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Pipe flanges for refrigerants

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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 the Japan Society of Refrigeration Air Conditioning Engineers (JSRAE)/ the Japanese Standards Association (JSA) 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 B 8602 : 1999** is replaced with this Standard.

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Pipe flanges for refrigerants

1 Scope This Japanese Industrial Standard specifies the pipe flanges for piping and stop valves (hereafter referred to as “flanges”), to be used for refrigerating equipment and heat-pump equipment.

Remarks : The pressure used in this Standard is gauge pressure.

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 1001 *Diameter of clearance holes and counterbores for bolts and screws*

JIS B 1051 *Mechanical properties of fasteners made of carbon steel and alloy steel—Part 1 : Bolts, screws and studs*

JIS B 1180 *Hexagon head bolts and hexagon head screws*

JIS B 2238 *General rules for steel pipe flanges*

JIS G 0303 *General rules for inspection of steel*

JIS G 4051 *Carbon steels for machine structural use*

JIS H 3250 *Copper and copper alloy rods and bars*

3 Classification The flanges shall be classified into two types, the steel flange and copper alloy flange, and divided according to the refrigerants to be used mainly, type and shape of flanges, type of coupling, method of connection and maximum working pressure as given in Table 1 and Table 2.

4 Shapes and dimensions The shapes and dimensions of flanges shall be as follows:

- a) The shapes and dimensions of respective portions shall be as shown in Attached Tables 1 to 14.
- b) The dimensional tolerances shall be as specified in **JIS B 2238**.
- c) The bolt fastening surface shall be parallel to the flange coupling surface.

5 Materials and processing The materials and processing of flanges shall be as follows:

- a) The materials for steel flange are as follows:
 - 1) For steel flanges, S25C in **JIS G 4051** suitable for welding and brazing is used. The flanges of this material shall be of the maximum working temperature 150 °C and not be used under the temperature -60 °C.
 - 2) The inspection is carried out in accordance with **JIS G 0303** to ensure that the materials are 440 N/mm² in tensile strength (400 N/mm² for those of steel diameter, distance between opposite sides, or thickness of main part is over 100 mm up to and including 200 mm) and 265 N/mm² or more in yield point.

- b) The steel flanges are processed as follows:
- 1) Hub flange may be processed by machining from hot rolled steel rod or forged steel ingot. The axis of the completed flange shall be in parallel with the longitudinal axis of the original steel rod or steel ingot (this does not mean that they have to be coaxial).
 - 2) With the exception of the case in 1), the hub flange is not allowed to be machined from steel rod.
- c) The material for copper alloy flange shall be C3771 in **JIS H 3250** suitable for brazing. The flanges using this material shall be of the maximum working temperature 150 °C and not be used under the temperature -80 °C.
- d) **Bolts** The bolts shall be of the materials specified in **JIS B 1051**, and shall be those specified in **JIS B 1180**. Strength divisions shall be shown as given in Attached Tables 1 to 13.

6 Appearance The appearance of flanges shall be smooth, and be free from defects detrimental to use such as flaws, cracks and burrs.

7 Inspection The inspection shall be as follows:

- a) The shape and dimensional inspection shall be carried out by direct measurements, limit gauge, and other methods, and the results shall conform to the requirements of 4.
- b) The appearance inspection shall be carried out visually and the results shall conform to the requirements of 6.

Table 1 Classification of steel flanges and maximum working pressure

Refrigerant used		Ammonia		Fluorocarbon							
Symbol for type		ATK	ATM	RTH	RTK	RTM	RSK	RSM	RBH	RBK	RBM
Shape of flange		Square	Round	Rhombic	Square	Round	Square	Round	Rhombic	Square	Round
Material		JIS G 4051 S25C									
Type of coupling		Butting		Butting			Plugging				
Method of connection		Welding		Welding			Welding		Brazing		
Nominal size		Maximum working pressure MPa									
A	B										
10	⅜	5.00	—	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
15	½	5.00	—	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
20	¾	5.00	—	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
25	1	3.45	—	—	5.00	5.00	5.00	5.00	—	5.00	5.00
32	1¼	3.45	—	—	4.30	5.00	4.30	5.00	—	4.30	5.00
40	1½	3.45	—	—	4.30	4.30	4.30	4.30	—	4.30	4.30
50	2	3.45	—	—	4.30	4.30	4.30	4.30	—	4.30	4.30
65	2½	3.45	—	—	3.45	4.30	3.45	4.30	—	3.45	4.30
80	3	3.45	—	—	3.45	4.30	3.45	4.30	—	3.45	4.30
(90)	(3½)	3.45	—	—	3.45	4.20	3.45	4.30	—	3.45	4.30
100	4	3.45	—	—	3.45	3.45	3.45	3.45	—	3.45	3.45
125	5	—	3.00	—	—	3.45	—	3.45	—	—	3.45
150	6	—	3.00	—	—	3.45	—	3.45	—	—	—
200	8	—	3.00	—	—	3.45	—	3.45	—	—	—
250	10	—	—	—	—	3.00	—	3.00	—	—	—
Informative		Attached Table 1	Attached Table 2	Attached Table 3	Attached Table 4	Attached Table 5	Attached Table 6	Attached Table 7	Attached Table 8	Attached Table 9	Attached Table 10

Remarks 1 The flanges which use ammonia as refrigerant may be used for fluorocarbon and the flange of fluorocarbon may be used for ammonia.

2 90A should not be used.

**Table 2 Classification of copper alloy flanges
and maximum working pressure**

Refrigerant used		Fluorocarbon				
Symbol for type		RBHC		RBKC		RBMC
Shape of flange		Rhombic		Square		Round
Material		JIS H 3250 C3771				
Type of coupling		Plugging				
Method of connection		Brazing				
Nominal size		Maximum working pressure MPa				
A	B					
10	⅜	3.00	3.45	3.00	4.30	4.30
15	½	3.00	3.45	3.00	4.30	4.30
20	¾	3.00	3.45	3.00	4.30	4.30
25	1	—	—	3.00	3.45	4.30
32	1¼	—	—	3.00	3.45	4.30
40	1½	—	—	3.00	3.45	4.30
50	2	—	—	3.00	—	3.45
65	2½	—	—	3.00	—	3.45
80	3	—	—	3.00	—	3.45
(90)	(3½)	—	—	3.00	—	3.45
100	4	—	—	3.00	—	3.45
125	5	—	—	—	—	3.45
Informative		Attached Table 11		Attached Table 12		Attached Table 13

- Remarks 1 These shall not be used for ammonia.
2 90A should not be used.