



Standard Specification for Chromium Metal¹

This standard is issued under the fixed designation A 481; 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.

This standard has been approved for use by agencies of the Department of Defense. This specification replaces Federal Specification QQ-F-145.

1. Scope

1.1 This specification covers two grades of chromium metal designated as A and B.

1.2 The values stated in inch-pound units are to be regarded as the standard.

2. Referenced Documents

2.1 *ASTM Standards:*

E 11 Specification for Wire-Cloth Sieves for Testing Purposes²

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications²

E 31 Methods for Chemical Analysis of Ferrous Alloys³

E 32 Practices for Sampling Ferrous Alloys and Steel Additives for Determination of Chemical Composition³

E 363 Methods for Chemical Analysis of Chromium and Ferrochromium⁴

3. Ordering Information

3.1 Orders for material under this specification shall include the following information:

3.1.1 Quantity,

3.1.2 Name of material,

3.1.3 ASTM designation and year of issue,

3.1.4 Size, and

3.1.5 Requirements for packaging, analysis reports, etc., as appropriate.

3.2 The customary basis of payments for chromium metal is per pound of alloy.

4. Chemical Composition

4.1 The various grades shall conform to the requirements as to chemical composition specified in Table 1 and Table 2.

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

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² *Annual Book of ASTM Standards*, Vol 14.02.

³ *Annual Book of ASTM Standards*, Vol 03.05.

⁴ *Annual Book of ASTM Standards*, Vol 03.06.

TABLE 1 Chemical Requirements^A

Element	Composition, %	
	Grade A	Grade B
Chromium, min	99.0	99.4
Carbon, max	0.050	0.050
Silicon, max	0.15	0.10
Sulfur, max	0.030	0.010
Phosphorus, max	0.010	0.010

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

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

TABLE 2 Supplementary Chemical Requirements^A

Element	Composition, %	
	Grade A	Grade B
Nitrogen, max	0.050	0.020
Iron, max	0.35	0.35
Manganese, max	0.01	0.01
Hydrogen, max	0.01	0.003
Oxygen, max	0.50	0.10
Vanadium, max	0.050	0.050
Copper, max	0.01	0.01
Molybdenum, max	0.050	0.01
Columbium, max	0.050	0.050
Tantalum, max	0.050	0.003
Cobalt, max	0.003	0.001
Aluminum, max	0.30	0.10
Titanium, max	0.050	0.003
Zirconium, max	0.050	0.003
Arsenic, max	0.005	0.003
Lead, max	0.003	0.001
Tin, max	0.001	0.001
Zinc, max	0.005	0.003
Boron, max	0.005	0.003
Antimony, max	0.005	0.003
Silver, max	0.003	0.001
Bismuth, max	0.003	0.001

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



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 between the manufacturer and the purchaser.

5. Size

5.1 The various grades are available in sizes as 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. 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 each product type is shown in the last column of Table 3. Definitions applicable to these code numbers are given in the Appendix.

6. Sampling

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

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 shall be made in accordance with the procedure for the ferroalloys as described in Methods E 31 and Test Methods E 363 or alternative methods that will yield equivalent results.

7.2 If alternative methods of analysis are used, in case of discrepancy, Methods E 31 and 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 between 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 shipped in bulk, in such a manner that none of the product is lost or contaminated in shipment.

TABLE 3 Standard Sizes and Tolerances

Product	Grade	Standard Sizes	Tolerances ^A	Friability Rating
Chromium Metal	A	Plate 2 in. by down	10 %, max retained on 2-in. (50-mm) sieve 10 %, max passing U.S. No. 8 (2.36-mm) sieve	2
	A and B	1 in. by down	15 %, max retained on 1-in. (25.0-mm) sieve 15 %, max passing U.S. No. 8 (2.36-mm) sieve	
		¼in. by down	5 %, max retained on ¼-in. (6.3-mm) sieve	
		8 mesh by down	5 %, max retained on U.S. No. 8 (2.36-mm) sieve	
		20 mesh by down	5 %, max retained on U.S. No. 20 (850 µm) sieve	
	B	Pellets 1½ in. by 1 in. by 1 in.	Designated by manufacturer	

^ASpecifications of sieve sizes used to define tolerances herein are as listed in Specification E 11.

APPENDIX

(Nonmandatory Information)

X1. FRIABILITY RATINGS

Code No.	Definition
1	Very tough materials which are susceptible 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: chrome 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)
4	Appreciable reduction in size of large pieces upon repeated handling. Some fines produced upon repeated handling of crushed sizes. (Example: 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 percent ferrosilicon)



- 6 This category represents the most friable alloys.
(Example: calcium-silicon)

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