



DIAMONDBACK  
NOZZLES

# Worry-Free 3D Printing

Precision Print | Any Filament | Longer Life



## Breakthrough Technology Solid Diamond Tip

IMPROVES PRINT QUALITY AND LOWERS  
OVERALL PRINTING TEMPERATURES

### PRECISION PRINT

Our nozzles rely on a solid diamond tip to improve precision printing. The tip is not a diamond coating, but rather a solid diamond substrate made of polycrystalline diamond. Not only is our diamond the hardest material in the world, but it also provides best-in-class thermal conductivity or heat transfer capability that exceeds the thermal properties of copper, brass, tungsten carbide, steel, and ruby. The DiamondBack nozzle tip easily transfers heat from the hotend through the nozzle and into the filament--ensuring more precision printing and better layer adhesion on every print.

### ANY FILAMENT

The DiamondBack relies on a proprietary and patented diamond technology. This breakthrough technology allows 3D printers to print any filament on the same nozzle. A DiamondBack can easily print standard PLA and ABS filaments AND highly abrasive carbon fiber-embedded filaments without having to worry about changing out the nozzle.

### LONGER LIFE

The Polycrystalline Diamond (PCD) used in every DiamondBack nozzle will significantly extend the overall life of the nozzle. The extreme hardness, wear resistance, and thermal conductivity of this unique material make it an ideal solution for 3D printing.

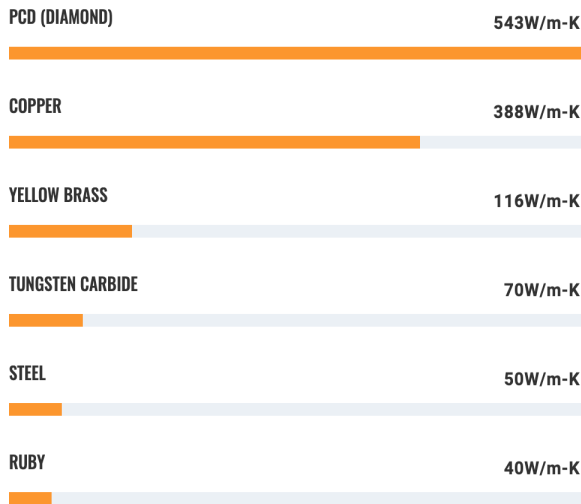
This unique technology delivers high thermal conductivity, low coefficient of friction, and high fracture toughness. Our PCD is extremely resistant to abrasion and has extended the tool life of other applications in other industries by 2 to 8 times the life of tungsten carbide and other hard metals.

### WHY DIAMOND

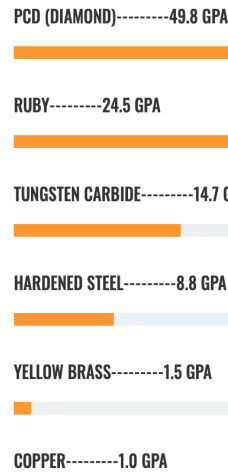
Professional 3D-printing companies and 3D-printing enthusiasts understand the benefits of cost, quality, speed, and flexibility when printing actual parts. Unfortunately, the development of embedded filaments (carbon fiber, glass, metals) is creating an even bigger need for more abrasion-resistant nozzles. To address this limitation and others of brass, professional 3D-printing companies and 3D-printing enthusiasts are considering specialty nozzles made of steel, tungsten carbide, ruby, and now diamond.

DiamondBack™ Nozzles deliver unmatched wear-resistance and versatility.

## THERMAL CONDUCTIVITY



## HARDNESS



### WHAT'S INSIDE

The diamond technology inside of our nozzles consists of randomly oriented diamond particles that have been fused together under high-pressure, high-temperature conditions in the presence of a catalytic metal. Using our patented cubic press technology, we sinter these individual crystals in each nozzle tip into a coherent diamond structure. This sintering takes place under extreme pressures (1 million pounds per square inch) and temperatures (1200 degrees Celsius). Sintered diamond provides greater toughness and durability than even single-crystal diamond because the individual crystals in a sintered body have formed diamond-to-diamond bonds that eliminate the natural cleavage planes that would run through a single-crystal diamond. These randomly oriented diamond particles in PCD prevent cracks from propagating along the weak planes where traditional diamond crystals cleave most easily.

### FEATURES AND BENEFITS

- Prints any filament—no nozzle change out required
- Improves layer adhesion and quality
- Has a solid diamond tip, NOT a diamond coating
- Is easier to clean and reduces tip clogging
- Delivers unmatched wear resistance
- Lowers required operating temperature
- Improves extrusion efficiency
- Is made in the USA

### WHO WE ARE

The DiamondBack Team is part of US Synthetic. Our team has been developing world-class diamond products for the energy industry for more than 40 years. Members of the team recently developed a proprietary Polycrystalline Diamond (PCD) nozzle to be used in 3D printing that can handle the most challenging filaments and applications.



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