

# Why CPM 10V & CPM 15V for Woodturning Blades

There are thousands of wood species, and all can be turned on a lathe. Unfortunately, the wood's structure, paired with an average surface-cutting speed of 30+ mph on a lathe, creates rapid wear at the blade's edge. Regardless of the technique, a blade becomes dull and progressively worsens, resulting in torn grain.

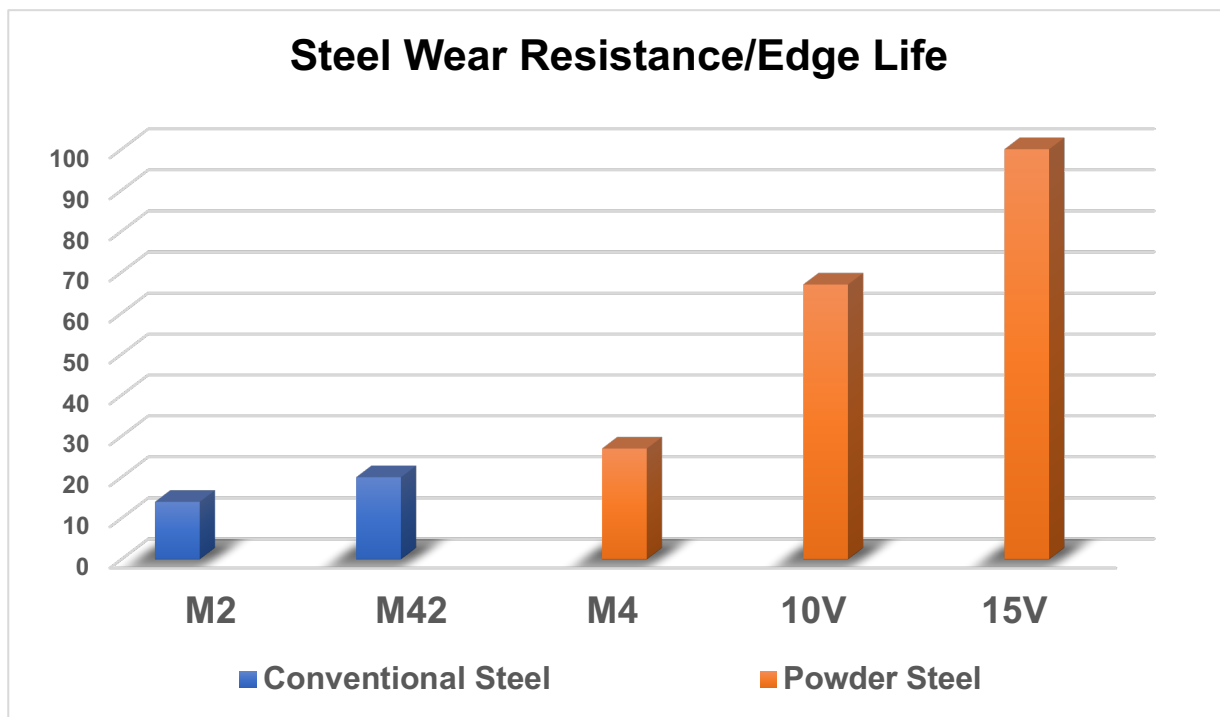
Modern powder metals have enabled the addition of a higher percentage of vanadium (the highest wear-resistant alloy) to steel, which has increased edge retention multifold.

Most woodturning tool manufacturers make their blades from M2 (2% vanadium) and M42 (1.1% vanadium & 8% cobalt). These are conventionally made high-speed steels that can work at elevated temperatures for metal cutting, a property we do not need for woodturning.

At Stuart Batty Tools, we make our edge tools from powder Tool Steel 10V (10% Vanadium) for exceptional edge life and 15V (15% Vanadium) for unsurpassed edge retention.

## Wear Resistance Equates to Longer Edge Life

While hardness plays a role in wear resistance, steel's chemistry truly matters. The three primary alloys, Tungsten, Molybdenum, and Vanadium, increase wear resistance in steel. When combined with sufficient carbon, these alloys form carbides, a key factor in steel's wear resistance.



## Hardness of Carbides

- Molybdenum Carbides 72/77 HRC
- Tungsten Carbides 72/77 HRC
- Vanadium Carbides 82/84 HRC

We developed a heat treatment process that includes a triple temper and cryogenic treatment to ensure the highest wear resistance: our 10V hardness is 60-62 HRC, and our 15V hardness is 62-64 HRC.



## **Why We Developed a Lamination Technology**

10V & 15V are high-tensile brittle steels, a quality required for a long edge life. At SB Tools, we developed a proprietary vacuum brazing technology to bond 10V & 15V to tough, hardened stainless steel. This enables us to create the strongest blades with unique shapes, enabling ultra-high-performance vibration and torn grain-free cutting.

## **Why Powder Metals**

Conventionally made steels, when molten, are poured into ingots to cool before rolling into plates or bars. When the carbide percentage exceeds 2% by volume of the steel, the carbides start to group when cooling in large ingots, making the steel too brittle for any practical use.

However, the 10V and 15V steels are made using a powder metallurgy process that involves atomizing molten tool steel into a fine powder that solidifies rapidly, preventing carbides from grouping during cooling. This powder metal is then vacuum sealed in large steel containers and subjected to extreme pressure (15,000 PSI) and high heat (2,300° F), forming solid steel again. This process produces steel with micro-carbides evenly distributed, offering exceptional wear resistance and toughness for high-carbide alloy steel.

## **Sharpening 10V & 15V**

To obtain the best cutting edge when sharpening 10V & 15V on a bench grinder, wet wheel grinder, or belt grinder, we recommend the following:

### **Bench Grinders:**

Cubic Boron Nitride (CBN) wheels from 180-320 grit for the best edge possible. Alternatively, Norton SG Ceramic wheels work fast and create a good-quality edge, but with these types of steel, the wheel will wear and groove over time and create more dust than CBN.

### **Belt Grinders:**

3M Trizact, 3M Cubitron II belts, or Norton Norax belts produce quality edges in high carbide steels but have a limited working life.

### **Wet Bench Grinders**

These generally work well with the wheel supplied for a quality, sharp edge; they are considerably slower than the other two options. However, CBN wheels are now available to fit wet-wheel bench grinders and create a superior edge.

The above grinding options create quality sharp edges by abrading the carbides to a fine edge. Low-quality aluminum oxide or silicon carbide wheels tend to chip the carbides contained in these steels and do not create as keen of an edge.

## **Laminated Blade Sharpening**

Our proprietary lamination of CPM 10V and CPM 15V to heat-treated hardened stainless steel ensures that all our blades can be easily sharpened on all the above-recommended forms of grinding, including CBN wheels.