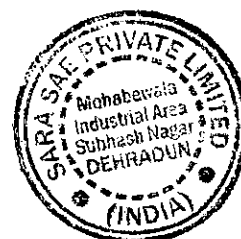

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## WROUGHT ALLOY 925 (120/90) NICKEL BASE ALLOY FOR H<sub>2</sub>S, CO<sub>2</sub>, CL & LOW TEMPERATURE SERVICE

### Summary:

This specification covers wrought nickel base alloy 925 for use in H<sub>2</sub>S, CO<sub>2</sub> and Cl.




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## 1.0 SCOPE

This specification covers wrought nickel base alloy 925 for use in H<sub>2</sub>S, CO<sub>2</sub> and CL.

## 2.0 REFERENCE SPECIFICATIONS

UNS N09925 (as modified below)

ISO 10423 / API 6A

## 3.0 APPROVED VENDORS

Material to meet this specification shall be supplied by one of the following vendors:

Special Metals Corporation

Allvac

Aubert Duvall

WASA

Foroni

Carpenter Technologies

ThyssenKrupp VDM

## 4.0 MANUFACTURE

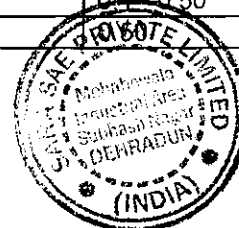
The material shall be melted by electric furnace or vacuum induction melting (VIM), followed by vacuum arc remelting (VAR) or electroslag remelt (ESR). Melting practices shall facilitate production of homogenous ingot with minimal non-metallic inclusions, banding, flake, pipe or other defects.


For forgings, the degree of hot work shall be sufficient to produce a wrought structure throughout the whole forging. The minimum hot work reduction ratio shall be 4:1. The forging manufacture shall document the hot working practices utilized.

## 5.0 CHEMISTRY REQUIREMENTS

The chemical analysis shall be as listed below. Values are maximum weight percentages unless otherwise noted.

Nickel (Ni)	40.0 - 46.0	Manganese (Mn)	1.0
Chromium (Cr)	19.5 - 23.5	Silicon (Si)	0.5
Iron (Fe)	Balance	Sulfur (S)	0.030
Molybdenum (Mo)	2.5 - 3.5	Phosphorus (P)	0.030
Carbon (C)	0.030	Aluminum (Al)	0.1 - 0.50
Titanium (Ti)	1.9 - 2.4	Niobium (Nb or Cb)	



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Copper (Cu)	1.5 - 3.0		
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## 6.0 MECHANICAL PROPERTIES

Products machined from barstock or extrusions (pipe or tubing) shall be tested on a prolongation. Forgings shall be tested by prolongation or sacrificial part, unless the forging is too small/thin to permit required testing. In such cases, a separate test coupon may be used in accordance with API 6A PSL3.

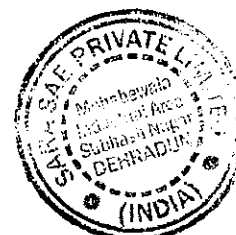
The material shall meet the following mechanical properties:


Tensile Strength, min	120,000 psi (827 Mpa)
Yield Strength, min	90,000 psi (620 Mpa)
Elongation in 2", min	17%
Reduction of Area, min	20%
Rockwell Hardness	26-38 HRC

## 7.0 HEAT TREATMENT

NOTE: Unless otherwise specified any of the options below are acceptable.

	Anneal	Quench	Age	Cool
Option 1 (Continuous)	1825°-1875°F 0.5 - 4 hours	For sizes < 1 inch, air cool or water quench.  For sizes > 1 inch, water quench.	1350°-1380°F (730-750°C) for 5-9 hours. Furnace cool to 1150°F (620°C), and hold at between 1135°F (610°C) and 1165°F (630°C) for a total aging time of 12 hours.	Air cool or water quench.
Option 2 (Continuous)	1850°-1950°F (1010-1065°C) 5-20 minutes/inch of maximum thickness.	Water quench.	1325°-1400°F (720-760°C) for 5-8 hours.	Air cool
Option 3 (Batch)	1850°-1950°F (1010-1065°C) for a minimum of one hour at temperature.	Water quench.	1325°-1400°F (720-760°C) for 5-9 hours followed by furnace cooling to 1250°-1150°F (620-675°C). Age as needed to achieve mechanical properties. Total aging time shall not exceed 18 hours.	Air cool
Option 4 (Hot work and age)*	Cool to ambient following completion of hot work.		1370°F-1410°F (745 -765 °C) for 4 to 12 hours, followed by furnace cooling to a temperature between 1165°F and 1240°F (630 and 670°C), holding at this temperature for 4 to 12 hours.	Air cool
*Maximum hardness for this condition is 40 HRC.				



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## 8.0 MARKINGS

Each piece of material shall be identified with the heat number in stenciled letters or marked with low stress or interrupted dot stamps.

## 9.0 INSPECTION

The material shall be inspected and free of defects that would be detrimental to the intended service.

## 10.0 CERTIFICATION

Each lot shall be accompanied with documentation certifying the method of heat treatment used to achieve the specified mechanical properties.

