



CHEMEON™ SURFACE TECHNOLOGY

TCP-NP (NO PREP): A PERFORMANCE STUDY FOR A PROPRIETARY "NO PREP" TRIVALENT CHROMATE

THE PHASE OUT OF HEXAVALENT CHROMATES

- ▶ Cr(VI) conversion layer offers superior corrosion resistance and increased paint adhesion on the aluminum surface
- ▶ Carcinogenic and toxic to human health
- ▶ Toxic and hazardous to the environment
- ▶ Highly regulated by the EPA, OSHA, and RoHS
- ▶ Sunset date effective September 21, 2017 prohibiting its use in the EU without granted authorization

AN ALTERNATIVE TO HEXAVALENT CHROMATES

- CHEMEON TCP-NP is used at room temperature, and does not require a deoxidizing or surface activation step in the process
- TCP-NP is:
- ▶ An excellent performing two-component trivalent chromium conversion coating that has been optimized to offer superior corrosion resistance, improved paint adhesion, and low electrical resistance
 - ▶ Used as a conversion coating for aluminum, magnesium and zinc-nickel alloys
 - ▶ Used as a room temperature seal for anodized aluminum

PROCESSING PARAMETERS AND EFFICIENCY

Trivalent Chromate Products



CHEMEON TCP-NP (No Prep)



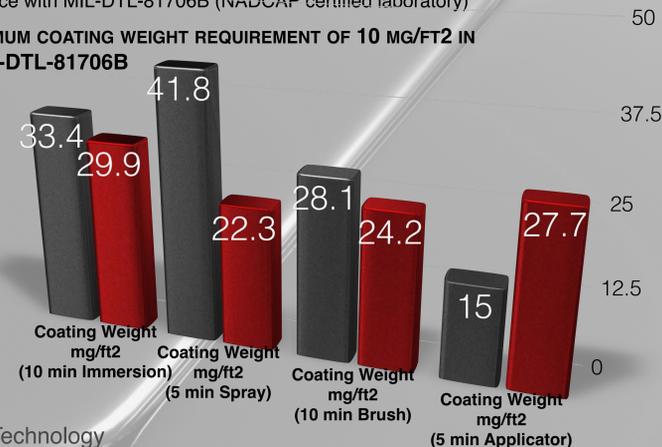
NO DEOXIDIZATION STEP REQUIRED!

CONVERSION COATING PERFORMANCE STUDY

2024-T3 and 7075-T6 aluminum coupons are processed in CHEMEON TCP-NP and tested in accordance with MIL-81706B Type II Class 1A methods A (spray), B (brush-on), C (immersion), and D (applicator pen) to meet the requirements of:

- ▶ Coating weight in accordance with MIL-DTL-81706B
- ▶ Corrosion resistance in accordance with MIL-DTL-81706B Type II Class 1A using a neutral salt fog corrosion maintained in accordance with ASTM B 117
- ▶ Paint adhesion in accordance with FED-STD-141 method 6301.3
- ▶ LER testing in accordance with MIL-DTL-81706B (NADCAP certified laboratory)

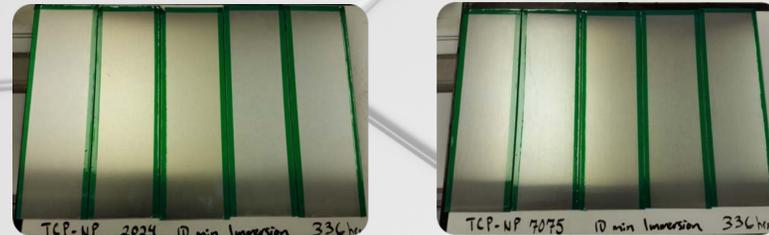
PANELS MEET THE MINIMUM COATING WEIGHT REQUIREMENT OF 10 MG/FT² IN ACCORDANCE WITH MIL-DTL-81706B



336-HOUR CORROSION RESISTANCE

Method C (Immersion)

No pitting at 336 hours neutral salt spray test on 2024-T3 & 7075-T6 aluminum alloys when TCP-NP is applied by spray, brush, immersion, or pen applications.



WET TAPE ADHESION

Method A (Spray)

MIL-PRF-23377J Type I Class C2 Primer, FED-STD-141 Method 6301.3

No intercoat separation or flaking in scribed areas when TCP-NP is applied by spray, brush, immersion, or pen applications.



LER TESTING

6061-T6 TCP-NP processed coupons were sent to a NADCAP certified lab to conduct low electrical resistance testing (LER) per MIL-DTL-81706B Type II Class 3

Coupons meet the requirements of MIL-DTL-81706B for Type II Class 3 (less than 5,000 microhms in² before salt spray and less than 10,000 microhms/in² after salt spray testing)

| Aluminum Alloy: | LER as processed (microhms/in ²): | Post 168-hour Salt Spray (microhms/in ²): |
|-----------------|---|---|
| 6061-T6 | 1090 ± 5.6 | 1136 ± 6.2 |

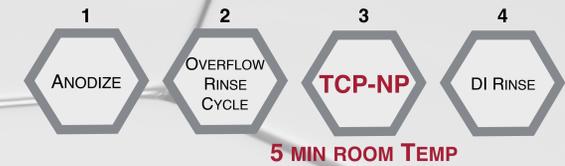
ANODIZE SEAL ADVANTAGES

- ▶ 5-10 minute immersion time exceeds 336-hour salt spray for corrosion resistance
- ▶ Used at room temperature compared to sodium dichromate seals used at much higher temperatures (195-212°F)
- ▶ Very energy and time efficient
- ▶ No hexavalent chromium
- ▶ Environmentally friendly

ANODIZE SEAL PERFORMANCE STUDY

- ▶ 2024-T3, 6061-T6, and 7075-T6 aluminum coupons were anodized in accordance with MIL-A-8625F Type II Class 1
- ▶ 2024-T3 and 7075-T6 aluminum coupons were thin film sulfuric acid anodized (TFSA) in accordance with MIL-A-8625F Type IIB Class 1
- ▶ Anodized coupons were immersed in TCP-NP for as an anodic seal for 5 minutes at room temperature and set to cure for 24 hours
- ▶ Corrosion resistance testing was performed on test coupons using a neutral salt fog corrosion test chamber maintained in accordance with ASTM B 117

PROCESSING PARAMETERS



5 MIN ROOM TEMP

ANODIC SEAL TYPE IIB

TFSA 336-Hour Corrosion Resistance 2024-T3

No pitting at 336 hours neutral salt spray test on 2024-T3 or 7075-T6 aluminum alloys



ANODIC SEAL TYPE II

1000-Hour Corrosion Resistance 2024-T3

No pitting at 1000 hours neutral salt spray test on 2024-T3, 6061-T6, and 7075-T6 aluminum alloys



CONCLUSIONS

CHEMEON TCP-NP (No Prep) is a novel optimized, effective, and efficient trivalent chromium conversion coating:

- ▶ Requires fewer pretreatment processing steps than conventional trivalent chromium alternatives
- ▶ Is operated at room temperature, mildly acidic, and is environmentally friendly
- ▶ May be applied by brush, spray, immersion, and applicator pen
- ▶ Is an excellent performing conversion coating that exceeds the requirements of MIL-DTL-81706B and MIL-DTL-5541F
- ▶ Offers superior corrosion resistance as a room temperature anodizing seal and exceeds the corrosion resistance requirements of MIL-A-8625F

CONTACT

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