AAF QUEENSLAND

RESEARCH & DATA — 06

RESEARCH PAPERS, PUBLICATIONS & REFERENCES

A Developing Library of Technical Knowledge and Independent Evidence

Making established research, documented performance and technical information more accessible to architects, designers, specifiers and the aluminium industry.

Introduction — Research to Support Informed Specification

Architectural anodising has been used for many decades, providing protective and decorative finishes for aluminium in buildings and other demanding applications.

During this time, considerable research has been undertaken into anodising technology, environmental performance, durability and the long-term service life of architectural aluminium.

Much of this information is contained in scientific publications, technical reports, industry conference papers and international research programmes.

AAF Queensland is developing its Research & Data Centre to bring together this information in an accessible and organised reference library.

The objective is to assist architects, designers, aluminium suppliers and building owners in understanding the characteristics and potential benefits of high-grade architectural anodising.

The collection includes AAF technical publications, independent environmental studies, documented building performance, relevant Australian and international standards and practical specification guidance.

It will continue to develop as additional research, historical records and project evidence become available.

6.1 AAF Research Paper Series

Research and Technical Information for Architectural Anodising

AAF Queensland is preparing a series of technical publications examining the technology, performance and appropriate specification of architectural anodising.

The papers draw on established industry knowledge, published scientific research and practical experience in aluminium finishing.

Their purpose is to explain important technical subjects in a clear and factual manner, supported by appropriate research references.

AAF Research & Data — Core Website Papers

Research-01 — Anodising: The Technology

An introduction to the electrochemical anodising process and its distinctive characteristics.

Covers the differences between anodising and powder coating, architectural-grade requirements, metallic finishes and the importance of manufacturing controls.

Research-02 — Sustainability & Environmental Performance

Examines the environmental implications of aluminium finishing, including lower-carbon aluminium, Environmental Product Declarations, Australian life cycle research, service life and material retention.

Research-03 — Durability & Real-World Evidence

Reviews documented long-term architectural anodising performance.

Includes the Oxford Weston Library research, Australia's early aluminium buildings, Queensland architectural heritage and potential coastal and marine case studies.

Research-04 — Technical Performance & Australian Standards

Explains the standards and testing requirements relevant to architectural anodising, including film thickness, sealing, corrosion resistance, environmental exposure and fire performance considerations.

Includes reference to architectural powder coating standards.

Research-05 — Specification, Certification & Maintenance

Practical guidance covering architectural specification, AAF Evershield® Architectural Hardcoat, process certification, warranties, cleaning, maintenance and the conservation of existing anodised aluminium.

Research-06 — Research Papers, Publications & References

The central reference library providing access to AAF publications, scientific studies, conference presentations and original research sources.

AAF Technical Paper Series — Further Publications

In addition to the six website research sections, AAF Queensland is developing a series of more detailed technical papers for publication and download.

The proposed series includes:

TP-01 — Anodising vs Powder Coating: The Critical Difference for Sustainable Architecture

An examination of the fundamental differences between architectural finishing technologies, including their manufacturing processes, performance characteristics and sustainability considerations.

Foundation manuscript prepared; further development and referencing required.

TP-02 — Low-Carbon Aluminium Is Only the Beginning

An examination of aluminium's sustainability journey after manufacture, with particular attention to finishing, service life and whole-of-life environmental performance.

Supported by the 2025 Australasian Aluminium Extrusion Conference paper.

TP-03 — The Science of Anodising: An Integral Aluminium Finish

A more detailed technical examination of anodising chemistry, electrochemical processing, oxide formation, colouring and sealing.

Proposed technical paper.

TP-04 — Architectural Durability: Beyond the Warranty

Research into the relationship between warranty periods, expected useful life and measured performance in historic buildings.

Proposed technical paper, supported by published international durability research.

TP-05 — How to Specify High-Grade Architectural Anodising

Practical guidance covering relevant standards, aluminium selection, anodic film thickness, environmental exposure, finish approval, certification and maintenance.

Proposed downloadable specification guide.

TP-06 — Refurbish. Retain. Reuse. — Keeping Aluminium in Service

An examination of the environmental and architectural value of retaining existing aluminium components through refurbishment, conservation and reuse.

Proposed technical paper, supported by historic building research and future documented projects.

The technical paper collection will expand as additional material is prepared and verified.

6.2 Independent Scientific Research

Evidence Beyond Product Literature

Independent research provides an important foundation for understanding the performance and environmental characteristics of architectural finishes.

Scientific studies can assist in evaluating different technologies by examining measured performance, manufacturing impacts, durability and life cycle outcomes.

AAF Queensland is progressively assembling references to relevant independent studies.

The following publications form an important initial collection.

International Aluminium Institute — Aluminium and Durability

Research: *Aluminium and Durability — Towards Sustainable Cities*
Author: Professor Michael Stacey
Publication: International Aluminium Institute, 2014

This research investigated aluminium's performance in existing buildings, including examples of architectural aluminium that had remained in service for many decades.

The research incorporated building inspections, material assessments and observations of long-term performance.

One particularly important example was the New Bodleian Library at Oxford University, where original anodised aluminium window frames were retained during major refurbishment after approximately 75 years of use.

The study provides important evidence regarding the potential durability and continued serviceability of architectural aluminium.

Research relevance: Architectural durability, service life, building conservation and sustainability.

Aluminum Extruders Council — Environmental Product Declaration

Research: *Environmental Product Declaration for Aluminum Extrusions*
Publisher: Aluminum Extruders Council, North America
Publication: 2022

An industry-wide Environmental Product Declaration examining aluminium extrusion products with different finishing systems.

The declaration includes mill-finished, anodised and painted aluminium products.

It provides independently verified environmental information, including the global warming potential associated with the assessed product categories.

Research relevance: Embodied carbon, finishing emissions and Environmental Product Declarations.

KMH Sustainable Infrastructure — Australian Environmental Study

Research: *Environmental Impact Comparison of Fluoropolymer Powder Coating, Polyester Powder Coating and Anodising Processes*
Author: KMH Sustainable Infrastructure
Publication: November 2010

An Australian environmental study comparing three established aluminium finishing systems.

The research examined energy use and greenhouse gas emissions under defined manufacturing and life cycle assumptions.

A particular contribution was its examination of the environmental consequences of different assumed finish service lives over a 100-year assessment period.

Research relevance: Life cycle assessment, greenhouse gas emissions, finishing technology and replacement assumptions.

Aluminium and Durability — Inspection and Testing

Research: *Aluminium and Durability: Reviewed by Inspection and Testing*
Authors: Michael Stacey and Colin Bayliss
Publication: Materials Today: Proceedings, 2015

A scientific publication examining the durability of architectural aluminium through inspection and testing.

The paper provides additional technical background to the International Aluminium Institute's research programme.

Research relevance: Non-destructive testing, actual service performance and material durability.

Historic Architectural Metal Conservation

Research published in specialist architectural conservation journals provides further information about the use, ageing and treatment of historic aluminium finishes.

These publications can assist in understanding the original use of anodising in modern architecture and appropriate methods of inspecting and preserving existing components.

Research relevance: Heritage buildings, material identification, conservation and reuse.

Developing the Independent Research Collection

AAF Queensland intends to expand this collection to include further published studies dealing with:

- Electrochemical anodising technology.
- Aluminium corrosion and protection.
- Marine and coastal environments.
- Environmental Product Declarations.
- Architectural service-life assessment.
- Fire and thermal properties.
- Surface treatment and sealing.
- Aluminium recycling and material retention.

Each reference should identify the original publication, its authors, date, scope and principal relevance to architectural finishing.

6.3 Conference Papers and Industry Publications

Sharing Industry Research and Experience

Industry conferences provide an important forum for presenting new research, technological developments and practical experience.

AAF Queensland's research library includes papers and publications addressing aluminium finishing, sustainability, durability and architectural specification.

Australasian Aluminium Extrusion Conference — Brisbane 2025

Paper: *Low-carbon Aluminium is a Great Start — Next, Aluminium's Journey to Further Optimise Sustainability*

Author: Bill Wyllie
Conference: 7th Australasian Aluminium Extrusion Conference
Location: Brisbane, Queensland
Date: 15–16 July 2025

This paper examined opportunities to improve the sustainability of architectural aluminium beyond the initial reduction of manufacturing emissions.

It brought together research from several sources, including:

- International Aluminium Institute durability research.
- North American Environmental Product Declarations.
- Australian KMH environmental life cycle research.
- Historical architectural aluminium applications.
- Australian finishing standards and technical developments.

A central theme was the contribution that durable architectural finishes can make to extending aluminium's useful service life.

The paper forms an important foundation for the AAF Queensland Research & Data Centre.

Publication status: Presented conference paper, available for reference.

International Aluminium Industry Publications

Technical papers from international aluminium industry organisations provide useful information on developing finishing technologies and performance requirements.

Relevant subjects include anodising chemistry, architectural colouring, sealing, environmental management and long-term durability.

AAF Queensland intends to progressively identify and include appropriate publications from recognised industry organisations and technical conferences.

Architectural and Conservation Publications

Research from architectural institutions, heritage organisations and conservation specialists can provide valuable evidence concerning the use and preservation of aluminium in existing buildings.

This includes studies of twentieth-century architecture, aluminium curtain walls and the retention of original building materials during refurbishment.

These publications are particularly relevant to the developing Australian durability evidence collection.

Contributions from Industry

AAF Queensland welcomes technical papers and documented project information from architects, fabricators, researchers, building owners and others involved in the aluminium industry.

Material considered for inclusion should have a clear source and provide information relevant to architectural aluminium finishing.

6.4 Research Sources and Reference Library

Access to Original Publications

The AAF Queensland Research & Data Centre is intended to provide a consolidated bibliography of technical research and recognised standards.

Where publicly available, links will be provided to the original publications.

Where standards or research documents are subject to copyright or commercial licensing, references will identify the publisher or authorised source.

The bibliography will be reviewed and expanded as new material becomes available.

A. Environmental and Sustainability Research

REF-01 — Wyllie, B. (2025)
Low-carbon Aluminium is a Great Start — Next, Aluminium's Journey to Further Optimise Sustainability.
7th Australasian Aluminium Extrusion Conference, Brisbane.

REF-02 — Aluminum Extruders Council (2022)
Environmental Product Declaration for Aluminum Extrusions.
North American industry-wide environmental assessment.

REF-03 — KMH Sustainable Infrastructure (2010)
Environmental Impact Comparison of Fluoropolymer Powder Coating, Polyester Powder Coating and Anodising Processes.

REF-04 — Hydro Aluminium
Aluminium Value Chain and Life Cycle.
Industry information covering aluminium production, recycling and environmental performance.

REF-05 — Capral Aluminium
LocAl — Lower-Carbon Aluminium.
Information on lower-carbon aluminium supply options.

B. Architectural Durability and Conservation

REF-06 — Stacey, M. (2014)
Aluminium and Durability — Towards Sustainable Cities.
International Aluminium Institute.

REF-07 — Stacey, M. and Bayliss, C. (2015)
Aluminium and Durability: Reviewed by Inspection and Testing.
Materials Today: Proceedings.

REF-08 — Morris, J. D. and Slaton, D. (2015)
Modern Metals: Finishes, Investigation, and Conservation Considerations.
APT Bulletin: The Journal of Preservation Technology.

REF-09 — Flandro, X. and Thomas-Haney, H. M. (2015)
A Survey of Historic Finishes for Architectural Aluminium, 1920–1960.
APT Bulletin: The Journal of Preservation Technology.

REF-10 — Ashby, J. (1999)
The Aluminium Legacy: The History of the Metal and Its Role in Architecture.
Construction History.

C. Anodising Technology and Technical Standards

REF-11 — Standards Australia
AS 1231:2000 — *Aluminium and Aluminium Alloys: Anodic Oxidation Coatings.*

REF-12 — International Organization for Standardization
ISO 7599:2018 — *Anodizing of Aluminium and Its Alloys: Method for Specifying Decorative and Protective Anodic Oxidation Coatings.*

REF-13 — Fenestration and Glazing Industry Alliance
AAMA 611 — *Specification for Anodized Architectural Aluminum.*

REF-14 — QUALANOD
Specifications for the QUALANOD Quality Label for Sulphuric Acid-Based Anodizing of Aluminium.

REF-15 — Brace, A. W. and Sheasby, P. G.
The Technology of Anodizing Aluminium.

REF-16 — International Organization for Standardization
ISO 3210 — *Assessment of Quality of Sealed Anodic Oxidation Coatings by Measurement of Loss of Mass After Immersion in Acid Solutions.*

D. Environmental Exposure and Alternative Finishes

REF-17 — Standards Australia
AS 4312:2019 — *Atmospheric Corrosivity Zones in Australia.*

REF-18 — Standards Australia
AS 3715:2025 — *Metal Finishing: Thermoset Powder Coatings for Architectural Applications of Aluminium and Aluminium Alloys.*

REF-19 — Fenestration and Glazing Industry Alliance
AAMA 2605 — *Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminium.*

E. Historical Building and Project Records

AAF Queensland is developing a further reference collection covering:

REF-20 — New Bodleian Library / Weston Library, Oxford

Published architectural durability research and original refurbishment documentation.

REF-21 — ICI House / Orica House, Melbourne

Heritage records and available technical information concerning original architectural aluminium.

REF-22 — Australia Square, Sydney

Historical construction records and further investigation into original aluminium finishing.

REF-23 — Collins Place, Melbourne

Architectural documentation and developing research into original aluminium facade materials.

REF-24 — Historic Brisbane Commercial Buildings

Research candidates including the former MLC Building and other early aluminium curtain wall applications.

REF-25 — Coastal and Marine Refurbishment Projects

Developing case studies examining the retention, condition and continued service of anodised aluminium in salt-laden environments.

Reference Library Development

For each publication, the full reference record should progressively identify:

- Author or originating organisation.
- Complete publication title.
- Publication year and edition.
- Publisher or research institution.
- Principal research subject.
- Link to the authorised source, where available.
- Relevant AAF research papers.
- Any important limitations affecting interpretation.

AAF Queensland will seek to distinguish between independently published scientific findings, industry technical guidance, AAF's own interpretation and project examples requiring further documentation.

This distinction is important to maintaining the reliability and usefulness of the research collection.

About the AAF Queensland Research & Data Centre

AAF Queensland is committed to maintaining the availability of high-grade architectural anodising as an important finishing option for Australian architecture.

With decades of specialist finishing experience behind its operations, AAF Queensland recognises the importance of making established technical information and emerging research more accessible.

Through this Research & Data Centre, we aim to share independently documented evidence, established technical knowledge and practical industry experience.

Our emphasis is on assisting informed specification, encouraging long service life and supporting the continued use of aluminium in sustainable architecture.

The collection will continue to develop as additional research, technical publications and documented building examples become available.

We welcome contributions from researchers, architects, aluminium suppliers, fabricators, building owners and others who may have relevant information.

Particular interest is encouraged in historic architectural anodising installations, long-term condition assessments and refurbishment projects where existing aluminium components have been retained.

AAF Queensland is available to assist from initial design and specification through to processing, certification and installation.

Explore the Research & Data Centre

Research-01 — Anodising: The Technology
Understand the electrochemical process and distinctive characteristics of anodised aluminium.

Research-02 — Sustainability & Environmental Performance
Explore life cycle research, carbon emissions and the environmental benefits of long service life.

Research-03 — Durability & Real-World Evidence
Review historical buildings, scientific measurements and architectural performance over decades.

Research-04 — Technical Performance & Australian Standards
Find information on standards, testing, corrosion resistance and performance requirements.

Research-05 — Specification, Certification & Maintenance
Practical guidance to assist with project specification and long-term building management.

AAF Colour Selector
Explore the seven selected AAF Evershield® Architectural Hardcoat finishes.

Contact AAF Queensland
Technical enquiries, specification assistance and contributions to the research library are welcome.

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