



Designation: B1020/B1020M – 22

Standard Specification for Seamless Nickel Alloy Mechanical Tubing and Hollow Bar¹

This standard is issued under the fixed designation B1020/B1020M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope*

1.1 This specification covers seamless nickel alloy tubing for use in mechanical applications or as hollow bar for use in the production of hollow components such as, but not limited to, nozzles, reducers, and couplings by machining where corrosion-resistant or high-temperature strength is needed. The grades covered are listed in [Table 1](#).

1.2 This specification covers seamless cold-finished mechanical tubing and hollow bar, and seamless hot-finished mechanical tubing and hollow bar in sizes up to 12¾ in. [325 mm] in outside nominal diameter (for round tubing) with wall thicknesses or inside diameters as required.

1.3 Optional supplementary requirements are provided and when desired, shall be stated in the order.

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[B829 Specification for General Requirements for Nickel and Nickel Alloys Seamless Pipe and Tube](#)

[E112 Test Methods for Determining Average Grain Size](#)

¹ 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.

Current edition approved Oct. 1, 2022. Published October 2022. Originally approved in 2021. Last previous edition approved in 2021 as B1020/B1020M – 21. DOI: 10.1520/B1020_B1020M-22.

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.

2.2 *Federal Standard:*³

[Fed. Std. No. 123 Marking for Shipments \(Civil Agencies\)](#)

2.3 *Military Standards:*³

[MIL-STD-129 Marking for Shipment and Storage](#)

[MIL-STD-163 Steel Mill Products Preparation for Shipment and Storage](#)

3. Terminology

3.1 *Definitions:*

3.1.1 *hollow bar, n*—round tubing that is intended to produce engineering components by machining, generally specified by minimum outside diameter and maximum inside diameter.

3.1.2 *mechanical tubing, n*—tubing of various shapes used for mechanical and general engineering purposes, specified by nominal outside dimension and nominal wall.

4. Ordering Information

4.1 Orders for material under this specification should include the following as required to describe the desired material adequately:

4.1.1 Quantity (feet, mass, or number of pieces),

4.1.2 Name of material (seamless mechanical tubing or hollow bar),

4.1.3 Mechanical tubing form only (round, square, rectangular, special, see [6.6](#)),

4.1.4 Dimensions (round, nominal outside diameter and nominal wall thickness, (see [8.1](#) and [8.2](#)) or minimum outside diameter and maximum inside diameter (see [8.3](#)); square and rectangular, nominal outside dimensions and nominal wall thickness, see Section [12](#); other, specify),

4.1.5 Length (specific or random, see [8.4](#)),

4.1.6 Manufacture (cold- or hot-finished, see [6.5](#)),

4.1.7 Grade (Section [7](#)),

4.1.8 Condition (solution heat-treated, as cold worked, or with special heat treatment, controlled microstructural characteristics, or other condition as required, see [6.7](#) – [6.10](#)),

4.1.8.1 For precipitation-hardening grades, unless otherwise specified, the material will be supplied in the solution heat-treated condition.

³ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

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

TABLE 1 Chemical Requirements^A

Grade	Composition, %												
	Carbon	Manganese	Phosphorus	Sulfur	Silicon	Nickel	Chromium	Molybdenum	Titanium	Niobium ^D	Cu	Iron	Other Elements
N10276	0.010	1.0	0.04	0.03	0.08	remainder ^B	14.5 to 16.5	15. to 17.0	...	...	...	4.0 to 7.0	W 3.0-4.5 V 0.35 Co 2.5
N06625	0.10	0.50	0.015	0.015	0.50	58.0 min ^B	20.0 to 23.0	8.0 to 10.0	0.40	3.15 to 4.15	...	5.0	Co 1.0 ^C Al 0.40
N07718	0.08	0.35	0.015	0.015	0.35	50.0 to 55.0	17.0 to 21.0	2.80 to 3.30	0.65 to 1.15	4.75 to 5.50	0.30	remainder ^B	Co 1.0 ^C Al 0.20-0.80 B 0.006
N08825	0.05	1.0	...	0.03	0.5	38.0 to 46.0	19.5 to 23.5	2.5 to 3.5	0.6 to 1.2	...	1.5 to 3.0	22.0 min ^B	Al 0.2
N09925	0.03	1.0	0.03	0.03	0.5	42.0 to 46.0	19.5 to 22.50	2.5 to 3.5	1.9 to 2.40	0.5	1.5 to 3.0	22.0 min	Al 0.1-0.5

^A Maximum unless range or minimum is given. Where ellipses (...) appear in this table, there is no requirement and analysis for the element need not be determined or reported.

^B Element shall be determined arithmetically by difference.

^C If determined.

^D The terms Niobium (Nb) and Columbium (Cb) are alternate names for the same element.