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JAPANESE INDUSTRIAL STANDARD

PIPING UNITS FOR DWELLINGS

JIS A 4413-1981
(REAFFIRMED: 1986)



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Piping Units for Dwellings

A 4413-1981

1. Scope

This Japanese Industrial Standard specifies the piping units, hereinafter, referred to as the "units", to be used mainly for dwellings.

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

2. Definition

For the purposes of this standard, the following definition applies.

piping units Pippings, ducts and groups of conduit pipes which have been prefabricated to be attached to the building members, and those which are built in individual frames and others.

3. Types

The types of the units shall be as given in the following:

Piping unit for floor: a unit to be assembled with a floor member

Piping unit for wall: a unit to be assembled with a wall member

Piping unit for ceiling: a unit to be assembled with a ceiling member

Piping unit for vertical pipe: a unit composed mainly of vertical pipe

4. Materials for Pippings and Ducts

4.1 Piping Materials and Division in Use The piping materials and their divisions in use shall be in accordance with the following:

Furthermore, these shall conform to the standards of the Gas Utility Industry Law and related laws and regulations.

- (1) Pipes among the piping materials for water supplying and draining, gas, cooling water, cold and hot water, and oil shall be in accordance with Table 1, fittings with Table 2, and valves with Table 3.

Applicable Standards: See pages 29 to 32.

- (2) Piping materials (pipes and pipe fittings) which are not specified in Table 1 and Table 2, and valves which are not specified in Table 3, shall have shapes and qualities of material suitable to the objects of use and applications, be endurable to the lowest permissible working pressure, as well as shall pass the test pressure.
- (3) The joints shall conform to the types of pipes of pipings to be used.

Table 1. Piping Materials (Pipes)

Division	Type of pipe	Name	Standard	Division of use							Remark	
				Water supply	Hot-water supply	Drainage	Ventilation	Gas	Cooling water	Cold and hot water		Oil
Metal pipes	Cast iron pipes	Cast-iron pit cast pipes for water works	JIS G 5521	○								Ordinary pressure pipes
		Cast-iron pipes centrifugally cast in sand-lined moulds for water works	JIS G 5522	○								Ordinary pressure pipes
		Cast-iron pipes centrifugally cast in metal moulds for water works	JIS G 5523	○								Ordinary pressure pipes
		Cast iron pipes and fittings for drainage	JIS G 5525			○	○					Class 1 and Class 2
		Ductile iron pipes centrifugally cast for water works	JIS G 5526	○								
		Galvanized steel pipes for water service	JIS G 3462	○	○	○	○		○	○		Galvanized pipes excluding for oil
	Steel pipes	Carbon steel pipes for ordinary piping	JIS G 3452	○	○	○	○		○	○	○	Galvanized pipes excluding for oil
		Carbon steel pipes for pressure service	JIS G 3454	○					○	○	○	Galvanized pipes excluding for oil
		Stainless steel pipes	JIS G 3459	○	○							Class 1 and class 2
		Lead pipes	JIS H 4311			○	○					Class 1 and Class 2
Non-metal pipes	Lead pipes	Lead pipes for water supply	JIS H 4312	○							Copper pipes for piping	
		Copper and copper alloy seamless pipes and tubes	JIS H 3300	○	○	○	○	○	○	○		VP general pipes
	Plastic pipes	Unplasticized polyvinyl chloride (PVC) pipes	JIS K 6741				○	○				
		Unplasticized polyvinyl chloride pipes for water works	JIS K 6742	○								
		Polyethylene pipes for water works	JIS K 6742	○								

Table 2. Piping Materials (Pipe Fittings)

Division	Type of pipe	Name	Standard	Division of uses						Remarks	
				Water supply	Hot-water supply	Drainage	Ventilation	Gas	Cooling water		Cold and hot water
Metal pipes	Cast iron pipes	Cast-iron pressure fittings for water works	JIS G 5524	○							
		Cast-iron pipes and fittings for drainage	JIS G 5525			○	○				
	Steel pipes	Ductile iron pressure fittings for water works	JIS G 5527	○							
		5 kgf/cm ² slip-on welding steel pipe flanges	JIS B 2221	○	○				○	○	
		10 kgf/cm ² slip-on welding steel pipe flanges	JIS B 2222	○	○			○	○	○	○
		16 kgf/cm ² slip-on welding steel pipe flanges	JIS B 2223	○	○				○	○	○
		20 kgf/cm ² slip-on welding steel pipe flanges	JIS B 2224	○	○				○	○	
		Screwed type malleable cast iron pipe fittings	JIS B 2301	○	○		○	○	○	○	○
		Screwed type steel pipe fittings	JIS B 2302	○	○		○	○	○	○	○
		Screwed type drainage pipe fittings	JIS B 2303			○	○				
		Steel butt-welding pipe fittings for ordinary use	JIS B 2304	○	○			○	○	○	○
		Steel butt-welding pipe fittings for special use	JIS B 2305	○	○				○	○	○
Steel plate butt-welding pipe fittings	JIS B 2307	○	○				○	○	○		
Copper pipes	Pipe fittings of copper and copper alloy	JIS H 3401	○	○		○	○	○	○		
Non-metal pipes		Unplasticized polyvinyl chloride pipe fittings for drain	JIS K 6739			○	○				
	Plastic pipes	Unplasticized polyvinyl chloride pipe fittings for water works	JIS K 6743	○			○				
		Polyethylene pipe fittings for water works	JIS K 6763	○							

Table 3. Valves

Classification	Material	Type	Standard	Division of uses						Remarks
				Water supply	Hot-water supply	Drainage Ventilation	Gas	Cooling water	Cold and hot water	
Globe valves	Cast iron	10 kgf/cm ² flanged type	JIS B 2041	○	○			○	○	Made of bronze for essential parts
	Bronze	5 kgf/cm ² screwed type	JIS B 2011	○	○			○	○	
		10 kgf/cm ² screwed type	JIS B 2021	○	○			○	○	
		10 kgf/cm ² flanged type	JIS B 2026	○	○			○	○	
Gate valves	Cast steel	10 kgf/cm ² flanged type	JIS B 2071	○	○			○	○	
		20 kgf/cm ² flanged type	JIS B 2081	○	○			○	○	
	Cast iron	5 kgf/cm ² flanged type (outside screw type)	JIS B 2031	○	○	○		○	○	Made of bronze for essential parts
		10 kgf/cm ² flanged type (inside screw type)	JIS B 2043	○	○	○		○	○	
		10 kgf/cm ² flanged type (outside screw type)	JIS B 2044	○	○	○		○	○	
	Bronze	5 kgf/cm ² screwed type	JIS B 2013	○	○	○		○	○	
		10 kgf/cm ² screwed type	JIS B 2023	○	○	○		○	○	
		10 kgf/cm ² flanged type	JIS B 2024	○	○	○		○	○	
	Cast steel	10 kgf/cm ² flanged type (outside screw type)	JIS B 2073	○	○			○	○	
		20 kgf/cm ² flanged type (outside screw type)	JIS B 2083	○	○			○	○	
Angle valves	Cast iron	10 kgf/cm ² flanged type	JIS B 2042	○	○			○	○	Made of bronze for essential parts
	Bronze	10 kgf/cm ² screwed type	JIS B 2022	○	○			○	○	
		10 kgf/cm ² flanged type	JIS B 2027	○	○			○	○	
	Cast steel	10 kgf/cm ² flanged type	JIS B 2072	○	○			○	○	
		20 kgf/cm ² flanged type	JIS B 2082	○	○			○	○	
	Cast iron	10 kgf/cm ² flanged swing	JIS B 2045	○	○	○		○	○	Made of bronze for essential parts
	Bronze	10 kgf/cm ² screwed lift	JIS B 2024	○	○			○	○	
		10 kgf/cm ² screwed swing	JIS B 2025	○	○	○		○	○	
Check valves	Cast steel	10 kgf/cm ² flanged swing	JIS B 2074	○	○			○	○	
		20 kgf/cm ² flanged swing	JIS B 2084	○	○			○	○	
	Bronze	Screwed plug cock	JIS B 2191	○	○	○		○	○	
		Screwed gland cock	JIS B 2192							
Cocks	Iron Copper alloy Aluminum Zinc alloy	Gas cocks	JIS S 2120				○			

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4.2 Duct Materials and Division of Uses The materials of the ducts shall be in accordance with Table 4.

Furthermore, the other materials than in Table 4 shall be those having shape and quality of material suitable to the objects of use and applications.

Table 4. Duct Materials

Name	Standard	Division of use	
		Feed and discharge air ducts	Exhaust air duct
Galvanized sheets	JIS G 3302	○	○
Cold rolled stainless steel sheets	JIS G 4305	○	○
Aluminium and aluminium alloy sheets and strip	JIS H 4000	○	

4.3 Conduits The conduits and accessories shall be in accordance with Table 5.

Table 5. Conduits and Accessories

Name	Standards
Steel conduits	JIS C 8305
Accessories for the above	JIS C 8330 to 8341 JIS C 8343 to 8345 JIS C 8347 JIS C 8357
Unplasticized polyvinyl chloride conduits	JIS C 8430
Accessories for the above	JIS C 8432 to 8438
Flexible metal conduits	JIS C 8309
Accessories for the above	JIS C 8348 to 8350

5. Construction

5.1 Appearance The units shall be excellent in finish of their coating and plating, and be free from harmful defects and flaws in use.

5.2 Qualities on Installation The units shall have necessary construction for installation as given in the following.

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- (1) The positioning reference line shall be capable of being ascertained of its position with ease during installing operation and after installing operation.
- (2) The shape of the fixing point of the unit shall be so formed that it is capable of being fixed without hindrance even though the unit has caused installation errors of ± 10 mm respectively in horizontal direction and vertical direction.
- (3) The connecting points with the piping of outside shall be capable of inserting necessary tools, shall have sufficient allowance to be caught with the tool, as well as shall be capable of being inspected of qualities of condition easily after connection.
- (4) The construction of the connecting point shall be capable of being adjusted for the errors of installing position.

5.3 Qualities on Maintenance The unit shall be so constructed as to be capable of being inspected, repaired and exchanged of the piping, ducts, conduits and others of inside with ease, and shall satisfy the following matters which are necessary in daily maintenance.

- (1) The reading of the meters of gas and city water, hereinafter, referred to as the "meters", shall be made easily.
- (2) The operations of valves, repairing of strainer and others, and the cleaning of sweeping opening shall be made easily.
- (3) Those which are to be exchanged periodically, such as meters and others shall be exchanged with ease, and the dimensions of connecting points shall be of the prescribed dimensions.
- (4) Such parts which are anticipated of exchanging as valves, cocks, expansion joints and motor for damper, shall be exchanged easily.
- (5) It shall be so constructed as to be easy in daily maintenance and repair, other than those given above.

5.4 Piping The piping inside the unit and that between the unit and outside shall be in accordance with the following:

5.4.1 Measuring Method of Piping In this standard, unless otherwise specified, measurements of the distances between the pipes, and the pipe and the wall, and the lengths of the pipes shall be carried out taking the centre lines of the pipes as reference.

5.4.2 Method of Piping In the piping, no diagonal pipe shall generally be arranged.

5.4.3 Curing of Piping Ends For the purposes of protection of piping ends and to prevent from intrusion of foreign materials, the piping ends shall be processed with curing, as required.

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5.4.4 Joints of Pipes The joints of the pipes shall be in accordance with the following:

(1) Types of Joints The types of the joints shall generally be in accordance with the following:

- (a) Caulking joint: for cast iron pipes
- (b) Flange joint: for steel pipes, cast iron pipes, copper pipes, unplasticized vinylchloride pipes, etc.
(excluding drainage and ventilation pipes)
- (c) Screw joint ⁽¹⁾: for steel pipes

Note ⁽¹⁾ Screw threads shall be in accordance with JIS B 0203.

- (d) Welding joint: for steel pipes (generally excluding water supply, hot-water supply, drainage and ventilation pipes.)
- (e) Solder joint: for lead pipes, lead pipes and pipes, fittings and metal wares of copper, bronze and brass.
- (f) Brazing joint: for copper pipes
- (g) Expanded opening joint: for lead pipes, copper pipes, unplasticized polyvinyl chloride pipes
- (h) Joint by adhesives: for unplasticized polyvinyl chloride pipes
- (i) Mechanical joint ⁽²⁾: for cast iron pipes, steel pipes, unplasticized polyvinyl chloride pipes, etc.

Note ⁽²⁾ Mechanical joint also includes the rubber ring joint.

- (j) Joint by fusion: for polyethylene pipes

(2) Jointing Materials and Sealing Materials The jointing materials and sealing materials shall be those which have been adaptable to natures of water, water pressures, temperatures, and others, and having endurance, and shall generally be in accordance with Table 6.

Furthermore, in the pipings of the town gas and LP gas, the jointing materials and sealing materials which have been adaptable to these shall be used.

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Table 6. - Jointing Materials and Sealing Materials

Use	Name	Summary	Remark
Caulking jointing	Lead	It shall be class 5 of JIS H 2105.	
	Yarn	It shall be the jute hemp of No. 130 single yarns which has been banded to 25 mm in diameter	For caulking
Flange jointing	Rubber	It shall be the class 1 No. 1 of JIS K 6353.	For water supply
	Asbestos joint sheets	It shall be the class 3 of JIS R 3453.	For hot-water supply
Screw jointing	White paint	The paste of white zinc paint which has been ready mixed with boiled oil to be suitable for piping use.	Thick paste of paint, putty, and the kind of hemp shall not be used.
	Minimum	It shall be a soluble minimum paint, of which principal raw material is red lead.	
	Tape for sealing	It shall be the tape specified in JIS K 6885.	That which is suitable for piping use
	Liquid packing of synthetic resin	It shall be suitable for piping use (water supply, hot-water supply and drainage).	
Weld jointing	Welding rod	It shall be the welding rod specified in JIS Z 3201.	
Jointing by adhesive		It shall be the unplasticized vinyl chloride pipe adhesive for water works, which is suitable for piping use (water supply and drainage).	
Solder jointing	Solder	It shall be the solder of JIS Z 3282, the pig lead shall be of class 5 of JIS H 2105, and the pig tin be of class 3 of JIS H 2108.	For piling solder shall be 35 Sn. For socket jointing shall be 50 Sn.

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Table 6. (Continued)

Use	Name	Summary	Remark
	Plastan joint	Paste plastan shall be of 50 Sn. Bar plastan shall generally be of 40 Sn.	
Brazing jointing	Soft brazing filler metal	It shall generally be eutectic Sn-Ag alloy, and the brazing temperature shall be about 220°C.	
	Hard brazing filler metal	It shall be the hard brazing of JIS Z 3264 or JIS Z 3261, and be suitable for use.	
Rubber ring (rubber gas-ket) jointing	Rubber	It shall be class 2 of JIS K 6353 or equal or superior to this.	

(3) Joints and Connections of Pipings The joints and connections of the pipings shall be in accordance with the following:

- (a) Joints, connecting methods, equipments or execution of work methods which obstruct the flow of fluids shall not be used in the systems of water supply, hot-water supply, drainage, ventilation, cooling water, cold and hot water and oil.
- (b) No branch shall generally be taken by drilling holes on drainage and ventilation pipes.
- (c) In the case where pipes of different diameters are to be jointed, suitable single tapered reducer and reducing coupling shall be used.
- (d) In the pipings of drainage and ventilation systems, jointing shall not be worked by using flanges and unions.
- (e) No slip joint (³) shall be used in the following parts.
 - 1 In the water supply and hot-water supply systems, the other parts excluding the face side of sanitary utensiles.
 - 2 All parts of drainage and ventilation systems.

Note (³) The slip joint means the joint as given in Attached Fig. 1.