

ASTM B425 / ASME SB425

SPECIFICATION FOR Ni-Fe-Cr-Mo-Cu ALLOY (UNS N08825 AND UNS N08221) ROD AND BAR

This specification covers nickel-iron-chromium-molybdenum-copper alloy (UNS N08 825 and UNS N08221) in the form of hot-finished and cold-drawn rounds, squares, hexagons, and rectangles.

A. Chemical Composition :-

The material shall conform to the composition limits specified in Table 1.

Table 1

Element	UNS N08825	UNS N08221
Nickel	38.0–46.0	39.0–46.0
Chromium	19.5–23.5	20.0–22.0
Iron ^A	22 min	balance
Manganese	1.0 max	1.0 max
Carbon	0.05 max	0.025 max
Copper	1.5–3.0	1.5–3.0
Silicon	0.5 max	0.5 max
Sulfur	0.03 max	0.03 max
Aluminum	0.2 max	0.2 max
Titanium	0.6–1.2	0.6–1.0
Molybdenum	2.5–3.5	5.0–6.5

^A Element shall be determined arithmetically by difference.

B. Mechanical Properties :-

The material shall conform to the mechanical properties specified in Table 2.

Table 2

Alloy	Condition	Tensile Strength, min, ksi (MPa)	Yield Strength (0.2 % Offset), min, ksi (MPa)	Elongation in 2 in. or 50 mm (or 4 D), min, %
UNS N08825	Annealed:	85 (586)	35 (241)	30 ^A
	Hot-finished, cold-drawn			
UNS N08221	Forging Quality:	B	B	B
	All sizes annealed	79 (544)	34 (235)	30

^A Not applicable to diameters or cross sections under 3/32 in. (2.4 mm).

^B Forging quality is furnished to chemical requirements and surface inspection only. No tensile properties are required.

C. Length :-

The permissible variations in length of cold-worked and hot-worked rod and bar shall be as prescribed in

Table 3

Random mill lengths:	
Hot-worked	6 to 24 ft (1.83 to 7.31m) long with not more than 25 weight % between 6 and 9 ft (1.83 and 2.74 m) ^A
Cold-worked	6 to 20 ft (1.83 to 6.1m) long with not more than 25 weight % between 6 and 10 ft (1.83 and 3.05 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. (6.4 mm) will 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 ^B
Cut lengths	a specified length to which all rods and bars will be cut with a permissible variation of plus 1/8 in. (3.2 mm), minus 0 for sizes 8 in. (203 mm) and less in diameter or distance between parallel surfaces. For larger sizes, the permissible variation shall be + 1/4 in. (6.4 mm), - 0.

^A For hot-worked sections weighing over 25 lb/ft (37 kg/m) and for smooth forged products, all sections, short lengths down to 2 ft (610 mm) may be furnished.

^B For cold-worked rods and bars under 1/2 in. (12.7 mm) in diameter or distance between parallel surfaces ordered to nominal or stock lengths with a 2-ft (610-mm) range, at least 93% of such material shall be within the range specified; the balance may be in shorter lengths but in no case shall lengths less than 4 ft (1220 mm) be furnished.

D. Test Methods :-

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

<u>Test</u>	<u>ASTM Designation</u>
Chemical analysis	E 1473
Tension	E 8
Rounding procedure	E 29

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