TECHNICAL OVERVIEW

UCT FORESTRY

Technology Overview

EXO™ Surface Enhancement

THE EXO™ ADVANTAGE

UCT Coatings is a leader in metal finishing technology development. Our patented fifth-generation coating technology offers a solution to the performance challenges faced by many industries. The UCT Forestry's family of products and surface enhancement solutions addresses the issues of improved performance, lower costs, and increased bottom line profits for the forestry products industry.

> EXO™ is a multi-functional coating that increases wear performance and reduces friction on forestry industry

EXO™ offers a broad range of functional properties unmatched by any competing technology. Most notable are the high degree of hardness, reduced friction, uniform coating on non-line-of-sight surfaces, and low temperature processing. The benefits to Forestry Industry companies in the paper, tissue, primary, and secondary wood products are very significant.

COMPETITIVE PERFORMANCE ADVANTAGES

- A combination of hardness, low coefficient of friction, even deposition, wear resistance, no hydrogen embrittlement, high temperature tolerance, corrosion resistance in one product.
- Reduces friction in mating parts, even under load.
- Provides wear resistance surface on complex geometry, no post machining.
- Ability to coat wide range of metal alloy substrates.

APPLICABILITY

The majority of important engineering alloys can be coated with this technology, including:

- Carbon and high strength alloy steels
- Cast iron
- Copper alloys (brass and bronze)
- Stainless steels
- Specialty Steels

Industries Served:

Industries currently using or testing these coatings include: forestry and woodworking, defense, aerospace, marine, automotive, oil and gas, industrial pumps, industrial tooling, and many others.

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EXO™ Technical Properties:

EXO Data

MICROSTRUCTURE
Columnar domains, nodular surface

COLOR
Silver to matte gray

COMPOSITION
As deposited: Ni-(6)B wt%
Precipitation hardened: 85%-100% Ni_3B

DENSITY
8.25 $glcm_3$

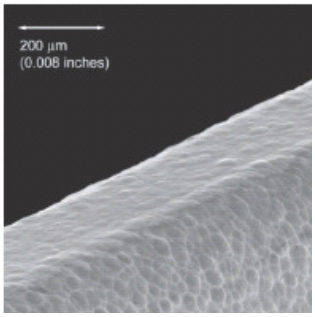
COATING DEPOSITION RATE
16-24 µm per hour

COATING THICKNESS RANGE
10-100 µm

UNIFORMITY OF DEPOSIT
Uniform thickness, regardless of geometry

ROUGHNESS
Original surface + 30-40 rms (microinches)

HARDNESS
As deposited: 850-950 Knoop
Precipitation hardened: 1150-1400 Knoop



COEFFICIENT OF FRICTION
0.08-0.20 depending on mating material and lubrication used

ADHESION
Before precipitation hardening: 48 MPa (7 ksi)
After precipitation hardening: >69 MPa (10 ksi)

TEMPERATURE RESISTANCE
Cryogenic up to +700°C

MELTING POINT
Ni-B Eutectic: 1090°C
Ni_3B inter-metallic: 1156°C

THERMAL EXPANSION (linear)
12.1 µm/m/°C

ELECTRICAL RESISTIVITY
As deposited: 80-190 µOhm cm
Precipitation hardened: 15-140 µOhm cm

UNIFORMITY OF DEPOSIT
Uniform thickness, regardless of geometry

MAGNETIC PROPERTIES AS DEPOSITED
Weakly ferromagnetic

THERMAL CONDUCTIVITY
0.015 cal/cm°C sec

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