

JIS

JAPANESE INDUSTRIAL STANDARD

Grey iron castings

JIS G 5501—1995

Translated and Published

by

Japanese Standards Association

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

JAPANESE INDUSTRIAL STANDARD

J I S

Grey iron castings

G 5501-1995

1. Scope This Japanese Industrial Standard specifies the iron castings having flake graphite (hereafter referred to as "iron castings").

Remarks: The cited standards and a corresponding International standard to this Standard are given in Attached Table 1.

2. Definitions The principal terms used in this Standard are as defined in the following:

- (1) separately cast test sample A specimen poured separately under the same conditions as the iron casting for each one batch by using generally the comparable mould thereto.
- (2) cast-on test sample A specimen generally poured into a comparable mould attached at a specified position of the mould for the iron casting.
- (3) test sample cut from the casting A specimen taken directly from the iron casting at a specified position.

3. Symbol of grade The symbol of grade of the iron castings shall be as given in Table 1.

Table 1. Symbol of grade

Symbol of grade
FC100
FC150
FC200
FC250
FC300
FC350

4. Chemical composition The iron castings, if particularly required, shall be subjected to the test of 9.4, and the chemical composition shall be as agreed between the purchaser and supplier.

5. Mechanical properties The iron castings shall be subjected to the test of 9.5, and the tensile strength and hardness of the separately cast test sample shall conform to Table 2. However, the hardness shall apply in the case where particularly required by the purchaser.

Further, the tensile strengths of the cast-on test sample and the test sample cut from the casting are given in Informative reference Tables 1 and 2, respectively, for informative reference.

Table 2. Mechanical properties of separately cast test sample

Symbol of grade	Tensile strength N/mm ²	Hardness HB
FC100	100	201
FC150	150	212
FC200	200	223
FC250	250	241
FC300	300	262
FC350	350	277

Informative reference Table 1. Mechanical properties of cast-on test sample

Symbol of grade	Thickness of iron casting mm	Tensile strength N/mm ²
FC100	—	—
FC150	20 to 40 (excl.)	120 min.
	40 to 80 (excl.)	110 min.
	80 to 150 (excl.)	100 min.
	150 to 300 (excl.)	90 min.
FC200	20 to 40 (excl.)	170 min.
	40 to 80 (excl.)	150 min.
	80 to 150 (excl.)	140 min.
	150 to 300 (excl.)	130 min.
FC250	20 to 40 (excl.)	210 min.
	40 to 80 (excl.)	190 min.
	80 to 150 (excl.)	170 min.
	150 to 300 (excl.)	160 min.
FC300	20 to 40 (excl.)	250 min.
	40 to 80 (excl.)	220 min.
	80 to 150 (excl.)	210 min.
	150 to 300 (excl.)	190 min.
FC350	20 to 40 (excl.)	290 min.
	40 to 80 (excl.)	260 min.
	80 to 150 (excl.)	230 min.
	150 to 300 (excl.)	210 min.

Informative reference Table 2. Mechanical properties of test sample cut from the casting

Symbol of grade	Thickness of iron casting mm	Tensile strength N/mm ²
FC100	2.5 to 10 (excl.)*	120 min.
	10 to 20 (excl.)	90 min.
FC150	2.5 to 10 (excl.)*	155 min.
	10 to 20 (excl.)	130 min.
	20 to 40 (excl.)	110 min.
	40 to 80 (excl.)	95 min.
	80 to 150 (excl.)	80 min.
FC200	2.5 to 10 (excl.)*	205 min.
	10 to 20 (excl.)	180 min.
	20 to 40 (excl.)	155 min.
	40 to 80 (excl.)	130 min.
	80 to 150 (excl.)	115 min.
FC250	4.0 to 10 (excl.)*	250 min.
	10 to 20 (excl.)	225 min.
	20 to 40 (excl.)	195 min.
	40 to 80 (excl.)	170 min.
	80 to 150 (excl.)	155 min.
FC300	10 to 20 (excl.)	270 min.
	20 to 40 (excl.)	240 min.
	40 to 80 (excl.)	210 min.
	80 to 150 (excl.)	195 min.
FC350	10 to 20 (excl.)	315 min.
	20 to 40 (excl.)	280 min.
	40 to 80 (excl.)	250 min.
	80 to 150 (excl.)	225 min.

Note*: The shape and dimensions of test sample shall be agreed between the purchaser and supplier.

6. Shape, dimensions, permissible deviations thereof and mass The shape and dimensions of the iron castings shall be specified in drawings or models, and the dimensional permissible deviations, unless otherwise specified by the purchaser, shall be in accordance with appropriate grade's one for the grey iron castings of JIS B 0403.

Regarding the mass, it shall be as agreed between the purchaser and supplier.

7. Appearance In appearance, the iron castings shall be free from flaws, cavities, and the like that are detrimental to practical use.

8. Method of manufacture The method of manufacture of the iron castings shall be as follows:

- (1) The iron castings shall be manufactured by melting and casting with a cupola, electric furnace and other appropriate furnace.
- (2) The iron castings, as agreed between the purchaser and supplier, may be undergone stress relieving and other heat-treatment.

9. Test

9.1 Test site The test site shall generally be the relevant factory.

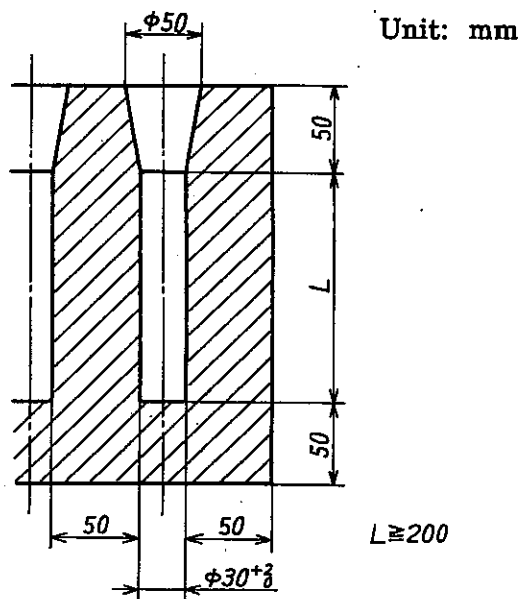
9.2 Formation of batches The formation of batches shall be as follows:

- (1) A batch shall consist of a group of products of 2000 kg or under poured the metal from the same ladle.
- (2) In the case where a product exceeds 2000 kg, one piece of product shall be considered to be one batch.
- (3) In the case where it is operated continuously in the same furnace of the same charging ratio, the tapped quantity within successive 2 h may be considered to be one batch.
- (4) When the molten metal tapped from 2 or more furnaces has been collected in a ladle, this shall be considered to be one batch.
- (5) Notwithstanding the requirements of (1), several batches may be combined into one group, and any single batch among those may be allowed to represent the said group by agreement between the purchaser and supplier. In this case, however, those batches shall be verified that those are poured from the same grade molten metal according to chill test, chemical analysis, thermal analysis and other appropriate means.

9.3 Test sample The test sample shall be as follows:

- (1) Separately cast test sample Separately cast test sample shall be poured under the same conditions as the iron casting for each one batch by using, as a rule, a comparable mould. The number of the test samples shall be one piece excluding spare ones. In the case where the iron castings are subjected to heat treatment, the test sample shall also be subjected to heat treatment in the same manner. The mould knockout temperature for this type test sample shall be 500°C or under. The shape, dimensions and tolerances thereof shall conform to Fig. 1.

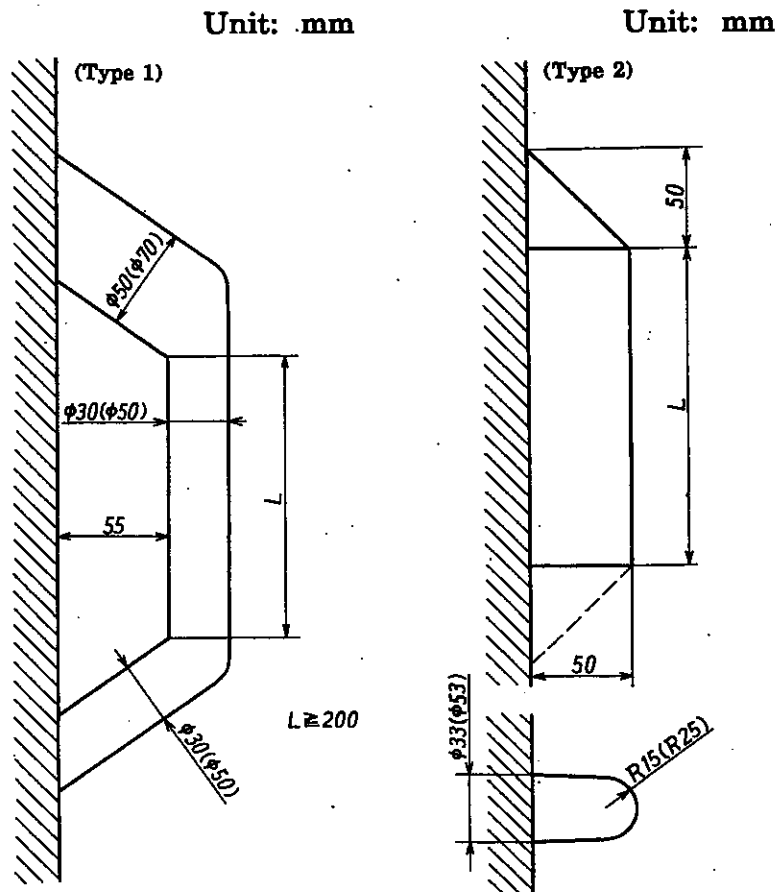
Fig. 1 Shape and dimensions of separately cast test sample



- (2) Cast-on test sample As for the iron casting 20 mm or thicker in wall thickness and 200 kg or more in mass, a cast-on test sample may be used upon agreement between the purchaser and supplier.

In this respect, the test specimen includes two types as shown in Fig. 2, and the selection of the type and location of the test sample in the relevant iron casting shall be agreed between the purchaser and supplier. In the case where the iron casting is undergone heat treatment, the test sample shall not cut off from the iron casting until the completion of heat treatment.

Fig. 2. Shape and dimensions of cast-on test sample



- (3) Test sample cut from the casting The shape and sampling location of the test sample cut from the casting shall be agreed between the purchaser and supplier.

9.4 Chemical analysis

9.4.1 Specimen for analysis One specimen for analysis shall, as a rule, be taken from a ladle for each one batch.

Provided that, the specimen for analysis of carbon shall be taken from the test sample for white iron.

Furthermore, in the case where the specimen is taken from the products as required by the purchaser, it shall be as agreed between the purchaser and supplier.

9.4.2 Methods for analysis The methods for chemical analysis shall generally be in accordance with any one of the following standards:

JIS G 1211, JIS G 1212, JIS G 1213, JIS G 1214
JIS G 1215, JIS G 1253, JIS G 1256, JIS G 1257

9.5 Mechanical test

9.5.1 Test pieces The test pieces shall be as follows:

- (1) The tensile test piece shall be the No. 8 test piece specified in JIS Z 2201, and its number shall be one piece excluding spare ones.
- (2) For the hardness test piece, a part of the tensile test piece shall be used.

9.5.2 Test method The test method shall be as follows:

- (1) The test method for tensile test shall be in accordance with JIS Z 2241.
- (2) The test method for hardness test shall be in accordance with JIS Z 2243.

10. Retest The retest shall be as follows:

- (1) When judged that the flaw or cavity of the test piece has affected adversely on test results, the test shall be deemed as invalid, and a retest may be carried out by using the spare test piece.
- (2) In the case where a part of the results of the mechanical tests does not conform to the requirements caused by another reason than that given in (1), the retest may be carried out on the test item(s) not conforming to the requirements by using the spare test pieces. In this case, the number of the test pieces shall be two times the number of the test pieces of 9.5.1.

In addition, all of the results of the retest shall conform to 5.

11. Inspection The inspection of the iron casting shall be as follows:

- (1) The mechanical properties shall conform to 5.
- (2) Shape, dimension, permissible deviation thereof and mass shall conform to 6.
- (3) The appearance shall conform to 7.
- (4) The iron castings shall not be treated, before inspection, such as painting and others which are impedimental to inspection.
- (5) The purchaser may designate a breaking inspection and other special inspection. In this case, the test method and acceptance criterion shall be preliminary agreed between the purchaser and supplier.
- (6) The chemical composition, if particularly required, shall conform to 4.

12. Marking The iron castings shall be marked with the following details on each product or each package. However, when approved by the purchaser, a part of them may be omitted.

- (1) Symbol of grade
- (2) Manufacturer's name or identifying brand
- (3) Manufacturing number or abbreviation

13. Report The manufacturer shall submit the test report which describes the manufacturing number on request by the purchaser.

Attached Table. 1

Cited Standards:

- JIS B 0403 Casting – System of dimensional tolerances and machining allowances
- JIS G 1211 Methods for determination of carbon in iron and steel
- JIS G 1212 Methods for determination of silicon in iron and steel
- JIS G 1213 Methods for determination of manganese in iron and steel
- JIS G 1214 Methods for determination of phosphorus in iron and steel
- JIS G 1215 Iron and steel – Methods for determination of sulfur content
- JIS G 1253 Method for photoelectric emission spectrochemical analysis of iron and steel
- JIS G 1256 Method for X-ray fluorescence spectrometric analysis of iron and steel
- JIS G 1257 Iron and steel – Methods for atomic absorption spectrometric analysis
- JIS Z 2201 Test pieces for tensile test for metallic materials
- JIS Z 2241 Method of tensile test for metallic materials
- JIS Z 2243 Methods of Brinell hardness test

Corresponding International standard:

ISO 185 Grey cast iron — Classification

G 5501-1995
Edition 2

Japanese Text

Established by Minister of International Trade and Industry

Date of Establishment: 1954-03-29

Date of Revision: 1995-07-01

Date of Public Notice in Official Gazette: 1995-07-03

Investigated by: Japanese Industrial Standards Committee

Divisional Council on Iron and Steel

**This English translation is published by:
Japanese Standards Association
1-24, Akasaka 4, Minato-ku,
Tokyo 107 Japan
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**Printed in Tokyo by
Hohbunsha Co., Ltd.**

