

Report Compiled by the Working Group on Classification Standards for Gas and Oil Appliances (Summary)

- Regarding the improvement of energy consumption performance of gas or oil water heaters, the working group discussed matters that should serve as standards for decisions made by manufacturers or importers (manufacturers, etc.) (standard energy consumption efficiency) and summarized the results.
- The target year for the new standard energy consumption efficiency is set at FY 2025 (fiscal year of Reiwa 7), expecting to improve the thermal efficiency by 5.4% based on the current energy conservation performance of targeted appliances.

1. Background of compiling the report

After the formulation of the current standards, the new indices and measurement method for the energy consumption efficiency based on the “standard usage mode,” which indicates a model approach to using warm water in which standard conditions of use are considered (e.g., amount of supplied warm water, temperature thereof, period of time for keeping the warmth of such water and ambient temperature) and its reproductivity, was formulated by JIS in 2011. Because the supply of warm water accounts for a particularly large portion of energy consumption in households, it is necessary to try to further improve the energy consumption performance of gas or oil water heaters by formulating a new standard energy consumption efficiency under such a measurement method in line with the actual conditions of use.

2. Scope of targeted gas water heaters and oil water heaters

(1) Gas water heaters

- * Some gas instant water heaters, bath tub water heaters with no hot water supply functions, and some of those with hot water supply functions, as well as gas water heater for space heating with no hot water supply functions are excluded from the targeted appliances due to decrease in the volume of shipments.

(2) Oil water heaters

- * Some appliances for hot water supply, some for heaters, and some for bath use are excluded from the targeted appliances due to decrease in the volume of shipments. In addition, hot water boilers whose gauge pressure exceeds 0.1MPa, which are currently excluded from the target, are newly included as targeted appliances due to increase in the volume of shipments.

3. Matters that should serve as standards for decisions made by manufacturers, etc.

(1) Energy consumption efficiency and measurement method

(Gas water heaters)

The energy consumption efficiency of appliances other than those with an air heating function is to be evaluated with the “mode thermal efficiency (%)” The measurement method is set forth in the “Measurement method of efficiency for domestic gas and oil water heater under standard usage mode” (JIS S 2075:2011).

The energy consumption efficiency of appliances with an air heating function is to be evaluated by a weighted mean of “rated thermal efficiency (%)” of the air heating part and the “rated thermal efficiency (%)” of the hot water supplying part in the ratio of 1:3, as is in the current standards.

(Oil water heaters)

The energy consumption efficiency of appliances other than those with an air heating function is to be evaluated with the “mode thermal efficiency (%)” Measurement method is set forth in the “Measurement method of efficiency for domestic gas and oil water heater under standard usage mode” (JIS S 2075:2011).

The energy consumption efficiency of appliances with an air heating function is to be evaluated with the “rated thermal efficiency (%)” as is in the current standards. As for the measurement method, it is evaluated with the “rated thermal efficiency (%)” based on the measurement method in the “General rules for test methods of oil burning appliances” (JIS S 3031 :2009).

(2) Target fiscal year

The target fiscal year for both gas water heaters and oil water heaters is FY2025 (fiscal year of Reiwa 7).

(3) Category and targeted standard value

(Gas water heaters)

The categories and targeted standard values are as follows.

Table 1. Targeted standard values for gas water heaters

| Category | | | Targeted standard value |
|---------------|------------------------------------|--------------------------|-------------------------------|
| Category name | Purpose | Ventilation type | |
| I | Gas instant water heaters | Natural ventilation type | 77.50% |
| II | | Forced ventilation type | $84.37\% \times \alpha_{II}$ |
| III | Bath tub gas water heaters | | $87.21\% \times \alpha_{III}$ |
| IV | Gas water heater for space heating | | 90.32% |

Table 2. Structural coefficients α_{II} , α_{III} (Category II, III)

| | Structure | Structural coefficient value |
|----------------|--|------------------------------|
| α_{II} | Through-the-wall type | 0.9998 |
| | Wall built-in type | 0.9869 |
| | Forced flue type | 0.9900 |
| | Forced exhaust type (limited to conventional type) | 0.9661 |
| | Integrated with cooking range ventilator cover (limited to conventional type) | 0.8415 |
| | Other | 1.0000 |
| α_{III} | Through-the-wall type | 0.9839 |
| | Wall built-in type (limited to conventional type) | 0.9576 |
| | Other | 1.0000 |

(Oil water heaters)

The categories and targeted standard values are as follows:

Table 3. Targeted standard values for oil water heaters

| Category | | | Targeted standard value |
|---------------|----------------------|------------------|--------------------------|
| Category name | Purpose | Heating type | |
| I | For hot water supply | Without bath use | Instantaneous type |
| II | | | Storage type |
| III | | With bath use | Instantaneous type |
| IV | | | Storage type |
| V | For heaters | Storage type | $87.06\% \times \beta_V$ |

Table 4 Structural coefficients β_I , β_{III} , β_V (Category I, III, V)

| | Structure | Structural coefficient value |
|---------------|--|------------------------------|
| β_I | Pressure-spray-type | 0.9585 |
| | Other | 1.0000 |
| β_{III} | Pressure-spray-type | 0.9492 |
| | Other | 1.0000 |
| β_V | On/off control (limited to conventional type) | 1.0051 |

| | | |
|--|-------|--------|
| | Other | 1.0000 |
|--|-------|--------|

(4) Method to determine achievement

The manufacturers of appliances are required to keep the harmonic mean of the energy consumption efficiency of appliances shipped for each fiscal year starting from the targeted fiscal year, weighted with shipment volume by category, at the same level or higher than the harmonic mean of the standard energy consumption efficiency weighted with shipment volume by category.

Also as an exception, evaluation through average thermal efficiency by company* is adopted. At the same time, it was made possible to add hybrid water heaters to the calculation of the value of average thermal efficiency by company.

* Harmonic mean of the energy consumption efficiency (thermal efficiency) of each shipped appliance weighted with shipment volume.

(5) Items to be labeled, etc.

Items to be labeled by the manufacturers, etc. regarding the energy consumption efficiency are compiled.

4. Recommendation towards energy conservation

In order to securely improve the energy consumption efficiency of gas or oil water heaters under the new standard energy consumption efficiency, active and continuous efforts by stakeholders will be indispensable. Recommendations are compiled in expectation of further efforts by stakeholders (government, sellers, manufacturers, etc.).

- Reference 1: Expectation of thermal efficiency improvement in the future with the new targeted standard value

It is expected that thermal efficiency will improve by 5.2% for gas water heaters, 7.1% for oil water heaters, and 5.4% for water heaters of both types combined.

| | Energy consumption efficiency | Targeted standard value in the target fiscal year (FY2025) | Thermal efficiency improvement rate |
|-------------------|--|--|-------------------------------------|
| | Hot water supply: FY2009 (mode thermal efficiency) Heating: FY2016 (rated thermal efficiency) | | |
| Gas water heaters | 81.1% | 85.3% | 5.2% |

| | | | |
|------------------------|-------|-------|------|
| Oil water heaters | 79.3% | 84.9% | 7.1% |
| Water heaters in total | 80.9% | 85.3% | 5.4% |

*It should be noted that data for FY2009 instead of the basic fiscal year of FY2016 are used for warm water supply due to restrictions on confirmable data. The shipment volume used for the weighted harmonic mean is assumed as unchanged for both ratio and volume from the basic fiscal year of FY2016 to the target fiscal year.

- Reference 2: The Working Group on Classification Standards for Gas and Oil Appliances of the Energy Efficiency and Conservation Subcommittee of the Committee on Energy Efficiency and Renewable Energy under the Advisory Committee for Natural Resources and Energy

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