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मानक

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Mazdoor Kisan Shakti Sangathan

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“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 1170 (1992): Ferrochromium [MTD 5: Ferro Alloys]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS 1170 : 1992
(Reaffirmed 1999)

भारतीय मानक

REAFFIRMED

फेरोक्रोमियम – विशिष्ट

(दूसरा पुनरीक्षण)

Indian Standard

FERROCHROMIUM — SPECIFICATION

(*Second Revision*)

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Price Group 2

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Ferro Alloys Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1957 and was subsequently revised in 1967. In the light of the experience gained during the years it has been felt necessary to revise this standard. The following main modifications have been made in this revision:

- a) High carbon ferrochromium grades with 6 to 10 percent silicon have been deleted,
- b) Particle size range has been modified,
- c) Information to be given while ordering the material have been incorporated for the benefit of the purchaser, and
- d) New clauses have been incorporated to avoid wide segregation of the chemicals constituents, thereby safeguarding the interest of small consumers of this product.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 MAY 1995
TO
IS 1170 : 1992 FERROCHROMIUM — SPECIFICATION
(Second Revision)

(Page 4, clause 9.2) — Add a new clause 9.3 as follows:

'9.3 3 mm fraction shall not exceed 5 percent.'

(Page 4, Table 2) — Substitute the following for the existing table :

Table 2 Particle Size Designation
(Clause 9.1)

Size Designation	Size Range, mm		Oversize, Percent <i>Max</i>	Undersize Percent, <i>Max</i>
	Over	Up to and Including		
(1)	(2)	(3)	(4)	(5)
1	50	150	10	15
2	10	50	10	15

(MTD 5)

Indian Standard

FERROCHROMIUM — SPECIFICATION

(Second Revision)

1 SCOPE

This standard covers the requirement of ferrochromium used in ferrous industry.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	Title
IS 1387 : 1967	General requirements for the supply of metallurgical materials (<i>revised</i>)
IS 1472 : 1977	Methods of sampling ferroalloys for determination of chemical composition (<i>first revision</i>)
IS 1559 : 1961	Methods of chemical analysis of ferroalloys

3 TERMINOLOGY

For the purpose of the standard, the following definitions shall apply.

3.1 Cast (Melt)

The product of any of the following:

- a) one furnace heat, or
- b) one tap of continuous furnace, or
- c) a number of furnace or crucible heats of similar composition mixed in a ladle or holding furnace and used for making a cast.

3.2 Consignments

3.2.1 Tapped Lot Method

A consignment constituted by the tapped lot method consists of a ferrochromium mass of one melt (or one part of a continuous tap).

3.2.2 Graded Lot Method

A consignment constituted by the graded lot method consists of a number of melts (or parts of continuous taps) of one ferrochromium designation. The chromium content of the melts (or parts of continuous taps) constituting the consignment shall not differ from each other by more than 3 percent absolute.

3.2.3 Blended Lot Method

A consignment constituted by the blended lot method consists of a number of melts (or parts of continuous taps) of one ferrochromium designation, which have been crushed to a particle size 50 mm and thoroughly mixed. The content of the main constituent of the melts (or parts of continuous taps) constituting the consignment may vary between the minimum and maximum limits specified for the appropriate ferrochromium designation.

4 DEFINITION

A master alloy of iron and chromium with chromium content of minimum 45.0 percent and maximum 95.0 percent, by mass, obtained by reduction.

5 GRADES

This standard covers fourteen grades of ferrochromium, with other subgrades as specified in Table 1.

6 PARTICULARS TO BE SPECIFIED WHILE ORDERING

For the benefit of the purchaser, particulars to be specified while ordering for the material to this specification shall be as follows:

- a) quantity of the material;
- b) constitution of consignment;
- c) name of the material;
- d) grade;
- e) size range; and
- f) necessary requirements for analysis and reports, packing etc, as appropriate.

7 SUPPLY OF MATERIALS

General requirements relating to the supply of material to this specification shall be as laid down in IS 1387 : 1967.

8 REQUIREMENTS

8.1 Constitution of Consignment

Ferrochromium shall be delivered in consignments constituted by one of the methods defined in 3.2.

8.2 Chemical Composition

8.2.1 Each batch of the material shall conform to the requirements of the chemical composition specified in Table 1 and if so specified by the purchaser at the time of enquiry and order, manufacturer shall supply a test certificate of chemical analysis of the sample of material for each melt.

NOTE — The material belonging to a cast/melt which is out of specification, shall not be blended or mixed with the material of another cast/melt.

8.2.2 If specified by the purchaser at the time of enquiry and order that each lump of the consignment should conform to the chemical composition specified in Table 1, this shall be agreed to between the purchaser and the manufacturer.

8.3 The chemical composition given in Table 1 shows only the main constituent elements and usual impurities. If the purchaser requires closer ranges for the main element contents and/or different limits for specified elements and/or non-specified elements, this shall be agreed to between the purchaser and the manufacturer.

8.4 The chemical composition of the material shall be determined either by the method specified in IS : 1559 : 1961 or any other established instrumental/chemical method. In case of dispute the procedure given in the latest version of IS : 1559 shall be the referee method. However, where the method is not given in IS : 1559, the referee method shall be agreed to between the purchaser and the manufacturer.

8.5 Residual Element

The percentage of residual elements in medium and low-carbon grades of ferrochromium shall be as given below:

<i>Element</i>	<i>Percent, Max</i>
Manganese	0.75
Nickel	0.50
Vanadium	0.50
Copper	0.050
Molybdenum	0.050
Columbium	0.050
Tantalum	0.050
Cobalt	0.10
Aluminium	0.10
Titanium	0.050
Zirconium	0.005
Arsenic	0.005
Lead	0.005
Tin	0.005
Zinc	0.005
Boron	0.005
Antimony	0.005
Silver	0.005
Bismuth	0.005

8.5.1 The manufacturer and the purchaser shall agree upon the concentration of other constituents, such as N₂, H₂, and O₂.

Table 1 Chemical Composition of Ferrochromium
(Clauses 5 and 8.2.1)

Grade No.	Grade Designation	Constituents, Percent			Remarks
		Cr	C	Si, Max	
(1)	(2)	(3)	(4)	(5)	(6)
a) High Carbon Ferrochromium					
1.	7 Fe Cr 65	60 to 70	6 to 8	1.5*	*Ferrochromium with Si contents 1.5 to 4% and 4 to 6% can also be supplied in Grade 1 and 2.
2.	5 Fe Cr 65	60 to 70	4 to 6	1.5*	
3.	7 Fe Cr 58	55 to 60	6 to 8	4	
4.	5 Fe Cr 58	55 to 60	4 to 6	6	

Table 1 (Concluded)

Grade No.	Grade Designation	Constituents, Percent			Remarks
		Cr (3)	C (4)	Si, Max (5)	
b) Medium-Carbon Ferrochromium					
5.	15 Fe Cr 55	60 Max	1 to 2	2	
	3 Fe Cr 55	60 Max	Over 2 & up to incl. 4.0	2	
6.	15 Fe Cr 64	Over 60 up to & incl. 67	1 to 2	2	
	3 Fe Cr 64	Over 60 up to & incl. 67	Over 2 up to & incl. 4	2	
7.	15 Fe Cr 71	Over 67 up to & incl. 75	1 to 2	2	
	3 Fe Cr 71	Over 67 up to & incl. 75	Over 2 up to & incl. 4	2	
c) Low-Carbon Ferrochromium					
8.	002 Fe Cr 55	60 Max	0.030 Max	1.5	
	004 Fe Cr 55	60 Max	Over 0.030 up to and incl. 0.050	1.5	
	008 Fe Cr 55	60 Max	Over 0.05 up to & incl. 0.10	1.5	
	03 Fe Cr 55	60 Max	Over 0.10 up to & incl. 0.5		
	08 Fe Cr 55	60 Max	0.75 Max	1.5	
9.	002 Fe Cr 64	Over 60 up to & incl. 67	0.030 Max	1.5	
	004 Fe Cr 64	Over 60 up to & incl. 67	Over 0.030 up to & incl. 0.050	1.5	
	008 Fe Cr 64	Over 60 up to & incl. 67	Over 0.05 up to & incl. 0.10	1.5	
	03 Fe Cr 64	Over 60 up to & incl. 67	Over 0.10 up to & incl. 0.5	1.5	
	08 Fe Cr 64	Over 60 up to & incl. 67	0.75 Max	1.5	
10.	002 Fe Cr 71	Over 67 up to & incl. 75	0.030 Max	1.5	
	004 Fe Cr 71	Over 67 up to & incl. 75	Over 0.030 up to & incl. 0.050	1.5	
	008 Fe Cr 71	Over 67 up to & incl. 75	Over 0.05 up to & incl. 0.10	1.5	
	03 Fe Cr 71	Over 67 up to & incl. 75	Over 0.10 up to & incl. 0.5	1.5	
	08 Fe Cr 71	Over 67 up to & incl. 75	0.75 Max	1.5	
11.	008 Fe Cr 64 Si 4	60 to 70	0.05 to 0.10	4	
12.	008 Fe Cr 71 Si 4	Over 67 up to & incl. 75	0.05 to 0.10	4	
d) High-Nitrogen Low-Carbon Ferrochromium					
13.	Fe Cr 64 N 075	60 to 67	0.10 Max	1.0	Nitrogen shall be 0.5 to 1.0
	Fe Cr 64 N 125	60 to 67	0.10 Max	1.0	Nitrogen shall be 1.0 to 1.5
	Fe Cr 64 N 175	60 to 67	0.10 Max	1.0	Nitrogen shall be 1.5 to 2.0
	Fe Cr 64 N 300	60 to 67	0.10 Max	1.0	Nitrogen shall be 2.0 to 4.0
e) Carbon-Free Ferrochromium					
14.	Fe Cr 70	65 to 75	Traces	2.0	Aluminium con- tent shall be 1.0% Max

NOTE — Unless otherwise specified by the purchaser the sulphur and phosphorus content in each grade shall be not more than 0.05 percent.

9 SIZE RANGE

9.1 The material shall be supplied in lumps or as crushed and screened particles. The particle size ranges and tolerances shall be as given in Table 2. The undersize values shall be valid at the point of delivery to the purchaser.

9.2 If the purchaser requires particular size range and/or tolerance other than those given in Table 2, this shall be agreed upon between the manufacturer and the purchaser.

Table 2 Particle Size Range
(Clause 9.1)

Size Designation	Size Range up to and above Including	Undersize, Percent by Mass, Max	Oversize, Percent by Mass, Max
(1)	(2) mm	(3)	(4)
1	100—150	5	10
2	50—100	5	10
3	10—50	5	10
4	2—10	5	10
5	Up to 2	—	10

10 EXTRANEEOUS CONTAMINATIONS

The material shall be reasonably free from extraneous contamination like slag, and non-metallic inclusion, etc.

11 SAMPLING

Each batch of the material shall be sampled in accordance with IS 1472 : 1977.

12 PACKING

The material shall be packed in suitable containers, in quantities as mutually agreed to between the supplier and the purchaser.

13 MARKING

The container shall be marked with the following:

- a) suppliers name and/or trade-mark,
- b) grade, cast or lot number and size designation,
- c) quantity,
- d) date of manufacture, and
- e) shelf life, if required.

The material may also be marked with the Standard Mark.

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