan supports

Pan supports or trivets must be permanently attached to the appliance and must not be reversible.

Reason:	Safety concerns have been identified with the reliability of the over pressure protection device and overheating of gas cartridges in appliances currently in the market.

Action(s):

Conformity Assessment Bodies are to ensure that the methods of laboratory tests are conducted in accordance with the procedures set out above when assessing this product type for certification.

Conformity Assessment Bodies are to create a new and unique certification number for certifications that have been issued in conjunction with this bulletin. A note should be added to the related entry in the GTRC National Certification Database indicating that the certification complies with this bulletin.

Conformity Assessment Bodies must ensure that the test detailed in Addendum 2 of this bulletin is repeated every 12 months for the life of the certification.

Transition:

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, a maximum 12-month period has been granted to allow suppliers and manufacturers to modify the products and amend their certifications. Certifications and existing applications must comply within 12-months of the date of this bulletin.

Result:

Ensure that portable cooking appliances with enclosed gas cartridges are designed so that the gas cartridge is disengaged and the gas is isolated if the cartridge is subjected to excessive pressure during operation of the appliance and the possibility of the cartridge overheating is reduced.

Proposed Revision(s) to Standard(s):

Please refer to the technical guidance above.

Addendum 1 - Method of Test – Temperature Hazards (Gas Cartridge Safety)

1 SCOPE

This method sets out the procedure to determine the gas cartridge pressure and surface temperature of the gas cartridge when subjected to the simulated use of an oversize pan and prolonged cooking time.

2 PRINCIPLE

A stainless steel test plate is positioned over the entire appliance and the appliance is operated under test conditions and the pressure and surface temperature of the gas cartridge(s) is continuously monitored both during appliance operation and following turning off the burner(s). The operation of any over pressure protection device is also recorded.

3 APPARATUS

WARNING: ADEQUATE PRECAUTIONS SHALL BE TAKEN TO PROTECT AGAINST THE EXPLOSION HAZARD IN THIS TEST

a) Temperature controlled chamber capable of being maintained at 35°C +/- 2°C.
b) Two standard stainless steel test plates are specified as follows:
   i. 375mm x 310mm x 6mm stainless steel test plate for single burner cookers, and;
   ii. 680mm x 320mm x 6mm stainless steel test plate for two burner cookers.

   The appropriate test plate is to be used providing that it covers the entire appliance. If the stainless steel test plate does NOT cover the entire appliance, a 6mm thick stainless steel test plate is to be cut to size such that it overhangs the appliance perimeter by 10mm in each direction.
c) Timing device.
d) Suitable thermocouples and temperature measuring device.
e) Water bath of suitable size to submerge gas cartridges in the water maintained at 40°C +/-1°C
f) Pressure measuring device

4 MATERIALS

Appliances for use with gas cartridges shall be tested with the filled cartidges(s) of gas composition ≥95% Butane (Isobutane and/or n-butane).

5 PREPARATION OF APPARATUS

The apparatus shall be prepared as follows:

a) Note that safety precautions in case of cartridge explosion should be taken into consideration when performing these tests.
b) Place the appliance into the temperature controlled chamber.
c) Locate the appliance such that damage caused by explosion would be minimised.
d) Refer to Figure A for the positioning of thermocouples

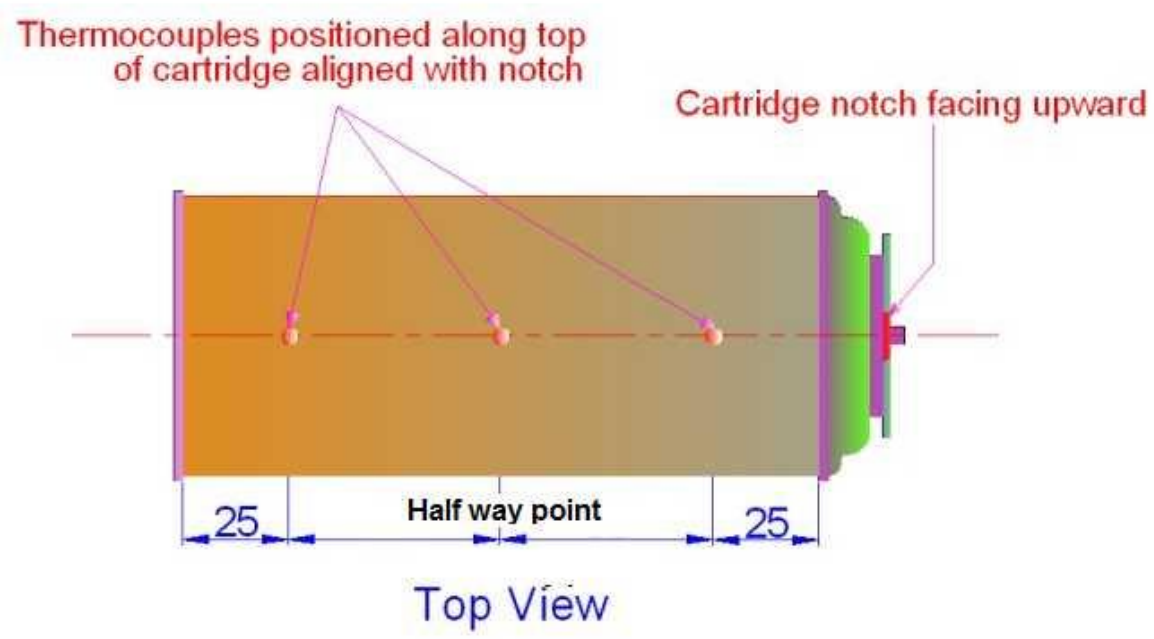

Figure A:

e) Precondition the full gas cartridges by immersing the cartridges for one hour in a water bath maintained at 40°C.
f) Fit full gas cartridge(s) to the appliance
g) Position a test plate over the appliance ensuring the entire appliance is covered.

6 PROCEDURE

The procedure should be as follows:

a) If any of the following conditions are met during this procedure remove the test plate and discontinue the test:
   i. The temperature at any point on the top surface of the gas cartridge exceeds 70°C
   ii. The pressure in the gas cartridge exceeds 450kPa.
   iii. If any over pressure protection device operates.
b) Calculate the time to consume 2/3 of the cartridge contents
c) Start the test within 5 minutes of fitting the pre-conditioned gas cartridge into the appliance.
d) Ignite the burner(s), adjust to maximum gas rate and start the timing device.
e) Continuously record the gas cartridge temperatures and pressure versus time.
f) Operate the appliance for the lesser of the calculated time or one hour and then turn the valve off. Record the time.
g) Within the next 3 minutes after turning off the appliance, carefully remove the test plate and replace the gas cartridge(s) with a full cartridge (conditioned to 40°C and similarly fitted with thermocouples) into the appliance. Engage the full cartridge(s). Position the test plate into the same position prior to removal and record the time.
h) With the burner(s) turned off, continue recording the cartridge surface temperatures and pressure. Observe for 5 minutes following the fitting of the test plate.
i) If the surface temperatures on the top of the cartridge continue to rise, wait a further 5 minutes applying the criteria set out in step (a).
j) Operate the burner(s) at full rate for the same period of time as determined in step (f).
k) Leaving the test plate in position, turn off the burner(s) and continue to record the surface temperatures and pressure until the maximum readings are achieved.

7 REPORT

All relevant observations are reported including:

a) Photographs showing the orientation of the test plate onto the appliance under test.
b) Results of gas cartridge surface temperatures and pressure versus time plotted on a graph, with notations to indicate the various steps in the test procedure.
c) The maximum gas cartridge pressures, surface temperatures and location, and the condition under which these were observed.
d) Whether the test had to be discontinued and why.
e) Dimensions of the stainless steel test plate used.

Addendum 2 - Method of Test – Clause 3.7.9 Overpressure Protection

1 SCOPE

This test applies to cookers with enclosed gas cartridges.

2 PRINCIPLE

Pressure is applied to the over pressure protection device when fitted to a complete appliance to ensure that the gas cartridge disengages from the gas combination control between 450 to 550 kPa. The cooker is then tested to confirm that the secondary over pressure protection device activates to shut off gas to the burner between 550 to 650kPa applied pressure. The ejection of the gas cartridge shall occur before the second overpressure protection device shuts off the gas supply.

3 APPARATUS

a) A pressure regulator capable of regulating an air or nitrogen supply source at a rate between 5 kPa and 7 kPa per second.
b) A test cartridge (or test device) incorporating a connection point for the supply of high pressure air/nitrogen to the test cartridge.
c) A calibrated pressure gauge/transducer with range 0 – 1000kPa and an accuracy of ± 5kPa.
d) Suitable flexible gas tube for connection from the air/nitrogen supply source regulator, pressure gauge and test cartridge.
e) A timing device accurate to +/- 0.2s.
f) A leak detector capable of measuring 1 ml/min with an accuracy of ± 0.3ml / min.
g) Test room at ambient.

4 MATERIALS

a) Supply of nitrogen gas or compressed air at pressures up to 1000 kPa.

5 PREPARATION OF APPARATUS

Set up the apparatus as follows:

a) Engage the test cartridge to the inlet gas connection of the appliance. Note that the connection tube to the test cartridge should be placed in a location not to interfere with any part of the appliance to which it is fitted.
b) Connect the air or nitrogen supply to the test cartridge.

6 PROCEDURE

A minimum of six appliances must be tested using the following procedure.

For testing of the Primary Overpressure Protection Device:

a) Place the appliance into the test room at ambient.
b) Set the appliance gas valve to the off position.
c) Supply air or nitrogen to the test cartridge nozzle. Starting from 0kPa, pressurise the test cartridge at a rate of between 5 kPa and 7 kPa per second up to the point where the over pressure protection mechanism ejects the cartridge.

Note: If the pressure in the cartridge exceeds 550 kPa at any time during the test, abort the test and record that the appliance has failed the test requirement.

d) Record and report the test cartridge pressure when ejection occurs.
e) Ensure that the test cartridge has fully disengaged and ensure that the device does not re-engage automatically.
f) Reduce the applied pressure to zero.
g) Turn the gas valve to the on position to relieve the pressure inside the appliance combination control before turning the valve off.

h) Discontinue test if the primary over pressure protection device fails to operate in the range 450 kPa – 550kPa or the primary overpressure protection device reengages the cartridge without manual intervention.
i) Repeat steps (a) to (g) for six consecutive trials for each sample.

For testing of the Secondary Overpressure Protection Device:

a) Disable the over pressure protection device that ejects the gas cartridge.
b) Set the appliance gas valve to the marked minimum gas rate setting.
c) Supply air or nitrogen to the test cartridge. Starting from 250 kPa, pressurise the test cartridge at a rate of between 5 kPa to 7 kPa per second up to the point where the second independent over pressure protection device operates.

Note: If the pressure in the cartridge exceeds 650 kPa at any time during the test, abort the test and record that the appliance has failed the test requirement.

d) Connect the leakage measurement device to confirm the gas flow has shut off or that leakage passed the independent secondary shut-off valve is no greater than 1.0 ml/min by measuring for leakage at the gas injector (Note that this may require removal of the burner to allow connection of a leakage measurement device).
e) Record and report the activation pressure for the second over pressure protection device.
f) Gradually reduce the applied pressure to zero and ensure that the device does not restore the gas flow automatically.
g) Discontinue test if the secondary over pressure protection device fails to operate in the range 550 kPa – 650kPa or the secondary overpressure protection device automatically restores the flow of gas.
h) Reset appliances incorporating a resettable secondary overpressure protection device in order to restore the flow of gas.
i) For appliances incorporating a resettable secondary overpressure protection device, repeat steps (a) to (e) for six consecutive trials for each sample.

7 REPORT

All relevant observations are reported including:
- Details of the test cartridge used for the test
- Means used to render the first over protection device inoperative
- The activation pressure for each trial
- Whether either the primary or secondary overpressure protection mechanisms automatically reengages the gas cartridge or restores gas flow following their operation.
- The measured leakage rate (Secondary overpressure protection device)