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भारतीय मानक ब्यूरो

DRAFT FOR WIDE CIRCULATION

भारतीय मानक मसौदा

फेरोमैंगनीज — विशिष्टि

(*आईएस 1171 का छठा पुनरीक्षण*)

Draft Indian Standard

Ferromanganese — Specification

(*Sixth Revision of IS 1171*)

ICS 77.100

Ferroalloys Sectional Committee, MTD 05

Last date of comment: 23 March 2025

FOREWORD

(*formal clause will be added later*)

This standard was first published in 1957 and was subsequently revised in 1964, 1973, 1988, 1996 and 2011. In view of the experience gained during these years, it was felt necessary to revise this standard. In this revision, the following main modifications have been made:

a) References clause has been updated
b) Grades are updated as per current industrial practices
c) Reference of method of chemical analysis of ferromanganese has been updated
d) Particle size ranges have been modified and aligned with current industrial practices
e) Minor editorial changes have been made

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 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard

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Draft Indian Standard

FERROMANGANESE — SPECIFICATION

(Sixth Revision)

1 SCOPE

This standard covers the requirements and condition of delivery for ferromanganese used by iron and steel industry and foundries.

2 REFERENCES

The following standards contain provisions which through reference in the text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
IS 460	Test sieves — Specifications:
(Part 1) : 2020	Wire cloth test sieve (*fourth revision*)
(Part 2) : 2020	Perforated plate test sieve (*fourth revision*)
(Part 3) : 2020	Methods of examination of apertures of test sieves (*fourth revision*)
IS 1387 : 1993	General requirements for the supply of metallurgical materials (*second revision*)
IS 1472 : 1977	Methods of sampling ferro-alloys for determination of chemical composition (*first revision*)
IS 1559 : 1961	Methods of chemical analysis of ferro alloys
IS 1607 : 2013	Methods of test sieving (*second revision*)
IS 2085 : 1962	Code for designation of Ferro alloys
IS 13938	Chemical analysis of ferromanganese
(Part 1) : 1994	Determination of silicon by gravimetric method
(Part 3) : 1993	Determination of phosphorus by (Alkalimetric) method
(Part 4) : 1994	Determination of total sulphur by direct combustion method
IS 15765 : 2008	Method of sampling ferro alloys for sieve analysis and size determination

3 TERMINOLOGY

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

3.1 Ferromanganese — Ferromanganese is a master alloy of iron and manganese with a minimum manganese content of 65 percent by mass, and maximum manganese content of 95 percent by

mass.

Grades covered under IS 2021 "Manganese metal – Specification" are not covered under this standard.

3.1.1 *Ferromanganese Low Carbon* — Ferromanganese having a mass fraction of carbon up to 0.5 percent.

3.1.2 *Ferromanganese Medium Carbon* — Ferromanganese having a mass fraction of carbon up to 3.0 percent.

3.1.3 *Ferromanganese High Carbon* — Ferromanganese having a mass fraction of carbon up to 8.0 percent.

3.2 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.

3.3 Consignment

3.3.1 ***Tapped Lot Method***

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

3.3.2 ***Graded Lot Method***

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

3.3.3 ***Blended Lot Method***

A consignment constituted by the blended lot method consists of a number of melts (or parts of continuous taps) of one ferromanganese designation, which have been crushed to a particle size less than 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 the maximum limit specified for the appropriate ferromanganese designation.

4 GRADES

This standard covers the grades of ferromanganese as specified in Table 1 and are designated as

per IS 2085.

5 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) Requirement of residual elements
g) Necessary requirements for analysis reports, packing, etc, as appropriate.

6 SUPPLY OF MATERIALS

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

7 REQUIREMENTS

7.1 Constitution of Consignment

Ferromanganese shall be delivered in consignment constituted by one of the methods defined in **3.3.**

7.2 Chemical Composition

7.2.1 Each consignment 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 consignment.

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

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

Table 1 Chemical Composition of Ferromanganese
(*Clauses* 4, 7.2.1, 7.2.2 *and* 7.2.3)

Sl No.	Grade Designation	Percent

	(as per IS 2085)					
		Mn	C *Max*	Si *Max*	S *Max*	P *Max*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	High carbon ferromanganese:					
	a) 8FeMn 82	78-85	8.0	3	0.050	0.045
	b) 8FeMn 76	74-78	8.0	3	0.050	0.045
	c) 8FeMn 74	72-76	8.0	3	0.050	0.045
	d) 8FeMn 73	70-75	8.0	3	0.050	0.045
ii)	Medium carbon ferromanganese:					
	a) 3FeMn 92	88-95	3.0	2.5	0.050	0.045
	b) 3FeMn 86	83-88	3.0	2.5	0.050	0.045
	c) 3FeMn 80	78-82	3.0	2.5	0.050	0.045
	d) 3FeMn 76	74-78	3.0	2.5	0.050	0.045
	e) 3FeMn 73	70-75	3.0	2.5	0.050	0.045
iii)	Low carbon ferromanganese:					
	a) 05 FeMn 92	88-95	0.50	2	0.050	0.045
	b) 05 FeMn 87	85-88	0.50	2	0.050	0.045
	c) 05 FeMn 83	80-85	0.50	2	0.050	0.045
	d) 05 FeMn 78	75-80	0.50	2	0.050	0.045
	e) 05 FeMn 73	70-75	0.50	2	0.050	0.045

NOTES
1 Aluminium content shall be 0.5 percent, *Max* when produced by alumino thermic process.
2 Remainder element in all the grades mentioned above is Fe.

7.2.4 Residual Element: The composition of residual elements shall be as agreed between the purchaser and the manufacturer and if specified by the purchaser at the time of enquiry and order, manufacturer shall supply a test certificate of chemical analysis of residual elements and the requirements shall be as agreed upon.

The recommended percentage of usual residual elements are B-0.03 % *Max*, Ti-0.25% *Max*, Al-0.25% *Max*.

7.2.5 The chemical composition of the material shall be determined either by the method specified in various parts of IS 13938 and IS 1559 or any other established instrumental chemical method. In case of dispute, the procedure given in various parts of IS 13938 and IS 1559 shall be the referee method. However, where the method is not given in various parts of IS 13938 or IS 1559 the referee method shall be as agreed to between the purchaser and the manufacturer.

8 SIZE RANGE

8.1 Unless otherwise specified 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. 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. However, the tolerance on such agreed size ranges shall be oversize 10% maximum and undersize 10% maximum. The undersize values shall be valid at the point of delivery to the purchaser.

8.2 The undersize and oversize values shall be valid at the point of delivery to the purchaser. The size analysis shall be carried out as per IS 1607.The test sieves used shall be in accordance with sizes specified in IS 460 (Part 1) and IS 460 (Part 2). As the standard test sieve will become less accurate after period of time, the sieve shall therefore be periodically checked according to IS 460 (Part 3) and the correction factor shall be determined and applied to the result.

8.3 For conducting the sieve analysis and size determination, the methods specified in IS 15765 shall be applied.

Table 2 Particle Size Range
(*Clause* 8.1)

Size Designation	Size Range up to and above Including (mm)	Undersize, Percent By Mass, *Max*	Oversize Percent by Mass, *Max*
(1)	(2)	(3)	(4)
I.	10 - 125	10	10
II.	3.15 - 10	10	10
III.	Up to 3.15	—	10

NOTES

1 For oversize, no piece to exceed 1.15 times the maximum limit of the size range specified in two or three directions.

2 In the undersized material –3.15 mm fraction shall not exceed 5 percent. If exceeds, this shall be agreed upon between the supplier and the purchaser.

9 EXTRANEOUS CONTAMINATIONS

The material shall be reasonably free from extraneous contamination like slag, and non-metallic inclusion etc. A quantity of slag and anti-burning materials shall be specified by mutual agreement between the supplier and the purchaser.

10 SAMPLING

Each consignment of the material shall be sampled in accordance with IS 1472 for chemical analysis and in accordance with IS 15765 for size designation.

11 PACKING

The material shall be packed in suitable packaging/bags, or shipped in bulk, in quantities as mutually agreed to between the supplier and the purchaser.

12 MARKING

12.1 The packing containing the material shall be marked legibly and indelibly with the following:

a) Indication of the source of manufacture;
b) Grade designation,
c) Constitution of consignment
d) Size range;
e) Quantity;
f) Consignment number

12.2 BIS Certification Marking

The products(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provision of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product may be marked with the Standard Mark.