

# Nimonic® 90 Superalloy

## Product Data Sheet



Revision: SHP/Nimonic\_90/4/2019

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## Introducing Nimonic® 90

Nimonic® 90 is a nickel-chromium-cobalt alloy which is precipitation hardenable.

Offering high stress-rupture strength and creep resistance at elevated temperatures up to 950°C (1740°F), this wrought alloy is highly suitable for use in applications where high temperature and high mechanical stress is a consideration.

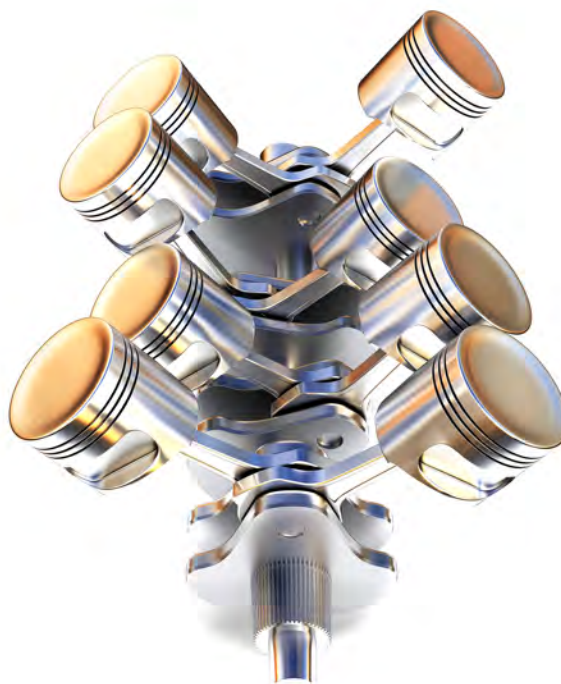
It's derived strength is due to the addition of aluminium and titanium in the alloying process. The material offers good resistance to high-temperature corrosion and oxidation.

### Machinability & Formability

Nitronic 90 can be machined after full heat-treatment using conventional machining methods with commercial coolants. Higher speed machining operations (turning, milling, grinding) should be performed using water-based coolants. When boring, drilling or tapping, a heavy lubricant is required. The alloy can be formed using basic conventional techniques.

### Applications

Traditionally used in the production of gas turbine blades and hot working tools, Nimonic 90 is also popular in the motorsport and automotive sector. The alloy is useful in applications where high mechanical stress and high temperature is a consideration, including specific engine applications, high-temperature springs and high-performance engine valves. The product is also a preferred choice for extreme high boost pressure turbocharged applications.



### Weldability

Welding on solution treated material is required, and a post-weld heat treatment is necessary to achieve optimum results. The alloy can be welded using conventional welding techniques.

### Product Availability

Round bar and plate

Smiths High Performance is a leading stockholder and supplier of high-performance engineering materials to the global motorsport sector. We are supply partners in a range of specialist motorsport markets including Formula 1, Formula E, NASCAR, MOTO GP, WEC & WRC.

Further technical data available on the reverse of this Datasheet

## Chemical Composition (%)

Carbon	0.13 max
Silicon	1.0 max
Copper	0.2 max
Iron	1.5 max
Manganese	1.0 max
Chromium	18.0 - 21.0
Titanium	2.0 - 3.0
Aluminium	1.0 - 2.0
Cobalt	15.0 - 21.0
Boron	0.02 max
Sulphur	0.015 max
Lead	0.0020 max
Zirconium	0.15 max
Nickel	Balance

## Thermal Conductivity

Temperature, °C		Thermal Conductivity	
°C	°F	W/m °C	Btu in/ft² h °F
20	68	11.47	80.46
100	212	12.77	89.58
200	392	14.44	101.30
300	572	15.99	112.17
400	752	17.54	123.04
500	932	18.97	133.07
600	1112	20.64	144.79
700	1292	22.32	156.57
800	1472	23.99	168.29
900	1652	25.83	181.20
1000	1832	27.88	195.58

## Tensile Properties (extruded bar)

Heat treatment 8 hr/1080°C (1975°F)/AC + 16hr/700°C (1290°F)/AC

Temperature, °C		0.1% Proof Stress		0.2% Proof Stress		Tensile Strength		Elongation	Reduction of
°C	°F	MPa	10³ ksi	MPa	10³ ksi	MPa	10³ ksi	on 5.65 √So, %	Area, %
20	68	729	106	752	109	1175	170	30	47
100	212	723	105	742	108	1148	167	27	46
200	392	689	100	708	103	1111	161	28	46
300	572	664	96	681	99	1087	158	29	48
400	752	661	96	678	98	1081	157	32	49
500	932	657	95	672	98	1038	151	31	49
600	1112	657	95	675	98	1027	149	26	47
700	1292	621	90	640	93	899	130	18	28
800	1472	510	74	532	77	657	95	18	26
900	1652	288	42	306	44	349	51	30	51
1000	1832	45	7	48	7	76	11	130	99

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When you purchase high-performance materials from **Smiths High Performance**, you will be joining some of the biggest and best global engineering companies. We are a Tier 1 supply chain partner to the world's leading motorsport companies. Our unique business structure and ethos allows us to offer services which are otherwise unavailable in this market sector.

[www.smithshp.com](http://www.smithshp.com)
[info@smithshp.com](mailto:info@smithshp.com)


Unit 3, Juno Place  
Stratton Business Park  
Biggleswade SG18 8XP  
Tel: +44 (0)1767 604 708



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