

JIS

JAPANESE INDUSTRIAL STANDARD

**Air-Conditioning Unit for
Dwellings**

JIS A 4412—1976

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JAPANESE INDUSTRIAL STANDARD
Air-Conditioning Units
for Dwellings

J I S
A 4412-1976
(Reaffirmed: 1983)

1. Scope

This Japanese Industrial Standard specifies the air-conditioning unit for dwellings, hereinafter referred to as the "unit", of not more than 20 000 kcal/h {83.7 MJ/h} in the rated heating capacity (in the case of combined use as hot-water supply, not more than 30 000 kcal/h {125.6 MJ/h} and not more than 15 000 kcal/h {62.8 MJ/h} in cooling capacity). Further, this standard specifies the air-conditioning unit on which a hot water supplier has been placed in combination. However, the unit which has been specified separately by Japanese Industrial Standard shall be in accordance with each Japanese Industrial Standard and be excluded from this standard.

Remark: The units and numerical values given in { } in this standard are in accordance with the International System of Units (SI), and are appended for reference.

2. Definitions

For the purposes of this standard, the following definitions apply:

- (1) air-conditioning unit The air-conditioning unit shall be defined as follows. The unit consists of the heat source part (hot-water boiler, hot air heater, heat pump air-conditioning machine, refrigerating machine, etc.), heat exchanger and pressure feed part (radiator, pump, blower, expansion tank, etc.). All or not less than one part of them have been set in one or several cabinets or frames (they are not outside frames for collecting products simply) for setting them in the space for facilities of dwelling. The unit has cooling and heating capacities.
- (2) air-conditioning hot-water supply unit The air-conditioning hot-water supplying unit is defined as a unit which has a circuit for hot-water supply at the heat source part of that unit additionally.
- (3) piping The piping is a general term for water piping, drainage piping, refrigerant piping, fuel piping, air duct, waste air exhaust pipe (including chimney), conduit tube, etc.
- (4) fixation of unit The fixation of unit, hereinafter referred to as the "fixation", means to screw or weld the unit to the building skeleton.
- (5) connection of piping The connection of piping means to connect one piping with another piping.

Applicable Standards: See page 28.

- (6) rated capacity The rated capacity is the capacity indicated in kcal {J} per hour when the unit has been operated under the rated voltage, rated frequency and rated temperature as specified in 4. and marked on the identification.
- (7) rated electric power consumption This is the total quantity of electric power to be consumed by the electric motor and others when the unit has been operated under the rated voltage, rated frequency and rated temperature condition as specified in 4. and marked in the identification plate.
- (8) rated fuel consumption This is the quantity of fuel to be consumed in a stable condition when the unit has been operated in the states of combustion air supply, air exhaust and fuel supply, specified by the manufacturer under the conditions of rated voltage, rated frequency and rated temperature condition as specified in 4. and further, marked on the identification plate.

3. Classification

The units shall be classified as shown in Table 1.

4. Summary of Rating

The summary of rating of units shall be as follows. Further, in regard to items (state of operation, measurement conditions and others) excepting rated voltage, rated frequency and rated temperature conditions, where they have been specified in other JIS, they shall be in accordance with each JIS, and where they have not been specified in JIS, they shall be in accordance with those specifications, as appropriate, or be subjected to the agreement between the parties concerned.

4.1 Rated Voltage and Rated Frequency The rated voltage of unit shall be single-phase alternating current 100 V, single-phase alternating current 200 V or three-phase alternating current 200 V and the rated frequency shall be 50, 60 Hz exclusive use or 50 and 60 Hz common use.

Table 1

Division	Type	Symbol	Summary
Division according to setting place	Floor-standing type	F	Unit to be placed on the floor.
	Wall-hanging type	W	Unit to be fitted in the direction facing to the wall at the intermediate place of the wall.
	Ceiling-hanging type	C	Unit to be suspended from the ceiling.
Division according to the finish of outer circumference	Exposure type	E	Unit to be placed with exposing the whole outer casing.
	Flush type	M	Unit to be placed with burying the whole in the part of ceiling, wall and floor of building.
Division according to constitution	Package type	P	Unit which has been assembled into one unit by accommodating main apparatuses and piping in a casing.
	Room type	R	Space unit in which the air-conditioning unit is accommodated in a room, including the unit assembled on site.
Accessory units		-	The following accessories are included: radiator, pump, each unit of air diffuser and water piping connecting them, drainage pipe, refrigerant piping, air duct and exhaust air pipe (include chimney)

4.2 Rated Temperature Condition The temperature condition of the rated performance test shall be in accordance with the following as a rule.

- (a) Conditions in the case of cooling or heating air and supplying it into a room directly

Division		Inlet air condition at the inlet of indoor side of room	
		Dry bulb temperature (°C)	Wet bulb temperature (°C)
Cool air	Cooling condition	27 ± 1	19.5 ± 0.5
	Dehumidifying condition	27 ± 1	24 ± 0.5
Hot air	Heat pump heating condition	21 ± 1	-
	Heating condition by electric heater	21 ± 1	-
	Other heating condition	21 ± 1	-

(b) Conditions in the case of cooling or heating and supplying water

Division			Conditions of cool and warm water sides	
			Temperature of inlet water (°C)	Temperature of outlet water (°C)
Circulating water	Cooling condition		12 ± 0.5	7 ± 0.5
	Heating condition ⁽¹⁾	①	No specification	45 ± 0.5
		②	60 ± 1	65 ± 1
		③	70 ± 1	80 ± 1
		④	60 ± 1	80 ± 1
Hot-water supply	Hot-water supply condition		10 ± 1	45 ± 1
	Cool and warm water supply conditions		5 ± 1	See how the temperature

(c) Condition in the case of using an air-cooled condenser or in the case of air-heat source heat pump

Division		Inlet air condition at the outdoor side	
		Dry bulb temperature (°C)	Wet bulb temperature (°C)
Air	Cooling condensation condition	35 ± 1	24 ± 0.5
	Heat pump evaporation condition	7 ± 1	6 ± 0.5

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(d) Condition in the case of using a water-cooling condenser in the case of water-heat source heat pump

Division		Condition at the outdoor side	
		Temperature of inlet water (°C)	Temperature of outlet water (°C)
Divisional water	Cooling condensation condition	24 ± 0.5	35 ± 0.5
	Heat pump evaporation condition	15.5 ± 0.5	7 ± 0.5

Notes (¹) The heating conditions ① to ④ are supposed exclusively the following conditions, but they can be chosen properly.

- Heating conditions ① In the case of heat pump heating
- ② In the case of using hot-water boiler, electric hot-water heater
- ③ In the case of using hot-water boiler, instantaneous hot-water heater, electric hot-water heater, etc.
- ④ The same as the above (small bore piping method)

Further, the applied conditions shall be marked together with the heating capacity.

(²) Where the conditions other than the conditions of this table have been applied, that temperature conditions shall be marked.

5. Quality

5.1 Function The unit shall display the rated cooling capacity or the rated heating capacity safely within the rated electric power consumption and the rated fuel consumption shown on the identification plate under the conditions of rated voltage, rated frequency and rated temperature as shown in 4. excluding the applied rated test.

5.2 Shape and Dimensions The shape and dimensions of unit shall comply with the following items:

5.2.1 Dimensions of External Shape The dimensions of external shape of unit shall be in accordance with JIS A 0014 as a rule.

5.2.2 Taking-out Place of Piping and Its Shape

(1) Waste Air Exhausting Pipe (Including Chimney)

- (a) Place The hole for the waste air exhaust pipe (including a chimney) mounted in the wall of building shall be placed at either one suitable place among places as shown in Fig. 1.
- (b) Shape The diameters of the circular waste air exhaust pipe (including a chimney) shall be as shown in Table 2. The rectangular waste air exhaust pipe shall conform to the penetrated hole of wall (inside dimensions) as shown in Fig. 1. Further, effective fire- prevention measures shall be taken previously for the circumference of holes.

Table 2. Diameter of Circular Waste Air Exhaust Pipe

Type	Division according to heat input or heat output (Kcal/h) {MJ/h}		Inside diameter of circular waste air exhaust pipe(mm)
Oil fire	Heat input	15 000 {62.8} max.	90, 106
		30 000 {125.6} max.	106, 120, 150
Gas fire	Heat output	9600 {40.2} max.	80
		11 000 {46.1} max.	90
		13 500 {56.5} max.	100
		16 000 {67.0} max.	110
		19 000 {79.5} max.	120
		23 000 {96.3} max.	130
		26 000 {108.8} max.	140
		36 000 {150.7} max.	160
		47 000 {196.7} max.	180

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(2) Piping other than the waste air exhausting pipe

- (a) Place On the supposition that the place where the waste air exhausting pipes can pass the wall in the building and the place (including dimensions) of space where these pipes can be extended in the horizontal direction across the insides of building are as shown in Fig. 2, the taking-out place of the piping other than the waste air exhausting pipe (including chimney) shall be determined to comply with either one of them.