



# Standard Specification for Low-Carbon Nickel-Chromium-Molybdenum, Low-Carbon Nickel-Molybdenum-Chromium, Low-Carbon Nickel- Molybdenum-Chromium-Tantalum, Low-Carbon Nickel- Chromium-Molybdenum-Copper, and Low-Carbon Nickel- Chromium-Molybdenum-Tungsten Alloy Rod<sup>1</sup>

This standard is issued under the fixed designation B574; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

## 1. Scope\*

1.1 This specification<sup>2</sup> covers rod of low-carbon nickel-chromium-molybdenum alloys (UNS N10276, N06022, N06035, N06455, N06058, and N06059)\*, low-carbon nickel-molybdenum-chromium (UNS N10362), low-carbon nickel-molybdenum-chromium-tantalum (UNS N06210), low-carbon nickel-chromium-molybdenum-copper alloy (UNS N06200), and low-carbon nickel-chromium-molybdenum-tungsten (UNS N06686) as shown in **Table 1**, for use in general corrosive service.

1.2 The following products are covered under this specification:

1.2.1 Rods  $\frac{5}{16}$  to  $\frac{3}{4}$  in. (7.94 to 19.05 mm), exclusive, in diameter, hot or cold finished, solution annealed and pickled, or mechanically descaled.

1.2.2 Rods  $\frac{3}{4}$  to  $3\frac{1}{2}$  in. (19.05 to 88.9 mm), inclusive, in diameter, hot or cold finished, solution annealed, ground or turned.

1.2.3 Rods  $\frac{1}{4}$  to  $3\frac{1}{2}$  in. (6.35 to 88.9 mm), inclusive, in diameter, solution annealed, cold finished, as cold finished, ground or turned (N06059 and N06686 only, see **Table 2** and **Table 3**).

1.3 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.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the*

*responsibility of the user of this standard to become familiar with all hazards including those identified in the appropriate Material Safety Data Sheet (MSDS) for this product/material as provided by the manufacturer, to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards*:<sup>3</sup>

**B880** Specification for General Requirements for Chemical Check Analysis Limits for Nickel, Nickel Alloys and Cobalt Alloys

**E8** Test Methods for Tension Testing of Metallic Materials  
**E29** Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

**E55** Practice for Sampling Wrought Nonferrous Metals and Alloys for Determination of Chemical Composition

**E527** Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

**E1473** Test Methods for Chemical Analysis of Nickel, Cobalt, and High-Temperature Alloys

## 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *rod, n*—a product of round solid section furnished in straight lengths.

## 4. Ordering Information

4.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Examples of such requirements include, but are not limited to the following:

4.1.1 *Alloy*—**Table 1**.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.07 on Refined Nickel and Cobalt and Their Alloys.

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<sup>2</sup> For ASME Boiler and Pressure Vessel Code applications see related Specification SB-574 in Section II of that Code.

\* New designation established in accordance with Practice E527 and SAE J1086, Practice for Numbering Metals and Alloys (UNS).

<sup>3</sup> 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.

TABLE 1 Chemical Requirements

| Element         | Composition Limits, %  |                        |                        |                        |              |              |                        |                        |                        |                        |
|-----------------|------------------------|------------------------|------------------------|------------------------|--------------|--------------|------------------------|------------------------|------------------------|------------------------|
|                 | Alloy N06035           | Alloy N10276           | Alloy N06022           | Alloy N06455           | Alloy N06059 | Alloy N06058 | Alloy N06200           | Alloy N10362           | Alloy N06210           | Alloy N06686           |
| Molybdenum      | 7.60–9.00              | 15.0–17.0              | 12.5–14.5              | 14.0–17.0              | 15.0–16.5    | 19.0 - 21.0  | 15.0–17.0              | 21.5-23.0              | 18.0–20.0              | 15.0-17.0              |
| Chromium        | 32.25–34.25            | 14.5–16.5              | 20.0–22.5              | 14.0–18.0              | 22.0–24.0    | 20.0- 23.0   | 22.0–24.0              | 13.8-15.6              | 18.0–20.0              | 19.0-23.0              |
| Iron            | 2.00 max               | 4.0–7.0                | 2.0–6.0                | 3.0 max                | 1.5, max     | 1.5, max     | 3.0 max                | 1.25 max               | 1.0 max                | 5.0 max                |
| Tungsten        | 0.60 max               | 3.0–4.5                | 2.5–3.5                | ...                    | ...          | 0.3 max      | ...                    | ...                    | ...                    | 3.0-4.4                |
| Cobalt, max     | 1.00                   | 2.5                    | 2.5                    | 2.0                    | 0.3          | 0.3 max      | 2.0 max                | ...                    | 1.0                    | ...                    |
| Carbon, max     | 0.050                  | 0.010                  | 0.015                  | 0.015                  | 0.010        | 0.010        | 0.010                  | 0.010                  | 0.015                  | 0.010                  |
| Silicon, max    | 0.60                   | 0.08                   | 0.08                   | 0.08                   | 0.10         | 0.10         | 0.08                   | 0.08                   | 0.08                   | 0.08                   |
| Manganese, max  | 0.50                   | 1.0                    | 0.50                   | 1.0                    | 0.5          | 0.5          | 0.5                    | 0.60                   | 0.5                    | 0.75                   |
| Vanadium, max   | 0.20                   | 0.35                   | 0.35                   | ...                    | ...          | ...          | ...                    | ...                    | 0.35                   | ...                    |
| Phosphorus, max | 0.030                  | 0.04                   | 0.02                   | 0.04                   | 0.015        | 0.015        | 0.025                  | 0.025                  | 0.02                   | 0.04                   |
| Sulfur, max     | 0.015                  | 0.03                   | 0.02                   | 0.03                   | 0.010        | 0.010        | 0.010                  | 0.010                  | 0.02                   | 0.02                   |
| Titanium        | ...                    | ...                    | ...                    | 0.7 max                | ...          | ...          | ...                    | ...                    | ...                    | 0.02-0.25              |
| Nickel          | remainder <sup>A</sup> | remainder <sup>A</sup> | remainder <sup>A</sup> | remainder <sup>A</sup> | Bal          | Bal          | remainder <sup>A</sup> | remainder <sup>A</sup> | remainder <sup>A</sup> | remainder <sup>A</sup> |
| Aluminum        | 0.40 max               | ...                    | ...                    | ...                    | 0.1–0.4      | 0.40 max     | 0.50 max               | 0.50 max               | ...                    | ...                    |
| Copper          | 0.30 max               | ...                    | ...                    | ...                    | 0.50 max     | 0.50 max     | 1.3–1.9                | ...                    | ...                    | ...                    |
| Tantalum        | ...                    | ...                    | ...                    | ...                    | ...          | ...          | ...                    | ...                    | 1.5–2.2                | ...                    |

<sup>A</sup> See 12.1.1.