

# SHP 38-644 Grade 19 (AMS 4957)

Smiths High Performance



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## Metastable Beta Titanium Alloy

### SHP 38-644 is equivalent to Beta C.

Our product is ideal for applications requiring high strength, low weight and high corrosion resistance.

SHP 38-644 is a solution heat-treated, cold-drawn titanium alloy. The alloy boasts outstanding ductility or dramatically improved tensile strength with good ductility, depending on which heat treatment process is adopted.

If solution-treated (annealed), SHP 38-644 provides the highest ductility. Solution treating & ageing give the material a 40% increase in tensile strength while still providing good ductility, superior fatigue strength and low modulus of elasticity. The time the alloy ages dictates the material's tensile strength - altering this time will modify strength to your requirements.

### Lightweight, high strength:

Boasting one of the lowest densities of all beta titanium alloys, SHP 38-644 provides an excellent strength-to-weight ratio, making the alloy highly suitable for high-strength engineering applications.

The alloy is manufactured in two ways - either by vacuum arc (VAR) or plasma arc cold hearth melting (PAM). We supply SHP 38-644 in solid round bars and provide processing services where we cut your products into more manageable billets.

### Applications:

- Fasteners
- Coil springs
- High strength structural parts
- Torsion bars

### About Smiths High Performance

Smiths High Performance is a leading stockholder and supplier of high-performance engineering materials. We are material supply chain partners supporting high-technology market sectors.



### Benefits:

- High strength (solution-treated & aged)
- Exceptional ductility when solution-treated (annealed)
- Excellent corrosion resistance
- Good fatigue strength



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Further technical data available on the reverse of this Datasheet

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## Chemical Composition (weight, %)

Element	Min	Max
Vanadium	7.50	8.50
Chromium	5.50	6.50
Molybdenum	3.50	4.50
Zirconium	3.50	4.50
Aluminium	3.00	4.00
Iron		0.30
Oxygen		0.14
Palladium		0.10
Carbon		0.05
Nitrogen		0.03
Hydrogen		0.030 (300 ppm)
Yttrium		0.005 (50 ppm)
Other, each		0.15
Other, total		0.40
Titanium		Rem

\* Properties as per AMS 4957

## After Aging

The product should have the following properties after being aged by heating to a temperature within 900 to 1050°F (482 to 566°C), holding at the selected temperature within  $\pm 10^\circ\text{F}$  ( $\pm 6^\circ\text{C}$ ) for 8 to 12 hours, cooling in air. Pyrometry shall be in accordance with AMS 2750.

## Stock Availability:

Available in solid round bars from 0.187" (4.75 mm) diameter to 0.625" (15.875 mm) diameter.

## Product Density:

0.174 lbs/" (4.82gm/cm<sup>3</sup>)

## Mechanical Properties (after ageing)

Nominal Diameter mm	Tensile Strength MPa	Elongation in 4D %, min	Reduction of Area %, min
Up to 4.75, incl	1,310 to 1,448	10	20
Over 4.75 to 9.52, incl	1,276 to 1,413	10	20
Over 9.52 to 15.88, incl	1,241 to 1,379	8	20

\* Properties as per AMS 4957

## ...where performance matters...

When you purchase high-performance materials from **Smiths High Performance**, you will join 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 allow us to offer services otherwise unavailable in this market sector.

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