# ALUMINIUM NEWS

THE VOICE OF THE UK ALUMINIUM INDUSTRY

ISSUE 13 JUNE 2022



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ALUMINIUM FEDERATION

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*Cover image courtesy of Wickens Engineering: Aluminium coils stored on a bespoke Wickens Heavy Duty Racking system.*

# DIARY DATES

**JUNE**
8-9 • Manufacturing Expo, NEC Bham
8-9 • Marketing Workshop (2x mornings)
16 • ALFED Board Meeting
16 • ALFED Annual General Meeting
21 • House of Lords Lunch
22 • ALFED Extrusion Sector Group
22 • ALFED Recycling Sector Group
23 • ALFED HS&E Support Group

**JULY**
6 • ALFED Meet the Automotive Industry
14 • ALFED Aluminium Distribution Sector Group
21 • ALFED Finishing Sector Group

**SEPTEMBER**
1 • ALFED Recycling Sector Group
6 • Aluminium Light - Module 1
8 • ALFED Board Meeting
13 • Aluminium Light - Module 2
14-15 • Metals Expo, NEC Bham
20 • Aluminium Light - Module 3
21 • ALFED Extrusion Sector Group
21 • ALFED Recycling Sector Group
27-29 • Aluminium Dusseldorf

**OCTOBER**
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25 • Aluminium Light - Module 7
26-27 • Aluminium for Engineers (Day 1&2)

**NOVEMBER**
1 • Aluminium Light - Module 8
2-3 • Advanced Engineering, NEC Bham
2-3 • Aluminium for Engineers (Day 3&4)
8 • Aluminium Light - Module 9
10 • ALFED Annual Dinner & Business Briefing, De Vere Tortworth Court
15 • Aluminium Light - Module 10
22-23 • World of Aluminium
30 • ALFED Extrusion Sector Group
30 • ALFED Recycling Sector Group

**DECEMBER**
1 • ALFED HS&E Support Group
7 • President's Dinner
8 • ALFED Board Meeting

**KEY**
- ALFED Members meeting
- Training course/webinar
- Event - open to all

**FOR MORE INFORMATION PLEASE VISIT:**

EVENTS:
www.alfed.org.uk/aluminium-federation-events/

TRAINING:
www.alfed.org.uk/alfed-training/training-with-alfed/#ourcourses

# FOLLOW US

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twitter.com/alfedaluminium

# ABOUT US

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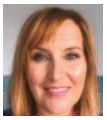

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# MEMBERSHIP

## ALUMINIUM FEDERATION IS THE VOICE OF THE UK ALUMINIUM INDUSTRY

The Aluminium Federation represents businesses who process, trade and work with aluminium. We foster innovation, promote best practice, develop skills and champion member interests. From training and networking to research, advocacy, lobbying and outreach, we help our members solve problems, capitalise on opportunities and boost their competitiveness.

As a member, you become part of an influential community, getting your voice heard within the industry and at the highest levels of government. Working together, we are actively driving UK aluminium forward - and we look forward to working with you in this endeavour.

### COLLABORATION:

We bring together recycling and secondary producers, extruders, finishers and stockholders – helping everyone involved in UK aluminium make connections for mutually beneficial business and supply development.

### INNOVATION:

You benefit from a range of services that help you stay at the cutting edge. From research and development through to industry benchmarking and technical support, you get insight that assists you to develop your business.

### OPPORTUNITY:

We give you a unique opportunity to get your voice heard - within the industry and in government. Whether you're a global company or an SME, you can advocate and influence to improve market conditions for your products and services.

### MEMBER BENEFITS:

Benefit from a range of services that help you develop your business, workforce and supply chain:

- Advocacy & lobbying
- Market insight
- Training
- Technical support
- Consultancy from energy management support to bespoke training, coaching and e-learning
- Events
- Influence & Policymaking
- Shared Learnings & Networking
- Savings & Partnerships

### WHY JOIN THE ALUMINIUM FEDERATION

Whatever your company size or speciality within the industry, we help you access the technical expertise, market insight, business support and government influence you need to boost your competitiveness.

We offer different levels of membership based on your business size – so it's both affordable and valuable.

"As an ALFED member, you get your voice heard. We're a small metal finishing company, but I get my voice heard very loudly. When I was the ALFED President, this gave me influence at a high level with government – I was routinely on calls with ministers and civil servants. And I had my voice heard even before I was president. In 2004, the British standard changed to an EU-wide one that was much weaker. I campaigned to change it, and as an ALFED member, I had a say via the Finishing Group. I got my opinions over, and the standard is now changing. It was a real success for our business."

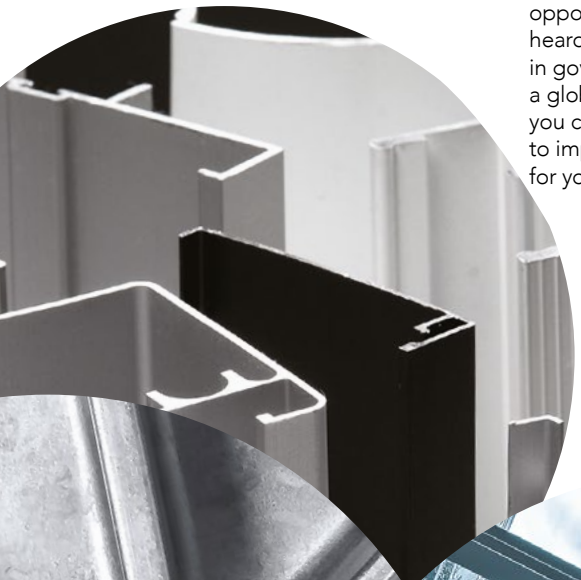
Giles Ashmead, Director, Powdertech

### CONTACT US TO DISCUSS HOW ALFED MEMBERSHIP CAN HELP YOUR BUSINESS

**T: 0330 236 2800**

**www.alfed.org.uk**

ALFED
ALUMINIUM FEDERATION



**EVERYTHING WE DO FOCUSES ON HELPING UK ALUMINIUM BUSINESSES CAPITALISE ON OPPORTUNITIES**

# WHAT HAS DRIVEN THE SHARP DROP IN THE ALUMINUM PRICE?

## LME 3-month aluminium is trading around $2,800-2,900 /t in mid-May, well down from the March peak of over $4,000 /t.

Despite the sell-off, aluminium is now flat on a year to date basis and there have been key changes in the aluminium market which is keeping price at historically high level. The supportive factors are a tight Chinese aluminium market, which has been a net importer of aluminium since 2020 and limited investments in new smelting capacity. This has resulted in a global aluminium market deficit.

**Table 1: Aluminium starts edging higher after recent sell-off**

| Price performance to: | Mon, May 16 | % change over | | | |
|---|---|---|---|---|---|
| | | 1 week | 1 month | 3 months | YTD |
| LME 3-month | Closing price $/t | | | | |
| Aluminium | 2,835 | 3.0% | -13.9% | -5.4% | 0.6% |
| Copper | 9,290 | 0.2% | -10.1% | -4.8% | -4.8% |
| Lead | 2,114 | -1.8% | -13.6% | -10.2% | -7.7% |
| Zinc | 3,600 | -0.4% | -18.7% | 2.5% | 1.8% |
| Nickel | 26,990 | -3.6% | -18.6% | 21.9% | 30.4% |
| Tin | 34,185 | -7.6% | -21.2% | -17.3% | -12.3% |

Data: CRU, LME, CME

Eoin Dinsmore is the Head of Base Metals Demand and Markets at CRU. He has over a decade of experience supporting the world's leading metals and mining companies. Eoin's core focus is modelling and analysing the demand, supply and price outlook across base metals, but understanding recycling, sustainability and carbon emissions are equally central to his role.

### Why did the price not hold over $4,000 /t?

Despite the bullish drivers, prices have corrected substantially since early March. One major negative factor has been the slow down in demand in China, which has come at a time when primary aluminium supply growth is rising.

Wan Ling highlighted the effects of Covid-19 lockdowns in the CRU Aluminium China Fortnightly, published on 13 May, emphasising the effects on the automotive and construction sectors. On the supply side, the Yunnan provincial government issued a plan to ensure energy supply for the province in 2022. Power supply has been generally sufficient this year, enabling over 1.8M t/y of aluminium smelting capacity in the province to restart since February.

Another factor which has added downside pressure to the price is concerns on the demand outlook outside China.

Indeed, in the May CRU Aluminium Products Monitor, a report where we survey aluminium downstream companies in Europe, North America and Asia, sentiment is turning weaker in Europe and remains weak in China. CRU analyst Kajal Kumar noted "In Europe, both rolled products and extrusions markets saw a decrease in orders this month, as consumers had stockpiled in March. In the US, demand is keeping pace, but downside risks remain, with inflation staying high."

Premiums also looked to have peaked. Recently we have seen the first signs of weakness this year in the US Midwest P1020 ingot premium, with quotes down a penny w/w to 37.5-38.5 ¢/lb. European and Japanese premiums have also stabilised after steady increases in recent months.

### Companies are investing, with a focus on recycling

Novelis announced plans to invest $2.5 bn to build a new low-carbon recycling and rolling plant in Bay Minette, Alabama, USA. The facility will have a capacity of 600,000 t/y. In Europe, Norsk Hydro announced a tender offer to acquire Polish aluminium recycler Alumetal for EUR232M, the deal would lift Norsk Hydro's post consumer recycling capacity by 150,000 t/y. Alumetal's profits have been rising steadily in recent years, and the deal valued the company at around 4.8 times 2021 EBITDA. That deal follows Speira's acquisition of Real Alloy's European aluminium recycling business.

Chinese companies are eyeing investments in primary aluminium smelting in Indonesia. In the CRU Aluminium Market Outlook, we forecast that production in Indonesia will rise from 270,000 t in 2022 to nearly 1Mt by 2026. Larger investments in Indonesia could shift the aluminium market from the deficit into surplus sooner than we expect and prompt another move lower for the price.

Eoin Dinsmore
**Head of Base Metals Demand and Markets CRU**

SOLD OUT

Email events@alfed.org.uk if you would like to be added to our waiting list.

ALFED ALUMINIUM FEDERATION 60TH ANNIVERSARY

# JOIN US TO CELEBRATE THE ALUMINIUM FEDERATION DIAMOND ANNIVERSARY AT THE ALFED ANNUAL DINNER AND BUSINESS BRIEFING ON 10TH NOVEMBER 2022.

This annual event is a great opportunity to catch up with industry colleagues and friends. Last year's dinner was sold out; attended by over 250 aluminium industry professionals offering an excellent networking opportunity.

**Guest speaker:** Kate Humble

Kate grew up next door to a farm in Berkshire where she acquired a love for nature. She has worked on a wide variety of TV programmes. In 1997 she joined the BBC, working first on the long running series 'Animal Hospital' and then joining the 'Holiday Programme', where she was asked to present her first report. She continued working both behind and in front of the camera until in 1999 she completed a lifelong dream and travelled through the Sahara Desert on foot and camel with salt traders. On her return, she continued presenting programmes for the BBC including 'The Essential Guide to Rocks', 'Tomorrow's World', 'Animal Park' and 'Rough Science'. Publishing countless nature and lifestyle books, Kate has established a popular following through her work in the wild over the years.

**Venue:** The dinner will be held at the at the superb De Vere Tortworth Court. Situated just north of Bristol and easily accessible from the motorway, Tortworth Court is a historic hotel in stunning surroundings – a place where a centuries-old story meets an exceptionally modern experience.

**Business Briefing:** A programme of industry speakers offering new insights on transformation, innovation and strategy in our current climate.

**Timings:**

**11.00** Arrival & Networking, Business Briefing & Lunch

**18.30** Welcome Reception

**19:00** Dinner

**Dress code:** Black tie

**Sponsorship opportunities:** This event provides a variety of sponsorship opportunities for you to raise your company's profile within the aluminium industry. Sponsorship packages range from £750 to £12,000 to suit your budget: ALFED Dinner and Business Briefing Sponsorship Opportunities – contact Kirsi Lintula at ALFED for any sponsorship enquiries: klintula@alfed.org.uk

**Tickets:**

- Business Briefing: Free to attend, this event is open to ALFED members and those who are also attending the dinner in the evening: Reserve your place: https://bit.ly/37ytdOZ
- Dinner and B&B (single occupancy): £375+vat per person: Reserve your place: https://bit.ly/3I7JneU

Please note: if you would like to reserve a double occupancy room (ie two persons) and two dinner tickets the total cost is £550+vat, this can be booked direct with the ALFED, please email events@alfed.org.uk.

**Ticket enquiries:** events@alfed.org.uk

SPONSORS OF THIS YEAR'S ANNUAL DINNER AND BUSINESS BRIEFING

ALUMINIUM INTERNATIONAL TODAY · AMARI METALS LTD · Metalogic IT FOR THE METALS INDUSTRY · BASF We create chemistry · Chemetall expect more · ALUMINIUM SHAPES · RAA RICHARD AUSTIN ALLOYS · Mechatherm aluminium casthouse solutions · aes METALS copper & aluminium alloy semi products · Novelis


The ALFED Annual Parliamentary Lunch is being held on Tuesday 21 June 2022 in the Cholmondeley Room Terrace at the House of Lords.

The event is being hosted by Lord Rupert Redesdale.

The purpose of this very important event in ALFED's calendar is to raise and discuss issues relating to the UK's Aluminium Sector at the highest level within UK Government.

There will be three short presentations given during lunch. The speakers will be from political backgrounds and industry leaders discussing current and future affairs.

There will be opportunity after the presentations for a Question and Answer session.

Fee to cover catering costs: £99 + vat. Numbers are limited and the demand is usually very high, and therefore places are restricted to one place per ALFED member company.

Please note this event is open to ALFED members only.

**Reserve your place now: https://bit.ly/3wuqpK9**

## WHITEHEAD ALLOYS

Whitehead Alloys Ltd are a UK based manufacturer of secondary aluminium ingots and aluminium deoxidants.

www.whiteheadalloys.co.uk/

## BROCKHOUSE GROUP

With over 150 years experience, Brockhouse has a proven record for supplying professional forgings to leading companies across the world, servicing a number of industries including nuclear, mining, oil & gas, railways, automotive, defence, fluid power, materials handling, and general engineering.

At Brockhouse, they pride themselves on their ability to meet the challenges of fast response, high quality and low cost solutions that their customers require. Their manufacturing facilities enable them to offer the broadest range of products from a single forge. Brockhouse offers a complete range of capabilities from die and tooling manufacture, to forging and machining, making them an ideal partner to provide a one-stop shop for all of their customers forging needs.

Brockhouse is approved to BS EN ISO 9001:2015 and they hold a number of specific customer and industry approvals, demonstrating a continued commitment to quality control, continuous improvement and customer service throughout their organisation.

www.brockhouse.co.uk/

## BKC CONSULTING

BKC Consulting offer comprehensive management & trade consultancy services for your organization focusing on your business.

They take an objective view of your organization and sales strategies. Meeting with owners, they listen to their concerns, understand the system and procedures currently in place, develop a plan, and determine stages of implementation. They focus on the customer's questions and needs, regardless of the size of the organisations.

www.bkc-consulting.co.uk/

## C & O POWDER COATINGS

Formed in 1985, they have over three decades of powder coating experience. Their longevity and success is built on the philosophy that to retain your business, good service must be delivered consistently and not just at the start of the relationship.

Continual investment in the latest equipment ensures that whilst they remain at the forefront of technology, they can also maintain a consistently high standard of finishing. Their continual drive for quality improvement also remains a key objective as demonstrated by our ISO 9001:2015 accreditation.

Their seven stage immersion pre-treatment facility is also a key element to the process. Overseen by their UK based chemical supplier it provides a key element to the process and is monitored daily in their onsite laboratory. With four horizontal conveyorised production lines and one off line static oven, they have the capacity to service the demands of any industry.

www.candocoatings.co.uk/

## OMEGA PISTONS

Since its conception in 1972, Omega Pistons have been at the forefront of all the premier motorsport categories. Omega are world leaders in forged performance pistons and are justifiably proud of their success in international motorsport. With an extensive ongoing investment strategy, Omega Pistons are able to stay ahead of the field, both in current design criteria, future research and development, keeping customers one step ahead of their competition.

www.omegapistons.com/

## MET-FAB SOLUTIONS

Met-Fab Solutions is a specialist supplier of bespoke architectural pressings and insulated panels. Supplying to window and curtain walling installers, they recognise the importance of strict project deadlines.

Powder coating takes place in-house to ensure metal fabrication materials are delivered in accordance with your requirements. With over 30 years fabrication and ppc experience, you can be assured of high quality, right first time aluminium ppc pressings and panels.

With a team of highly experienced in-house estimators, Met-Fab Solutions can offer quick and accurate pricing. Packing, dispatch and delivery are done in-house, with a vehicle fleet adding flexibility and reducing order turnaround.

www.met-fab.co.uk/

## WICKENS ENGINEERING

Wickens Engineering is one of the largest manufacturers of heavy duty storage solutions in the UK. The company has over 40 years of experience in designing, manufacturing and installing bespoke racking systems, which are widely used across many industries, including Automotive, Aerospace, Marine, Fenestration, Energy and Metal Stockholders.

Wickens Cantilever Racking or Heavy Duty Racking is an ideal solution for storing aluminium products in any shape and form: sheet and plate, coils, extrusion or tube, and all racks are designed to suit customers' particular requirements and to suit specific application in the most cost-effective way.

ISO 9001:2015 and CE accredited, Wickens takes great pride in its robust products and highly-skilled staff. By continuously developing its people and investing in manufacturing technology, Wickens ensures that the best products and customer service are offered to all customers.

www.wickens.co.uk

## MARTIN DAVENPORT CONSULTANT

Following a long and successful career in both the Casting & Automotive Industry, he is now focusing on delivering Value and Continuous Improvements as a Freelance Consultant on a 'project to project' basis in the Cast Metals Industry. In 2021 he decided to leave Jaguar Land Rover where he was the Quality Engineering, Complex Castings, Customer Liaison and Warrant Returns Manager. Previously working for Ford Motor Company Casting & Forging Operations as European Casting Program Manager, he worked with global casting manufacturers on quality and productivity improvements through many Global Powertrain launches. He has also worked in China for Geely Auto (Volvo) as a Powertrain Quality Director achieving the flawless launch of several new Powertrain Plants. He has enjoyed a broad and diverse career working in the UK, Germany, Russia and China. This has led to exposure to contrasting manufacturing technologies and leadership styles in such countries as the USA, Japan, Sweden, France, Italy, South Africa and Mexico. He now wants to use this experience with particular interest in Product life Cycle Management within the Cast Metals Industry and Circular Economy.

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## STEEL & ALLOY PROCESSING

With more than 60 years of experience, they produce a wide assortment of products under four business lines.

They work to improve customer relations, offering the most innovative and sustainable metal solutions, as a result of a highly-collaborative worldwide organisation.

Gonvarri Industries is focused on complete customer service in order to satisfy the metal needs of their clients through four divisions of their business:

- Service Centers: They supply flat steel, aluminium, steel rods and 3D Laser cutting to major automotive makers.
- Metal Structures is focused on complete customer service in order to satisfy the metal needs of their clients through three subdivisions.
- Material Handling: They design, build and assemble comprehensive material handling systems. They guarantee their attention to technical specifications, as well as to their functionality and security systems.
- Precision Tubes: They manufacture high-precision carbon steel tubes and stainless steel tubes with the highest quality standards and state-of-the-art R&D.

www.gonvarri.com/en/

Steel & Alloy
Gonvarri Steel Services

# EMR OPENS NEW METAL RECYCLING FACILITY AT GLASGOW'S KING GEORGE V DOCKS FOLLOWING MULTI MILLION POUND INVESTMENT

The operation will target eight deep-sea ships with capacity to carry cargo up to 30,000 tonnes each in the first 12 months. Each ship will transport sustainable, recycled material to markets around the world. Sea freight is a low carbon transport option for moving material to steelworks in the UK and abroad where recycled metal can be processed competitively and responsibly.

The larger ships arriving at the new EMR site at King George V dock, will produce a fifth of the emissions, per tonne of steel carried, compared to the smaller ships typically carrying around 3,000 tonnes currently loaded on the River Clyde by EMR*.

At almost 8 acres, the site will also house an innovative End-of-Life Vehicle (ELV) facility capable of depolluting and recycling high volumes of vehicles each week. Supported by a brand-new ELV collection network, the King George V development will enable EMR to become Scotland's leading ELV recycler for members of the public and businesses alike.

There will also be a dedicated, segregated area for members of the public and tradespeople to drop of small quantities of any type of metal such as metal household goods, copper, brass, cable and aluminium. All with dedicated parking and instant payment.

A second phase will see the site expand to 11.5 acres. This will allow EMR to increase its capacity for both advanced ELV recycling and metal processing and separation. The extended site will focus on processing significant volumes of shredder feed such as ELVs and metals from business customers and local authorities across Scotland.

EMR King George V will bring 15 new, skilled jobs to the Glasgow area and enhance the company's existing network of Scottish sites, which are located in Glasgow (South Street), Bellshill, Dundee and Kilmarnock.

The project is a partnership between EMR, landlord Peel Ports Ltd (Clydeport) and developer McLaughlin & Harvey.

As part of EMR's ambitious goal to reach net-zero, the King George V site will feature enhanced electrical connections, allowing equipment used on the site to be fully electrified as the company transitions to net-zero by 2040. This will allow EMR to supply sustainable, recycled metal to its UK and international customer base in the most competitive and low carbon way possible.

Further investments in sustainability will include the re-introduction of native Scottish plants around the docks, alongside support for environmental education in local schools.

** A 1000Km voyage in a 3000te vessel will generate around 30Kg CO2 per te of steel carried, compared to around 6Kg CO2 per te of steel carried for a 1000Km voyage in a 30,000te vessel. Taken from 'UK Government GHG Conversion Factors for Company Reporting'*

# VERTIK-AL SECURES GSB QUALITY SEAL

Vertik-Al is proud to announce that it has once again secured the GSB Quality Seal for Approved Coater Aluminium, achieving Master status.

The Birmingham-based powder coating specialist remains the only applicator in the UK and Ireland to hold the quality seal and has done so for over 27 years, since 1994.

GSB International awards quality seals in different levels of quality. Recipients are tested annually for adherence to the prescribed quality requirements. Vertik-Al met the demands of GSB AL631-5 for aluminium coating companies.

The annual audit checks all parts of the powder coating process including, pre-treatment, coating, stoving parameters and final testing. The coated items are then put through a rigorous testing regime which includes mechanical testing, pressure cooking and acetic acid salt spraying (AASS) testing. The finished coating must also be of the correct appearance, thickness and gloss level.

To further strengthen the company's credentials as a excellent powder coater, Vertik-Al's Technical Manager Tristan Pope successfully completed and passed the GSB online training course in June.

The course addressed theoretical knowledge on the GSB International and quality guidelines, coater examination, and properties and corrosion behaviour of aluminium in the architectural field. Vertik-Al believes Pope to be the only person in the UK to achieve this certificate.

VERTIK-AL
Aluminium Powder Coating Specialist Since 1966

- **Vertik-Al Technical Manager Tristan Pope**

# EXCITING NEW ERA FOR POWDERTECH (CORBY)

Powdertech Corby are excited to announce the next chapter in the growth of Powdertech (Corby) Limited. Current directors Giles Ashmead and Richard Besant, with the support of Cordovan Capital Partners, have completed a management buyout of the company from the retiring Managing Director and founder of Powdertech (Corby) Limited, Martyn Green. Giles and Richard will continue to lead the team and for customers and suppliers it is "business as usual".

There is no change to the organisation or operation of the business and all your contacts will remain the same as we continue our expansion in supplying innovative finishes, technical solutions and high-quality products to the architectural market.

If you have any questions please don't hesitate to call Giles or Richard on 01536 400890.


- **Richard Besant (left) and Giles Ashmead. Directors, Powdertech**

# VERTIK-AL RENEWS ISO 9001:2015 CERTIFICATE

Vertik-Al is pleased to announce the successful renewal of its ISO 9001:2015 certificate. Underpinning its commitment to quality, the powder coating specialist has held the internationally recognised standard since 1994.


- **Vertik-Al managing director, John Park-Davies pictured with the new ISO 9001 certificate.**

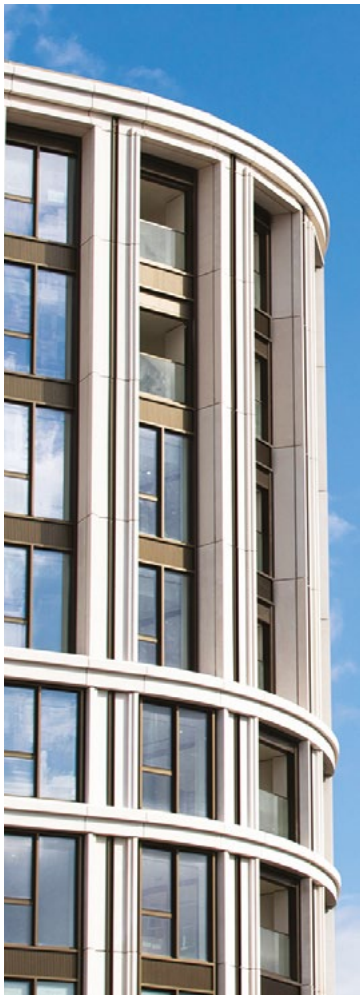
ISO 9001:2015 encompasses the whole business, from management down to manufacturing procedures. Walking in the steps of a typical Vertik-Al customer the auditors conduct a robust assessment of the entire organisation.

ISO 9001 defines the requirements for a Quality Management System (QMS). While it does not guarantee product quality it does ensure that the processes surrounding the product are controlled and performed consistently.

Vertik-Al's auditor was very complimentary about their achievements over the past 12 months and how they are developing their quality management system.

www.vertik-al.com

# QUALICOAT UK & IRELAND ANNOUNCES CONFERENCE 2022



QUALICOAT UK & Ireland is pleased to announce the launch of its conference for 2022 – Future-proofing Facades. The event will gather professionals from across the construction industry to discuss developments in finishing technology for architectural aluminium, with the aim of ensuring that future project specifications offer the best protection.

Architect by trade, TV presenter and former President of the Royal Institute of British Architects, Maxwell Hutchinson is confirmed as keynote speaker.

## Agenda

The conference will address topics such as fire resistance of façade coatings, specifying powder coatings, and future developments in powder coating including the recent launch of the QUALICOAT 3.0 specification. Aluminium pretreatment, site inspections and maintenance will also be explored. There will also be an exhibition area of QUALICOAT UK & Ireland member's products and services.

## Date and Location

Future-proofing Facades is to be held at the Building Centre, London on Tuesday 14th June. This one-day event is free to attend. Delegates must register for tickets in advance via qualicoatukiconference.co.uk. or search QUALICOAT - Future Proofing Facades at eventbrite.co.uk. Follow QUALICOAT UK & Ireland on LinkedIn for updates.

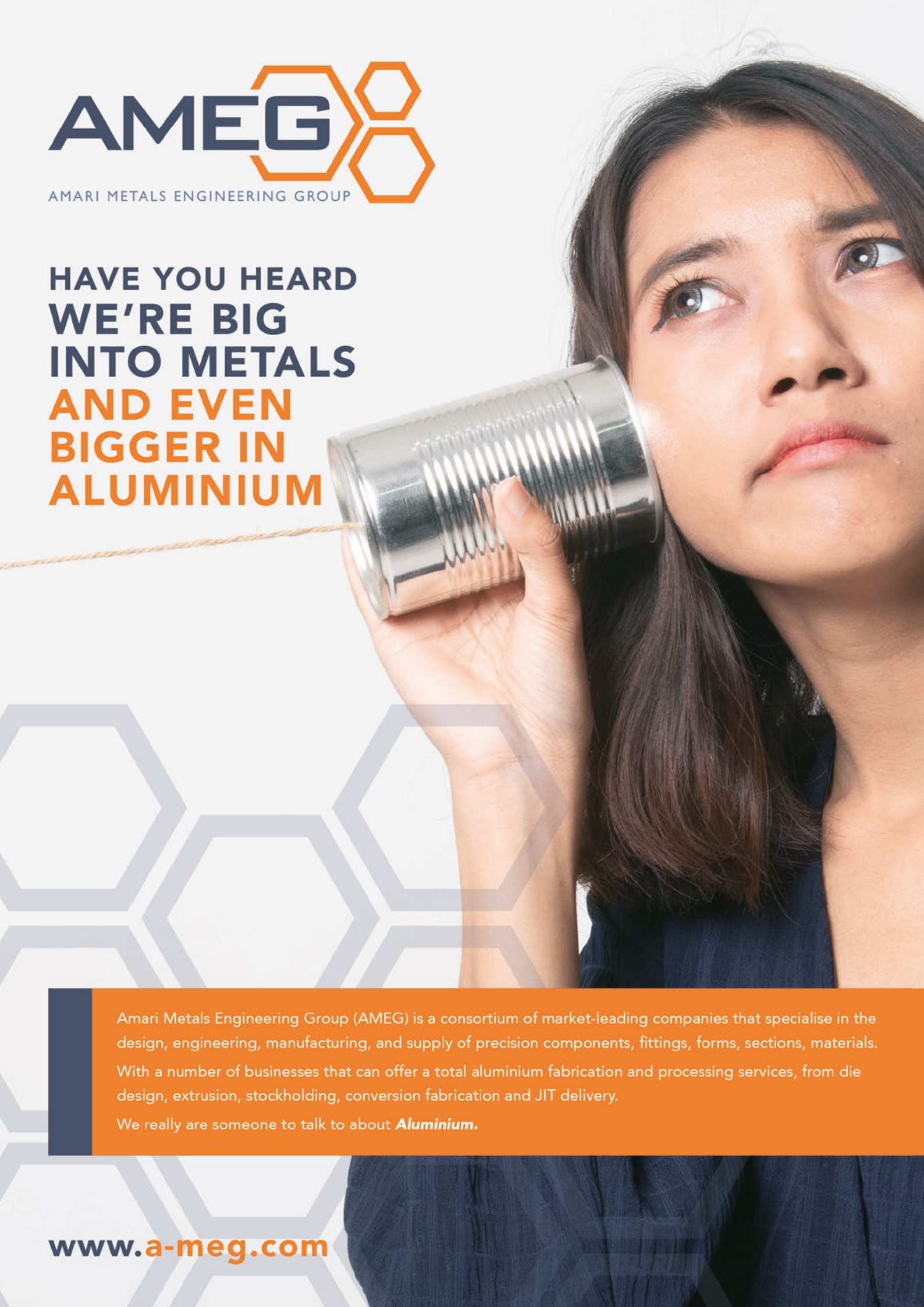
This event is sponsored by Barley Chalu, Chemetall, Interpon, Jotun, and Vertik-Al.

*Image credit: ALUK*

AMEG

AMARI METALS ENGINEERING GROUP

# HAVE YOU HEARD WE'RE BIG INTO METALS AND EVEN BIGGER IN ALUMINIUM



Amari Metals Engineering Group (AMEG) is a consortium of market-leading companies that specialise in the design, engineering, manufacturing, and supply of precision components, fittings, forms, sections, materials.

With a number of businesses that can offer a total aluminium fabrication and processing services, from die design, extrusion, stockholding, conversion fabrication and JIT delivery.

We really are someone to talk to about ***Aluminium.***

**www.a-meg.com**

# RESEARCH OPPORTUNITIES ADDRESSING ZERO WASTE, NET ZERO EMISSIONS & PRODUCTIVITY IMPROVEMENT CHALLENGES OF THE UK ALUMINIUM INDUSTRY AND METALS SECTOR

In the December 21' edition of this publication the Materials Process Institute (www.mpiuk.com) presented details of the PRISM programme which is aimed at improving the competitiveness of the UK Metals Sector by providing funded research and innovation services in the areas of the Circular Economy, Industrial Decarbonisation and Digitalisation. In this follow-up, PRISM Programme Manager, Joe Lee (Joe.Lee@mpiuk.com) discusses core industry challenges that the Institute is investigating this year.

"The cement industry accounts for around 7% of global carbon dioxide emissions making the drive for alternative materials with a low environmental impact and carbon footprint essential if the impacts of climate change are to be mitigated. The metals sector is at the heart of this innovation as academics, researchers and material innovators develop alternative processes and products derived from metal industry slags and bi-products that can replace traditional Portland cement with a fraction of the embedded emissions of this ubiquitous material. We aim to quantify and characterise the potential value that exists within these undervalued and UK-located assets, identifying, developing and demonstrating new material combinations and their practical applications.

A further aim is to retain high residual value in recycled materials that are commonly downcycled to poorer grade products than their initial application. This is a consistent trend across the metals sector where high purity, high value materials are diluted through bulk recycling and converted into lower grade products. The Institute is applying Materials System Analysis and Lifecycle Assessment to investigate and demonstrate the reduced impact that improved material segregation and application of tools can reduce demand for virgin resources and replace with recovered materials.

Our research programme also reflects the importance of switching to alternative fuels and the challenges that are likely as different industry sectors make the transition to a low carbon economy. Our industrial decarbonisation group is installing an onsite hydrogen network that will support businesses gauge the impacts that the use of hydrogen will have on furnace efficiency, refractory performance, and product quality. This demonstration facility is supported by computational modelling incorporating CFD applications which can model furnace operation prior to physical testing. And while direct fuels are important, we are also focussing on electrification of industrial heating, and developing tools to aid specific companies make the decision to switch to hydrogen or electricity as a green heat source.

The third pillar of our programme addresses the need to develop and demonstrate practical applications for novel digital technologies that are relevant, appropriate, and accessible to metals sector processes. Our digitalisation group operate a bespoke internet of things (IoT) platform that supports and integrates artificial intelligence and machine learning applications with foundation industry processes with the aim of improving productivity, quality, performance and safety.

The Materials Processing Institute welcomes engagement from the entire aluminium supply chain, as well as any other critical challenges that ALFED members face, in this challenging economic and political environment, with various funding options available to increase accessibility to the facilities and services of the Institute.

PRISM
Funded by Innovate UK

# MANAGE YOUR ENERGY BUDGET IN A RISING MARKET

## When you need to consume a lot of energy to run your business, understanding market trends is vital to protect budgets, because poor timing of contract decisions can significantly impact costs.


Such has been the volatility of the energy market that, for a short time, remaining on out-of-contract rates was more cost effective than re-contracting. That is no longer the case and, while it can be daunting to re-contract in the current climate, any organisation in this position should rectify it immediately as they will be paying a significant penalty.

For example, the table below with variable/out of contract prices obtained from suppliers, illustrates the substantial uplift in the out of contract rate that will be adding an immense cost to your energy bill.

| | Variable/Out of Contract rate | 12-month contract option | 24-month contract option | 36-month contract option |
|---|---|---|---|---|
| Electricity day (p/kWh) | 50-60 | 36.13 | 33.98 | 31.54 |
| Electricity night (p/kWh) | 42-63 | 22.77 | 25.27 | 23.10 |
| Gas (p/kWh) | 17-20 | 12-13 | 10-11 | 9-10 |

Prices look set to remain well above historical averages. While we expect them to trend downwards over the long term, we suggest re-evaluating what represents good value in today's markets, and to reset your energy budget accordingly.

You need an energy strategy to help manage that budget, but the vast supplier product choice can make the presentation of the future costs of your energy difficult to compare.

A fixed contract can provide budget certainty by helping you achieve the best available energy tariff while benefiting from fully fixed and inclusive prices.

A flexible contract allows you to control the amount of energy you buy and when you buy it. Energy can be bought in seasons, quarters, months, or even for the day ahead. Most typically, buyers will commit to buying a base load with top up purchases throughout a contract period. This type of contract enables organisations to take advantage of any favourable price movements throughout the whole term of the contract – rather than be restricted to a single procurement decision as is the case with fixed contracts.

Power Purchase Agreements (PPAs) enable you to contract for your electricity supply directly with a renewable generator via an electricity supplier, who will sleeve through the electricity and invoice at the agreed rates, in exchange for a longer-term contract, typically 10 years. In addition to the cost benefits and budget certainty this arrangement affords, it also supports organisations wishing to satisfy environmental objectives by being supplied directly from renewable assets.

### Mitigate rising energy prices

Payback periods on energy audits and renewables are currently a lot shorter due to the increased energy costs. Therefore, we recommend organisations consider investing in identification of opportunities to reduce their energy consumption and reliance on the grid. Afterall, the cheapest kWh is the one that you don't consume.

### Extra help at your fingertips

Zenergi has a team dedicated to tracking the market and summarising these insights in a daily market analysis. The Market Watch team also provide monthly reports, which provide an overview of the UK wholesale markets in greater depth.

If you are a member of the Aluminium Federation please contact the ALFED Team for more information: alfed@alfed.org.uk.

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# ALUMINIUM; THE IDEAL SOLUTION FOR BALCONIES?

In the aftermath of the Grenfell Tragedy, building regulations have rapidly shifted. With combustible materials banned in the external walls and attachments of high-rise buildings, architects and specifiers have had to adjust to a new design environment that utilises only fire-safe materials.

We spoke with Richard Izzard, Managing Director of ***AliDeck,*** to learn more about the new specification framework for balconies and the benefits that aluminium delivers to specifiers.

Following Grenfell, the specification of non-combustible materials in the external envelope of high-rise buildings is now mandated by revised building regulations. With balconies clearly defined as "specified attachments" to the external envelope, the new more-stringent regulatory environment requires balcony materials to be equally fire-safe, removing previously common materials, such as timber or composite decking, from the options available to specifiers.

Architects and specifiers have rapidly embraced the new opportunities made available to them by the increasingly sophisticated metal balcony component systems that manufacturers have delivered to the market in response to evolving legislation.

Aluminium, in particular, has risen to the fore, with manufacturers reacting to the situation by developing comprehensive aluminium systems for balconies, including decking boards, support joists, pedestals, soffit cladding, balustrades, and more.

Richard Izzard, of AliDeck, said, "What became clear in the aftermath of Grenfell was the real lack of non-combustible materials for balconies, with timber or composite being the long-established de-facto standards and little else commonly available. As Approved Document B began to be amended, though, non-combustibility became an absolute requirement and aluminium was soon recognised as the main viable choice."

## Off-the-shelf compliance

To satisfy the new regulations, all materials must be certified to EuroClass A1 or A2-s1, d0 ratings. Aluminium easily achieves this standard, providing no contribution to fire and, when powder-coated to Qualicoat standards, no smoke emission and no production of flaming droplets.

The compliance guarantee that these fire ratings deliver to specifiers is invaluable, allowing for essentially "off-the-shelf" specification of products and providing peace-of-mind that proposals are robust and, most importantly, safe.

"By specifying aluminium balcony components, an architect can be sure that their design is compliant from conception to completion," continued Richard. "Over the last 12 months especially, it has become clear that architects and designers have recognised and embraced this simple and guaranteed route to compliance."

It has by no means been a smooth transition, though. As regulations began to evolve following Grenfell, and against a backdrop of the unrecognised implications for balcony design, many new and in-progress developments fell between the cracks and were completed with timber or composite decking across their balconies.

"We're still seeing today recently-completed high and low-rise developments that have non-compliant materials in their balcony and terrace decks," explained Richard. "It has been a major problem and has resulted in a huge amount of almost brand-new timber or composite decking needing to be stripped out and replaced with a non-combustible alternative, creating unnecessary additional expense and waste."

## Building a fire-safe future?

Despite the associated costs and upheavals, these new requirements are necessary and appropriate responses to a genuine and inarguable set of problems within the construction sector, as highlighted by the Grenfell tragedy.

New legislation such as the Fire Safety Act and Building Safety Bill has helped to clarify the situation and move us towards a fire safe future.

An additional impact on the non-viability of combustible materials was highlighted by the External Wall Fire Review scheme. Developed by the Royal Institution of Chartered Surveyors (RICS) and the Building Societies Association, this scheme (more commonly known as EWS1) was designed to unblock the high-rise housing market by providing lenders with a standard fire survey for buildings above 18m in height.

Changing Government advice in January 2020, however, broadened the scope of affected buildings to all multi-occupancy buildings of any height, leading to mortgage lenders requiring EWS1 surveys for many more properties than originally envisioned. This immediately resulted in a new logjam and huge delays for homeowners and their buyers.

For buildings that fail the EWS1 survey, the only solution is for all combustible materials to be replaced with non-combustible alternatives. While many of these failed buildings have profound fire-safety issues affecting multiple aspects of the entire construction, there have been large numbers of buildings failing simply due to the presence of combustible materials only in the balconies.

"We've seen a lot of otherwise-compliant relatively new buildings fail EWS1 on the balconies alone," said Richard. "Lenders have simply refused to accept any risk when it comes to providing mortgages on properties that contain combustible components."

With comprehensive aluminium balcony systems available to directly replace combustible timber or composite decking, this issue has been relatively simple to resolve, albeit at not inconsiderable expense. It underlines, though, the importance of manufacturers developing complete and off-the-shelf compliant systems for architects and designers to not only solve these issues but to prevent them from occurring in the first place.

## Safe, strong, sustainable specification

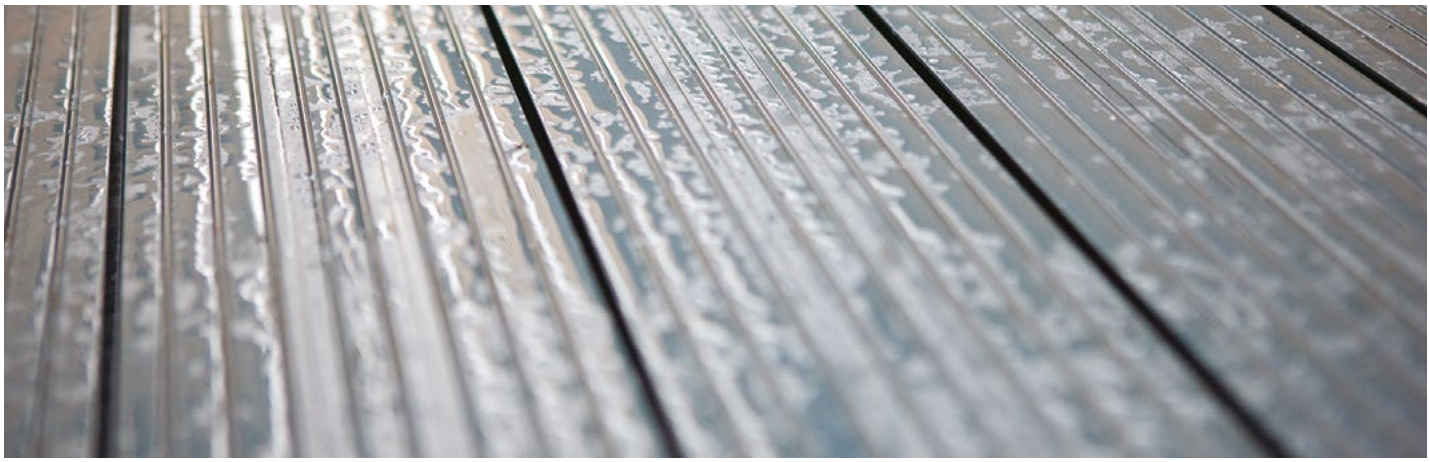
While the non-combustible nature of aluminium is certainly the primary driving force behind its rapid adoption as the go-to material for balcony components, there are other features that play no small part in its overall suitability as the ideal replacement for timber or composite in specification.

"Beyond fire-safety, there are several other important factors that aluminium products can bring to bear on projects," remarked Richard. "Durability, strength, light weight, sustainability, and cost are all areas where aluminium performs exceptionally well compared to other non-combustible materials. It's this comprehensive package of benefits that has made extruded aluminium systems the new de facto standard for balcony, terrace, and walkway design."

Aluminium is a strong and highly durable material, able to withstand decades of use with minimal wear, yet is only a third of the weight of steel, delivering a low structural load and allowing building designs to be streamlined. A further key property of aluminium is that it does not corrode or rust, even when exposed to wet environments over many years, and when powder-coated provides am almost maintenance-free solution, with just simple surface cleaning required.

In plentiful natural supply and with expected product lifespans of up to 60 years, aluminium systems are fast becoming the ideal solution for 21st Century architecture. As manufacturers continue to develop comprehensive aluminium product lines for all areas of a building's construction, aluminium's inherent benefits and the hugely positive contribution it brings to fire-safety will surely embed this material as the new standard in specification for much more than just on balconies and decking.

To find out more about AliDeck and their aluminium decking and balcony component products, call them on 01622 235 672 or visit www.alideck.co.uk.



# TOMRA RECYCLING LAUNCHES NEW GENERATION X-TRACT FOR ALUMINIUM RECYCLING AND PROCESSING

For more than 15 years, TOMRA Recycling has been a global leader in the advancement of aluminium recycling and processing. Today marks a new chapter in the company's impressive metal sorting history with the launch of its next generation X-TRACT unit which features a new design and breakthrough innovations. TOMRA's x-ray transmission (XRT) technology combines innovative synergies in metal and diamond recovery, once again setting new standards in sensor-based aluminium sorting.

The new X-TRACT's enhanced capabilities and machine intelligence significantly improve the high-throughput sorting of complex mixed metal streams to produce high purity, furnace-ready aluminium fractions. With a number of brand-new and enhanced features, the next-generation X-TRACT sets the stage for accelerating the production of circular metals as the industry moves towards a low-carbon future.

## Faster, more precise detection

Offering groundbreaking innovation and high-speed sorting capabilities, the new X-TRACT features dual processing technology which increases the belt width's capacity per metre. Its simultaneous single object and area processing allow operators to choose between high purity and high recovery sorting. Even adjacent, overlapping and composite materials can be instantly identified and separated using data-driven decision making.

The high-throughput sorting system features a next-generation DUOLINE XRT sensor, with two independent line scans positioned close to the input material for high precision detection and faster processing. Due to its close proximity to the material, the sensor also effectively detects copper wires and ultra-thin objects to reduce material loss and maximise profits. The X-TRACT's new x-ray source offers variable power, with up to 1000w supply for high-throughput processing of multiple applications and grain sizes, from large fractions to fines (>5mm).

## Enhanced capability and flexibility

The new generation X-TRACT is now capable of sorting with higher belt speeds ranging from 2.3 - 3.8 m/s, to maximise throughput and yields at the same time. To accommodate the faster belt speeds and higher throughput, TOMRA designers extended the unit's sorting chamber and added new extraction ports to remove dust and reduce air turbulence.

With improved image capturing, the new X-TRACT delivers unrivalled sorting accuracy and its new intensity scale feature measures the relative thickness of objects. This eliminates the need for additional sensors and improves the detection of specific material groups, such as printed circuit boards (PCBs).

While TOMRA's previous generation XRT metal sorting systems offered models that varied by application, the new X-TRACT is based on a modular machine concept. As a result, operators can choose between high resolution or high sensitivity sensor systems and different valve blocks. It also delivers greater operational flexibility and ensures easy upgrades to minimise long-term capital expenditures.

Machine trials in a production environment produce 10-30mm sized aluminium fractions with 99% purity levels. Alutrade, the UK's largest independent aluminium recycling company and extrusion specialists, was the first company to trial the new X-TRACT and compare its results to the previous model. Andrew Powell, Director at Alutrade Ltd, explains: "Even during the trials, the new X-TRACT delivered extremely powerful results. It has created new market opportunities for our business, and we are looking forward to expanding our operations."

Terence Keyworth, Segment Manager Metals at TOMRA Recycling, adds: "The new X-TRACT gives recyclers and smelters opportunities to increase their revenues with high-purity aluminium fractions while lowering their carbon footprint and having enough material on hand to meet market demand. The

automotive and construction sectors rely on recycled aluminium to lower their carbon footprint – it's a matter of being fast enough to supply the surging demand."

### Designed with the future in mind

The proven and robust design of X-TRACT has long convinced the most prominent industry players globally. Matthias Winkler, Product Manager at TOMRA, explains: "When our inhouse team set out to design a new generation of X-TRACT, it was a given that it needed to be sustainable, connected and built for long-term performance to reduce operational costs."

Developing a new machine to meet the future needs of the industry involved collaboration with customers, design engineers, aluminium processing experts, metal application specialists and service teams. To extend the lifetime of the machine, TOMRA's designers added enhanced sensor shielding in addition to a top-mounted x-ray source to protect its most valuable components and provide extra stability. The new sorting system, which separates aluminium from heavy metals and super lights in a single step, comes with a four-year extended warranty on the x-ray source and XRT sensor to consistently meet high-performance standards and service levels.

Tom Jansen, Segment Manager Metals at TOMRA, explains: "Our partners in the aluminium industry rely on the lowest downtimes and long-term performance. X-TRACT's new design makes it faster and safer for plant operators to replace parts due to normal wear and tear with as little downtime as possible. The machine's new catcher hood allows for easier access for maintenance, whether performed by a service team or on-site staff that have been trained by TOMRA."

The new X-TRACT is also enabled for cloud-based monitoring, data-driven optimisation tools and remote access with the add-on TOMRA Insight service. With the ability to connect to the machine through online monitoring and digital services, TOMRA's service team can identify potential issues before they arise and provide remote support to ensure low downtimes.

For further details about X-TRACT and highlights from the machine trials, please visit www.tomra.com/xtract.

For more information on TOMRA Recycling visit www.tomra.com/recycling

TOMRA

# NEW VERTICAL POWDER COATING BOOTH FOR VERTIK-AL

## The first *Cube Grande* to be installed in the UK

Vertik-Al has further enhanced the efficiency and quality of its powder coating service with the installation of a new vertical powder coating booth, the Cube Grande from SAT (Surface Aluminium Technologies) SRL.

A new generation of powder coating technology, it is the first booth of its kind to be installed in the UK. This investment enables Vertik-Al to offer its customers the very latest and highest standards in surface finishing, including gloss, matt, metallics and textured finishes.

Installed into the existing line, the booth has many benefits, not least the ability to produce more coated product due to its efficient operational capacity. This includes shorter colour changes and more targeted application, with less potential for cross contamination. As a result, output will greatly increase in line with the company's expanding customer demands.

With its revolutionary 'V' shape design and optimised layout of components, tests prove that the Cube Grande application efficiency (percentage of fresh powder directly applied on the profiles) is markedly higher than older less efficient booths.

These improvements offer environmental advantages, factors which go some way to support customers in their ecological endeavours.

This is the fourth in a series of multimillion pound planned investments for the powder coating specialist. In recent years, Vertik-Al has also installed two Magic Compact horizontal powder coating plants and an upgrade of an existing horizontal line at its Birmingham-based facility.

As with the Cube Grande, the horizontal plants utilise Gema automation and gun technology and provide the very best efficiencies in powder consumption and superior quality coatings.

Investment such as this enables Vertik-Al to uphold its commitment to quality and maintain its reputed high standards. The company holds the QUALICOAT quality label and is proud to be a member of the Aluminium Federation (ALFED), the secretariat for QUALICOAT UK & Ireland. Vertik-Al remains the only applicator in the UK and Ireland to hold the GSB quality seal and has done so since 1994.

www.vertik-al.com

# LIFE CYCLE ANALYSIS (LCA) AND SUSTAINABILITY WITHIN THE ALUMINIUM CASTING INDUSTRY. THE ROAD TO NET ZERO.

By Martin J Davenport. MSc. Complex Casting Consultant.

## The UK Government has established an Industrial Carbon Neutral Goal by 2050 (with intermediate check-points at 2030 and 2037) aiming to decarbonise industry in line with net zero goals whilst transforming the UK industrial heartlands.

For the Aluminium Casting Industry to survive it must prepare itself for the implications and opportunities of a new Low Carbon Economy.

The aim of this article is to identify techniques and tools which will establish where the Aluminium Casting Industry is today so that it can take actions to meet the Net Zero requirements of tomorrow.

Understanding the techniques.

- **Life Cycle Analysis** is a standardized methodology which will give valuable advice how to make changes to your business.
- **Product Management Life Cycle** is a model to be used by businesses to review the process of developing, manufacturing and selling products.
- **The Circular Economy** is a new view of a product life cycle - the need to rethink everything.

### Life Cycle Analysis.

LCA is key to evaluating the environmental impact of aluminium castings and products, it is a technique used to assess the environmental impacts throughout the products life. Beginning with raw material extraction, the manufacturing process, and product usage, through to end of life, recycling and disposal. It is an important tool for mapping upstream impacts and downstream benefits. Thus, identifying where environmental improvements can be made through the different stages of the product life cycle.

The four main phases being:

1. **Goal and Scope definition;** establishing the reason for the LCA, a precise definition of the product and its life cycle and a description of the system boundaries.
2. **Inventory Analysis;** identifying the environmental inputs and outputs. (The use of raw materials and energy - and then the emission of pollutants and the waste streams.)
3. **Impact assessment;** classification of the environmental impacts, evaluating them by what is most important to the company.
4. **Interpretation;** ensuring that the conclusions are well substantiated and adequately supported by the data.


**Fig 1.** **Source: Going Full Circle. The Life-Cycle of Aluminium.** www.constellium.com

### Product Management Life Cycle.

**The Product Life Cycle** (Fig.1 & 1a) of an Aluminium casting would cover a number of 'cradle to grave' areas:

- **Resource Extraction:** Primary production of aluminium starts with the mining of bauxite. Alumina is refined from the bauxite through a number of process steps (digestion/clarification/ precipitation and calcination). Liquid Aluminium is then produced by electrolysis and poured into moulds to solidify in different shapes which are then shipped as ingots.
- **Manufacturing:** There are numerous casting processes available ranging from basic Gravity Sand, Low Pressure Die Casting through to High Pressure Die Casting. Each process having unique inputs and outputs.
- **Product Usage:** Aluminium castings are used in a multitude of applications ranging form Automotive, Aviation, Marine and Medical to name but a few.
- **Disposal/ Re-cycling:** Recycling takes place at all three stages of the aluminium life cycle, internal casting scrap, machining scrap and end of life scrap. Note: it is estimated that recycling aluminium castings requires only 5% of the energy used to produce primary metal. Hence, it is thought that end of life recycling is the most efficient way to significantly improve the carbon footprint of aluminium.


**Fig 1a.**
**Source: Capgemini Engineering. Unravelling the complexities and nuances of Product Lifecycle Management 2022.**

## The Circular Economy.

Casting Businesses must consider and implement more sustainable and socially responsible methods of operation.

Firstly, an understanding of current state 'Linear Economy' is required where:

- Virgin materials are used to manufacture aluminium castings.
- The casting or machined component is purchased by the user and used until it fails and is discarded or becomes obsolete.
- Waste generated during the casting manufacturing process and use are discarded.

In a Circular Economy (Fig 2.)

- Raw materials used in the casting manufacturing process are minimised and instead, reclaimed materials are utilised.
- Manufacturing waste is designed out of the manufacturing process.

The Circular Economies Strategies and Goals are:

- Slow and minimise the manufacturing energy and material loops.
- Eliminate waste of materials and energy by adopting innovate materials, products, business models and operational systems.


**Fig 2.**
**Source: Scientific Research and Education in the Air Force – AFASE. Anca Iuga. January 2019.**

## Analytical / Process Tools and International Standards

There are a number of specific analytical and process tools available, ranging from:

- Sankey Diagram (Fig 3.). Process Flow Inputs and Outputs, quantifying energy and materials and waste streams through all the associated processes.
- DMAICR (Define, Measure, Analysis, Improve, Control & Replicate), Six Sigma Black Belt Methodology.
- ISHIKAWA Cause & Effect Diagram (Identifying the Critical Causes and address them).
- GaBi Software. Models every element of a product life cycle system, allowing businesses to make the best-informed decisions on the manufacture and life cycle of any product. Models are built up and illustrated like a 'Sankey Diagram'.
- Value Stream Mapping. A Flowchart method to illustrate, analyse and improve steps required to deliver a product.
- DFMEA / PFMEA assessments. Design and Process Failure Mode Effects Analysis is a method which analyses potential failure modes by severity in operational management and product development within a system.
- KPI (Key Performance Indicators) establishment. Identifies the critical indicators of progress towards an intended result providing a focus for strategic and operational improvement.
- Benchmarking. The process of comparing how a business is doing against the performance of other leaders in the same industry.
- Both ISO 14040 & 14044 are the appropriate international standards to adhere to.

## Typical Sankey Diagram for an Aluminium Cycle Block Casting produced in the Low Pressure Sand Casting Process.

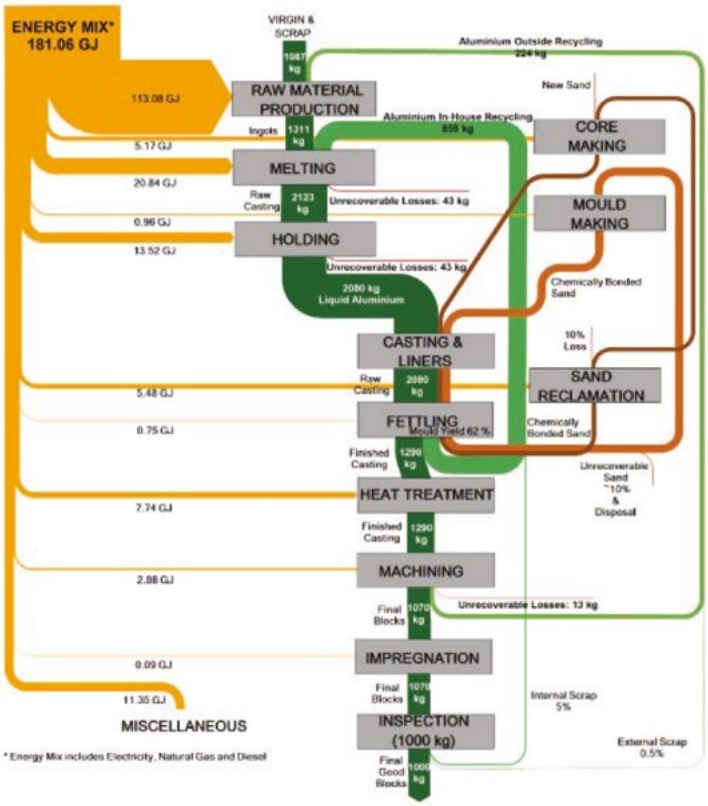



**Fig 3. Source: Energies- Life Cycle and Energy Assessment of Automotive Component Manufacturing (Article published July 2019).**

## Summary.

It is inevitable that the suppliers of Aluminium Casting urgently face up to the fact that they must adopt a new business model in line with the requirements of a Low Carbon Economy.

This article identifies a number of high-level techniques and tools to start to establish such a business model and begin the Net Zero journey.

As always, the devil is in the detail with regards to the depth of analysis required but in combination with a **Circular Economy Strategy** a holistic approach for innovation can be achieved.

# IS ALUMINIUM A FUEL FOR TOMORROW?

In this blog Prof. Geoff Scamans from Innoval Technology tells us about research from the 1980's which looked at using aluminium as a fuel, and how that theme carries on today.

## Aluminium as the fuel of the future


**Figure 1: Cartoon of re-fueling an aluminium-air battery with aluminium anode plates.**

Back in 1986, when I worked for Alcan, I was the co-author of an article published in New Scientist that proposed aluminium as the fuel of the future. It focused on its use in mechanically rechargeable aluminium-air batteries (1).

The carrot dangled was the assumption that if only 1% of cars in the US at the time ran on aluminium as a fuel, then every year this would consume 600,000 tonnes of the metal. This is equivalent to the output of a major primary aluminium smelter. As a result, this was highly attractive to Alcan as a major producer of primary aluminium at the time.

Unfortunately, it turned out to be a false dream even though it was possible to overcome all the major technical hurdles. The practicality of mechanical refuelling and sending the aluminium hydroxide reaction product back to the smelting system was the problem. It could never be energetically or financially favourable compared to a rechargeable battery using green electricity. The best uses for the system were either secret military applications, mainly sub-sea, or reserve power applications for supporting telecommunications.

**Figure 2: Examples of aluminium air batteries from a desk light, to an emergency light, to a vehicle battery for a GM Minivan. The final image is of a propulsion system for an unmanned underwater surveillance vehicle.**

## Aluminium-ion battery

A very small component of Alcan's aluminium-air development programme was a speculative project on aluminium secondary batteries. It was based on the use of an ionic electrolyte, like in the now all-pervasive lithium-ion batteries. Alcan's Kingston laboratory carried out this work in collaboration and with guidance from Prof. Brian Conway at the University of Ottawa. However, the initial work on secondary aluminium batteries began back in the early 1970s.

This rechargeable system has developed very slowly over the years and is now more popularly known as the aluminium-ion battery. Recently, since 2010, there has been a major surge of interest in this system. Consequently, the pace of research and development of these batteries has increased, and there are several comprehensive review papers (2-5). There is now an array of different systems based either on ionic liquids or polymeric electrolyte systems. The attraction is the significantly increased energy density, power density and fast-charging capability that's potentially available. This is together with better inherent safety compared to the use of lithium. Furthermore, aluminium is much more abundant and available.

| | LITHIUM | MAGNESIUM | ALUMINIUM | ZINC |
|---|---|---|---|---|
| Theoretical Cell Voltage with Oxygen | 3.4 | 3.1 | 2.7 | 1.3 |
| Gravimetric Energy Density (Wh/g) | 13 | 6.8 | 8.1 | 1.63 |
| Volumetric Energy Density (Wh/cm$^3$) | 7 | 11.8 | 21.8 | 11.6 |

**Table 1: The comparative gravimetric and volumetric energy densities of battery anodes.**

A recent article describes development work at the University of Queensland (6) which is at the stage of making commercial prototypes. It claims that their latest aluminium-ion technology provides faster-charging batteries with higher power density. They also have a life up to three times greater than lithium-ion. Consequently, the aluminium-ion battery has the potential to displace lithium-ion batteries across the full spectrum of application. However, the developers still have significant technical challenges to overcome.

## The need for superpurity aluminium

**Figure 3: A Hoopes cell line in operation at the Vigeland Metals refinery in Norway. *Image credit: Øyvind Breivik***

A major hurdle for the primary aluminium-air batteries is the requirement to use aluminium alloys based on superpurity aluminium. The Hoopes Cell electrolytically refines pot-line aluminium from traditional smelters to make this grade of aluminium. Unfortunately, this makes the creation of the battery anode material extremely energy intensive and carbon intensive if green electricity is not used.

Vigeland Metals in Norway makes a significant fraction of the world's superpurity aluminium. An old Russian-built hydro-electric power station supplies the electricity at extremely low

cost. In 2013 Hydro increased their 50% share and acquired full ownership of this metal refinery, and the 180 GWh hydropower station, from Rio Tinto Alcan. The refinery has an annual production capacity of 8,500 tonnes of high-purity (99.99-99.999%) aluminium.

**Figure 4: The Vigeland Metal refinery located in Vennesla on the banks of the lower part of the Otra River.**
***Image credit: Norsk Hydro ASA***

## Batteries from scrap?

Interestingly, it is also possible to make pure aluminium from end-of-life aluminium scrap through a similar electrolytic refining process to that used in the Hoopes Cell. In 2011 Alcoa (7) published a technical report on "Membrane Purification Cell Aluminum Recycling". The aim of the project was to develop an electrorefining molten aluminium process for purifying scrap aluminium to reduce energy consumption and emissions by 75% compared to conventional technology. However, the technology could also produce superpurity aluminium from primary aluminium. Alcoa worked out that the cost of refining using the developed cell was less than the price differential between the cost of the feedstock scrap and the LME primary aluminium price.

It would be rather interesting to see if it's possible to make aluminium suitable for aluminium-ion batteries using this process from relatively pure grades of scrap. This would be a low carbon and low energy route to providing electropositive plates for these batteries, in keeping with sustainability considerations.

## Purification of post-consumer aluminium scrap

**Figure 5: Piles of Zorba at a recycling centre.** ***Image credit: Axion***

Electrolytic refining of post-consumer aluminium scrap could also be of value for aluminium casting alloys. A potential feedstock could be the mountain of scrap from the eventual reduced demand for internal combustion engines and conventional transmission systems.

The tonnages of aluminium tied up in these secondary alloy-based casting products is relatively large. Refinement of these alloys at the end of life could provide metal for wrought aluminium applications and/or structural casting applications. Furthermore, there could be an opportunity to recover alloying additions like magnesium and silicon from this stream to satisfy alloying requirements.

Alcoa have very recently (8), announced the ASTRAEA technology for purification of any post-consumer aluminium scrap. It can reach a purity level of P0101 (0.01 wt% Si and 0.01% Fe) which is better than the purity of P1020 (0.10% Si and 0.20wt% Fe) aluminium produced in a typical smelter. The intended feedstock for this is Zorba automotive shred. It is quite probable that the membrane purification cell from the 2011 report is the basis of this technology.

## Extracting magnesium

In 2016 Adam Gesing, a colleague from the Alcan battery days, and Subodh Das, who has an Alcoan back story, presented an interesting paper. They demonstrated a proof of concept of an electrolytic process for extracting magnesium from recycled secondary aluminium scrap melts (9). It produced a magnesium product suitable as a magnesium alloying hardener additive to primary grade wrought aluminium alloys.

They reported that the process operates at high current efficiency, high magnesium recovery and low energy consumption. Therefore, this could be disruptive and transformational for the magnesium production industry by enabling the recycling of 30,000 tonnes of primary-quality magnesium annually.

## So, can we use aluminium as a fuel?

In summary, I don't think that we should consider aluminium as the fuel of tomorrow or even the future. However, it has a major role to play in rechargeable battery systems, as exemplified by the aluminium-ion battery. Furthermore, other non-aqueous electrolytic processes have a vital role to play for end-of-life aluminium scrap refining and returning secondary aluminium casting alloys to the product cycle. This is also true for the recovery of critical alloying additions like magnesium for alloy formulation. Thankfully, all of these help to replace the need for primary production.

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Foundry alloys image credit: Norsk Hydro ASA.

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# New Anodising Plant

Opening June 2022

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# METALS MANUFACTURING PROCESS OPERATIVE APPRENTICESHIP WITH THE ALUMINIUM FEDERATION

The Aluminium Federation are delighted to announce that through its partnership with an apprenticeship provider we can offer Metals Manufacturing Operative qualification. This is an established apprenticeship standard developed specifically to meet the needs of the UK metals sector.

The programme will provide learners with industry specific knowledge and skills that will help them achieve a rewarding career in manufacturing. This programme will support apprentices in opening avenues within both small and multi-national organisations where innovation and excellence are key.

This foundation qualification will encourage employees to progress within the organisation and take on greater responsibility.

## Course Duration

18 months (15 months practical and 3 months end point assessment)

## Entry Requirements

Entry Requirements will be set by the employer.

## Functional Skills

Apprentices are required to have level 1 English and Maths prior to taking the end-point assessment. However, those without, will be given the opportunity to achieve both grades during the practical period of their programme.

## Course Content

**Science Manufacturing Process Operative Standard – Level 2**

- Aluminium Light – CPD Accredited Course
- Aluminium Summary Introducing Aluminium as a strategic metal.
- Production of Aluminium & Global Demands
- Good Manufacturing Processes
- Skills and Behaviours

- How to Operate Industry Plant and Equipment
- Process Manufacturing Improvement Techniques
- Maths & English Functional Skills level 2
- Health & Safety
- Manufacturing Start up and Shut Down Procedures

For more information please contact ALFED training and education manager Kathy Romback – email: kromback@alfed.org.uk or call 07899 924 315.

## BLOODHOUND EDUCATION

The Aluminium Federation through its partnership with the Bloodhound Education charity has sponsored the two projects designed to get children excited about aluminium, raise awareness of its properties, benefits and key role in contributing to sustainable living.

The ALFED resources are continuing to be popular with teachers as a live project resource. In the period January - April 2022, the Bloodhound ALFED projects have an estimated reach of over 11,000 children. This is based on new schools accessing the resources and likely to be much higher with schools who use it as an annual STEM activity.

50% of these were schools who accessed the updated Key Stage 3 version of Aluminium Desert Wheels booklet. This is an interactive booklet with QR codes linking to videos and further information.

The original Key Stage 2 Aluminium Desert Wheels project, which first ran as a competition in 2018, is still being utilised alongside the Sustainable Tools project.

Although the Car project itself has been on-hold due to Covid, the education legacy continues and project like Bloodhound demonstrating innovative technology and materials including aluminium are a great way to show case them.

Bloodhound Education have also recently completed a programme of workshops for 300 home schooled children and their parents who very much enjoyed accessing these projects and being able to see examples of the equipment and materials at the Bloodhound Education Centre. This project was funded by the Engineering Grant Scheme co-sponsored by the IET and IMechE. The places were snapped up within three hours of being made available.

Bloodhound Education are currently looking for funding to be able to offer more of these types of programmes to the increasing number of home school groups post-Covid. They would welcome support from any ALFED members and the wider manufacturing industry.

For more information please contact Kirsty Allpress: Kirsty.allpress@bloodhoundeducation.com.

ALFED
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# TRAINING COURSES AND WORKSHOPS

## WORLD OF ALUMINIUM

### 12 & 13 OCTOBER 2022
### 9.30-13:00

The World of Aluminium is an intermediate level technical course and is specifically designed for production engineers, process and quality technicians, stockholders, customer facing sales/marketing persons and material/product purchasing individuals. This course is aimed at individuals who require a solid basic understanding to confidently engage with the aluminium industry and its products.

The course creates a solid basic understanding of aluminium, aluminium metallurgy, heat treatment and metal forming processes. It assumes no prior knowledge of metallurgy and is specifically tailored to the industry sector.

Technical elements are balanced with insights into the history of aluminium, its growth as the strategic metal of society, its sustainability properties and illustration of products, to create a holistic broad rounded knowledge.

This live, tutor-led interactive course will be delivered over two consecutive mornings via our online platform

**COST:**

- ALFED members: £199+vat per person
- Non members: £299+vat per person

**For more information or to book a place please visit:**
**https://bit.ly/2TTxITe**

## MARKETING.... a course designed for marketing executives, marketing co-ordinators, team leaders or any individuals who want to build their career in the field of marketing.

**8 – 9 June 2022 9.30 – 13.00** (2x mornings)

The ALFED Training Academy marketing course covers different marketing techniques to succeed in a competitive market:

- Marketing fundamentals
- Marketing mix
- Marketing techniques
- Different marketing approaches
- Customer communication techniques

**What will you learn:**

- How to create a roadmap that works for your business.
- Discover the opportunities of digital marketing.
- How to be flexible and agile in the new world of marketing.
- Understand the six processes which will drive marketing in the future.
- What continues to work and what no longer will work in the future of marketing.

**Live interactive session delivered via online platform**


**Cost:**

- ALFED members: £199+vat per person
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**For more information or to book a place please visit:**
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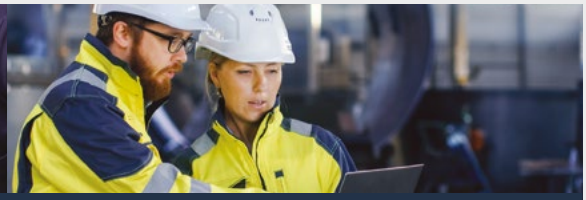

# TECHNICAL TRAINING WEBINAR

ALFED ALUMINIUM FEDERATION
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## INTRODUCTORY/BEGINNER LEVEL WEBINARS FOR EXISTING STAFF OR NEW STARTERS WHO DON'T HAVE A TECHNICAL BACKGROUND.

### Aluminium Light – Module 1

A webinar on aluminium as a strategic metal & a basic introduction for existing staff or new starters who don't have a technical background.

This interactive engaging session will highlight:

- Where aluminium comes from
- The processes used in industry
- Properties and applications of this material that has shaped our world
- Identifies each of the holistic properties of aluminium
- The basis of global demand for aluminium
- Q&A

When: **6 September 2022**

### Aluminium Production and Global Demand – Module 2

This webinar will highlight:

- Sources of aluminium, how it is refined and produced
- Growth relationship with the availability of electricity
- Low carbon recyclability of aluminium
- What differentiates it from other materials
- Understanding how supply is matching demand
- Q&A

When: **13 September 2022**

### Wrought Aluminium and Applications webinar – Module 3

This module outlines:

- How aluminium alloys group specifications were developed.
- Focusing on the properties of each alloy specification group, explains their uses and illustrates applications.
- Concluding by dispelling myths on aluminium, fire and health demand
- Q&A

When: **20 September 2022**

### Heat Treatment of Aluminium – Module 4

This module outlines:

- The difference between non-heat treatable alloys and heat treatable alloys
- How non heat treatable alloys are strain hardened and heat treatable alloys age hardened
- Understanding this module completes the understanding required to correct select alloys for applications
- Q&A

When: **4 October 2022**

### Elastic and Plastic Behaviour of Metals – Module 5

This module outlines:

- Understanding how metals behave under load, and the applicability of the significant characteristics to product design
- How characteristics are determined/ proved by tensile and/or hardness testing
- Explanation of the significance of different test certificates
- Q&A

When: **11 October 2022**

### Production of Wrought Aluminium – Module 6

This module outlines:

- How plate, slab, shate, sheet and foil are produced and some of their innovative applications
- Introduction to product defects
- Q&A

When: **18 October 2022**

### Extrusion – Module 7

The super-plasticity of aluminium at moderate temperatures sets aluminium apart from all other metals in its ability to be extruded.

This module outlines:

- The extrusion process
- Exploring its potentials, product designs and applications
- A study of extrusion introduced defects
- Q&A

When: **25 October 2022**

### Drawing, Shaping and Forming of Aluminium – Module 8

A broad survey of how aluminium is shaped, formed, manipulated, cut, fabricated.

This module outlines:

- How aluminium is joined and/or bonded
- Explaining the potential of emerging hot forming technologies
- Thought provoking technologies for the designers
- Q&A

When: 1 November 2022

### Corrosion and Protection of Aluminium – Module 9

This module outlines:

- Explaining what corrosion is and its various mechanisms
- Researches alternative coating and protection methods
- Ending with eye catching examples of coated architecture
- Q&A

When: **8 November 2022**

### Casting Technologies – Module 10

More correctly liquid aluminium engineering, this module compliments both Modules 3, 7 and 8 by exploring how castings offer alternative manufacturing processes. The module outlines the various techniques and their application to specific product applications.

When: **15 November 2022**

Each webinar is approx. 40-50 minutes

Cost:

- ALFED Members £30+vat/person
- Non Members £40+vat/person

For more information or to book a place please use the QR code below or visit:
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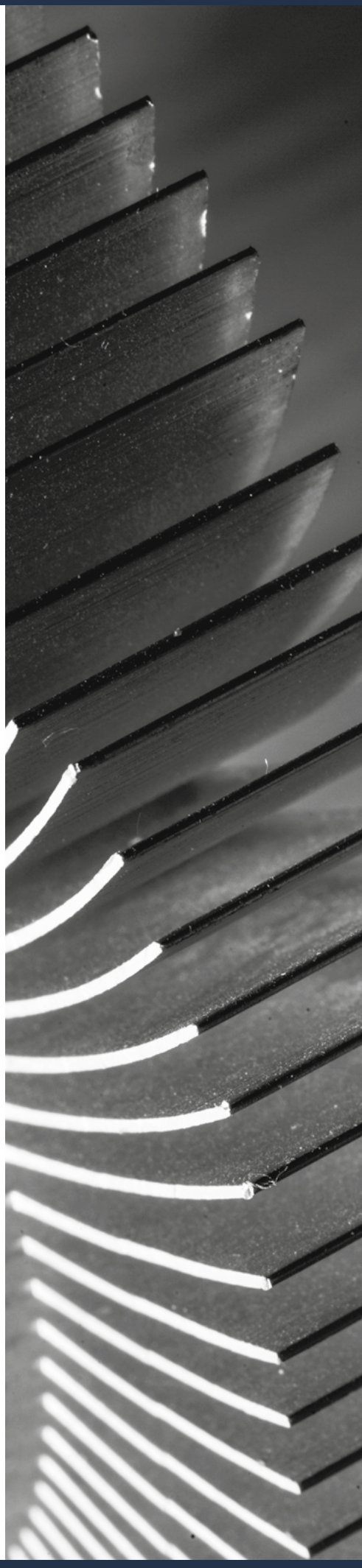

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### NOVELIS AUTOMOTIVE EUROPE
West Midlands 0121 565 6228
https://novelis.com/

### NOVELIS EUROPE
Cheshire 01483 853 136
https://novelis.com/sustainability

### NOVELIS UK
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https://novelis.com/

## O

### OMEGA PISTONS
West Midlands 0121 559 6778
https://www.omegapistons.com/

## P

### PHOENIX MATERIALS TESTING
West Midlands 01384 382 253
https://www.phoenix-mt.co.uk/

### PLASTOMETREX
Cambridgeshire 01223 867 992
https://plastometrex.com/

### POWDERTECH (CORBY)
Northamptonshire 01536 400 890
http://www.powdertechcorby.co.uk/

### POWDERTECH SURFACE SCIENCE
Oxfordshire 01869 320 600
http://www.powdertech.co.uk/

### PRESS METAL UK
West Midlands 01902 498 667
http://www.pressmetaluk.com

### PRETREAT
Lancashire 01422 847 671
https://www.pretreat.co.uk/

### PRE-TREATMENT SOLUTIONS
Leicestershire 02475 090 133
http://www.pretreatmentsolutions.com/

### PRIMETALS TECHNOLOGIES (SHEFFIELD)
South Yorkshire 01709 726 571
https://www.primetals.com/

## R

### REAL ALLOY UK
Swansea 01792 871 000
https://www.realalloy.com/eu/#

### REAZN UK
Staffordshire 01543 276 666
https://www.reazn.com/

### RICHARD AUSTIN ALLOYS (GLASGOW)
Glasgow 01417 718 391
http://www.raa.com/

### RIGHTON BLACKBURNS
West Midlands 01384 276 400
https://www.rightonblackburns.co.uk/

### RIMSTOCK
West Midlands 0121 525 2525
https://www.rimstock.com/

### ROTECH LABORATORIES
West Midlands 0121 505 4050
https://www.rotechlabs.co.uk/

### RUSAL MARKETING GMBH
0041 41 560 98 00
https://rusal.ru/en/press-center/press-releases/uc_rusal_opens_trade_office_in_switzerland/

## S

### SCANSTRUT
Devon 01392 531 280
https://www.scanstrut.com/

### SDE TECHNOLOGY
Shropshire 01743 450 501
http://www.sde.technology/

### SENIOR ARCHITECTURAL SYSTEMS
Yorkshire 01709 772 600
http://www.seniorarchitectural.co.uk/

### SHERWIN WILLIAMS UK
Merseyside 0151 486 0486
https://www.inver.com/en/index.html

### SILBERLINE
Fife 01333 424 734
https://www.silberline.com/

### SIMMAL
Lancashire 01772 318 218
https://www.simmal.com/

### SKF (UK)
Gloucestershire 01275 876 021
https://www.skf.com/uk

### SMITHS ADVANCED METALS
Bedfordshire 01767 604 671
http://www.smithsadvanced.com/

### SMITHS METAL CENTRES
Bedfordshire 08455 273 331
https://www.smithmetal.com/

### SMITHS METAL CENTRES
Nottinghamshire 08455 273 331
https://www.smithmetal.com/

### SMITHS METAL CENTRES
Hertfordshire 08455 273 331
https://www.smithmetal.com/

### SNELSONS
Cheshire 01606 553 580
http://www.snelsons.co.uk/

### SPA ALUMINIUM
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http://www.spaaluminium.com

### SPARTAL
Gloucestershire 01386 700 898
https://www.spartal.co.uk/

### SPEIRA UK
West Midlands 01902 396 630
https://www.speira.com

### STEEL & ALLOY PROCESSING
West Midlands, 0121 553 5292
https://www.gonvarri.com/en/

### SUPERIOR PAINT & POWDER COATING
West Midlands 02476 464 676
http://www.sppc.co.uk

### SURFACE FINISHING ENGINEERING
West Midlands 01902 409 186
https://www.sfeuk.com/

## T

### TANDOM METALLURGICAL GROUP
Cheshire 01260 271 122
https://tandom.co.uk/

### TECOMET (SYMMETRY MEDICAL)
South Yorkshire 01142 855 881
http://www.symmetrymedical.com/

### THE HAIR COLLECTIVE BRAND
Lancashire 07805 477 820
https://haircollective.co.uk/

### THE METAL CENTRE
West Midlands 0121 352 7200
https://www.themetalcentre.com/

### THERMSERVE
Shropshire 01952 684 488
http://www.thermserve.com/

### TOMBURN
Hampshire 02392 692 020
https://www.tomburn.com/

### TOMRA SORTING
Leicestershire 01162 181 430
https://www.tomra.com/en

## U

### UK PROFILE COMPONENTS
Oxfordshire 0333 456 0121
http://www.lovealuminium.co.uk

### ULTROMEX
Merseyside 0151 203 8377
https://www.ultromex.com/

### UNITED ANODISERS
West Yorkshire 01484 533 142
https://www.unitedanodisers.com/

### UNIVERSAL COLLABORATION RESEARCH
Hampshire 02382 356 956
https://www.ceramicalloys.com

## V

### VERTIK-AL
West Midlands 0121 608 7171
https://www.vertik-al.com/

### VOITH TURBO
Surrey 0208 667 0333
https://voith.com/uk-en/index.html

## W

### W H TILDESLEY
West Midlands 01902 366 440
https://www.whtildesley.com/

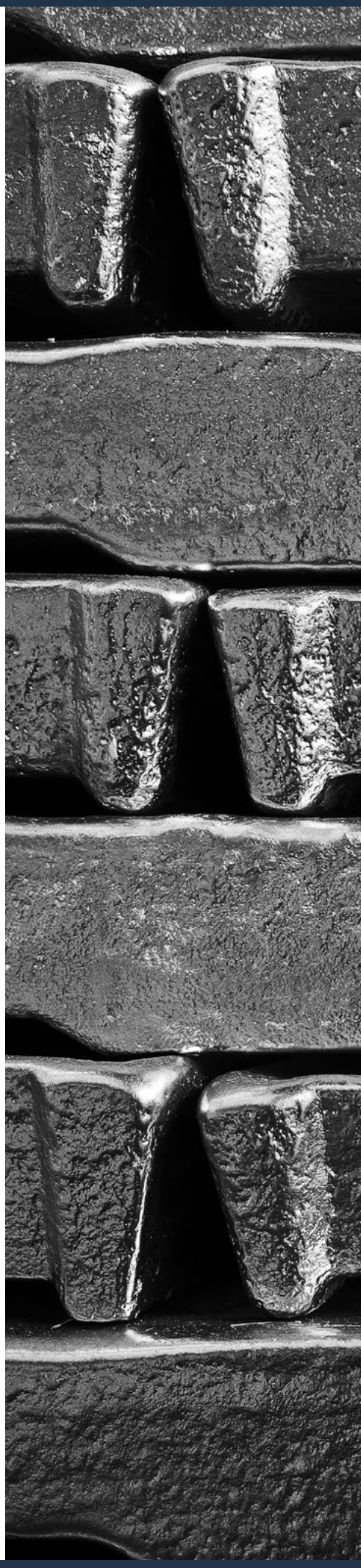
### WESTMORELAND MECHANICAL TESTING & RESEARCH
Oxfordshire 01295 261 211
https://www.wmtr.co.uk/

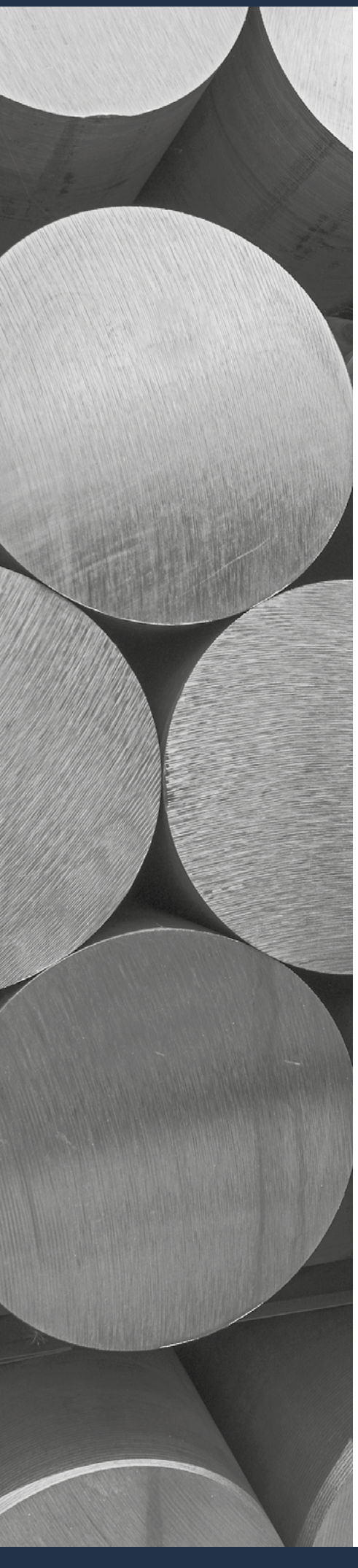
### WHITEHEAD ALLOYS
Cleveland 01642 223 606
http://www.whiteheadalloys.co.uk/

### WICKENS ENGINEERING
Worcestershire 0800 9544 201
https://www.wickens.co.uk/

### WILLIAM KING
West Midlands 0121 500 4100
http://www.williamking.co.uk/

### WILSONS
Cambridgeshire 01487 833 600
https://www.wilsonsmetals.com/





# OUR KNOWLEDGE PARTNERS

## A

### ADVANCED FORMING RESEARCH CENTRE (AFRC)
Renfrewshire 01415 345 200
https://www.strath.ac.uk/research/advancedformingresearchcentre/

## B

### BARTLETT SCHOOL OF ARCHITECTURE
Greater London 0207 679 2000
https://www.ucl.ac.uk/bartlett/architecture/

### BCAST, BRUNEL UNIVERSITY LONDON
Middlesex 01895 274 000
https://www.brunel.ac.uk/research/Centres/BCAST

### BRITISH SAFETY INDUSTRY FEDERATION
Hertfordshire 01442 248 744
https://www.bsif.co.uk/

### BURCHILL GC
London 07766 461 018
https://burchillgc.com/

## C

### COVENTRY UNIVERSITY
West Midlands 02477 657 688
https://www.coventry.ac.uk/

### CRU INTERNATIONAL
Greater London 0207 903 2000
https://www.crugroup.com/

## H

### HANA TECH
West Midlands 01384 913 010
https://www.hana-tech.co.uk/

## I

### INSTITUTE OF MATERIALS FINISHING
Warwickshire 0121 622 7387
https://materials-finishing.org/

## M

### MAKE UK - THE MANUFACTURERS' ORGANISATION
Greater London 0207 222 7777
https://www.makeuk.org/

## S

### SWANSEA UNIVERSITY
Wales 01792 606 770
https://www.project-metal.co.uk/

## T

### THE SOCIETY OF MOTOR MANUFACTURERS & TRADERS (SMMT)
Greater London 0207 235 7000
https://www.smmt.co.uk/

### THE UNIVERSITY OF SHEFFIELD
South Yorkshire 01142 222 000
https://www.sheffield.ac.uk/materials

### TWI - THE WELDING INSTITUTE
Cambridge 01223 899 000
https://www.twi-global.com/

## U

### UKRI/STFC RUTHERFORD APPLETON LABORATORY
Oxfordshire 01235 445 962
https://stfc.ukri.org/

### UNIVERSITY OF WARWICK
West Midlands 02476 523 523
https://warwick.ac.uk/

### UNIVERSITY OF WOLVERHAMPTON
Shropshire 01902 323 900
https://www.wlv.ac.uk/

## Z

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