TUNGSTEN CARBIDE: WEAR RESISTANT, HARD, AND DURABLE

AN EFFECTIVE SOLUTION FOR DIFFICULT WEAR PROBLEMS

HELPING PARTS PERFORM
Wear, impact, corrosion, and heat all affect the life and efficiency of wear parts. Carbide has many features that help parts perform more effectively by resisting wear and extending work life.

IMPACT STRENGTH
Repeated high-energy impacts can make steel parts deform and deteriorate more rapidly. Carbide has high-impact strength and can resist wear and impact applications far longer than steel or ceramic. This results in fewer repairs and replacement parts and lower operating costs.

HARDNESS
Carbide hardness can be almost as hard as diamond and harder than tool steels. High hardness results in greater wear resistance in abrasive applications. Carbide wear parts last longer.

CORROSION EFFECTS
Certain carbide grades have special binders with nickel and chrome to increase corrosion resistance. Carbide grades can have corrosion resistance to handle environments with acetone, ethanol, gasoline, ammonia, most bases, weak acids, tap water and other organic solvents.

WEAR RESISTANCE
Steel parts, that experience extreme abrasion, do not last as long as carbide wear parts. In most instances, carbide will outwear typical steel by a factor of 25 to 1 or more!

HEAT RESISTANCE
Carbide can perform reliably at temperatures where other materials would begin to soften. As steel heats up, it begins to expand and loses hardness thus decreasing wear resistance. Tungsten does not anneal and can be used in environments with temperatures approaching 1800°F.

THE MATERIAL THAT CUTS STEEL, ROCK, AND WOOD!
Cemented Tungsten Carbide is an extremely hard and wear-resistant material - a man-made composite material that takes advantage of the properties of very hard carburized tungsten particles bonded in a matrix of cobalt. The tungsten carbide gives abrasion resistance while the cobalt binder provides the toughness. Carbide and Hard Metal are two nicknames!

In its most basic form, carbide is a fine gray material made up of microscopic particles of carburized tungsten held together with a cobalt binder. Sintered under high temperature, the cobalt melts and cements the particles of tungsten together to form a variety of shapes. These shapes can then be utilized in various industrial, military, and consumer applications.

Carbide shapes are used for machining steel, as tips for rock drills, as saw blade teeth, for protecting industrial parts from wear, as piercing projectiles, and as beautiful jewelry. Carbide is unique because it has the highest hardness, toughness, density, and compressive strength of all known carbides. Carbide is the combination of these characteristics produces a high-performance, highly wear-resistant material. Its effectiveness can be further enhanced by tailoring its chemistry for specific applications.

MIXED, HEATED, PRESS, AND POLISHED
Described as powder-metallurgy, the manufacturing process begins with fine carbide powder and a binder material, such as cobalt or nickel, depending on the desired characteristics of the final product. Carbide properties are adjusted by varying the particle size, and percentages of tungsten carbide, and binder recipe.

Next the powder is compacted in a die to form a specific size and shape. These are called blanks. During this process, the blanks are the consistency of dense chalk, but are still soft and can be machined. Rectangles, cylinders, and round bars are common shapes pressed in these dies.

Using pressure and heat, the blank is processed in a high-temperature sintering furnace. After this step, the blank has become cemented tungsten carbide, and now have the high hardness and wear-resistant characteristics.

After cooling, the sintered carbide component are ready for use, or they could go through secondary operations including EDM, grinding, lapping, and/or polishing processes as required. Carbide is very difficult to machine at this point and requires diamond tooling.

HOW CAN TUNGSTEN CARBIDE HELP YOU?
We are pioneers in the engineering and application of carbide for industrial wear parts. We develop and produce wear solutions for industries ranging from material handling, ground-engaging wear parts, power generation, mining, mineral processing, oil and gas, railroad maintenance, and pet food production to name a few. Give us a call, send us an email, or see our brochures to see how carbide can go to work helping your company reduce downtime and increase productivity!