

JIS

JAPANESE INDUSTRIAL STANDARD

High Strength Brass Castings

JIS H 5102—1988

The text in Japanese of this English version
has been withdrawn. _____

Translated and Published

by

Japanese Standards Association

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the original Standard in Japanese is to be final authority.

JAPANESE INDUSTRIAL STANDARD

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High Strength Brass Castings

H 5102-1988
(Reaffirmed: 1994)1. Scope

This Japanese Industrial Standard specifies the high strength brass castings for general use, hereinafter referred to as the "castings".

Remark: The units and numerical values given in { } in this Standard are based on the International System of Units (SI) and are appended for informative reference.

Further, the traditional units and numerical values accompanied by the SI units and converted values in { } shall be replaced by the units and the numerical values given in the Appendix on January 1, 1991.

2. Classes and Symbols

The classes and symbols of the castings shall be classified as given in Table 1, according to the chemical composition and casting methods.

Applicable Standards:

JIS H 0321-General Rules for Inspection of Non-ferrous Metal Materials

JIS H 1051-Methods for Determination of Copper in Copper and Copper Alloys

JIS H 1052-Methods for Determination of Tin in Copper and Copper Alloys

JIS H 1053-Methods for Determination of Lead in Copper and Copper Alloys

JIS H 1054-Methods for Determination of Iron in Copper and Copper Alloys

JIS H 1055-Methods for Determination of Manganese in Copper and Copper Alloys

JIS H 1056-Methods for Determination of Nickel in Copper and Copper Alloys

JIS H 1057-Methods for Determination of Aluminium in Copper and Copper Alloys

JIS H 1222-Methods for Chemical Analysis of Special Brass

JIS Z 2201-Test Pieces for Tensile Test for Metallic Materials

JIS Z 2241-Method of Tensile Test for Metallic Materials

Table 1. Classes and Symbols

Class	Classification of casting method	Symbol	Reference	
			Characteristics and examples of uses	
Class 1	Sand mold castings and others ⁽¹⁾	HB _s C 1	High in strength and hardness, and good performance in corrosion resistance. Being lower than class 2 in tensile strength, having toughness. For use in propellers for ships, propeller bonnets, bearings, valve seats, valve stems, bearing retainers, levers, arms, gears, fittings for ships, etc.	
Class 1 C	Continuous castings	HB _s C 1 C		
Class 2	Sand mold castings and others ⁽¹⁾	HB _s C 2	High in strength and good performance in abrasion resistance. Higher in hardness than class 1, having rigidity. For use in propellers for ships, bearings, bearing retainers, slippers, end plates, valve seats, valve stems, special cylinders, general machine components, etc.	
Class 2 C	Continuous castings	HB _s C 2 C		
Class 3	Sand mold castings and others ⁽¹⁾	HB _s C 3	Particularly high in strength and hardness, and good performance in abrasion resistance. For use in sliding components of low speed and heavy load, large size valves, stems, bushes, worm gears, slippers, cams, hydraulic cylinder components, etc.	
Class 3 C	Continuous castings	HB _s C 3 C		
Class 4	Sand mold castings and others ⁽¹⁾	HB _s C 4	Higher in strength and hardness than class 3, and good performance in abrasion resistance. For use in sliding components of low speed and heavy load, bearing boards of bridges, bearings, bushes, nuts, worm gears, abrasion resistance plates, etc.	
Class 4 C	Continuous castings	HB _s C 4 C		

Note ⁽¹⁾ The sand mold castings and others mean the sand mold castings, metal mold castings, centrifugal castings and precision castings other than continuous castings.

3. Qualities

3.1 Appearance The castings of which cast surfaces shall be excellent, and be free from such defects as flaws, cracks and blow holes which are harmful in use.

3.2 Chemical Composition The chemical composition of the castings shall be in accordance with Table 2.

Table 2. Chemical Composition

Class	Cu	Zn	Mn	Fe	Al	Sn	Ni	Pb	Si
Class 1	55.0 to 60.0	33.0 to 42.0	0.1 to 1.5	0.5 to 1.5	0.5 to 1.5	(1.0 max.)	(1.0 max.)	(0.4 max.)	(0.1 max.)
Class 1 C									
Class 2	55.0 to 60.0	30.0 to 42.0	0.1 to 3.5	0.5 to 2.0	0.5 to 2.0	(1.0 max.)	(1.0 max.)	(0.4 max.)	(0.1 max.)
Class 2 C									
Class 3	60.0 to 65.0	22.0 to 28.0	2.5 to 5.0	2.0 to 4.0	3.0 to 5.0	(0.5 max.)	(0.5 max.)	(0.2 max.)	(0.1 max.)
Class 3 C									
Class 4	60.0 to 65.0	22.0 to 28.0	2.5 to 5.0	2.0 to 4.0	5.0 to 7.5	(0.2 max.)	(0.5 max.)	(0.2 max.)	(0.1 max.)
Class 4 C									

Unit: %

Remark: Regarding the components of which numerical values have been given in (), analyses shall be carried out only on those required by the purchaser.

3.3 Mechanical Properties The mechanical properties of the castings (tensile strength and elongation) shall be in accordance with Table 3.

Table 3. Mechanical Properties

(Applicable till the end of 1990)

Class	Tension test		Hardness test (²)	
	Tensile strength kgf/mm ² {N/mm ² }	Elongation %	Brinell hardness	
			HB (10/1000)	HB (10/3000)
Class 1	44 min. {431 min.}	20 min.	90 min.	-
Class 1 C	48 min. {470 min.}	25 min.	90 min.	-
Class 2	50 min. {490 min.}	18 min.	100 min.	-
Class 2 C	54 min. {529 min.}	20 min.	100 min.	-
Class 3	65 min. {637 min.}	15 min.	-	165 min.
Class 3 C	67 min. {656 min.}	18 min.	-	165 min.
Class 4	77 min. {755 min.}	12 min.	-	200 min.
Class 4 C	78 min. {764 min.}	14 min.	-	200 min.

Note (²) The hardness is of the value for reference.

Remark: Regarding the continuous castings, this prescription applies to the mechanical properties of the pipes and bars of 100 mm and under in outside diameter, and for the pipes and bars exceeding 100 mm in outside diameter shall be as agreed between the parties concerned.

4. Shapes, Dimensions and Masses

The shapes, dimensions, and masses of the castings shall be in accordance with models and drawings. The tolerances for shapes, dimensions, and masses shall be as agreed between the parties concerned.

5. Tests

5.1 Chemical Analyses The chemical analyses of the chemical composition shall be in accordance with one of the following Standards.

JIS H 1051,	JIS H 1052,	JIS H 1053,	JIS H 1054,
JIS H 1055,	JIS H 1056,	JIS H 1057,	JIS H 1222

Furthermore, regarding the emission spectrochemical analysis, atomic absorptiometry or fluorescent X-rays analysis, it shall be as agreed between the parties concerned.

5.2 Tension Test The tension test shall be in accordance with JIS Z 2241. The test piece in this case shall be the No. 4 test piece of JIS Z 2201, using the sample of 6. (2).

6. Inspection

The inspection shall be carried out as given in the following:

- (1) The castings shall be subjected to inspection on the appearance, shape, dimensions and masses, and then be tested in accordance with 5.; those which have conformed to the requirements of 3. and 4. shall be deemed as acceptable.
- (2) The method of taking the sample necessary for manufacturing tension test pieces shall be as follows:

(2.1) For Sand Mold Casting and Others

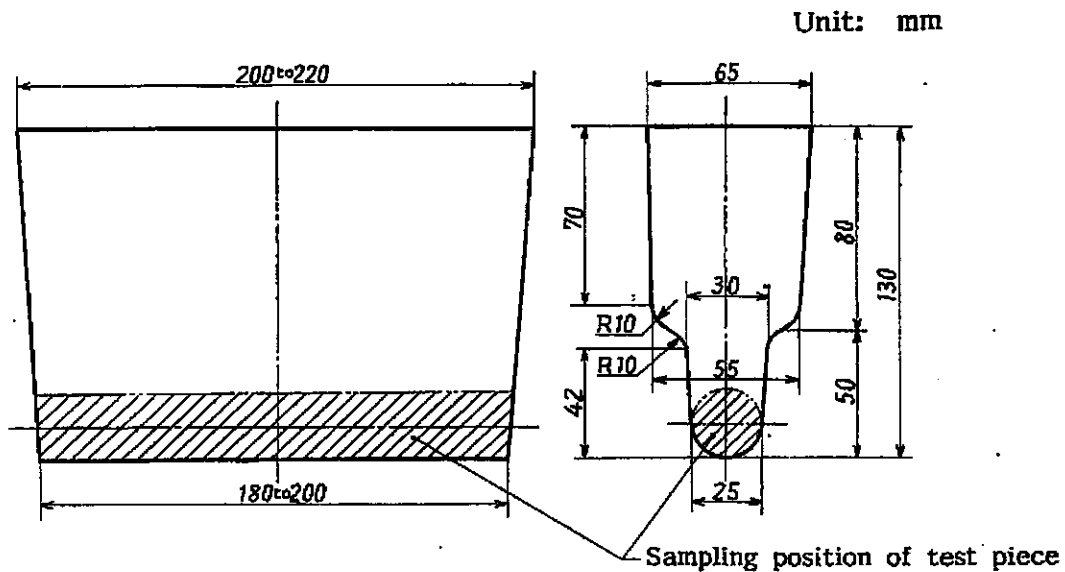
- (a) The samples shall be cast at the same time when castings are cast.
- (b) The samples, unless otherwise specified, shall be taken one or more pieces per each melt.
- (c) The shape and dimensions of the sample and the sampling position of test piece shall be in accordance with Figure.
The sample of this shape is called as No. B sample.

(2.2) For Continuous Castings

- (a) The samples, unless otherwise specified, shall be taken one or more pieces per one continuous casting process of the same intended composition and the same shape.
- (b) The sample shall be a continuous casting itself, and if this is not capable of being prepared into the No. 4 test piece, it shall be as agreed between the parties concerned.

- (3) The method of taking analysis samples and general items shall be in accordance with JIS H 0321.

Figure. Shape and Dimensions of No. B Sample and Sampling Position of Test Piece



7. Marking

When required upon the agreement between the parties concerned, the castings or packing shall be marked with the following information by an appropriate means.

- (1) Class or its symbol
- (2) Manufacturing number or year and month of manufacture
- (3) Manufacturer's name or its abbreviation

Appendix

To the standardized values for the tensile strength and elongation in accordance with the traditional units specified in 3.3 of the text of this standard, the standardized values in accordance with the SI Units stated in Appendix Table apply after January 1, 1991.

Appendix Table. Mechanical Properties

(Applicable on and after 1, 1991)

Class	Tension test		Hardness test ⁽²⁾	
	Tensile strength N/mm ²	Elongation %	Brinell hardness	
			HB (10/1000)	HB (10/3000)
Class 1	430 min.	20 min.	90 min.	-
Class 1 C	470 min.	25 min.	90 min.	-
Class 2	490 min.	18 min.	100 min.	-
Class 2 C	530 min.	20 min.	100 min.	-
Class 3	635 min.	15 min.	-	165 min.
Class 3 C	655 min.	18 min.	-	165 min.
Class 4	755 min.	12 min.	-	200 min.
Class 4 C	765 min.	14 min.	-	200 min.

Note ⁽²⁾ The hardness is of the value for reference.

Remark: Regarding the continuous castings, this prescription applies to the mechanical properties of the pipes and bars of 100 mm and under in outside diameter, and for the pipes and bars exceeding 100 mm in outside diameter, it shall be as agreed between the parties concerned.

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Edition 2

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