



Standard Specification for Electrolytic Manganese Metal¹

This standard is issued under the fixed designation A601/A601M; 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 several grades of electrolytic manganese designated as follows:

	Grade
Regular	A
Intermediate Hydrogen	B
Low Hydrogen	C
4.5 % Nitrogen Bearing	D
6 % Nitrogen Bearing	E
Weld Grade Powder	F

1.2 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.2.1 This specification is expressed in both inch-pound units and in SI units (within the text, the SI units are shown in brackets); however, unless the purchase order or contract specifies the applicable M specification designation (SI units), the inch-pound units shall apply.

2. Referenced Documents

2.1 *ASTM Standards*:²

[A1025 Specification for Ferrous Alloys and Other Alloying Materials, General Requirements](#)

[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](#), including any supplementary requirements that are indicated in the purchase order. Failure to comply with the general requirements of Specification [A1025](#) constitutes nonconformance with this specification.

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.

In case of conflict between the requirements of this specification and Specification [A1025](#), this specification shall prevail.

4. Chemical Requirements

4.1 The various grades shall conform to the requirements as to chemical composition specified in [Table 1](#) and [Table 2](#).

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

5. Size

5.1 The various grades are available in the sizes listed in [Table 3](#).

5.2 The sizes listed in [Table 3](#) 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 (see [5.3](#) and Specification [A1025](#)).

5.3 Friability Ratings:

Grades A, B, C	No. 6
Grades D, E	No. 5

6. Chemical Analysis

6.1 Chemical analysis methods are subject to agreement between the purchaser and the supplier.

7. Packaging

7.1 Color coding shall be used when shipment is made in containers. The color coding may be used in lieu of grade designation, if agreed upon between the purchaser and the manufacturer. The following colors shall be used to designate the grades:

Color	Designation	Grade
Blue	Regular	A
Purple	Intermediate Hydrogen	B
White	Low Hydrogen	C
Red	4.5 % Nitrogen Bearing	D
Yellow	6 % Nitrogen Bearing	E
No color	Weld Grade Powder	F

8. Keywords

8.1 electrolytic manganese; electrolytic manganese powder; intermediate hydrogen electrolytic manganese; low hydrogen electrolytic manganese; manganese metal; nitrogen bearing

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

TABLE 1 Chemical Requirements

Element	Composition, %					
	Regular A	Intermediate Hydrogen B	Low Hydrogen C	4.5 % Nitrogen Bearing D	6 % Nitrogen Bearing E	Weld Grade Powder F
Manganese, total	99.5 min	99.5 min	99.5 min	94-95 ^A	93-94 ^A	99.5 min
Manganese, ^B metallic	99.9 min ^A	99.9 min ^A	99.9 min ^A	^C	^C	99.9 min
Sulfur	0.030 max ^A	0.030 max	0.030 max	0.035 max	0.035 max	0.035 max
Hydrogen	0.015 max	0.005 max ^A	0.0010 max ^A	^C	^C	0.0030 max ^A
Nitrogen	^C	^C	^C	4.0-5.4 ^A	5.5-6.5 ^A	^C

^A Analysis required with each lot.

^B Percentage of total as metallic manganese.

^C No requirement.

TABLE 2 Specified Residual Elements

Element, max	Composition %					
	Regular A	Intermediate Hydrogen B	Low Hydrogen C	4.5 % Nitrogen Bearing D	6 % Nitrogen Bearing E	Weld Grade Powder F
Iron	0.005	0.005	0.005	0.005	0.005	0.08
Carbon	0.005	0.005	0.005	0.040	0.040	0.010
Phosphorus	0.001	0.001	0.001	0.001	0.001	0.001
Silicon	0.001	0.001	0.001	0.001	0.001	0.001
Aluminum	0.001	0.001	0.001	0.001	0.001	0.001

TABLE 3 Standard Sizes and Tolerances

Grade	Standard Sizes	Tolerances ^A
Regular		15 % max retained on 2-in. [50-mm] sieve
Intermediate Hydrogen	Plate 2 in. [50 mm] by down	10 % max passing No. 8 [2.5-mm] sieve
Low Hydrogen		
4.5 % Nitrogen Bearing	Plate 2 in. [50 mm] by down	10 % max retained on 2-in. [50-mm] sieve
6 % Nitrogen Bearing		10 % max passing No. 10 [2-mm] sieve

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

manganese; weld grade electrolytic manganese powder; weld grade powdered electrolytic manganese

SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to this standard since the last issue (A601 – 05 (2010)) that may impact the use of this standard. (Approved Oct. 1, 2010.)

(1) Addition of 1.2.

(2) Table 3 revised.

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