

DURMALON™

Alternative to Cadmium

“Durmalon” Amphenol’s answer to Hazardous material surface finish.

Commercial, industrial & military markets are rapidly moving away from hazardous materials such as Cadmium (Cd) & Hexavalent Chrome (Cr6+). Amphenol is offering an alternative finish & process that complies with all customer requirements tied to these specifications.

Cd & Cr6+ have been applied to numerous components of land, sea and air weapon systems for many years & provides sacrificial corrosion protection for steels and excellent lubricity for threaded applications. However, Cd is a toxic metal and a known carcinogen. In addition, Cd is plated from an aqueous bath containing cyanide salts. Cr6+ is a known carcinogen as well.

MIL-DTL-38999 rev L, controlled by the Defense Supply Center Columbus (DSCC) has established 3 new service classes as alternatives to Cd.

- Class P Pure Dense Electrodeposited Aluminum (Alumiplate)
- Class T Nickel Fluorocarbon Polymer (Ni-PTFE)
- Class Z Zinc-Nickel (Zn-Ni)

Amphenol is using this & the European Union directive 2002/95-EC-RoHs (Restriction of Hazardous Substances) as direction to qualification for all domestic, global, commercial, industrial & military specifications requiring the reduction or elimination of these hazardous materials.

At this time, we are focusing on Ni-PTFE, Durmalon, our internal part number coding “DT” finish. Amphenol Durmalon is now QPL'd (qualified) by DSCC to MIL-DTL-38999 Rev L, Series III, Class T. The finish is also RoHS compliant due to the NON-use of Cr6+.

Amphenol also continues to develop a heavy duty Durmalon (Amphenol “DX” p/n code designation) to support the JSF, F-35 program. This plating is intended to meet the additional higher corrosive Sulfur Dioxide (SO₂)/salt fog requirements of JSF.

Also under development & qualification testing is Zinc-Nickel (Amphenol “DZ” p/n code designation) to comply with the new D38999 class “Z” finish requirements.

Amphenol’s Durmalon like Olive-Drab Cadmium plating (Class W), meets 500 hours of Salt Spray, combined with 500 mating cycles and maintains less than a 2.5 millivolt drop shell-to-shell conductivity. Of all platings tested, Durmalon has been proven to meet these requirements and is also being tested under development & showing positive results for the following:

- Sulphur Dioxide (SO₂) corrosion requirement of the JSF Program
- Potassium Formate- Deicer fluid testing performed by Boeing

Please consult the factory for availability.



Applications

Interest for non-hazardous alternative finishes is gaining momentum & many customers are currently using Durmalon. As mentioned above, Amphenol is developing a “Heavy Duty” version of Durmalon to comply with the higher level requirements by Lockheed Martin for the F-35, Joint Strike Fighter (JSF) program. The requirements include 2000 hrs of neutral salt fog exposure & an acidic salt fog environment exposure with added sulfur dioxide (SO₂) for 336 hrs. Please contact the factory for availability.

Testing

Amphenol Aerospace has performed extensive testing on 14 alternative platings with the most consistent performer being Durmalon. Please contact Amphenol Principal Engineer Eric Shepler at eshepler@amphenol-ao.com for more information or test data on Durmalon

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Comparison Chart

Requirements	Cadmium	Durmalon™	Zinc Nickel	Alumiplate	Zinc Cobalt	Stainless Steel	Electroless Nickel
Coupling Torque Post 500 hr salt	■	■	N/A	■	N/A	■	N/A
Shell-to-Shell Conductivity <1 millivolts							■
<2.5 millivolts	■	■	■	■			
<10 millivolts	■	■	■	■		■	
Cycles of Durability 500 mates	■	■	■	■		■	■
Salt Spray 48 hours	■	■	■	■	■	■	■
Dynamic-500 hours	■	■	■	■		■	
1000 hours		■*					
Temperature Rating 175° C	■	■	■	■	■	■	■
200° C		■	■	■		■	■
>200° C						■	
Non-Reflective	■	■	■	■	■		
RoHs Compliant		■	TBD		■	■	■
Non-Magnetic	■	■	■	■	■	■	■
Available on Composite	■	■	■	■	■		■
Cr6+ Presence	■		TBD	■	**		**
Sulfur Dioxide Resistance F35-336 hours	■	*					
Aviform De-Icing Fluid		TBD				■	

* Durmalon XP See "applications"

**Meets EU RoHs/ELV hexavalent chromium maximum concentration value (MCV) of 1000ppm (0.1% w/w) per homogenous material.

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