

# JIS

**JAPANESE INDUSTRIAL STANDARD**

## **Test Methods of Hot Water Heaters for Automobiles**

**JIS D 5901—1988**

**Translated and Published**

**by**

**Japanese Standards Association**

In the event of any doubt arising,  
the original Standard in Japanese is to be final authority.

## JAPANESE INDUSTRIAL STANDARD

J I S

Test Methods of Hot Water  
Heaters for Automobiles

D 5901-1988

1. Scope

This Standard specifies the testing method of the car cabin heater, hereinafter referred to as the "heater" which utilizes the cooling liquid, hereinafter referred to as the "hot water" of the car engine as heat source.

Remark: The units and numerical values given in { } in this Standard are based on the traditional unit system and are appended for informative reference.

2. Definition

The meanings of the main terms used in this Standard shall be as follows:

- (1) cabin Driver's and guests' rooms where the water heater to be tested is used.
- (2) room heaters In a car room heating apparatus, the portion consisting of the radiator, the blower, the hot water piping, and the air piping connecting the radiator and the blower.
- (3) heating capacity Calories lost by hot water when the heater is operated under the specified testing conditions with the testing operatus as expressed by (kW) (kcal/h).

---

Applicable Standards:

JIS B 8330-Testing Methods for Turbo-Fans and Blowers

JIS C 1102-Electrical Indicating Instruments

JIS C 1502-Sound Level Meters

JIS D 1601-Vibration Testing Method for Automobile Parts

JIS Z 8731-Methods of Measurement and Dscription of A-Weighted  
Sound Pressure Level

## Reference Standards:

JIS B 8346-Methods of A-Weighted Sound Pressure Level Measurement  
for Fans, Blowers and Compressors

JIS D 1618-Testing Method for Automobile Air Conditioners

JIS D 5005-Testing Voltages for Automotive Electric Equipments

- (4) corrected heat radiation capacity Corrected discharged heat amount expressed by the temperature difference between the inlet water temperature and the inlet air temperature on the basis of 65°C. It shall be expressed in (kW) {kcal/h}.
- (5) heat radiation capacity on hot water side Calories lost by hot water in the testing conditions. It shall be expressed in (kW) {kcal/h}.
- (6) airflow volume The volume of airflow passing through the radiator in measurement of heating capacity. To be expressed in {m<sup>3</sup>/h}.
- (7) pressure loss on the hot water side The difference between the pressure measured in the inlet and that measured in the outlet of the hot water piping in the test condition. It is to be expressed in (kPa) {mmHg in mercury column}.
- (8) mode A specific situation selected by switching over, depending on the purpose of heating, the adjusting device governing air inlet, outlet and wind volume.

### 3. Testing Items

The testing items of the hot water heaters shall be as follows:

- (1) Function test
  - (a) Heating capacity
  - (b) Airflow volume
  - (c) Power consumption
  - (d) Pressure loss on the hot water side
- (2) Noise test
- (3) Vibration test
- (4) Pressure test
  - (a) Airfightness test
  - (b) Pressure test
  - (c) Repeated pressure test

### 4. Performance Test

4.1 Testing Conditions The testing conditions shall be as follows.

- (1) Air Condition The air condition shall be normal temperature and normal humidity, and the variation during the test shall be 5°C or less for the temperature and 20 % or less for humidity.

- (2) Hot Water Condition The hot water to be used for the measurement of heat discharge quantity shall be the municipal water unless otherwise specified, and the water temperature at the inlet shall be  $85 \pm 3^{\circ}\text{C}$ .
- (3) Flow Quantity of Warm Water The flow quantity of warm water shall be one of 6, 10, or 20 l/min.
- (4) Terminal Voltage of the Blower Motor The terminal voltage of the blower motor shall be 13.5 V for the rated voltage 12 V, and 27 V for the rated voltage 24 V.
- (5) Setting of Mode The mode to be set shall, as a rule, be the mode of sucking open air for room air warming and of blowing out from the lower outlet.
- (6) Air Piping System By agreement between the parties concerned, the air piping system may be installed to the outlet side of the heaters to be tested.

4.2 Testing Apparatus For the functional test of the heater, the testing device as shown in the attached figure is to be used.

- (1) Air Tank The air tank to be connected to the air inlet of the heater shall be one specified in JIS B 8330. (The test and inspection, method of the blower) or the equivalent functional one.
- (2) Nozzle The nozzle or the orifice for measuring the airflow volume shall be one specified in JIS B 8330 or equivalent one in performances.
- (3) Blower for Air Tank This should have the capacity to send enough airflow volume to keep the pressure inside the tank at atmospheric pressure.
- (4) Hot Water Tank The hot water tank for the heater shall have sufficient capacity to supply hot water at  $85^{\circ}\text{C}$  of the specified flow volume steadily.
- (5) Power Source The power source to be used for the driving of the blower motor shall be a stable d.c. source with a ripple voltage not exceeding 0.1 V.

4.3 Measuring Instruments The measuring instruments shall be as follows:

- (1) Thermometer For the measurement of the temperatures of air and hot water, such thermometers as have  $0.1^{\circ}\text{C}$  or less of the minimum scale and the accuracy within  $\pm 0.1^{\circ}\text{C}$  shall be used and, specifically, the pair of thermometers for measuring the temperatures of hot water in inlet and outlet shall be corrected or selected to indicate the value not exceeding  $0.1^{\circ}\text{C}$  as the minimum scale. However, the thermometer installed in the vicinity of the inlet for measuring the temperature of hot air shall have an accuracy of  $\pm 0.2^{\circ}\text{C}$  or finer.