

# TriPass ELV 1500LT

## Iridescent Trivalent Chromium Passivate

*Version 6.2 # 187396*

### Description

**TriPass ELV 1500LT** is a trivalent passivate based upon trivalent chromium, for use with electroplated zinc and zinc/iron deposits.

It is a single component liquid concentrate, which produces an iridescent passivate film by immersion. It has a characteristic green-yellow colour when used over zinc deposits and operated within the recommended guidelines.

In production it operates at lower solution temperature, therefore offering exceptional energy efficiency. It is easy to control and is highly suited to both rack and barrel applications.

When used with an approved topcoat, the passivate film will produce a silver-like finish. It achieves excellent corrosion resistance even after heating treatment compared to conventional yellow chromates that are based upon hexavalent chromium.

### Features

- Solution free from hexavalent chromium and fluoride
- Characteristic iridescent colour on zinc
- Lower temperature, energy efficient operation
- Excellent corrosion resistance
- Meets 'End of Life Vehicle' directive
- IMDS ID Number 900896

## Operating Parameters

	Range	Make-up
<b>TriPass ELV 1500LT</b>	120 – 160 mL/L (12 – 16% v/v)	120 mL/L (12% v/v)
Temperature	25 - 40°C (77 - 105°F)	25°C (77°F)
pH	1.6 – 2.0	1.8
Immersion Time	60 - 120 seconds	90 seconds
Agitation	Mechanical or mild air	
Filtration	Recommended	

**Note:** To achieve maximum life extension and passivate performance, we recommend an addition of 2 – 5 mL/L **TriPass Fe Inhibitor** at initial make-up.

## Solution Make-up

1. Select a suitable clean tank<sup>#</sup> and fill to 50% of working volume with water\*.
2. Add the required amount of **TriPass ELV 1500LT** and stir to mix thoroughly.
3. Check solution pH using a calibrated pH meter or suitable pH papers, and adjust to recommended range with 25% sodium hydroxide solution. The passivate solution must be well agitated when adding sodium hydroxide.
4. Adjust solution level to final working volume with water, and adjust temperature within the recommended range.
5. Allow solution to stand with agitation for two hours at operating temperature. Once pH has stabilized, recheck and adjust as necessary.

<sup>#</sup> If the tank has previously contained a hexavalent based chromate, then it must be **decontaminated** prior to installation of the trivalent chromium passivate, as per the procedure detailed below.

\* In areas of poor water quality, deionised water should be used for initial make-up.

**Note:**

At initial make-up the passivate solution pH is typically around 1.0 therefore adjustment will be required.

**Decontamination Procedure**

1. Water rinse the process tank and remove any solution residues.
2. Prepare the decontamination solution by dissolving 3-5 kg sodium metabisulphite in 100 L water.
3. Adjust solution acidity to pH 3.0 – 4.0 with sulphuric acid.
4. Fill the tank with an appropriate volume of this solution to match normal working tank volume and leave to soak for a minimum of two hours.
5. Decontamination will take place as any hexavalent chromium residues will be reduced to the trivalent form.
6. Remove the solution from the tank and rinse out with clean water.

**Solution Maintenance**

The passivate solution is maintained by regular additions of **Tripass ELV 1500LT**. Consumption is highly dependent upon drag-out.

As a guide Replenishment per m<sup>2</sup> of processed parts:

- **20 - 60 ml TriPass ELV 1500LT** depending on drag-out.
- Automatic dosing is recommended for larger installations.

The passivate solution should be analysed regularly in order to verify its strength. Recommended analytical procedures are detailed in this document.

Solution pH should be regularly monitored and corrected with additions of Nitric acid as appropriate.

**TriPass ELV 1000 Replenisher** is a support product used to restore colour and correct hazy film appearance in areas of hard water and as a result of zinc contamination of the passivate solution.

Additions of up to 20 mL/L **TriPass ELV 1000 Replenisher** may be beneficial to restore the colour and finish. The actual addition amount will be dependant upon the relative water hardness, amount carried into the solution and the degree of zinc contamination.



## Operating Guide

A minimum thickness of 5 microns of zinc deposit is required to achieve an optimum passivate film.

Avoiding contamination with hexavalent chromium is essential, therefore we recommend that the passivate solution must not be installed after a hexavalent chromium tank in the process line.

As used over zinc deposits, it is recommended to activate the deposit surface in **Metex IT** prior to immersion in **TriPass ELV 1500LT**.

Operating at higher solution concentration and higher temperature, will result in the formation of a heavier passivate film with a stronger iridescent colour.

To achieve maximum corrosion protection and particularly when processing barrel parts that require post heating (thermal shock), **TriPass ELV 1500LT** should be used in combination with an approved topcoat.

Due to the highly acidic nature of the product, the passivate will continue to react with parts that are accidentally dropped into the working solution. This will increase iron levels in solution reducing operating life and performance. To avoid this, it is strongly recommended that parts fallen into the working solution are removed immediately.

### Solution Life Extension

When using **TriPass ELV 1500LT** over zinc and zinc/iron, the effective working life of the passivate solution can be increased through the addition of **TriPass Fe Inhibitor**.

<b>TriPass Fe Inhibitor</b>	
Initial make-up	2-5 mL/L
Maintenance addition	0.2-0.6 L per 10 L addition <b>TriPass ELV 1500LT*</b>

\* In the case of plating cast irons or tubes or using iron auxilliary anodes higher additions are may necessary to achieve extended solution life.

### Troubleshooting Guide

When operating to the recommended processing parameters, working solutions of **TriPass ELV 1500LT** will be stable and trouble-free.

Faults may occur when the passivate solution is operated outside of these parameters or if contamination occurs. In these cases we advise that reference should be made to the separate **Troubleshooting Guide** document for instructions on fault correction.



## Process Sequence

- Zinc electroplate to 5 microns minimum thickness.
- Water rinse 2 x
- Activation in **Metex IT**
- **TriPass ELV 1500LT** passivate
- Water rinse 2 x
- Rinse in warm water
- Oven dry (up to 60 °C)

## Equipment

### Tank:

Koroseal or Rubber lined steel or tank made from reinforced polypropylene, polyethylene material.

### Heating:

Heaters made from Teflon are the preferred choice. Metallic based heaters such as Titanium may be used as an alternative.

### Agitation:

Uniform agitation is essential. Use either mechanical or slight air agitation. In barrel applications an intermittent barrel rotation is advantageous.

### Filters:

Recommended, use 20 micron polyethylene filter media.

### Racks/Baskets:

Polypropylene, polyethylene or stainless steel.

### Fume Extraction:

Recommended.



## Analytical Control

### Concentration of TriPass ELV 1500LT solution

#### Reagents:

- Sodium hydroxide 25% solution
- Hydrogen peroxide 35%
- Sodium bifluoride
- Hydrochloric acid, concentrated
- Potassium iodide 10% solution
- Sodium thiosulphate 0.1 N solution

#### Titration Method:

1. Pipette a 5 mL sample of the passivate solution into a 250 ml Erlenmeyer flask and add DI water to an approximate final volume of 100 mL.
2. Add 2 mL of sodium hydroxide 25% solution. Solution becomes a dark green.
3. Add 5 mL of hydrogen peroxide solution. Solution sample develops an orange colour.
4. Boil the solution to an approximate volume of 10 mL. Solution becomes light yellow.
5. Add 1 gram of sodium bifluoride and 15 mL of concentrated hydrochloric acid.
6. Add 10 mL of potassium iodide solution (10% KI).
7. Titrate the solution with 0.1 N sodium thiosulphate standard solution, add starch indicator towards the endpoint. Colour change from tan to blue/green.
8. Slowly continue to titrate with 0.1 N sodium thiosulphate, to discharge the blue colour.

#### Calculation:

mls of 0.1N sodium thiosulphate x 5.78 = mL/L TriPass ELV 1500LT

**CAUTION:** Make sure solution is free of floating solids or turbidity before analysis is carried out. Filter using Whatman 54 paper as required

### Concentration Of Zinc Metal

#### Reagents

- pH 5.5 buffer solution: *To make 1 litre = 90g of sodium acetate and 15 mL pure acetic acid*
- Xylenol orange indicator (0.1 xylene orange in 100 g sodium chloride)
- 0.05 M EDTA solution



**Titration Method:**

1. Pipette a 2 mL sample of passivate solution into a 250 mL flask
2. Make addition 50 mL DI water.
3. Add 50 mL pH 5.5 buffer solution and 1 spatula of xylenol orange indicator
4. Titrate immediately with 0.05 M EDTA solution
5. Colour change red to yellow

**Calculation:**

mls of 0.05M EDTA solution x 1.63 = g/L zinc

**Concentration Of Iron Metal**

The preferred method for iron concentration analysis is by instrument method such as A.A.S and I.C.P. which will give the greatest accuracy. The following volumetric method can be used as a guide:

**Reagents:**

- Hydrogen peroxide 35%
- Sodium hydroxide 25% solution
- Hydrochloric acid (10% and conc. Solutions
- Sodium thiosulphate 0.01 N solution
- Potassium iodide 10% solution
- Starch indicator
- Ammonia 10% solution

**Method**

1. Pipette a 10 mL sample of the passivate solution and 60 mL of DI water into a 250 mL flask.
2. Make addition 10 mL sodium hydroxide 25% solution followed by 5 mL hydrogen peroxide.
3. Bring to boil and hold for 20 minutes (maintain level with DI water).
4. Allow solution to cool to room temperature and filter. Wash filter with ammonia 10% solution.
5. Dissolve the precipitate with 10% hydrochloric acid and wash paper with DI water. Heat and add 15 mL ammonia 10% solution, heat again.
6. Filter precipitate again, wash with ammonia 10% solution and DI water.
7. Dissolve the precipitate with 15 mL concentrated hydrochloric acid. Wash filter with DI water.
8. Top up to 100 mL with DI water, add potassium iodide 10% solution.
9. Allow to stand in dark for a few minutes.
10. Titrate with 0.01 N sodium thiosulphate using starch indicator



**Calculation:**

mls of 0.01N sodium thiosulphate x 0.0558 = g/L iron

**Safety In Handling And Use**

Refer to relevant Material Safety Data Sheets.

**Waste Water Treatment**

It is recommended that waste water treatment is carried out to conform to the specific requirements of the local authority. Advice on how to meet these requirements, once known, can be obtained from MacDermid plc.

**Order Information**

Product Name	Product Code	Container
TriPass ELV 1500LT	187396	25 L & 1000 L
TriPass ELV 1000 Replenisher	174404	25 L
TriPass Fe Inhibitor	187203	25 L

**Disclaimer**

Any information given here relating to Health & Safety should be regarded as general advice and is not to be regarded as comprehensive or definitive.

Every user should also be in possession of Safety Data Sheets for each individual product/chemical used. These are available for all products sold by MacDermid plc.

The Safety Data Sheet contains the definitive advice.

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