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PAKISTAN STANDARD

GAS FIRED ROOM HEATERS --- VENTED TYPE



**PAKISTAN STANDARDS SPECIFICATION
FOR
GAS FIRED ROOM HEATERS – VENTED TYPE OIL & GAS BURNING APPLIANCES
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Pakistan Standard Specification

For

GAS FIRED ROOM HEATERS --- VENTED TYPE

0 Foreword:

- 0.1** This Pakistan Standard has been adopted by the Authority of the Pakistan Standards & Quality Control Authority, (National Standards Body of Islamic Republic of Pakistan), after the draft prepared by the Mechanical Technical Committee (MTC-18) for “Oil & Gas Burning appliances which is approved and endorsed by the National Standards Committee on Mechanical on 28.02.2017
- 0.2** This Standard was first formulated in 2008, in preparation thereof technical assistance was taken from the Sui Southern Gas Company Limited (SSGCL) / Sui Northern Gas Pipelines Limited (SNGPL) which are acknowledged with thanks.
- 0.3** Keeping in view the suggestions from the manufacturers, specialists, technologists and utilizing agencies, it has now become imperative to revise the prevailing version.
- 0.4** This revised version of PS: 4859 is adopted after taking into consideration the views and the suggestions of manufacturers, specialists, technologists and utilizing agencies. It is hoped that user will find it well in line with the technical barriers to trade agreement (WTO/TBT).
- 0.5** This standard is subject to periodical review in order to keep pace with development in technology. Any suggestion for improvement will be recorded and placed before the concerned Committee in due course.

1. SCOPE:
These requirements will be applicable in addition to all requirements laid down in PS-4860/2008 “Gas Appliance--- General requirement” unless otherwise hereinafter specified.

1.1 DEFINITION

1.2 Vented Type: An enclosure or canopy provided with a device for regulating the flow of air (as in a fire place) with flue pipe

2. CONSTRUCTION REQUIREMENTS:

2.1 GENERAL CONSTRUCTION AND ASSEMBLY:

The construction of the body shall be substantial to the extent that it will support without damage the following weight applied uniform over the top:-

WEIGHT OF HEATER	LOAD
Less than 50 Ib.	100 Ib.
50 Ib. or more.	200 Ib.

3. MATERIALS:

When sheet metal is used in construction of room heater the thickness shall be in conformance with the following:-

- (a) Heating element: 0.0300 inch (20 B & S Gauge) of low carbon steel or having equivalent strength
- (b) Inner liners & Radiation Shields not exposed to combustion products: 0.0152 inch (26 B & S Gauge) sheet steel or having equivalent strength.
- (c) Exterior casing: 0.0250 inch (22 B & S Gauge) sheet steel or having equivalent strength.

3.1. AUTOMATIC PILOT AND PILOTS:

Separate pilots for each burner as specified in PS-4860/2008 Section 8.1 shall be provided for ignition of main burners.

4. PERFORMANCE REQUIREMENTS

4.1 GENERAL:

During test for compliance with these requirements, a room heater shall not be connected to a flue pipe but shall depend solely on the provisions incorporated in it unless otherwise hereinafter specified.

5. COMBUSTION:

A room heater shall produce no carbon monoxide .This requirement shall be deemed met when:-

- a) A concentration of carbon monoxide not in excess of 0.02 percent is present in an air free sample of the products of combustion, when the heater is tested in a room, with approximately a normal oxygen supply.
- b) A concentration of carbon monoxide not in excess of 0.05 percent produced in a 1,000 cubic feet room with no air changes occurring during combustion of the amount of gas necessary to reduce oxygen content of the room to a quantity equal to 15.1% by volume, corrected to 60°F (16°C) & 30” Hg.

6. METHOD OF TESTS:

Under (a) above, after the gas has been burring for at least 15 minutes at normal test pressure, sample of products of combustion shall be taken at flue gas outlet when the heater is operating at reduced and increased test pressure. The sample collected shall be analyzed for carbon monoxide and carbon dioxide. Under (b) above, the heater shall be installed in a 1,000 cubic feet room constructed so as to prevent infiltration of air. The heater shall be operated for 15 minutes with the door of room open and completely ventilated. If this is not possible, then the heater shall be operated outside of the closed room for 15 minutes. Immediately after 15 minutes heating up period, it shall be placed in a closed room and gas ignited. The heater shall operate at increased test pressure. A sample of room atmosphere shall be withdrawn at start of test and analyzed for carbon monoxide and oxygen. Sufficient samples shall be withdrawn and analyzed for oxygen during the test to permit accurate determination of the end point of the test. When percentage oxygen by volume indicates that total oxygen contained in the closed room is within $\pm 0.5\%$ of the amount contained in the room at the concentration of 15.1% by volume at 60°F (16°C) & 30”Hg, the test sample shall be analyzed for carbon monoxide and oxygen and increase in carbon monoxide concentration computed.

6.1 BURNER OPERATING CHARACTERISTICS:

Burner flames shall not flash back nor become permanently extinguished when subjected to a draft equivalent to a wind velocity of 3 MPH striking the heater from front and sides.

6.1.1 PILOT OPERATING CHARACTERISTICS:

Pilot flames shall be adequately protected against draft i.e. pilots should be stable against a wind of 7 MPH.

7. THERMAL EFFICIENCY:

Vented room heater having input rating in excess of 20,000 Btu per hr. shall have thermal efficiency not less than 70% based on total heating value of the gas. Vented room heater having rating of 20,000 Btu or less shall have a thermal efficiency of not less than 65%

8. METHOD OF TEST:

The test shall be conducted at normal test pressure. The draft hood shall be in place on the heater. Appliances having a vertical discharging draft hood outlet shall have sufficient UNINSULATED black-iron flue pipe, the same size as the draft hood outlet, to extend neither less than 5 feet nor more than 5 feet 6 inches above the highest point of the draft hood relief opening.

Appliances having a horizontally discharging draft hood outlet shall have attached an un-insulated black-iron 90° elbow so that the outlet is neither less than 5 feet nor more than 5 feet 6 inches above the highest point of the draft hood relief opening.

Two lines intersecting at right angles shall be established in the horizontal plane of measurement which shall be located at 4 feet 6 inches above the highest point above draft hood relief opening. They shall be oriented so that they divide the cross sectional area of flue pipe into quadrants. One temperature measurement shall be taken at point of intersection of the two lines and one in each quadrant and the temperature be measured with thermocouples or 0-1000°F mercury thermometer. The average flue temperature shall taken as the average of five individual readings.

The heater shall be operated for 15 minutes to attain thermal equilibrium. The gas meter, gas temperature, gas pressure and barometer shall be read and a heating value determination be made.

The temperature of flue gases and carbon dioxide content shall be measured. The hourly flue loss shall be computed at the same diem of heat above room temperature carried by carbon dioxide, free air and water vapour. Water vapour is assumed to exist as a vapor at room temperature.

Thermal efficiency shall be computed by the formula:-

$$E_t = 100 - \frac{(E_i \times 100)}{Q}$$

E_t = Thermal efficiency, %

E_i = Heat above room temperature carried away by the flue gases, Btu/hour,

Q = Hourly input rate, Btu/hour

9. FLUE GAS TEMPERATURE:
The average temperature of flue gases (4 feet and 6 inches above highest point of draft hood relief opening) from a vented type room heater shall not exceed 480°F (249°C) above the room temperature.

10. COMBUSTION CHAMBER RELIEF:
The construction of the room heater shall be such that should sufficient gas accumulate before ignition so as to cause excessive internal force when ignition takes place, such force will vent itself out without damage to the appliance.

11. METHOD OF TEST:
This test shall be started when the heater is cold. The gas shall be turned on and allowed to flow before ignition for 10 seconds. The heater may be surrounded by a metal box of screen to prevent accident to observers.

12. MARKING:

Each appliance shall be indelibly marked with the following

- i. Manufacturer's name or trade mark (embossed)
- ii. Knob's "on" and "off" position.
- iii. Country of origin.
- iv. Gas input rating
- v. Thermal Efficiency

Brochure with instruction for use shall be provided in national and English language.

It may also be marked with the PS Mark.

NOTE – The use of PS Mark is governed by the provision of the Pakistan Standards and Quality Control Authority Ordinance Act-VI of 1996, and the rules and regulations made under the ordinance. Products bearing PS Mark are protected with the guarantee that they have been produced to comply with requirements of the relevant standard under a well defined system of inspection, testing and quality control during production. Particular governing conditions under which a license for the use of the PS Mark may be granted to manufacturers, may be obtained from the (PSQCA) Pakistan Standards and Quality Control Authority.

13.

PACKING:

It shall be packed in accordance with the best prevalent trade practice or as agreed between the manufacturer and purchaser taking care of safety requirement during handling, transit and storage.

The supplier shall also supply on instruction card giving the following information:

- i) Brief instructions for installation and regulation which include piping and fitting of terminal, if any.
- ii) Instruction for the correct operation of the appliance.
- iii) Manufacturers name and address.
- iv) Guarantee period, serviced or repair, and replacement of parts.

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