COLUMBIA® CHEMICAL
Simplifying Surface Finishing®

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COLDIP® TRI-V

TECHNICAL DATA
01-28-2021

COLDIP® TRI-V

CONCENTRATED LIQUID SINGLE DIP TRIVALENT PASSIVATE

COLDIP® TRI-V	produces a consistent blue passivate film on zinc deposits from alkaline cyanide-free zinc, cyanide zinc and chloride zinc plating processes.
COLDIP® TRI-V	eliminates yellow staining characteristic with hexavalent passivates on deposits from alkaline cyanide-free zinc baths.
COLDIP® TRI-V	baths have a longer operating life than many other trivalent passivates. In many cases, COLDIP® TRI-V passivate baths can be operated for months without being dumped. Instead, they can be decanted and “charged up” once every few weeks.
COLDIP® TRI-V	is extremely tolerable to impurities which result in fewer rejected parts.
COLDIP® TRI-V	polishing action adds to brightness of parts and protects from finger prints, staining and corrosion.
COLDIP® TRI-V	effluent contains Trivalent Chromium, reduces waste treatment requirements.

OPERATING PARAMETERS

	RANGE:	OPTIMUM:
Solution Makeup:	1.0% - 3% by volume	2% by volume
Temperature:	70 - 90° F (21 - 33° C)	
Dip Time:	10 - 35 seconds	
Agitation:	Air or mechanical agitation recommended	
pH:	1.5 - 2.5	

EQUIPMENT

Chromating tanks should be constructed of stainless steel, Koroseal, PVC or rubber lined steel, or polypropylene.

MAINTENANCE ADDITIONS

COLDIP® TRI-V solutions are very easy to control. Generally, visual control is the most effective and easiest manner in which to monitor this passivate. As the color of the passivate finish approaches a clear white, bright appearance, an addition of COLDIP® TRI-V should be made to the operating solution. These additions should be made in increments of 0.25% - 0.5% by volume, until the desired color is obtained.

A pre-dip of 0.5% Nitric Acid by volume followed by a good, fresh water rinse directly in front of the COLDIP® TRI-V tank will add to the operating life of the passivate.

Although COLDIP® TRI-V solutions have a great tolerance to iron and zinc, all fallen parts should be removed from the tank regularly. In doing so, the passivate will be easier to control and will last longer.

To produce the best blue color, the final hot water rinse should be between 100 - 130° F (37 - 55° C). If the final rinse is too hot, discoloration of the passivate film can occur.

ANALYTICAL PROCEDURE

TITRATION PROCEDURE

1. Pipette a 10 mL passivate sample into a 100 mL volumetric flask. Dilute to 100 mL with distilled water and mix well.
2. Pipette 10 mL of the above diluted solution into a 250 mL Erlenmeyer flask and dilute to 100 mL with distilled water.
3. Add 5 mL 20% Sodium Hydroxide and 1 mL 35% Hydrogen Peroxide.
4. Boil solution approximately 5 minutes.
5. Slowly add 1 mL 10% Nickel Chloride Solution and continue boiling for an additional 2 minutes.
6. Cool solution to room temperature.
7. With mixing, add 10 mL Concentrated Hydrochloric Acid, 1 g Ammonium Bifluoride, 10 mL 10% Potassium Iodide and 2 mL Starch Indicator Solution.
8. Titrate with Standard 0.010 N Sodium Thiosulfate from a blue to clear-green endpoint.

Factor: mL 0.010 N Sodium Thiosulfate x 0.530 = % COLDIP® TRI-V

HELPFUL HINTS

COLDIP® TRI-V CYANIDE ZINC AND ALKALINE CYANIDE-FREE ZINC DEPOSITS

COLDIP® TRI-V works very well on deposits from cyanide zinc baths and alkaline cyanide-free zinc baths. However, there are some applications that may require fine tuning. Even though most of today's cyanide and alkaline cyanide-free zincs are easy to rinse, some vary in caustic concentration, which plays a big role in rinse ability. There are systems that occlude a significant amount of organic in the final deposit, which can make passivating difficult. Here are some tips to obtain the most desirable passivate finishes:

1. Make sure that there is adequate water rinsing after the zinc plating operation. Adequate means plenty of fresh water washing the work as well as adequate time in the final rinse.

2. In some instances, a pre-dip located after the water rinses and prior to the passivate is necessary. Typically, a pre-dip of 0.25% to 0.5% by volume of Nitric Acid can be used to cut any brightener film from the surface. A good fresh water rinse should follow such a pre-dip before passivating. Failure to do so typically results in yellowing of the passivate deposit due low pH at the solution/part interface.

3. In some instances, a pre-dip made up of 3% by volume Hydrogen Peroxide (35%) and 0.5% by volume Sulfuric Acid will be more effective at organic film removal. Again, a water rinse should follow such pre-dips before passivating.

4. Careful testing of the finished product should be performed to determine the immersion time necessary to produce the proper passivate film. Failure to do so, could result in premature white corrosion. Typically, an immersion time of 15 to 45 seconds for cyanide zincs and 30 to 40 seconds for alkaline cyanide-free zincs will provide an adequate passivate film.

5. Hot water dips that do not exceed 130° F (55° C), as final rinses are helpful in drying the work and providing, yellow-free passivate films. This rinse must be dumped frequently, particularly on barrel lines. Hot water final rinses aid in producing bluer passivate coatings.

6. Excessive heat in the final hot water rinse and/or drying operation can result in discoloration. Temperatures in the drying operation should be kept at a minimum, just hot enough to assure dry parts.

Adequate water rinsing cannot be over emphasized. Poor rinsing will lead to most clear passivate failures associated with cyanide zinc or alkaline cyanide-free zinc. The first rinse after plating may need to be dumped on a regular basis. The first rinse after passivating may have to be dumped on a somewhat regular basis. If the rinse after plating becomes highly alkaline, then the pH of the surface before passivating may be too highly alkaline. Such a condition results in poor polishing and a very mottled yellow deposit. If the passivate post rinse becomes overloaded with passivate, the resulting passivate film can be too thick, causing a yellowish appearance especially around holes in the part.

HANDLING & STORAGE

Columbia Chemical recommends referring to the specific product Safety Data Sheets for safety, handling, and storage precautions.

NON-WARRANTY

The data contained in this bulletin is believed by Columbia Chemical Corp. to be accurate, true, and complete. Since, however, final methods of use of this product are in the hands of the customer and beyond our control, we cannot guarantee that the customer will obtain the results described in this bulletin, nor can we assume responsibility of the use of this product by the customer in any process which may infringe the patents of third parties.