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Rapid On-Line Aerospace Heat Treatment Quoting Service Launches at Farnborough

Surface engineering specialist, the Wallwork Group, chose Farnborough to inaugurate their on-line quoting service for aerospace heat treatment. The automated service permits customers to input data directly and receive an instant indicative price for a complete range of heat treatment processes including harden and temper, annealing, stress relief, solution treat precipitation harden and many more. The service is only available to aerospace component manufacturers.

“A manual quotation can often take 24 hours to turn around and many customers, working 24/7, on tight deadlines, find this frustrating. The new service means that we can give them an indicative price, with a high level of confidence, automatically. Quotations are subject to human confirmation but we are confident that the new system is an enhancement to our manual system and a significant help to our customers,” said Ian Griffin, aerospace hub site director.

Users of the service must first be accredited and registered. Once this is done each access is subject to simple identification checks before the user inputs details of the material, size of component, weight, process, number of pieces, release authority, QA standards and other key factors. The system is structured to provide useful intuitive prompts on the information as needed. Once this is complete computation is instant.

“We have built the software around the needs of aerospace customers and it covers nearly all out heat treatment processes,” explained sales manager Howard Maher. “Aluminium and magnesium heat treatment, vacuum brazing and coating services are more complex to cost so these are not currently included in the service.”

Access to the 24/7 service is available from any internet enabled location and on any type of device including desktop PC’s, laptops and mobiles.

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Press pack images and PDF: www.ainsmag.co.uk/wa253/5539wa1a-farnborough-2016.htm

July 08, 2016



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Making Lighter Landing Gear More Resilient

New materials bring new challenges. In the quest for lighter aircraft to reduce fuel consumption and improve payload, titanium is replacing steel and other dense metals in applications such as bearings, including within landing gear. Though titanium is much lighter, incredibly strong and fatigue resistant it has poor surface characteristics.

Wallwork has an answer, Nitron-O, a duplex coating. The substrate of the component is first hardened by the production of a hardened nitride diffusion zone in the metal surface. A lubricious, PVD applied, titanium or chromium nitride surface coating is then applied on top of this. Both hardening and final coating are achieved in a single process. The resulting hardened surface is more resilient and has a low coefficient of friction. In load bearing situations this prolongs the working life of the component reducing maintenance attention substantially.

Nitron-O is universally available and capable of meeting many aerospace industry needs. Where the standard process is not totally suited to the application, the Wallwork research and development department is able to design similar bespoke approaches to the surface treatment of titanium and other aerospace metals to meet specific technical goals.

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Boosting Productivity in Machining Composites

Composites are revolutionising air frame manufacture, but bring a new set of technical problems. These tough materials are harder to machine because of their complex structure. Wallwork coated carbide tools stay sharper for longer to give higher yields, fewer tool changes and better quality yield.

Ian Haggan, a specialist in rotational tooling at Wallwork in Cambridge explained, “Because the carbon fibres are tough and hard to break, greater mechanical effort is required generating more heat. This cannot be dissipated as it would with conventional materials, so heat builds-up smearing the resin and impairing the removal of debris from the cutting site. Conventionally coated tools wear quickly in this situation resulting ragged cuts and the danger of material de-lamination, unless tools are changed frequently.”

To meet the specific requirement for coating rotational tooling used in cutting composites, Wallwork is partnered with the German industrial diamond coating specialists, CemeCon. To fully replicate the CemeCon process, Wallwork has installed a CemeCon 800/9XL magnetron sputtering coating system for round shank tooling and carbide inserts coating. The process produces a super smooth micro thin film, free from droplets and pinholes that can be further enhanced by post-coat wet processing if required.

Patent CemeCon coatings available exclusively from Wallwork in the UK include TinALOX SN2, Hyperlox, ALOX SN2, CCAIuspeed and HSN2. In addition, the company provides the complete line of CemeCon CarbonSpeed, FiberSpeed and MultiSpeed pure diamond coatings.

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Rising to the Aerospace Challenge: Improving Engine Performance

Coatings and thermal processing specialists, Wallwork Group, offer a number of services that can improve engine performance. These contribute to greater reliability, extended time-on-wing with reduced fuel use and CO2 emissions.

Maintaining Aerofoil Profile

High temperature, pressure and the erosive forces of airflow and contaminants in the air stream all alter the performance and shorten the life of compressor aerofoils. Nitron Flight, a family of multi-layer coatings based on titanium, chromium, chromium/aluminium or carbon/metal carbide overcome these problems.

Applied in six to eight nano-layers depending on the process, the final surface complies closely with the polished substrate. This produces a low stress surface coating that is highly resilient to delamination compared to a single layer coating of the same thickness.

Trials undertaken with a major European operator prove performance in a treated engine compared to an untreated reference engine operating under identical conditions. Specific fuel consumption (SFC) was 0.5 per cent better, exhaust gas temperature margin (EGTM) and fuel flow (FF) results were ahead of expectations at 0.5 per cent compared to 0.3. After 10,000 flight hours the super polished substrate was unimpaired whereas this surface was already eroded in the untreated engine. Engineers also noted, during the three monthly cleaning cycles, that whereas encrustation on the untreated blades had hardened and was difficult to remove, the treated blades were easily descaled.

Honeycomb Attachment

Sealing rings on aero engines are a potential trouble spot. Bonding between the honeycomb seals and the ring need to be 100 per cent perfect to prevent leakage. This is an area where the Wallwork vacuum brazing unit has an exceptional capability.

Work is undertaken at fully equipped vacuum brazing workshops at both Cambridge and Manchester. Post bonding, high magnification inspection ensures that every cell in the honeycomb is fully bonded to the base material with manual inspection backed up by water leakage tests to verify the integrity of the bond in each cell.



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Most commonly used for joining metal to metal components, brazing can also be used in other aerospace applications to join more exotic materials such as ceramics and carbides. Brazing will satisfactorily join dissimilar metals such as copper, stainless steel and titanium. All joints are free from surface oxidation and therefore have high strength, often greater than that of the materials being joined. Brazed joints are ductile and so components perform reliably, even when subject to the shock and vibration, retaining their strength and remaining leak proof.

It is possible to combine heat treatments such as solution treatment or hardening during the brazing process leading to reduced lead times and total part price reduction. With extensive metallurgical laboratories the company can deliver a quality product every time.

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Facilitating the use of Aluminium and Magnesium in Aerospace Weight Reduction Programmes

Material substitution is driving aerospace weight reduction programmes and aluminium and magnesium are now used as an alternative to heavier denser metals. These materials do not naturally have great hardness and stiffness, but Nadcap approved processor Wallwork Group offer heat treatment services to provide a calibrated improvement in performance to meet differing technical requirements.

Wallwork introduced their aluminium heat treatment service just before Farnborough in 2014. Since then the company has expanded the scope of the service to include magnesium and now also offers a greater depth of service to cover components from fabrications and castings to small pressed-metal parts. Within their high-tech furnaces, Wallwork can heat treat loads of up to two cubic metres in each process cycle.

The Wallwork Nadcap approvals fall within the Merit Programme whereby successive audits with no or low non-compliances, automatically extends the interval for full audits to two years. In addition to Nadcap approvals, the company also has prime approval from Moog and is seeking specific approvals from other aerospace primes.

Wallwork provide a range of post treatment testing services including hardness, conductivity and mechanical testing. Nationwide collection and delivery using company owned dedicated vehicles ensures a typical 24 to 72 hour turnaround on commercial work and 3-5 day return on aerospace work where more extensive post-treatment quality assurance is required.

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Rising to the Aerospace Challenge: Providing the Technical and Logistical Services to Support Coating and Heat Treatment Services

Heat treatment and hard coating specialist Wallwork Group aim to provide more than these core services. As a project partner to aerospace producers at all levels the company strives to add value, build trust and create long term relationships with both research and development and logistical services that support client needs.

Research Discovery and Exploitation

With a stable and highly skilled workforce Wallwork operate as a problem solver for customers, “We want all our customers to understand that we offer more than just heat treatment for metal hardening and more than just coatings. Our processes, and the research, development and quality systems behind them mean that we can match the technology to suit the application,” explained sales and marketing director Simeon Collins.

At their Cambridge site Wallwork operate an advanced R&D laboratory staffed by highly qualified scientists and technicians. The company is able to undertake primary research and testing of a level equal to that found in the material science departments of major universities. In addition the company has extensive ties to universities creating a unique problem solving resource, allied to manufacturing facilities that permit scaling and real-world evaluation of new coating, heating and metal jointing technology.

Collecting and Returning Product to Meet Clients’ Lean Targets

On a practical level the company is acutely aware of the time pressures affecting aerospace projects. With three strategically located sites at Manchester, Birmingham and Cambridge the company is close to its customers. In addition, a company owned fleet of over 40 vehicles provide the resources to turn around orders fast.

“Our three plants operate 24/7 and only stop for Christmas. Our aim is to collect, process, validate the treatment and return to the client in the shortest time possible. This could be as little as 24 hours for commercial product, but the more extensive certification required for aerospace and defence may mean a typical cycle time of 2-5 days,” explained sales manager Howard Maher.



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Quality Certification

The company has extensive quality accreditation. Manchester has Nadcap approval for heat treatment. This site is also qualified under the Nadcap Merit Programme because of a high level of compliance over several audit cycles. Cambridge has Nadcap approvals for coatings, while Birmingham follows ISO9001 quality assurance procedures and is certified to aerospace standard AS9100. The company is actively pursuing the extension of approvals to cover new processes.

Specific company approvals for particular processes have been obtained from BAe Systems, Rolls Royce, Airbus, Bombardier, Moog, UTC, Safran (UK sites) and many other key manufacturers. Again Wallwork has an active programme to extend coverage of these approvals and a commitment to quality assurance at all levels.

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Images on Memory Stick and Available to Download

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<http://www.ainsmag.co.uk/newsimages/wa253/5539wa4h-quoting-system.jpg>



Welcome to Wallwork Group

Our mission, vision and values

Instant online quote for heat treatment

GET QUOTE

With 50-plus years of experience in the industry, the Group has many specialists who can give advice on materials, treatments and surface engineering, preferably at the design stage.

Group sites are open 24/7 and our fast turnaround service is backed up by a fleet of more than 35 commercial vehicles offering a reliable, safe delivery and collection service in most areas of the UK.



Making Lighter Landing Gear More Resilient

<http://www.ainsmag.co.uk/newsimages/wa253/5539wa3h-hard-coating-aerospace-bearings.jpg>





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Rising to the Aerospace Challenge: Improving Engine Performance

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High Magnification Images enable the Effectiveness of Vacuum Brazing of the Aero Engine Ring Seals to be Verified

<http://www.ainsmag.co.uk/newsimages/wa253/5539wallh-vacuum-brazing-aerospace-ring-seal.jpg>



Facilitating the use of Aluminium and Magnesium in Aerospace Weight Reduction Programmes

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Rising to the Aerospace Challenge: Providing the Technical and Logistical Services to Support Coating and Heat Treatment Services

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