



Not All Carbide is Created Equal

Like many industries, the woodturning market is in constant flux, with newer, sharper, faster, better tools available from across America and across the globe. For turners, traditional steel has been around since the industrial revolution, and carbide-tipped tools are relative newcomers. But what is carbide, and why should you consider making an investment in these new tools?

What is Carbide?

The term “carbide” refers to tungsten carbide, a compound made of tungsten and carbon, although nickel and/or cobalt are also added as a binder. This material is used in the manufacture of cutting and abrasion tools, dies, and wear-resistant machine parts. It’s more than twice as dense as steel¹ and outperforms all other cutting surfaces.

Industrial carbide is manufactured for use in a wide range of applications like machining tools; armor-piercing ammunition; mining and petroleum drills; surgical instruments; tire and snowmobile track studs; horseshoes; jewelry; automotive parts; and even ball-point pens.² Carbide can also be custom made through proprietary chemical composition and grinding processes: thus, not all carbide is created equal.

Carbide Grades

There are over 100 common grades of carbide; all are a combination of tungsten and carbon with a metallic binder like nickel or cobalt, as well as other additives; these grade options offer better wear resistance and/or increased toughness. Grades of carbide differ by the amount of each type of chemical in the composition, as well as by grain size, and the grinding methods used.

On an industrial scale, these grades have standard measures of each ingredient, and manufacturing engineers determine which grade works best for their particular application. For example, adding more cobalt makes the carbide softer but more impact-resistant; less cobalt makes it harder but more brittle.

The size of the carbide grains also determines the mechanical properties of the final product; the size of the grains depend on the size of the tungsten oxide particles, and how long and at what temperature the oxide/carbon mixture is processed.¹

Grinding and Polishing

Carbide finishing incorporates a grinding process to create the sharpest edges possible. Mass-produced carbide often goes through a process called flat lapping, which uses a lap, a grooved surface along with an abrasive like micron-sized diamond powders or slurry, to polish the edges or top surface and giving a shine to the surface. Unfortunately, lapping produces microscopic fractures in the carbide³, which can negatively affect its hardness and durability of the cutting edge.

Carbide and Woodworking

Woodworkers can find carbide in router bits; CNC equipment; saw blades; and more, but companies using carbide for shapers and planers quickly discovered that if one of the carbide bars chipped, they had to replace the whole bar, which was expensive. In an attempt to save money and streamline manufacturing processes, carbide cutting inserts were introduced. It was a parallel development that showed carbide-tipped tools would be perfect for lathe work and woodturning.

Carbide Woodturning Tools

In 2008, Easy Wood Tools (EWT) became the first company to develop carbide-tipped turning tools for professional woodturners and hobbyists. The company's goal was to find a carbide manufacturer who could create the sharpest, longest lasting carbide in the industry, designed specifically for woodturning: Easy Wood Tools partnered with Total Engineered Products (TEP), an Illinois-based company that specializes in custom, small-batch carbide.

Working closely together, TEP and EWT tested many grades of carbide, geometries, grinding processes, and tip designs to develop the first carbide-tipped turning tools for woodturners. Their collaboration launched a new market that has been growing exponentially, with carbide turning tools now outselling traditional steel tools.

Carbide Today

Imitation is the sincerest form of flattery, and now there is a wide range of carbide-tipped turning tools available in this growing market. Some companies use standard-grade carbide that is made for other purposes but still work for wood; others buy less expensive grades because lower prices appeal to consumers. But it's important to remember that the highest-quality carbide lasts the longest, is the sharpest, and is more cost effective in the long run.

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