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Morgan Advanced Materials announces groundbreaking brazed carbon fibre-titanium honeycomb capability

This material is ideal for aerospace applications, especially on lifting surfaces such as wings or flaps, where strength, low weight and a thin cross-section are important, and the rear sections of engines, where combined high strength and thermal transfer is key. The material has the capability for use in hypersonic crafts, given that such high speeds require great strength and often lead to exceptionally high temperatures on leading edges.

Beyond aerospace applications, engineers from Morgan expect that this new material will be useful wherever lightweight, extremely high strength and exceptional thermal capabilities are mission-critical, such as in certain automotive or defense applications.

“We believe that now that this capability has been developed as part of our Ultinea™ brazing solutions offerings, our customers will find uses for it that we haven’t even dreamed of yet,” said Tom Sandin, Product Manager at Morgan Advanced Materials’ Brazing Alloys business. “The combination of the thermal capabilities and strength of the carbon fiber, with the impact absorption and joining capabilities of the titanium, all with a high-strength brazing bond, mean that the possibilities for this material are exceptional.”

In addition, the strength of the brazed bond is exceptional, equaling or exceeding the strength of each component material, unlike the reduced strength of adhesive, riveted, or other bonds. The addition of the titanium honeycomb to the carbon fiber allows easy joining of the titanium to other structures through traditional joining techniques.

Morgan Advanced Materials has responded to customer demand with the development of bespoke insulating fire bricks for the production of infrared (IR) gas furnaces used by a major customer in applications where precise control and consistency of temperature are key.

IR gas furnaces were developed around 40 years ago to harness the cost-effectiveness of IR-heating compared with the energy produced by electrical heating. They are mainly used in applications such as special heat treatment of steel, and sintering and stabilising of fluorescent lamps and tubes.

The walls of these furnaces are made from insulating fire bricks with particular properties of porosity and permeability, known as ‘luminous bricks’. The bricks ensure the entire wall acts as a burner, providing a uniform temperature throughout the furnace and no hot or cold spots, while ensuring any change in temperature is accurately controlled. A mixture of gas and air in the required proportions is generated then passed through the wall, which has a permeability level specifically designed to minimise pressure loss while ensuring the flame develops evenly on the interior surface.

While the use of these furnaces remains widespread, availability of non-standard replacement bricks to extend their service life has been poor; prompting Morgan to develop its own bricks in response to a specific customer request from Global Oven Systems (GOS).

Morgan’s Research & Development team at its facility in Casalpusterlengo, Italy, experimented with various levels of permeability – developing a dedicated system to the exacting international American Society for Testing and Materials (ASTM) standard - and various material configurations on its production line before settling on the final formulation. The new product, known as JM25 PH, was then subjected to rigorous production trials and testing at the customer’s facility before being adopted.

Ermanno Magni of Morgan Advanced Materials explained: “The development of the new luminous bricks exemplifies our extensive industry experience, and ability to hone our material formulation and production techniques to deliver a bespoke, high-performance solution for a customer who was previously only able to select from standard products.”

Morgan’s Thermal Ceramics business is an established partner to global industry, supplying a range of high-temperature insulation wool and refractory ceramics in a variety of environments and industries.

Morgan appoints defence specialist

Morgan Advanced Materials has appointed a defence specialist with more than 40 years’ experience to the role of EMEA Business Development Executive within its Composite & Defence Systems business in Coventry, UK.

Adrian Clarke began his career as a British Army Royal Electrical and Mechanical Engineers (REME) apprentice before completing international postings with the Royal Armoured Corps Research & Development unit, the Queen’s Royal Irish Hussars and the King’s Hussars.

He later acted as an advisor to the Kuwaiti Army, and retired from the Army after serving as the Head of Electo-Mechanical Engineering at the School of Electro-Mechanical Engineering in Bordon, Hampshire. Adrian then moved into programme management and business development roles at BAE Systems and ITT Defence, most recently working as European Business Development Executive at Exels Defence Ltd before joining Morgan.

Commenting on his new role, Adrian said: “Morgan has established an enviable reputation for soldier protection and armoured vehicle systems for the global military marketplace, and I relish the opportunity to develop new export opportunities using my own experience of the Armed Forces.”

Martyn Cook, Business Development Director added: “Adrian brings a wealth of experience to the team and his industry relationships will be key to the successful implementation of our export strategy, which focuses on our unique combination of state-of-the-art composites with robust ceramic materials.”
New ultrasonic PZT sensors allow continuous operation between -30°C and 160°C

Morgan Advanced Materials has once again pushed the boundaries of sensor design and construction and has developed the capability to reliably manufacture compact, lead zirconium titanate (PZT) based ultrasonic sensors for continuous operation between -30°C and 160°C.

Morgan is an established leader in the design and manufacture of piezoceramic sensors for applications in sectors such as oil & gas, aerospace, marine and chemical processing. Sensor types benefiting from Morgan’s temperature-tolerant technology include flow measurement, continuous level sensing, distance detection and “contact” sensors. Ultrasonic transducers can also be supplied which are able to conduct additional analyses such as the identification of fluid “quality” and chemical concentration.

As well as excellent functionality at high operational temperatures, the new sensors can tolerate wider non-operational temperature ranges and regular thermal cycling during service.

Morgan’s expertise ensures the optimal material is selected for each sensor. The material finally selected will often be chosen to fulfil multiple criteria with known heritage in comparable applications. For example, an aerospace-qualified material rated for continuous high temperature operation up to 250°C may be selected for one application, while another material, operating at very similar temperatures in a sonar application, may be selected for its high resistance to pressure. Morgan’s intimate materials knowledge enables its dedicated design team to propose the best solution for the customer’s requirements. Complementary sensors, actuators or elements can also be incorporated at customer request to provide increased device capability and system integration.

Morgan believes that sensor operating temperature ranges could be extended even further. As Tony Beswick of Morgan explained: “Although in our recent trials we did not perform low temperature tests below -30°C, the performance of our sensors was shown to increase with a decrease in temperature. Further reductions in the bottom limit of the rated operational temperature are expected and indeed Morgan has already manufactured sensors for cryogenic applications that operate at much lower temperatures. We are keen to hear from any customer seeking reliable, high-specification sensing solutions for any extreme temperature operating environment.”

Morgan announces availability of sapphire lenses for industrial applications

A high-specification alternative to glass, already established in critical applications in the aerospace and defence sectors, is now being offered for a variety of industrial applications by Morgan Advanced Materials.

Made from a single aluminium oxide crystal, sapphire-based lenses are optically transparent from infrared through to UV light. They offer the highest strength of all optical window materials and low loss tangent makes it suited to low-loss, long-wavelength chemicals. High radiation systems also offer resistance to solarisation and they are resistant to the vast majority of commonly encountered chemicals. High radiation systems also offer resistance to solarisation and they are resistant to the vast majority of commonly encountered chemicals.

Further applications for which this technology is suitable include optical windows for infrared thermal detection; windows for semiconductor plasma and chemical etching; and windows for furnaces, pyrometers and other high-temperature processes.

Oliver Petersen of Morgan Advanced Materials explained: “Sapphire boasts a unique range of properties and while it is widely used in the aerospace and defence sectors, we are seeing greater demand in applications where any lessening of the transparency cannot be compromised; for the sake of process quality or safety. With a range of sealing options and braze alloys available, we believe the list of potential applications could be much longer, and we are keen to speak to any customer seeking to harness these attributes in their own applications.”

Investment helps optimise service to aerospace and industrial gas turbine sectors

A substantial six-figure investment by Morgan Advanced Materials in both people and equipment at its UK-based Certech sites is further enhancing the company’s offering to industrial sectors including aerospace and industrial gas turbines.

The company has invested in a state-of-the-art three-axis robot, being used primarily in high-volume, medium complexity operations, which is helping to optimise repeatability and process consistency while significantly increasing overall yield.

A new injection moulding machine has also been acquired for the production of industrial gas turbine blades, with yields in this area already up by a significant percentage. A further machine, dedicated to production for the aerospace sector, is to be installed by the end of 2014.

An on-site research & development laboratory has been overhauled too, with the introduction of pilot production equipment including an injection moulding machine, mixer and kiln. This is enabling the extended testing of existing material properties and performance.

In addition to the investments being made in equipment, two new manufacturing engineers and two new global business development executives have been employed to service growing business and pursue new opportunities.

Part of Morgan since 2008, the Certech business develops innovative materials which it manufactures into sacrificial cores for investment casting, primarily for manufacturing blades for aerospace engines and industrial gas turbines, but also components for new sectors such as medical and automotive. Its dedicated facilities at Corby and Derby serve major international customers across the globe.

Robert Park from Morgan’s Certech business explained: “The demands from the markets in which we operate are ever-changing and we continue to invest in new processes and materials to maintain and strengthen our market-leading position in the area of sacrificial cores. With validations from the leading players in each sector, we are able to combine state-of-the-art materials and design with agile, responsive service and complete traceability.”

Advanced Thinking in Advanced Materials

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Morgan’s Electrical Carbon business launches new MSPro14 surface profiler for commutators and slip rings

Morgan Advanced Materials has launched a new market-leading surface profiler offering a unique range of features and benefits.

The new MSPro14 product, which seamlessly integrates a range of cutting edge technologies and user-friendly features into one portable unit, is set to raise industry standards for the surface profiling of commutators and slip rings.

The Morgan MSPro14 accurately measures and records the surface conditions of commutators and slip rings, but accuracy is not its only advantage. This new measuring system boasts a solid, easy-to-mount sensor that can be fitted to a wide range of holder sizes and can cope with extreme environments, including vibration. Moreover, the optimised sensor head will fit easily onto helically grooved slip rings. Offering rapid and simple set-up, it also has a responsive and user-friendly touch screen that is held within a robust housing.

It has been designed to help determine the cause of problems such as uneven or poor brush wear, chipped brushes, frayed flexes, underbrush sparking and system deterioration. The results it generates indicate the quality of the surface profile, and whether the component needs to be replaced or further fault diagnosis is required; helping to reduce downtime and maintenance costs by highlighting potential issues before complete failure occurs.

The MSPro14 software, DASPro14, is extremely user-friendly and easy to navigate. It offers a built-in editing interface, allowing further analysis of the measurement on a computer. It can load and read files from Morgan’s previous profiler model, the MMS6000. The box has a large memory capacity that allows the ability to store more profiler measurements than the MMS6000. By using the software, different measurements can be compared on a computer.

The MSPro14 comes in a robust yet lightweight carrying case, containing all the equipment needed to profile accurately and effectively. This includes DASPro14 data analysis software, sensor and clamp, sensor sleeve, sensor spacer set, USB cable and charger, G-clamp, torch, pen and back-up battery. The MSPro14 is compatible with any PC running Windows (even Windows XP) via a USB connection, and can easily be switched between imperial and metric measurement modes.

Morgan announces new P-59 ceramic core material for improved jet engine fuel efficiency

Morgan Advanced Materials announces its new P-59 ceramic core material, a high-silica core type with a fine particle size distribution. The P-59 material is a development of P-52 and represents a breakthrough into the high stability realm of materials. P-59 is intended for Directionally Solidified (DS) and Single Crystal (SX) applications with thin cross sections that P-52 and P-57 core material cannot fill.

Used in the manufacture of jet engine turbine blades as part of the investment casting process, P-59 is at the cutting edge of materials innovation, providing critical benefits to the final product such as increased fuel efficiency. In order to achieve greater efficiency, engines must run at extremely high temperatures which demands superior air cooling capabilities.

One element of that air cooling capability is a small, thin, trailing edge portion of the core; P-59 material, with its fine particle size distribution, is able to achieve a trailing edge that is up to 20% thinner than that produced by other materials.

Morgan Advanced Materials launches lightweight rifle plates for police and security personnel

Morgan Advanced Materials’ Composites and Defense Systems business announces the availability of its buoyant, lightweight rifle plates, capable of stopping 7.62mm rifle ammunition. The ergonomically designed rifle plates offer exceptional performance and are therefore ideal for police and security personnel.

Even with its fine particle size, P-59 is able to maintain other key properties for investment casting, such as stability, crushability and leachability. In addition to the Aerospace market, Ceramic cores from Morgan are regularly used during the creation a variety of products, including Industrial Gas Turbine blades for power generation.
New ultrasonic sensor from Morgan Advanced Materials can detect liquid level without physical contact

Morgan Advanced Materials has introduced a new ultrasonic sensing solution, capable of detecting the level of liquids in a variety of container sizes without needing to come into physical contact with the contents.

Relying on acoustic wave reflection, the new level sensor sends an ultrasonic burst and then “listens” for an echo at a point in time depending on the container size. The signal changes when the liquid drops below a pre-determined level, with the ability to trigger an alert for corrective action to be taken. The sensor can also operate in continuous mode when positioned at the base of a container, detecting liquid depth. In this mode, its operation relies on wave reflection from the liquid/air interface.

The transducer simply mounts onto the container exterior with an adjustable strap, making positioning and removal straightforward. To further ease its use, the sensor is based on a ‘dry-coupled’ design which is not reliant on separate liquid or gel couplants that leave unwanted residue. Instead it uses an innovative compliant layer that only requires moderate pressure against the desired container to operate.

Its ability to detect liquid levels from outside the container makes it ideal for use with drip chambers and in any other application where the liquid is not intended to come into contact with the sensor. This is particularly relevant in medical applications where the physical presence of a sensor could contaminate the liquid.

This is the first system of its kind able to work accurately with cylindrical containers below 2” (51mm) in diameter, with capacities between 20mm and 300mm. It is available with or without electronics, depending on the customer requirement.

Oliver Ridd of Morgan Advanced Materials explained: “There are many medical and laboratory applications where the levels of small quantities of liquid need to be measured accurately but where the physical presence of a sensor could contaminate the liquid.

Needing no separate fixing media, the new sensor can be quickly and conveniently fitted to even a very small container, rapidly producing an accurate reading of the liquid level which can then be used to ensure it remains above the safe or desired minimum.”
Morgan’s Electrical Carbon business offers expertly designed, reliable linear transfer systems for crane electrification

Morgan’s Electrical Carbon business announces that it offers high quality, expertly designed linear transfer systems suitable for a wide range of applications, including hoists, cranes, theme park rides, and robots on automotive production lines. The electromechanical linear transfer systems enable the transfer of current from a stationary source to linear moving equipment.

Rekola branded linear transfer systems from Morgan are used in the electrification of cranes, such as harbor cranes. Most worldwide container transport cranes run on diesel engines; by modifying these cranes so that the diesel engine only moves the crane between lines, with the crane driven electrically within lines, the systems can be run more economically and environmentally resulting in potential cost savings for operators.

Morgan’s systems offer reliable transfer of current in moving equipment without the use of cables. The contact materials and carrier systems have been designed with input from OEMs to ensure that all linear transfer systems are up-to-date with the latest market requirements and industry challenges. Comprised of metallized carbon brushes, the linear transfer systems run on a conductor rail and are protected in a fully or partially shrouded assembly. Both single carbon brushes and full system solutions are available from Morgan.

The metallized carbon brushes are specially designed by Morgan’s materials scientists to create the optimum brush film, minimizing friction while maintaining excellent conductivity. Materials used are optimized for each specific application to maximize life and minimize overall operating cost.

Morgan’s application engineers work closely with customers to ensure that each linear transfer system is designed to meet application requirements and ensure maximum performance.

Morgan Advanced Materials’ Seals and Bearings business offers superior quality axial and radial bearings for applications in the petrochemical industry with severe service conditions. Morgan’s bearings are mechanically strong, even at high temperatures, and are ideal for applications where conventional lubricants are not effective. The bearings have a low wear rate due to their rugged construction from carbon, graphite, or silicon carbide based materials. They perform reliably under stress and can be tailored to best fit individual applications.

The bearings also feature high chemical inertness and dimensional stability, making them ideal for the petrochemical industry. They are easy to install and easily machined within tight tolerances, resulting in reliable performance. Morgan’s applications engineers use their extensive experience to work with customers to tailor seal solutions to specific end conditions and applications.

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Morgan Advanced Materials is a global engineering company offering world-leading competencies in materials science, specialist manufacturing and applications engineering.

We focus our resources on the delivery of products that help our customers to solve technically challenging problems, enabling them to address global trends such as energy demand, advances in healthcare and environmental sustainability.

What differentiates us?

- Advanced material science and processing capabilities
- Extensive applications engineering experience
- A strong history of innovation and reinvention
- Consistent and reliable performance
- A truly global footprint
- We find and invest in the best people

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