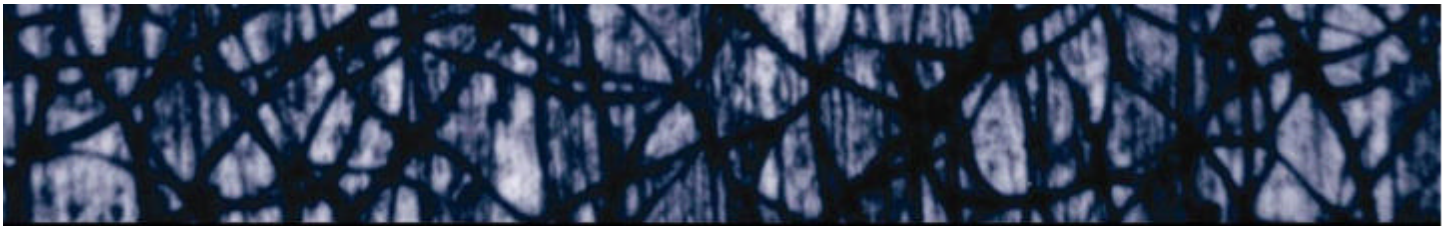
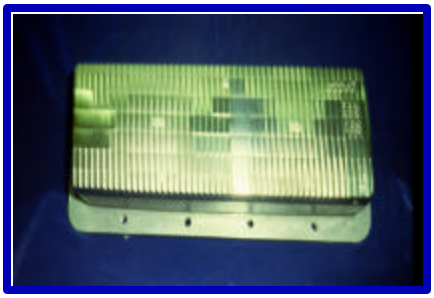


TM 117P is a high phosphorous Electroless Nickel-Teflon Impregnation process used when low-coefficient of friction, release, wear & corrosion resistance are needed, but cost is a restraint.



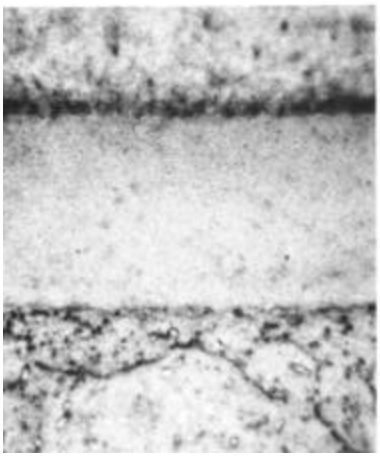
Headlight mold plated with TM 117 P giving added release while maintaining a clear finish

USER BENEFITS

- **Complete coverage on complex shapes for corrosion resistance**
- **Uniform thickness eliminating post process treatment such as grinding**
- **Excellent non-sticking properties for molding & forming operations**
- **Low coefficient of friction, especially in the break-in-stages**
- **Lower cost than co-deposits of Nickel & PTFE**
- **Extended life by the reduction of wear**
- **It often eliminates the use of release products in molding**
- **Reduces cycle times**
- **Can be plated on aluminum & other non-ferrous metals**
- **Can maintain a bright reflective surface.**
- **Caution: while the deposit remains viable, the PTFE particles are damaged at temperatures over 600°F. See UltraKoat™ for higher temperature applications.**

SUMMARY

This concept in coating technology uses the advantages of High Phosphorous Electroless Nickel (TM 103) & economical impregnation of the polytetraflouroethylene (PTFE) particles. This procedure enhances the performance of the TM 103 deposit, especially during the break-in period. Although there are fewer PTFE trapped in the nickel coating as compared to the co-deposit TM 117C, there is a PTFE rich surface, which allows the mating surface to have the ultimate protection during the break-in stage when it is often times critical. After the break-in stage there is still some PTFE impregnated in the nickel to assure future performance. The nickel receives a proprietary treatment to enhance the Teflon-like materials penetration & attachment to the nickel. The high phosphorous electroless nickel, with its natural lubricity, is excellent for wear & release. Even after the break-in stage, there is still sufficient PTFE impregnated in the nickel to assure future performance.



← High concentration of PTFE on surface critical to break-in period

← Porous electroless nickel deposit traps some PTFE particles

← Base material

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The advantages of this coating over the co-deposit of high phosphorus nickel PTFE is that it is less costly, has a higher concentration of PTFE on the surface and can be plated on larger parts. The disadvantage is that it does not have as much PTFE trapped in the nickel matrix as the part wears in. Both coatings offer excellent release and corrosion resistance. Some typical properties of TM 117P are in the table below.

Property	Typical Value:
Coefficient of Friction	<0.1
Corrosion Resistance 1 mil deposit	
Salt Spray ASTM B117	
Hours to first red rust	1000 hours
Nitric Acid Test (30 sec.)	Passes
Hydrochloric Test (3 min.)	Passes
Ductility (% Elongation)	0.5 – 1
Modules of Elasticity Mpsi	30
Tensile Strength Kpsi	100
Density g/cm	7.82
Internal Stress Kpsi	-3.0
Composition	
Nickel, % by Wt.	88
Phosphorus, % by Wt.	11
Teflon, % by Wt.	<1
Teflon, % by Vol.	Depends on surface properties
Temperature Limits	
For Teflon	
Decomposition °F	600
For Electroless Nickel	
Melting Point °F	1630
Coefficient of Thermal Expansion	
(in/in/F)	5.5 – 6
(m/m/C)	11 – 12
Thermal Conductivity	
(cal/cm/sec/C)	0.013
Electrical Resistivity	
microohm-cm	110
Magnetic Properties	Non-magnetic
Hardness	
Knoop Hardness (kg/mm)	
50g load, 3.0 mil deposit	790 – 940
Approx. Rockwell Hardness	
C Scale	64-70
Wear Resistance	
Tabor Abraser Wear Test	
wt./loss mg/1000 cycles	15 – 18