



Nickel-Tungsten 5711

INTRODUCING NICKEL-TUNGSTEN

SIFCO ASC is continuously developing and refining new deposits and coatings, providing the highest quality surface enhancement materials that meet industry's ever changing requirements.

SIFCO ASC's Nickel-Tungsten deposit is the perfect green alternative to chromium for repair and OEM applications that require exceptionally hard plating. The deposit was developed for aerospace, automotive, oil and gas, and any other industry where the hardness of the surface is critical.



APPLICATIONS

For OEM or dimensional repair applications that require the enhancement of localized areas to improve surface properties including hardness, wear resistance and coefficient of friction.

Composition	60% Ni; 40% W
Structure	Micro-cracked
Corrosion Resistance	>500 hours with a 0.0005" thick copper preplate
Coefficient of Friction	0.35 – 0.55
Average Hardness	660 – 690 VHN as plated 835 VHN (heat treated at 375° F for 23 hours) 1060 – 1150 VHN (heat treated at 923° F for 2 hours)
Wear Resistance (Taber)	14
Hydrogen Embrittlement (ASTM F 519)	Passes without bake
Maximum Thickness	0.002"
Plating Rate	0.002"/hour

WHY NICKEL-TUNGSTEN?

- ▶ Free of hexavalent chromium
- ▶ One of the hardest chromium alternatives available today
- ▶ Ten times lower wear rate than hard chromium
- ▶ Meets the hydrogen embrittlement characteristics of ASTM F519 without a relief bake



SIFCO Process® of Selective Plating

US Headquarters

5708 E Schaaf Road
Independence, Ohio 44131, USA

T +1 800 765 4131

+1 216 524 0099

F +1 216 524 6331

E info@sifcoasc.com

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A COMPARISON OF EHC and Ni-W PROPERTIES

(Electrodeposited Hard Chrome, Nickel-Tungsten)

	Test Method	Applicable Standard	EHC	Ni-W
Appearance	Microscopy		Micro-cracked	Micro-cracked
Microstructure	XRD			Nanocrystalline (crystallite size 2 nm)
Hardness	Vickers Microhardness	ASTM B578	800 – 1200 VHN 790 VHN (375° F/20 hour)	660 – 690 VHN 835 VHN (375° F/23 hr) 1060 – 1150 VHN (heat treated 932° F/2 hr)
Adhesion	Bend	ASTM B 571	Pass	Pass
Ductility	Bend Test	ASTM B 489	<1%	<1.6%
Wear Volume Loss	Pin-on-disc	ASTM G 99	$9 - 11 \times 10^{-6}$ mm ³ /Nm	5.0×10^{-7} mm ³ /Nm
Wear Abrasive	Taber	ASTM D 4060	3 – 6	14
Coefficient of Friction	Pin-on-disc	ASTM G 99	0.7	0.35 – 0.55
Pin Wear	Pin-on-disc	ASTM G 99	Severe	Mild
Corrosion Resistance	Salt Spray	ASTM B 117 ASTM B 537 Rating	Protection Rating 2 (1000 hr salt spray)	> 500 hours with a 0.0005" thick preplate
Hydrogen Embrittlement	Notched Bar	ASTM F 519	Pass with bake	Pass without bake
Fatigue	Axial	ASTM E 466	Significant debit	Debit
Thermal Stability	Air Oven		400° C	500° C
Internal Stress	Bent Strip			12 – 16 kpsi tensile
Current Efficiency			15 – 35%	35 – 40%
Deposition Rate			0.0005" – 0.001"/hr	0.002"/hr
Process Stability using Insoluble Anode			Good	Good