Natech AL3000

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Who are Natech Limited?

Natech Limited was incorporated in 2002

Natech design and manufacture cutting edge chemical technologies from two ISO 9001 accredited production facilities in Staffordshire, England.

Natech specialise in water-based cleaners, metal pretreatment products and paint strippers.

Natech are a global company supplying products into Asia pacific, The Americas,Europe, Turkey and Africa, via a network of international partners and distributors.

Natech Surface Treatment Products:

Natech have a range of surface treatment products already in the market place;

Phosphate free conversion coats for steel, or mixed metal lines
Chromate replacement conversion coats for aluminium
Paint strippers
Corrosion removers
Corrosion converters
Corrosion inhibitors
Biodegradable cleaners and degreasers
Organic coatings and primers

Markets

Natech have established products in the following market sectors;

Beverage Can

Natech offer a full range of products for aluminium Beverage can washing and Pretreatment, including cleaners, conversion Coatings, accelerators and mobility enhancers

White Goods

Natech have a large presence in the white goods industry supplying global companies who manufacture goods such as; fridges, freezers, panel radiators, and ovens

Paint Stripping

Natech supply a range of non acidic, water-based strippers for both trade and industry. The range includes strippers for alloy wheels, immersion, and brush on strippers, paint brush cleaners and Artex removers.

Natech's Product Drivers

The following are always considered with any Natech product;

- The increasing raw material costs, water and energy costs.
- Operational safety and storage
- Waste generation and disposal
- New directives and legislations (RoHS, REACH)
- Increasing environmental awareness
- Reduction in CO_2 emissions
- Process cost optimisations

What is a conversion coating?

A coating formed by the reaction of a chemical with the metal substrate thus making the metal substrate an integral part of the coating
The converted surface is uniform, non conductive and inert.

What is the purpose of a conversion coat?

To improve paint adhesion and corrosion protection.
The converted surface inhibits the spread of corrosion creepage under the paint film.

Aluminium Conversion Coat

With the emergence of electric cars driving the desire for lighter car body weights, and the consumers desire for more aesthetically pleasing elaborate white goods;

The demand for Aluminium pretreatment is increasing

Natech AL3000

Background

Chromate based conversion coatings remain the benchmark for preventing corrosion on aluminium

However, these conversion coatings suffer from severe disadvantages:

- They are toxic both to users and the environment
- They are persistent in the environment and so present long term hazards
- They are expensive and complex to use

A safe alternative which offers the same performance as hexavalent chromium is required.

Natech AL3000

Natech are pleased to introduce ***AL3000*** to the market.

AL3000 is a new and innovative technology free of heavy metals:

- Non toxic to the environment and to users
- Easy and cost effective to use – no complex control systems required
- Gives better performance than traditional chromate conversion coatings

Natech AL3000

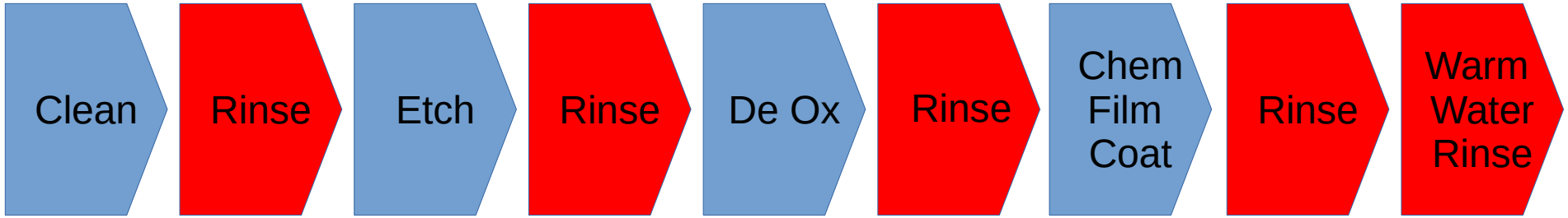
Using advanced technology AL3000 creates an extremely thin coating over the metal surface.
This coating:

- Gives improved corrosion protection over traditional chromate conversion coats – better than 2000 hours acidic salt spray with no creep, filiform corrosion or blistering
- Improves the adhesion of top coats to the metal surface which further improves performance in harsh environments

Project scope

- Develop a safe conversion coat alternative to chromate conversion coatings
- Better the performance standards of chromate conversion coatings
- Operate at low to ambient temperature
- Minimise waste and effluent – minimal sludge
- Minimal constraints on performance which means easy to use and control.

Typical Chromating Process



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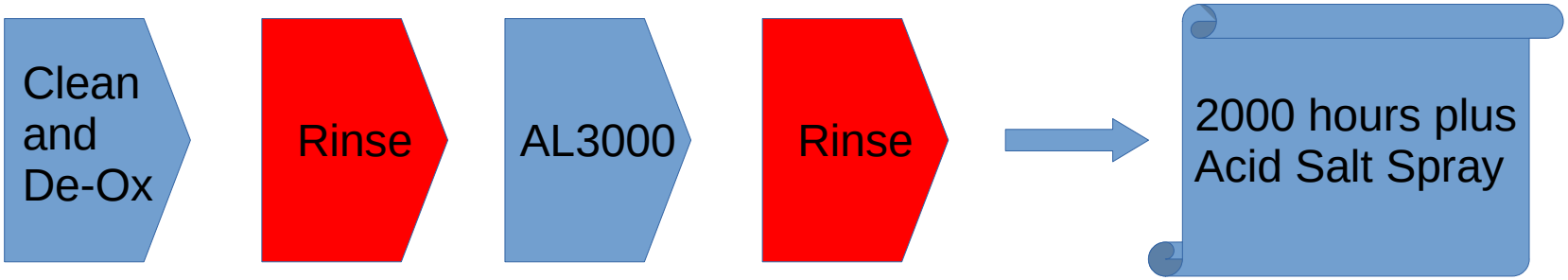
Bath concentration typically 3 – 5 %

Bath temperature typically ambient to 40^{0}C

Water consumption per 100 sqm typically 200-500L

Natech AL3000 Process



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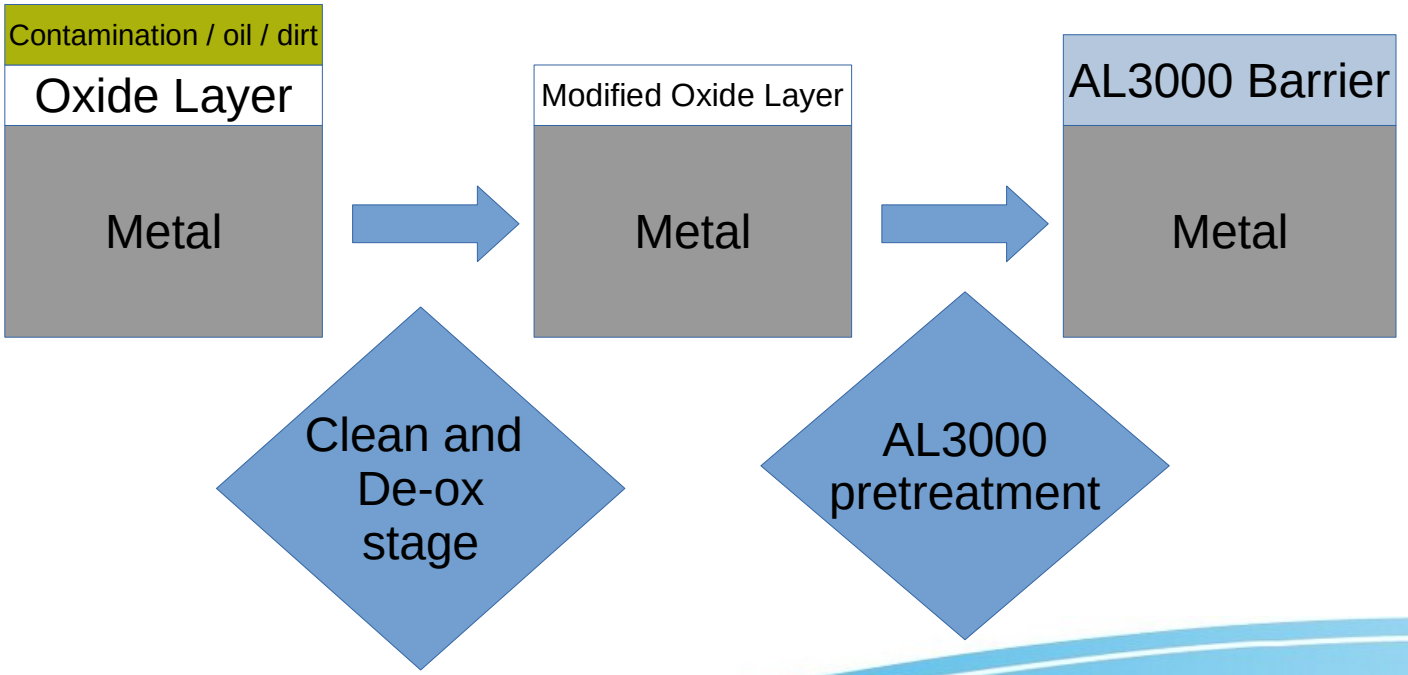
Recommend 0.5 – 1.0% working solution concentration
Spray or dip application for 90 to 180 seconds
Clean stage at 40^0C, treatment at ambient temperature
Water consumption per 100 sqm 50-100L.

Natech AL3000 Process



Appearance

Chromate bath

AL3000

Lab Results: ISO 9227 Acetic acid salt spray 2000 hours

Chromate

AL3000

Chromate failed at 2000 hours due to blistering.

Lab Results:

Test	Chromate bath	AL3000
Dry film adhesion	Pass – no loss	Pass – no loss
Wet film adhesion	Pass – no loss	Pass – no loss
Acid test	Pass – no visual change or blistering	Pass – no visual change or blistering
Detergent resistance	Pass – no visual change or blistering	Pass – no visual change or blistering
Hot acetic acid salt bath	Pass – no loss of adhesion or blistering	Pass – no loss of adhesion or blistering

Lab Results AL3000:

Wet film adhesion

Dry film adhesion

Detergent resistance

Lab Results AL3000:

24 hour Hot Acetic Salt bath

Acid test

Process HSE Comparison

Chromate Line

- Air Monitoring must show 2.5 ug/m^3 as an 8-hour TWA
- Full PPE
- Risk of occupational poisoning
- Specialist fume extraction using HEPA filters
- Special laundry service for coveralls
- Special hygiene regimes and facilities
- Specialist waste treatment or disposal

AL3000 Line

- No requirement for air monitoring
- No specialist PPE
- No risk of occupational poisoning
- No specialist fume extraction required
- No special laundry service for workwear
- Only basic hygiene required
- No specialist waste treatment or disposal

Predicted Cost Savings

Energy and water consumption per 100 sqm

	Typical Chromate Process	Natech AL3000
Energy Consumption (kWh)	57 kWh	20 kWh
Water Consumption (Litre)	200 - 500L	50 - 100L

Natech AL3000 Features and Benefits

- Provides superior corrosion resistance
- Promotes paint adhesion
- Non toxic – hexavalent chromate free
- Significantly reduces water usage and waste water treatment costs
- Enables extended warranties
- Reduction in energy costs.

Conclusions

- Natech AL3000 has matched chromium 6 performance on all lab tests conducted
- ISO 9227 Acetic acid salt spray performance of AL3000 is better than chromium 6
- AL3000 offers a reduction in energy costs as it can be run at ambient temperature
- AL3000 offers reduced waste and effluent disposal and handling costs
- AL3000 gives a lighter more even surface treatment perfect for white goods lines.

All tests were run on Natech lab scale washers and baths. A full scale line trial with operational support is recommended.

Summary

- Natech AL3000 offers an environmentally and user friendly process
- Natech AL3000 reduces process costs and cycle times
- Natech AL3000 complies with increasing environmental demands
- Natech AL3000 meets high quality standards and performance
- Natech AL3000 is the eco friendly solution for Aluminium Pretreatment.