

# INEX : Ensuring A Sustainable Future

## Introduction

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INEX is the leading producer of aluminium extrusion in Australasia and has the capacity to produce in excess of 40,000 tonnes per annum.

As a market leader INEX strives to set new criteria in environmental management issues and is working to ensure sustainability for aluminium extrusion and its future.

INEX is the only extruder in Australasia to recycle its scrap back to a primary producing smelter to produce aluminium billet. This recycling process reduces the energy requirement in the manufacturing process without compromising the high quality requirement of the product. This partnership with New Zealand Aluminium Smelters Limited is an example of this sustainability quest. We recognise that sustainability, both economically and environmentally, must be part of a long-term strategic approach.



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## Aluminium: A Sustainable Future

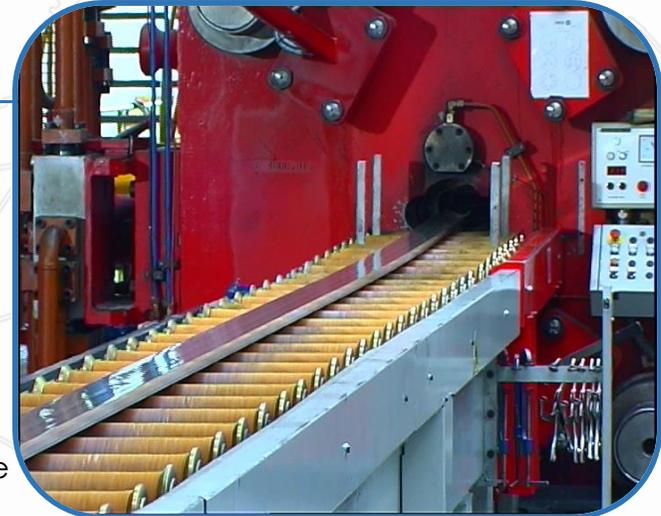
Aluminium is commercially produced from bauxite which consists mainly of the minerals gibbsite, boehmite and diaspore. It has traces of iron oxides, goethite and hematite together with clay mineral kaolinite and traces of anatase.

Aluminium is the most common metal element in the earth's crust accounting for seven percent of its mineral makeup. The current global estimate of aluminium reserves using today's consumption rate is several hundreds of years.

Unlike timber, plastic, ceramics, fibrous plaster and many other products, aluminium can be recycled indefinitely due to its high intrinsic value. Aluminium is also the most cost-effective metal or material to be recycled thus reducing landfill by 6-9% every year.

Aluminium has been recycled since it was first commercially produced and today recycled aluminium accounts for about one-third of global consumption. Recycling is an essential part of the aluminium industry and makes good sense economically, technically and ecologically. All aluminium products retain value, even at the end of their useful life, which guarantees that it is possible to continue to create value by recycling them into new products.

Over 75% of all aluminium produced is still in use today.





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## Independent Extrusions Ltd (INEX)

Australasia's leading manufacturer of aluminium extrusions is continually improving processes and procedures to ensure a sustainable future.

Aluminium is the most sustainable of all products, but we can't stop there.

In 2002 INEX and Rio Tinto Alcan entered into an agreement that INEX would recycle its aluminium scrap back to their smelter at Bluff in Southland. INEX is the only extrusion plant in Australasia to recycle directly with a smelter. This direct process has further reduced the energy required to recycle aluminium.

Due to our reciprocal billet/scrap arrangements with NZ Aluminium Smelter Ltd, INEX has eliminated the necessity of a re-melt plant and thus the CO2 emissions associated with such plants.

On a quest for continual improvement INEX invests \$300k on die design and development every year. This research manifests into reduced energy usage annually.

Recycling is a target strategy at INEX. The recyclability of all reusable components is paramount. Timber dunnage for packaging is collected and after grading the dunnage it is fully recycled. All steel packaging straps are separated for metal recycling. Timber cases for packaging are repaired and constantly recycled. All die steel is separated and recycled.



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INEX's investment path to ensure a continual sustainable future:

2004/05 Investment of \$1,000k in press technology developments to improve efficiency and reduce energy on presses in NZ.

2006 Investment of \$500k in the first cooled extrusion container in NZ. This highly technical development further reduced our energy consumption.

Investment of \$12,000k on a new state-of-the-art extrusion plant in Dandenong, Melbourne. The new technical advances in energy requirements and efficiencies were fully utilised on installation of this new facility.

2007 Further investment allowed for a reduction in metal ageing cycles. The reduced age cycles resulted in a 25% decrease in gas consumption and associated emissions.

Investment of \$1,000k in a semi-automated packaging plant in NZ.

2008 Capital investment improved the efficient use of energy by commissioning "soft starts" to all large electric motors.

2009 Investment of \$1,000k in recycling processing equipment to enable INEX to bale internally prior to shipping it back to a primary aluminium producer.

2010 Investment of \$14,000k in a world class extrusion plant in Loganlea, Brisbane to increase productivity while vastly reducing energy input requirements.

2011 Investment of \$2,000k in an automated extrusion packaging line, custom built for the Dandenong plant.



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2011 Investment of \$1,000k on a quench hood to the larger press in NZ to increase capacity and reduce energy requirements.

2014 Investment of \$2,000k on another fully automated packaging line in Loganlea due to increased volumes.

INEX conducts regular energy audits to ensure full utilisation of power and gas. Having induction billet heating on all presses, as opposed to gas, eliminates any CO2 emissions.

The culture at INEX is one of continual improvement and we know we have achieved several milestones in our quest for sustainability. Many objectives have been achieved by targeted projects designed to reduce our energy requirements, improve productivity or increase efficiencies.

We have a commitment to "ensure a sustainable future" and this commitment is part of our company ethos.



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## New Zealand Aluminium Smelters Ltd

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The NZAS smelter at Tiwai Point is one of the world's largest and has 672 smelting or 'reduction' cells or pots, with around 670 full time equivalent employees and 130 contractors. The smelter contributes \$525 million to Southland's GDP which equates to 10.5 per cent. Most of the aluminium produced at the smelter is exported to Japan, Europe, other Asian countries and North America, but eight per cent is sold locally, here, in New Zealand.

Key facts relating to environmental performance and initiatives at NZAS include the following:

- Almost all the electricity NZAS smelter uses is obtained from a renewable resource – hydro-electricity
- In 2014, NZAS received the top rating in all four categories of the Environment Southland Compliance Monitoring Report. Categories cover provision of data/results, compliance with consent conditions, responsiveness to issues, and keeping Environment Southland informed of intentions/changes
- Over the past 25 years NZAS has halved its annual greenhouse gas emissions, investing nearly ten million dollars of capital for energy efficiency in 2006 alone
- In 2008 NZAS was runner up at the IQPC awards for the six sigma work on reducing carbon consumption (carbon consumption is NZAS's largest contributor to GHG and this project reduced GHG emissions by around 14,000 tonnes per year),
- In 2007 NZAS won the Corporate Social Responsibility category of the Australasian Business Excellence (ABE) Awards, recognizing its performance in pursuing sustainable development,
- In 2007 NZAS won the Supreme Award at the International Quality and Productivity Centre (IQPC) awards for the six sigma work which halved the PFC greenhouse gas emissions at the smelter,
- Other environmental mitigation projects implemented include landfill reduction initiatives, reject timber mulching, adoption of reusable packaging in export shipments, recycling of extrusion scrap and domestic packaging in NZ, staff participation in stoat trapping on Peninsula, and continued participation in – and sponsorship of – the Kakapo Recovery Programme in a partnership with the Department of Conservation and Forest & Bird."

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## Colour Works Ltd (Powder Coating Process)

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Colour Works is an associated company of INEX that powder coats aluminium extrusions for supply to the INEX manufacturer network in New Zealand and the Pacific. Powder coating is a method of coating products with a powdered resin which is applied to the aluminium profile. Electrically charged powder is sprayed onto extrusions which then pass into an oven to gel the powder and cure it. The result is a uniform, high quality and durable finish.

Prior to this process the aluminium profiles go through a preparation phase comprising the following: immersion in a pre-cleaning tank containing detergent, rinsing, immersion in acid etch solution (a dilute mixture of sulphuric acid and hydrofluoric acid), rinsing, then immersion in a chromate solution (a dilute mixture of acids with chromic acid being the main ingredient), followed by rinsing in demineralised water and drying.

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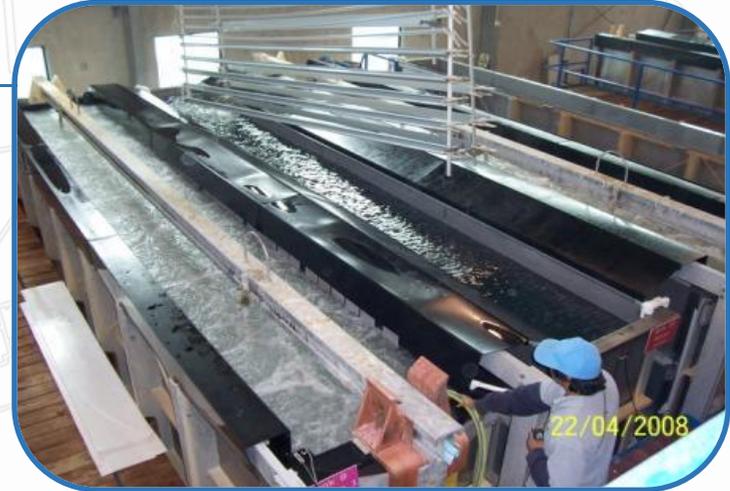
Some key facts relating to environmental performance and initiatives at Colour Works include:

- Overflow from the pre-treatment tank using chromium 6 is now treated with a reducing agent prior to waste disposal. This reducing process converts the compound to chromium 3, which is dramatically less toxic than the hexavalent version (chromium 3 is an essential nutrient in the diet of humans and animals in small amounts but is toxic at high levels);
- Chromium in the waste stream is settled out by flocculation, gathered as a sediment and is then compacted through a filter press before being disposed of at a landfill as a dry cake. The chromate tank is emptied annually by a trade waste contractor and the contents are treated before disposal;
- The pre-cleaning tank is emptied for maintenance purposes once a year and the contents are neutralised prior to discharge to trade waste;
- Acid etch tank discharge and acidic rinse water are neutralised with a caustic solution to meet trade waste requirements;
- Rinse tank flows are counter-cycled to re-use clean water and reduce water consumption;
- A significant proportion of the waste powder in the spray booth is sucked back into a collection system and recycled through the application process. Waste powder that cannot be recycled is currently collected and taken to landfill. However, Colour Works supplier, Orica Powder Coating, is investigating ways of re-using this powder, possibly in a patented board product with similar qualities to MDF;
- Orica Powder Coating has obtained Enviro-Mark Gold certification – an internationally recognised environmental management system. Its powders are manufactured free of VOC (volatile organic compounds), TGIC (triglycidyl isocyanurate), PVC or PVC derivatives, formaldehyde, lead and cadmium. The environmental impact of waste powder taken to landfill is rated as low.

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## FINEX Ltd (Anodising Process)

FINEX is another associated company providing an on-site anodising plant, which was built in 2004. It is New Zealand's most modern anodiser and as such was designed with the latest effluent treatment technology. An extensive underground storage and treatment system was included in the plant's construction and may well be unique internationally for the comprehensive and integrated design approach that was taken. In addition, failsafe bunding was incorporated to ensure the containment of any accidental chemical spills.



The anodising process itself is a complex, multi-stage operation that typically involves an aluminium extrusion in 17 separate tank immersions in order to achieve the lustrous anodised surface finish that is so popular in the building industry. The process requires the aluminium to be cleaned and etched before being subject to electrolysis to create the decorative oxide coating. Colouring may then take place (except for a natural anodised finish) and then sealing takes place.

The contents of the 17 process tanks include a detergent, rinse water, demineralised rinse water, a caustic solution, and other dilute solutions including nitric acid and ferrous sulphates, sulphuric acid, a sulphuric acid and stannous sulphate mix, as well as nickel acetate. Some tanks are heated.

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Key facts relating to the environmental performance and initiatives at FINEX include the following:

- Natural heat generated by the caustic tank is transferred to assist heating of other process tanks. All other heating is by a natural gas burner which heats closed-circuit oil lines;
- Rinse tank flows are counter-cycled to reuse clean water and reduce water consumption;
- Waste rinse water and waste acid and caustic solutions have metals and solids removed by flocculation. This precipitate is gathered as a sediment and is then compacted through a filter press before being disposed at a landfill as a dry cake. Waste water streams are neutralised before discharge to the trade waste system;
- Effluent discharges are to standards applied by the local authority and are sampled and monitored on a regular basis.



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## Sustainable Facts About Aluminium Recycling

Recycling 1 kg of aluminium saves up to 6 kgs of bauxite, 4 kgs of chemical products, and 14 kWh of electricity because it only requires 5% of the energy compared to primary product.

Worldwide aluminium consumption is increasing and forecast to be at 97 million tonnes with around 31 million tonnes being recycled by 2020. The environmental effect of using aluminium as a preferred material will be severely lessened relative to using less durable products that have little or no recycling value.

In all areas of transport, aluminium is reducing fuel consumption by reducing vehicle weight. Every kilogram of aluminium used to replace heavier materials in a motor vehicle can reduce CO2 emissions by 20 kgs over the life of the vehicle.

In the transport industry it is estimated that by 2017 the increased use of aluminium will have the potential to save enough fuel to offset all of the greenhouse gases produced by the aluminium industry globally!

Over 75% of all aluminium produced is still in use today.

*The most durable, diverse product is also the lowest cost-effective material for recycling.*

