

JIS

JAPANESE INDUSTRIAL STANDARD

Aluminium Bronze Castings

JIS H 5114—1988

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has been withdrawn.

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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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Aluminium Bronze Castings

H 5114-1988
(Reaffirmed: 1994)1. Scope

This Japanese Industrial Standard specifies aluminium bronze 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 depending upon the chemical composition and the casting method.

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⁾	Al BC 1	High in strength and toughness, and good performances in corrosion resistance, thermal resistance and low temperature characteristics. Applications to acid resistant pumps, bearings, bushes, gears, valve seats, plungers, rolls for paper making, etc.
Class 1 C	Continuous casting	Al BC 1 C	
Class 2	Sand mold castings and others ⁽¹⁾	Al BC 2	High in strength, and good performances in corrosion resistance and abrasion resistance. Applications to small propellers for ships, bearings, gears, bushes, valve seats, impellers, bolts, nuts, safety tools, etc.
Class 2 C	Continuous casting	Al BC 2 C	
Class 3	Sand mold castings and others ⁽¹⁾	Al BC 3	Suitable for large size castings, particularly high in strength, and good performances in corrosion resistance and abrasion resistance. Applications to propellers for ships, impellers, valves, gears, pump components, machine components for chemical industry, etc.
Class 3 C	Continuous casting	Al BC 3 C	
Class 4	Sand mold castings and others ⁽¹⁾	Al BC 4	Suitable for large size castings of simple shape, particularly high in strength, and good performances in corrosion resistance and abrasion resistance. Applications to propellers for ships, sleeves, gears, machine components for chemical industry, etc.

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.

Applicable Standards: See page 7.

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

Unit: %

Class	Cu	Al	Fe	Ni	Mn	Sn	Zn	Pb
Class 1	85.0 to 90.0	8.0 to 10.0	1.0 to 4.0	0.1 to 1.0	0.1 to 1.0	(0.1 max.)	(0.5 max.)	(0.1 max.)
Class 1 C								
Class 2	80.0 to 88.0	8.0 to 10.5	2.5 to 5.0	1.0 to 3.0	0.1 to 1.5	(0.1 max.)	(0.5 max.)	(0.1 max.)
Class 2 C								
Class 3	78.0 to 85.0	8.5 to 10.5	3.0 to 6.0	3.0 to 6.0	0.1 to 1.5	(0.1 max.)	(0.5 max.)	(0.1 max.)
Class 3 C								
Class 4	71.0 to 84.0	6.0 to 9.0	2.0 to 5.0	1.0 to 4.0	7.0 to 15.0	(0.1 max.)	(0.5 max.)	(0.1 max.)

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 casting (tensile strength, elongation and hardness) shall be in accordance with Table 3.

Table 3. Mechanical Properties

(Applicable till the end of 1990)

Class	Tension test		Hardness test	
	Tensile strength kgf/mm ² {N/mm ² }	Elongation %	Brinell hardness	
			HB (10/1000)	HB (10/3000)
Class 1	45 min. {441 min.}	20 min.	90 min.	-
Class 1 C	50 min. {490 min.}	20 min.	90 min.	-
Class 2	50 min. {490 min.}	20 min.	120 min.	-
Class 2 C	55 min. {539 min.}	15 min.	120 min.	-
Class 3	60 min. {588 min.}	15 min.	-	160 min.
Class 3 C	62 min. {608 min.}	12 min.	-	160 min.
Class 4	60 min. {588 min.}	15 min.	-	160 min.

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.

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 methods.

JIS H 1051	JIS H 1052	JIS H 1053	JIS H 1054
JIS H 1055	JIS H 1056	JIS H 1057	JIS H 1222
JIS H 1252			

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).

5.3 Hardness Test The hardness test shall be in accordance with JIS Z 2243.

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 mass, 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 samples necessary for manufacturing tension test pieces shall be as follows:

(2.1) For Sand Mold Castings and Others

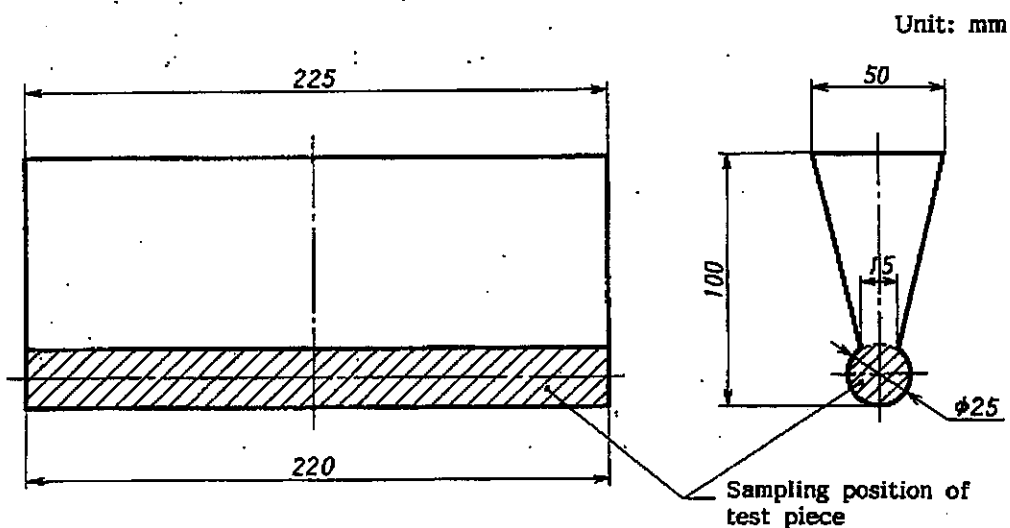
- (a) The samples shall be cast at the same time when castings are cast.
- (b) The samples, unless otherwise specified, shall be taken one or more pieces per each melt.
- (c) The shape and dimensions of the sample and the sampling position of the test piece shall be in accordance with Figure.

The sample of this shape is called as No. F 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 samples shall be the continuous castings themselves, and if these are not capable of being prepared into the No. 4 test pieces, it shall be as agreed between the parties concerned.
- (3) The method of taking samples necessary for manufacturing hardness test pieces shall be as agreed between the parties concerned.
 - (4) The method of taking analysis samples and general items shall be in accordance with JIS H 0321.

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



7. Marking

When required upon the agreement between the parties concerned, the castings or package 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, elongation, and hardness 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 Jan. 1, 1991)

Class	Tension test		Hardness test	
	Tensile strength N/mm ²	Elongation %	Brinell hardness	
			HB (10/1000)	HB (10/3000)
Class 1	440 min.	20 min.	90 min.	—
Class 1 C	490 min.	20 min.	90 min.	—
Class 2	490 min.	20 min.	120 min.	—
Class 2 C	540 min.	15 min.	120 min.	—
Class 3	590 min.	15 min.	—	160 min.
Class 3 C	610 min.	12 min.	—	160 min.
Class 4	590 min.	15 min.	—	160 min.

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.

Applicable Standards:

- JIS H 0321-General Rules for Inspection of Nonferrous 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 H 1252-Methods for Chemical Analysis of Aluminium Bronze and Special Aluminium Bronze
- JIS Z 2201-Test Pieces for Tensile Test for Metallic Materials
- JIS Z 2241-Method of Tensile Test for Metallic Materials
- JIS Z 2243-Method of Brinell Hardness Test

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