

TRIBOMET® Wear Control Coatings

The Technology

Praxair TRIBOMET® coatings are electrodeposited composites which are applied by a patented deposition process. They are produced when particles are kept in suspension within an electroplating bath, settle onto the component and become fixed by the depositing metal, Fig.1.

TRIBOMET® wear resistant coatings can operate at elevated temperatures and are produced from electroplated cobalt and fine particles of chromium carbide, Fig.2. There are two versions of the coating, T104C and T104CS which have different amounts of carbide. Excellent wear resistance is due to their ability to form an adherent oxide which readily forms a glaze on sliding contact which prevents adhesive wear, Fig.1. The higher carbide composite T104CS can be used in the heat treated form with an increased hardness, corrosion resistance and hammer wear resistance and is a very good replacement for hard chrome and other galvanic coatings.

Applications –

Aerospace, Automotive, Gas Turbines, and General Engineering.

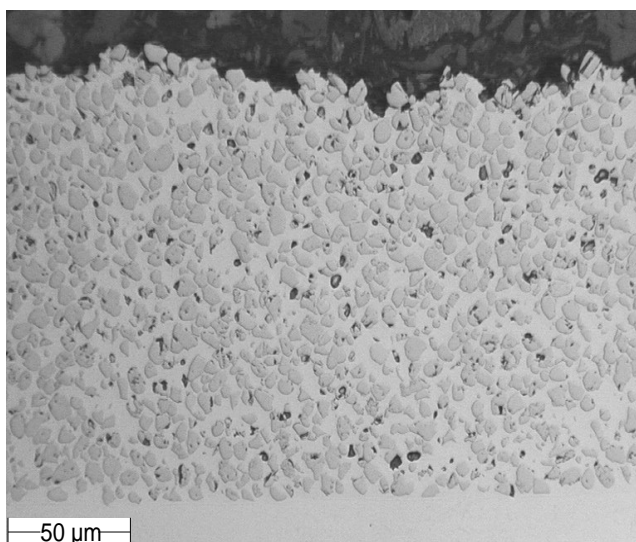
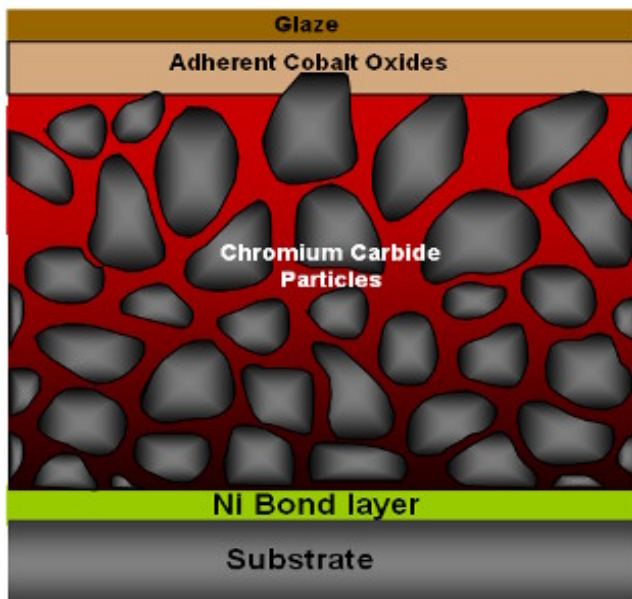


Fig. 2 - T104CS Coating Microstructure

Coating Characteristics:

- **T104C** - Carbide content 12-28 wt%, Nominal Hardness 300 HV. Maximum Operating Temperature 700°C. Typical coating thickness 0.08mm – 0.130mm after final machining.
- **T104CS** - Carbide content 30-40 wt%, Nominal Hardness 450 HV. Maximum Operating Temperature 900°C. Typical coating thickness 0.08mm – 0.130mm as plated.
- **T104CS Heat Treated** - Carbide content 30-40 wt%, Nominal Hardness 700-800 HV, Maximum Operating Temperature 900°C. Typical coating thickness 0.08mm – 0.130mm as plated.

Advantages

- Provides excellent resistance to fretting and abrasive wear.
- Non line of sight faces and internal bores can be coated.
- Excellent adhesion >30,000 psi.
- Operating temperatures of up to 900°C (T104CS).
- Coatings are 100% dense.
- Suitable for high and low volume manufacturing on both repair and OEM.
- No thermal distortion of components.
- Pre-oxidation heat-treatment will further improve wear resistance for applications operating <300°C.
- Applicable to most metallic substrates.
- Can be coated to size or ground.
- Very suitable for applications in contact with titanium alloys.
- Very good as replacement for hard chrome and other galvanic coatings.

Praxair Partnership Approach

- Optimization of TRIBOMET® coatings are achieved when the coating has been “designed in”.
- The Weston facility is the home of PST’s Global TRIBOMET® Research and Development.
- Capable to support customer’s applications and discuss the possibilities for new coating chemistries.

Suitable Base Materials

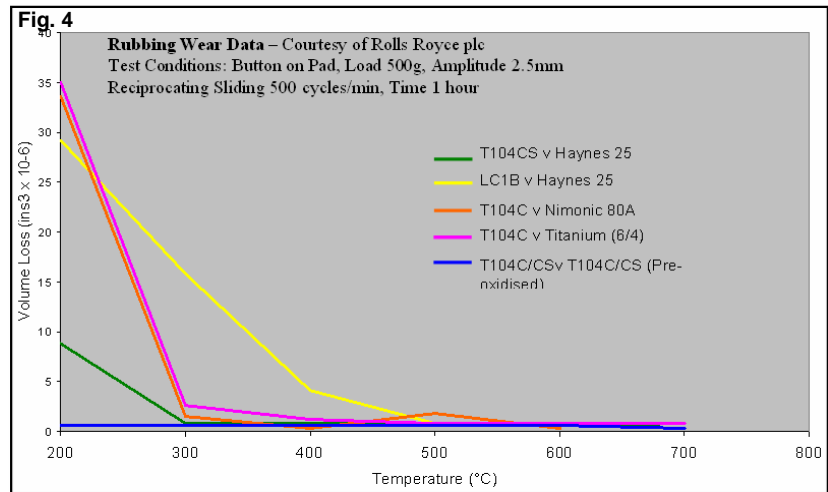
- TRIBOMET® coatings can be applied to steels, aluminium, nickel and cobalt based alloys.
- Components can be cast, forged, rolled or extruded.

Grinding of Tribomet

- TRIBOMET® coatings may be used as-plated or ground to finished dimensions.
- TRIBOMET® coatings have an as-plated surface finish of 1 – 2µm Ra.
- Ra can be further improved by grinding, lapping, vibro finishing or honing.

Why TRIBOMET® T104C and T104CS?

- Take market leading wear control coatings of today and:-
- Make it smoother!
- Make it 100% dense!
- Make it tougher!
- Add non-line-of-sight benefits!
- Significantly increases the wear resistance!
- Fig. 4 & 5 show rub wear and hammer wear test data for T104C and T104CS wear control coatings against other comparative wear control coatings.



Quality Assurance and Approvals

- Praxair Surface Technologies is committed to ensuring every product is made in accordance with our quality standards and our development and production partners:-
- Performance Review Institute – Aerospace Standard 9100 (PRI - AS9100).
- National Aerospace and Defense Contractors Accreditation Program (NADCAP).
- Rolls-Royce.
- General Electric (GE).
- British Aerospace (BAE Systems).
- Pratt & Whitney.
- Safran Group.

