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Items for inclusion in *Hotline* and enquiries about CHTA activities should be addressed to:

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CHTA Secretary and *Hotline* Editor: Alan J. Hick B.Sc., C. Eng., FIMMM

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CHTA Secretary wins award for Meritorious Service to the <u>Heat Treatment</u> Industry



October's well-attended SEA Awards and Contract Heat Treatment Association 50th Anniversary Gala Dinner was an extra-special event for CHTA Secretary Alan J Hick. He's seen here being presented with the prestigious Meritorious Service to the Heat Treatment Industry award by SEA President Lord Whitby (left). The award recognises Alan's 32 years as Manager of the Wolfson Heat Treatment Centre / Editor of *Heat Treatment of Metals* journal and 50 years as part-time CHTA Secretary, during which he has been Editor of *Hotline* since 1997. With retirement planned for 2024, metallurgist Alan said: "I am extremely proud to be honoured by my peers with such a well-timed award".



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What a night!

CHTA's 50th Anniversary was celebrated, alongside SEA's Awards, with a gala dinner at Birmingham's Grand Hotel on October 20th. CHTA-member staff and partners, seen here, were amongst some 160 guests that assembled for a great time, despite travel problems on a storm-hit evening.



































_ Hotline 174 _

Hot isostatic pressing – filling the void



Business Manager at the new Wallwork Hot Isostatic Pressing Centre, **David Loughlin**, has 15 years' commercial and general management experience within HIP, heat and

surface treatment enterprises. Here he outlines some of the technical benefits of HIPing that have led Wallwork to make significant investment in the technology.

The process

At its simplest, the hot isostatic pressing (HIP) process requires the concurrent application of heat and pressure, within an atmosphere of gas that is usually inert. The aim is to remove porosity in the material in application, giving many benefits such as improved microstructure for greater strength, better fatigue properties and reduced creep.

The pressure is applied to the load isostatically, meaning that gas pressure is applied from all directions. Temperature is applied at around 70 to 80% of the melting point of the material. These process conditions, when held for a suitable duration, create a uniform isentropic microstructure within the workpiece material. The mechanism for this porosity removal is a combination of creep, plastic deformation and diffusion.

Beyond the significant benefits mentioned, the engineer specifying the process can also be assured of a much greater reliability and repeatability of properties, as the typical scatter that would otherwise be found in properties will be significantly reduced. This is highlighted in a paper by H.V.Atkinson and S.Davies, *Fundamental Aspects of Hot Isostatic Pressing: An Overview 2000**.

Applications

From its early adoption in diffusion bonding of nuclear products, through to its typical usage today in supporting castings (densification) and powder metallurgy-HIP (part production through powder metallurgy), the future applications for HIP technology are interesting and varied. The most obvious and rapidly-advancing production technology that HIP benefits is additive manufacturing - 3D printing components from metals and alloys. Sometimes, these can be complex geometries that replace several traditionally-

*Atkinson, H. V. and Davies, S. Fundamental aspects of hot isostatic pressing: An overview. *Metall Mater Trans A 31, 2981–3000 (2000). https://doi.org/10.1007/s11661-000-0078-2*

engineered components that would need assembling, or may be impossible to manufacture by any other means. Microvoids are inherent in the microstructure of 3D-printed parts – built-in by the nature of the AM process.

In simple terms, HIP is used to remove defects and microporosity in AM parts, providing similar benefits to those offered to cast parts over the last decades. Perhaps more interesting, though, is how the planned use of HIP technology can lend itself to optimised AM printing parameters that can allow AM suppliers to produce parts more quickly and cheaply.



Powder metallurgy-HIP attracts much less attention than 3D printing, even though this technology is being used far more widely. Often referred to as "near-netshape" technology, here specialists design cans, typically made of steel, that are then filled with a metal powder of the desired final part. The can is carefully designed to ensure that once it is processed within a HIP system, during which time it will contract, the solid and now homogeneous end-product has a geometry close to the desired end-product. This type of manufacturing is an extremely efficient way of making parts, reducing costs and lead times, compared with conventional manufacturing methods. It is also a large and often unseen area of the hot isostatic pressing service market.

Investment

With so many and varied options to support the use of new and exciting materials within 3D printing and powder metallurgy-HIP, and while also remaining a mainstay for conventionally-cast products, the need for HIP services is growing quickly. With so few providers of HIP services, especially right now in the UK, there is need for more capacity to support this demand with HIP systems that reliably achieve the latest HIP specifications. Unfortunately, it is a high-capital-cost investment beyond most smaller heat treaters and this has left little supply choice for UK manufacturers.

So why is Wallwork investing over £20million in the latest HIP equipment? As the leading independent supplier of thermal processes within the UK, with extensive Nadcap-approved processes across its four UK sites, several large customers across industry approached Wallwork to invest in the technology. Wallwork's reputation for customer-focussed service and providing industry with leading quality standards were the baseline for the discussion. Additionally, the ability for solesupplier support for HIP and other thermal processing needs was also highly desirable to these customers.

Perhaps unsurprisingly, as this had already been considered for over a decade, the Wallwork board made the decision to invest in HIP.

Now housed within a dedicated 2500m² facility close to the Lord Street works in Bury, the first of several HIP systems has been installed and is now fully operational. The state-of-the-art system was manufactured by industry-leading supplier Quintus Technologies. Offering processing limits of 1250°C and 207MPa, the system is suitable for a wide range of engineered alloys, from aluminium, titanium, steels, cobalt-chrome through to nickel.

With an 800mm diameter and 2550mm height, it is possible to process a huge volume of material quickly and efficiently through the HIP. The system is also fitted with URC TM technology, allowing the rapid and uniform controlled cooling of materials, which can allow HIP and heat treatment of certain alloys within a single process. The service offering will also include several shared or 'coach' cycles, for those customers who do not have sufficient material to fill such a large system.

More information

David Loughlin, Business Manager, Wallwork HIP Centre at *david.loughlin@wallworkht.com.*

Mat-Tech Joining Technologies: innovative joining solutions for industry

A profile from Mat-Tech Director Arthur Miles...

CHTA member Mat-Tech Joining Technologies Ltd specialises in the production, development, optimisation and testing of joining solutions. The company's extensive technical knowledge and research resources ensure that customers receive cost-efficient solutions that maximise product life.

Mat-Tech's focus on innovation means that we help clients develop a unique product from idea and concept to the final stage of production. Whether it is vacuum brazing, diffusion bonding, induction brazing, fluxless or lead-free soldering, we have the expertise to help customers develop a competitive edge in their product.

Based in Stone, Staffordshire, Mat-Tech Joining Technologies operates alongside two sites in The Netherlands (Mat-Tech BV and Mat-Tech BV Production) helping customers across the UK, Europe and worldwide develop products with unique joining solutions (*www.mat-tech.com*).

It is essential to explore the various choices of joining processes during the product development stage and to assess whether any optimisations are feasible. This can ultimately have a positive impact on the cost, function and lifespan of the component.

Most components we help our customers with at our state-of-the-art facilities operate in very demanding service environments. Typically these are in aerospace, nuclear, cryogenic and Big Science projects at extreme temperatures and in vacuum, where choice of material and joining is one of the most integral factors in life of the product.

At Mat-Tech we are constantly exploring solutions for joining materials, working with academia and research partners across various sectors and industries to ensure we are kept informed of the latest breakthroughs in material science and research, especially those in the Big Science



Author Arthur Miles, seen here at November's Advanced Engineering 2023 show.

domain, where insight into these international projects can benefit our customers in other manufacturing sectors. In order to complement our research capabilities, Mat-Tech is able to conduct SEM, EDX and optical microscopy for visual and cross-sectional analysis of joints. We also have the capability to perform all mechanical and environmental tests, such as thermal cycle, thermal shock, temperature and humidity, vibration and corrosion tests, in our facilities.

Alongside our development and testing unit, our production unit focuses on proven technology and components which have passed and qualified the prototype and pre-production stages by our clients. We are able to entertain any order size, from small batches to high-volume production. Our joining techniques include vacuum brazing, induction brazing, diffusion bonding and soldering of various similar or dissimilar substrates and various commercial or developed brazing/soldering alloys, depending on application. We are often able to combine heat treatment with vacuum brazing and diffusion bonding in the same thermal process, depending on desired properties of the final component. We were pleased to exhibit, for a fifth time,

at November's *Advanced Engineering* 2023, held at the NEC in Birmingham. There we had the opportunity to display a range of products we have developed together with our customers and are currently in full-scale production.

Every year we get the opportunity, through *Advanced Engineering*, to engage with both the industry and academia and understand the challenges in joining materials and potential upcoming develoments. This does provide a basis for further development and research in the field and to align ourselves with the demands of the industry.



Typical products processed by Mat-Tech.

We continue to be guided by our vision to help industry meet the challenges of joining materials, both for products and assemblies, whether in production or for future developments, and to bring the science of material and joining solutions to the customer. We would be pleased to hear from you and to see how we can help provide the perfect joining solution



NEWS

Member news

BODYCOTE GROUP CHIEF EXECUTIVE APPOINTMENT

Bodycote plc has announced the appointment of Jim Fairbairn as Group Chief Executive to succeed Stephen Harris on his retirement. Jim is expected to join the company and the board in March 2024



and become Group Chief Executive in May 2024 following an orderly transition. Stephen will step down from the board and retire from the company at the next Annual General Meeting on 31 May 2024.

Jim, 54, has considerable experience in managing engineering businesses, having worked with John Wood Group, PE-owned Clyde Bergemann, Howden Group and Megger Group in a career spanning over three decades, with substantial experience as a Divisional and then Group CEO.

Jim joins Bodycote from test and measurement specialist Megger Group in Dover, which he joined as Group CEO in 2017. Under his leadership, its revenues have materially grown to £325m, with operating margins expanding significantly. He also meaningfully evolved Megger's strategy and culture over this period. Prior to Megger, he held executive positions with Howden Group in Glasgow from 2009-2017, concluding his time there as President of the Howden Power, Environment and Process business with global product and service revenues of over \$1billion with 19 sites worldwide.

During his time in Glasgow, Jim chaired the Glasgow Employer Coalition, helping long-term unemployed into work, for which he was awarded an OBE in 2007.

Jim has a degree in Mechanical Engineering from the University of Strathclyde, is a Chartered Engineer, a Fellow of the Royal Academy of Engineering and has an honorary Doctor of Science from City University.

Chair of Bodycote, Daniel Dayan, said: "The board is delighted to appoint Jim as Bodycote's next Group Chief Executive. His track record in leading and developing specialist global industrial businesses and teams is outstanding and will enable him to contribute rapidly. His understanding of many of our processes, many of our customers, and the nature of our highlyvaried markets, will be of enormous value. I look forward to working with Jim to drive the continuing development and growth of Bodycote."

BENEVOLENT SOCIETY SUPPORT

The Benevolent Society, the charitable organisation of the British Allied Trades Federation, provides support to individuals of members of BATF constituent associations, including SEA and CHTA. The support available includes:

General financial assistance

Available for individuals who currently

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Single-insertion charges for black-and-white ads:				
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Full page	254mm high x 178mm wide	£630 +VAT		
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2024 DEADLINES

Issue	Publication month	Order deadline	Copy dead l ine
Hotline 175	March	2 February	9 February
Hotline 176	June	3 May	10 May
Hotline 177	September	2 August	9 August
Hotline 178	December	1 November	8 November

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As well as enjoying a 20% discount on the rates listed, advertisers in four consecutive editions of *Hotline* are, at no additional charge, entitled to:

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Appear on the Suppliers page of CHTA's website (www.chta.co.uk/suppliers/).

Post regular items in Hotline's "advertiser news".

COPY REQUIREMENTS

Hotline does not accept recruitment advertising.

For further details, contact *Hotline* Editor Alan J. Hick. Tel: 0121 329 2970; e-mail: <u>mail@chta.co.uk</u>

Devoted exclusively to the UK heat treatment community

work or have previously worked in the BATF industries and are experiencing financial hardship. The charity provides support in the form of regular monthly or quarterly grants, or one-off grants for essential expenses such as the replacement of white goods.

Cost of living support fund

Only available to individuals who are current or previous members of one of the BATF federated trade associations. Oneoff grants of £750 are available to help alleviate some of the impact of rising living costs.

Bursaries

Bursaries of up to £9,000 for education/ training are available for individuals who currently work or are embarking on a career in the BATF industries. Applicants must be 21 or over and have been offered a place on their intended course. All courses run by accredited providers are considered.

Fuller Foundation

A legacy trust provides bursaries of up to £15,000 to support individuals looking to advance their careers within the company in which they are currently employed. It provides financial support for applicants who wish to undertake continuing professional development, training and/ or education which will enable them to progress their managerial competencies to director/executive level within the industries covered by the trades embraced by BATF. Its purpose is to support individuals looking to advance within a company to enable a managerial or directoratelevel change, to both the individual and the company, through the study and application of continuing professional development, training and education at the management/director level.

All grant and bursary applications are assessed by the board of trustees on a case-by-case basis and are awarded according to the applicant's individual circumstances and financial situation. Grants and bursaries are for individuals only, not to support businesses or business start-ups. The board of trustees review all applications at their quarterly meetings. However, if any applications are deemed urgent, they can be reviewed via email by the trustees between meetings.

If you require more information, contact Laura Banner on 0121 237 1119 or 07827 387 200 (*laura.b.banner@gmail.com*).

CHTA 2024 MEMBERSHIP FEES

The annual CHTA membership fee for a single-site company will be £750+VAT for 2024. For multi-site companies, the additional fee is £190+VAT per extra division.

The 2024 fees are being invoiced on behalf of CHTA by SEA/BATF.

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Diary

November 13-14 2023 ADVANCED PYROMETRY Birmingham, England PRI Training (pri-training.com)

November 13-16 2023 **28TH IFHTSE CONGRESS** Yokohama, Japan https://isht.or.ip/ifhtse2023

November 16-17 2023 INTRODUCTION TO PYROMETRY Derby, England PRI Training (pri-training.com)

November 21 2023 TRANSVALOR SOLUTIONS FOR HEAT TREATMENT MODELLING CBM webinar https://thecbm.co.uk/news-and-events/events/

November 22-23 2023 CONFERENCE ON MATERIALS AND EQUIPMENT IN HEAT TREATMENT Jihlava, Czech Republic www.htconference.cz/en/

December 4-6 2023 PRACTICAL INDUCTION HEAT TREATING ASM Education virtual option online www.asminternational.org/learning/courses

December 4-5 2023 INTRODUCTION TO PYROMETRY Coventry, England PRI Training (pri-training.com)

January 25 2024 CHTA PUBLICITY SUBCOMMITTEE* Birmingham, England

February 8 2024 CHTA MANAGEMENT COMMITTEE* Birmingham, England

February 28-29 2024 METALLURGY FOR NON-METALLURGISTS CBM online course https://thecbm.co.uk/news-and-events/events/

March 27-29 2024 12TH INTERNATIONAL METALLURGY, FOUNDRY, FORGING AND HEAT TREATMENT INDUSTRY EQUIPMENT EXHIBITION Buson, South Korea www.thermotec.co.kr/English/introduction.html

April 9-11 2024 HEAT TREAT MEXICO 2024 Queretaro, Mexico www.asminternational.org/heat-treat-mexico-2024/

April 16-17 2024 8TH CENTRAL EUROPEAN HEAT TREATMENT FORUM AND EXPO

Wrocław, Poland Organised by the Global Heat Treatment Network. www.heat-treatment-forum.pl/homepage/

April 16-18 2024 **ENGINEERING SUPPLY CHAIN SHOW 2024** Birmingham, England https://engineeringsupplychain.co.uk/

April 17-19 2024 4TH MEDITERRANEAN CONFERENCE ON HEAT TREATMENT AND SURFACE ENGINEERING Lecce, Italy www.aimnet.it/eng/manifestazione.php?id=788&idc=4

April 22 2024

HEAT TREATING: NADCAP AUDIT CRITERIA REVIEW Southampton, England PRI Training (pri-training.com)

April 25 2024 CHTA PUBLICITY SUBCOMMITTEE* Birmingham, England

April 25-26 2024 2ND BOSPHORUS INTERNATIONAL HEAT TREAT-MENT SYMPOSIUM Istanbul, Turkey www.bhtsheat.com/en

May 9 2024 CHTA MANAGEMENT COMMITTEE / AGM* Birmingham, England

*Members wishing issues to be raised at CHTA meetings should notify CHTA's Secretary, well beforehand, at mail@chta.co.uk.

Market Movements

ANALYSIS OF QUESTIONNAIRE REPLIES RELATING TO 21 CHTA MEMBER SITES

"THIS QUARTER" =

1 JULY -30 SEPTEMBER 2023

(21 SITES) index This quarter last year 95.8 101.3 Last quarter **Predicted next quarter** 101.4

Mean

OVERALL ANALYSIS





May 11-13 2024

24TH CHINA (GUANGZHOU) INTERNATIONAL HEAT TREATMENT & INDUSTRIAL FURNACE EXHIBITION Guangzhou, China www.heattreatmentexpo.com

June 5-6 2024 SUBCON

Birmingham, England

June 5-7 2024



EUROPEAN CONFERENCE ON HEAT TREATMENT AND SURFACE ENGINEERING / A3TS 50TH CONGRESS Toulouse, France

https://en.a3ts.org/evenements/echt-2024-and-a3ts-50th-congress July 25 2024

CHTA PUBLICITY SUBCOMMITTEE* Birmingham, England

August 8 2024 CHTA MANAGEMENT COMMITTEE* Birmingham, England

September 4-6 2024 15TH HEAT TREAT SHOW - 2024 Mumbai, India www.htsindiaexpo.com

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Please send comment and news items for March's Hotline 175 to: mail@chta.co.uk **Deadline: February 9th**