

# riag Act 691

## Liquid etching-degreasing process

**riag Act 691** is an etching process on aluminum and copper and its alloys with a degreasing function. On aluminum, under certain conditions, it can advantageously replace the use of sodium hydroxide pickling and/or pickling with fluorine. A wide range of uses is possible such as the preparation of aluminum before plating or anodizing. Copper after soldering, brazing or strongly oxidized, will be easily cleaned. With higher concentration, it can easily be used for pretreatment on titanium alloys.

### Properties

- Acidic solution
- Suitable for aluminum, copper substrates and titanium
- Nitric and fluoride free pretreatment on aluminum
- Suitable for immersion application and with ultrasonic

### Ingredients

- Mineral acids
- Organic acids
- Nonionic detergents (in **riag Act 695 Surfactant (NI)**)

### Make up of riag Act 691 for aluminum, copper and alloys

	Range	Optimum
<b>riag Act 691 Additive</b>	50 – 250 mL/L	200 mL/L
<b>riag Act 695 Surfactant (NI)</b>	1 – 50 mL/L	30 mL/L
Temperature	20 – 65 °C	55 °C
Time	5 – 15 min	10 min

## Make up of riag Act 691 for titanium

**riag Act 691 Additive**

**riag Act 695 Surfactant (NI)**

Phosphoric acid (85 %)

Temperature

Time

Range	Optimum
400 – 600 mL/L	500 mL/L
1 – 50 mL/L	30 mL/L
100 – 180 mL/L	140 mL/L
55 – 65 °C	60 °C
5 – 15 min	10 min

## Make up

The tank is filled with deionised water to 30 % of the final volume. Slowly add the required amount of **riag Act 691 Additive** and **riag Act 695 Surfactant (NI)** while stirring. Top up with water to the working level. Once the working temperature has been reached, the electrolyte is ready for use.

## Operating parameters

Agitation:	Not critical, but agitation of the parts or by electrolyte circulation improves the cleaning effect.
Tank:	Plastic
Heating:	Immersion heaters, but thermostatic control is essential.
Fume extraction:	Recommended
Filtration:	For long term use of the electrolyte, in cases of etching substrates with significant sludge formation, filtration may be necessary.
Water:	Tap water may be taken for the makeup, however the use of low calcium or DI water is recommended.
General:	<p>The make up concentration and temperature should be adjusted according to the substrate and its degree of soiling. Temperature is an important catalyst in etching and for degreasing.</p> <p>For some sensitive aluminum alloys, such as those rich in zinc and magnesium, the immersion time should be reduced to a maximum of 10 minutes or less. For aluminum alloyed with copper, a black sludge creation is normal and can easily be removed with the <b>riag Act 653</b>.</p>
Maintenance:	<p><b>riag Act 691</b> can be used with different concentrations depending on the application. In order to remain within the desired working range, the <b>riag Act 691</b> must be checked regularly by analyse.</p> <p>The <b>riag Act 695 Surfactant (NI)</b> is added in at the same ratio as for make up. In case of heavy oil drag in, an overdose of <b>riag Act 695 Surfactant (NI)</b> is possible to disperse the floating oils.</p> <p>If the performance of the electrolyte is no longer correct despite maintaining the set values, a new makeup is necessary.</p>

## Procedure on Aluminium

1. Alkaline Soak Cleaner	<b>riag Clean 611</b>	40 – 80 °C	60 – 300 s
2. Double rinse			
3. Acid Soak Cleaner	<b>riag Act 691</b>	20 – 65 °C	300 – 900 s
4. Double rinse			
5. Whitening	<b>riag Act 653</b>	18 – 25 °C	10 – 60 s
6. Double rinse			
7. Zincate	<b>riag AIX 651</b>	15 – 25 °C	15 – 120 s
8. Double rinse			
9. Zincate stripping	<b>riag Act 653</b>	18 – 25 °C	10 – 60 s
10. Double rinse			
11. Zincate	<b>riag AIX 651</b>	15 – 25 °C	15 – 120 s
12. Double rinse			
13. Deposit	<b>riag Cu 385, riag Ni 149, riag PN 102, DNC technologies</b>		
14. Drying			

## Procedure on Copper & alloys

1. Alkaline Soak Cleaner	<b>riag Clean 611</b>	40 – 80 °C	60 – 300 s
2. Double rinse			
3. Acid Soak Cleaner	<b>riag Act 691</b>	20 – 65 °C	300 – 900 s
4. Double rinse			
5. Electro-Cleaner	<b>riag Clean 640</b>	20 – 40 °C	60 – 300 s
6. Double rinse			
7. Activation	<b>riag Act 655</b>	20 – 40 °C	20 – 120 s
8. Double rinse			
9. Deposit	<b>riag Cu 385, riag Ni 149, DNC technologies</b>		
10. Double rinse			
11. Drying			

## Procedure on Titanium

1. Sandblasting			
2. Acid Soak Cleaner	<b>riag Act 691</b>	55 – 65 °C	300 – 1200 s
3. Double rinse			
4. Activation	Sulfuric acid	18 – 25 °C	15 – 120 s
5. Double rinse			
6. Strike	<b>riag Cu 385</b>	38 – 60 °C	at least 500 s
7. Double rinse			
8. Activation	According to deposit	18 – 25 °C	15 – 120 s
9. Double rinse			
10. Deposit	<b>riag Ni 149, DNC technologies</b>		
11. Double rinse			
12. Drying			

## **Environmental considerations and product safety**

All concentrates, rinse waters and waste solution must be treated and discharged in accordance with local effluent control regulations. Information can be gleaned from the material safety data sheets. Chemicals shall not be stored below 10 °C.

## **Liability**

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## Analysis (Analytical Methods)

This method is only suitable for **riag Act 691** without phosphoric acid.

Reagents:                      Sodium hydroxide solution 1.0 mol/L  
Indicator Methyl orange 0.2 % in water

Procedure:                      5 mL                      electrolyte are transferred via pipette into a  
250 mL                      beaker, add  
ca. 100 mL                      deion. water  
ca. 5 drops                      Methyl orange 0.2 %  
Titrate with sodium hydroxide from rose to yellow

Calculation:                      Use NaOH in mL x 20.6 = mL/L **riag Act 691 Additive**

### Attention:

Chemicals not intended to be added to the process may disturb and influence the quality of the processed surfaces.