

CUTTING TOOL ENGINEERING®

A man wearing a green military helmet and binoculars is looking through a field of tall grass. The background is a blurred natural setting. The man is wearing a dark suit jacket, a white shirt, and a dark tie. The binoculars are black and have a strap around his neck. The overall tone is professional and focused.

October 2008 | Vol. 60 | Issue 10
www.ctemag.com

On Target

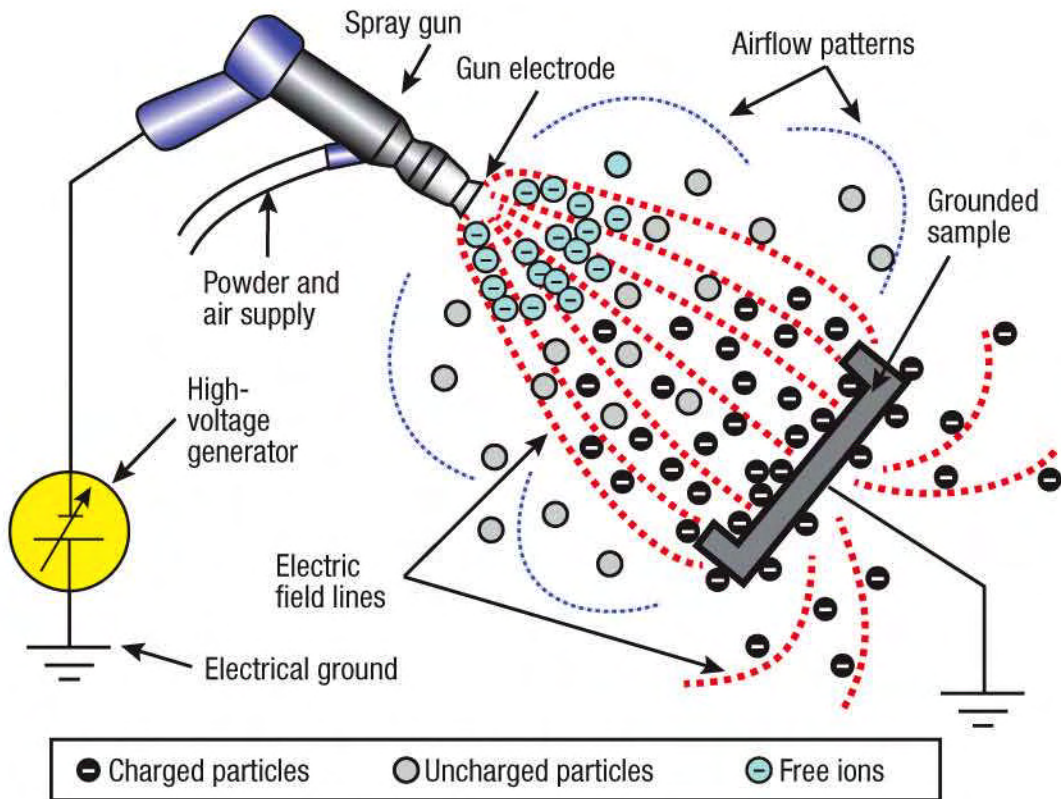
Shops try new strategies
to capture military part contracts

Plus:

Cubic boron nitride tool coatings: coming soon?

Making micro electrodes for sinker EDMs

Finding flexibility and savings with portable CMMs



Application of a coating using electrostatic spray coating involves physically spraying nanoparticles and/or microparticles in a powder or suspension form under the influence of an electric field to allow them to assemble in a desired form and thickness.

NanoMech

Coating's *Holy Grail*

Commercialization of cubic boron nitride coatings has proven elusive, but a two-step process for coating cutting tools with CBN is expected to come to market 'soon.'

By Alan Richter, Editor

If the hardest known material, diamond, can be coated onto cutting tools, then why isn't CBN, the second hardest material, commercially available as a tool coating? Moreover, why even bother with such coatings when CBN isn't on top of the hardness podium?

The short answer to the latter query is that CBN provides outstanding thermal stability, high abrasive wear resistance and chemical inertness when applied for cutting ferrous alloys, whereas diamond's aggressive reaction with iron at the high temperatures generally reached when machining prevents diamond from being effectively used as a tool material for cutting ferrous alloys.

Answering the first question is a bit more complicated. Nonetheless, Duralor LCC, Springdale, Ark., an offshoot of NanoMech LLC, Fayetteville, Ark., has developed TuffTek CBN-based composite coatings using a technology it licensed from the University of Arkansas-Fayetteville. The technology is reportedly close to commercialization.

CBN Coating Challenges

Research on synthesizing CBN coatings via thermal chemical vapor deposition and plasma-assisted physical vapor deposition (PVD) began in the early 1980s, shortly after pioneering work on CVD diamond coatings showed posi-

tive results, according to Dr. Dennis T. Quinto, a surface engineering consultant with more than a quarter century of experience in cutting tool and coating technologies.

Unlike diamond, CBN doesn't occur naturally, but similar to diamond it can be synthesized into bulk crystalline form, and polycrystalline cubic boron nitride- and PCD-tipped carbide tools are readily available. "The applications for diamond and PCBN tools do not overlap," Quinto said.

In addition, diamond coatings are successfully deposited by CVD and PVD processes, but CBN does not seem amenable to CVD. It can, however, be