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

25.07.2014

riag Pass 418

Trivalent blue chromate passivation with high corrosion resistance

The **riag Pass 418** is a new trivalent blue chromate process that produces glossy blue colour finish on zinc plated surfaces . The coating so obtained provides corrosion resistance **without the presence of hexavalent Chrome.**

The **riag Pass 418** is supplied in easy to use liquid concentrates.

Make up

	Range	Optimum
riag Pass 418 Additive (density = 1.18 g/mL)	30 – 50 mL/L	40 mL/L
pH	1.7 – 2.2	1.9
Temperature	20 – 30 °C	20 °C

The higher the concentration and temperature of the solution, the lower will be the immersion time.

Procedure for a make up of 100 litres

Take 50 L DI water in the process tank. Add 4 L **riag Pass 418 Additive** and adjust the volume to 100 litres. Mix well. Adjust the pH with diluted nitric acid (or increase with a sodium carbonate anhydrous 75 g/L) and temperature of the operating bath to specified values. Now the bath is ready for operation.

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.

Operating conditions

Temperature:	20 – 30 °C (optimum 20 °C)
Time:	15 – 60 sec. (optimum 30 sec.)
pH-Value:	1.8 – 2.2 (optimum 1.9). Frequent control is recommended. pH ≤ 1.7: decrease of the corrosion protection pH ≥ 2.3: yellowish appearance, decrease of the corrosion protection
Agitation:	Air or parts movement Do not use lead as weight for air blowing tubes!
Fume extraction:	Recommended
Equipment:	Mild steel tank with polypropylene lining
Heating:	Not required or Teflon tube heaters
Pre dip activation:	This will improve the **riag Pass 418** 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.
Hints:	**riag Pass 418** is sensitive to heavy metal impurities. The **riag Pass 418** service life is only limited due to the iron concentration. The critical concentration is between 250 and 500 mg/litre. When loading with uncoated parts (tubes) we recommend the addition of an inhibitor.

Effluent control

The **riag Pass 418** chromate conversion coating solution is acidic and contains trivalent chromium salts. Spent solution has to be treated and discharged according to local waste water laws.

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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) deionized water	
Process		Pipette
	10 mL	passivation bath into a
	250 mL	Erlenmeyer flask. Add
	50 mL	deionized water and
	1 mL	sodium hydroxide 10 % (colour change) and
	0.5 mL	Hydrogen peroxide and boil the solution for 30 min. It is very important to evaporate excessive H_2O_2. Don't boil to dryness Add deionized water up to
	100 mL	and acidify with
	20 mL	conc. hydrochloric acid. Cool down to room temperature Add
	2 g	potassium iodide, titrate with 0.1 mol/L sodium thiosulphate until the solution is only slightly yellowish, then add
	0.5 mL	starch solution and titrate on until the blue colour disappears.
Calculation	mL/L **riag Pass 418 Additive** = Consumption in mL x 7.1	

pH-Chart for riag Pass 418

value	desired						
actual	1.7	1.8	1.9	2.0	2.1	2.2	
1.0	58 mL	61 mL	63 mL	66 mL	67 mL	69 mL	Sodium carbonate (anhydrous) 75 g/L
1.1	43 mL	46 mL	48 mL	51 mL	52 mL	54 mL	
1.2	30 mL	33 mL	35 mL	37 mL	39 mL	40 mL	
1.3	23 mL	25 mL	28 mL	30 mL	32 mL	33 mL	
1.4	15 mL	18 mL	20 mL	23 mL	24 mL	25 mL	
1.5	8.5 mL	11 mL	14 mL	16 mL	18 mL	19 mL	
1.6	4.2 mL	7.1 mL	9.5 mL	12 mL	13 mL	15 mL	
1.7		2.8 mL	5.3 mL	7.8 mL	9.2 mL	11 mL	
1.8			2.47 mL	4.9 mL	6.4 mL	7.8 mL	
1.9		0.33 mL		2.47 mL	3.89 mL	5.3 mL	
2.0		0.60 mL	0.27 mL		1.41 mL	2.83 mL	
2.1		0.78 mL	0.45 mL	0.18 mL		1.41 mL	
2.2		0.94 mL	0.61 mL	0.34 mL	0.16 mL		
2.3		1.06 mL	0.73 mL	0.46 mL	0.28 mL	0.12 mL	Nitric acid 60%
2.4		1.15 mL	0.82 mL	0.55 mL	0.37 mL	0.21 mL	
2.5		1.23 mL	0.90 mL	0.63 mL	0.45 mL	0.29 mL	
2.6		1.29 mL	0.95 mL	0.69 mL	0.51 mL	0.34 mL	
2.7		1.34 mL	1.00 mL	0.74 mL	0.56 mL	0.39 mL	
2.8		1.38 mL	1.05 mL	0.78 mL	0.60 mL	0.44 mL	
2.9		1.42 mL	1.08 mL	0.82 mL	0.64 mL	0.47 mL	
3.0		1.44 mL	1.11 mL	0.84 mL	0.66 mL	0.50 mL	
3.1		1.47 mL	1.14 mL	0.87 mL	0.69 mL	0.53 mL	
3.2		1.49 mL	1.16 mL	0.89 mL	0.71 mL	0.55 mL	
3.3		1.51 mL	1.18 mL	0.91 mL	0.73 mL	0.57 mL	
3.4		1.53 mL	1.20 mL	0.93 mL	0.75 mL	0.59 mL	
3.5		1.55 mL	1.21 mL	0.95 mL	0.77 mL	0.61 mL	
3.6		1.56 mL	1.23 mL	0.96 mL	0.78 mL	0.62 mL	
3.7		1.57 mL	1.24 mL	0.97 mL	0.79 mL	0.63 mL	
3.8		1.58 mL	1.25 mL	0.98 mL	0.80 mL	0.64 mL	
3.9		1.59 mL	1.26 mL	0.99 mL	0.81 mL	0.65 mL	
4.0		1.60 mL	1.26 mL	1.00 mL	0.82 mL	0.65 mL	

In the chart above you can see the values of sodium carbonate solution or nitric acid in mL/L passivation to get the desired pH value. These values are just auxiliary and are not a guarantee. High contents of zinc and different make up concentrations will influence the values above. We recommend to adjust the pH slowly to the desired value with a recently calibrated pH meter.