



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS S 2116 : 2004

(JIA)

Water heaters containing water under atmospheric pressure

ICS 91.140.65

Reference number : JIS S 2116 : 2004 (E)

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Gas Appliances Inspection Association (JIA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS S 2116 : 1997** is replaced with this Standard.

Date of Establishment: 1981-03-01

Date of Revision: 2004-03-20

Date of Public Notice in Official Gazette: 2004-03-22

Investigated by: Japanese Industrial Standards Committee
Standards Board
Technical Committee on Consumer Life
Products

JIS S 2116:2004, First English edition published in 2005-03

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Printed in Japan

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Water heaters containing water under atmospheric pressure

Introduction This Japanese Industrial Standard was established as **JIS S 2116** *Water heaters containing water under atmospheric pressure* in 1991 by integrating **JIS S 2116** *Water Heaters Containing Water under Atmospheric Pressure used with Liquefied Petroleum Gas* established in 1981 and **JIS S 2136** *Water Heaters Containing Water under Atmospheric Pressure used with Town Gas* established in 1981. In this revision, the criteria for effect of water quality was revised to correspond to the revised Ministry Ordinance related to Water Works Law. Also, “annex (normative) Interim standard of **JIS S 2116** *Water heaters containing water under atmospheric pressure*” was established as an interim measure.

1 Scope This Standard specifies water heaters containing water under atmospheric pressure⁽³⁾ to be used mainly for preparing hot water or tea for business purposes, having a burner using liquefied petroleum gas or city gas⁽¹⁾ (hereafter referred to as “gas”) as fuel, which are 42 kW or less in marked gas consumption⁽²⁾ (hereafter referred to as “appliance”).

Notes (1) Liquefied petroleum gas means the gas described in “Liquefied petroleum gas standard” of enforcement regulations (1997, Ministerial ordinance of Ministry of International Trade and Industry No. 11) based on the Law Concerning the Securing of Safety and the Optimization of Transaction of Liquefied Petroleum Gas (1967, Law No. 149).

City gas means the gas of gas group described in the Ministerial ordinance for Gas Appliance Certification (1996, Notification of Ministry of International Trade and Industry No. 47) based on the Gas Utility Industry Law (1954, Law No. 51).

(2) Marked gas consumption means gas consumption when the appliance is used under a working condition where the largest amount of gas is consumed, and it is the value marked on the appliance.

(3) Water heater containing water under atmospheric pressure means an appliance for supplying drinking hot water, having a construction to heat water contained previously in a hot-water storage tank and a mechanism capable of opening and closing the gas passage in relation to water temperature. Its hot-water storage part is opened to the air so that it is not subjected to any pressure exceeding the atmospheric pressure (see informative figures 1 and 2).

Remarks : The pressure described in this Standard is of gauge pressure, unless indicated as atmospheric pressure.

2 Normative references The standards listed in attached table 1 contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards shall be applied.

3 Classification

- a) **Classification by installation system** The classification by the installation system of appliance shall be indoor type of table 2 of **JIS S 2092**.
- b) **Classification by air supply and exhaust system of indoor type appliance** The classification by the air supply and exhaust system of indoor type appliance shall be according to table 3 of **JIS S 2092**.
- c) **Classification by installation mode** The classification by the installation mode of appliance shall be according to table 4 of **JIS S 2092**.

4 Performance

4.1 General quality performances The general quality performances of appliance, when tested by **JIS S 2093** and clause 6, shall conform to the requirements given in table 1.

Table 1 General quality performances and test methods

Item		Performance	Test method	
			JIS S 2093	Subclause of this Standard
Gastightness of gas passage		The leakage through appliance valve shall be 70 mL/h max.	Table 6	—
		The leakage through gas shut-off valve other than appliance valve shall be 550 mL/h max.		
		To be free from outward leaks between the gas supply inlet and burner port.		
Gas consumption		The accuracy with respect to the marked gas consumption shall be ± 10 %.	Table 5	6.2
Combustion condition	At windless state and ordinary atmospheric condition of BF-D	To be securely ignited without explosive ignition.	Table 7	6.3
		To be free from lifting.		
		To be free from flame extinction.		
		Flames to be uniform.		
		To be free from back fire.		
		To be 60 dB max. in continuous noise.		
		To be free from explosive noise at extinction.		
		CO concentration in theoretical dry combustion gas (vol %) (hereafter referred to as "CO %") shall be 0.28 % (0.14 % for unvented type) max.		
		To be free from soot generation.		
		There shall be no usual contact of yellow flame with the electrode and heat exchange parts.		
		There shall be no outflow of combustion gas from other than exhaust outlet.		
		To be free from extinction or back fire of pilot burner.		

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Table 1 (continued)

Item		Performance			Test method		
					JIS S 2093	Subclause of this Standard	
Combustion condition	In a blocked vent state	CO % in combustion gas flowing out from other than exhaust outlet shall be 0.28 % max. (apply to CF)			CF: table 24 FE: table 25 BF-W: table 26 BF-C: table 28 BF-D: table 30 FF: table 33	6.3	
	In a windy state	To be free from extinction, back fire, and flame-overflow harmful to use (excl. unvented type).					
		To be free from extinction and back fire of pilot burner (excl. unvented type).					
		To be free from outflow of combustion gas from other than exhaust outlet (apply to FE).					
		CO % shall be 0.28 % max. (apply to BF and FF)					
		To be securely ignited without explosive light up (apply to BF and FF).					
	In water spraying state	To be free from flame extinction (apply to BF-W and FF).					
	In low oxygen atmospheric state (apply to BF-D)	To be securely ignited without explosive ignition.			BF-D: table 30	6.3	
		To be free from extinction and back fire of pilot burner.					
		To be free from flame extinction.					
		To be free from soot generation.					
		CO % shall be 0.28 % max.					
Temperature rise	Temperature rise in ordinary state (every part of appliance)	Surface of part touched by hand at operation (knobs)	Those made of metal, ceramics and glass	60 °C max.	Table 10 Table 14	6.4	
			Others	70 °C max.			
		Surface of part possible to be touched by hand at operation		140 °C max.			
		Surface of dry cell		55 °C max.			

Table 1 (continued)

Item		Performance		Test method	
				JIS S 2093	Subclause of this Standard
Temperature rise	Temperature rise in ordinary state (every part of appliance)	Outer surface of gas-passing part of gas shut-off valve (incl. appliance valve) body	Not exceeding 85 °C or the temperature confirmed by a heat resistance test to be in compliance with the item of gas-tightness of gas passage and to cause no abnormality on operation	Table 10 Table 14	6.4
		Surface of ignition unit (incl. piezoelectric element)	Not exceeding 85 °C or the temperature confirmed to cause no hindrance to use by a heat resistance test		
		Outer surface of gas-passing part of appliance governor	Not exceeding 70 °C or the temperature confirmed by a heat resistance test such that it complies with the item of gastightness of gas passage and that it does not lead to change of regulated pressure greater than $(0.05P_2 + 30)$ Pa P_2 : Regulated pressure before heat resistance test		
	Temperature rise in ordinary state (wooden wall and the like)	Surface of wooden walls of rear, side, and upper ceiling faces of main body and wooden base underneath the appliance	100 °C max.	Table 10	6.4
		Surface of wooden frame of wall through which concentric supply and exhaust pipe passes			
		Surface of wooden wall adjacent to the top of exhaust pipe or top of concentric supply and exhaust pipe (excl. CF)			
		Exhaust gas temperature ⁽⁴⁾ (excl. unvented type)	260 °C max.		

Table 1 (continued)

Item		Performance		Test method	
				JIS S 2093	Subclause of this Standard
Temperature rise	Temperature rise in abnormal state (wooden wall and the like)	Surfaces of wooden walls of rear, side, and upper ceiling faces of main body and wooden base underneath the appliance	100 °C max.	Table 10	6.5
		Surface of wooden frame of wall through which concentric supply and exhaust pipe passes			
		Surface of wooden wall adjacent to the top of exhaust pipe or top of concentric supply and exhaust pipe (excl. CF)			
Electric ignition		In windless state	To be ignited at least 8 times out of 10 without consecutive non-ignition and explosive ignition.	Table 11	—
		In water spraying (apply to BF-W and FF)			
		In low oxygen atmosphere (apply to BF-D)			
		In windy state (apply to BF-W・C and FF)	To be ignited at least 5 times out of 10 without explosive ignition.		
Safety device	Pilot safety shut off device	Valve opening time	1.5 min max.	Clause 1 of Table 12	—
		Valve closing time	1.5 min max.		
	Blocked vent safety shut off device	To close gas passage to the burner before occurrence of extinction, back fire or flame overflow and within 5 min, and not to self-reopen (apply to FE).		Table 25	—
	Excessive wind pressure safety device	To close gas passage to the burner before occurrence of extinction, back fire or flame overflow (apply to FE).			
		Overheat shut off device	To close gas passage to the burner after actuation, and not to self-reopen.		Table 12