

# Metalast TCP-HF

A chromium (III) conversion coating used for immersion and spray applications which is ROHS, WEEE, and ELV compliant.

## PRIMARY APPLICATION

**METALAST TCP-HF** is a liquid chemical solution for aluminum alloys, magnesium, zinc and zinc alloys, as well as a sealer for anodized aluminum.

METALAST TCP-HF is used to produce a protective coating on metal, which minimizes corrosion, and to enhance the surface for better paint adhesion.

Surfaces treated with the METALAST TCP-HF process are generally a faint blue to tan, and iridescent.

- Hexavalent chromium free passivation on aluminum, zinc and magnesium
- Excellent bare metal corrosion protection, comparable to hexavalent passivation
- Suitable for use as an under paint and powder coating pretreatment, providing an excellent bonding surface and increased salt spray performance
- Meets MIL-DTL-81706B and MIL-C-5541 class 1A & class 3 for bare corrosion protection (336 hrs. in Neutral Salt Spray per ASTM B 117) and low electrical resistance, < 0.8 mOhm/cm<sup>2</sup>
- U.S. Patent Number 6,375,726 (PCT/US 01/45434); 6,511,532 (PCT/US 02/35599); 6,521,029; and 6,527,841 (PCT/US 02/35490)

## CHEMICAL CHARACTERISTICS:

chemical composition.....	trivalent chromium salt
physical form.....	liquid (light green)
odor.....	none
bulk density.....	8.5 lbs/gal
pH, concentration.....	2.0 – 3.5
flash point.....	not applicable
recommended diluents.....	water
rinsability.....	good
water solubility.....	complete

# APPLICATION PROCEDURE

## General Operating Conditions:

Method of Application:	soak or spray
Concentration:	10-50% by volume, depending on application
Water for make-up:	DI water is preferred
Temperature:	65-120° F
Time:	1-10 minutes
pH:	3.85 (3.6-4.0) <i>do not operate above 4.0</i>
pH adjustments	adjust with Gardobond Additive H 7204 (alkaline/raise pH) or Enprox 702 (acidic/lower pH) Note: <u>pH adjustments should be made very slowly using constant mixing</u> , so that the pH range is not over shot. When using Enprox 702 (acidic) to lower pH, only a very small amount will be necessary
Tank material:	Polypropylene or Teflon-lined tank Note: Before initial charge, thoroughly clean the tank. For new tanks or liners, condition with a 10% Enprox 702 solution, then rinse thoroughly.
Heater material:	Teflon coated heater

## Operating conditions on bare aluminum:

Excellent results have been achieved by thoroughly cleaning (must be water-break free) and deoxidizing the aluminum substrate before passivation.

When processing aluminum alloys with <1% silicon, such as 6016 alloy, follow the following procedure: Pretreat the aluminum with a mild alkaline soak cleaner (Aluminum Cleaner NST or Pyrene 1075 is recommended) followed by a deoxidizing step (Gardobond Additive H 7140/1or Oakite 60-FD-126 with 50% nitric acid is recommended) for 1 – 10 minutes. Good rinsing (tap water) should be used after each step, with DI or RO water being preferred for the pre and post METALAST TCP-HF stages.

When processing aluminum alloys with >1% silicon, use a mild, non-etch, non-silicated cleaner (Aluminum Cleaner NST is recommended), rinse, followed by a short deoxidizing step (Oakite 60-FD-126 with 50% Nitric is recommended) for up to 3 minutes.

Immerse aluminum parts into 25% by volume METALAST TCP-HF at 70°F for 1 to 10 minutes depending upon application.

## Performance on bare aluminum:

Panels of 2024 and 6061 alloy treated in this manner have been found to withstand more than 336 hours in neutral salt fog without pitting.

Minimum coatings weights meeting MIL-DTL-81706B and MIL-C-5541 are achieved in 3 to 5 minutes, depending on the alloy.

Electrical resistance is well below the MIL-DTL-81706B and MIL-C-5541 limits for immersion times up to 10 minutes.

METALAST TCP-HF is an excellent undercoat for paint bond and rubber bonding to metals. The product meets or exceeds all paint bond applications and specifications for Hex chromate products.

## Bath Makeup and Maintenance

### Bath Makeup

- Fill the tank half full with deionized water.
- Adjust the pH of the water to 3.4 or lower using Enprox 702 (only a small amount of Enprox 702 should be needed to lower pH).
- Add the desired amount of METALAST TCP-HF to the tank with continuous mixing.
- Fill the tank to final level
- Adjust the pH of the tank to 3.6-3.8 using Gardobond Additive H 7204.

## **Bath Maintenance**

- The pH of the bath should be checked regularly. It is important that the pH of the bath does not exceed 4.0.
- Replenishment due to drag out should be made with METALAST TCP-HF in water at the same concentration as the bath was made. For example, if the bath is made up at a nominal 25% concentration, drag out should be replenished with a 25% solution of METALAST TCP-HF
- Measurement of the bath concentration may be accomplished by titration or UV-VIS spectrometry.

## **Precipitation in older tanks**

Over time, a small amount of precipitate may form in the tank. This is normal. If the pH of the solution rises above 4.0, an unacceptably large amount of precipitate may form. Please contact the METALAST TCP-HF Technical Support Group for assistance in re-dissolving the precipitate. Chemetall Oakite does not recommend filtering the precipitate as essential ingredients will be removed.

**Solution Control:** For titration use Gardotest Procedure 212.

Sample Size: 100.0 mls                      Factor: 1.4

## **Test for the Presence of METALAST TCP-HF:**

For the testing of the presence of Metalast TCP-HF use Gardotest Procedure 213.

**Note:** In order to receive an accurate result from Gardotest Procedure 213, the procedure must be performed within several hours of the part being processed with METALAST TCP-HF or before coating has fully cured.

Solution control testing can also be performed by METALAST TCP-HF technical service group using UV-VIS Spectrometry. Please contact your local Chemetall Oakite representative if you are interested in this service.

## **SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Material Safety Data Sheets should be read and understood by all personnel in contact with these materials. Eyes and skin should be protected with appropriate personal protective equipment. Do not ingest. Eyewash fountains and emergency showers are recommended.

## **KEEP OUT OF REACH OF CHILDREN**

## **STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F is recommended, away from any incompatible materials referenced in the Material Safety Data Sheets. All containers should be tightly closed when not in use.

## **DISPOSAL**

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

## SUGGESTION OF OTHER PRODUCTS YOUR COMPANY MAY USE

- CLEANERS
- ETCHANTS
- DEOXIDIZERS
- RUST PREVENTIVES
- METALWORKING FLUIDS (coolants and lubricants)
- WASTE WATER TREATMENT CHEMICALS
- FLOOR CLEANERS AND MAINTENANCE PRODUCTS
- PROCESS EQUIPMENT/CONTROL SYSTEMS

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