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Cast iron pipe flanges

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In the event of any doubts arising as to the contents,
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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 Pipe Fittings Association (JPFA)/ 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 2239:2004** is replaced with this Standard.

However, **JIS B 2239:2004** may be applied in the **JIS** mark certification based on the relevant provisions of Article 19 Clause 1, etc. of the Industrial Standardization Law until November 19, 2014.

This **JIS** document is protected by the Copyright Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

Cast iron pipe flanges

Introduction

This Japanese Industrial Standard was established in 1996 and has gone through two revisions up to the present. The last revision was made in 2004, and the revision at this time is to respond to the revisions of standards referred to in this Standard and the addition of provisions concerning coatings.

Although there is the first edition of **ISO 7005-2** *Metallic flanges—Part 2: Cast iron flanges* published in 1988 as the corresponding International Standard, since the content is improper, the said standard is not currently used. Under such circumstances, in this revision, the overall degree of correspondence between **JIS** and the International Standard is designated as “NEQ”.

1 Scope

This Standard specifies cast iron pipe flanges of the nominal pressures 5K, 10K, 10K (thin type), 16K and 20K and of the nominal diameters 10A to 1500A (hereafter referred to as “flanges”), which are used for jointing steel pipes for fluid such as water¹⁾, oil, vapour, air, gas, etc. and also used for cast iron pipes, pipe joints, valves and the like.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 7005-2:1988 *Metallic flanges—Part 2: Cast iron flanges* (NEQ)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

Note ¹⁾ It refers to general service water, water for fire-fighting, water for industrial use, cold and hot water for air-conditioning, cooling water, etc. except drinking water.

2 Normative references

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

JIS B 0151 *Iron and steel pipe fittings—Vocabulary*

JIS B 0203 *Taper pipe threads*

JIS B 0253 *Gauges for taper pipe threads*

JIS B 0601 *Geometrical Product Specifications (GPS)—Surface texture: Profile method—Terms, definitions and surface texture parameters*

JIS B 0621 *Definitions and designations of geometrical deviations*

JIS B 2001 *Nominal size and bore of valves*

JIS B 2032 *Wafer type rubber-seated butterfly valves*

JIS G 5501 *Grey iron castings*

JIS G 5502 *Spheroidal graphite iron castings*

JIS G 5705 *Malleable iron castings*

JIS H 0401 *Test methods for hot dip galvanized coatings*

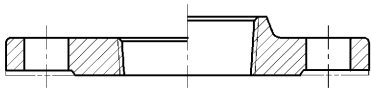
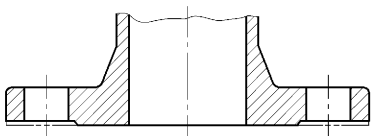
3 Terms and definitions

For the purposes of this Standard, the terms and definitions given in **JIS B 0151** apply.

4 Classification and designation of flange

The flanges shall be classified and designated according to the shapes thereof as given in table 1.

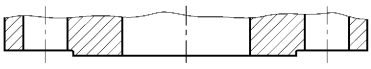
Table 1 Classification and designation of flange

Classification of flanges	Designation	Diagram
Threaded type flanges	TR	
Integral flanges	IT	

5 Classification and designation of facing

The facings shall be classified and designated as given in table 2.

Table 2 Classification and designation of facing

Classification of facings	Designation	Diagram
Flat face	FF	
Raised face	RF	

6 Designation of flange according to presence of coating

The designations according to the presence of hot dip galvanized coatings shall be as given in table 3.

Table 3 Designation of flange according to presence of galvanized coating

Designation	Meaning
Black flange	Flanges not given hot dip galvanized coatings
White flange (ZN)	Flanges given hot dip galvanized coatings

7 Relation between fluid temperature and maximum working pressure

The relation between the fluid temperature and the maximum working pressure (hereafter referred to as “pressure–temperature rating”) shall be as given in table 4.

Table 4 Pressure–temperature rating

Unit: MPa

Nominal pressure	Material group symbol	Maximum working pressure			
		Temperature of fluid ^{a)} °C			
		–10 to 120	220	300	350
5K	G2, G3	0.7	0.5	—	—
	D1, M1, M2	0.7	0.6	0.5	—
10K	G2, G3	1.4	1.0	—	—
	D1, M1, M2	1.4	1.2	1.0	—
10K (thin type)	G2, D1, M1, M2	0.7	—	—	—
16K	G2, G3	2.2	1.6	—	—
	D1, M1, M2	2.2	2.0	1.8	1.6
20K	G3, M1	2.8	2.0	—	—
	D1, M2	2.8	2.5	2.3	2.0
NOTE : For the material group symbols, see table 6.					
Note ^{a)} The maximum working pressure at the intermediate temperature between the values indicated in the table shall be obtained by the proportional interpolation method.					

8 Shapes/dimensions and dimensional tolerances**8.1 Threads**

The threads shall be as follows.

- The threads of threaded type flanges (TR) shall be according to **JIS B 0203**.
- The useful thread of flanges shall be free from defects such as harmful thin threads and broken crests.

8.2 Facing surfaces

The finish of facing surfaces of flanges shall be as given in table 5. The facing surfaces may be finished otherwise upon the agreement between the purchaser and the manufacturer.

Table 5 Finish of facing surface

Unit: μm

Finishing method	<i>Ra</i>
Turning	3.2 to 12.5
Machining other than turning	3.2 to 6.3
The numerical value of <i>Ra</i> shall comply with the definition in JIS B 0601 .	

8.3 Dimensions of flanges

The dimensions of flanges of each nominal pressure shall be as given in table 8 to table 12. The shape of the hub of integral flanges (IT) shall be cylindrical or of the shape close thereto with x of 1.25 or over when the taper is expressed by 1: x . Furthermore, the inside diameter (d), diameters of hub (a and b) and radius of fillet (r) of integral flanges (IT) are given in table 8 to table 12 as reference, where the diameters of hub are obtained from the strength calculation with the assumption of wall thickness based on the bore specified in **JIS B 2001**. If these informative values cannot be applied, it is necessary to determine the diameters of hub according to the strength calculation.

8.4 Dimensional tolerance

The dimensional tolerance of flanges shall be as given in table 13.

The squareness of the axis of threads of threaded type flanges (TR) to the facing surface shall be within 0.9 mm for each axial length of 100 mm. The squareness shall be according to **5.8** of **JIS B 0621**.

9 Performances

9.1 Materials of flanges

- The materials of flanges shall be as given in table 6.
- The mechanical properties of flanges shall satisfy those given in table 6.

Table 6 Materials and mechanical properties of flanges

Material		Mechanical properties			Material standard		Corresponding material standard (informative)	
Classification	Material group symbol	Tensile strength	Elongation	0.2 % proof stress	Number of standard	Material symbol	Number of standard	Material symbol
		Min.	Min.	Min.				
		N/mm ²	%	N/mm ²				
Grey cast iron	[G1 ^{a)}]	(145)	—	—	—	—	ASTM A 126	A
	G2	200	—	—	JIS G 5501	FC 200	ISO 185	200
		214	—	—	—	—	ASTM A 126	B
	G3	250	—	—	JIS G 5501	FC 250	ISO 185	250
Spheroidal graphite iron castings	D1	415	18	276	JIS B 2032	FCD-S ^{b)}	ASTM A 395	414-18
		350	22	220	JIS G 5502	FCD 350-22	ISO 1083	350-22
		400	15	250	JIS G 5502	FCD 400-15	ISO 1083	400-15
		450	10	280	JIS G 5502	FCD 450-10	ISO 1083	450-10
	[D2 ^{a)}]	(400)	(5)	(300)	—	—	ISO 2531	400-5
		(600)	(3)	(370)	—	—	ISO 1083	600-3
Blackheart malleable iron castings	M1	270	5	165	JIS G 5705	FCMB 27-05	ISO 5922	JMB/275-5
		300	6	190	JIS G 5705	FCMB 30-06	ISO 5922	JMB/300-6
	M2	340	10	220	JIS G 5705	FCMB 34-10	ASTM A 47	32510
		350	10	200	JIS G 5705	FCMB 35-10 FCMB 35-10S ^{b)}	ISO 5922	JMB/350-10
NOTE : 1 N/mm ² = 1 MPa								
Notes ^{a)} The material group symbols G1 and D2 are materials specified in ASTM Standard or ISO Standard, and these are not adopted in this Standard. Their values of mechanical properties specified in ASTM Standard or ISO Standard are indicated in parentheses.								
^{b)} Impact values need not be considered unless the impact values specified in the material standard are required to be satisfied according to the applicable laws and regulations.								

9.2 Coatings

The coatings shall be as follows.

- a) When coating is applied to flanges, it shall be performed according to the hot dip galvanized coatings method before machining. However, the surface treatment of flanges of iron-system materials other than blackheart malleable iron castings shall be upon the agreement between the purchaser and the manufacturer.
- b) The amount of hot dip galvanized coatings shall be obtained according to any method of **a)**, **b)** and **c)** in **11.2**, and the performance according to each method shall be as follows.
 - 1) In the case of obtaining according to **11.2 a)**, the coating mass of five samples shall be obtained, and it shall be not less than 500 g/m² on average and not less than 450 g/m² on individual sample.