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

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riag CPol 696

Nitric acid-free brightening pickling for copper and copper alloys

riag CPol 696 is an acidic chrome- and nitric acid-free brightening pickling for rack and bulk goods made of brass or lead-containing brass, copper, copper alloys, nickel-silver (copper-nickel-zinc alloy) and their combinations with iron and stainless steel. **riag CPol 696** produces a brightening effect which exceeds the one using nitric acid containing picklings. With **riag CPol 696** aluminum-copper-alloys can be brightened after pickling.

Properties

- chrome- and nitric acid-free brightening pickling
- for rack and bulk goods
- no nitrogen oxides or other toxic gases
- excellent service life and stability
- very efficient, since twentyfold concentrate
- ideal for pickling of brass, lead-containing brass, copper, copper alloys
- soldering points become bright and can be plated directly

Procedure

A hydrophilic, grease-free surface is required for each pickling. Since **riag CPol 696** is less aggressive than nitric acid, we recommend one of the following pretreatments, depending on the type of contamination:

1. Acidic degreasing

Removes e.g. greases, oils, drawing soaps, soldering aids (borax), mold release agents based on fatty acids and sulfurized cutting agents. This application has proven to be particularly suitable for copper alloys.

Make up of 100 L electrolyte:

-	Water			80	L
-	Sulfuric acid conc.	3	–	5	L
-	**riag Act 695 Surfactant**	2	–	8	L
-	Water	fill up to final volume			
-	Temperature	20	–	90	°C
-	Time approx..	2	–	5	min.

2. Pre-treatment

Completely removes strong oxide layers, mill scale, e.g. soldering, die-coating and graphite / molybdenum sulfide residues from wire productions (e.g. chains). After pre-treatment, the parts have a bright uniform surface.

Make up of 100 L electrolyte:

-	Water			65	L
-	Sulfuric acid conc.	5	–	10	L
-	Hydrogen peroxide 35 %	ca. 10	–	20	L
-	**riag CPol 696 Additive**	ca.		5	L
-	Water	fill up to final volume			

Possibly against spray mist and for removing soldering aids and mill scale:

-	**riag Act 695 Surfactant**	0.5	–	2	L
-	Temperature	20	–	40	°C
-	Time	ca. 1	–	5	min.

Rinsing is only necessary with large drag-outs.

3. Brightening Pickling

Make up of 100 L electrolyte:

-	Water			75	L	
-	Hydrogen peroxide 35 % ca.	10	–	20	L	
-	**riag CPol 696 Additive**	ca.		5	L	
-	Water	fill up to final volume				
-	Temperature	20	–	40	°C	
-	pH	1.5	–	2.5		
-	Time	ca. 2	–	10	min.	depends on desired degree of brightness

Cooling is not required. However, the temperature should not drop below 20 °C. The stripping rate is about 1 µm / min at 30 – 35 °C. Check the pH during production and at the end and, if necessary, adjust with a replenishing solution (see make up of replenishing solution below). The pH should never rise above 3.5. Avoid drag-in of chlorides. Rinsing is only necessary with large drag-outs.

4. Brightening respectively preservation

During the proper application of **riag CPol 696** the material is coated with a uniform, brown oxide film, which must be removed in the following brightening:

Make up of 100 L electrolyte:

-	Water	95	–	97	L
-	Sulfuric acid conc., ca.	3	–	5	L
-	Temperature	room temperature			
-	Time ca.	10	–	30	sec.

5. Drying or Plating

a) Dry the parts. They now have the desired brightening effect and an intermediate corrosion protection such as a chromate coating.

b) The parts are coated via cathodic electrolytic degreasing, deoxidation, etc.

Monitoring, additional dosage of the brightening pickling

The pickling process consumes acid ions, hydrogen peroxide and **riag CPol 696 Additive** (pH increase). The monitoring is carried out by controlling the pH value. The adjustment is done by manual addition or automatic pH metering of the following replenishing solution:

Make up of 10 L replenishing solution:

-	Wasser		3 – 3.5	L		
-	Sulfuric acid conc..		ca.0.5 – 1	L	cool down below 30 °C	
-	**riag CPol 696 Additive**		1	L		
-	Hydrogen peroxide 35 %	ca.	5	L		

Aluminum brightening

Make up of 100 L electrolyte:

-	Water		80	L
-	Sulfuric acid conc.	ca. 5 –	10	L
-	Hydrogen peroxide 35 %	ca. 2 –	4	L
-	**riag CPol 696 Additive**	ca. 0.5 –	3	L
-	Water	fill up to final volume		
-	Temperature	room temperature		

Specific information

Normally the H_2O_2 in brightening picklings is decomposed by heavy metal ions, which means even when a pickling is just stored the quality of the pickling reduces constantly. However, due to the use of a special stabilizer system the decrease in quality of **riag CPol 696** is largely prevented for weeks. Therefore a chemical reaction only occurs when the pickling is contaminated with metals.
Please make sure to get a H_2O_2 quality stabilized according to DIN standards in order to prevent excessive consumption!

Since **riag CPol 696** only strips small amounts of metal long service lives are achieved, similar to nitric acid containing picklings . Depending on the area of application the metal intake adds up to approx. 50 g/L (or approx. 5 m² of goods/L) and more.
Storage at room temperature. When stored around freezing point crystallization may occur: heat the container to about 30 °C before use.

Recovery / waste water treatment

riag CPol 696 is free of any complexing agents. The recovery of the accumulated metals can be done by deposition in a suitable electrolysis cell.

The waste water treatment can be carried out without problems by simple hydroxide precipitation of the residue. Please note that the procedure has to be done in neutral state since in redox stages the electrode is affected by H_2O_2, which leads to incorrect measurements.

Tank, heating element

- Tanks made of plastic, stainless steel or rubberized steel containers
- Heaters with teflon coating, stainless steel, porcelain or glass

Environmental considerations

All concentrates, rinse waters and waste solution must be treated and discharged in accordance with local effluent control regulations. Further information can be gleaned from the MSDS.

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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