Designation: A 601 – 05

Standard Specification for Electrolytic Manganese Metal[1]

This standard is issued under the fixed designation A 601; 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

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

3. General Conditions for 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 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 A 1025).

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

[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.

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

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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. [50.8-mm] sieve
Intermediate Hydrogen Low Hydrogen	Plate 2 in. [51 mm] by down	10 % max passing No. 8 [2.36-mm] sieve
4.5 % Nitrogen Bearing	Plate 2 in. [51 mm] by down	10 % max retained on 2-in. [50.8-mm] sieve
6 % Nitrogen Bearing		10 % max passing No. 10 [2.00-mm] sieve

[A] Specification of sieve sizes used to define tolerances herein are as listed in Specification E 11.

SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to this standard since the last issue, A 601 - 96 (2004), that may impact the use of this standard. (September 1, 2005)

(*1*) Revised Sections 1, 2, 4, 5, 6, 7, and Table 2.
(*2*) Deleted old Section 3 (Ordering Information), and added new Section 3 (General Conditions for Delivery).
(*3*) Deleted old Sections 6, 8, 9, and 11.

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