



Info CVD Turning Tools

CVD is generally recommended for machining non-ferrous materials where high abrasion resistance is required. This means it can be used on a wide range of materials : Aluminium-, copper-, brass- and bronze alloys, metal matrix composites, graphite, glass-reinforced plastics and carbon fibre-based materials, sintered and pre-sintered tungsten carbide and plastics and rubber. In these cases the surface quality as well as the tool life of CVD will exceed those of PCD. For example on AlSi and Al-bronze alloys the CVD has a 1,5 to 2 times longer tool life than PCD. On graphite it has even a tool life up to 3 times better combined with a better surface quality.



Tungsten Carbide Parts

Cutting Tungsten Carbide with CVD diamond

Test results have shown that tungsten carbide is machinable with good results. Normally Tungsten Carbide is ground, but turning has some advantages:

- More flexibility on produced shapes and forms.
- Shorter production time
- Better surface finish, less polishing

Tungsten Carbide to be cut has to have the following two properties:

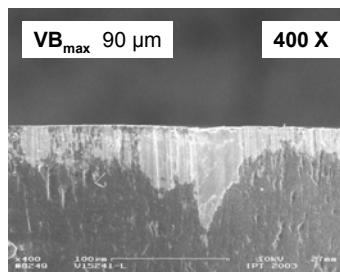
- Larger Cobalt content than 6%. Lower than this is possible but will give shorter tool life.
- Fine grain size (<1µm). Larger grain size results in too much abrasive wear and shorter tool life.

It is possible to achieve an average surface finish of a Ra value between 0,1 and 0,2µm with beside mentioned cutting parameters. The tests have been done on a rigid Hembrug Hydrostatic Turning machine. Obviously, rigidity of the machine has an impact on the result.

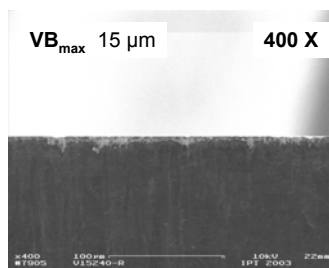
Toolradius	: 0,8 mm
Speed	: 60 – 120 m/min
Feed	: 0,015 – 0,04 mm/rev
Cutting depth	: 0,01 – 0,05 mm
Coolant	: Air

Tool life comparison

A traditionally ground CVD tool and a Contour CVD tool have been tested to cut the same volume of Tungsten Carbide with 10% Cobalt content and a Hardness of HV1680. Below pictures show the dramatic difference in wear pattern.



Wear on ground CVD cutting edge.



Wear on Contour CVD cutting edge.

The cutting edge preparation of the CVD diamond developed by Contour Fine Tooling offers the highest possible edge sharpness in combination with high wear resistance. This reduces production time dramatically (no grinding and less or no polishing) and more flexibility on produced shapes and forms.

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