Designation: A 922 – 93 (Reapproved 2000)

Standard Specification for Silicon Metal[1]

This standard is issued under the fixed designation A 922; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers three regular grades of silicon metal designated as Grades A, B, and C.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI equivalents of inch-pound units given may be approximate.

2. Referenced Documents

2.1 *ASTM Standards:*

E 11 Specification for Wire-Cloth Sieves for Testing Purposes[2]

E 29 Practices for Using Significant Digits in Test Data to Determine Conformance with Specifications [2]

E 32 Practices for Sampling Ferroalloys and Steel Additives for Determination of Chemical Composition[3]

E 50 Practices for Apparatus, Reagents, and Safety Precautions for Chemical Analysis of Metals [3]

E 60 Practice for Photometric and Spectrophotometric Methods for Chemical Analysis of Metals [3]

E 360 Test Methods for Chemical Analysis of Silicon and Ferrosilicon[4]

3. Ordering Information

3.1 Orders for material under this specification shall include the following information:

3.1.1 Quantity,

3.1.2 Name of material,

3.1.3 ASTM designation and year of issue,

3.1.4 Grade,

3.1.5 Size, and

3.1.6 Requirements for packaging, analysis reports, etc. as appropriate.

3.2 Although silicon metal is purchased by total net weight, the customary basis of payment is per pound of contained silicon.

4. Chemical Composition

4.1 The grades shall conform to the requirements as to the chemical composition prescribed in Table 1.

4.2 The manufacturer shall furnish an analysis of each shipment showing the silicon content and any other required element.

4.3 Upon request of the purchaser, the manufacturer shall furnish an analysis of any trace elements on a schedule mutually agreed upon between the manufacturer (including their agents) and the purchaser.

5. Size

5.1 The grades of silicon metal are available in sizes listed in Table 2.

5.2 The sizes listed in Table 2 are typical as shipped from the manufacturer's plant. The various grades can exhibit different degrees of friability; therefore some attrition may be expected in transit, storage, and handling. A quantitative test is not available for rating relative friability of silicon metal. A code system has been developed, therefore, for this purpose, and a number rating for each product type is shown in Table 3. Definitions applicable to these code numbers are given in Table 3.

6. Sampling

6.1 The material shall be sampled in accordance with Practices E 32.

6.2 Other methods of sampling mutually agreed upon between the manufacturer and the purchaser may be used; however, in case of discrepancy, Practices E 32 shall be used for referee.

7. Chemical Analysis

7.1 The chemical analysis of the material shall be made in accordance with the procedure for silicon metal as described in Methods E 360 or alternative methods that will yield equivalent results.

7.2 If alternative methods of analysis are used, in case of discrepancy, Methods E 360 shall be used for referee.

7.3 Where no method is given in Methods E 360 for the analysis for a particular element, the analysis shall be made in accordance with a procedure agreed upon between the manufacturer and the purchaser.

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[1] This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.18 on Castings.

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[2] *Annual Book of ASTM Standards*, Vol 14.02.

[3] *Annual Book of ASTM Standards*, Vol 03.05.

[4] *Annual Book of ASTM Standards*, Vol 03.06.

TABLE 1 Chemical Requirements

Element	Composition %		
	Grade A	Grade B	Grade C
Silicon	>98.00	89.00 to 97.99	80.00 to 88.99
Iron	. . .	4.00 max	4.00 max

TABLE 2 Standard Sizes and Tolerances[A]

Standard Sizes	Tolerances	
8 by 2 in. (200 by 50 mm)	60 lb. (27.2 kg) lump, max	10 % max, passing 2 in. (50 mm) sieve
6 in. (150 mm) by down	10 % max, retained on 6 in. (150 mm) sieve	12 % max, passing 8 M sieve
4 in. (100 mm) by down	10 % max, retained on 4 in. (100 mm) sieve	12 % max, passing 8 M sieve
4 by ½ in. (100 by 12.5 mm)	10 % max, retained on 4 in. (100 mm) sieve	10 % max, passing ½in. (12.5 mm) sieve
4 by 1 in. (100 by 25 mm)	10 % max, retained on 4 in. (100 mm) sieve	10 % max, passing 1 in. (25 mm) sieve
3 by ½ in. (75 by 12.5 mm)	12 % max, retained on 3 in. (75 mm) sieve	15 % max, passing ½in. (12.5 mm) sieve
3 by 1 in. (75 by 25 mm)	12 % max, retained on 3 in. (75 mm) sieve	15 % max, passing 1 in. (25 mm) sieve
2 by ½ in. (50 by 12.5 mm)	12 % max, retained on 3 in. (75 mm) sieve	15 % max, passing ½in. (12.5 mm) sieve
1 in. (25 mm) by No. 8	10 % max, retained on 1 in. (25 mm) sieve	10 % max, passing No. 8.
1 in. (25 mm) by down	12 % max, retained on 1 in. (25 mm) sieve	20 % max, passing No. 8.
No. 8 by down	10 % max, retained on No. 8 sieve	. . .
No. 20 by down	10 % max, retained on No. 20 sieve	. . .

[A]Tolerances and sieve sizes defined by Specification E 11.

NOTE 1—For further information, see Practices E 29, E 50, and E 60.

8. Inspection

8.1 The manufacturer shall afford the inspector representing the purchaser all reasonable facilities, without charge, to satisfy the inspector that the material is being furnished in accordance with this specification.

TABLE 3 Friability and Friability Ratings

Product Grade	Proposed Friability Rating
A	5
B	5
C	5

Friability Ratings

Code	Definition
1	Very tough materials that are susceptible to little, if any breakage during shipment or handling. (Example: low carbon ferrochrome.)
2	Some breakage of large pieces probable in shipping and handling. No appreciable fines produced from either lump or crushed sizes. (Example: chrome metal.)
3	Appreciable reduction in size of large pieces possible in shipping and handling. No appreciable production of fines in handling of crushed sizes. (Example: ferrovanadium.)
4	Appreciable reduction in size of large pieces upon repeated handling. Some fines produced upon repeated handling of crushed sizes. (Example: standard ferromanganese.)
5	Appreciable reduction in size in repeated handling of large pieces. Appreciable fines may be produced in the handling of crushed sizes. (Example: 50 % ferrosilicon.)
6	This category represents the most friable alloys. (Example: calcium silicon.)

9. Rejection

9.1 Any claims or rejections shall be made to the manufacturer within 45 days from receipt of material by the purchaser.

10. Packaging

10.1 The material shall be packaged in sound containers, or shipped in bulk, in such a manner that none of the product is lost or contaminated in shipment.