



Designation: ~~A 101—93 (Reapproved 2000)~~ 101 – 04

Standard Specification for Ferrochromium¹

This standard is issued under the fixed designation A 101; 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 two types of ferrochromium designated as high carbon and low carbon, the latter including nitrogen-bearing and vacuum grades.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

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

Current edition approved ~~Dec. 15, 1993; May 1, 2004~~. Published ~~April 1994; May 2004~~. Originally published as ~~A 101—25 T~~, approved in 1925. Last previous edition ~~A 101—80 (1985) ϵ ¹~~, approved in 1993 as A 101 – 93 (2000).

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

2. Referenced Documents

2.1 *ASTM Standards:*²

- A 1025 Specification for Ferrous Alloys, Common Requirements
- E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- E 31 Methods for Chemical Analysis of Ferrous Alloys
- E 32 Practices for Sampling Ferrous Alloys and Steel Additives for Determination of Chemical Composition³
- E 363 Test 363 Test Methods for Chemical Analysis of Chromium and Ferrous Chromium

3. Ordering Information

3.1 ~~Orders~~General Conditions for ~~m~~ Delivery

3.1 Materials furnished to this specification shall ~~include~~ conform to the following information:

- 3.1.1 Quantity;
- 3.1.2 Name requirements 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 ferrous chromium is purchased by total net weight Specification A 1025, including any supplementary requirements that are indicated in the customary basis purchase order. Failure to comply with the general requirements of payment is per pound Specification A 1025 constitutes nonconformance with this specification. In case of ~~contained chromium.~~ 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 specified in Table 1 ~~and Table 2.~~

4.2 ~~The.~~ The manufacturer shall furnish an analysis of each shipment showing the elements specified in Table 1.

4.3 ~~The values shown in Table 2 are expected maximums. Upon request of the purchaser, the manufacturer shall furnish an analysis for any of these elements on a cumulative basis over a period mutually agreed upon by the manufacturer and the purchaser.~~

5. Size

5.1 The various grades are available in sizes as listed in Table ~~3~~ 2.

5.2 The sizes listed in Table ~~3~~ 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 ferrous alloys. 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 ~~3.~~ 2. Definitions applicable to these code numbers are given in ~~the Appendix.~~ Specification A 1025.

6. Sampling

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

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*, Vol 14.02, volume information, refer to the standard's Document Summary page on the ASTM website.

TABLE 1 Chemical Requirements^A

Type Ferrous Chromium	Composition, %						
	Grade	Chromium	Carbon	Silicon	Sulfur, max	Phosphorus, max	Nitrogen
High carbon	A	51.0–56.0	6.0–8.0	6.0 max	0.040	0.030	...
	B	56.0–62.0	6.0–8.0	8.0–14.0	0.050	0.030	...
	C	62.0 min	6.0–8.0	3.0 max	0.050	0.030	...
Low carbon	A	60.0–67.0	0.025 max	1.0–8.0	0.025	0.030	...
	B	67.0–75.0	0.025 max	1.0 max	0.025	0.030	...
	C	67.0–75.0	0.050 max	1.0 max	0.025	0.030	...
	D	67.0–75.0	0.75 max	1.0 max	0.025	0.030	...
Vacuum low carbon	E	66.0–70.0	0.015 max	2.0 max	0.030	0.030	...
	G	63.0–68.0	0.050 max	2.0 max	0.030	0.030	5.0–6.5
Nitrogen bearing		62.0–70.0	0.10 max	1.0 max	0.025	0.030	1.0–5.0

^AFor purposes of determining conformance with this specification, the reported analysis shall be rounded to the nearest unit in the last right hand place of figures used in expressing the limiting value, in accordance with the rounding method of Recommended Practice E 29.

TABLE 32 Standard Sizes and Tolerances

Product	Standard Sizes	Tolerances	Friability Ratings	
Ferrochromium: High-carbon	8 in. (200 mm) by 4 in. (100 mm)	10 in. (250 mm), max	10 %, max, passing 4-in. (100-mm) sieve	4
	6 in. (150 mm) by down	10 %, max, retained on 6-in. (150-mm) sieve		
	5 in. (125 mm) by 2 in. (50 mm)	10 %, max, retained on 5-in. (125-mm) sieve	10 %, max, passing 2-in. (50-mm) sieve	
	4 in. (100 mm) by in. (12.5 mm)	10 %, max, retained on 4-in. (100-mm) sieve	10 %, max, passing 1/2-in. (12.5-mm) sieve	
	3 in. (75 mm) by 1 in. (25 mm)	10 %, max, retained on 3-in. (75-mm) sieve	10 %, max, passing 1-in. (25-mm) sieve	
	3 in. (75 mm) by 1/4 in. (6.3 mm)	10 %, max, retained on 3-in. (75-mm) sieve	10 %, max, passing 1/4-in. (6.3-mm) sieve	
	1/4 in. (6.3 mm) by down	5 %, max, retained on 1/4-in. (6.3-mm) sieve		
	8 mesh (2.36 mm) by down	5 %, max, retained on U.S. No. 8 (2.36-mm) sieve		
Low-carbon	8 in. (200 mm) by down	10 in. (250 mm), max		1
	8 in. (200 mm) by 4 in. (100 mm)	10 %, max, retained on 8-in. (200-mm) sieve	5 %, max, passing 4-in. (100-mm) sieve	
	4 in. (100 mm) by down	10 %, max, retained on 4-in. (100-mm) sieve		
	3 in. (75 mm) by 1 in. (25 mm)	10 %, max, retained on 3-in. (75-mm) sieve	10 %, max, passing 1-in. (25-mm) sieve	
	8 mesh (2.36 mm) by down	5 %, max, retained on U.S. No. 8 (2.36-mm) sieve		
Vacuum low carbon	brick or pellet	designated by manufacturer		

6.2 Other methods of sampling mutually agreed upon by 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 method shall be made in accordance with agreed upon by the procedure for the ferroalloys as described in Method E 31 purchaser and Test Methods E 363 or alternative methods that will yield equivalent results.

7.2 If alternative methods supplier.

6.2 In cases of analysis are used, in case of discrepancy, Method E 31 and Test Methods E 363 shall be used for referee.

7.3 Where no method is given in Methods E 31 or Test Methods E 363 for the analysis for a particular element, the analysis shall be made in accordance with a procedure agreed upon by the manufacturer and the purchaser.

8. Inspection

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

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 and Package Marking

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

10.2 Each package shall be identified with product name and other information required by OSHA regulations.

11. referee purposes.

7. Keywords

7.1 ferroalloys; ferrochromium; high carbon; low carbon; nitrogen-bearing; vacuum low carbon

APPENDIX

(Nonmandatory Information)

X1. FRIABILITY RATINGS

Code No:	Definition
4	Very tough materials which are susceptible to little, if any, breakage during shipment or handling. —(Example: low carbon ferrochrome)
<u>1</u>	<u>Very tough materials which are susceptible</u>

SUPPLEMENTARY REQUIREMENTS

- ~~The composition shall be limited 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: chromium metal)~~
 - 2 ~~Some breakage the requirements of Table S1.1 in shipping and handling. No appreciable fines produced from either lump or crushed sizes.
—(Example: chromium 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: ferrovandium)~~
 - 3 ~~Appreciable reduction addition to those in Table 1. Upon request of the purchaser, the manufacturer shall furnish an analysis for any of fines in handling of crushed sizes.
—(Example: ferrovandium)~~
 - 4 ~~Appreciable reduction in size of large pieces upon repeated handling. Some fines produced upon repeated handling of crushed sizes.
(Example: standard ferromanganese)~~
 - 4 Appreciable reduction in size of large pieces these elements on a cumulative basis over a period mutually agreed upon by the manufacturer and the purchaser.

SUMMARY OF CHANGES

- Committee A01 has identified the location of selected changes to this 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)~~
 - 5 Appreciable reduction in size in repeated handling of large pieces. Appreciable fines since the last version (A 101 – 93 (2000)) that may impact the use of crushed sizes:
—(Example: 50% ferrosilicon)
 - 6 ~~This category represents the most friable alloys.
—(Example: calcium silicon)~~
 - 6 This category represents this standard.
(1) Practice E 29, Test Methods E 31, and Practices E 32 were removed from 2.
(2) Specification A 1025 was added to 2.
(3) Changed Ordering Information to General Conditions for Delivery.
(4) Revised 4 and 5.
(5) Removed sections on Sampling, Inspection, Rejection, and Packaging.
(6) Added Supplementary Requirements.
(7) Moved Table S1.1 into the most friable alloys:
—(Example: calcium silicon)

Supplementary Requirements section and renumbered other tables appropriately.

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