

Tribomet® Abrasive Coatings

Tribomet® coatings are electro-deposited composites that are applied by a patented process. The coatings are produced when particles, which are kept in suspension within an electroplating bath, settle onto the component, and are fixed by the depositing metal.

Abrasive coatings are produced when a monolayer of abrasive particles such as cubic boron nitride (cBN) is co-deposited with a thin adhesion (tack) layer of nickel. The cBN is then secured by an infill composite layer of either cobalt/chromium carbide (Tribomet TBT406) or MCrAlY (Tribomet TBT429 or TBT412). The latter is heat treated to form an alloy (see Figures 1 and 2).

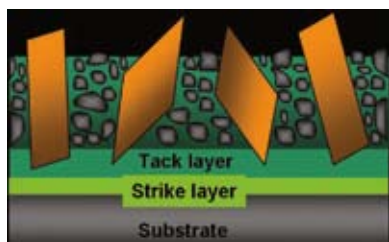


Figure 1. Schematic showing formation of Tribomet abrasive coating



Figure 2. Cross section of Tribomet TBT406 coating

Tribomet abrasive coatings are applied to rotating parts of gas turbine engines such as turbine and compressor blade tips and labyrinth seals. If contact between a stator and a rotor occurs, interactions between the abrasive and abradable counterface coatings can cut a machined gas path seal and also prevent the generation of thermally induced cracking of the rotor as a result of friction heating. This enables a design that reduces the gap between stator-rotor assemblies to improve fuel efficiency.

Advantages

- Coatings can be applied to complex and critical areas accurately and repeatably
- Flexibility with selection of abrasive materials of varying particle sizes and alloy matrices
- Excellent adhesion >30,000 psi
- Creates excellent seals against ceramic and metallic counterfaces
- Plated to finish dimensions
- 100% dense coating
- Applied to low- or high-volume manufacture
- No thermal distortion of component
- Coatings with MCrAlY infill are diffusion heat treated over a wide range of temperatures (typically 1000°C to 1150°C)



Figure 3. Gas turbine blades coated with Tribomet abrasive tip coating; magnified top view of Tribomet TBT406 coating

Applications

Typical applications include aviation, power generation, and marine.

Base Materials

Tribomet coatings can be applied to aluminum, steel, and cobalt- and nickel-based alloys. Components can be cast, forged, rolled, or extruded.

Coating Characteristics

Tribomet TBT406 – Cubic boron nitride (cBN) 200/230 mesh, cobalt chrome carbide infill; applied to labyrinth seals and compressor components; operating temperatures typically <700°C

Tribomet TBT412 – Cubic boron nitride (cBN) 140/170 mesh, CoNiCrAlY bond coat and infill; applied to turbine tips and seals; operating temperatures typically 950°C

Tribomet TBT429 – Cubic boron nitride (cBN) 100/120 mesh, NiCoCrAlY infill; applied to turbine tips; operating temperatures typically >1000°C