

## M50 Steel Bar - AMS 6491

Alloy Steel M50 (AMS 6491) is a high-performance bearing steel. M50 alloy steel possesses a high degree of hardness, excellent resistance to wear and abrasion, and is capable of retaining its strength properties at elevated temperatures. Primarily composed of iron alloyed with substantial amounts of chromium, molybdenum, and vanadium, this versatile steel exhibits truly outstanding properties.

Its standout quality is the remarkable hardness it can achieve after proper heat treatment, ranging up to 248 HB on the Brinell hardness scale. This ultra-high hardness means that it has superb resistance against abrasive wear and superior durability under heavy bearing loads. Components made from M50 alloy steel can withstand punishing conditions that would rapidly degrade softer bearing materials.

In terms of the composition, the chromium forms hard carbide particles dispersed throughout the steel matrix, enhancing wear resistance. The molybdenum increases overall hardness and toughness. Vanadium promotes a fine-grained microstructure for greater strength.

Potential applications that capitalize on M50's exceptional properties include bearings for aircraft turbine engines, high-speed machine tool spindles, offshore oil equipment, and anywhere ultra-hard, wear-resistant bearing components are required to operate under high temperatures and loading.

| Specific Gravity   |      |      |      |       |       |      |   |     |      |      |      |     |     |
|--|------|------|------|-------|-------|------|---|-----|------|------|------|-----|-----|
| 7.84 g/cm3   |      |      |      |       |       |      |   |     |      |      |      |     |     |
| Typical Applications   |      |      |      |       |       |      | Related Specifications                    |     |      |      |      |     |     |
| Aircraft Engine Bearings<br>Helicopter Rotor Bearings<br>Gas Turbines<br>High Performance Racing Engines |      |      |      |       |       |      | AMS 6491<br>1.3551<br>1.3552<br>AIR 9160C |     |      |      |      |     |     |
| Chemical Composition (Wt %)  |      |      |      |       |       |      |   |     |      |      |      |     |     |
|  | C    | Mn   | Si   | P     | S     | Cr   | Mo  | V   | Ni   | Co   | W    | Cu  | Fe  |
| Min  | 0.8  | 0.15 | -    | -     | -     | 4    | 4   | 0.9 | -    | -    | -    | -   | Bal |
| Max  | 0.85 | 0.35 | 0.25 | 0.015 | 0.008 | 4.25 | 4.5                                       | 1.1 | 0.15 | 0.25 | 0.25 | 0.1 |     |
| Typical Mechanical Properties  |      |      |      |       |       |      |   |     |      |      |      |     |     |
| Typical Hardness (Cold Finished)   |      |      |      |       |       |      |   |     |      |      |      |     |     |

|                   |
|-------------------|
| HB                |
| Not more than 248 |

**What is M50 Steel?**

M50 is a high-carbon, high-vanadium tool steel known for excellent wear resistance and toughness. Its composition includes around 0.8% carbon, 4% chromium, 4.4% molybdenum, and 1.1% vanadium. The carbon provides hardness and wear resistance, while vanadium promotes a fine-grained microstructure for greater strength. M50 is widely used for bearings, cutting tools, punches, dies, and other wear-resistant components requiring high performance.

**What material is AMS 6491?**

AMS 6491 is the Aerospace Material Specification for M50, a high-carbon, high-vanadium tool steel.

It defines the chemical composition, mechanical properties, and heat treatment for this grade when used in aerospace applications requiring exceptional wear resistance, toughness, and hot hardness.

AMS 6491 ensures M50 steel meets strict aerospace industry standards and provides traceability. Referencing this specification guarantees manufacturers are using M50 steel that conforms to rigorous quality and performance criteria for critical aerospace components.

**What are the typical uses for M50 Alloy Steel?**

Typical uses of M50 include bearings for aircraft turbine engines, high-speed machine tool spindles, offshore oil equipment, and anywhere ultra-hard, wear-resistant bearing components are required to operate under high temperatures and loading.

\* This data has been supplied in good faith and is indicative only. It has been provided for general information purposes only and is not to be relied upon in place of the full specification. Mechanical properties can vary considerably with different supply conditions such as heat treatment or temper and product dimensions.

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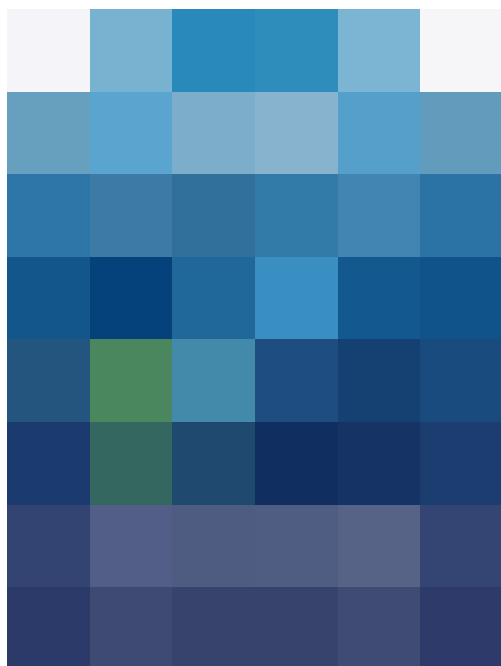
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