Designation: A 100 – 07

Standard Specification for Ferrosilicon[1]

This standard is issued under the fixed designation A 100; 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 grades of ferrosilicon for steelmaking and foundry uses.

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

2. Referenced Documents

2.1 *ASTM Standards:* [2]

A 1025 Specification for Ferroalloys and Other Alloying Materials, General Requirements

E 11 Specification for Wire Cloth and Sieves for Testing Purposes

E 360 Test Methods for Chemical Analysis of Silicon and Ferrosilicon[3]

3. General Conditions of Delivery

3.1 Materials furnished to this specification shall conform to the requirements of Specification A 1025, including any supplementary requirements that are indicated in the purchase order. Failure to comply with the general requirements of Specification A 1025 constitutes nonconformance with this specification. In case of conflict between the requirements of this specification and Specification A 1025, this specification shall prevail.

4. Chemical Composition

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

4.2 The manufacturer shall furnish an analysis of each shipment showing the silicon content and when required, such of the other elements specified in Table 1.

5. Size

5.1 The various grades are available in sizes as listed in Table 2.

5.2 The sizes listed in Table 2 are typical as shipped from the manufacturer's plant. These alloys exhibit varying 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 ferroalloys. A code system has been developed, therefore, for this purpose, and a number rating for each product type is shown in the last column of Table 2. Definitions applicable to these code numbers are given in Specification A 1025.

6. Chemical Analysis

6.1 Unless otherwise agreed upon, the chemical analysis of the material shall be made in accordance with Test Methods E 360.

6.2 If alternative methods of analysis are used, Methods E 360 shall be used for referee.

6.3 Where a method is not 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.

7. Keywords

7.1 ferroalloy; ferrosilicon

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

Current edition approved March 1, 2007. Published March 2007. Originally approved in 1925. Last previous edition approved in 1993 as A 100 – 04.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Withdrawn.

***A Summary of Changes section appears at the end of this standard.**

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TABLE 1 Chemical Requirements

Element	Grade																
	C	CA	CB	C1	C2	D	DA	E	EA	E1	F	F1	F1A	G	GA	G1	G1A
	Composition, %[A,B]																
Silicon	74.0–79.0	74.0–79.0	74.0–79.0	74.0–79.0	74.0–79.0	65.0–70.0	65.0–70.0	47.0–51.0	47.0–51.0	47.0–51.0	20.0–24.0	20.0–24.0	20.0–24.0	14.0–17.0	14.0–17.0	14.0–17.0	14.0–17.0
Carbon	0.10	0.10	0.10	0.10	0.10	0.10	0.10	.010	.010	0.10	0.50	0.50	0.50	0.70	0.70	0.70	0.70
Sulfur	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Phosphorous	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.040	0.040	0.040	0.120	0.120	0.120	0.120	0.120	0.120	0.120
Aluminum	1.50	0.50	0.10	1.00–1.50	1.00–1.50	1.25	0.10	1.25	0.40	1.25	1.00	1.00	1.00	0.75	0.75	0.75	0.75
Manganese	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.75	0.75	0.75	1.00	1.00	1.00	1.25	—	1.25	—
Calcium	—	—	—	0.50	1.50	—	—	—	—	—	—	—	—	—	—	—	—
fvariant3																	
Boron	—	—	—	—	—	—	—	—	—	0.04–0.10	—	0.04–0.10	0.04–0.10	—	—	0.04–0.10	0.04–0.10

[A] A single value indicates a maximum, except for calcium.
[B] When shipped in 3000 lb containers, the average boron content of a container shall not vary from the average reported for the entire shipment by more than 0.010 %.

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TABLE 2 Standard Sizes and Tolerances

Grades	Standard Sizes	Tolerances and Sieve Sizes Defined by ASTM Specification E 11		Friability Rating[A]
C,D,E	8-in. (203-mm) by 4-in. (102-mm)	90-lb (40.8-kg) lump, max	10 %, max, passing 4-in. (102-mm) sieve	
	8-in. (203-mm) by 2-in. (50.8-mm)	90-lb (40.8-kg) lump, max	10 %, max, passing 2-in. (50.8-mm) sieve	
	5-in. (127-mm) by 2-in. (50.8-mm)	10 %, max, retained on 5-in. (127-mm) sieve	10 %, max, passing 2-in. (50.8-mm) sieve	
	4-in. (102-mm) by ½-in. (12.7-mm)	10 %, max, retained on 4-in. (102-mm) sieve	10 %, max, passing ½-in. (12.7-mm) sieve	
	4-in. (102-mm) by down	10 %, max, retained on 4-in. (102-mm) sieve	12 %, max, passing ¼-in. (6.35-mm) sieve	
	3-in. (76.2-mm) by ½-in. (12.7-mm)	10 %, max, retained on 3-in. (76.2-mm) sieve	15 %, max, passing ½-in. (12.7-mm) sieve	
	3-in. (76.2-mm) by down	10 %, max, retained on 3-in. (76.2-mm) sieve	15 %, max, passing No. 8 (2.38-mm) sieve	
	2-in. (50.8-mm) by ½ in. (12.7-mm)	10 %, max, retained on 2-in. (50.8-mm) sieve	15 %, max, passing ½-in. (12.7-mm) sieve	
	2-in. (50.8-mm) by down	10 %, max, retained on 2-in. (50.8-mm) sieve	15 %, max, passing No. 8 (2.38-mm) sieve	
	1-in. (25.4-mm) by No. 8 (2.38-mm)	5 %, max, retained on 1-in. (25.4-mm) sieve	10 %, max, passing No. 8 (2.38-mm) sieve	
	1-in. (25.4-mm) by down	5 %, max, retained on 1-in. (25.4-mm) sieve	20 %, max, passing No. 8 (2.38-mm) sieve	
C,D,F	Lump or Pig	90-lb (40.8-kg) lump or pig, max		
C,D,E	½-in. (12.7-mm) by No. 8 (2.38-mm)	5 %, max, retained on ½-in. (12.7-mm) sieve	10 %, max, passing No. 8 (2.38-mm) sieve	
	⅜-in. (9.51-mm) by No. 6 (3.36-mm)	5 %, max, retained on ⅜-in. (9.51-mm) sieve	10 %, max, passing No. 6 (3.36-mm) sieve	
	⅜-in. (9.51-mm) by No. 12 (1.68-mm)	5 %, max, retained on ⅜-in. (9.51-mm) sieve	10 %, max, passing No. 14 (1.41-mm) sieve	
	⅜-in. (9.51-mm) by down	5 %, max, retained on ⅜-in. (9.51-mm) sieve	15 %, max, passing No. 70 (0.21-mm) sieve	
	¼-in. (6.35-mm) by down	5 %, max, retained on ¼-in. (6.35-mm) sieve		
	No. 8 (2.38-mm) by down	5 %, max, retained on No. 8 (2.38-mm) sieve		
	No. 28 (841-ϵm) by down	5 %, max, retained on No. 20 (841-ϵm) sieve		
G	pig	90-lb (40.8-kg) pig, max.		

[A] See Appendixes.

SUPPLEMENTARY REQUIREMENTS

The composition shall be further limited to the requirements of Table S1.1. Upon request of the purchaser, the manufacturer shall furnish an analysis of these elements on a schedule agreed between the manufacturer and purchaser.

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TABLE S1.1 Supplementary Chemical Requirements

Element	Grade																	
	C	CA	CB	C1	C2	D	DA	E	EA	E1	E1A	F	F1	F1A	G	GA	G1	G1A
	Composition, % maximum																	
Chromium	0.30	0.30	—	—	0.50	0.50	0.50	0.50	0.15	0.15	0.25	0.25	0.25	—	—	0.25	0.25	—
Nickel	0.10	0.10	0.10	—	—	0.20	0.20	0.30	0.30	—	—	—	—	—	—	—	—	—
Copper	0.10	0.10	0.10	—	—	0.20	0.20	0.30	0.30	—	—	—	—	—	—	—	—	—
Titanium	0.20	0.20	0.20	—	—	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	—	—	0.20	0.20

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APPENDIX

(Nonmandatory Information)

X1. FRIABILITY RATINGS

X1.1 Proposed friability ratings are shown in Table X1.1 as follows:

TABLE X1.1 Proposed Friability Ratings for Ferrosilicon

Product Grade	Proposed Friability Rating
C	4
D	4
E	5
F	4
G	2

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SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to this standard since the last issue (A 100 – 04) that may impact the use of this standard.

(1) Revised Table 1 and footnotes to Table 1.

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