STAINLESS

High performance Alloys - Medical - Aerospace - Microtechnics - Motorsport - Industry

NICKEL BASE ALLOY
ALLOY 90
UNS N07090

GENERALITIES

Nickel-based alloy 90 *contains cobalt and has excellent heat resistance superior to that of alloy 80A (up to 920°C), resists creep and hot oxidation well. The mastery of its VIM production method followed by an ESR or VAR remelting gives it a high level of cleanliness and homogeneity essential to guarantee its properties.*

Stainless has in stock several qualified European or American sources as well as different diameters that will allow you to best meet your needs in terms of implementation. This product can also be made to measure or cut into pieces by our service centers.

Each material is delivered with its producer certificate of origin in order to guarantee you total transparency and complete traceability.

APPLICATIONS

The grade is used for the manufacture of parts subjected to high temperatures up to 920°C and high mechanical stresses. Applications include valve valves for heat engines, aeronautical engine parts such as discs or hot fasteners.

STANDARDS AND DESIGNATIONS

Numerical designations:
W. Nr 2.4632 - UNS N07090

Standards :
AMS 5829

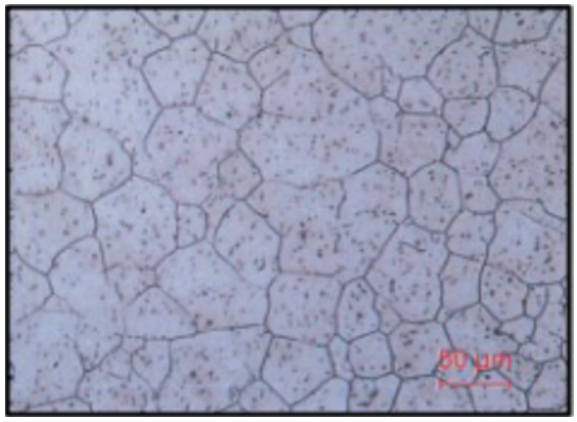
Brands:
Nimonic®90, VAT90,...

TYPICAL CHEMICAL ANALYSIS (mass %)

	Carbon	Manganese	Silicium	Chrome	Cobalt	Titane	Aluminium	Sulphur	Iron	Nickel
MIN	---	---	---	18.0	15.0	2.0	1.0	---	---	BALANCE
MAX	0.13	1.0	1.0	21.0	21.0	3.0	2.0	0.015	1.50	

METALLURGY

The grade can be solution treated then work hardened before aging hardening. The microstructure is homogeneous with fine grains and the hardening is done by the appearance of gamma prime precipitates. In the solutionized state, the microstructure is illustrated below with an austenitic matrix and homogeneously distributed carbides:



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PHYSICAL PROPERTIES AT 20°C

Density.....8.18g.cm-3.
Coefficient of thermal expansion (between 20 et 200°C).....12,7 x 10^{-6}m/m.°C
Young's modulus......200 - 220 x 10^{3} MPa
Thermal conductivity.....11.5 W.m/m².°C

MECHANICAL PROPERTIES OF THE BARS

The grade is offered as standard in the solution-hardened or solution-hardened and work-hardened condition. The grade is always aged at 700°C/16h after machining. Typical mechanical properties are:

Condition	UTS (Mpa)	YS 0.2% (Mpa)	E5d%
solution setting	> 1000	> 800	> 30
Aged 16h/700°C	> 1200	> 900	> 25

PROCESSIES

Forgeability/Usability
The grade can be hot forged in the temperature range 1050/1200°C. Machining of this grade requires suitable equipment and tools. TIG or MIG welding is possible.

Heat treatments
Aging is to be carried out at 700°C for 16 hours/air cooling on the solution treated or solution treated and work hardened condition.

CORROSION RESISTANCE

The grade is highly resistant to hot oxidation which allows it to be used in engine applications.

STANDARD SHAPE

- 3m bars in solution treated or solution treated and work hardened condition - Work hardened or ground surface
- Other formats: please consult us

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