

HYDRO CARBIDE

Hydro Carbide

Hydro Carbide has a wide range of quality tungsten carbide products designed to meet your specific needs using the latest technology including CAD-CAM, electronic transfer of information and CNC machinery.

The Hydro Carbide plants are leading suppliers of preformed tungsten carbide compositions for a variety of markets. The operations enjoy a leadership position in tungsten carbide rods, die parts, rolls, and other products for the metalworking market, and are major suppliers of nozzles, studs, and substrates, valve parts, bearings and other wear parts for the oil and energy industries.

The 45,500 square foot Latrobe, PA Hydro Carbide plant blends tungsten carbide powders with cobalt or nickel binders to create 25 grades of materials that are then pressed and machined by state-of-the-art equipment for the rotary tool and die fabricating markets.

At the 35,000 square foot Gulfport, MS facility, products are mechanically pressed by specially designed equipment, then machined, sintered, and finished ground to exact size and geometry. Primary markets include rotary tool and fabrication, and rock drilling.

In addition to the quality, purity and precision of its products, the two Hydro Carbide operations are known throughout for service and quick turnaround and are supported by warehouse inventories for off-the-shelf delivery in Los Angeles, CA and Singapore. Other industries served include polycrystalline diamond production, container tooling, and fluid handling.

The staff at Hydro Carbide is available to customers for problem solving or product development assistance.

**Quality and Vision
make Hydro Carbide
the Right Choice**



The HIP process is considered beneficial to most properties. The need for HIP should be assessed on an application and performance basis.

Hot Isostatic Pressing

HIP (Hot Isostatic Pressing) involves the use of gas pressure (15,000 psi) as a post treatment to the sintering process. We also have Low Pressure (800psi) Sinter HIP Furnaces that Sinter/HIP in the same process. Hydro experts are available to help you determine the correct process for your grade of carbide and the intended application for your tooling.

Many users have adopted HIP as an insurance policy against defects and to minimize physical property variations; but with this "policy" you have a premium involved. Hydro Carbide provides both Sinter/HIP and High Pressure HIP treated material as well as high quality vacuum sintered material.

If you have any further questions or wish to discuss specific applications and benefits, please call at your convenience.



The Hydro Carbide Group is the fastest growing manufacturer of standard and special rod for the production of endmills, drills, reamers and special tools, including coolant hole blanks.

Standard Rod and Burr Products

Hydro Carbide is the fastest growing manufacturer of standard tungsten carbide rod and burr blanks in the United States. For producers of rotary tooling, Hydro Carbide specializes in fine grain HC-290 (C2) and submicron HC-US06, HC-US10, HC-US11, Ramet 1[®] and HC-US16. Ultra fine grades (Nano Phase) are the newest selection offered in 8%, 10%, & 12% cobalt.

Most standard inch and metric size rods are delivered from stock. Special non-standard grades or sizes are shipped in two weeks. Ground and unground rod is available 1/32 inch diameter and larger and up to 12 inches plus in length.

Hydro Carbide is known for quality and consistency. All fixed length rod is mechanically or hydrostatically pressed. The philosophy of Continuous Process improvement affords Hydro Carbide excellent process control and the ability to produce only the highest quality material. All parts are straight, round and have minimum grind stock to remove.



Preforms for the Rotary Tool Industry

Hydro Carbide is the preferred supplier of tungsten carbide preforms of many specialty round tool manufacturers. Our custom preforms have less grind stock to remove, which allows toolmakers to realize considerable cost savings. Preformed round tool blanks are used in production of gun drills, coolant hole tools, special burrs, double-ended endmills, slot cutters, reamers, step tools, combination drill and countersink tools, ball nose endmills and tools requiring centers. Special preforms are available in standard metal cutting grades, special grades, large or small quantity orders and are normally shipped in two weeks. All rotary tool preforms are either isostatically or mechanically pressed. Our manufacturing methods eliminate the possibility of metallurgical imperfections.



Hydro Carbide is also a major supplier of nozzles, compacts, hard trim, and other wear parts for the oil and energy industries. From our plants in Pennsylvania and Mississippi, we manufacture products such as special rotary tool blanks, saw blanks, slitters, seals, and a host of other specialized wear parts.

Rotary Slitter Knives and Edge Trimmers

For customers in the metal producing industry, Hydro Carbide manufactures tungsten carbide slitter knives and edge trimmers which meet or exceed the toughest metallurgical requirements. Grades are available for every application. Submicron grades offer good resistance to wear and impact while maintaining excellent edge strength for slitting most materials. Medium and course grade materials offer exceptional impact resistance for heavy shearing. Carbide slitters are produced up to 13 inches in diameter and blades can be made up to 20 inches long.

Carbide components from Hydro Carbide outlast the same parts made from steel by at least 10 to 1.

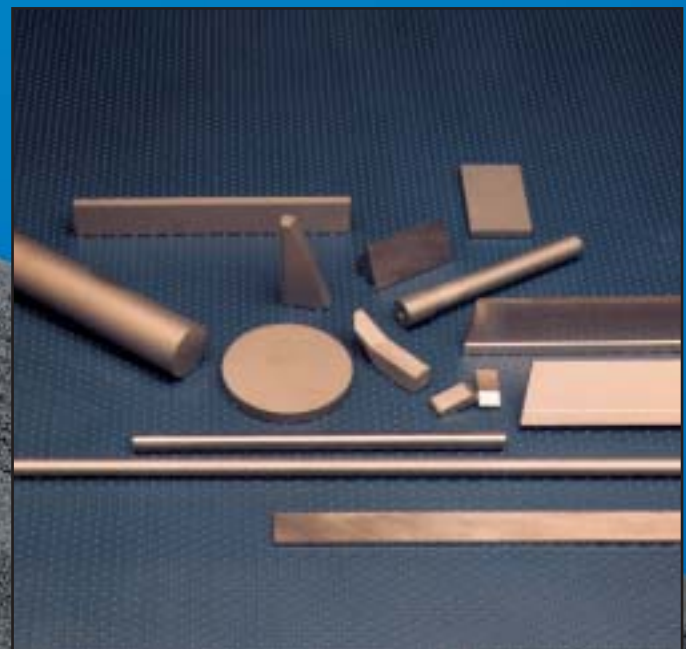


Blades and Tips for Toolmakers

For manufacturers of tungsten carbide tools, Hydro Carbide offers underground blanks with minimum grind stock to remove. Parts are carefully made and inspected to insure that they are straight, flat, of proper size and correct metallurgically.

We will custom make blanks in grades that meet your needs. Grades range from submicron, which offers exceptional wear resistance, to course for heavy impact applications. Additionally, fine grain and mixed grain compositions are produced in various cobalt percentages for use in operating conditions requiring both wear and impact resistance.

Blanks are typically used to fabricate metal cutting tools, woodworking tools, chopping blades and gravers.



Skilled craftsmen use CNC equipment to form tungsten carbide into shapes unavailable elsewhere. Accurate near net size preforming minimizes the amount of grinding and EDM necessary to finish the part. In certain instances, tungsten carbide components from Hydro Carbide outlast steel 100 to 1.

Preforms for the Die Industry

Hydro Carbide has long been considered the industry's premium supplier of tungsten carbide die preforms. Because of the outstanding material quality and purity of each grade, our preforms give excellent performance in tough stamping, laminating, extruding, powder compacting, drawing, forming and cold heading applications.

Our carbide specialists work with die makers and end users to select any of 25 standard grades or custom design special compositions for specific applications. Components are produced up to 12 inches in diameter and 20 inches long. Rectangular and round shapes are made with bolt holes, brazed steel plugs and special cutouts. Die blanks for wire or conventional EDM are sintered with or without start holes. All die metal used for EDM is subjected to a proprietary stress relieving process. The procedure prevents stress related material failure during EDM. High pressure hot isostatic processing is available for most parts.



Nozzles, Valves and Bearing Components for the Fluid Handling Industry

There are numerous proven applications for wear resistant Hydro Carbide products in valves, pumps, compressors and metering devices. In some instances, tungsten carbide parts have outlasted steel by over 100 to 1.

Tungsten carbide wear and structural components are used in power generating stations, mines, refineries, drilling rigs and factories. The outstanding strength, wet and dry wear resistance, rigidity, high and low temperature hardness, stability and corrosion resistance of tungsten carbide help engineers design components with physical properties unavailable with any other material.

Skilled craftsmen at Hydro Carbide form tungsten carbide into unique shapes. Grades range from 3% cobalt (high hardness, wear and corrosion resistance) to 23% cobalt (heavy impact) and each is manufactured to exact customer specifications.



Metalworking rolls and oilfield components are designed and built to provide outstanding performance in the toughest environments.

Rolls and Rings for the Metal Producing Industry

For the metal producing industry, Hydro Carbide manufactures tungsten carbide hot and cold mill rolls, flattening rolls, slitter knives, edge trimmers, scrap chopper blades, saws, guides and other parts suitable for use in tough mill environments. Our grades range in hardness from 93.5 RWA to 83.5 RWA.

Hydro Carbide rolls and slitters are produced as large as 13 inches in diameter and up to 20 inches long. The materials are 100% dense and components such as work rolls are often finished to 1 RMS. Other mill products include burnishing, capstan, rod mill, turks head, Koch mill, wire flattening and tube mill rolls.



Compacts for the Drilling and Mining Industry

For manufacturers of rock drilling tools, Hydro Carbide produces components that perform well even under the most difficult conditions. Hydro Carbide drilling compacts, studs, geophysical inserts, flat top compacts and drill stabilizer products are produced by direct pressing from carbide grades of medium to coarse grain structure and from 10% to 19% cobalt.

Our Gulfport, Mississippi manufacturing facility is strategically located to service the needs of OEM producers of earth drilling tools. Location, efficiency, and years of experience in pressing carbide make this first class carbide plant the preferred supplier of drilling components for some of the world's largest rock bit, water well bit, geophysical and drill stabilizer manufacturers.

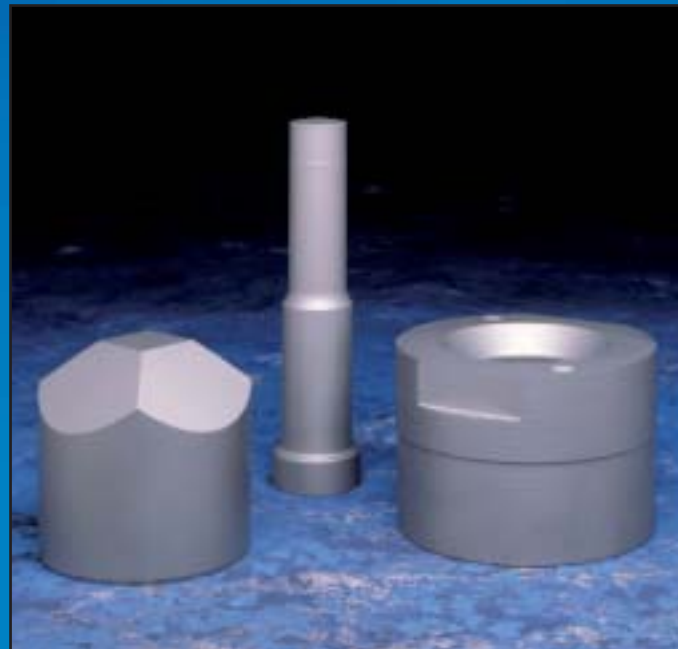


Defect free material from Hydro Carbide is ideal for ultra high pressure tooling for the production of diamond and other superhard materials.

Ultra High Pressure Tooling and Wear Parts

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Our carbide specialists work with die makers and end users to select any of 25 standard grades or custom design special compositions for specific applications. Components are produced up to 12 inches in diameter and 20 inches long. Rectangular and round shapes are made with bolt holes, brazed steel plugs and special cutouts. Die blanks for wire or conventional EDM are sintered with or without start holes. All die metal used for EDM is subjected to a proprietary stress relieving process. The procedure prevents stress related material failure during EDM. High pressure hot isostatic processing is available for most parts.



Intricate Shapes

There are numerous proven applications for wear resistant Hydro Carbide products in valves, pumps, compressors and metering devices. In some instances, tungsten carbide parts have outlasted steel by over 100 to 1.

Tungsten carbide wear and structural components are used in power generating stations, mines, refineries, drilling rigs and factories. The outstanding strength, wet and dry wear resistance, rigidity, high and low temperature hardness, stability and corrosion resistance of tungsten carbide help engineers design components with physical properties unavailable with any other material.

Skilled craftsmen at Hydro Carbide form tungsten carbide into unique shapes. Grades range from 1.5% cobalt (high hardness, wear and corrosion resistance) to 23% cobalt (heavy impact) and each is manufactured to exact customer specifications.



Typical Nominal Properties

GRADE	GRAIN STRUCTURE	GRAIN SIZE Average/ microns	GRAIN SIZE Range/ microns	COBALT %	HARDNESS Ra	DENSITY g/cc	TRS Average/ 1000 PSI	HARDNESS HV ₃₀
HC UF08	ULTRA FINE	0.5	0.01-1.0	8.0	93.5	14.6	515	1820
HC UF10	ULTRA FINE	0.5	0.01-1.0	10.0	93.0	14.4	555	1750
HC UF12	ULTRA FINE	0.5	0.01-1.0	12.0	92.5	14.2	625	1680
HC USO6	SUBMICRON	0.8	0.2-2.0	6.0	93.0	14.85	350	1750
Ramet I®	SUBMICRON	0.8	0.2-2.0	10.0	92.2	14.45	450	1640
HC US10	SUBMICRON	0.8	0.2-2.0	10.0	92.2	14.45	450	1640
HC US11	SUBMICRON	0.8	0.2-2.0	11.0	91.7	14.4	465	1580
HC US15	SUBMICRON	0.8	0.2-2.0	14.0	90.5	14.1	475	1440
HC US16	SUBMICRON	0.8	0.2-2.0	16.0	90.8	13.85	550	1470
HC 200	FINE	1.5	0.8-5.0	3.0	93.0	15.23	275	1750
HC 290	FINE	1.5	0.8-5.0	6.0	91.8	14.95	340	1590
HC 292	FINE	1.5	0.8-5.0	6.0	92.2	15.02	350	1640
HC 400	FINE	1.5	0.8-5.0	9.0	91.3	14.62	365	1530
HC 410	FINE	1.5	0.8-5.0	11.5	90.5	14.37	400	1440
HC 500	FINE	1.5	0.8-5.0	13.0	90.0	14.22	410	1380
HC 550	FINE	1.5	0.8-5.0	14.0	89.5	14.12	405	1330
HC 600	FINE	1.5	0.8-5.0	15.0	89.0	14.02	425	1280
HC 291	MEDIUM	3.2	1.5-7.0	6.0	91.2	14.92	310	1520
HC 510	MEDIUM	3.2	1.5-7.0	11.5	89.8	14.37	350	1360
HC 509	MEDIUM	3.2	1.5-7.0	12.0	89.0	14.32	425	1280
HC M112	MEDIUM	3.2	1.5-7.0	13.0	88.5	14.22	450	1230
HC 700	MEDIUM	3.2	1.5-7.0	19.0	85.2	13.62	440	950
HC M105	COARSE	4.5	2.0-10.0	10.0	88.2	14.52	400	1200
HC M155	COARSE	4.5	2.0-10.0	15.5	86.3	13.97	420	1030
HC 800	COARSE	4.5	2.0-10.0	23.0	83.5	13.25	430	830

Our Quality Control Department establishes standards for all tungsten carbide grades. Control checks are performed at each operation. Chemical analysis and grain size are checked to assure all products conform to standards. Test pieces are made

to determine physical properties: hardness, transverse rupture strength and density. Fractured and polished surfaces are examined micrographically, and test results of each lot are recorded. Certifications of test results are available.

Hydro Carbide

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