Draft Indian Standard

SILICOMANGANESE — SPECIFICATION

(*Fifth Revision*)

1 SCOPE

This standard covers the requirements and condition of delivery for silicomanganese 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 for sampling ferro alloys for determination of chemical composition (*first revision*)
IS 1559 : 1961	Methods of chemical analysis of ferro alloys
IS 15765 : 2008	Method of sampling ferro alloys for sieve analysis and size determination
IS 2085	Code for designation of ferro-alloys

3 TERMINOLOGY

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

3.1 Silicomanganese — A master alloy of iron, manganese and silicon with a minimum manganese content in the range of 50-75 percent by mass and silicon content in the range of 10-35 percent by mass, obtained by reduction.

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 Constitution of Consignment

3.3.1 *Tapped Lot Method* — A consignment constituted by the tapped lot method consists of silicomanganese mass of one melt (or one part of a 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 silicomanganese designation.

The silicomanganese content of the melts (or parts of continuous taps) constituting the consignment shall not differ from each other by more than 3 percent.

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 silicomanganese 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 part of continuous taps) constituting the consignment may vary between the minimum and maximum limits specified for the appropriate silicomanganese designation.

4 GRADES

This standard covers 11 grades of silicomanganese, as specified in Table 1.

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 designation;
e) Size range; and
f) Necessary requirements for analysis reports, packing, etc, as appropriate.

6 SUPPLY OF MATERIALS

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

7 REQUIREMENTS

7.1 Constitution of Consignment

Silicomanganese shall be delivered in consignments constituted by one of the methods defined in **3.3**.

7.2 Chemical Composition

7.2.1 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, the manufacturer shall supply a test certificate of chemical analysis for each melt.

Table 1 Chemical Composition of Silicomanganese

(*Clauses* 4, 7.2.1, 7.2.2 *and* 7.2.3)

Sl No.	Grade Designation	Constituents, Percent, *Max*[1)]				
	(as per IS 2085)	Mn	Si	C	P	S
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Sil8Mn73	70-75	16-20	1.5	0.20	0.03
ii)	Si23Mn68LS	65-70	20-25	1.0	0.30	0.03
iii)	Si23Mn68	65-70	20-25	1.5	0.30	0.05
iv)	Si18Mn68	65-70	16-20	2.0	0.30	0.02
v)	Si16Mn65	63-67	15-17	2.0	0.3 *Max*	0.03 *Max*
vi)	Si19Mn63	60-65	17-20	2.0	0.30	0.03
vii)	Si16Mn63	60-65	15-17	2.5	0.30	0.03
viii)	Si26Mn60LP	60 *Min*	26 *Min*	0.2	0.05	0.03
ix)	Si15Mn60	58-62	14-16	2.5	0.3 *Max*	0.03 *Max*
x)	Si25Mn55HP	52-58	21-28	1.0	0.12-0.2	0.05 *Max*
xi)	Si26Mn53	50-55	24-28	0.1	0.30	0.03

[1)] Except where ranges specified.

Note: Unless otherwise agreed upon between the purchaser and the manufacturer, residual elements, percent, *Max*. B-0.01, Ti- 0.25, Al-0.25

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

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

7.2.3 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 different limits for specified elements and/or non-specified elements, this shall be agreed to between the purchaser and the manufacturer.

7.2.4 The chemical composition of the material shall be determined either by the method specified in IS 1559 or any other established instrumental/chemical method. In case of dispute the procedure given in 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.

Table 2 Particle Size Range
(*Clause* 8)

Sl No.	Class	Particle size Range mm	Undersize, Max, Percent by Mass		Oversize, Max, Percent by Mass
			Total	Below 3.15 mm	
(1)	(2)	(3)	(4)	(5)	(6)
i)	1	100-315	15	5[1)]	10 No of piece to exceed 1.15 × the maximum limit of the size range specified in two or three directions
ii)	2	25-200	15	7[1)]	
iii)	3	10-100	15	7[1)]	
iv)	4	3.15-50		7	
v)	5	3.15-25		7	
vi)	6	Up to 3.15		—	

[1)] If not otherwise specified, these values are for information only.

8 SIZE DESIGNATION

8.1 Unless otherwise specified the material shall be supplied in lumps of as crushed and screened particles in size designations 1 to 3. 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.

8.2 The undersize and oversize values shall be valid at the point of delivery to the purchaser. 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.

9 EXTRANEOUS CONTAMINATIONS

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

10 SAMPLING

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

11 PACKING

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

12 MARKING

12.1 The material shall be marked with the following:

a) Indication of the source of manufacture;
b) Grade designation, cast or lot and size
c) designation;
d) Quantity;
e) Date of manufacture; and
f) Shelf life, if required.

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.