

Table 6.4.2 F: Nanocrystalline Co-P Property Data Summary Compared to Hard Chromium Electroplating (McCrea et al. 2003)

Factor	Nanocrystalline Co-P	Hard Chrome
Hardness (as deposited)	600-700 VHN	800-1200 VHN
Hardness (heat treated @ 250° C)	700-800 VHN	----
Hardness (heat treated @ 400°C)	1000-1200 VHN	----
Ductility	2-7% elongation	<0.1%
Thermal Stability	400° C	----
Wear (Abrasive – Taber)	27 mg/1000 cycles (CS-17)	3.2 mg/1000 cycles (CS-17)
Wear (Adhesive – Pin on disk)	11 mg/1000 cycles (CS-10)	1.0 mg/1000 cycles (CS-10)
Corrosion (Salt Spray)	Protection Rating 8 @ 1000 hours	Protection Rating 2 @ 1000 hours
Corrosion (Potentiodynamic)	0.1-1 mpy	0.01 mpy
Internal Stress	10-15 ksi (tensile)	Cracked – exceeds cohesive strength
Hydrogen embrittlement	None	Yes – min. bake 24 hrs.
Fatigue	Retesting required	Fatigue debit