Designation: A 146 – 04

Standard Specification for Molybdenum Oxide Products[1]

This standard is issued under the fixed designation A 146; 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 four grades of molybdenum oxide, designated as A, B1, B2, and molybdic oxide briquets.

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

2. Referenced Documents

2.1 *ASTM Standards:* [2]

A 1025 Specification for Ferroalloys, General Requirements

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.

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

5. Sampling

5.1 *Sampling Small Bags*—When packed in the standardized small packages, each holding contained molybdenum, the material shall be sampled by selecting at random one twentieth of the bags that may bear the same manufacturing lot number, and the combined content of these bags shall be reduced and analyzed as a separate sample. When a shipment cannot be divided by lot numbers, one twentieth of the total number of bags constituting the shipment shall be selected and treated as one sample. The material forming a sample shall be crushed if necessary, and in any event passed through a No. 10 (2.00-mm) sieve. The sample after sieving shall be thoroughly mixed by coning and then reduced to about 2 lb (0.9 kg) by quartering or by means of a riffle sampler. The reduced sample shall then be crushed and passed through a No. 60 (250-µm) sieve. The sample after sieving shall again be mixed by coning and then divided through a riffle, preferably a Jones divider, into the required number of analytical samples.

TABLE 1 Chemical Requirements

	Molybdenum Oxide			Molybdic Oxide Briquets
	Grade A	Grade B1	Grade B2	
Molybdenum, min	55.0	57.0	57.0	51.6
Sulfur, max	0.25	0.10	0.10	0.15
Copper, max	1.0	1.0	0.15	0.15

5.2 *Sampling Large Containers*—When packed in drums or large bags or cartons, the material shall be sampled by selecting about one twentieth of the content of each package that may bear the same manufacturing lot number, and the combined material selected shall be reduced and analyzed as a separate sample. When a shipment cannot be divided by lot numbers, about one twentieth of the content of each package in the shipment shall be selected, and the combined material selected shall be treated as one sample. The material comprising a sample shall be thoroughly mixed by coning and reduced by half-shoveling, alternating the operations until the residual weight reaches about 40 lb (18.1 kg). Segregation of sizes shall be carefully avoided. The sample thus reduced shall be crushed, if necessary, to pass through a No. 10 (2.00-mm) sieve, and the subsequent sampling procedure shall be as prescribed in 5.1 .

5.3 *Correcting Sample to Dry Net Weight*—Absorption of moisture by the material would depress the analytical percentages with respect to the dry basis, on which the product was analyzed when packaged. Accordingly, any analytical sample shall be dried at 110°C, before analysis, and the sampler's moist net weight of the shipment, of a manufacturing lot, or of any constituent package shall be appropriately corrected to the corresponding dry weight, thus leading to the proper weight of contained molybdenum.

[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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6. Keywords

6.1 molybdenum; molybdenum oxide

SUPPLEMENTARY REQUIREMENTS

S1. The composition shall be further limited by the requirements of Table S1.1 in addition to those in Table 1.

TABLE S1.1 Supplementary Chemical Requirements

	Composition, %[A]		
	Molybdenum Oxide		Molybdic Oxide Briquets
	Grade A	Grade B1 and B2	
Carbon	trace	trace	12.0 (approx)
Phosphorus, max	0.050	0.050	0.050

[A]The values shown are maxima. 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. An analysis of each lot is not required.

SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to this standard since the last version (A 146 – 64 (2000)) that may impact the use of this standard.

(1) Practice E 29, and Test Methods E 31 were removed from 2.
(2) Specification A 1025 was added to 2.
(3) Changed Ordering Information to General Conditions for Delivery.
(4) Revised Section 4.
(5) Removed sections on Size, Chemical Analysis, Inspection, Rejection, Marking, and Packaging.
(6) Changed Grade B to Grade B1 and added Grade B2 to Table 1.
(7) Added Supplementary Requirements section.
(8) Changed Table 2 to Table S1.1.

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