

THE RESEARCH COMMITTEE FOR TOTAL ENERGY
AND NATURAL RESOURCES
THE ENERGY CONSERVATION STANDARDS
WORKING GROUP

THE SUB-COMMITTEE FOR
JUDGEMENT CRITERIA
FOR GAS AND OIL APPLIANCES

SUMMARY OF FINAL CRITERIA

April 3, 2002

This Sub-Committee deliberated on matters that would serve as criteria for manufacturers and importers of gas and oil appliances (hereinafter referred to as "manufacturers and the like") in making decisions about energy consumption efficiency and the like of gas and oil appliances and compiled a summary as follows.

1. Scope (See Attachment 1)

- Gas burning space heaters (limited to gas burning space heaters that use city gas 13A or LP gas), excluding open types and semi-enclosed types.
- Oil burning space heaters, excluding open types, enclosed types with a fuel consumption of over 2.75 liters/hour, and semi-enclosed types with a fuel consumption of over 4.0 liters/hour.
- Gas cooking appliances (limited to household gas cooking appliances that use city gas 13A or LP gas), excluding gas grills, gas ovens, gas rice cookers, gas cooking tables, and portable butane stoves.
- Gas burning water heaters (limited to household gas burning water heaters with an indicated gas consumption of 70 kW or less that use city gas 13A or LP gas), excluding gas hot water storage heaters, atmospheric-pressure gas hot water storage heaters, combined room and water heaters, installed-in bath tub gas water heaters, and bath tub gas water heaters for special applications (*).
 - * • Spontaneous combustion, semi-enclosed type bath tub gas water heaters that are equipped with a capability of oxygen depletion safety shut off and are installed in a bathroom
 - Power burner combustion, forced circulation, enclosed type bath tub gas water heaters (with a hot water supply) that are used as replacements for spontaneous combustion, enclosed type bath tub gas water heaters connected with a supply and exhaust duct
 - Power burner combustion, forced circulation, enclosed type bath tub gas water heaters (with a hot water supply) that are equipped with a capability of oxygen depletion safety shut off and are installed in a bathroom
- Oil burning water heaters (for household use only), excluding wick type oil burning bath heaters, pot type oil burning bath heaters, combined oil and firewood bath heaters, and hot water boiler with a water head pressure of over 10m up to 20m inclusive and a heat transfer area of 2 m² or less.

2. Judgment Criteria for Manufacturers and the Like (See Attachments 2 to 4)

(1) Target year

FY 2006

(2) Target standard value

Regarding the gas and oil appliances shipped to the domestic market by each manufacturer or the like in the target year, a weighted average of energy consumption efficiency must not be less than the target standard value in each category shown in the following table. The weighted average is calculated for each category as follows: first, the energy consumption efficiency should be measured by the measuring method set forth in Paragraph (3), and then it should be averaged using the number of units shipped by each manufacturer as the weight.

[Gas burning space heater]

Category	Air supply and exhaust and heat exchange type	Target standard value (%)
1)	Enclosed forced convection type	82.0

[Oil burning space heater]

Category	Air supply and exhaust and heat exchange type	Target standard value (%)
1)	Enclosed natural convection type	83.5
2)	Enclosed forced convection type	86.0
3)	Semi-enclosed radiating type	69.0
4)	Semi-enclosed natural convection type Forced convection type	(Note)

Note: Stoves with a fuel consumption of 1.5 liters/hour or less: 67.0%

Stoves with a fuel consumption of over 1.5 liters/hour: According to the following expression

$$\text{Energy consumption efficiency } E (\%) = -3.0 \times \text{fuel consumption (liters/hour)} + 71.5$$

[Gas cooking appliance]

Category	Product characteristic	Installation pattern	Number of burners	Target standard value (%)
1)	Gas cooking stove	Table-top type		51.0
2)		Built-in type		48.5
3)	Cooking stove with a gas grill	Table-top type	2 or less	56.3
4)			3 or more	52.4
5)		Built-in type	2 or less	53.0
6)			3 or more	55.6
7)		Cabinet or stationary type		49.7
8)		Gas range		

Note: The energy consumption efficiency (thermal efficiency) of gas cooking appliances with more than two burners is calculated as a weighted average using weights of 1 for small burners, 2.1 for medium burners, and 3.5 for large burners.

Definitions of burners are as follows:

Small burners : Burners with an indicated gas consumption of 2.02 kW or less

Medium burners: Burners with an indicated gas consumption of over 2.02 kW up to 3.49 kW inclusive

Large burners : Burners with an indicated gas consumption of over 3.49 kW up to 5.80 kW inclusive

[Gas burning water heater]

Category	Product characteristic	Combustion system	Circulation system	Air supply and exhaust system	Target standard value (%)	
1)	Instantaneous gas water heater	Spontaneous combustion	—	Open type	<u>83.5</u>	
2)				Semi-enclosed type Enclosed type	78.0	
3)		Power burner combustion	—	Semi-enclosed type Enclosed type	80.0	
4)				Outdoor type	82.0	
5)	Bath tub gas water heater (without a hot water supply)	Spontaneous combustion	Natural circulation	Semi-enclosed type Enclosed type (BF-DP)	75.5	
6)				Enclosed type(BF)	71.0	
7)				Outdoor type	76.4	
8)		Power burner combustion	Natural circulation	Semi-enclosed type Enclosed type Outdoor type	70.8	
9)				Forced circulation	Semi-enclosed type Enclosed type Outdoor type	77.0
10)		Bath tub gas water heater (with a hot water supply)	Spontaneous combustion	Natural circulation	Semi-enclosed type Enclosed type(BF-DP)	78.0
11)					Enclosed type(BF)	77.0
12)					Outdoor type	78.9
13)			Power burner combustion	Natural circulation	Semi-enclosed type Enclosed type Outdoor type	76.1
14)	Forced circulation				Semi-enclosed type Enclosed type	78.8
15)					Outdoor type	80.4

Note: The energy consumption efficiency (thermal efficiency) of bath tub gas water heaters (with a hot water supply) is calculated as a weighted average using weights of 1 for parts of bath and 3.3 for parts of hot water supply.

[Oil burning water heater]

Category	Application	Heating type	Air supply and exhaust and control system Control method	Target standard value (%)	
1)	For hot water supply	Instantaneous type		86.0	
2)		Water storage type (rapid heating type)		87.0	
3)		Water storage type (others)		85.0	
4)	For heating	Instantaneous type	Open type	85.3	
5)			Semi-enclosed type	79.4	
6)			Enclosed type	82.1	
7)		Water storage type (rapid heating type)	By ON-OFF control	87.0	
8)			Other than above	82.0	
9)		Water storage type (others)		84.0	
10)		For bath	With a smoke pipe		75.0
11)			Without a smoke pipe		61.0

(3) Measuring method (see Attachment 5)

[Gas burning space heater]

The energy consumption efficiency is calculated (as thermal efficiency) by subtracting "the calorific value taken away by exhaust gas" from "the calorific value of consumed gas (input)" and dividing "the resulting difference" by "the calorific value of consumed gas (input)."

The method for measurement should be in accordance with the thermal efficiency test stipulated in JIS S 2122 "Household Gas Heating Appliances."

[Oil burning space heater]

The energy consumption efficiency is calculated (as thermal efficiency) by subtracting "the calorific value taken away by exhaust gas" from "the calorific value of consumed oil (input)" and dividing "the resulting difference" by "the calorific value of consumed oil (input)."

The method for measurement should be in accordance with the thermal efficiency test stipulated in JIS S 3031 "General Rules for Test Methods of Oil Burning Appliances."

Incidentally, high calorific values should be used in thermal efficiency testing.

[Gas cooking appliance]

The energy consumption efficiency of cooking stoves, cooking stoves with a gas grill, and parts of cooking stoves of gas ranges are calculated (as thermal efficiency) by dividing "the quantity of heat acquired by water contained in a testing kettle" by "the calorific value of consumed gas (input)."

The method for measurement should be in accordance with the thermal efficiency test for cooking stoves stipulated in JIS S 2103 "Household Gas cooking appliances."

[Gas burning water heater]

1) Instantaneous gas water heater

The energy consumption efficiency is calculated (as thermal efficiency) by dividing "the quantity of heat acquired by outlet water (i.e., outlet water temperature minus feed water temperature multiplied by quantity of outlet water)" by "the calorific value of consumed gas (input)."

The method for measurement should be in accordance with the thermal efficiency stipulated in JIS S 2109 "Household Gas burning water heaters."

2) Bath tub gas water heater (without a hot water supply)

The energy consumption efficiency is calculated (as thermal efficiency) by dividing "the quantity of heat acquired by bath tub water (i.e., final water temperature in the bath tub minus initial water temperature in the bath tub multiplied by quantity of bath tub water)" by "the calorific value of consumed gas (input)."

The method for measurement should be in accordance with the thermal efficiency of baths stipulated in JIS S 2109 "Household Gas burning water heaters."

3) Bath tub gas water heater (with a hot water supply)

The energy consumption efficiency is calculated as a weighted average using weights of 1 for parts of bath and 3.3 for parts of hot water supply.

The energy consumption efficiencies of parts of hot water supply and parts of bath and their measuring method are as follows:

a) Part of hot water supply

Same as instantaneous gas water heaters

b) Part of bath

Same as bath tub gas water heaters (without a hot water supply)

[Oil burning water heater]

The energy consumption efficiency of oil burning water heaters and its measuring method, classified by functions of appliances, are as follows. If an appliance has two or more functions, the energy consumption efficiency and measuring method for the main function should be used.

Incidentally, high calorific values should be used in higher heating measurement.

1) For hot water supply

The energy consumption efficiency is calculated (as thermal efficiency) by dividing "the continuous hot water supply output (i.e., the quantity of heat acquired by outlet water = outlet water temperature minus feed water temperature multiplied by quantity of feed water)" by "the calorific value of consumed oil (input)."

The method for measurement should be in accordance with the continuous hot water supply efficiency stipulated in JIS S 3031 "General Rules for Test Methods of Oil Burning Appliances."

2) For heating

The energy consumption efficiency is calculated (as thermal efficiency) by dividing "the heating output (i.e., the quantity of heat acquired by heating water = outlet heating water temperature minus return temperature multiplied by quantity of circulating heating water)" by "the calorific value of consumed oil (input)."

The method for measurement should be in accordance with the heating efficiency stipulated in JIS S 3031 "General Rules for Test Methods of Oil Burning Appliances."

3) For bath

The energy consumption efficiency is calculated (as thermal efficiency) by dividing "the quantity of heat acquired by bath tub water (i.e., final water temperature in the bath tub minus initial water temperature in the bath tub multiplied by quantity of bath tub water)" by "the calorific value of consumed oil (input)."

The method for measurement should be in accordance with the water heating efficiency stipulated in JIS S 3031 "General Rules for Test Methods of Oil Burning Appliances."

(4) Indicating method

1) Items to be indicated are as follows.

- Product name or model name
- Category name
- Fuel consumption
- Energy consumption efficiency
- Name of manufacturer or the like

Note:

- Of the items to be indicated, the category name does not apply to gas burning space heaters, which are not classified into categories.
- Fuel consumption needs to be indicated only for semi-enclosed, natural convection or forced convection type oil burning space heaters.
- The name of a manufacturer or the like may be substituted by a registered trademark that has been reported to a minister or an abbreviated designation approved by a minister if this is permitted by provisions of the Gas Enterprise Law, the Law Concerning Safety and Proper Trading of Liquefied Petroleum Gas, or other applicable laws.

2) Indicate energy consumption efficiency up to the first decimal place.

3) Indicate the above items indelibly in an easily viewable place on catalogs containing performance data and on the body of gas and oil appliances or indicate them on a metal or synthetic resin label attached securely to an easily viewable place on the body.

Together with the energy consumption efficiency of a given appliance, the energy consumption efficiency of each burner should be indicated on catalogs in the case of gas cooking stoves with two or more burners and the energy consumption efficiencies of parts of hot water supply and parts of bath should be indicated on catalogs in the case of bath tub gas water heaters (with a hot water supply).

3. Recommendations for Energy Saving

(1) Users' Efforts

Users should try to select products with high energy consumption efficiency and appropriate capacity when purchasing gas or oil appliances and make efforts to save energy by using gas or oil appliances in an appropriate and efficient manner.

(2) Efforts by manufacturers and the like

1) Manufacturers and the like should make efforts to promote technology development for

energy saving of gas and oil appliances and to develop products with high energy consumption efficiency.

- 2) Manufacturers and the like should make efforts to gain users' understanding to promote widespread use of gas and oil appliances with high energy consumption efficiency.
- 3) Manufacturers and the like should make efforts for technology development to reduce the power consumption of gas and oil appliances.
- 4) Manufacturers and the like should make efforts to improve efficiency, taking into consideration the actual use of gas and oil appliances.

(3) Government's efforts

In order to promote widespread use of gas and oil appliances with high energy consumption efficiency, the government should try to gain users' understanding and encourage manufacturers' efforts by taking necessary measures such as political assistance and encouragement of widespread use.

4. Others

During the deliberation, careful consideration was given to the fact that the room for improvement of efficiency was restricted by measures for maintaining the safety of appliances

Circumstances leading to organization of sub-committee (See Attachment 6)

Committee member list (See Attachment 7)