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Minimum allowable values of energy efficiency and energy efficiency grades for domestic gas cooking appliances

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Foreword

Sub-clause 4.3 in this Standard is mandatory; the rest are recommendatory.

This Standard is drafted according to the rules specified in GB/T 1.1-2009.

This Standard was proposed by Resource Saving and Environment Protection Department of National Development and Reform Commission and Energy Saving and Comprehensive Utilization Department of Industry and Information Technology.

This Standard shall be under the jurisdiction of National Technical Committee (SAC/TC 20) on Energy Fundamentals and Management of Standardization Administration of China.

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Minimum allowable values of energy efficiency and energy efficiency grades for domestic gas cooking appliances

1. Scope

This Standard specifies the minimum allowable values of energy efficiency, evaluating values of energy-saving, energy efficiency grades, testing methods and inspection rules for domestic gas cooking appliances.

This Standard is applicable to the domestic gas cooking appliances which use urban gas, has a single combustor, and its rated thermal load is not more than 5.23 kW.

This Standard is not applicable to the gas cooking appliances used on moving vehicles.

2. Normative references

The articles contained in the following documents have become part of this document when they are quoted herein. For the dated documents so quoted, all the modifications (Including all corrections) or revisions made thereafter shall be applicable to this document.

GB/T 13611 Classification and essential property of city gas

GB 16410 Domestic gas cooking appliances

3. Terms and definitions

For the purpose of this document, terms and definitions given in GB 16410 and the following terms and definitions apply.

3.1

Minimum allowable values of energy efficiency for domestic gas cooking appliances

According to the testing conditions specified in the standard, it refers to the minimum thermal efficiency value to which the domestic gas cooking appliances should reach under the rated thermal load.

3.2

Evaluating values of energy-saving for domestic gas cooking appliances

s -- Saturated water vapor pressure at temperature t_g , unit: kPa; if dry gas flow meter is used, then s shall be corrected by multiplying relative humidity of the testing gas;

M_1 -- Mass of water added into the pan, unit: kg;

M_2 -- Mass of the aluminum pan (including the cover and the stirrer), unit: kg.

- d) Conduct two times of the above testing under the same conditions; when the difference between the continuous two times of thermal efficiency is less than 1%, take the average value as the actual thermal efficiency; otherwise, a new testing shall be conducted until the requirements are met;
- e) After the testing of actual thermal efficiency of the upper limited and lower limited pans, the thermal efficiency of the tested cooking range shall be calculated according to Formula (3).

$$\eta = \eta_{\text{Actual-Lower}} + \frac{q_{\text{Lower}} - 5.47}{q_{\text{Lower}} - q_{\text{Upper}}} \times (\eta_{\text{Actual-Upper}} - \eta_{\text{Actual-Lower}})$$

Where:

η -- Thermal efficiency, %;

$\eta_{\text{Actual-Lower}}$ -- Actual thermal efficiency when the lower limited pan is used, %;

q_{Lower} -- Pan bottom thermal intensity when the lower limited pan is used during the testing [Pan bottom thermal intensity = actual thermal load (W) / area of the testing pan at the front plane of projection (cm^2)], unit: W/cm^2 ;

q_{Upper} -- Pan bottom thermal intensity when the upper limited pan is used during the testing, unit: W/cm^2 ;

$\eta_{\text{Actual-Upper}}$ -- Actual thermal efficiency when the upper limited pan is used, %.

Note: For combustors with thermal load less than 1.72 kW, repeat the above thermal efficiency testing two times under the same conditions; when the difference between the continuous two times of thermal efficiency is less than 1%, take the average value as the final thermal efficiency.

6. Inspection rules

6.1 Exit-factory inspection

6.1.1 Energy efficiency shall be included in the exit-factory inspection items for domestic gas cooking appliances.

6.1.2 Products with energy efficiency failing to meet the requirements specified in 4.3 after

inspection are not allowed to be delivered.

6.2 Type inspection

6.2.1 If one of the following conditions appears, type inspection of energy efficiency for domestic gas cooking appliances shall be conducted:

- a) Trial new products;
- b) When product performance is significantly influenced due to changes in designs, technical process or materials;
- c) When national quality supervision department requires the type inspection.

6.2.2 Sampling of energy efficiency inspection: Sample 3 sets of samples each time; 2 for testing and 1 for standby use. If both of the 2 samples tested meet the requirements of this Standard, then this batch of products are deemed as qualified; if neither of the two samples tested meet the requirements of this Standard, then this batch of products are deemed as unqualified. If the minimum allowable value of energy efficiency of 1 of the 2 samples tested does not meet the requirements of this Standard, then the sample of gas cooking appliance for standby use shall be tested. If it successfully passes the test, then this batch of products are deemed as qualified; otherwise, this batch of products are deemed as unqualified.

Annex C

(Normative)

Pan for testing of gas cookers and amount of heating water

Pan for testing of gas cookers and amount of heating water are shown in Table C.1.

Table C.1 Pan for testing of gas cookers and amount of heating water

Actual thermal load/ kW	Dimensions of the pan/ mm					Other parameters			Amount of the heating water/kg	Treatment requirements of pan surface
	Pan inner diameter ϕA	Thickness of pan bottom* C	Thickness of pan wall* D	Depth of the pan H	Radius of bottom angle E	Basal area / cm^2	Mass of the pan/ g	Mass of the pan cover/ g		
~1.72	200	2	1.5	130	2.5	314	540	125	3	The pan for testing adopts: pan with matt black bottom; chromatic value meet the following requirements: $L^* \leq 50$, $-10 \leq a^* \leq 10$ $-10 \leq b^* \leq 10$ Testing conditions: adopt SCI (including specular reflection light) method; standard observation angle is 10°; use D65 standard light source.
2.08	220			140	3	380	680	149	4	
2.48	240			150	3.5	452	800	177	5	
2.91	260	160	531	965		208	6			
3.36	280	170	615	1130		290	8			
3.86	300	180	707	1350		323	10			
4.40	320	190	804	1520		360	12			
4.95~	340	200	4	907	1800	402	14			
Tolerance	±1%			±1%	0~0.5		±5%	±5%		

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