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PAKISTAN STANDARD

DOMESTIC GAS STOVE



PSQCA Complex, Standardization Wing, 1st Floor, Plot-ST-7/A, Block-3, Scheme No.36, Gulistan-e-Jauher, Karachi,

PAKISTAN STANDARDS SPECIFICATION FOR DOMESTIC GAS STOVE OIL & GAS BURNING APPLIANCES TECHNICAL COMMITTEE

<u>Chairman</u>

1.	Mr. S. Ali. H. Naqvi,	Ex. General Manager, Karachi Shipyard & Engineering Works Banglow # C-108, Block-J, North Nazimabad, Karachi .Cell: 0321-8739362 E-mail:driamalnaoyi@hotmail.com
	<u>Members</u>	E man.a.jumamaq (TC notiman.com
2.	Dr. Engr. Khursheed Mahmood,	Professor, Metallurgy & Material Engineering Department Dawood University of Engg; & Technology, New M.A. Jinnah Road, Karachi.
3.	Engr. Muhammad Etesam Hussain sector 19, Korangi Industrial Area, Karachi.	Factory Manager, M/s. Singer (Pak.) Ltd., Plot- 39, Tell: 035057437, Cell: 03312870149
4.	Mr. M.S. Ansari	Consultant, Cell: 03232178789 E-mail:msansari@skenbms.com,
5.	Mr. M. Shahid Zaman	Coord Engineering Support Services Suparco, IS(III), Suparco Head Quarter, Suparco Road, P.O. Box #8402. Cell: 03452732629 Shahidzaman88@gmail.com
6.	Muhammad Ali Shah	Sr. Engineer, M/s. Sui Southern Gas Co., Ltd. (SSGCL) Head Office, 7th Floor, Karachi
7.	Rehan Naeem	Sr. Engineer, M/s. Sui Southern Gas Co., Ltd.(SSGCL) Head Office,7th Floor, Karachi
8.	Engr. Zulfuqar A Dhakan	Officer In charge, Safety & Security PCSIR Laboratories Complex, off University Road, Karachi., Cell;03333805590, Email: <u>zdhakan@hotmail.com</u>
	<u>Secretariat:</u>	
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2.	Fahim Bari	Assistant Director Mechanical Division PSQCA, Karachi.
3.	Junaid Wasan	Assistant Director Mechanical Division PSQCA, Karachi.

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PAKISTAN STANDARD SPECIFICATION FOR DOMESTIC GAS STOVE

0. <u>FOREWORD</u>:

- **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 has been approved and endorsed by the National Standards Committee on Mechanical on 28.02.2017
- **0.2** Domestic Gas stoves are very commonly being manufactured locally hence it is of vital importance to standardize the product for quality production.
- **0.3** This Standard No.1560 was first laid-down in 1982 which was revised in 1995 and was reaffirmed in 2008. Now, after taking into consideration the views and suggestion of the manufacturers, technologists and utilizing agencies it has again been re-affirmed to accommodate the latest technology.
- **0.4** In the preparation of this standard assistance has been derived from the following standards which are acknowledged with thanks.
 - i. Testing and approval requirements (GICP)
 - ii. ANSI z21.1/78 Household cooking gas appliances
 - iii. PS: 1361/79 Grey Iron casting
 - iv. PS: 1442/79 wrought copper & copper alloys detection of residual stress Mercury (i) nitrate test.
 - v. PS: 682 Oil Pressure Stove Brass type.
- **0.5** This revised version of PS: 1560 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).
- **0.6** 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:

- **1.1** This Standard specifies construction, operation, safety requirements and test for domestic gas stove intended for use with natural gas pressure not exceeding 400mm (14") water column having a gross calorific value between 32 to 44 MJ /m³.(850-1150 Btu/Cu.ft.).
- **1.2** Appliances shall be constructed entirely of new, unused materials and parts.

2. <u>MATERIALS:</u>

- **2.1** The frame of the body shall be manufactured from at least 0.8mm M.S. Sheet having minimum 28 Kg/mm^2 tensile strength and the hardness 85HV.30. or stainless steel of the same gauge.
- **2.2 Burner:** It shall be manufactured from Grey Iron Casting conforming to grade 15 to PS: 1361.
- **2.3** Nipple and Pipe: It shall be manufactured from Mild Steel or brass. The height of the nipple shall be 100mm from the base.
- **2.4 Gas Valve:-** It shall be manufactured form brass conforming to clause 4.2 of PS:682.
- **2.5 Taper Plug:-** The taper plug shall be preferably manufactured from brass conforming to clause 4.2 of PS:682.
- **2.6** Spring: It shall be of brass or steel conforming to PS: 682 and PS:1361 respectively.
- **2.7 Tray:-** It shall be of at least 0.8mm M.S. Sheet as in clause 2.1 or stainless steel of the same gauge.
- **2.8 Trivet:-** It shall be manufactured from grey iron casting conforming to grade 15 to PS:1361.
- **2.9 Tap (Knob):-** It shall be bakelite material and one tap shall govern one burner only. The ON & OFF position of the knob shall be clearly marked so that its position can be determined from a suitable distance.
- 2.10 Nuts & Screws:- Shall be of plated or galvenized mild steel.
- **2.11 Orifice Spud:** It shall be made of brass rod, as per clause 4.2 of PS: 682 and should be replaced by a spanner. Size of spud; see figure-4.

- **3. Construction:** The body shall be manufactured by riveting or welding, It shall be free from burrs, pin holes, blisters and roughness. Component parts shall be secured to prevent distortion, warpage and damage of essential part during handling and usage. Each taper plug shall be spring loaded to maintain a gas tight fit, if a coil spring is used, its ends shall be flattened. There should not be any gas leakage during manual operation of the tap and shall be easy to operate at all temperature normally attained in use.
- **3.1. Burners:-** The construction of the burners and the assembly shall allow their dismantling from the supports preferably without use of any tools and shall be so designed that it is fitted back in one position only.
- **3.1.1** Burner parts shall be so made that complete Gas Air mixture is burnt at burner ports and no unburnt gas mixture escapes from injector inlet. The burner injector shall be properly cleaned from inside of all forging particles and shall have a smooth finish. The seating of the burner head shall be such that no gas leak when in operation.
- **3.1.2**. The burner supports shall be rigid and shall be fixed in their place. Their construction shall ensure the stability of the burners and shall prevent their undue movement.
- **3.1.3.** The construction of the burner shall be such that the primary air adjustment can be made with the burner in place.
- **3.1.4.** The design of the gas stove trivet shall be such that a 75mm dia vessel will remain stable on at least one burner and such that a 125mm diameter vessel will remain stable over burner, the trivet feet shall not come directly in contact with flame.
- **4. Rigidity and stability** The appliance shall be so designed that when fitted currently it shall be in level and rigid. It should remain stable and shall not be easily overturned when subjected to vibration.
- 5. Finish The finish on visual examination, shall not show any defects such as roughness, blisters or sharp edges or exposed area of metal which might give rise to unduly rapid deterioration in use. The frame shall be painted and backed for corrosion resistance or may be chrome plated or enameled.

6. TESTS:

- 6.1 Gas soundness The whole of the gas way, including the taps, which in practice are held under working pressure shall be gas tight when tested at a pressure of 400mm of water column for one minute. This applies to all positions if the gas taps on at all temperature normally attained by the stove in use.
- **6.2.1.** Copper and copper alloy parts shall pass the mercury nitrate test (season cracking test) when tested according to the method specified in PS: 1442/79.
- **6.3** Strength of frame When a load of 20Kg is applied without impact on a steel plate placed on top of the stove for one hour, the body of the stove shall develop no crack or permanent distortion.

7. <u>PERFORMANCE REQUIREMENTS.</u>

- 7.1 Ignition of gas at the burner head shall occur instantly after the gas is available at the burner ports.
- **7.2** Test pressure and Burner Adjustment.

8. <u>BURNER THERMAL EFFICIENCY.</u>

8.1 Thermal efficiency of small, medium and large burners shall be not less than 50% for burners having rated inputs from 0.25 m^3 / hr not less than 42 % for burners having rated inputs exceeding 0.3 m^3 /hr.

8.2 <u>Method of Test.</u>

8.2.1. The test shall be conduced on small, medium and large burners at normal test pressure. The test shall be conducted with a hot start. A weight amount of water, 2Kg for small burners and 5 Kg for medium and, large burners, contained in a covered cooking utensil, shall be placed over the burner and heated through temperature of 38°C.

Standard utensil for this test shall be 165mm deep, straight sides, approximately of 1.25mm thick aluminum with a flat bottom and a 25mm radius edges and an inside diameter of 240 mm.

The amount of gas consumed shall be recorded and corrected to standard barometric conditions of 760mm mercury pressure at 15°C, the heating value of the gas shall be ascertained and the thermal efficiency shall be calculated from the following formulae:-

Ther	mal efficiency % =	4.19(W+W _v) $(t_2 - t_1)$	— X 100
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Where W	= mass of water		
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$\mathbf{w}_{\mathbf{v}}$	= water equivalent of vessel, Kg
	= mass of vessel x specific heat
t_1	= initial temperature of water $^{\circ}C$

- t_2 = maximum temperature recorded °C
- V = gas consumption (as shown by water), m^3
- C = gross calorific value of the gas, kj/m^3
- f = correction factor for the gas f

Where $f = P_f X F_f P_f = Pressure correction factor$

$$\begin{array}{ll} Pf & = PO\underline{+P_a} & Tf = Temperature \ correction \ factor \\ P_b \end{array}$$

Tf _	$273 + t_b$
II = —	$273 + t_{0}$
$P_a =$	atmospheric pressure
P_o =	operating pressure
P_b =	base pressure
t _b =	Base temperature °C
$t_{\rm o}$ =	Operating temperature °C
	m ³

NOTE – Deci cubic meter d.m³ =
$$\frac{m^3}{10}$$

9. <u>MARKING</u>

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.

10. 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.

11. <u>SAMPLING:</u>

- **11.1.** Lot In any consignment, all the Gas Stoves of the same type and manufactured from the same material under essential similar conditions of manufacture, shall be grouped together to constitute a lot.
- **11.2.** Sampling Plan A sampling plan indicates the number of unit of product from each lot or batch which are to be inspected (sample size or series of sample sizes) and the criteria for determining the acceptability of the lot or batch (acceptance and rejection number).
- **11.3. Inspection Level** The inspection level determines the relationship between the lot or batch size and the sample size. The inspection levels, I, II, and III are given in Table-1 for general use. Unless otherwise specified, inspection level II will be used with an AQL of 2.5 as shown in Table-2.
- **11.4.** Code letters Sample sizes are designated by code letters Table -1 shall be used to find the applicable code letter for the particular lot or batch size and the prescribed inspection level.
- **11.5. Obtaining Sampling Plan** The acceptable quality level (AQL) and the code letter shall be used to obtain the sampling plan from Table-2.

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e letters		ection levels	5.3
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Fig. 2 DATAILS OF GAS COCK ALLOWANCES









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GAS STOVE ORIFICE SPUD













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