riag Oberflächentechnik AG · Postfach 169 · CH-9545 Wängi TG

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riag Pass 446

Trivalent thick layer passivation with high corrosion resistance without cobalt

The **riag Pass 446** is a new trivalent chromate process that produces a greenish finish on zinc plated surfaces .The coating has high stability while tempered at 200 °C in terms of loss of colour and brightness. The coating so obtained provides high corrosion resistance **without the presence of hexavalent chrome and cobalt.**

The **riag Pass 446** additives are supplied in easy to use liquid concentrates.

Make up

	Range	Optimum
riag Pass 446 Additive 1 (density = 1.13 g/mL)	50 – 100 mL/L	70 mL/L
riag Pass 446 Additive 2 (density = 1.04 g/mL)	10 – 20 mL/L	15 mL/L
pH	1.6 – 2.2	1.6 – 2.2

The optimum values depends on the zinc process used and the equipment.

Procedure for a make up of 100 litres

Put 80 L water in the process tank. Add 7 L **riag Pass 446 Additive 1** and 1.5 L **riag Pass 446 Additive 2** and mix well. Adjust the pH with diluted nitric acid (or increase with a 10 % solution of sodium hydroxide) and top the volume up to 100 litres. Now the bath is ready for operation.

Operating conditions

Temperature:	min. 40 °C – 50 °C (for the best corrosion protection)
Time:	30 – 60 s
pH-Value:	1.6 – 2.2 (the optimum pH-value depends on the equipment and will vary to the production plant). Frequent control is recommended.
Agitation:	Air or parts movement
Fume extraction:	Recommended
Equipment:	Mild steel tank with polypropylene lining
Heating:	Glass or Teflon tube heaters
Hints:	The content of Iron must not exceed 500 mg/L, the content of Zinc 15 g/L.
Pre dip activation:	This will improve the **riag Pass 446** bath life as well as the adhesion and corrosion resistance. The tank make up is 0.3 – 1.0 % nitric acid. Frequent tank changes are necessary for uniform production quality.
Post treatment	We recommend our riag post treatment for enhanced corrosion protection

Process sequence

1. Zinc plating
2. Water rinse
3. Water rinse
4. Activation in nitric acid
5. Water rinse
6. **riag Pass 446**
7. Drag out rinse
8. DI water rinse
9. **riag Seal *** ***** different options possible
10. Dry (min. 60 °C)

In order to achieve consistent and uniform coating – it is most important to maintain the highest level of brightness in plating. Always maintain zinc plating bath parameters at optimum level at all times. The higher the concentration and temperature of the solution, the lower will be the immersion time. In order to get the best results in corrosion, it is important to work at fixed conditions.

Replenishment

riag Pass 446 Additive 1 is added on the basis of analysis. The replenishment ratio of the two parts **riag Pass 446 Additive 1** and **riag Pass 446 Additive 2** should be made according to the make up ratio.

Effluent control

The **riag Pass 446** chromate conversion coating solution is acidic and contains trivalent chromium salts. Spent solution has to be treated and discharged according to local wastewater laws.

Safety considerations

Protective gear such as face shields and gloves should be worn during bath make up and operation. Chemicals shall not be stored below 10 °C.

Liability

This instruction manual was compiled with reference to the state of the art and all current standards, and is based on the long-term knowledge and experience of riag. However, riag cannot monitor compliance with this instruction manual and the methods described herein at the customer/end-user's premises. Work carried out with riag products must be adapted accordingly to meet local conditions. In particular, riag cannot accept liability for damage, loss or cost incurred due to a failure to adhere to this instruction manual, improper application of the methods, unauthorised technical modifications, insufficient maintenance or the absence of maintenance in respect of the requisite technical hardware or equipment, or in the event of use by unqualified personnel. riag is not liable for damage or loss caused by riag or its employees except where intention or gross negligence can be proved.
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Analysis

Sample preparation

Take the sample at a homogeneously mixed position and let it cool down to room temperature. If turbid, allow to settle and decant or filter.

Chromium (III)

Reagents	10 % Sodium hydroxide 30 % Hydrogen peroxide (H_2O_2) Hydrochloric acid conc. Potassium iodide 0.1 mol/L sodium thiosulphate 1 % starch solution (freshly prepared)	
Process		Pipette
	10 mL	passivation bath into a
	250 mL	Erlenmeyer flask, add
	50 mL	DI water and sodium hydroxide to a pH-value of about 10 (colour change), then add
	10 mL	Hydrogen peroxide and boil the solution for 30 – 40 min. It is very important to evaporate excessive H_2O_2 (boil and reduce until shortly before crystallisation) Cool the solution, add DI water up to
	100 mL	and acidify with hydrochloric acid (colour change from yellow to orange), add
	1 g	potassium iodide, titrate with 0.1 mol/L sodium thiosulphate until the solution is only slightly yellowish, then add
	Some mL	starch solution and titrate until the blue colour disappears.
Calculation	mL/L **riag Pass 446 Additive 1** = Consumption in mL x 9.0	