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riag Pass 440

Trivalent black chromate passivation on zinc-nickel layers

The **riag Pass 440** is a new trivalent black chromate process that produces a black colour finish on zinc-nickel 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**.

The **riag Pass 440** additives are supplied in easy to use liquid concentrates.

Make up

	Range	Optimum
riag Pass 440 Additive 1 (density = 1.23 g/mL)	100 mL/L	100 mL/L
riag Pass 440 Additive 2 (density = 1.15 g/mL)	10 – 40 mL/L	20 mL/L
Sodium nitrate	40 g/L	40 g/L
pH	1.7 – 1.9	1.8

The quantity of **riag Pass 440 Additive 2** depends on the zinc-nickel process used and the equipment.

Procedure for a make up of 100 litres

Put 80 L water in the process tank. Add 4 kg of sodium nitrate and 10 L **riag Pass 440 Additive 1** and the minimum quantity of **riag Pass 440 Additive 2** and mix well until the sodium nitrate is dissolved. Adjust the pH with diluted sulphuric 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:	18 – 22 °C (room temperature)
Time:	30 – 60 sec.
pH-Value:	1.7 – 1.9 (optimum 1.8). Frequent control is recommended. Adjust the pH with diluted sulphuric acid or sodium hydroxide
Agitation:	Air or parts movement
Fume extraction:	Recommended
Equipment:	Mild steel tank with polypropylene lining
Heating:	Glass or teflon tube heaters
Pre dip activation:	This will decrease the corrosion resistance and therefore is not recommended.
Post treatment:	We recommend our riag post treatment for enhanced corrosion protection

Process sequence

1. Zinc-nickel plating
2. Water rinse
3. Water rinse
4. **riag Pass 440**
5. Drag Out
6. DI water rinse
7. **riag Seal *** * different options possible
8. Dry

Replenishment

riag Pass 440 Additive 1 is added on the basis of analysis. The replenishment ratio of the two parts **riag Pass 440 Additive 1** and **riag Pass 440 Additive 2** should be made according to the make up ratio. Sodium nitrate is not added when replenishing.

Effluent control

The **riag Pass 440** 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. riag furthermore reserves the right to make changes in relation to products, methods and the instruction manual without prior notice.

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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 ₂ O ₂) Hydrochloric acid conc. Potassium iodide 0.1 mol/L sodium thiosulphate 1 % starch solution (freshly prepared)
Process	<p>Pipette</p> <p>10 mL passivation bath into a</p> <p>250 mL Erlenmeyer flask, add</p> <p>50 mL DI water and sodium hydroxide to a pH-value of about 10 (colour change), then add</p> <p>10 mL Hydrogen peroxide and boil the solution for 30 – 40 min. It is very important to evaporate excessive H₂O₂ (boil and reduce until shortly before crystallisation)</p> <p>100 mL Cool the solution, add DI water up to and acidify with hydrochloric acid (colour change from yellow to orange), add</p> <p>1 g potassium iodide, titrate with 0.1 mol/L sodium thiosulphate until the solution is only slightly yellowish, then add</p> <p>Some mL starch solution and titrate until the blue colour disappears.</p>
Calculation	mL/L riag Pass 440 Additive 1 = Consumption in mL x 6.9