The New Zealand Ecolabelling Trust

Licence criteria for Aluminium building products

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This document is for consultation only. Any finally published criteria may differ from those proposed here. The proposed criteria and supporting explanatory information have been prepared specifically for the New Zealand Ecolabelling Trust as part of the Environmental Choice New Zealand programme's life cycle approach and its principles and procedures for developing Licence criteria for specific product categories. The New Zealand Ecolabelling Trust accepts no responsibility for any use by any party of information in the document in any other context or for any other purpose.

Specification change history

Minor clarifications, corrections or technical changes made since the specification was issued in XXXX.

Date	Version	Change

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1 Introduction

Environmental Choice New Zealand (ECNZ) is an environmental labelling programme which has been created to help businesses and consumers find products and services that ease the burden on the environment. The programme results from a New Zealand Government initiative and has been established to improve the quality of the environment by minimising the adverse and maximising the beneficial environmental impacts generated by the production, distribution, use and disposal of products, and the delivery of services. The programme is managed by the New Zealand Ecolabelling Trust (the Trust).

ECNZ operates to the ISO 14024 standard "Environmental labels and declarations – Type I environmental labelling – Principles and procedures" and the Trust is a member of the Global Ecolabelling Network (GEN) an international network of national programmes also operating to the ISO 14024 standard.

ISO 14024 requires environmental labelling specifications to include criteria that are objective, attainable and verifiable. It requires that interested parties have an opportunity to participate and have their comments considered. It also requires that environmental criteria be set, based on an evaluation of the environmental impacts during the actual product or service life cycle, to differentiate product and services on the basis of preferable environmental performance.

The life cycle approach is used to identify and understand environmental issues (adverse or beneficial impacts) across the whole life of a product or service (within a defined product or service category). This information is evaluated to identify the most significant issues and from those to identify the issues on which it is possible to differentiate environmentally preferable products or services from others available in the New Zealand market. Criteria are then set on these significant and differentiating issues. These must be set in a form and at a level that does differentiate environmentally preferable products or services, is attainable by potential ECNZ licence applicants, and is able to be measured and verified. As a result of this approach, criteria may not be included in an ECNZ specification on all aspects of the life cycle of a product or service. If stages of a product or service life cycle are found not to differentiate environmentally preferable products or services, or to have insufficient data available to allow objective benchmarking in New Zealand, those stages will not generally be included in criteria in the specification. For some issues, however, (such as energy and waste) criteria may be set to require monitoring and reporting. These criteria are designed to generate information for future reviews of specifications.

The Trust is pleased to publish this proposed specification for Aluminium building products. The specification takes into account environmental concerns about the production of greenhouse gases, disposal of waste products, energy and waste management.

This proposed specification sets out the requirements that aluminium building products will be required to meet in order to be licensed to use the ECNZ Label. The requirements include environmental criteria and product characteristics. The specification also defines the testing and other means to be used to demonstrate and verify conformance with the environmental criteria and product characteristics.

This specification has been prepared based on an overview level life cycle assessment, information from specifications for similar products from other GEN-member labelling programmes, relevant information from other ECNZ specifications, publicly available information, and information provided by interested parties.

Once finalised, this specification will be valid for a period of five years. Twelve months before the expiry date (or at an earlier date if required), the Trust will initiate a review process for the specification.

ABOUT THIS DRAFT:

This is the first version of the ECNZ Aluminium building products specification. Through a feasibility study, the Trust found there was appetite for independent verification of these products, to both raise the profile of environmentally preferable products and recognise what good performance looks like.

ECNZ is a member of the Global Ecolabelling Network (GEN). Some other GEN-member eco-labels are considering including criteria on social issues in their eco-labelling specifications. GEN-members believe that environmentally preferable products should also be socially responsible. There are many social issues within the supply chain and product life cycle from raw material harvesting and processing to end user. Social issues of concern during manufacturing of a typical product include fair pay, child labour, modern slavery, workers' rights and employer's responsibilities, community impacts, training, education, and health and safety. The emphasising of social aspects within the specification aligns ECNZ with the global trend of merging both environmentally and socially acceptable practice when developing and producing products within the market. Criteria within the specification are marked with 👪 where they relate to a social issue, and with 🌏 where they relate to an environmental issue. Some criteria are marked with both a 🌏 and 👪 which denotes the criteria cover both an environmental and socially acceptable practice.

MAKING SUBMISSIONS:

The Trust invites comments from interested parties on this proposed specification. This proposed specification includes a number of these shaded text boxes. These include notes and some specific questions to assist readers to understand and provide comment on the requirements and proposed clauses.

This proposed specification has been prepared based on an overview level life cycle assessment, information from specifications for similar products from other GEN-member ecolabelling programmes, relevant information from other ECNZ specifications and information provided by interested parties.

The Trust is keen to receive comments about:

- any other information that may be relevant.
- how applicable and relevant the information and requirements included in the proposed specification are to differentiate environmentally preferable products in the New Zealand market.
- how achievable and practical the requirements are, including the requirements for verification.

This document is for consultation only. Any finally published criteria may differ from those proposed here. The proposed criteria and supporting explanatory information have been prepared specifically for the New Zealand Ecolabelling Trust as part of the Environmental Choice New Zealand programme's life cycle approach and its principles and procedures for developing Licence criteria for specific product categories. The New Zealand Ecolabelling Trust accepts no responsibility for any use by any party of information in the document in any other context or for any other purpose.

2 Background

Aluminium's combination of physical properties results in its use in a wide variety of products including light vehicles, railcars, and aircraft; wire is used for long-distance transmission of electricity; air conditioning, refrigeration, and heat-exchange systems; and building, construction, packing, and engineering products[1].

Aluminium is the second most used metal after steel and more aluminium is produced than all other non-ferrous metals put together[2]. There are several minerals available in the world from which aluminium can be obtained, but the most common raw material is bauxite[3]. No bauxite is mined in New Zealand, but bauxite from Weipa in Queensland is smelted at the New Zealand Aluminium Smelter (NZAS)[4] at Tiwai Point in Southland. Around 90% of the aluminium produced at NZAS is exported[5] and much of the aluminium used in building and construction in New Zealand is in the form of joinery imported from other countries, particularly China[6]. After China, Aluminium Bahrain B.S.C (Alba, in Kingdom of Bahrain), is the world's largest aluminium smelter with a production of more than 1.561 million metric tonnes per annum (2021)[7]. From January to December 2021, 1,888 metric tonnes of primary aluminium was produced in Australia and New Zealand[8].

Figure 2.1 shows a generalised model of the life cycle, or flow, of aluminium:

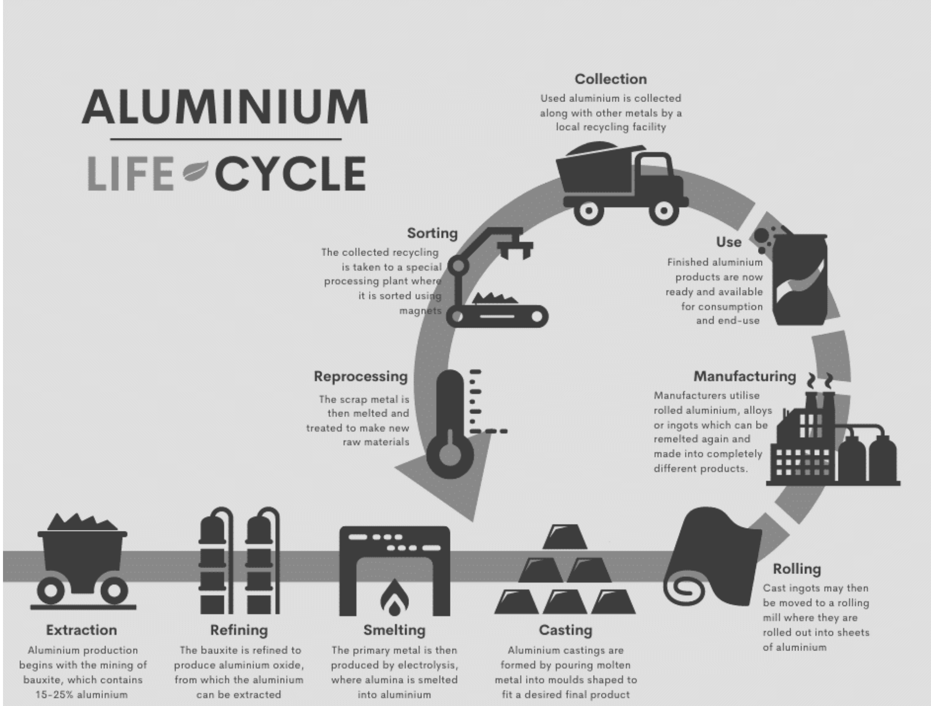

Figure 2.1: The Aluminium life cycle *Source: https://alutechsystems.co.uk*

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[1] The Global Flow of Aluminum From 2006 Through 2025, W.D. Menzie et al (2010)

[2] Mapping the global flow of aluminium: from liquid aluminium to end-use goods (2013)

[3] https://www.aluminiumleader.com/production/how_aluminium_is_produced/

[4] https://www.nzpam.govt.nz/nz-industry/nz-minerals/resources-potential/

[5] NZAS webpage

[6] Thinkstep ANZ, *Under construction Hidden emissions and untapped potential of buildings for New Zealand's 2050 zero carbon goal*, on behalf of NZGBC (Aug 2019)

[7] https://www.albasmelter.com/en/category/corporate-profile

[8] Primary Aluminium Production - International Aluminium Institute (international-aluminium.org)

2.1 Methods of primary aluminium production

Fabricated aluminium products can be used in construction (33%), vehicles (28%), industrial equipment (28%), and metal products (11%)[9].

The aluminium production stages are:

Extraction – Bauxite is a red dirt and clay mixture commonly found in Australia (top producer), China, Brazil, India, Guinea, Indonesia, Jamaica, Russia and Suriname. Bauxite is a mixture of aluminium hydroxide, iron oxide, titanium dioxide and kaolinite. The great majority of the world's bauxite ores are extracted by open-cut methods which can have significant impacts on local biodiversity[10]. The mining process itself is relatively low energy use (0.6% of total energy for aluminium production[11]) and low carbon emitting (compared to other processes in the production of aluminium chain), representing one quarter of a percent of total aluminium sector greenhouse gas emissions, mainly from mobile equipment used to remove and haul overburden (rock or soil overlying the bauxite) and bauxite [12]. The main wastes from bauxite mining are tailings produced by grinding and washing the bauxite.

Refining – Bauxite ore is first converted into pure aluminium oxide ('alumina') by the 'Bayer Process' which requires energy in the form of heat and steam. A digestion process, using sodium hydroxide, allows the separation of aluminium hydroxide from the so-called "bauxite residue" (a red mud). This waste is usually disposed of in landfill, but research is ongoing to find better ways to recycle and reuse red mud—for example, as building materials (bricks, roofing and flooring tiles), catalysts, ceramics, fillers, fertilisers, and light-weight aggregates[13]. The last step in the refining process is calcination which removes the water content in the hydroxide. Alumina production represents just over 15% of all aluminium sector's greenhouse gas emissions[14]. Approximately 17.1% (or 14,200 MJ/kg) of the total energy for aluminium production is required in the refining stage[15], [16].

Approximately two to three tonnes of bauxite are required to produce a tonne of alumina, as bauxite only contains 30-54% alumina, and four to six tonnes of bauxite are required to be purified to produce one tonne of aluminium metal[17].

Smelting – Through the 'Hall-Heroult' process, molten aluminium (created by dissolving alumina in molten fluoride salt) is extracted through an electrolytic process called smelting, which breaks the strong chemical bond of the aluminium and oxygen atoms using a powerful electric current (electrolysis). Electrolysis is an electricity intensive process and requires huge amounts of electricity to break the strong oxygen bonds of alumina. The smelting process requires 68.6% (or 193.6 MJ/kg) of the total energy for aluminium production[18].

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[9] Mapping the global flow of aluminium: from liquid aluminium to end-use goods (2013)

[10] OECD, Sustainable Materials Management – Aluminium (2010)

[11] Data, Statistics, and Useful Numbers for Environmental Sustainability (May 2021). Benoit Cushman-Roisin, Bruna Tanaka Cremonini

[12] *Aluminium Sector Greenhouse Gas Pathways to 2050*, International Aluminium Institute (2021)

[13] https://www.science.org/content/article/red-mud-piling-can-scientists-figure-out-what-do-it

[14] *Aluminium Sector Greenhouse Gas Pathways to 2050*, International Aluminium Institute (2021)

[15] Aluminum: The Element of Sustainability. The Aluminum Association (September 2011)

[16] Data, Statistics, and Useful Numbers for Environmental Sustainability (May 2021). Benoit Cushman-Roisin, Bruna Tanaka Cremonini

[17] Environmental and Occupational Health Impact of Bauxite Mining in Malaysia: A Review (2017)

[18] Data, Statistics, and Useful Numbers for Environmental Sustainability (May 2021). Benoit Cushman-Roisin, Bruna Tanaka Cremonini

During 2020, it is reported that Chinese aluminium smelters produced an average of 12.36 tonnes of CO_2e per tonne of aluminium produced from coal-fired power generation last year[19]. During 2020, NZAS (which largely uses hydroelectric power) reports that the average emission rate was 2.13 tonnes CO_2e of per tonne of aluminium produced[20].

The most significant waste products from the production of aluminium from alumina are air emissions, including perfluorocarbon (PFC) gases (tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6)) and carbon dioxide (CO_2) from the production of anodes and electricity. PFCs are of particular concern because they have a greater global warming potential (GWP) per unit of emission than CO_2. PFCs can be produced during events referred to as 'anode effects'. An anode effect is a process upset condition, where an insufficient amount of alumina is dissolved in the electrolyte bath. This causes the voltage in the bath to be elevated above the normal operating range, resulting in the emission of CF_4 and C_2F_6 which are extremely potent greenhouse gases (GHGs)[21]. Over the past 30 years, there has been a decline in PFC emissions from primary aluminium production, associated with successful implementation of anode effects quenching strategies incorporated into the process control of the electrolysis cells. However, some PFCs are still produced from low voltage electrolysis.

There are also environmental concerns associated with solid waste produced from the smelting process including spent pot liner (which comes from the relining of pots, which takes place every five-to-eight years)[22].

Casting - once the molten aluminium is collected, it is transferred to the casthouse, where it is purified, alloyed to specification and then cast into ingots[23].

Aluminium as a material is almost always used in alloyed form. When adding other atomic elements into pure aluminium, such as magnesium, zinc, copper, manganese, silicon, tin, etc., the original softness, reactivity and formability of aluminium change dramatically. Aluminium alloys can be made as strong as steel but with only half the weight of the same strength as steel[24].

2.2 Aluminium finishing stage

Aluminium can be rolled into sheets from which panels for external cladding or building facades and roofing are made. Using the forming process of extrusion, aluminium can also be shaped to form longer, thinner pieces of aluminium called rod, bar or wire, often used for manufacturing different types of machine parts like nails, bolts, screws and rivets.

The main finishing stages for aluminium are:

Passivation – carried out in one of three ways: alclading, chromate conversion coating and anodising. Pure aluminium naturally forms a tough resistant oxide, almost immediately, that protects it from further oxidation in most environments. Aluminium alloys, however, offer little protection against corrosion[25].

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[19] https://www.woodmac.com/press-releases/carbon-neutrality-goal-forces-chinese-aluminium-smelters-away-from-captive-coal-power/

[20] NZAS Annual Environmental Monitoring Report 2020 for Environment Southland

[21] *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* – Chapter 3 PFC emissions from primary aluminium production, Michael J. Gibbs (2001)

[22] OECD, Sustainable Materials Management – Aluminium (2010)

[23] Aluminium Life Cycle | Alutech Systems

[24] Aluminum: The Element of Sustainability, The Aluminum Association (2011)

[25] Passivation of Aluminium

- Alclading is the process of metallurgically bonding a thin layer of pure aluminium to the aluminium alloy.
- Chromate conversion coating (CCC) is a common way of passivating not only aluminium, but also zinc, cadmium, copper, silver, magnesium, and tin alloys. Historically, hexavalent chromium has been used. Hexavalent chromium (chromium VI) compounds are acutely toxic, carcinogenic, mutagenic, suspected reproductive toxins, corrosive and ecotoxic. Due to these human health and environmental concerns, alternatives to CCC are becoming more widely available. The most common alternative is trivalent chromium, which has fewer human health and environmental concerns.
- Anodising, via an electro-chemical process, forms a thick oxide coating on the aluminium surface. This finish is more robust than the other two processes and also provides good electrical insulation, which the other two processes do not[26].

Powder coating - Aluminium extrusions are typically coated with high grade polyester powders as an alternative to anodising (and no solvent is necessary). This involves the following process:

- A detergent cleaner is applied to the aluminium extrusion to remove oil and smut. Once cleaned, the powder is sprayed on through an electrostatic spray gun (the positive charge makes the powder bond with an electrically-grounded extrusion). Then the extrusion is placed into a large curing oven. The oven bakes the extrusions until there is a uniformly-melted coating[27].

The amount of waste, or scrap, from fabrication and manufacture varies, depending on individual processes. For example, cutting of aluminium sheet can produce significant amounts of scrap whereas casting aluminium parts may produce little scrap. Worldwide, scrap from fabrication and the manufacture of finished goods is generally recycled[28].

2.3 Recycling and aluminium production

Most aluminium in the world is already recycled (75% of all aluminium ever produced is still in use[29]) and now contributes significantly to the global market with much lower emissions than primary production. McKechnie (aluminium extruder in New Zealand) reports to have a carbon footprint of 1.2 kg CO_2e/kg of aluminium produced as they operate New Zealand's only remelt casthouse and therefore can use mainly recyclable aluminium scrap from its own manufacturing process and scrap sourced from other New Zealand extruders[30]. Although secondary (recycled) aluminium in New Zealand is not widely used in extrusion plants (as other operators don't have remelt casthouses), industry estimates are that recycled aluminium will make up 30% of the market in future and it is assumed that with enough research this aluminium blend will be able to be used in the extrusion industry[31].

Secondary aluminium is recovered from the processing of various kinds of aluminium scrap, including casting alloys, dross (a mixture of alumina, metal, and other materials), packaging, turnings, used beverage cans, wire and cable, and wrought alloys.

Aluminium does not experience significant product losses in the use stage nor degrade during the recycling process, and its properties do not change between primary and secondary (recycled)

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[26] Anochrome Group

[27] https://www.gabrian.com/powder-coating-aluminum-extrusions/

[28] The Global Flow of Aluminum From 2006 Through 2025

[29] IAI 2017 report

[30] https://www.mckechnie.co.nz/company-profile/environment-quality.html

[31] Thinkstep ANZ, *Under construction Hidden emissions and untapped potential of buildings for New Zealand's 2050 zero carbon goal*, on behalf of NZGBC (Aug 2019)

material. It is estimated that during the remelting process, approximately 1-2% of material is lost, primarily due to oxidation. Secondary aluminium production requires nearly 10 to 15 times less energy than primary aluminium production[32] and produces only 5% of the CO_2 emissions as compared with primary production. In addition, fluorocarbon gases are not produced with secondary smelting. Aluminium can be recycled indefinitely and is also cost-effective to recycle[33].

Nearly all aluminium products are made with some percentage of recycled aluminium, a quality that fluctuates with product requirements, global and local scrap availability, market demands, and sector constraints. While including recycled content in aluminium products is cost effective and environmentally beneficial, manufacturers are constrained by the availability of scrap as the global demand for aluminium outweighs the availability of recycled aluminium[34].

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[32] A Review of Secondary Aluminum Production and Its Byproducts Sai Krishna Padamata, Andrey Yasinskiy and Peter Polyakov (2021)

[33] https://www.ullrich-aluminium.co.nz/profile/environment.php

[34] Aluminium and life cycle thinking – towards sustainable cities (2015)

3 Interpretation

🌏 (Environmental Responsibility) means a criterion or sub-clause within the ECNZ specification which addresses an environmental concern.

👪 (Social Responsibility) means a criterion or sub-clause within the ECNZ specification which addresses a social concern.

Alloy means a metallic substance composed of two or more elements, as either a compound or a solution.

Anodes means large carbon blocks which are used to conduct electricity during the aluminium reduction process.

Anodising means a surface treatment method that thickens the natural oxide layer on the aluminium surface. The aluminium anodising process is an electrochemical process, which requires the aluminium parts to be submerged into an electrolytic bath, and an electric current is run through it.

Bayer process means the two steps to produce alumina; 1) the pressure leaching of bauxite with sodium hydroxide solution to obtain sodium aluminate solution and 2) the precipitation of pure aluminium hydroxide from this solution by seeding with fine crystals of aluminium hydroxide.

Dross means a waste by-product from the smelting process. It is formed on the surface of molten aluminium or its alloys, by oxidation. It contains mostly aluminium oxide, alloying elements and salts such as sodium chloride or potassium chloride.

Energy management programme means a programme to achieve and sustain efficient and effective use of energy including policies, practices, planning activities, responsibilities and resources that affect the organisation's performance for achieving the objectives and targets of the Energy Policy.

Environmental management system means a framework that helps an organisation achieve its environmental goals through consistent review, evaluation, and improvement of its environmental performance.

GECA means Good Environmental Choice Australia.

GEN means Global Ecolabelling Network.

GHG means is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect (a process that occurs when energy from a planet's sun goes through its atmosphere and warms the planet's surface, but the atmosphere prevents the heat from returning directly to space, resulting in a warmer planet).

Hall–Héroult process means the common industrial process for smelting aluminium. It involves dissolving aluminium oxide (alumina) (obtained most often from bauxite, aluminium's chief ore, through the Bayer process) in molten cryolite, and electrolysing the molten salt bath, typically in a purpose-built cell.

ILO means International Labour Organisation, which is a United Nations agency whose mandate is to advance social and economic justice through setting international labour standards.

ISO means International Organisation for Standardisation.

Casting means the process of forming aluminium into a shape suitable for further processing.

Label means the Environmental Choice New Zealand Label.

Living Wage means a concept launched in New Zealand in 2012. It is the hourly wage a worker needs in order to pay for the necessities of life and participate as an active citizen in the community.

Mine restoration means the process used to repair the impacts of mining on the environment. Mine restoration can also be referred to as ‘mine rehabilitation’, ‘land rehabilitation’, ‘mine site rehabilitation’ or ‘mine site restoration’. The long-term objectives of rehabilitation can vary from simply converting an area to a safe and stable condition, to restoring the pre-mining conditions as closely as possible to support the future sustainability of the site.

Mitigation hierarchy means a step-by-step tool used to limit the negative biodiversity impacts of development projects. The mitigation hierarchy consists of four steps: – Avoid, then Minimise, then Restore impacted areas and finally Offset any impacts that remain. When applying the hierarchy, the best-practice goal is to achieve No Net Loss or, whenever possible, a Net Gain[35].

Passivation means a metal finishing process to prevent corrosion. It is required because unlike other metals, aluminium does not naturally have protection against corrosion.

Primary aluminium production means aluminium produced directly from mined ore.

Secondary aluminium production means recycling aluminium scrap to form new products.

Smelting involves passing a large electric current through a molten mixture of cryolite, alumina and aluminium fluoride to obtain liquid aluminium metal. There are two families of smelting technology in operation today – Søderberg and Prebake – which are characterised by the types of anode employed. Prebake smelters predominate (representing over 90% of worldwide aluminium production), with all new facilities built today utilising this technology[36].

Waste management programme means a programme to achieve and sustain efficient and effective minimisation and disposal of waste including policies, practices, planning activities, responsibilities and resources that affect the organisation’s performance for achieving the objectives and targets of the Waste Policy.

Notes & Questions

Term definitions are outlined in this section to ensure consistent understanding of key phrases. They include some standard terms used in other ECNZ specifications.

Q1. Do you think there is another term definition that should be added? If so, what and why?

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[35] *Guidance on Good Practice Biodiversity Offsetting in New Zealand,* Ministry for the Environment and Department of Conservation (2014)

[36] https://primary.world-aluminium.org/processes/anode-production/

4 Category definition

This category includes the following products:

- Aluminium building products including joinery, roofing, cladding and building façades made from bauxite ore or recycled aluminium.

This specification includes aluminium products that have undergone alloy coating, surface passivation, or powder coating.

The following products are excluded from this category:

- Aluminium products not used in the building industry.
- Aluminium products that have been painted, except where this aluminium has been painted to prevent surface corrosion during storage and transport. Painted aluminium building products are included in EC-57-16 Pre-painted and Resin Coated Metal Products.

To be licensed to use the Label, a product must meet all of the relevant environmental criteria set out in clause 5 and the product characteristics set out in clause 6.

Notes & Questions

The category definition for this proposed specification is aluminium building products. This includes aluminium building products that have been formed by mechanical processes of rolling, forming or shape casting, for example roofing, joinery, cladding, fencing and balustrade systems.

Q2. Does the category definition appropriately capture all relevant aluminium building products made from primary and recycled aluminium?

5 Environmental criteria

5.1 Legal requirements 🌏

Criteria

a The applicant/licence holder must demonstrate how applicable environmental legal requirements are met, including that all necessary consents and permits are in place.

b Where the licence holder is not the manufacturer of the product(s), the licence holder must have a documented requirement for the manufacturer to manage its compliance with applicable environmental regulatory requirements (for example, via supply contract conditions).

Verification required

Conformance with this requirement shall be demonstrated by providing a written statement on regulatory compliance, signed by the Chief Executive Officer or other authorised representative of the applicant company. This statement shall be supported by current documentation:

- Identifying the applicable regulatory requirements including specific obligations arising from permits, regulations, and plan rules.
- Demonstrating how compliance is monitored and maintained.
- Copies of wording from supply contract conditions or other documented requirements for contract manufacturers (if applicable).

Verification of continued compliance with legal requirements will form part of the Licence Supervision Plan.

Explanatory notes

Relevant laws and regulations applicable to the facilities that are manufacturing the ECNZ-licensed product and the licence holder’s distribution and sales operations, could, for example, include those that relate to:

- Producing, sourcing, transporting, handling and storing raw materials and components for manufacture.
- Manufacturing processes.
- Handling, transporting, handling and disposing of waste products arising from manufacturing.
- Transporting product within and between countries.
- Using and disposing of the product.

The documentation required may include, as appropriate:

- Procedures for approving and monitoring suppliers and supplies.
- Information provided to customers and contractors regarding regulatory requirements.
- Evidence of a formal certified environmental management system (for example an ISO 14001 certificate) and supporting records on regulatory compliance (for example, copies of regulatory requirements registers, procedures to manage regulatory compliance, monitoring and evaluation reports on regulatory compliance, internal or external audits covering regulatory compliance and management review records covering regulatory compliance).

- Copies of published environmental, sustainability and/or annual reports expressly addressing environmental regulatory compliance (for example verified Environmental Statements prepared under the European EMAS regulations).
- Audit reports completed by independent and competent auditors addressing regulatory compliance (for example, reports for other eco-label licences or reports from regulator audits).
- Participation by the supplier in the applicants/licence holder's own supplier audit programme.

It is not intended to require licence holders to accept increased legal responsibility or liability for actions that are outside their control. The Trust's intention is to ensure any potential for environmental regulatory non-compliance associated with an ECNZ labelled product is managed to a level that minimises risk of reputation damage to the ECNZ label and programme.

> **Notes**
>
> This is a standard clause in all ECNZ specifications. It sets an expectation that the licence holder and manufacturer (if different) are managing their compliance with applicable environmental legal requirements.

5.2 Product information required

Licence applicants/holders must provide the following information as part of the assessment process:

a Supply chain information including components or processes, suppliers and geographical origin (see Table A1 in Appendix A)

b Additives and hazardous substances used in the production of the product (see Table A2 in Appendix A).

Licence holders must maintain this information, and notify ECNZ if it changes.

Verification required

Conformance with these requirements shall be demonstrated by providing a written statement on compliance, signed by the Chief Executive Officer or other authorised representative of the applicant company/licence holder. The statement shall be supported by completed Tables A1 and A2.

> **Notes**
>
> This is a standard clause in all recent ECNZ specifications. It helps to clarify the supply chain associated with each ECNZ-licensed product and ensure that any changes to the supply chain, process or hazardous substances used are verified to confirm they comply with the requirements of EC-62.

5.3 Environmental management system or processes 🌏

Criteria

a To demonstrate its ability to ensure ongoing compliance with the requirements of this EC-62 specification, the ECNZ applicant/ licence holder must have (or establish, if necessary) appropriate management processes or a management system, to obtain, record, verify and maintain relevant information to provide assurance that it consistently meets all of the relevant requirements of EC-62.

b The aluminium smelting plant must have an ISO 14001-certified Environmental Management System (EMS), or equivalent certification, that includes the aluminium used for the ECNZ-licensed products.

Verification required

Conformance with these requirements shall be demonstrated by providing a written statement on compliance, signed by the Chief Executive Officer or other authorised representative of the applicant company/licence holder. The statement shall be supported by:

- Details of the management processes or environmental management system used to maintain and ensure ongoing compliance with EC-62. Examples could include information from the organisation’s chain-of-custody control system, and evidence to show EC-62 is included in the compliance obligations register/document of the EMS.
- A copy of the ISO 14001, or equivalent, certificate for the aluminium smelting plant.

Notes

For 5.3 b)

Examples of certifications that will be considered equivalent to ISO 14001 certification:

- Enviromark Diamond.
- European Commission’s EMAS scheme.

Equivalency of other certifications will be determined by the Trust on a case-by-case basis.

The following are some examples that will not be considered equivalent to ISO 14001 certification:

- Other Enviromark certifications (Bronze, Gold).
- Environmental management system based on ISO 14001 that have not be independently audited and certified.
- EPDs, ISO 9001 or any other certifications that are not an environmental management system certification.

Notes and questions

The requirement in Clause 5.3 a) highlights that it is the licence holders’ responsibility to ensure ongoing compliance with the requirements of EC-62. The licence holder must have appropriate processes in place to obtain the required information from its supply chain and ensure ongoing compliance outside of its annual ECNZ verification audits. A similar requirement has been included in the recently revised EC-60-21 specification for Paper Products.

Given the long supply chain for aluminium products, which can be undertaken by different operators in different locations, the Trust appreciates that the licence holder/applicant may not be able to obtain information from all the suppliers up its supply chain, as it may not have direct contractual relationships with them. The Trust believes it is reasonable to expect information be obtained from the smelting plant, as the licence holder is likely to purchase directly from them. Therefore, the requirement in 5.3 b) has been included for the aluminium smelting plant to have an ISO 14001-certified EMS (or equivalent certification) in order to address the large environmental impacts associated with that process – it is an energy intensive operation and results in the production of PFC and CO_2 gases.

Q3. Do you agree with the proposal to require licence holders/applicants to have or establish management processes to manage their supply chain?

Q4. Do you agree with the proposed criteria in Clause 5.3 b) which require the smelting plant to have an ISO 14001-certified Environmental Management System (or equivalent certification)?

5.4 Modern slavery and social accountability 👪

Criteria

a The applicant/licence holder and aluminium smelting plant operator must have a policy/policies on human rights, diversity & inclusion, and anti-bullying. At a minimum, it should comprise:

  - An explicit commitment to respect all internationally recognized human rights standards – understood, at a minimum, as the International Bill of Rights and the International Labour Organization (ILO) Declaration on the Fundamental Principles (see below) and Rights at Work;
  - Stipulations concerning the company's expectations of personnel, business partners and other relevant parties e.g. a code of conduct; and
  - Information on how the company will implement its commitment and monitor compliance with it.

b Where a licence holder/applicant and aluminium smelting plant operator has found instances of modern slavery in their business operations and or supply chains in the past two years, there shall be evidence of corrective action.

c In addition to the above, the licence holder/applicant and aluminium smelting plant operator shall consider:

  - Providing information to confirm whether the requirements of Social Accountability International Standard, SA8000 have been considered.
  - Being a Living Wage employer (or equivalent).
  - Having a senior member of its organisation responsible for social and environmental sustainability.

Note: From ILO Declaration on the Fundamental Principles and Rights at Work, there are the following core labour standards:

- Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)
- Right to Organise and Collective Bargaining Convention,1949 (No. 98)
- Forced Labour Convention, 1930 (No. 29)
- Abolition of Forced Labour Convention, 1957 (No. 105)
- Minimum Age Convention, 1973 (No. 138)
- Worst Forms of Child Labour Convention, 1999 (No. 182)
- Equal Remuneration Convention, 1951 (No. 100)
- Discrimination (Employment and Occupation) Convention, 1958 (No. 111)

Verification required

Conformance with this requirement shall be stated in writing and signed by the Chief Executive Officer or other authorised representative of the applicant company. This statement shall be accompanied by documentation that:

- Copies of the relevant policies, procedures and plans.
- Records demonstrating the plans are being effectively implemented (including monitoring results).

Notes and questions

Human rights are relevant to all businesses, regardless of size, sector or country operation, and may include:

- Social cultural and economic rights, such as the right to participate in cultural activities, the right to food, the right to clean drinking water and sanitation, and the right to education.
- Labour rights, such as the right to freedom of association and effective recognition of the right to collective bargaining, and freedom from forced labour, child labour and discrimination.
- Civil and political rights, such as the right to life and liberty, freedom of expression and equality before the law.

New Zealand joined the International Labour Organisation (ILO) in 1919 (as a founding member) and as a member of the ILO, New Zealand is required to report on its application of ILO Conventions.

In 1998 the ILO Declaration on Fundamental Principles and Rights at Work was adopted and highlights a set of core labour principles endorsed by the international community. The Declaration covers four main areas for the establishment of a social ‘floor’ in the world of work:

- freedom of association and the effective recognition of the right to collective bargaining;
- the elimination of all forms of forced or compulsory labour;
- the effective abolition of child labour and;
- the elimination of discrimination in respect of employment and occupation.

From the above core labour principles, ILO Conventions has identified core labour standards (listed in Clause 5.4 b)).

The Trust considers it now timely and appropriate for the licence applicant/holder and aluminium smelting plant operator to comply with the above core labour standards as human rights are the basic rights and freedoms to which all humans are entitled.

The Trust proposes to encourage the use of the SA8000 Standard and Certification System as it provides a framework for organizations of all types, in any industry, and in any country to conduct business in a way that is fair and decent for workers and to demonstrate their adherence to the highest social standards, and is freely available for download from Social Accountability International (SAI). Elements of the standard include: child labour, forced or compulsory labour, health and safety, freedom of association & right to collective bargaining, discrimination, disciplinary practices, working hours, remuneration, and management system[37].

Q5. Do you agree with the proposal to require licence holders/applicants and aluminium smelting plant to have a policy on human rights, diversity & inclusion and anti-bullying and to have requirements for dealing with modern slavery and social accountability?

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[37] https://sa-intl.org/programs/sa8000/

5.5 Raw materials and biodiversity 🌏

Criteria

a Bauxite quarries from which materials are obtained for an ECNZ licensed aluminium product must have and implement management plans, including any necessary policies and management procedures, to minimise adverse effects from the following potential impacts:

- Noise.
- Vibration.
- Dust.
- Discharges to water or land.

b The Bauxite quarry must have a biodiversity management plan that includes:

- Assessing the risk and materiality of the impacts on biodiversity from the land use and activities on the mining site.
- Consultation with relevant local groups (i.e. indigenous communities).
- Addressing impacts in accordance with the Mitigation Hierarchy).
- Implementing measures to prevent accidental or deliberate introduction of non-native species that could have significant adverse impacts on biodiversity.
- A mine restoration plan for when the site is no longer operational.

The achieved biodiversity outcomes shall be shared with stakeholders, made publicly available, periodically reviewed, and updated where necessary.

Verification required

Conformance with this requirement shall be stated in writing and signed by the Chief Executive Officer or other authorised representative of the applicant company. This statement shall be accompanied by documentation that:

- Copies of the relevant management and mine restoration plans.
- Records demonstrating the management plans are being effectively implemented (including monitoring results).

For b) this could include actions with time-bound targets to address material impacts and monitor effectiveness of the actions.

Note: If the bauxite mine is co-located with the alumina refinery, combined management plans may be prepared and implemented to meet these requirements.

Notes and questions

Mining is an extractive industry and, by its very nature, can have significant direct and secondary environmental and social impacts. A portion of land and its biodiversity must be removed – at least for a period of time – to allow the extraction of minerals. The negative legacy of past mining practices has created a deep level of mistrust of the industry in conservation circles and raised questions about the mining industry's role in society's transition to sustainable development. However, minerals such as aluminium are essential to modern life and important to the economic and social development of many countries.

Today, both onsite and offsite opportunities are being pursued by some mining companies to enhance their contributions to biodiversity conservation[38]. These include assessments and conservation of unique flora and fauna, research and development, support for protected areas,

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[38] https://www.csrwire.com/press_releases/20101-leading-mining-companies-present-at-major-conservation-forum

site management programmes and proactive community development programmes to provide sustainable economic and social benefits even after mine closure.

Q6. Do you agree with the proposed criteria in clause 5.5? If not, please explain why.

5.6 Storage of raw materials and waste 🌏 👪

Criteria

The aluminium smelting plant must have and implement effective management policies, procedures and systems covering the appropriate storage and handling of raw materials, including aluminium scrap, solid wastes, and environmentally hazardous materials.

These procedures must include the following requirements:

- the smelting plant must ensure any storage of aluminium scrap is located and managed to prevent contamination of surface water or land.
- storage areas must be constructed in a manner that effectively prevents the release of waste (including spent pot lining and dross) or leachate to the environment.
- the smelting plant must perform regular checks and implement appropriate controls to ensure the integrity of the storage areas.
- the smelting plant must control and treat water discharge from storage facilities, to minimise impacts to the environment.
- there should be no discharge of waste to marine or aquatic environments.
- the smelting plant must develop a Spill Response Plan detailing procedures to identify, contain and clean-up any spill of potentially hazardous substances.

Verification required

Conformance with this requirement shall be demonstrated by providing a written statement of compliance, signed by the Chief Executive Officer or other authorised representative of the applicant company. This statement shall be supported by documentation that includes:

- Details, including photographs, of the location and type of storage facilities on site and the materials stored in each; and
- A copy of the Spill Response Plan and records of test/drills, implementation and reviews.

Notes & Questions:

Inadequate storage of raw materials and waste, some of which may be hazardous, can result in financial loss, may have potential negative environmental impacts (including soil and or water contamination) and may result in potential harm to human health. Therefore, the Trust has included this Clause to require practical controls to ensure that materials and waste are appropriately stored and handled to prevent spills.

Spent pot lining (SPL) waste generated from the smelting process comes from the relining of pots, which takes place every five-to-eight years. Some companies minimise the generation of SPL by extending lifetimes of the pots, and ensuring proper handling of SPL waste through treatment or use by other industries, such as the cement industry[39].

Dross, another by-product, is formed on the surface of molten aluminium or its alloys, by oxidation. Typical dross generation from a primary operation can be from 0.8 wt% to 1.3 wt% of

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[39] https://aluminium-stewardship.org/why-aluminium/responsible-aluminium-asi-role/

aluminium output, while from secondary smelters it can reach up to 10%[40]. It is not entirely waste material; as it can be recycled and is used in secondary steelmaking for slag deoxidation[41]. The remaining residue dross contains mostly aluminium oxide, alloying elements and salts such as sodium chloride or potassium chloride. Stockpiling this residue dross can create pollution of the adjoining area as salts leach out. It can also emit harmful gases (such as such as ammonia, methane, phosphine, hydrogen and hydrogen sulfide)[42].

Q7. Do you agree with the proposed requirements for licence holders to provide information about storing and handling of raw materials and wastes at the smelting plant?

Q8. Should the Trust set a specific requirement for re-use or recycling of aluminium-making wastes from the smelting plant, particularly dross, such as a percentage of waste that must be diverted from landfill?

5.7 Product design

Criteria

The licence applicant/holder shall integrate clear objectives to enhance sustainability in the design and development process for products or components, including consideration of the environmental impacts of the end product e.g. design longer-lasting and better-functioning products which will have to be replaced less frequently and/or standardising the size of the aluminium products.

Verification required

Conformance with this requirement shall be demonstrated by providing a written statement of compliance, signed by the Chief Executive Officer or other authorised representative of the applicant company/licence holder. This statement shall be supported by documentation demonstrating how sustainability has been considered within the product design.

Notes & Questions

Four to six tonnes of bauxite are required to be purified to produce one tonne of aluminium metal[43]. In addition, the smelting process is an energy intensive process and produces harmful greenhouse gases. The aim of this criterion is to ensure sustainability and longevity of the product is carefully considered, and to reduce the demand for bauxite and virgin aluminium and the energy associated with manufacturing.

Q9. Do you agree with the proposed criterion for product design? If not, can you please comment on why and what you would suggest as an alternative (if any) for this criterion?

Q10. Should the Trust set a specific requirement for recycled content within the licenced aluminium products? If yes, please explain what you think that recycled content should be and why.

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[40] https://www.sciencedirect.com/topics/engineering/black-dross

[41] https://www.eco-business.com/news/aluminium-dross-recycled-into-fertilizer-in-new-zealand/

[42] https://www.sciencedirect.com/science/article/abs/pii/S089268750600238X

[43] Environmental and Occupational Health Impact of Bauxite Mining in Malaysia: A Review (2017)

5.8 Hazardous substances

Criteria

a During the finishing stages[44], the aluminium products shall not be treated with any chemicals that are classified under Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as follows:

Carcinogens

- Category 1a and 1b ('known or presumed human carcinogens')
- Category 2 ('suspected human carcinogens')

Reproductive toxicants

- Category 1a and 1b ('known or presumed human reproductive toxicant')
- Category 2 ('suspected human reproductive toxicant')

Germ cell mutagenicity

- Category 1a and 1b ('known or presumed to induce heritable mutations in germ cells of humans')
- Category 2 ('suspected to induce heritable mutations in germ cells of humans')

AND

b The aluminium products must not be coated with cadmium, chrome, nickel or tin, or their compounds. In exceptional cases, metal surfaces may be treated with chromium or nickel where this is necessary on the grounds of heavy physical wear. Such chromium plating must not use chromium VI compounds.

Verification Required

Conformance with these requirements shall be demonstrated by providing a written statement on compliance, signed by the Chief Executive Officer or other authorised representative of the applicant company. The statement shall be supported by documentation that includes:

- Completed Table A2 in Appendix A, identifying hazardous substances used in the finishing processes.
- Safety Data Sheets (SDS) for each hazardous substance used.
- Information about any chromium or nickel treatments used.

Notes and questions

As discussed in the background section, historically, hexavalent chromium (a carcinogenic substance), has been used to process aluminium chromate conversion parts. Chromium coating is formed as a consequence of chemical attack on a metal when it is brought in contact with an aqueous solution of chromic acid, chromium salts, hydrofluoric acid, salts, phosphoric acid or mineral acids[45]. With aluminium, chromate coating minimises surface oxidation, and it is used as an undercoat for paint. However, chromium is acutely toxic, carcinogenic, mutagenic, suspected reproductive toxins, corrosive and ecotoxic.

Now, the most common alternative is trivalent chromium, which has fewer human health and environmental concerns but may not be as effective as hexavalent chromium[46].

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[44] Finishing stages means when the aluminium undergoes passivation or powder coating.

[45] Principles of Corrosion Engineering and Corrosion Control, Zaki Ahmad (2006)

[46] https://finishingandcoating.com/index.php/conversion/237-trivalent-chromium-for-enhanced-corrosion-protection-on-aluminum-surface

Q11. Do you agree with the proposed criteria in clause 5.8? If not, please explain why.

5.9 Process emissions

Notes

The requirements for process emissions in Clauses 5.9.1 – 5.9.3 include emissions from the smelting process.

New Zealand’s only aluminium smelter at Tiwai Point is regulated under the Resource Management Act and is subject to a number of resource consents that control discharges to land, air and water. Overseas manufacturing facilities will be subject to different local licensing requirements.

Given the range of countries-of-origin for aluminium used in New Zealand, the Trust believes it is appropriate to set minimum environmental performance criteria for discharges to air and water where appropriate benchmarking data is available. Where there is insufficient benchmarking data available, the proposed criteria include requirements to monitor and report data so that appropriate limits can be established in the future. The Trust believes it is also appropriate to include a requirements for the smelting plant to demonstrate that there is no unacceptable impact of the discharges to air and water from the activity.

5.9.1 Effluents to water 🌏 👪

Criteria

a The licence holder/applicant and aluminium smelting plant must have effective procedures and systems (including an annual improvement plan) in place to minimise emissions of metals in wastewater (including cooling water and stormwater if these contaminants may be present) discharged to the natural environment (natural water bodies, ocean or land).

b The aluminium smelting plant must have and implement systems to recover process wastewater sludges and sediments. The aluminium smelting plant must report on how it re-uses process waste sludge and sediment or demonstrate that they are disposed to an appropriate location.

c Discharges of contaminants to the natural environment (natural water bodies, ocean or land) from the aluminium smelting plant, shall be demonstrated to result in acceptable and environmentally sustainable level of impact on the quality of the receiving environment.

Verification Required

Conformance with this requirement shall be demonstrated by providing a written statement of compliance, signed by the Chief Executive Officer or other authorised representative of the Applicant company. This statement shall be supported by documentation that includes:

- Plans to minimise emissions of metals in wastewater.
- A description of the methods and systems to recover process wastewater sludges and sediments.
- An independent assessment of the discharge quality and its impact on the receiving environment completed by a person or agency competent to complete such an assessment. The assessment may be based on the quality of discharge from the point at which the discharge from the site or any relevant combined or municipal waste collection and treatment system discharges to the natural environment; or from the plant in situations where the plant

discharge is mixed with other organisations waste streams and the combined waste stream and its treatment before it is discharged to the natural environment is outside the control of the plant or licence applicant and suitable information is not available on the quality of the combined discharge.

Notes and questions

Wastewater from aluminium smelters is considered to have high concentrations of heavy metals and these may pose a risk to the aquatic ecosystem through leaching[47]. The criteria in Clause 5.9.1 have been set to require licence holders to check process at the smelting plant(s) that supplies their aluminium and to demonstrate that the effects of any discharges to the natural environment are acceptable and environmentally sustainable.

In addition, the Trust has set a requirement to have and implement systems to recover process wastewater sludges and sediments.

Q12. Do you consider the proposed criteria for discharge of effluents to water to be appropriate? If you do not consider they are appropriate, what do you consider would be more appropriate to ensure sites demonstrate that adverse effects from wastewater discharges are effectively managed?

Q13. Is the requirement to develop and implement systems to recover wastewater sludge and sediment appropriate? If not, why not?

5.9.2 Point source emissions to air 🌏 👪

Criteria

a The licence holder/applicant shall provide information on the following air emission from the primary aluminium smelting plant:

- Gaseous fluoride
- Particulate fluoride
- Sulphur dioxide and
- Polycyclic aromatic hydrocarbons

b The licence holder/applicant is to provide the following information for the secondary aluminium production (if applicable):

- Chloride gases
- Volatile organic compounds and
- Polycyclic aromatic hydrocarbons.

The above emissions (for primary and secondary aluminium production) must be measured at least annually and reported to the Trust.

Verification required

Conformance with this requirement shall be stated in writing and signed by the Chief Executive Officer or other authorised representative of the applicant company. This statement shall be supported by documentation that includes:

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[47] https://www.researchgate.net/publication/324606194_Heavy_Metal_Removal_from_Aluminum_Smelter_Waste_Water_using_Tree_Leaves

- Annual test reports.
- Calculations or emissions inventories.

Notes and questions

The primary air emissions generated during the smelting process occur at the potlines, and consist of particulate as well as gaseous emissions (including carbon dioxide – see Clause 5.9.3). The particulate emissions are primarily controlled using fabric filters or electrostatic precipitators, while dry scrubbing technology, using alumina as an adsorbent, is used to control fluoride emissions. Sulphur dioxide (SO_2) emissions are also generated – they are primarily a product of the sulphur contained in the anodes[48].

High temperature carbon oxidation in primary aluminium smelters results in the release of polycyclic aromatic hydrocarbons (PAH) into the environment. The main source of PAH are the anodes, which are composed of petroleum coke (black carbon) and coal tar pitch[49].

With regards to secondary aluminium production, dust generation and air emissions are typical at both scrap pre-processing and melting facilities. Chloride gases, volatile organic compounds (VOCs), and polycyclic aromatic hydrocarbons (PAHs) are representative substances emitted from these facilities as a result of scrap delacquering and evaporation of fluxing salt[50].

It is because of these different air emissions produced from primary and secondary production, that there are different requirements in Clause 5.9.2.

By gathering the data on the emissions, the Trust can set a maximum limit on emissions in the future.

Q14. Do you consider the proposed criteria for point source emissions to air are appropriate? If you do not consider they are appropriate, what do you consider would be more appropriate to ensure sites demonstrate that adverse effects are effectively managed?

5.9.3 Emissions of Greenhouse Gases (GHG) from smelting

Criteria

GHG emissions shall be calculated as the sum of the emissions from the aluminium smelting plant*, and should not exceed:

- 8 tonnes CO_2e per metric tonne aluminium.

*emissions related to anode production, electricity production, smelting (electrolysis) must all be included in the calculation, irrespective of whether they are direct or indirect sources.

Verification Required

Conformance with this requirement shall be demonstrated by providing a written statement on compliance, signed by the Chief Executive Officer or other authorised representative of the applicant company/licence holder. This statement shall be supported by documentation that includes:

- test reports;
- calculations or emissions inventories; and

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[48] https://www.gcteng.com/wp-content/uploads/2008_IAC_2008_SO2_Emissions_Reduction_A_New_Challenge_for_Aluminium_Smelters.pdf

[49] https://www.researchgate.net/publication/6389438_Sorption_Characteristics_of_Polycyclic_Aromatic_Hydrocarbons_in_Aluminum_Smelter_Residues

[50] Aluminum: The Element of Sustainability, The Aluminum Association (2011)

- production and quality control information.

Test reports must be from laboratories competent to perform the relevant tests. If an equivalent method is to be used, The Trust may require details of the method and its validation.

Notes

- The above limit includes emissions from purchased electricity and use of fossil fuels, but excludes emissions from renewable sources. Renewable energy sources means renewable non- fossil energy sources, e.g. wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogas.
- CO_2 from surplus energy at the manufacturing site sold as electricity, steam or heat may be subtracted from the total CO_2 emissions.
- The energy used for transport in distributing the product or other raw materials shall not be included in the calculations.

Notes and questions

The aluminium smelting process is a strong emitter of GHG with three major contributions: that arising from electrical energy generation and its utilisation, the process conversion contribution linked with anode consumption and anode production, and the greenhouse gas equivalents of the intermittent perfluorocarbon (PFC) emissions[51].

The GHG emitted from a smelter can hugely vary as it depends on where the power is sourced from - during 2020, it is reported that Chinese aluminium smelters produced an average of 12.36 tonnes of CO_2e per tonne of aluminium produced from coal-fired power generation last year[52], and NZAS (largely uses hydroelectric power) reports that the average emission rate was 2.13 tonnes CO_2e of per tonne of aluminium produced[53]. Therefore, the limit of 8 tonnes CO_2e per metric tonne aluminium is considered appropriate to allow for improvement in overseas coal-fired smelters (given that a much of the aluminium used in building and construction in New Zealand comes from China).

Q15. Is the maximum level of carbon dioxide emissions appropriate? If not, why not?

5.10 Water management 🌏 👪

Criteria

a The applicant/licence holder and aluminium smelting plant and must have effective water management policies and procedures and/or a water management programme.

b Licence holders must report annually to the Trust on water management during the aluminium making process, this should include:

  i objectives and targets.

  ii explanation for any divergence from objectives and targets.

  iii initiatives taken to manage fresh water use better and improve water efficiency, including use of recycled water or harvested rainwater, if applicable.

The annual report shall also include information on water management during aluminium smelting where that information is available from the aluminium manufacturers.

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[51] Applying Fundamental Data to Reduce the Carbon Dioxide Footprint of Aluminum Smelters. Barry Welch, Martin Iffert, and Maria Skyllas-Kazacos

[52] https://www.woodmac.com/press-releases/carbon-neutrality-goal-forces-chinese-aluminium-smelters-away-from-captive-coal-power/

[53] NZAS Annual Environmental Monitoring Report 2020 for Environment Southland

Verification required

Conformance with this requirement shall be stated in writing and signed by the Chief Executive Officer, or other authorised representative, of the applicant company/licence holder. This statement shall be supported by documentation (as relevant):

- describing the water management policies, procedures and programmes;
- including annual reports to The Trust on water use and management.
- detailing performance against continuous improvement objectives and targets relating to the reduction of water use related to production over time.

Notes & Questions

The proposed requirements in Clause 5.10 above for a management policy, annual report and continuous improvement are similar to those included in other ECNZ specifications. Water is used in smelting plants and also the casthouses for cooling and as such the Trust considers it appropriate to monitor the usage of water.

Q16. Do you agree with the proposed requirements above? If not, please explain why not and what you suggest as an alternative, if any.

5.11 Energy management and embodied carbon 🌏

Criteria

a The applicant/licence holder and aluminium smelting plant must have effective energy management policies and procedures and/or an energy management programme for their operations.

b Licence holders must report annually to the Trust on energy management, including:

- Total energy use.
- Breakdown of total energy use to types of energy used, including renewable energy.
- Energy use related to production (i.e. the embodied energy of a product).
- Energy use related to transport of raw materials.
- Methodology for calculating and recording material GHG emissions.
- Initiatives taken to reduce energy use and CO_2 emission and to improve energy efficiency.
- Initiatives taken to calculate CO_2 emissions per product (i.e. the embodied CO_2 of a product).
- Initiatives or requirements for suppliers or contract manufacturers.
- Information on energy use and management, including use of renewable energy, durin the smelting process, where that information is available to the licence holder.

c Licence holders must have improvement objectives and targets for reduction of energy use related to production of ECNZ-licensed products, and associated GHG, over time. Furthermore, licence holders must publicly disclose a commitment to decarbonise between now and 2050 on a 1.5°C trajectory, with a significant reduction prior to 2030. Any divergenc from objectives or targets should be explained in the annual report.

Verification required

Conformance with this requirement shall be stated in writing and signed by the Chief Executive Officer, or other authorised representative, of the applicant company/licence holder. This statement shall be supported by documentation (as relevant) that:

- Describes the energy management policies, procedures and programmes.
- Includes annual reports to the Trust on energy use and management.
- Details of performance against improvement objectives and targets relating to the reduction of energy use related to production of ECNZ-licensed products, and associated GHG emissions, over time.

Notes & Questions:

In order to meet the Sustainable Development Scenario (the broad evolution of the energy sector that would be required to reach the key energy-related goals of the United Nations, including the climate goal of the Paris Agreement (SDG 13), and universal access to modern energy by 2030 (SDG 7)), the global energy intensity of aluminium production (refining and smelting) overall (primary and secondary combined) needs to fall at least at 1.2% annually to 2030, similar to the average annual rate of decline since 2010[54]. Therefore, it is important to continue reducing the energy intensities of primary and secondary aluminium production, and to expand secondary production by improving old-scrap collection and sorting, as well as reducing losses within the recycling system.

Given the considerable amount of electricity consumed in the aluminium subsector, decarbonising the power sources would help reduce indirect emissions and is thus a key complement to reducing direct aluminium emissions.

All ECNZ specifications include the similar standard requirements for energy management as in parts a) and some of part b) above. The Trust is proposing to expand the standard part b) requirements and strengthen the overall energy requirements with the introduction of a new requirement in part c). These changes will ensure that embodied carbon is not only measured and reported but that there is also a target to decarbonise between now and 2050, with a significant reduction prior to 2030. The requirement in part c) aligns with New Zealand's commitment to contribute to the global effort under the Paris Agreement[55] to limit the global average temperature increase to 1.5 °C above pre-industrial levels. New Zealand intends to achieve this by reducing net GHG emissions (other than biogenic methane) to 50% below 2005 levels by 2030.

The 2019 New Zealand Climate Change Response (Zero Carbon) Amendment Act introduced a target for 2050; net zero emissions of all GHG (other than biogenic methane). As such, there is a requirement for New Zealand industry to make energy efficient and renewable energy investments and adopt best practice energy management. Under the Act, the Government must prepare an economy-wide Emissions Reduction Plan to set out how New Zealand will meet its first emissions budget (2022-2025). A discussion document was issued in December 2021 and the final Plan is expected to be published in May 2022[56].

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[54] https://www.iea.org/reports/aluminium

[55] Paris Agreement - a legally binding international treaty on climate change, adopted by 196 Parties in 2015 and entered into force in 2016. New Zealand ratified the Paris Agreement in 2016 and it took effect in 2020.

[56] https://www.mpi.govt.nz/consultations/emissions-reduction-plan#:~:text=What%20is%20the%20Emissions%20Reduction,to%20a%20low%20emissions%20future.

By including requirement part c) above, this will ensure that energy is not only managed and reported but that there is also a decrease in energy use and GHG emissions (in line with New Zealand requirements) related to production of ECNZ-licensed products over a specific time period. The Trust understands that there have been some recent developments in the aluminium industry, focused on reducing GHG emissions, including:

- new technology which could replace carbon electrodes with an alternative material, which would produce only O_2. Combined with renewable electricity sources, this could result in zero carbon emissions from the smelting process[57].
- A feasibility study to determine if carbon dioxide can be captured from flue gas emitted from aluminium plants[58].

Q17. Do you agree with the proposed requirements above? If not, please explain why not and what you suggest as an alternative, if any.

5.12 Waste management 🌏

Criteria

a The applicant/ licence holder and aluminium smelting plant must have effective waste management policies and procedures and/or a waste management programme.

b Licence holders must report annually to the Trust on waste management including:

- Quantities and types of waste recovered for reuse internally and externally.
- Quantities and types of waste recycled internally and externally, for example quantities of pre-consumer aluminium scrap used or exported for recycling.
- Quantities and types of waste disposed of to landfill.
- Quantities and types of waste burned internally for energy recovery.
- Waste generation related to production.
- Initiatives taken to reduce waste generation and improve recovery/recycling of waste.
- Initiatives or requirements for suppliers or contract manufacturers.

c Licence holders must have improvement objectives and targets for reduction of waste generation, and the increase of reuse and recycling rates over time, where practical. Any divergence from objectives or targets should be explained in the annual report.

Note

Uprisings from abnormal conditions or that are contaminated such that they cannot be recycled, are excluded from 5.12(b) above. A specific discussion on the cause of contamination and abnormal conditions and why the uprisings cannot be recycled is to be included in the report.

Verification required

Conformance with this requirement shall be stated in writing and signed by the Chief Executive Officer or other authorised representative of the applicant company. This statement shall be accompanied by documentation that:

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[57] Thinkstep ANZ, *Under construction Hidden emissions and untapped potential of buildings for New Zealand's 2050 zero carbon goal*, on behalf of NZGBC (Aug 2019)

- Describes the waste management policies, procedures and programmes.
- Includes annual reports to The Trust on waste generation and management.
- Details of performance against the improvement objectives and targets for reduction of waste generation and increase of reuse and recycling rates.

Notes & Questions:

All ECNZ specifications include the standard requirements for waste management in parts a) and b) above. The Trust recently strengthened those standard requirements with the introduction of a new requirement in part c) which will ensure that waste is not only managed and reported but that there is also a decrease in waste generation and increase in reuse and recycling rates over time.

Q18. Should the Trust set a specific requirement for re-use or recycling of aluminium-making wastes, particularly bauxite residue, such as a percentage of waste that must be diverted from landfill?

5.13 Product stewardship 🌏

Criteria

a Aluminium products must not be impregnated, labelled, coated or otherwise treated in a manner which would prevent recycling in New Zealand or in the country where the product is used.

b The applicant/licence holder must be actively participating in a product stewardship scheme in New Zealand that involves:
  - recovery of unwanted or unused aluminium from pre- and post-consumer sources.
  - reuse and/or recycling of recovered aluminium.
  - promotion of the product stewardship scheme to customers.

c Licence holders must report annually to ECNZ on the performance of the product stewardship scheme, including:
  - volume of pre-consumer and volume of post-consumer aluminium recovered.
  - the % of recovered aluminium that was re-used and the means by which it was reused.
  - the % of recovered aluminium that was recycled.
  - initiatives taken as part of the programme to increase the volume of recovered aluminium and reduce the % of virgin aluminium in the products.

Verification required

Conformance with these requirements shall be stated in writing and signed by the Chief Executive or authorise representative of the applicant company. This statement shall be accompanied by documentation that:

- includes information which demonstrates that the product can be reused or recycled;
- describes the product stewardship scheme; and
- includes annual reports on the product stewardship scheme.

Notes & Questions:

Aluminium is 100% recyclable and experiences no loss of properties or quality during the recycling process. Recycling aluminium also uses only 5% of the energy used to created new aluminium and emits only 5% of the greenhouse gases. Approximately 75% of the aluminium ever produced is still in use today[59].

Recycling of post-consumer scrap and waste requires a number of conditions, including the availability of systems to collect and sort used materials, and the adequate design of products that enable classification and recycling, among others. The Trust supports development of systems to increase aluminium recycling in New Zealand.

Q19. Do you agree with the proposed requirements above? If not, please explain why not and what you suggest as an alternative, if any.

6 Product characteristics

6.1 Product performance 🌏 👪

Criteria

The product must be fit for its intended use and conform, as appropriate, to the relevant code of practice and/or product performance standards.

Verification required

Conformance with this requirement shall be demonstrated by providing a written statement of compliance, signed by the Chief Executive Officer or other authorised representative of the applicant company/licence holder.

Conformance shall be supported by a statement and/or the following documentation:

- Demonstrating how compliance is monitored and maintained (including quality control and assurance procedures).
- Records of customer feedback and complaints.

Notes & Questions

This requirement is standard in ECNZ specifications.

During our research, we identified the following New Zealand performance standards:

- New Zealand Metal Roof and Wall Cladding Code of Practice version 3/2021[60]
- AS/NZS 1170.2:2021 Structural design actions, Part 2: Wind actions
- Building Code Clause B1 Structure – this clause sets requirements around the combination of loads that buildings, building elements and sitework are likely to experience during construction, alteration and throughout their lives.

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[59] Thinkstep ANZ, *Under construction Hidden emissions and untapped potential of buildings for New Zealand's 2050 zero carbon goal*, on behalf of NZGBC (Aug 2019)

[59] https://aluminium-stewardship.org/why-aluminium/responsible-aluminium-asi-role/

[60] https://www.metalroofing.org.nz/about

- Building Code Clause B2 Durability - under the clause, building materials, components and construction methods are required to be sufficiently durable[61].
- Building Code Clause E2 External moisture - this clause requires buildings to be constructed to provide adequate resistance to penetration by, and the accumulation of, moisture from the outside. It contains requirements for roofs, wall claddings and external openings[62].

Q20. Do you agree with the proposed criterion for product performance? If not, can you please comment on why and what you would suggest as an alternative (if any) for this criterion?

Q21. Are there other performance standards that should be included in Clause 6.1?

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[61] https://www.building.govt.nz/building-code-compliance/b-stability/b2-durability/

[62] https://www.building.govt.nz/building-code-compliance/e-moisture/e2-external-moisture/

7 Requirements and notes for licence holders

Monitoring compliance

Prior to granting a licence, the Trust will prepare a plan for monitoring ongoing compliance with these requirements. This plan will reflect the number and types of products covered by the licence and the level of documentation appropriate to provide confidence in ongoing compliance with criteria. The plan will also reflect the nature of the licence holder (whether a manufacturer and supplier, a wholesale/retail supplier with contract manufacturing, or involved in other arrangements with contract manufacturing and brand ownership). It will specifically provide for supervision of the licence holder's contractual or other explicit arrangements with suppliers, customers or other agents/parties to ensure all relevant requirements of this specification and Licence Conditions are met (including those related to legal requirements, packaging and labelling, information about products, product claims and use of the Label). This plan will be discussed with the licence applicant and when agreed will be a condition of the licence.

As part of the plan, the Trust will require access to relevant quality control and production records and the right of access to manufacturing facilities. Relevant records may include formal quality management or environmental management system documentation (for example, ISO 9001 or ISO 14001 or similar).

The monitoring plan will require the licence holder to advise the Trust immediately of any noncompliance with any requirements of this specification which may occur during the term of the licence. If a non-compliance occurs, the licence may be suspended or terminated as stipulated in the Licence Conditions. The licensee may appeal any such suspension.

The Trust will maintain the confidentiality of identified confidential information provided and accessed during verification and monitoring of licences.

Using the Environmental Choice Label

The Label may appear on the wholesale and retail packaging for the product, provided that the product meets the requirements in this specification and in the Licence Conditions.

Wherever it appears, the Label must be accompanied by the words 'Aluminium building products' and by the Licence Number e.g. 'licence No 1234'.

The Label must be reproduced in accordance with the ECNZ programme's keyline art for reproduction of the Label and the Licence Conditions.

Any advertising must conform to the relevant requirements in this specification, in the Licence Conditions and in the keyline art.

Failure to meet these requirements for using the Environmental Choice NZ Label and advertising could result in the Licence being withdrawn.

Appendix A: Tables

Table A1 - Component/process supplier information

Supplier name	**Supplier address and contact details (include all manufacturing locations)**	**Component or process supplied**
e.g. Supplier A	*Address Wiri, Auckland*	*Passivation*

Include each component and subcontracted processing operation

Table A2 - Hazardous substances and materials description table

Process/Type of Chemical	Trade Name	Chemicals Name	Supplier	Safety Data Sheet (SDS)	
				Issue date	Copy provided to ECNZ (√)
e.g. Passivation					

Complete one table for each aluminium product