ASTM B572 / ASME SB572

Standard Specification for UNS N06002, UNS N06230, UNS N12160, and UNS R30556 Rod

This specification covers alloys UNS N06002, UNS N06230, UNS N12160, and UNS R30556 in the form of rod for heat resisting and general-corrosive service.

The following products are covered under this specification:

Rods 5/16 to 3/4 in. (7.94 to 19.05 mm) exclusive in diameter, hot or cold finished, solution-annealed, and pickled or mechanically descaled.

Rods 3/4 to 3(1/2) in. (19.05 to 88.9 mm) inclusive in diameter, hot or cold finished, solution annealed, ground, or turned.

A. Chemical Composition :-

The material shall conform to the requirements as to chemical composition prescribed in Table 1.

Table 1

Element	UNS N06002	UNS N06230	UNS N12160	UNS R30556
Nickel	remainder[A]	remainder[A]	remainder[A]	19.0–22.5
Iron	17.0–20.0	3.0max	3.5max	remainder[A]
Chromium	20.5–23.0	20.0–24.0	26.0-30.0	21.0–23.0
Cobalt	0.5–2.5	5.0max	27.0-33.0	16.0–21.0
Molybdenum	8.0–10.0	1.0–3.00	1.0max	2.5–4.0
Tungsten	0.2–1.0	13.0–15.0	1.0max	2.0–3.5
Carbon	0.05–0.15	0.05–0.15	0.15max	0.05–0.15
Silicon	1.00max	0.25–0.75	2.4-3.0	0.20–0.80
Manganese	1.00max	0.30–1.00	1.5max	0.50–2.00
Phosphorus	0.04	0.030max	0.030max	0.04max
Sulfur	0.03	0.015max	0.015max	0.015max
Columbium	...	...	1.0max	0.30max
Tantalum	...	...	...	0.30–1.25
Aluminum	...	0.50max	...	0.10–0.50
Zirconium	...	...	...	0.001–0.10
Lanthanum	...	0.005–0.050	...	0.005–0.10
Nitrogen	...	...	...	0.10–0.30
Boron	...	0.015max	...	0.02max
Titanium	...	...	0.20–0.80	...

[A] See point E.1.

B. Mechanical and Other Requirements :-

1. The mechanical properties of the material at room temperature shall conform to those shown in Table 2.

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2. Grain Size—Annealed alloy (UNS N12160) shall conform to an average grain size of ASTM Number 5 or coarser.

Table 2

UNS	Tensile Strength, min, ksi (MPA)	Yield Strength (0.2 % Offset), min, ksi (MPa)	Elongation in 2 in. (50.8mm) or 4D[A] min, %
N06002	95 (660)	35 (240)	35
N06230[B]	110 (760)	45 (310)	40
N12160[C]	90 (620)	35 (240)	40
R30556[D]	100 (690)	45 (310)	40

[A] *D refers to the diameter of the tension specimen.*

[B] *Solution annealed at a temperature between 2200 to 2275°F (1 204 to 1 246°C) followed by a water quench or rapidly cooled by other means.*

[C] *Solution annealed at 1950°F (1065°C) minimum.*

[D] *Solution annealed at 2100°F (1150°C) minimum.*

C. Length:-

1. The permissible variations in length of multiple, nominal, or cut length rod shall be as prescribed in Table 3.
2. Where rods are ordered in multiple lengths, a 1⁄4-in. (6.35-mm) length addition shall be allowed for each uncut multiple length.

Table 3

Random mill lengths	2 to 12 ft (610 to 3660 mm) long with not more than 25 weight % under 4 ft (1.22 m).
Multiple lengths	Furnished in multiples of a specified unit length, within the length limits indicated above. For each multiple, an allowance of 1⁄4 in. (6.35 mm) shall be made for cutting, unless otherwise specified. At the manufacturer's option, individual specified unit lengths may be furnished.
Nominal lengths	Specified nominal lengths having a range of not less than 2 ft (610 mm) with no short lengths allowed.
Cut lengths	A specified length to which all rods shall be cut with a permissible variation of ±1⁄8 in. (3.1 7 mm) − 0.

D. Weight :-

For calculations of mass or weight, the following densities shall be used:

Alloy	Density	
	lb/in.^{3}	(g/cm^3)
N06002	0.297	(8.23)
N06230	0.324	(8.97)
N12160	0.292	(8.08)
R30556	0.297	(8.23)

E. Test Methods :-

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The chemical composition and mechanical properties of the material as enumerated in this specification shall be determined, in case of disagreement, in accordance with the following ASTM methods:

1. Chemical Analysis— Test Methods E1473. For elements not covered by Test Methods E1473, the referee method shall be as agreed upon between the manufacturer and the purchaser.
2. Tension Test— Test Methods E8.
3. Method of Sampling— Practice E55.
4. Determining Significant Places— Practice E29.

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