



Designation: A99 – 03 (Reapproved 2019)

Standard Specification for Ferromanganese¹

This standard is issued under the fixed designation A99; 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 ten grades of ferromanganese, designated as follows:

Standard ferromanganese	Grade A Grade B Grade C
Medium-carbon ferromanganese	Grades A, B, C, and D Nitrided
Low-carbon ferromanganese	Grade A Grade B

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

A1025/A1025M Specification for Ferrous Alloys and Other Alloying Materials, General Requirements

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.

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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.

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

3. General Conditions for Delivery

3.1 Materials furnished to this specification shall conform to the requirements of Specification **A1025/A1025M**, including any supplementary requirements that are indicated in the purchase order. Failure to comply with the general requirements of Specification **A1025/A1025M** constitutes nonconformance with this specification. In case of conflict between the requirements of this specification and Specification **A1025/A1025M**, this specification shall prevail.

4. Chemical Composition

4.1 The material shall conform to the requirements as to chemical composition specified in **Table 1**.

4.2 The manufacturer shall furnish an analysis of each shipment showing the percentage of each element specified.

5. Size

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

5.2 The sizes and friability ratings 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 code system has been developed. Therefore, for this purpose, 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 **A1025/A1025M**.

6. Keywords

6.1 ferroalloy; ferromanganese

	Standard Ferromanganese			Medium-Carbon Ferromanganese				Nitrided Medium- Carbon Ferroman- ganese	Low-Carbon Ferromanganese	
	Grade A	Grade B	Grade C	Grade A	Grade B	Grade C	Grade D		Grade A	Grade B
Manganese, %	78.0 to 82.0	76.0 to 78.0	74.0 to 76.0	80.0 to 85.0	80.0 to 85.0	80.0 to 85.0	80.0 to 85.0	75 to 80 ^A	85.0 to 90.0	80.0 to 85.0
Carbon, max, %	7.5	7.5	7.5	1.5	1.5	1.5	1.5	1.5 ^A	As specified	0.75
Silicon, max, %	1.2	1.2	1.2	1.5	1.0	0.70	0.35	1.5 ^A	2.0	5.0 to 7.0
Phosphorus, max, %	0.35	0.35	0.35	0.30	0.30	0.30	0.30	0.3	0.20	0.30
Sulfur, max, %	0.050	0.050	0.050	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Nitrogen, %								4% min		

^A Based on metallic content.

Grades	Standard Size	Tolerances ^A
Grades 1 through 4	125 mm (5-in.)	± 6 mm (± 1/4 in.)
Grades 5 through 7	95 mm (4-in.)	± 5 mm (± 3/16 in.)
Grades 8 through 10	75 mm (3-in.)	± 4 mm (± 1/8 in.)
Grades 11 through 14	63 mm (2 1/2-in.)	± 3 mm (± 3/32 in.)
Grades 15 through 18	50 mm (2-in.)	± 3 mm (± 3/32 in.)
Grades 19 through 22	37.5 mm (1 1/2-in.)	± 2 mm (± 1/16 in.)
Grades 23 through 26	30 mm (1 1/4-in.)	± 2 mm (± 1/16 in.)
Grades 27 through 30	25 mm (1-in.)	± 2 mm (± 1/16 in.)
Grades 31 through 34	19 mm (3/4-in.)	± 1 mm (± 1/32 in.)
Grades 35 through 38	15 mm (5/8-in.)	± 1 mm (± 1/32 in.)
Grades 39 through 42	12.5 mm (1/2-in.)	± 1 mm (± 1/32 in.)
Grades 43 through 46	9.5 mm (3/8-in.)	± 0.8 mm (± 1/32 in.)
Grades 47 through 50	7.5 mm (5/16-in.)	± 0.8 mm (± 1/32 in.)
Grades 51 through 54	6.3 mm (1/4-in.)	± 0.8 mm (± 1/32 in.)
Grades 55 through 58	5.0 mm (3/16-in.)	± 0.8 mm (± 1/32 in.)
Grades 59 through 62	4.75 mm (No. 40 sieve)	± 0.8 mm (± 1/32 in.)
Grades 63 through 66	4.25 mm (No. 45 sieve)	± 0.8 mm (± 1/32 in.)
Grades 67 through 70	3.75 mm (No. 50 sieve)	± 0.8 mm (± 1/32 in.)
Grades 71 through 74	3.35 mm (No. 55 sieve)	± 0.8 mm (± 1/32 in.)
Grades 75 through 78	3.0 mm (No. 60 sieve)	± 0.8 mm (± 1/32 in.)
Grades 79 through 82	2.8 mm (No. 65 sieve)	± 0.8 mm (± 1/32 in.)
Grades 83 through 86	2.5 mm (No. 75 sieve)	± 0.8 mm (± 1/32 in.)
Grades 87 through 90	2.25 mm (No. 80 sieve)	± 0.8 mm (± 1/32 in.)
Grades 91 through 94	2.0 mm (No. 90 sieve)	± 0.8 mm (± 1/32 in.)
Grades 95 through 98	1.75 mm (No. 100 sieve)	± 0.8 mm (± 1/32 in.)
Grades 99 through 102	1.5 mm (No. 110 sieve)	± 0.8 mm (± 1/32 in.)
Grades 103 through 106	1.25 mm (No. 130 sieve)	± 0.8 mm (± 1/32 in.)
Grades 107 through 110	1.18 mm (No. 135 sieve)	± 0.8 mm (± 1/32 in.)
Grades 111 through 114	1.1 mm (No. 140 sieve)	± 0.8 mm (± 1/32 in.)
Grades 115 through 118	1.0 mm (No. 150 sieve)	± 0.8 mm (± 1/32 in.)
Grades 119 through 122	0.85 mm (No. 20 sieve)	± 0.8 mm (± 1/32 in.)
Grades 123 through 126	0.75 mm (No. 25 sieve)	± 0.8 mm (± 1/32 in.)
Grades 127 through 130	0.6 mm (No. 30 sieve)	± 0.8 mm (± 1/32 in.)
Grades 131 through 134	0.5 mm (No. 40 sieve)	± 0.8 mm (± 1/32 in.)
Grades 135 through 138	0.425 mm (No. 45 sieve)	± 0.8 mm (± 1/32 in.)
Grades 139 through 142	0.375 mm (No. 50 sieve)	± 0.8 mm (± 1/32 in.)
Grades 143 through 146	0.3 mm (No. 60 sieve)	± 0.8 mm (± 1/32 in.)
Grades 147 through 150	0.25 mm (No. 75 sieve)	± 0.8 mm (± 1/32 in.)
Grades 151 through 154	0.2 mm (No. 100 sieve)	± 0.8 mm (± 1/32 in.)
Grades 155 through 158	0.15 mm (No. 130 sieve)	± 0.8 mm (± 1/32 in.)
Grades 159 through 162	0.125 mm (No. 150 sieve)	± 0.8 mm (± 1/32 in.)
Grades 163 through 166	0.1 mm (No. 200 sieve)	± 0.8 mm (± 1/32 in.)
Grades 167 through 170	0.075 mm (No. 250 sieve)	± 0.8 mm (± 1/32 in.)
Grades 171 through 174	0.06 mm (No. 300 sieve)	± 0.8 mm (± 1/32 in.)
Grades 175 through 178	0.05 mm (No. 350 sieve)	± 0.8 mm (± 1/32 in.)
Grades 179 through 182	0.04 mm (No. 400 sieve)	± 0.8 mm (± 1/32 in.)
Grades 183 through 186	0.03 mm (No. 600 sieve)	± 0.8 mm (± 1/32 in.)
Grades 187 through 190	0.02 mm (No. 850 sieve)	± 0.8 mm (± 1/32 in.)
Grades 191 through 194	0.015 mm (No. 1000 sieve)	± 0.8 mm (± 1/32 in.)
Grades 195 through 198	0.01 mm (No. 2000 sieve)	± 0.8 mm (± 1/32 in.)
Grades 199 through 202	0.0075 mm (No. 2500 sieve)	± 0.8 mm (± 1/32 in.)
Grades 203 through 206	0.006 mm (No. 3000 sieve)	± 0.8 mm (± 1/32 in.)
Grades 207 through 210	0.005 mm (No. 4000 sieve)	± 0.8 mm (± 1/32 in.)
Grades 211 through 214	0.004 mm (No. 5000 sieve)	± 0.8 mm (± 1/32 in.)
Grades 215 through 218	0.003 mm (No. 6000 sieve)	± 0.8 mm (± 1/32 in.)
Grades 219 through 222	0.002 mm (No. 8000 sieve)	± 0.8 mm (± 1/32 in.)
Grades 223 through 226	0.001 mm (No. 10000 sieve)	± 0.8 mm (± 1/32 in.)

^A Specifications of sieve sizes used to define tolerances herein are as listed in Specification E11.

The following supplementary requirements shall apply only when specified by the purchaser in the purchase order or contract.

The composition shall be further limited to the requirements of **Table S1.1** in addition to those of **Table 1**. The manufacturer shall furnish an analysis of each shipment showing the percentage of the elements specified.

	Composition, max, %		
	Standard Ferromanganese, All Grades	Medium-Carbon Ferromanganese, All Grades	Low-Carbon Ferromanganese, All Grades
Arsenic	0.30	0.15	0.10
Tin	0.020	0.010	0.010
Lead	0.050	0.050	0.020
Chromium	0.50	0.50	0.50
Carbon	0.10 or 0.50 or 0.70 for Grade A only		



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