

A spotlight on the vibrant north west chemicals sector

Elements

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Plus many more articles and features from a wide range of Chemicals Northwest members.



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Membership

Would your company benefit from joining an organisation that supports and promotes the chemistry-using sector in the Northwest? Do you want to understand more, and contribute to, the industry issues within the region?

If you are a manufacturer, chemical user or offer products and services to the sector, why not join us today?

<https://www.cia.org.uk/chemicalsnorthwest/Membership/Benefits-Costs/>

2024 rates. (from 1st April 2024)

Micro corporate membership	(1 - 10 employees)	£486.23
Standard corporate membership	(11-100 employees)	£845.70
Large corporate membership	(100+ employees)	£1076.25

Our membership year runs from 1 April to 31 March. A pro-rata basis usually applies to joining at other times in the year and we'd be happy to discuss on application.

Welcome

Dear Reader,

Welcome to the Spring edition of Elements which features a full roundup of our 2024 Awards and winners.

We were delighted to celebrate the Chemicals Northwest Awards on the 21st March at the Hilton Manchester Deansgate hotel. Jimmy McGhie hosted the evening brilliantly with his comedy lines and kept the flow of the awards running smoothly. Feedback from guests and sponsors has been extremely positive. A special "Thank You" goes to all sponsors without whom the event would not have been possible. The Chemicals Northwest team and expert judging panel were once again delighted at the exceptional standard and high number of award entries. Our sincere congratulations to all winners but also thanks and admiration to all who submitted an entry, you have all got positive news stories to share and all citations were gratefully received. Read more about our special evening on the inside pages and view the image gallery here - https://www.cia.org.uk/chemicalsnorthwest/awards_2024

Looking ahead CNW are looking forward to participating at CHEMUK 2024 in Birmingham on the 15th and 16th May. We are proud to be a "headline partner" for this impressive event, come and say hello to the CNW team on Stand N114. The expo promises to be bigger and better than ever with 500+ specialist exhibitors and 150+ expert speakers split between four major show zones:

- Chemical Industries Supply Chain
- Chemical, Process & Plant Engineering
- CHEMLAB – Laboratory & Innovation
- NEW FOR 2024: Chemical, Process & Plant Safety

The team at Chemicals Northwest have been busy in the run up to the awards with some new and varied events taking place. We hosted our Regulation and Trade updates on the 17th January with Paul Wright, European Industry Business Sector Leader from SLR who gave an update on Environmental Permits, Climate Change Adaptation Planning and Risk Assessment into management systems. He was joined by Ian Cranshaw from the Chemical Industries Association and Chemicals Northwest giving an update on Free Trade Agreements and CIA Trade Activity for 2024. Silvia Segna from the Chemical Industries Association gave an update on UK REACH policy and other updates from Government. Our next Regulation event is planned for the 24th April. Further details can be found on the website.

The IChemE hosted an insightful case study at the Chemicals Northwest offices in Daresbury on the 28th February. The topic was "Chemical plant – inherently safer design." Our presenter, Craig Wright from the IChemE safety centre, guided users through the principles of inherently safer design and their applications. The event received excellent feedback and we hope to work with the IChemE on future events.

We hosted our 7th March breakfast event at Catalyst Science Discovery Centre with presentations from Nikki Burton, CEO, of Catalyst, who give an overview of Catalyst. Ged Moran, Sales Engineer, Atlas Copco Specialty Rental UK gave a company overview. Glyn Horner, Global Head Business Development – Laboratory Services for Scymaris gave a comprehensive company overview and Stephen Slater from the GM Business Growth Hub, gave an overview of The GM Innovation Ecosystem. Our next breakfast event is 20th June, further details to follow.

As always, please keep your good news stories, case studies and thought leadership articles coming in to be featured in Elements.

Further details of our events can be found here - <https://www.cia.org.uk/chemicalsnorthwest/CNW-Events>

Alex Abraitis - Member Services and Events Manager

About us...

Chemicals Northwest is an established business network wholly owned by the Chemical Industries Association.

With around 130 members we actively promote this important regional sector and our objective is to help membership to grow through;

- **facilitating** networking events, common interest groups and interactive workshops, all aimed at covering topical industry issues.
- **supporting** projects and programmes that identify and enhance business performance and generally support continuous improvement across the sector.
- **promoting** science and engineering based skills, helping to address the region's future needs.
- **improving** the image of the industry overall, including generating a positive reputation, through communicating achievements and success.
- **contributing** to the industry's strategic voice and the national growth agenda aligned to the work of the Chemical Industries Association.
- **connecting** the community of chemistry-using businesses and the vital supply chains here in the Northwest.

Chemicals Northwest really does bring people together! It is an essential feature of successful networking strategies used by many organisations. We coordinate a range of meetings and events to enable 'face to face' networking for the benefit of all members. Every successful business networking organisation also needs effective communications channels.

As a result of gradual development over recent years, getting messages across, promoting member companies and reporting news, Chemicals Northwest has reached new levels of topicality and quality.

Here are the the main features and benefits of membership...

Annual Awards Dinner

During the annual Chemicals Northwest awards programme we are privileged to witness the many achievements made in our sector. Culminating in a great night of celebration each year's awards are a fantastic way your company can support the region's chemicals sector and help raise your own profile. Over 300 guests from across the industry gather on the night in Manchester and everyone can see for themselves the amazing achievements made by our industry, people and organisations.

Breakfast Networking

Chemicals Northwest has gained a good reputation for high quality breakfast networking events. With no specific theme, delegates are encouraged to come along and make a short business pitch about their company, its products and services plus news announcements! The breakfast meetings have proved to be very popular and currently run quarterly with up to 40 in attendance. New contacts can lead to new opportunities and new business. All are welcome and the event is free of charge to attend.

Partner Events

Over the years CNW has focused on a range of highly topical and relevant business issues. We run these focussed events in conjunction with members. Technical, regulatory and operational insights have been delivered by experts in their fields. These events ensure good practices are shared and all attendees gain new knowledge. As businesses get to grips with the changing landscape there will always be new issues for members to analyse.

Common Interest Group

Chemicals Northwest have launched a "Regulation and Trade" update group. This quarterly meeting is a round up of the latest news for the industry on REACH, Regulations, Trade issues and negotiations and any other topics of interest for the industry to keep up with the latest developments. This group is open to members of Chemicals Northwest and is free of charge to attend.

Elements Magazine

This is a great opportunity to establish an association between your organisation and important sector issues, by contributing free editorial and press releases as part of membership. Companies who do business in the chemicals sector may also wish to look at advertising options. The CNW sector directory is integrated into Elements showing our service suppliers to the sector.

Website

The website is regularly updated with industry news and events from CNW and the sector. Companies are increasingly using it for enquiries. Viewers of the directory pages can search the whole of our supply chain providers to find where to buy products and services.

E-bulletin

Chemicals Northwest send out a monthly bulletin with the latest industry news, export opportunities, events from Chemicals Northwest and the sector. Plus ad hoc bulletins with latest/ urgent calls. All members and new members are able to send a "meet the member" bulletin. A paid for advertising service is also available for those wishing to advertise their events or company news.

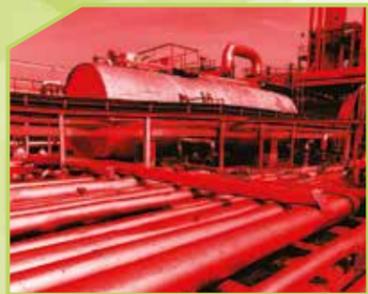
LinkedIn

The Chemicals Northwest LinkedIn group provides the opportunity for chemical industry professionals to share ideas and knowledge. There is also the CNW LinkedIn company page which provides a forum for information sharing between CNW and our members.



RISK & HAZARD MANAGEMENT

Understanding and facilitating the effective management of risk is our core business. Our expertise covers the full range of risk assessment and management services.



SAFETY



BUSINESS



ENVIRONMENT

Only when the risk facing an organisation is well understood can it be effectively managed. Key to the successful identification, assessment and management of risk is engagement with the right people, using the right processes at the right time. We believe we are different to many of our competitors and our approach is distinctive, we don't always walk the well-trodden path but look at each client's particular risk context and develop a tailored solution, working in partnership with our client.

We work across all aspects of risk, from Quantitative Risk Assessments and Predictive & Consequence modelling, through to the 'softer' risks which may affect an organisation's reputation.



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Managing Process Safety through a Project Life Cycle in High Hazard Industry

Decarbonisation is a subject at the forefront of everyone's mind and the goal of decarbonisation in high hazard industry is a pivotal one.

The pressure is on for organisations to decarbonise their infrastructure, assets, and business models but this does not come without its challenges; whether that be cost, a lack of clear regulation and policy, logistical challenges, stakeholder resistance, or the pressures to meet targets. But what about the need to integrate process safety management as early as possible in the project life cycle of emerging technologies? Whilst there is no difference between the need for early identification and mitigation of safety risk in this growing sector to that of more traditional industry, with growing levels of public awareness, the stakes might be just that bit higher.

Let's take hydrogen. It's a hot topic. Hydrogen is an ideal source of clean energy but it's a very small molecule, making it prone to find ways out or equipment, and it has a wide flammability range in air, a low ignition energy, and can be explosive even when unconfined, making it harder to manage, factors that must be considered when designing hydrogen systems. If we fail to acknowledge these and other safety considerations at the design stage, the potential for large safety consequences and, indeed publicity, could be catastrophic and delay if not derail the progress to achieving the goal of high hazard industry decarbonisation.

The preliminary stages of the project life cycle are where most of your preparation should be done you should be looking for ways to achieve inherent safety. Returning to hydrogen and its inherently unsafe properties as an example, where substitution for a safer material isn't possible, you need to look for inherently safer options elsewhere. Can you reduce stored volumes, reduce pressures, or minimise process steps?

Next, look at separation distances between equipment, layout and configuration of plant units, and distances between occupied areas. Checklists exist that can help with these considerations; for example, the IChemE Safety Centre guidance 'Applying process safety during a concept select phase of a project' or the Energy Institute's guidance on 'Applying inherent safety in design: Reducing process safety hazards whilst optimising CAPEX and OPEX.'

Whilst the importance of inherent safety is clearly recognised, our experience is that it is not often given the attention it deserves. All projects have pressures, whether it be from the multitude of teams involved in the

concept vs detailed design phases, to a lack of documented processes, and this often means that safety is not given enough focus and is rarely documented. Using a stage-gated project system which includes confirmation that appropriate studies have been conducted to inform the project's feasibility decisions are, therefore, crucial to ensuring that safety has remained one the main priorities. It also makes good business sense. Looking to minimise risk at the initial stages of a project will de-risk the project overall. Without considering process safety at this point, there is the potential for the design to progress only to be found that when the risks are finally assessed they are found to be unacceptable.

As the detail of the design develops, so too will the detail of the risks. Whether you are a COMAH establishment or not, a risk assessment is both a legal requirement and an essential tool for ensuring that your risks are properly understood and managed. The starting point in any risk assessment is hazard identification and techniques will differ depending on the project. The essential reference for anyone considering a risk assessment in a process industry is Lees' 'Loss Prevention in the Process Industries,' and it does an excellent job of summarising the numerous techniques available to us. Another valuable reference is hySafe's HIAD database which provides research into past incidents and enables us to learn from past mistakes. Remember, it's essential to keep in mind the reasons why you are conducting a risk assessment.

Risk assessment can take many forms and is made of many parts so it's important to understand the toolbox that is available to you and to pick the right tool for your situation. Once again, we return to the example of hydrogen. With projects appearing in populated areas, the stakes are higher and a larger amount of quantification is likely to be required. Consequence modelling is one such approach that will assist with this, and with the extensive levels of research into the outcomes of hydrogen releases currently underway, especially as we move to handling and storing it in large volumes, the Fire and Blast Information Group (FABIG) are an essential reference.

For further details please visit www.ras.ltd.uk



Chemicals Northwest 2024 Awards

On the 21st March, the team at Chemicals Northwest welcomed nearly 300 guests to the Hilton, Manchester Deansgate hotel. Yes, we liked it so much we came back for a second year on the run.

It is an honour to celebrate excellence in our vital industry and thank you to everyone who submitted an award entry. The Chemicals Northwest Awards celebrate the entire supply chain, whether companies are producers or suppliers of services or products, their commitment to the chemical industry is critical and is greatly valued. We also wanted to thank our sponsors who made judging and planning this evening an absolute pleasure.

Our host

Our host for the evening was Jimmy McGhie. Jimmy is an acclaimed stand-up comedian. A hit at Edinburgh and on the live circuit, he has been a finalist in a host of new comedy competitions including the BBC New Talent and the Perth Comedy Festival. Jimmy kept the awards running smoothly with some ad lib jokes to amuse the audience along the way.



Announcing the Winners



Sponsored by the
Chemical Industries Association (CIA)

Winner - Studley Ltd



Studley Ltd employ 300 people working with more than 50 customers each year. Their award entry described work on Hulme Hall Expansion creating additional cavities to deliver brine at required rates. The design managed the risk of injury whilst maximising environmental protection. Design included buried pipework, tie-ins to existing pipework anchor blocks, ditch crossings. Also land drainage post-construction. Studley worked to Client procedures relating to vehicles and led on engagement with the local authority and police to minimise obstructions, due to needing to keep infrastructure open throughout. 3km of stainless steel pipes were delivered and 300lb flanges met local farmland requirements and utilised wetland expertise for operating in bogged areas, successful delivery has led to further work with the client.



Steve Elliott - Chemicals Industry Association (CIA)



Sponsored by PM Group

Winner – Bitrez Ltd



Bitrez Ltd is one of the UK's leading manufacturers of specialist polymers and chemicals. Bitrez manufacture a new Curaphen range of products which are phenolic resins employed in the manufacture of specialist coatings and as a resin used in the generation of composites for light weight components. Bitrez's skilled R&D department developed a formula to reduce the formaldehyde levels. A brand-new formula and process technique was required to comply with regulatory guidelines. Extensive R&D, evaluation with trials involving cutting edge/innovative chemistry resulted in a series of Curaphen grades that were not classified as carcinogenic but exceeded the performance levels of conventional grades. Curaphen is now established as the best-selling Low FF phenolic resin on the market and due to its commercial success, the company has had to double manufacturing capacity requiring 24/7 UK production to service customers in the US and China.



Sponsored by Arcadium Lithium

Winner - INEOS Inovyn

Safety is key to the entire site at INEOS Inovyn and responsibility falls on employees and visiting contractors to play their part. INEOS introduced an Walksafe project when trip and slip incidents plateaued over a number of years. INEOS understood that our eyes absorb a huge amount of detail but our brain, overworked as we all are, chooses which parts to process and in the process overlooks elements that are familiar and might contribute to an accident. seven scenes were set up with various STF hazards



that someone might come across. Small groups were walked through the scenes and encouraged to call out what they saw. Through speaking what they saw it helped remap brain pathways encouraging fresh eyes used on each journey. Congrats to the INEOS SHE Team who in 2023 walked 900 employees and contractors through the safety training and which has already delivered a 50% reduction in incidents over the year.



Sponsored by INEOS Inovyn

Winner - Koura



Koura developed Klea 456A, a “drop-in” refrigerant which has 50% lower Global Warming Potential compared to the incumbent product on the market. Koura explained that with 200m cars still using the existing product the potential benefits are huge – they calculated it equating to the removal of 56 million cars from the roads in a year. Technically the new products is drop in and go replacement with no mechanical, oil or other changes required to the vehicle. There is no polymerisation risk and Klea 456A has already been approved by a major servicing manufacturer. Performance wise, it's equivalent to the incumbent with cooling capacity boosted by 10%. Judges were delighted that a new grade of “drop-in” refrigerant delivers a significant step in reducing the GWP of AC systems in older vehicles. Given the cost of replacing cars having options such as this is vital if we are to achieve our nations environmental targets.



Sponsored by Koura

Winner Croda Europe Ltd



Croda Europe's winning entry focussed on production records switching from hard copy batch processing records to e-batch card software covering two sites. The switch considerably improved traceability and reproducibility and the quality and accuracy of available data. The new system permits the operations team to follow the entire production process allowing bottlenecks to be avoided and providing a better understanding of the manufacturing sequence. Time is saved on investigations and the simplified data leads to clearer decision making. Deliverables include the release time reduced by 60%, batch time cycle reduced by 20%. Clearing training requirements and reduced administration time. E-batchcard is connected to SAP system ensuring the whole company benefits from data availability and stock levels.



Sponsored by IKM Consulting Ltd

Winner - John Hogg Technical Solutions

John Hogg Technical Solutions are a market leader in fuel marking technology and solvent dye manufacturing. 2023 was a particularly good year for the company. Revenue has increased by 18% and net margin by 43% over 2022. 80% of sales exported into 70 global countries. 2024 is destined



to take the company even further with revenue predicted to double over the previous year. John Hogg successfully designed, manufactured and shipped millions of litres of 20 different products into EU markets to ensure the sector remained compliant. A new government contract in Asia delivered 65% in revenue growth on one product line. Congratulations John Hogg.



Sponsored by Business of Science Ltd

Winner AM Technology



AM Technology is an innovator in continuous chemical reactor technology. In 2023 AM Technology collaborated with a South African research institute to develop a reactor demonstration lab which can be configured to handle a range of chemical processes at KG scale. Project should help onshore pharmaceutical production. AM Technology will provide technical support till 2028 as part of the contract. The single South African projects will boost AM Technology revenue by 25%. Continuous manufacture demands significantly less energy than and delivers less waste than traditional methods, particularly relevant in South Africa where power outages remain common. The demonstration lab will be operational later in 2024.



Sponsored by SRG

Winner - Rhys Kelly, M&I Materials Limited



Rhys joined M&I Materials 15 months ago as a lab technician supporting two distinct aspects of the business. Within a year Rhys was promoted to Process Technologist. Rhys is well thought of by his peers and has made an instant impact on the business on a number of levels. Rhys has excellent skills engaging with technical professionals and manufacturing staff to a level not often expected from someone so young. The judges were impressed with Rhys's in-built care and concern for those around him which had helped the company to improve safety in critical areas.



Sponsored by SLR

Winner - PM Group



The Judges were delighted to see PM Group focus on both social and environmental strategies in efforts to meet their obligations. PM adopted Environmental Social Governance framework and included D&I as part of holistic approach. Sustainability tool used on all projects. Best practise at work has led to best practise at home and in friendship groups focussing on fairness and wellbeing and inclusivity for LGBTQ+. PM Group are celebrating 50 years in business with a 50 Good Deeds programme which included world environment day, volunteering, education and STEM workshops, fundraising and charity and children's hospital activity. A women's week delivered demonstrable results. PM were active in gender diversity, ethical sourcing, allyship and disability. Every box was ticked!



Sponsored by Chemicals Northwest

Winner - IKM Consulting Ltd



IKM have offices in Grangemouth and Runcorn providing civil, structural and environmental consultancy. IKM have a particular offering in asset lifecycle solutions. Since opening the Runcorn facility in 2022 IKM have quickly assembled a very impressive list of NW clients. The North West will contribute 10% of company turnover by end-2024. IKM have accessed new customers in a range of innovative ways, they have run a series of technical seminars including on blast resistant building design and are now proposing running similar in businesses. IKM have supported a client pursuing green hydrogen as a fuel source and contributed to FEED and master planning leading to reduced emissions. The company run a mentoring program for graduate level engineers and have achieved Gold certification in Investors in People and Investor in Young People. Judges wished them every success.



Sponsored by Chemicals Northwest

Winner - James Robinson Speciality Ingredients (JRSI) & The University of Manchester

James Robinson Speciality Ingredients (JRSI) are a small research-lead company that design, manufacture and sell high performing organic materials. JRSI we keen to develop understanding of thermally activated delayed fluorescence (TADF) materials for use in OLED devices. JRSI worked with professors at University of Manchester on a joint project, knowing their own research limitations. JRSI's knowledge of TADF materials went beyond academic research but into new scalable routes to TADF species. JRSI also generate their own proprietary range of TADF materials that have the potential to be utilised in next generation oled displays. Knowledge Transfer Partnership funding helped recruit specialist staff and subsequently support from the University of Manchester. An Academic paper has been produced raising JRSI's profile in this area.



With thanks to our award sponsors



Sponsor of the Health and Safety Award 2024

Arcadium Lithium is a leading global lithium chemicals producer, created on January 4, 2024 as a result of the successful merger of equals between Livent and Allkem. With roughly U.S. \$1.9 billion of combined total revenue in 2022 and a global team of more than 2,600 employees, we are one of the largest integrated producers of lithium chemicals in the world. We are committed to safely and responsibly harnessing the power of lithium to improve people's lives and accelerate the transition to a clean energy future.

Find out more here <https://arcadiumlithium.com/>



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The conference sees business leaders, industrialists, academics, and policymakers explore the latest opportunities and challenges in the business of science. We bring industry professionals together with school students to help nurture scientific ideas that could become the innovations of tomorrow. Find out more here - <https://www.businessofscience.co.uk/>



Sponsor of the Engineering Firm of the Year Award 2024

The Chemical Industries Association is the organisation representing and advising chemical and pharmaceutical companies located across the UK.

Find out more here - <https://www.cia.org.uk/>



Sponsor of the Partnership and Supplier Awards 2024

Chemicals Northwest is the industry-led, chemical cluster support organisation for the North West and surrounding areas chemical sector, the largest in the UK. We are a funded by our members and owned and supported by the Chemical Industries Association.

We are a membership organisation that supports and promotes the interests and activities of the chemistry-using industries. Find out more here - <https://www.cia.org.uk/chemicalsnorthwest/>



Headline sponsor for the Chemicals Northwest 2024 Awards

CHEMUK will return on the 15th & 16th May 2024 running in Hall 1 at the NEC, Birmingham and Chemicals Northwest are delighted to be a headline partner for this event.

The expo will present 500+ specialist exhibitors and 150+ expert speakers split between three major show zones:

- * Chemical Industries Supply Chain
 - * Chemical, Process & Plant Engineering
 - * CHEMLAB – Laboratory & Innovation
 - * NEW FOR 2024: Chemical, Process & Plant Safety
- Find out more here - www.chemicalukexpo.com



Sponsor of the International Trade Award 2024

IKM Consulting is an award-winning civil, structural, and environmental consultancy. Committed to managing client risk and facilitating strategic decision-making, our multidisciplinary teams have expertise in bulk fuel storage, chemical manufacturing, and transmission terminals. With offices in Grangemouth and Runcorn, we specialise in asset integrity, containment, infrastructure design, occupied building strategies, environmental risk assessments, and COMAH compliance. We deliver unparalleled value and expertise to every client and work to deliver every project with distinction. Find out more here - <https://www.ikmconsulting.co.uk/>



Sponsor of the Sustainability Award 2024

A premier chemical company, INEOS Inovyn is at the heart of Europe's chemical industry. Our products find use in almost every aspect of modern society, keeping people housed, healthy and connected. INEOS Inovyn is Europe's leading producer of vinyls and in the top three worldwide. With an annual turnover of €4.5 billion, INEOS Inovyn has circa 4,200 employees at 15 chemical manufacturing, sales and marketing sites in 8 countries across Europe.

Find out more here <https://www.inovyn.com/>



Fluor & Energy Materials



Sponsor of the Operational Excellence Award 2024

Orbia's Fluor & Energy Materials business Koura is a global leader in the development, manufacture and supply of fluoroproducts that play a fundamental role in enhancing everyday lives. Orbia Koura's products are used in numerous applications including electric vehicles, indoor climate management, food and medicine refrigeration and treating respiratory conditions.

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Find out more here - <https://www.manntek.se/>



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PM Group is an employee owned, international project delivery company operating across Europe, the USA and Asia. We have a 50+ year track record in project management, process design, process safety, facility design and construction management for leading multinational companies. Find out more here - <https://www.pmggroup-global.com/>



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Global leaders in sustainability solutions: providing clients with strategic advice and on-the-ground technical support to tackle some of the world's most complex sustainability challenges. We have a collaborative and entrepreneurial culture and have recently been recognised as a "leader" in climate change consulting by the independent research firm Verdantix. Find out more here - <https://www.slrconsulting.com/>



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SRG are industry leaders in Science, Engineering and Clinical Recruitment. We empower individuals and businesses to power the future of STEM. With true specialist knowledge, we support a full spectrum of technical roles and talent solutions across the whole product life cycle, from R&D, through analysis, manufacturing, and engineering to market access. Find out more here - <https://www.srgtalent.com/>

Accelerating progress in chemical safety testing with the latest animal-free science

XCellR8 is a GLP accredited laboratory located at Sci-Tech Daresbury in Cheshire. Established in 2008, our mission is to accelerate the world's transition to 100% animal-free testing, through our scientifically advanced and ethical approach. We provide *in vitro* safety and efficacy tests for global cosmetics brands, chemical companies and ingredient manufacturers.

The replacement of animal testing isn't only an ethical issue, but very much a scientific one. By using the latest cell culture and tissue engineering technologies, we are creating test models with much higher relevance to humans in everyday use scenarios. Along with peers across the global scientific community, we're playing our part in bringing product safety testing up to date, while creating future-fit scientific careers here in the northwest. Our work was recently featured on the BBC series *Inside The Factory*, where we explained how we use our animal-free tests to provide safety data to cosmetics company, Lush.

Our latest ground-breaking acute toxicity research

Over the last few years, one of our key research areas has been acute toxicity – the adverse effects caused by short-term chemical exposure by mouth, inhalation, or dermal absorption. Acute toxicity data is commonly required for regulatory submissions, and it's currently the only human health endpoint in REACH Annex VII with no validated non-animal approach. As many cosmetic ingredients are imported into the EU at 1-10 tonnes per year, they fall into Annex VII, and a requirement to generate test data presents regulatory and ethical conflicts around animal testing. Across all sectors combined, more than 80,000 animals are used every year in acute toxicity testing in the EU alone, and millions worldwide. For almost 100 years, acute toxicity has been tested using "LD50" type animal tests – identifying the dose that's lethal to 50% of the animals - even though the methods have been widely discredited, both ethically and scientifically.

However, more robust and human-relevant science is on its way. Regulators - including ECHA in Europe and the EPA and NTP in the US - encourage the use of *in vitro* methods, combined with computer modelling (*in silico*), as a first step which can sometimes avoid the requirement to do an animal test. Previously, there was no validated *in vitro* test with human relevance. With funding from Innovate UK and Animal Aid, we developed "AcutoX", a human cell-based screen that predicts oral acute toxicity. The test uses a fully human test system, incorporates metabolism, and has been validated by XCellR8 using 68 cross-sector chemicals. The resulting prediction model can classify chemicals in a binary fashion (toxic / non-toxic) as well as designating toxic class for both GHS and EPA classification systems. We launched the test at the Society of Toxicology (SOT) conference last year and our

peer-reviewed paper will be published soon in the ALTEX journal. It's already being used by some leading companies, and crucially, regulators are interested in incorporating the test into their recommended programmes.

While we're thrilled with the progress being achieved through AcutoX, we're only at the tip of the iceberg, and our talented scientific team are moving on to next steps. We're now expanding our work to make AcutoX relevant to a much wider range of chemicals used across a variety of industries, from cosmetics and household cleaning products to automotive, aerospace, agriculture and healthcare. The next steps will massively increase the impact of the test and add further weight to our conversations with global companies and regulators. More companies will start using AcutoX instead of animals, with an immediate and direct impact on replacing animal testing with up-to-date, human-relevant science.

We are currently crowdfunding to raise £100,000 to enable this crucial work to continue and are looking for corporate sponsors to help keep up the momentum for this globally impactful work. Find out more [here](#).

We'd love to hear from companies who are interested in using AcutoX or becoming a corporate sponsor for our animal-free testing and research.

For further details please contact info@x-cellr8.com / 01925 607 134.

Dr Carol Treasure
Founder and CEO, XCellR8

Background Image - human fibroblasts used in the AcuTox test



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The UK's Chemical Industries prepare for largest ever CHEMUK expo

The CHEMUK 2024 EXPO will return this 15th & 16th May to the NEC, Birmingham. CHEMUK continues to grow, with over five hundred exhibitors expected for this year's event.

Event organiser Ian Stone comments, "This is the 5th edition in the CHEMUK journey, from its launch back in 2019, and it's amazing to now see every corner of the 'chemicals industries' rallying around this annual 'destination'.

CHEMUK 2024 can boast its largest-ever showing of suppliers and partners supporting industrial chemicals, fine and specialty chemicals, chemical-formulated products, chemical and biochemical engineering and processing operations, chemical distribution and logistics, R&D and product development, and chemical-dependent communities, spanning 14,000 sqm of floor space under one giant roof.

The multi-stage speaker programmes will also be announced soon, with an impressive array of leading figures, thought leaders, and organisations tackling the big issues and trends shaping, challenging, empowering, and enabling the UK's chemical and chemical product industries".

CHEMUK 2024: 1 Expo, 4 Show Zones

CHEMUK 2024 is comprised of four focused show zones; the **Chemicals Supply Show** zone, the **Chemicals Management Show** zone, the **Process & Chemical Engineering Show** zone; and the **Chemical Laboratory Show** zone.

The Chemicals Supply Show zone

The Chemicals Supply Show zone will showcase manufacturers and distributors of chemicals, ingredients, and raw materials to attending R&D, product development, and supply chain teams.

Exhibitors confirmed to exhibit in this area include *Brenntag UK&I, BTC UK, Univar Solutions, Caldic, BTC Europe, IMCD UK*, and many others.

The Chemicals Management Show zone

The Chemicals Management Show zone will present suppliers providing products, services, and equipment covering logistics and transportation; storage, labelling and packaging; HSE management, REACH, and regulatory compliance; waste management and recycling services; skills, training, and recruitment; and financial and legal support.

Exhibitors confirmed to exhibit in this zone include *AST Plastic Containers, Avery UK, CIRS, Dachser, Freightroute, Hoyer Group, Ramboll, Ricardo*, and many more.

The Process & Chemical Engineering Show zone

The Process & Chemical Engineering Show zone will showcase the latest engineering technology and specialist

services to attending plant, process, control, and engineering professionals from across the chemical and wider process industries.

Exhibitors confirmed to exhibit in this area include *ABB, GEMU Great Britain, Funke UK, Hytorc, Kluber Lubrication, ProMinent Fluid Controls, Silverson Machines, Staubli, WIKA, Siemens*, plus many others.

The Chemical Laboratory Show zone

The Chemical Laboratory Show zone will showcase specialist laboratory chemical and chemical equipment suppliers supporting research & development, analysis, process design & development, flow chemistry, scale-up, and quality testing within the chemical and chemical product industries.

Exhibitors confirmed to exhibit in this area include *GPE Scientific, IKA England, Lambda Photometrics, Radleys, Scimed, ECH Scientific, Mettler Toledo, Verder Scientific*, and many others.

CHEMUK 2024 Speaker Programme

In addition to the exhibition floor, visitors can attend any of the **50+ hours of keynotes, feature sessions, and panel discussions** running across the show's five auditoriums, embracing some 150+ contributing speakers.

The speaker programme will address the key challenges and opportunities facing today's chemical industries.

Organisations provisionally confirmed to be hosting sessions at CHEMUK 2024 include: *Nouryon, Clariant, CPI - Centre for Process Innovation, BASF, Biorenewables Development Centre, IChemE - Institute for Chemical Engineering, BASA - British Adhesives & Sealants Association, BCA - British Chemicals Association, CBA - Chemical Business Association, BADGP - British Association for Dangerous Goods Professionals, CHCS - Chemical Hazards Communications Society, CUK - Cosmetics Cluster UK, GAMBICA, IBiolC, Innovate UK and BBSRC, UK Government - DBT, Defra, HSE, and The Home Office, RSC - Royal Society of Chemistry, Process Intensification Group / Newcastle University, IBiolC, ScotCHEM, Ricardo, Ramboll, Surfachem, Siemens, UK & Ireland Spill Association, WSP*, plus many others.

The full speaker schedule will be announced on the website, so please check for updates and the latest announcements.

DATES FOR THE DIARY

CHEMUK 2024 takes place on Wed 15th & Thu 16th May 2024

Venue: NEC - National Exhibition Centre, Birmingham, B40 1NT

Opening Times:

Day 1: 9.30am - 5.00pm
Day 2: 9.30am - 4.00pm

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People Powering Net-Zero

The role of Process Safety Manager at Agratas, a global battery business, is incredibly rewarding.

We're a recently established enterprise and a subsidiary of the Tata Group which owns Jaguar Land Rover (JLR) and Tata Motors, our two anchor customers. We'll be pioneering the design, development, and manufacturing of batteries for electric vehicles (EVs). Battery cell production is due to commence in 2026 at facilities in the UK and India. Our multibillion-pound UK gigafactory will be one of the largest ever investments in the UK automotive sector to date, creating thousands of jobs directly and in the wider supply chain.



Design (ISD) into the production process and site design, as well as how we operate our business. A lithium-ion battery and its manufacturing process encompasses many inherent hazards, ranging from potential fire, explosion and toxic impacts. One doesn't need to look too far online to come across videos of battery-related fire incidents. As such, it's crucial we have a sound foundational understanding of these hazards and risks, in order to eliminate and minimize them wherever possible. For example, in Agratas we will produce two different battery chemistries (NMC, nickel-manganese-cobalt, and LFP, lithium-iron-phosphate) – therefore we need to understand and manage the hazards

specific to both chemistries. We have two sites in very different locations – therefore we need to understand how this may impact our process design and operation.

In the UK chemical industry, we are well-versed in assessing hazards and risks. Hazard Studies, guidance documents, Trade Association involvement and a strong "Lessons Learned" approach have each played a key part in continually improving process safety performance. I have been keen to develop the same mindset and good practices at Agratas, so have dedicated a great deal of time to upskilling the wider team in Process Safety Risk Management and building a strong safety culture.

The battery industry demands skills from a wide variety of backgrounds and industries, from paper to food to pharmaceutical, to high-volume manufacturing, to data science. As the UK industry grows, we have a unique opportunity to apply all the valuable learning from these established industries, to help us excel in the global EV market. I'm privileged to work with excellent engineers, scientists and specialists every day – I have already learned a lot from them and look forward to growing the team in the next exciting stages of the project.

Agratas started life within JLR and since January 2024 has become an independent company under the Tata Group umbrella. To date, we're about 200 people strong and growing quickly! Our UK office is based at the National Automotive Innovation Centre (NAIC) near Coventry, but I work remotely from my home office in Cumbria.

I'm a Chartered Chemical Engineer and prior to joining the project in 2022, spent more than 8 years working in the high-hazard chemical industry. Through various Process Engineering, Project and Process Safety roles, I've learned from countless experts and honed my skills.

I love my job. It's very motivating to know that I'm playing an active part in the energy transition and helping to grow a new exciting UK industry. Every day brings new challenges so it's really important to be flexible and adaptable, whilst remaining dedicated to ensuring the highest standards in safety and environmental performance.

Working closely with the Process Engineering and Construction teams in both the UK and India, my team provides support and technical expertise to design and construction activities. This is the largest greenfield project I've been involved with during my career. A real benefit a new facility brings is the opportunity to incorporate Inherently Safer

To find out more about Agratas visit:
<https://agratas.net/> or contact me on LinkedIn:
<https://www.linkedin.com/in/katieoxley/>



Major milestone for UK Hydrogen industry announced at Foresight Hydrogen live

Hydrogen has the potential to play a pivotal role in the quest to decarbonise industry. There are many challenges associated with harnessing this energy vector and somewhat ironic the most abundant element in the universe is hard to come by on planet earth, especially with a NetZero label attached to it.

Industrial manufactures across the UK came together to talk everything Hydrogen at the two-day conference and exhibition in Liverpool on February 7th and 8th. The speaker roster boasted a range of thought leaders, but the stand outs included Marian Garfield from Heidelberg materials who shared insight on the Bay Hydrogen Hub and Tim Chadwick from Ceramics UK who highlighted the potential CO2 savings when installing NetZero technology.

Members of the audience also heard from Department for Energy Security and NetZero (DESNZ) civil servants regarding the hydrogen business model which is designed to support hydrogen suppliers/users and future investment towards hydrogen production projects.

More input from DESNZ came when Lord Callanan announced a statement of principles with EET Hydrogen for its flagship HPP1 low-carbon hydrogen plant. Construction is expected to begin later this year.

Lord Callanan, Minister for Energy Efficiency and Green Finance said: "We have already halved our emissions from 1990 levels, and hydrogen will play a vital role in the UK's journey towards net zero by providing businesses large and small with cleaner energy in the future.

"By moving into final negotiations with the Ellesmere project, we are working to deliver our ambition of up to 10GW of low carbon hydrogen production capacity, in an industry expected to support up to 12,000 jobs by 2030."

Tony Fountain, Managing Partner of EET said: "Today's statement of principles is a great outcome for both EET and the UK. Scaling hydrogen capacity is essential to decarbonising heavy industries. This is an important step in our ambitious decarbonisation plan to transform our business and the North West. We appreciate the Government's partnership which will contribute to protecting skilled jobs in the region and ensuring our industries remain competitive."

Joe Seifert, CEO of EET Hydrogen said: "This is a critical milestone for EET Hydrogen and the hydrogen sector in the UK. We are very proud to be leading the way and look forward to starting construction later this year."

The hydrogen will be provided to industrial businesses across the North West of England to decarbonise their operations, protecting jobs and driving economic growth. The project is the cornerstone of the HyNet cluster and is essential for the cluster to commence construction later this year.



Post-Combustion Carbon Capture, and it's place in HyNet

HyNet is the one of the UK's leading industrial decarbonisation projects, and will use a wide range of technologies to deliver decarbonisation. This includes Hydrogen production from electrolysis and CCS enabled, both of which will comply with the UK low carbon hydrogen standard. It has CO₂ transport and storage, Hydrogen pipeline network from producer to end use, and salt cavern storage for Hydrogen to smooth out demand peaks and troughs.

Though one of the most abundant technologies being employed is post-combustion carbon capture. These are primarily being developed to decarbonise industrial processes where there isn't another practical or cost-effective solution, such as electrification or fuel switching, or where CO₂ is a byproduct of the chemical process. This includes Energy from Waste, Cement Production and Refinery operations.

Post-combustion carbon capture is incredibly effective at removing CO₂ from these processes. The plants under development are targeting CO₂ capture rates of 95% of the current emissions, i.e. for every 100 tonnes of CO₂ in the flue, 95 tonnes will be captured and sent to storage with the remaining 5 tonnes being vented to atmosphere. A greater percentage of CO₂ capture could be achieved, but the increase in energy required to capture the last few percent of CO₂ increases exponentially making it uneconomic. When viewed as a complete installation the process can seem very energy intensive, though when viewed at a per unit level of CO₂ capture it is one of the most cost-effective methods of carbon reduction.

The plants under development in HyNet range in size of annual emissions to atmosphere of between 400,000 to 1,000,000 tonnes per year of CO₂. The addition of post-combustion capture on these industrial processes presents a similar challenge with broadly the same technological solution. Though each of the plants have their own unique integration challenges and opportunities on the existing sites to optimise the design.

This article will walk through the major process steps with a post-combustion capture plant. To aid the description, a process flow diagram for a basic 1 MTPA (million tonnes per year) capture plant has been shown, this was developed by Progressive Energy Ltd using Thermoflex 31 using an Amine based CO₂ chemical absorption process.

The start of the process begins taking the existing stack away from the stack where it is vented to atmosphere, and instead ducting it towards to the capture plant. This will typically involve flue gas at a temperature in excess of 100°C, contain a CO₂ concentration of between 8% and 12% by volume, and be only marginally above atmospheric pressure. The flue gas is also likely to contain impurities that need to be stripped out

prior to the absorber column, as they can deleteriously impact performance and longevity of the Amine used to capture the CO₂.

The first major step in the process is where flue gas enters a direct contact cooler (DCC) to bring the flue gas temperature down to between 40 and 50°C. This temperature is required for optimal operation of the Amine in the absorber tower. This is achieved through a flue gas blower, or fan, pushing the flue gas through the process. In this case this the blower/ fan is upstream of the DCC, but alternative designs exist with the fan downstream of the DCC. The DCC typically incorporates some flue gas clean up, such as SO₂ removal (not shown in this simplified example). The clean, cool flue will exit and make its way to the absorber column, and a substantial quantity of relatively clean water will exit the bottom of the DCC. This water will usually be treated with NaOH to maintain the correct pH level for re-use.

The second major step is through the absorber column where the cooled flue gas enters at the bottom and flows vertically upwards. The absorber column is typically made up of 2 sections.

- 1) The CO₂ absorption section, where lean amine solvent flows downward to react with the flue gas flowing upwards. This is where a chemical bond is formed with the carbon dioxide contained in the flue gas, in this example up to 95%. In a plant this size it would occur over multiple beds of packing with the solvent evenly distributed across each bed; and
- 2) A water wash section – located at the top of the absorber serving to cool and scrub any entrained solvent from the treated flue gas.

The clean flue gas exits the top of the absorber column to atmosphere, and the CO₂ rich solvent exits the bottom of the column and is pumped via a heat-exchanger to the 3rd major step of the process, the stripper column.

In the stripper column the rich CO₂ solvent is heated using relatively low-grade steam. Typically, between 130°C to 200°C, and between 3 bar and 15 bar. In this example the temperature is 170°C and 4 bara. The steam mixing with the rich solvent breaks the chemical bond between the CO₂ and the amine, generating a flow of saturated CO₂ and lean amine solvent. The amine solvent flows from the bottom of the stripper column to the reboiler where it is regenerated, and sent back to the absorber column for re-use. The CO₂ exits the top of the column where it is cooled.

The stripper column and reboiler step is where the majority of the steam is consumed, and is often quoted as a headline figure for energy consumption for per unit for CO₂ captured. A generic amine solution, such as MEA, could offer a rate of 3 GJ/tCO₂, whereas a proprietary amine from one of the major carbon capture technology suppliers can be as low as 2.3 GJ/tCO₂. In the process diagram example, a rate of 2.5 GJ/tCO₂ has been used, though for clarity it is expressed in kJ/kgCO₂.

The final major step in the process is the conditioning and compression such that the CO₂ is suitable for entry to the transport and storage system. Post cooling, the CO₂ enters a knock-out drum to remove any water droplets from the stream before entering a multi-stage centrifugal compressor. For HyNet the onshore transport system is planned to always operate with CO₂ in gas phase, as such inlet conditions for the CO₂ require compression up to a maximum of 43 bar. To achieve this the CO₂ stream from the absorber, which is marginally above atmospheric pressure will go through 4 or 5 compressor stages, with intercooling and knockout between each stage. This will achieve a dry CO₂ at the required inlet temperature of around 40 to 45°C. There will be requirement to further drying to reach the <50 mol ppm requirement of water, likely through a desiccant bed.

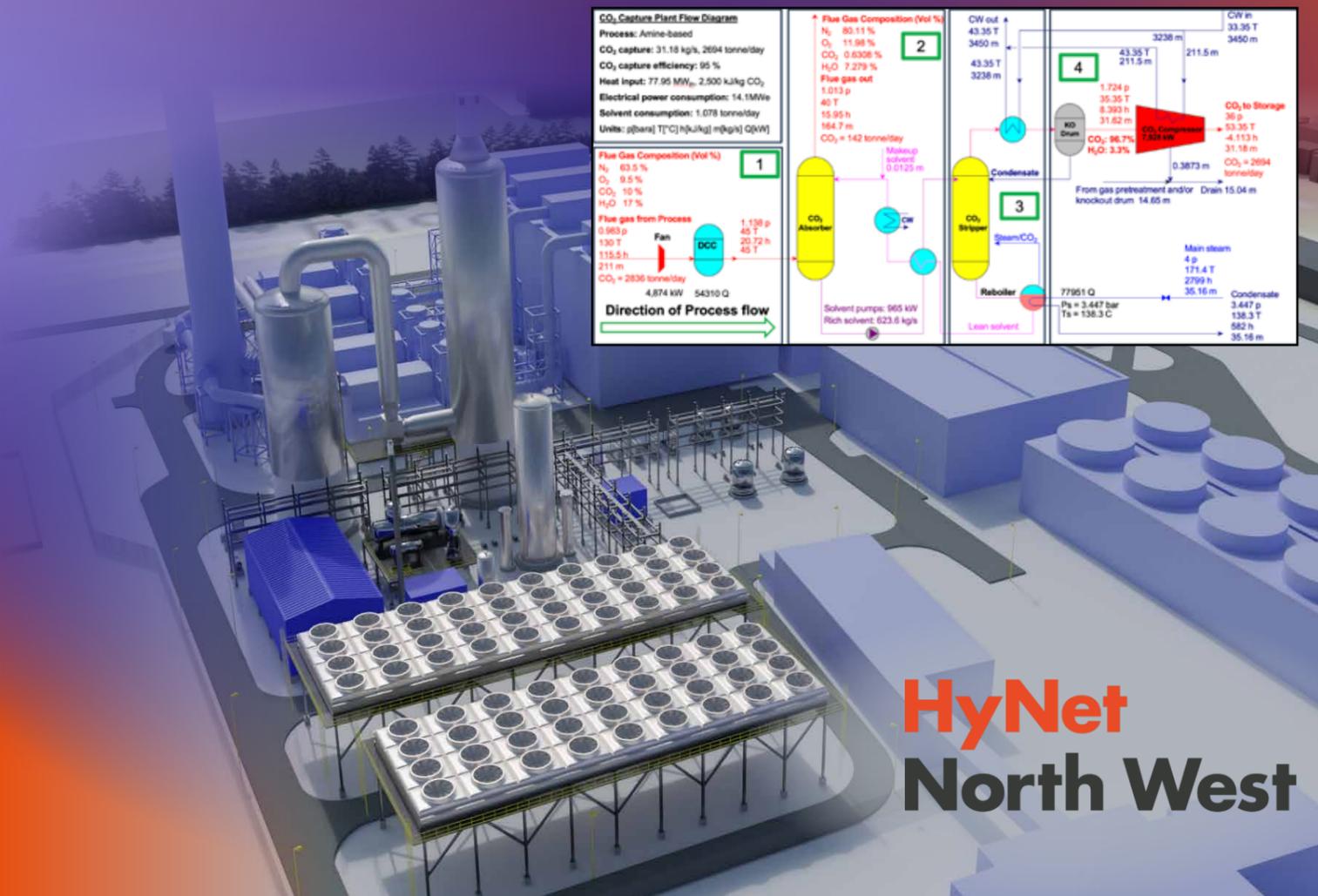
Outside of the core process there are other considerations which can optimise the overall efficiency of the capture process. This includes steam provision, optimisation of the DCC, clean flue gas heating, cooling water supply, and electrical power consumption.

Much of these optimisations are based on the configuration of the existing process that is being decarbonised. The simplest system is to provide steam from a dedicated package boiler or CHP, but this may not be the most cost-effective approach from a capital perspective or overall efficiency. On a plant with an existing steam provision, such as a refinery or EFW the system can be re-purposed to provide some, or all of the steam to the capture plant.

There is a significant cooling requirement for the process flue gas to cool it down to 45°C. Conversely the exit from the absorber at 40°C is too cold for the plume to be buoyant, adequately disperse and potentially meet plume visibility requirements. An air-to-air heat exchanger to cool the inlet flue gas from the process, and heat the exit flue gas from the absorber can significantly optimise the process. Further optimisation is done on a plant-by-plant basis.

The post-combustion capture plants within HyNet being deployed in the hard to decarbonise industries. They offer a cost competitive solution with a high technology readiness level. While cost of capture currently will require a form of subsidisation, via a Contract for Difference (CfD) model for the emitters, it is predicted that as CO₂ emission price increases it will become less costly to capture and store the CO₂ via this method than to pay the via the UK Emissions Trading Scheme. These are also plants with stable CO₂ generation which enables a steady flow, this enables the CO₂ transport and storage system to have a high utilisation versus capture plant with a less stable output, such as a post-combustion capture on the back end of a dispatchable power plant. The higher utilisation should result in lower overall transmission and storage cost per tonne of CO₂ captured.

For further information visit <https://hynet.co.uk/> and www.progressive-energy.com





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One enterprise, One product, One QR code _ Hazardous Chemical Registration in China

For hazardous chemicals in China, their manufacturers and importers in China shall register them to the National Registration Centre of Chemicals (NRCC) prior to manufacturing or importation. It's under the Measures for Administration of Hazardous Chemicals Registration (hereinafter referred to as the "SAWS Order 53"), which has been implemented since 2012. The latest new regulatory update is a QR code system that has been introduced in 2021 and shall be fully implemented later this year. It's also known as the "One enterprise, One product, One QR code" and becoming one of the most popular topics in the chemical supply chain in the world.

Hazardous Chemical Registration

In general, chemicals listed on the Catalog of Hazardous Chemicals (2015) and chemicals that meet the determinative principle proposed by guidance of the Catalog of Hazardous Chemicals (2015) shall be registered under SAWS Order No.53. Both substances and mixtures are subject to registration.

Chinese domestic manufactures and importers which are handling hazardous chemicals shall register them accordingly. Please note that companies outside of China cannot register those hazardous chemicals as registration holder directly but can complete the registration through their importers.

The registration requires certain information including Chinese MSDS and label, classifications, physical and chemical properties, uses, company information, relative permission certificates, safety management information, etc. Depending on the different activities, e.g., import, manufacture, etc, the required documents are also different.

The validity of registration certificate is 3 years and has to be renewed 3 months prior to the certificates expiry date.

One enterprise, One product, One QR code

In general, for any hazardous chemical product in China, after the hazardous chemical registration is done, a QR code could be generated from the system directly. By scanning the QR code, the information including hazardous chemical registration, Chinese SDS and labelling, etc. will be accessed. The authority would like to use this QR system to encourage enterprises to comply with this hazardous chemical registration and keep all hazard information up to date. The QR code is the identification of hazardous chemicals. All kinds of enterprises shall not sell, purchase, use or transport dangerous chemicals without the code. This is called "One enterprise, One product, One QR code".

The QR code should be in the right corner of or somewhere suitable on the chemical safety label. The QR code location should keep consistent in the same product and same enterprise.

The QR code shall also be provided to the carriers or purchasers. It is required to print, paste or hang the QR code in a conspicuous position during transportation. There are also certain requirements regarding printing the QR code and its size and quality. Particularly, the size of the QR code shall be determined according to the size of the chemical safety label. Generally, it shall not be less than the size of the pictogram in the chemical safety label, and the length of the short side shall not be less than 1cm. The printed QR code shall not be deformed or damaged easily, so as to make sure the code works in the whole supply chain process.

Latest implementation status in China

The first pilot project was started in 2021 in Guangdong province, which was very successful. Currently it is a very local requirement in different regions. Based on the local customs and authorities, the implementation requirements are quite different. Provinces including Shanghai, Guangdong, Jiangsu, Fujian, Shandong, Zhejiang, Beijing, Hebei, Sichuan, etc. are more involved in this new QR requirement.

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Hydrogen failures without Hydrogen?

The shift towards a hydrogen economy brings about many challenges, not least the well-known, but often poorly understood, threat it poses to the integrity of pipework and vessels on hydrogen duty.

On the macro-scale, these mechanisms manifest themselves as three low temperature mechanisms (hydrogen embrittlement, hydrogen induced cracking, and hydrogen stress cracking) and are often observed in the material as step-wise cracking (Figure 1). Providing the right materials are used, hydrogen pipework / vessels generally operate without issue, however, hydrogen failures can still occur on site and pose a risk to asset integrity, often when there is no direct exposure to hydrogen.

High strength steels are most commonly affected by hydrogen however certain types of stainless steel or cold worked stainless steel can be affected, as can some nickel alloys as well as cast iron and exotic metals that form hydrides such as titanium.

Hydrogen enters metals in the form of nascent (atomic) hydrogen, which is always present to some degree in gaseous hydrogen, and is small enough to enter between the crystal structure interstices. Molecular hydrogen cannot enter as this is much larger than the space between interstices, Molecular hydrogen having a diameter of 124 pm compared to ~75 pm for the interstices of BCC iron, and 13 pm for nascent hydrogen. Corrosion evolves relatively significant amounts of nascent hydrogen which can enter and damage material even when hydrogen is nowhere near to be found. This tends to be the most common cause of hydrogen failures seen.

Despite regular and well documented inspection regimes for non-return valves, hydrogen induced cracking failures are still seen in high strength steel springs in these items (Figure 2). These failures occur due to corrosive product coming into contact with the bare metal of the spring, due to paint degradation typically as a result of its poor application. Failure of relief valve (RV) springs could the valve to consequently fail to lift and potentially having much larger consequences.

High strength lifting chains also typically experience hydrogen induced cracking due to the evolution of hydrogen due to corrosion when

used in acidic or alkali environments, such as chimney stacks and wash bays, there is even HSE guidance note PM39 advising against the use of grade 8 chains in these locations yet failures still occur. A failure of a lifting chain could easily result mechanical damage to nearby assets, large spills, or even a casualty.

Another common hydrogen failure is the embrittlement and cracking of zinc coated high strength steel bolts. These become charged with hydrogen during manufacture when they are acid cleaned before galvanising and lead to early failures once used on site. The failure of bolts on a flange for example could lead to leaks and if being used for hydrogen duty could have much greater consequences.

In summary, the majority of hydrogen related failures do not occur on hydrogen duty, particularly when equipment has been designed for hydrogen service, but arise from the introduction of atomic hydrogen to a susceptible material where hydrogen damage mechanisms may not be anticipated. Hydrogen failures require a susceptible material, most often it is high strength steels, particularly if they are galvanised, and a source of atomic hydrogen, most commonly being corrosion or damp welding rods. This is due to the fact that molecular hydrogen is too large to enter the material while atomic hydrogen is small enough to pass through the interstitial spaces of metallic crystals. Once hydrogen has entered the material, however, the underlying theoretical mechanisms are not fully understood.

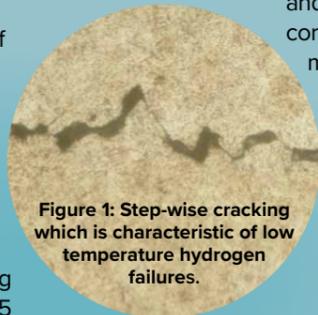


Figure 1: Step-wise cracking which is characteristic of low temperature hydrogen failures.

For more details, please visit <http://www.axiom-ltd.com>
Steve Woodward BSc CEng FIMMM
Principal Materials Engineer, AXIOM
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Figure 2: Corrosion in a high strength steel RV spring which failed due to hydrogen embrittlement.

Using digitalisation to support leadership in delivering more effective process safety management

In a recent survey^[1], 65% of respondents acknowledged a gap between their company's process safety goals and the reality of what they were achieving. For those operating in and around the hazardous process industries this is particularly concerning.

The main challenges cited were as follows:

- 46% thought training and competency challenges were ever present
- 32% said being able to engage front line staff to improve awareness was a problem
- 38% stated maintaining management involvement was a major challenge

A lack of training coupled with difficulties in engaging front line staff, suggests there are real issues in people management and education – if those who carry out routine maintenance and production have gaps in their capabilities and understanding, this is bound to have an impact on meeting process safety goals.

Leadership in process safety is known to drive the right culture
Leadership in process safety (PSL) - maintaining management involvement is currently seen as an issue for nearly 40% of respondents - plays a crucial role in cultivating a robust safety culture to drive improvement. PSL necessitates the commitment and accountability of leaders and senior management to make process safety a fundamental value and strategic priority. This involves setting clear expectations, allocating sufficient resources and effective communication.

For some years now, PSL training has been available with the aim of equipping managers with the knowledge, skills, and mindset necessary to effectively lead and manage process safety within an organisation. Leaders must understand how to balance the ask between protection and production^[2] to ensure that underlying factors such as organisational culture, resource limitations, communication breakdown or equipment failures are adequately addressed so as not to contribute to potential major accidents. However, shorter term issues such as we have seen recently with rising energy prices, rising employment costs and the wider impacts of Brexit, may be tilting the balance.

This has not gone unnoticed, and the competent authorities remain focused on driving major hazard leadership, looking for leaders to demonstrate the following:

- **Leadership and Accountability:** Senior leaders must actively promote major hazard safety, with clear accountability outlined in job descriptions and performance agreements. They should align practices with corporate policies, regularly assess their leadership behaviours, and maintain a sense of vulnerability to prevent complacency.
- **Integration of Safety:** Safety should remain the top priority, integrated into commercial decisions, and considered alongside other business threats. Budget allocation should

be based on site conditions and past performance, with major hazard considerations incorporated into investments, planning, and mergers/acquisitions.

- **Board Level Competence:** Effective Board level competence requires a dedicated senior leader responsible for major hazard risks, possessing the necessary skills and receiving specific training. Leaders should deeply understand major hazard risks, anticipate long-term consequences, and may take on operational roles temporarily to enhance their proficiency.
- **Monitoring and Improvement:** Regular monitoring of major hazard performance using key indicators, audits, inspections, and feedback. They should assess the effectiveness of systems, seek out weaknesses in plant, processes, procedures, and people, and utilise metrics to track safety culture and plant/equipment health. Continuous improvement is a priority.
- **Transparency and Knowledge Sharing:** Performance information should be published and communicated within and outside the organisation, demonstrating a commitment to transparency and accountability. Senior leaders should actively engage with industry peers, encourage information sharing, and ensure that learnings from incidents and benchmarking exercises lead to tangible changes in major hazard control, fostering a culture of continuous improvement and safety vigilance.

Digitalisation can help businesses transform their approach.
Without a unifying system, this information is more likely to sit in silos or inaccessible places, not easily viewed in the round. Equally it means that employees may only have partial understanding of the status quo, which makes it very difficult to be sure all issues are dealt with effectively. Leaders should be championing digitalisation within their businesses to ensure that there is full visibility on all core data, to foster engagement throughout and accountability across the board.

Our software, OpenPSM, seeks to help businesses make this transformation using structured and systematic processes built on best practice guidance. At any given time, it provides a live snapshot of key risk controls, strengths and weaknesses, and actions for improvement that can be managed using an integrated action management and reporting system.

A built-in maturity model, linked to recognised guidance, ensures PSM systems and programmes continually evolve and improve, to provide ever-more effective control over major accident hazards, and a sound basis for benchmarking and reporting on key ESG and Responsible Care issues for your business.

For more information, visit <https://openpsm.uk/>
Fiona Hought, Marketing Director - OpenPSM

[1] Research by Sphera November 2023

[2] Reason, J., 1977, Managing the Risks of Organizational Accidents, Ashgate.



Using additives to enhance coating application performance

Additives are an essential part of coating applications as they can enable additional functionality that many alternative coating technologies cannot match in terms of manufacturing capabilities or the specific performance properties of the finished product. Additives for coating applications may include:

- Solvents
- Catalysts
- Extenders
- Thickening agents
- Levelling agents

Solvents

Solvents are used in coatings to disperse the various components of a formulation (e.g., pigments, binders) before the product is applied. Solvents also control the viscosity of the coating for the required substrate and application method. If a coating is applied to a substrate, the solvent evaporates, thereby leaving the resin and pigments to form a film that has a consistent appearance and quality.

Due to their release of volatile organic compounds, the aim is to reduce the amount of solvents in coating applications. However, their rapid drying times, durability, and ability to withstand harsh environments and temperature extremes make solvent-based coating applications the most workable option for many products and manufacturing processes.

Catalysts

Catalysts are added to coating formulations to: (i) influence their reaction rates during polymerisation; (ii) provide beneficial properties to coating applications. A typical example is faster reaction rates enabling quicker drying times at lower temperatures while providing enhanced mechanical properties and durability. These actions permit productive and cost-effective coating applications, higher-quality coatings and, therefore, better-quality finished products.

Extenders

Extenders are used in coatings to enhance performance before, during and after application. Magnesium silicate ('talc') is a good example. Talc is added to formulations to increase viscosity and create the appropriate levels of coverage and dispersion upon application. After application, the talc in the coating creates a barrier against moisture and chemicals due to its hydrophobic properties. This feature protects against corrosion, peeling and cracking of the coated surface. The longer pot life enabled by extenders by maintaining the

coating at the correct application viscosity can also reduce costs and waste.

Thickening agents

Thickening agents (also termed 'rheology modifiers') are added to coating formulations to provide the requisite flow properties. These can be pseudoplastic or thixotropic. The former is characterised by increased viscosity as force is applied, and the latter is characterised by reduced viscosity. These factors are crucial to the chosen application method and outcome of the finished product. For example, the correct viscosity upon application can prevent excess dripping/spattering if a brush or roller is used, and can promote a consistent and durable finish. Thickening agents can also be employed to promote the correct rheology characteristics required of a coating formulation throughout manufacturing, storage and transportation.

Levelling agents

If aesthetics are important levelling agents can be employed to optimise the finished appearance of a coated surface by controlling the surface tension of a coating (i.e., its ability to wet and spread adequately over a given substrate). If the surface tension of a coating is too high, defects which may not have been visible upon application may appear once the coating has dried. These can include pinholes, scratches, craters, "floating" and "flooding". Levelling agents are added to coating formulations to help eliminate these surface defects and provide a superior looking and smoother appearance.

In conclusion...

Additives comprise only a small proportion of all the components in a coating formulation. However, the performance characteristics they enable are very important for manufacturing, storage, application and/or end-use stages. Hence, consideration of the most appropriate additives is crucial. This can be in relation to an additive's compatibility with the coating formulation, including the base polymer, solvents, pigments and other additives. With over 120 years formulation and manufacturing experience in the performance coatings sector, ITAC can help.

Further information on ITAC's technical solutions and application expertise can be found online at <https://itacadhesives.co.uk> or by calling 01204 573736 or emailing info@itac.uk.com



Making a mark on the international fuel distribution market

How, in a matter of weeks, did the UK's fuel distribution market meet the demands of the first change to fuel marking rules in two decades?

John Hogg Technical Solutions – in conjunction with public relations partner, Metamorphic PR – ensured the market was both engaged and ready for regulatory change.

The Europe-wide change in regulations for marking fuel needed an operational and communications campaign to inform, educate and engage the B2B fuel distribution market in the final weeks of 2023.

Though the EU had announced revised regulations for a new fuel marker two years before the January 2024 deadline, the UK approach – governed by HMRC and likely to be affected by the Windsor Framework for Northern Ireland – was still awaiting confirmation in late 2023.

John Hogg – a market leader in fuel marking technology and solvent dye manufacturing – was already supporting fuel distribution companies in the EU to switch to the new fuel marking regime. And, with HMRC's permission, it could inform the UK market of a potential change to the marking system, while highlighting its ability to support companies with the change.

James Page, Marketing Manager at the company said: "We wanted to be the leading voice informing and educating the market about the imminent change to the Euromarker regulations, while reinforcing our visibility and credibility as the industry thought leader."

A media strategy

To support this goal, John Hogg engaged Metamorphic PR – public relations and communications agency specialising in complex industries – to devise a simple but effective communications strategy.



Jon Clements, Metamorphic PR Director, explained: "This needed a two-stage media strategy, incorporating a news story and an in-depth, advisory article closely targeted to the key audience of UK

fuel distributors ahead of the regulatory deadline in the EU and the UK."

The news story – under the title "Fuel distributors to prepare for possible fuel marker change" – highlighted the imminent Euromarker change, while signalling an upcoming announcement from HMRC to confirm the UK's position.

The story, which featured in key industry publications including Fuel Oil News, also emphasised the operational actions needed for companies to be ready for any change and summarised the services and products available from John Hogg to help this process.

Advice and expertise

While HMRC formulated its policy and scheduled an announcement for the UK's updated fuel marking regulations, Metamorphic PR worked with John Hogg to create the framework for an in-depth, advisory article. This needed a fast turnaround for factual accuracy once new UK legislation was finalised and HMRC made it public.

The final article – "A changing of the guard in the UK fuel marking regime", published exclusively in Fuel Oil News – provided a definitive guide to UK businesses marking fuel for rebate and suppliers of rebated fuel.

This explained the new fuel marker – Accutrace Plus – and offered technical guidance for the range of fuel marker types and quantities required for compliance, along with implementation advice and the key deadline dates for companies to comply with the new regulations.

The article added insight into John Hogg's experience with EU companies and country regulators along with information about the company's new product range designed to meet the new regulations.

Achieving regulatory compliance and driving business

The Euromarker campaign had the desired impact: helping the fuel market meet new regulations and developing new business opportunities for John Hogg.

Both articles created by Metamorphic PR in conjunction with John Hogg were the top two viewed pages on the company's website from September 2023 - January 2024, along with significant website traffic driven by searches relating to Accutrace Plus.

The positive market response to the articles resulted in enquiries for John Hogg's new products from members of the UK and Ireland Fuel Distributors Association (UKIFDA) and companies' successful implementation of new products before the deadline.

James Page added: "One customer, seeing the extent of our PR activity about the Euromarker, asked if we had acquired our main competitor as they had been silent on the subject. The communications campaign helped to reiterate our position as the market leader for these products and the experts that are here to help."

"Implementing the new marker products by the January deadline was a significant challenge and wouldn't have been possible without the campaign and the engagement that it generated."

For further details visit johnhogg.co.uk and metamorphicpr.co.uk



Processes for lignin refinement: Optimal use of the renewable raw material

In the past, the natural raw material lignin was regarded as a by-product produced during the manufacture of pulp or bioethanol. Lignin has primarily been utilised thermally up to now. Today, it is also used as a renewable raw material for a wide range of products. For processing, it must be either in the form of fine powder or granules and therefore be ground or compacted. Hosokawa Alpine offers customised process solutions for both processes.

The natural properties of lignin can be used specifically in a wide range of applications. Whether in the production of carbon fibres, hard carbon for battery anodes, animal feed, as a building block for the chemical industry, a carbon black substitute for rubber (tyres), resins, plastics (thermoplastics, elastomers, waxes) or as an additive for foams (PU foam, aerogels) and cosmetics – lignin can serve as a useful replacement for fossil or harmful raw materials.

Individual processing of lignin

Like other natural raw materials, lignin is also prone to certain quality fluctuations. Various methods are used in processing, which result in different lignin qualities. "There are no standard processing solutions for this. Instead, a deep understanding of the respective application and its requirements is necessary," explains Sonja Seiler, Head of Sales Chemical Division at Hosokawa Alpine.

"For industrial use, the performance of lignin in most target applications is highly dependent on its particle properties. Particle size distribution plays a decisive role here. As granules or briquettes, lignin can be processed further, allowing for good free-flowing and dust-free properties. For other applications, a finely ground powder is required. In both cases, Hosokawa Alpine can offer its support with comprehensive process know-how in compacting, grinding and classification," advises Sonja Seiler.

Grinding with jet mills or classifier mills

Two types of mills from Hosokawa Alpine are particularly suitable for grinding lignin: The AFG jet mill achieves the finest grinding results through precise fine control, reaching high fineness levels of $d_{97} = 5-15 \mu\text{m}$. "The ACM classifier mill, on the other hand, is impressive with its low specific grinding energy, sharp separation limit and flexible production parameters, while enabling a coarser target product with a fineness level of $d_{97} = 10-25 \mu\text{m}$," explains Seiler.

The Microburst AMB jet mill is ideal for use in laboratories and can also grind coarse or fibrous products to

extremely fine levels without any preliminary crushing. In order to obtain a steeper particle size distribution, classification with air classifier ATP is recommended for dust removal at $2-3 \mu\text{m}$ and top grain classification at $20-30 \mu\text{m}$.

Granules versus powder

"Fine lignin powder is explosive, has poor flow characteristics and a low bulk density. For this reason, product handling is complex, occupational health and safety is cost-intensive and large warehousing areas are required," says Sonja Seiler, pointing out the challenges. The solution to these challenges is granulating or briquetting lignin powder. In the process, the raw material is pressed, dust and webs are sieved out, and then fed back into the process. A roller press enables the production of dust-free lignin granules or briquettes with a high product quality, increased bulk density and good flowability. "This not only enables better further processing, safe storage and efficient transport, but also reduces the risk of dust explosions and contamination," Sonja Seiler sums up.

The granulation process consists of evenly dosing the material into the compactor, where it is compressed into a flake by two counter-rotating rollers. Subsequently, the flake is broken down to the desired particle size by pre-crusher and roller crusher.



Figure 1

Further research into the use of lignin

In order to conduct further research into the industrial use of the natural raw material lignin, Hosokawa Alpine is cooperating with Hamburg-based start-up company Lignopure GmbH. Together, the two companies aim to develop customised processes for the lignin market and offer individual solutions based on the quality of the raw material and its market potential.

For further details please visit www.hosokawa-alpine.com

Figure 1: Since lignin is a very diverse material, there are no standard solutions. For this reason, Lignopure analyses the raw material as well as the requirements of the potential end-use in order to obtain the best possible results.

Figure 2: With the ARC MS compactor from Hosokawa Alpine, lignin powder can be processed into dust-free granules or briquettes with a consistent and very high product quality.



Figure 2

Patenting research outputs – finding a gap in a crowded market

As we continue our series on considerations for researchers interested in patenting their research outputs, we turn to some of the finer details of patentability in the field of chemistry. This time, we look at "selection inventions".

Selection inventions

To be patentable, an invention must be novel, inventive and capable of industrial application. In modern industry, research and development has progressed myriad fields of technology at extraordinary rates, building upon existing developments accrued over the years. As such, the inventive steps that inventions take over the prior art are often iterative, not revolutionary. However, inventions do not necessarily need to step into completely untapped technical fields to be patentable. Rather, patentable inventions can also comprise specific types or subsets within more general groups known in the art, provided they have a technical effect. In UK and European law, these are known as "selection inventions", and they are of particular importance in the field of chemistry.

Species vs Genus

The patentability of selection inventions is based upon the tenet that prior disclosure of a species takes away the novelty of a genus encompassing that species, but not *vice versa*. For example, a patent claim directed to a generally disclosed metal alloy would not be novel if a copper alloy had already been disclosed. However, it would be unfair to deny patent protection to an inventor who discovers a new technical effect of a copper alloy when the prior art only discloses a generic metal alloy with no mention of copper.

Whilst an invention that selects a species when only the genus has been previously disclosed might be novel, it is, of course, not novel to simply select one of a number of options from an existing list. However, if two or more entities are selected from two or more existing lists, their selection could potentially be novel (e.g., where a compound is claimed with two particular substituents, each of which has previously only been disclosed as one of many options to be added to the compound's backbone). In this case, patentability depends, amongst other factors, on the lengths of the two lists of potential substituents.

Numerical ranges

Selecting a numerical sub-range from within a known broader range might also be novel, provided the sub-range is narrow relative to the known range, and sufficiently far removed from the end-points of, or specific examples within, the known range. Of course, it must also have a technical effect to be considered inventive, rather than be an arbitrary selection. Generally, minor technical effects need to be offset by large distances between the endpoints of the sub-range and the known range. A claimed numerical range that overlaps a known range might also be patentable if the known range does not disclose a single specific value that also lies within

(or sometimes close to) the range of overlap. As you might imagine, assessment of the likely allowability of numerical selection inventions often requires context-specific analysis from a patent attorney.

Purity and preparation

The purity of a compound is often of importance in the chemicals industry but, whilst it might be seen as a type of selection invention, it can be difficult to patent in Europe. Although a chemical might be of a higher purity than has been previously disclosed, and might thus be novel, the compound per se is only likely to be considered inventive if non-standard methods of purification were used to achieve it. This is based on the understanding that no compound will be 100% pure and so the skilled person would routinely seek to purify it. Whilst somewhat limiting, this is actually a loosening of restrictions, since a claim to a compound was previously held to include that compound at any purity, destroying the novelty of a subsequent claim to that compound at any purity.

As you can see, patent applications for selection inventions (as with all inventions) rely on the identification of a clear technical effect, or inventive step, provided by one's invention. This is best identified early on to enable necessary experimentation to be carried out, and once again demonstrates the paramount importance of preparing and planning one's patent application carefully from the outset.

To find out more from WP Thompson, including how IP could benefit your work, please visit <https://www.wpt.co.uk> or contact Stuart Forrest at sfo@wpt.co.uk.



Schools roped into some exciting experiments during the Chemistry at work week

Bitrez were pleased to have the opportunity to support and contribute at the Catalyst Science Discovery Centre and Museum, “Chemistry at Work Week 2024”, whereby students met and engaged with six local scientific industries. They learnt about the different careers available, what a typical day looks like in one of these jobs, pathways to getting a similar job and take part in a practical science activity related to that company.

After giving an introduction and overview about Bitrez as a business, and a little about their own roles there was a video presentation. This featured a brief summary of polymers and the importance of their role in our everyday life, including a short video to show the secret of the internal lacquer that is present in food and beverage cans.

Following this it was time for an experiment and the gloves were off, well actually the gloves were on, along with other PPE as Dr Thomas Mangnall and Wendy Howarth presented an interactive experiment with audience participation in the generation of Nylon from monomer feedstock. The “Nylon rope trick” and explanatory information about polymers was presented to multiple

groups over the 2 days. Under the watchful eye of Wendy, the volunteers (including some enthusiastic staff members from the Centre) donned their white coats, gloves, and protective glasses looking every bit the scientist of the future, and with some steering and guidance from Tom they capably managed to replicate the experiment that Tom had previously demonstrated. Carothers would have been proud, as volunteers placed their glass rods through the upper phase to magically draw Nylon from the interface by winding up the long thread of nylon rope around their rods.

The event also allowed us to bring the newly commissioned Chemploy interactive game displayed on the ground floor of the Centre to the attention of the attendees, giving them an opportunity to compare the Avatars displayed within the game with the original staff members presenting in person.

Paul Jones, Managing Director attended the event and joined some of the classes to watch his colleagues, commenting, “It was great to see so many young people interested in the presentation, and I was surprised just how engaged they were when undertaking the experiment. I interface with Tom



and Wendy on a daily basis, and it was a pleasure to see them offer such a professional yet interesting and balanced portrayal of chemistry in Bitrez. I also took the opportunity to watch the other excellent presentations, and it was quite apparent that the whole event was perfectly organised and a huge success.”

Tom and Wendy undertook 6 sessions a day over the 2 days and could probably present and perform in their sleep by the end of the event. They wrapped up their reagents, glassware, and other equipment before making the short journey back along the M6 to their customary roles in the business helping to develop and promote new and disruptive chemistry to satisfy market needs. We are sure the event will have helped inspire some young people and maybe provide some insight into life in the chemical industry.



Maybe sat amongst the observing pupils is our next Sales and Marketing Executive, Research and Development Manager or Managing Director. Who knows, but Science is about education, information, and sharing that information so it can be used to aid progress. We wish everyone who presented, attended, or hosted the event our warmest thanks and best wishes and we hope to see you soon.

For further details visit <https://www.bitrez.com/>



Revolutionary flow measurement solutions in experimental reactor processes

In the field of industrial processing, the need for precise and adaptable flow measurement technologies is paramount for the development, testing, and optimisation of various operations. A leading process engineering company recently showcased the effectiveness of clamp-on ultrasonic flow measurement at their technical centre, utilising this advanced technology in processes involving changing mediums in batch reactors.

To appreciate this specific application, it's essential to first understand the basics of clamp-on ultrasonic flowmeter technology. Using ultrasonic transducers that are externally mounted on a pipe, these transducers emit ultrasonic waves through the pipe wall and medium flowing inside, with the flow rate being determined by measuring the time it takes for the sound waves to travel with and against the flow direction. This non-intrusive technique is particularly beneficial for measuring flow in pipes containing corrosive, abrasive, or viscous fluids, as there is no direct contact between the sensor and the medium.

Challenges in flow measurement

In the company's technical centre, each test system is uniquely designed for specific customer processes. The facility can test a broad range of media, often dealing with corrosive substances, and those that vary from viscous to sticky. A significant challenge arose during an experiment involving the production of an oligomer in a batch-operated heated reactor. The process required accurate measurement of volume flow in the circulation line, complicated by the medium's changing properties – increasing viscosity and density as the reaction progressed.

Collaboration and solution implementation

To address this challenge, the technical centre team collaborated with Flexim's field sales engineer, who provided a portable flowmeter, along with a comprehensive introduction to its operation. The clamp-on ultrasonic flowmeter proved to be an ideal solution, offering several benefits:

1. Non-intrusiveness: The external mounting of transducers means they aren't exposed to corrosive or viscous media, reducing wear and damage risks.
2. High measurement dynamics: The technology can detect even minimal flow rates and low velocities, essential for precise control in experimental processes.
3. Flexibility and versatility: The ease of setting up a measuring point and the transmitter's internal substance database allowed for swift adaptation to various media.
4. Configurability: Users could create custom data sets for specific mediums, improving the accuracy of measurements.

Investment and future applications

Impressed by the portable flowmeter's performance, the company invested in a stationary system with enhanced digital communication features. A significant advantage of this technology is its ability to record flow rates non-intrusively and provide insights into the reaction process by simultaneously measuring the speed of sound in the medium.

The successful deployment of clamp-on ultrasonic flowmeter technology in this industrial setting highlights its potential as a versatile, accurate, and reliable tool for process engineering. It demonstrates how modern measurement technologies can significantly contribute to the efficient and safe design of industrial processes.

To find out more about the capabilities and benefits of clamp-on ultrasonic flow measurement in the chemical industry, contact Simon Millington – www.emerson.com flexim-uk@emerson.com | +44 (0)1606 781 420



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At AM Technology, we take pride in our global leadership in continuous flow reactor technology, driving advancements in chemical and pharmaceutical manufacturing worldwide. Our goal is simple: to assist our clients in embracing leaner, more sustainable, and safer processes, fostering a greener and more efficient future.

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Langfields are specialist fabricators of process plant equipment for the Hydrogen, Waste to Energy, Pharmaceutical, Petrochemical, Chemical, Nuclear and other process industries. From our facilities in Salford and Warrington, Langfields have a long history in supporting the North West Chemical sector with the design and manufacture of high integrity products including: Pressure Vessels; Heat Exchangers; Columns; Pipework;

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Our foundation is a heritage of over 75 years' experience in serving the global pharmaceutical, agrochemical and chemical industries. Our modern, world class facility and state of the art laboratories as well as unique access to marine species in Brixham, Devon, means we can provide a turnkey solution for GLP and non-GLP Environmental Risk Assessment requirements.

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WSP in the UK

At WSP, we understand that chemical companies face wide-ranging challenges. These often include regulatory and safety compliance, changes in demand, digitisation and the strive for more cost-effective production methods. With over 15 years' experience in the industry, WSP assists clients in tackling these challenges – throughout the lifecycle of an asset or project.

Registration Services

Having been involved with REACH since its 2007 EU inception, WSP offers both EU and UK-REACH Only Representative (OR) services. This involves helping companies maintain compliance of their registrations following any change in requirements. These often come in the form of compliance decisions from ECHA & HSE, such as the need for additional data, or following the inclusion on the SVHC, Authorisation or Restriction lists.

Our specialist team also provides a full range of services to help companies fulfil REACH endpoint requirements, including independent study monitoring, read-across and QSAR.

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WSP can act as a trustee to ensure supply chain anonymity and protect intellectual property. We can also conduct supply chain audits, ensuring compliance through registration or OR coverage.

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With extensive experience in the classification and labelling of products, WSP provides SDS and label authoring services as well as Poison Centre & SCIP database notification facilities. We additionally have experience in the classification of complex mixtures and new substances from first principle data.

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Supplying to the Chemical Industry

Knowing your local supply chains is important, and suppliers of expertise, solutions and great products are right here in the northwest. CNW members have a strong association with and many years of experience supplying to the chemical industry. The companies listed in this directory cover a wide range of products and services. They have established customers in the sector, with proven track records. Many will be well known, long-standing firms and there will also be new and innovative businesses that you may not have heard about. Effective supply partnerships, delivering success for all! For more details, the websites for the listed companies and organisations can be found at:

<https://www.cia.org.uk/chemicalsnorthwest/Membership/Our-Members/>

Chemicals Distribution, logistics & chemical handling

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Chemical distribution and related services of sample management, storage and blending. Provision of AdBlue, Samsol products, packed chlorine and TRIKLONE & PERKLONE chlorinated solvents. Markets served include: automotive, precision cleaning, coating, oilfield & refineries, flavours, fragrances, surfactants for personal care, household and industrial cleaning and pharmaceuticals.

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F2 Chemicals Ltd

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Hibiscus is one of the UK's leading manufacturers of chemical labels and hazard communication compliance software. For over 40 years they have specialised in providing high-quality labelling solutions for the chemical and hazardous goods industries and are renowned for their knowledge of industry legislation and for the durability and excellent performance of their products.

Hosokawa Micron Ltd

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Itac

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Design and manufacture of drum, IBC and container filling systems ranging from fully automated robotic systems to simple manual machines. Full range of marine, road and rail tanker loading/unloading and safe access equipment. Distributor for Mann-Tek couplings, with repair facility and 'return to base' option.

Keyser & Mackay

Keyser & Mackay is a market oriented agent and distributor of chemical raw materials and industrial equipment, acting as an intermediary between customers and suppliers. Keyser and Mackay NV has their headquarters in Amsterdam, Holland and has been active since 1894. With over 125 years' experience, the company's success today is down to reaping the benefits of all those generations of staff that have been or still are working for it. Today, the group has offices in the Netherlands, Belgium, France, Switzerland, Germany, Poland and Spain, and has started another chapter with the recent entry into the UK market.

Klüber

Global manufacturer of over 2500 speciality lubricants for virtually every industry, Klüber Lubrication high-performance speciality lubricants and effective lubrication management programs enable customers to achieve their operational efficiency goals, increase reliability, and lower the total cost of ownership across assets.

Education, training & skills

Catalyst Science Discovery Centre

An independent charitable trust playing a pivotal role in promoting science across the Northwest. Catalyst works in conjunction with industry partners to excite young people about all STEM subjects and careers available within the science sector. Companies can also sponsor a local school to visit and attend industry days.

Centre for Industry Education Collaboration

CIEC supports companies in making credible and sustainable links with primary schools, in order to inspire the next generation of scientists and engineers. We train STEM professionals to improve their communication skills, and develop industry-focused activities for use directly by teachers or by ambassadors visiting schools.

Chemistry with Cabbage

We work with students of all ages, demonstrating through practical experiments, the relevance of chemistry in solving problems. Research shows that children make career choices very early on, so capturing their imagination early is important. Chemical companies are welcome to support our hands-on work in primary schools.

IChemE

The leading professional qualifying body for chemical, biochemical and process engineers.

TTE Training Ltd

Engineering training and apprenticeships focused on whole person development and bridging the sector's skills gap. The learning environment will be one which is welcoming, safe and inspiring, appropriate to the subjects and responsive to the needs of the learner.

Engineering products & services

AM Technology

AM Technology are experts in continuous manufacturing solutions for the chemical and pharmaceutical industries with their patented Coflore flow reactor technology suitable for a wide range of chemical processes, including multiphase reactions with slurries, from grams to kilotons.

Addison Project

Addison Project is a Multi-Disciplined Engineering Project Management & Design organisation, established in 1997, with offices located in Cheshire, Lancashire and Teesside. We have an in-house team of engineers and designers circa 130 people, catering for mechanical, civil, structural, EC&I, process engineering and a full range of CDM services.

Beamex

Beamex helps its customers to find a better way to calibrate, according to the most demanding requirements of process instrumentation. Beamex offers a comprehensive range of products and services – from portable calibrators to workstations, calibration accessories, calibration software, industry-specific solutions and professional services.

CDR Pumps UK

A leading independent Pump manufacturer. Since opening our doors 60 years ago, we have gone from strength to strength bringing you a company that has the product, service and knowledge to support the chemical, nuclear and pharmaceutical industries on a global scale. And small enough to give you the individual care and attention you need yet big enough to support multi-site, multi-national blue-chip chemical companies. Our global manufacturing facility in Milan is strategically located to support our customers across the world.

Dron & Dickson

Dron & Dickson are recognised market leaders in the supply and maintenance of hazardous area electrical equipment. Our Engineering Services and Wholesale divisions offer bespoke solutions incorporating the very latest industry standard and safety legislation.

Flexim Instruments UK Ltd

We support UK clients with their measurement, commissioning, verification & maintenance needs. Offering clamp-on flow metering of liquids & gases; SIL 2 for safety critical duties; mass flow or concentration measurement options from outside the pipe; virtually zero maintenance; no cost escalation with exotic pipe, pressure or temperature; no outages for commissioning or maintenance; zero leak paths

Laker Vent Engineering Ltd

Supply, fabrication and installation of process and utility piping systems. Project management, detailing, procurement, on and off-site fabrication and installation of pipework and coded welding. Associated steelwork supporting and mechanical installation of plant and equipment. Testing and Handover. Pipework and steelwork is fabricated to specific customer-needs and conforms to all appropriate ISO, BS EN and ASME standards and specifications.

Know your supply chains

Engineering products & services

Langfields

Langfields are specialist fabricators of process plant equipment for the Hydrogen, Waste to Energy, Pharmaceutical, Petrochemical, Chemical, Nuclear and other process industries.

Lokring UK

Lokring UK offer technical engineering support and sales for Lokring technology across the UK. The Lokring "Cold Weld" pipe and tube joint reduces the need for hot work, NDT inspection and reduces on site resources. Code compliant with ASME B31. Lokring is a Safer, Faster, Lower Cost replacement for site welding and flanged fabrication.

Manntek AB

Supply of safety dry disconnect and safety breakaway couplings. Comprehensive range of specialist dry quick release couplings to suit 99% of known chemical applications. Bespoke solutions with a size range of ¾" to 8" nb. Dry disconnect couplings are made to NATO standard Stanag 3756.

METTLER TOLEDO

Mettler Toledo manufacture & service weighing, analytical and inspection equipment used throughout the product cycle from Research & Development, through Scale-Up & Production to Quality Control, Storage & Despatch. We work with our customers to understand and achieve their business goals, including key areas of safety, quality, productivity and sustainability.

MCE Group

Offering valve service and overhaul in our state-of-the-art service workshops, or on site, using OEM parts, from single valves to complete outages. European distributor for ValTechnologies, providing severe service, zero-leakage isolation valve solutions, setting the standard for the next generation of valves for the chemical industry.

O'Hare Engineering Design Ltd

Innovative, Detailed, Working Solutions. O'Hare Engineering Design Ltd. are providers of 3D laser scanning, mechanical and pipe design solutions. With over 18 years' experience, we know that accuracy is fundamentally the most important element in every engineering design project, so our client focused approach uses the latest technology to provide an effective solution that is sure to hit the brief, every time.

Perry Process Equipment Ltd

Buying and selling of high quality used processing plant and equipment. Savings of up to 70% on the cost of process equipment, full mechanical and electrical refurbishment and equipment immediately available form stock. Centrifuges, dryers, evaporators, filters, heat exchangers, mills, mixers, reactors, separators, tanks.

Pumptec Engineering Services

Specialises in supporting the chemical industry in the inspection, repair, overhaul and fitting of all types of rotating equipment. Our highly trained engineers can support your routine maintenance, call outs and shutdowns. Our Wirral based machine shop can complete overhauls on your pumps, fans and mixers.

ProDecon®

Providing industrial service solutions to the Oil&Gas, Chemical, Power, Pharmaceutical and Industrial sectors. Specialising in hazardous hydrocarbon and chemical environments. ProDecon® has a unique range of technical expertise, that enables us to support customers with restoring process performance and providing maintenance risk management through bespoke industrial cleaning solutions.

SABSCO (Steam and Air Blowing Service Company)

is the British subsidiary of the Solarca Group, with offices in Kent. They have been providing world-class steam/air blowing services on projects across the globe since 2003. With the addition of SABSCO, the Solarca Group gained a major competitive advantage: the ability to offer integrated chemical cleaning and steam/air blowing services. World-renowned in their field, they have been selected by leading engineering companies for large-scale steam/air blowing projects in every corner of the globe

Studley Engineering Ltd

A multi-disciplined mechanical and electrical engineering contractor, providing a comprehensive service to the process industries in disciplines including: steelwork, welding, maintenance, site services, pipework, tanks and vessels. Over time we have gained an enviable reputation as a reliable, responsive, motivated contractor that delivers safe, high quality, cost effective work.

Swagelok Manchester

Fluid system solutions, products, training and services. Supply of over 7000 fluid system components including; fittings, hoses, tubing, regulators, equipment servicing and custom fabricated solutions. Provision of practical information, know-how, tools and speciality services needed to purchase, manage and apply them successfully.

Yokogawa

Yokogawa is a leading provider of field instrumentation, safety systems, industrial automation and digital transformation solutions. IOT, OT Cybersecurity and Alarm Management are specific areas of focus for Yokogawa's Advanced Solutions team with a number of major projects currently being delivered across Europe.

Engineering project management & energy

Atlas Copco Rental UK

Provides temporary cost and energy efficient solutions for long- or short-term demands, planned maintenance or unexpected emergencies. Our engineers design the most suitable temporary installation, utilising our fleet of state-of-the-art equipment which includes 100% oil-free Class 0 and oil-injected compressed air at medium or high pressure, generators for power, and nitrogen. Quality of service, environmental care and personnel safety are guaranteed by our triple ISO certification.

AXIOM

A multi-award-winning, asset management solutions provider, supporting the chemical, pharmaceutical, oil & gas, bulk storage, power, renewables and related industries. With integration of their Materials, Mechanical, Inspection, Process Engineering and Process Safety Services, Axiom are uniquely positioned to identify and mitigate key through-life risks across the entire asset life cycle.

Graham Hart (Process Technology) Ltd

Delivering high integrity heat transfer equipment for over 45 years. The company has a strong emphasis on Chemical/Process & Mechanical Engineering backed up by an advanced manufacturing facility.

IKM Consulting

With 25 years of civil & structural engineering and environmental consulting experience, IKM's portfolio in high-hazard and regulated industries is extensive. With offices in Runcorn and Grangemouth, IKM specialises in consulting services around asset integrity, secondary & tertiary containment, asset infrastructure inspections, environmental risk assessments and COMAH compliance.

John F Hunt Regeneration Ltd

John F Hunt Regeneration are a trusted partner for brownfield demolition, remediation, water treatment and enabling services. As part of the John F Hunt Group, we have the scale and financial stability to provide a complete works package no matter the size of the scheme.

Otto Simon Ltd

Diverse engineering consultancy and project delivery organisation. Initial consultations, technical and commercial due diligence and front-end design and definition. Feasibility studies through design, supply, erection, and commissioning services using in-house and licensed technology. Services for complete plants or upgrades. Procurement, construction management, start-up and operation & maintenance expertise.

PM Group

PM Group is an employee owned, international project delivery company operating across Europe, the USA and Asia. We have a 50+ year track record in project management, process design, process safety, facility design and construction management for leading multinational companies.

Engineering, IT & process consultants

Gexcon UK Ltd

Safety and risk management and advanced dispersion, explosion and fire modelling. Unique expertise and shared knowledge on how to prevent explosion accidents. Carrying out accident investigations and dedicated facilities for physical testing. Ventilation and dispersion modelling also available. Hazardous area classification and quantitative and qualitative risk analysis and assessment.

OpenPSM

OpenPSM® is a cloud-based software solution, developed to help businesses manufacturing or handling hazardous chemicals meet the requirements of modern risk-based process safety legislation. Providing a unique framework allowing you to log and assess every aspect of your company's process safety management programme, OpenPSM® necessarily supports engagement from shopfloor to boardroom, allowing everyone with an active part to play in process safety to have relevant information to hand.

Siemens Digital Factory & Process Industries and Drives

Productivity and efficiency requirements continuously increase in the field of process automation. A comprehensive range of process automation and Drives products as well as an award-winning range of training and support services.

Environment, health & safety risk management

ABS Consulting

A global process safety consultancy and training services provider with regional headquarters in Warrington, UK. Our expertise in data-driven risk and reliability includes a range of capabilities: root cause analysis, incident investigation, organisational culture evaluation, risk management, process hazard analysis, bow-tie and data science techniques. Our approved process safety leadership training courses and proficiencies also include building risk assessments, HAZOP analysis, compliance auditing, asset integrity management competency assurance and management systems certification services.

BakerRisk Europe Ltd

Dedicated to help predict, prevent and mitigate hazards and explosions, fires and toxic releases. Specialising in process safety and risk management, we help clients understand their risks and offer cost-effective risk management solutions. Success id delivered through proven knowledge and experience, innovative research and unique engineering capabilities.

Chemical and Industrial Consultants Association

An association of independent consultants with extensive experience, many having worked in the chemical industry, across various fields. Provision of technical and business advice on almost every aspect of chemical manufacture, development, marketing and management.

RAS Ltd

Expertise that covers the full range of risk assessment and management services across; safety risk, business risk and environmental risk. Carry out Quantitative risk Assessments and Predictive & consequence modelling, through 'softer' risks affecting an organisation's reputation.

RPS Group

Provision of specialist consultancy to help those with responsibility for health and safety achieve compliance. With particular expertise in the chemicals sector, we provide support from plant development through to operation. Core services include: ATEX/DSEAR, asbestos, BowTie analysis, CDM, COMAH support, fire safety engineering, functional safety, hazard identification, Legionella, occupation health and risk assessment/analysis.

SLR Consulting

A unique blend of leadership, management, consulting, engineering and training services is offered to the chemicals industry. A forerunner in sustainable process safety management combined with proven business improvement capabilities enables delivery of practical solutions to promote safety and efficiency in design, operation and maintenance of complex hazardous facilities.

Facilities, finance and other business services

Department for Business & Trade

Operational support for British exports as well as facilitating inward and outward investment activity. Support is given to first-time exporters or established exporters requiring more help with accessing more difficult markets or putting strategic alliances in place. Access to expert advice, trade services, training and events.

Pen Underwriting incorporating OAMPS

Specialist Insurance services to high hazard manufacturing and haulage industries. Motor fleets, property, liability and transit policies. We help clients minimise risk through proactive risk management and a range of training and response services to assist companies in planning for and dealing with incidents and emergencies.

Sci-Tech Daresbury

We are a national science and innovation campus, and enterprise zone providing a range of office, laboratory and workshop accommodation for technology companies (from a desk to large laboratory and office units). Companies have access to a range of facilities covering material analysis, virtual design & simulation, and rapid prototyping.

STFC Innovations Technology Access Centre

A unique, fully equipped space for innovation, research and development. Providing flexible access to laboratory space, "hot labs" and scientific equipment. Ideally suited to start-up companies, smaller and medium size enterprises and R&D team from established companies.

TW Languages Ltd

Provision of a professional and reliable multi-lingual translation service delivering high quality translations. We specialise in business, technical and scientific translations into 250+ language combinations. We provide certified translations for legal purposes. We are full members of the ATC & EUATC and ISO 17100 Translation Services certified.

Laboratory products, testing and services

Scymaris Ltd

We offer high quality and cost-effective ecotoxicology, environmental fate, and chemistry services to the global agrochemical, pharmaceutical, industrial chemicals & animal health industries. Our state-of-the-art laboratory is equipped with controlled temperature rooms, freshwater and seawater testing facilities and is accredited to work according to GLP and most Global regulatory requirements.

XCellIR8 Ltd

A world leader in animal-free testing. Our GLP accredited laboratory provides groundbreaking in vitro safety tests for the chemical and personal care industries. We are passionate about delivering testing strategies that are both scientifically advanced and ethically sound. Our award-winning work is recognised at a regulatory level by the OECD and ECHA.

Legal & patents

Appleyard Lees LLP

Patent and trademark attorneys. Aim to obtain the best possible patent protection for clients. Experience of product clearance against competitor patents and in due diligence for mergers and acquisitions. Advice on licensing issues and collaboration agreements relating to IP.

Bawden and Associates

A legal firm providing professional services across all IP matters. Drafting and prosecution of patent applications, handling opposition and appeals in the EPO and in litigation in UK and international courts. Business led and strategic approach to generate assets of real commercial value.

Mathys & Squire LLP

Mathys & Squire LLP is a full-service intellectual property law firm with industry-leading expertise in patents, trade marks, design protection and IP litigation and including a dedicated chemistry team of highly experienced attorneys holding higher degrees and research or industrial experience who are passionate about innovation in the chemical field.

Squire Patton Boggs (UK) LLP

Global legal company providing legal, regulatory and advocacy assistance to the chemical and performance material industries. Expertise that emphasises areas that mean the most to industry such as environmental, mergers and acquisitions, commercial finance, construction, litigation, Ip, public policy and international expansion.

Withers & Rogers LLP

A leading UK and European intellectual property law firm with five offices including London and Munich. We offer a range of IP services including obtaining UK, European and worldwide patent or trade mark protection, the handling of contentious matters, advice surrounding licensing arrangements and issues including validity of patents and "freedom to operate".

WP Thompson

Intellectual property attorneys providing high quality advice to start-ups, SMEs or FTSE 100 companies. Team of experienced IP attorneys specializing in chemistry and life sciences, with first degrees and PhDs in these fields. Securing the most appropriate, cost effective and commercially valuable protection for your intellectual investment and innovation.

REACH and chemicals services

CIRS

CIRS Group was established in 2007 and is a leading product safety and regulatory consulting firm. It utilizes its technical expertise, resources, and international network to provide comprehensive compliance services including chemical notifications and registrations, global GHS compliance, laboratory testing, R&D, and data services across multiple industries globally.

Dr Knoell Consult Ltd

An independent service provider for the chemical and related industries. Globally the Knoell group has over 450 employees covering all aspects of regulatory compliance for industrial chemicals, agrochemicals and biocides: e.g., strategic planning, dossier preparation, exposure assessment, SDS preparation, and from REACH to K-REACH!

GlobalIMSDS

A complete safety data sheet/literature and regulatory service for your entire product communications in any language, style and format required. Hazmix is a new 'pay as you go' web-browser product that is setting a new standard in SDS authoring. A Solutions service that also provides technical advice.

Intertek Regulatory Services

Health, environmental and regulatory services for implementation of chemicals management. Worldwide registration of chemicals, food contact compliance and notification, global chemicals compliance, design/optimisation of toxicological and eco-toxicological studies, hazardous substance management, EU cosmetic and biocidal products compliance, classification & labelling, SDS consulting.

Know your supply chains

REACH and chemicals services

WSP in the UK

Recognising that chemical companies face a wide range of regulatory challenges, WSP's centre of excellence can assist companies with chemical compliance and safety obligations. The team's role is to facilitate a company's route to compliance in areas such as chemical registration (including EU and UK-REACH), supply chain management, GHS/CLP and DGSA, amongst other safety related services.

Yordas Group

Yordas Group is a leading provider of scientific, environmental, human health and global regulatory consulting services. They offer chemical regulatory support, expert scientific services and support on chemicals management and product stewardship, global hazard communication, hazard and risk assessment, analytical and (eco)tox testing.

Recruitment

Adepto Technical Recruitment

A specialist engineering, manufacturing and scientific recruitment consultancy that focuses upon the provision of permanent staff and contract resource to the Chemicals industry. Established in 2015, Adepto has quickly become the partner of choice for many blue-chip and SME manufacturers, engineering companies and consultancies due to our deep knowledge of the industry, credibility and professionalism.

Handley James Chemical

Mid to senior level appointments solely within the Chemical Manufacturing space. Over 30 years search experience. The company was built on the success of Stuart Tomkinson's successful 11-year recruitment career primarily within the chemical manufacturing arena. Focusing on providing the best talent in the chemical industry. We work closely with you, to understand your business, your culture and exactly what you are looking for from a recruitment partner.

Page Executive

The executive recruitment division of PageGroup – provides a range of search, selection and talent management solutions. We focus on Board- and Director-level assignments, both on a permanent and interim basis, and have a strong track record of successfully partnering with the Chemicals sector.

RMG

RMG is an award-winning headhunting consultancy with a difference - we make it our business to search and understand who's who in the Chemicals and STEM sectors and have the know-how to find talented people who will deliver lasting impact and add financial value to your organisation.

Science Recruitment Group

Experts in the recruitment of scientific, regulatory, quality, engineering and technical professional across all areas of the industry. Support in recruiting temporary, contract or permanent staff for your team.

Science Solutions Recruitment

Is a specialist science & technical recruiter with specific expert teams to service niche fields, including speciality chemicals, drug discovery, polymers, materials, cosmetics, personal care, household products, pharmaceuticals, biotechnology & medical devices.

SRG

SRG are industry leaders in Science, Engineering and Clinical Recruitment. We empower individuals and businesses to power the future of STEM. With true specialist knowledge, we support a full spectrum of technical roles and talent solutions across the whole product life cycle, from R&D, through analysis, manufacturing, and engineering to market access.

Join and Connect

Chemicals Northwest is the industry-led, chemical cluster support organisation for the North West and surrounding areas chemical sector, the largest in the UK.

We are funded by our members and owned and supported by the Chemical Industries Association.

Chemicals Northwest members currently serve a wide range of markets, including manufactures of chemicals, pharmaceuticals, automotive, electronics and construction products.

Our membership also has a large proportion of vital service

provision to the industry, including legal, engineering, recruitment, laboratories and logistics - to name a few!

Members benefit from access to high quality events and communications. Face to face networking is at the heart of our offering, giving members the best opportunities to meet new contacts and find new opportunities.

Why not join Chemicals Northwest and connect with this dynamic and innovative industry? Please visit our website at: <https://www.cia.org.uk/chemicalsnorthwest/> Or, contact us directly as below.

Chemicals
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A Changing Climate

Mandate for Environmental Permits - are you prepared?

The UK government has mandated new climate change risk planning for organisations operating under an Environmental Permit in England and Wales. Those permitted from 1 April 2023 must integrate a climate adaptation plan into management systems. Organisations permitted earlier need to complete a climate risk assessment by 1 April 2024.

SLR provides technical expertise in the following areas, should you require assistance preparing a climate change risk and adaptation plan:

- Undertaking standard and in-depth climate change risk assessments
- Development and implementation of climate adaptation plans
- Environmental management systems
- Environmental compliance auditing
- Environmental permit applications

“A global leader in full spectrum sustainability solutions, providing clients with strategic advice and on the ground support.”

Contact Us

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