Morgan part of British trio joining forces to sustain and upgrade the Mastiff family of vehicles  Full Story Page 13

Morgan Advanced Materials introduces new Syncarb Z2 e2 crucible

Morgan helps power up innovative durathon batteries for GE Energy Storage

New FireMaster® FireBarrier™ high performance fire protection launched
Morgan Advanced Materials launches next generation fully watertight wheel balancing transducer

Leading international materials company Morgan Advanced Materials has launched its next generation standard wheel balancing transducer, featuring a range of value-adding capabilities. The new transducer offers the automotive sector dynamic force measurement, ease of installation and excellent quality and reliability. Manufactured with wheel balancing equipment in mind, the product range can also be used in automotive applications such as measuring the force exerted on the brake pedal during brake tests, and as a rotor balancing sensor.

Retaining all the benefits and advantages of the well-established 0911 Series, the latest Morgan innovation is a ‘best-in-class’ design which encompasses new innovative features to make the product fully watertight. It incorporates fully potted contact terminations and a four-pin, one way watertight connector. The new sensor comprises an Ø4.3mm OD unit and 1m long cable – able to withstand the demands of harsh environments such as garage workshops – together with a cable jacket which ensures excellent oil, solvent and fuel resistance. The maximum operating temperature for the cable is 70°C and, for the connector, 85°C. Both products can function at temperatures as low as -40°C. The company’s design engineers can adjust the architecture and material of the sensor to suit specific applications, and customisation can be made to cable type, cable length and connector type. Morgan can also provide the new transducer with exposed connectors or with cable and connector. Oksana Jaroszak of Morgan Advanced Materials commented: “Accurate wheel balancing is essential to optimising performance and safety in a variety of automotive and other industrial applications. Our latest product range offers enhanced robustness and functionality, enabling it to provide rapid and accurate measurement in highly demanding environments.”

July 2013

Latest ultrasonic sensor delivers consistently reliable distance measurement within fluids

Morgan Advanced Materials has launched its latest ultrasonic sensor, capable of continuously detecting fluid levels and the location of objects within them. Applications include static and live fluid level sensing in the transportation, medical, chemical and industrial sectors.

The new sensor has been developed in response to customers requiring increasingly precise means of recording fluid levels and identifying objects within fluids. It can allow measurements to be accurately taken in a variety of fluids with different viscosities and opacities, such as fuel, oil, blood and water.

Hermetically sealed to deliver exceptional reliability, the sensor is able to function in even the harshest and most demanding of environments. It has been developed to withstand attack from hot and cold water; petroleum, kerosene, jet fuel, oils and alcohol.

The sensor operates by transmitting an ultrasonic wave through the fluid, which is then reflected back from the surface of the fluid or the object. The time that the ultrasonic wave takes to reach its destination and return enables the sensor to calculate the fluid level or distance of an object within the liquid. Capable of being mounted in any orientation as long as its front face is in contact with the fluid, the sensor can be fully immersed without sustaining damage. Peter Thomas of Morgan Advanced Materials commented: “Our existing sensor range is already established for delivering an unrivalled level measurement solution to the transportation, medical, chemical and industrial sectors, and our latest ultrasonic sensor further refines this capability. We understand how important it is to our customers that fluid levels or the location of objects within the fluid are measured and detected accurately and consistently.

“In order to achieve high-performance level measurement, we offer customised solutions to our customers, meaning we can optimise housing dimensions, operational frequency and device sensitivity. Additional elements, such as temperature sensors or electromagnetic shielding, can be incorporated and the materials used can be optimised to ensure the sensor is suitably protected against specific chemicals and temperatures.”

July 2013

Advanced Thinking in Advanced Materials
Active Brazing used for Innovative Beam Target Probing Neutrino Secrets

The Department of Energy’s Fermi National Accelerator Laboratory’s Main Injector Neutrino Oscillation Search (MINOS) experiment uses a neutrino beam to study neutrino oscillations. Pulses of neutrinos are sent on a path through the earth from Fermilab to a detector located 450 miles away, in the Soudan Underground Mine State Park in Minnesota. There, a 6,000-ton particle detector searches for neutrinos that may have changed type during the 2.5-millisecond trip.

The beam target consists of a series of graphite segments lined by tubes filled with water for cooling. It must be strong, robust, and able to withstand significant mechanical stresses. When quality issues arose with the original target, Fermilab engineers came up with a new design that called for a single tube approximately 51 inches long that uses three 180 degree bends, rather than joints or transitions. The new design called for titanium tubes, which added strength and corrosion resistance. The tubes contain the same graphite segments used in the stainless design, each about 0.8 inches long. The small segments are stacked and then brazed in place about 0.010-inches apart. When approached by FermiLab, Morgan Advanced Materials suggested the process of active metal brazing, which allows metal to be bonded directly to non-metal materials that typically require a metallization layer. Active metal brazing allows direct wetting of the alloy to the substrate material, eliminating several steps in the joining process and creating an extremely strong bond seal. The active alloy process provides a more robust joint, with fantastic bond strength. The alloys are designed so that as they can withstand thermal cycling, and will not crack, break, or fatigue.

Working through iterations, design changes, and perfection of sample geometry to make sure all the dimensions will work when the assembly is placed in the furnace, Morgan and FermiLab engineers came up with a successful design.

Morgan donates market-leading insulating fire bricks to International Ceramics Festival

Morgan Advanced Materials, a leading manufacturer of highly-engineered products for thermal insulation applications, offered its support to the International Ceramics Festival in Aberystwyth through a donation of 800 insulating fire bricks. Taking place at Aberystwyth University between 28-30 June, the three-day festival has grown to become one of the UK’s leading ceramic events. Morgan Advanced Materials JMTM 26 brand insulating fire bricks were used by renowned ceramics artist Jeremy Steward to create a wood-fired soda kiln at the festival. The construction of the kiln was designed to serve as inspiration for those attending the event, so that it could be successfully adopted by most potters with modest premises.

Harald Kaune of Morgan Advanced Materials commented: “As an international manufacturer of ceramics, we were thrilled to be able to support the International Ceramics Festival. The event provides a unique opportunity for teachers, students, ceramic artists, collectors, working potters or simply those with a passion for ceramics to meet and study the work of distinguished and internationally celebrated ceramic artists.”

Sophie Bennett, Festival Co-ordinator, added: “The donation of 800 insulating fire bricks from Morgan Advanced Materials was very much appreciated. The event was a great success, with more than 1,000 people attending and enjoying a variety of activities, which included lectures, live demonstrations and exhibitions.”

July 2013

www.morganadvancedmaterials.com
Exhibition sponsored by Morgan Advanced Materials launched at National Army Museum

August 2013

Morgan Advanced Materials, a world leader in the design and manufacture of innovative material solutions for a wide range of applications, is sponsoring a thought-provoking public exhibition about the effects of terrorism and war, at London’s National Army Museum. The Unseen Enemy exhibition tells the story of Improvised Explosive Devices (IEDs) and their deadly impact, focusing on the experiences of the British Army in Afghanistan. It traces the history of IEDs, from their first known employment in the failed Gunpowder Plot in 1605 to their widespread use in today’s military warfare. The powerful and moving exhibition includes testimonies from soldiers and medical teams working in Afghanistan and explores a range of themes including Courage, Fear, Loyalty and Skill. Through its Composites and Defence Systems business, Morgan Advanced Materials pioneers the development of techniques to combat the effects of IEDs. The company developed, manufactured and integrated specialist armours for the Mastiff, Ridgback and Wolfhound range of vehicles successfully deployed to the Afghan and Iraq campaigns. It has also integrated these vehicles with substantial UK-specific electronic counter-measures. Its exceptional capabilities in composite protection systems have also been applied in the bomb disposal suits provided to the MoD. It has been the sole source of this highly advanced equipment for the past 20 years. Duncan Eldridge of Morgan Advanced Materials said: “This exhibition is, we believe, the first of its kind, informing and educating people on these devices and the devastating effects they have. We are fully supportive of the work our armed forces personnel are doing in Afghanistan and around the world and remain committed to doing everything in our power to provide the best possible protection for these uniquely challenging environments.” Janice Murray, Director General for the National Army Museum, said: “The National Army Museum is delighted that Morgan Advanced Materials has supported us in delivering the Unseen Enemy exhibition. We believe that it is vital the Museum is able to tell the stories of British soldiers throughout time and we are committed to representing the work of our troops today. The generous support of Morgan Advanced Materials is instrumental in enabling this story to be told.” The exhibition is located at the National Army Museum in Chelsea, is free to enter, and runs until 31st March 2014. For more information on the exhibition, visit www.nam.ac.uk/unseen-enemy.

Morgan invests in state of the art testing equipment enabling in-house medical sensor prototyping

August 2013

Specialist designer and manufacturer of sensors for use in a variety of medical equipment, Morgan Advanced Materials has invested in an additional state-of-the-art capability at its facility at Southampton in the UK, for testing its technologically advanced range of standard and customised medical sensors.

Designed to test pressures as low as 0.3 bar absolute, the rig incorporates a function generator, oscilloscope, impedance analyser, digital pressure sensor and Coriolis flow meter with a resolution of <0.02 - >3000 ml/min, an accuracy of ± 0.2%, and repeatability of ± 0.05%.

Morgan Advanced Materials manufactures a variety of air in line sensors, occlusion and flow sensors for the Healthcare market. The company’s air in line sensors detect the presence of air bubbles in liquid lines, protecting patients while undergoing procedures such as, drug therapy, dialysis, infusions and enteral feeding. Designs and configurations can be adapted to suit individual OEM requirements in terms of tube diameters, clamping methods, mounting arrangements and interfaces with disposable cassettes.

Occlusion sensors offer non-invasive detection of pressure changes - both upstream and downstream of the pump mechanism - in the flexible tubes used in equipment such as infusion pumps, enteral feeding pumps, dialysis equipment and other fluid applications. They ensure the safe delivery of the fluid to the patient in the correct quantity while protecting against fluid surges and will raise an alarm if a line becomes blocked.

Richard Miles of Morgan Advanced Materials says: “Primarily, our customised test rig has been designed to fully and accurately test prototype sensors prior to them going into full production. The rig - which is built to our own specification and has the ability to create bubbles of a pre-determined size, as small as 0.5 microlitres - tests sensitivity, repeatability, time stability and hysteresis, giving us a detailed picture of how an individual product is performing.”

The new sensor test capability is just one example of the significant investment being made by Morgan Advanced Materials in its manufacturing facilities worldwide. “The sensor and testing market presents a wealth of opportunities for ceramic technology, a material which offers a more resilient and accurate solution than those traditionally used in measurement and testing applications”,
Morgan launches improved stave-shaped ceramic components

Morgan Advanced Materials announces the launch of its improved range of stave-shaped ceramic components for the defence and commercial sonar sectors. Sonar systems utilised by many of the world’s navies contain ceramic materials, as they offer solutions where high acoustic transmission properties are required in low frequency environments. Morgan’s products are operable at extremely low depths, and continue to work even in the most severe bathythermal conditions, where water temperature falls as water depth increases.

To produce low frequency active sonar, Morgan manufactures a range of ‘stave’ components, assembled together to create large ceramic rings and used as underwater projector transducers. To combat size restrictions, electrodes are positioned between each ceramic segment, with the segments then poled around the circumference. This arrangement is also known as a segmented construction and allows for very large rings to be constructed, although careful control of the tolerance is necessary to obtain a well-consolidated assembly with uniform joints.

Ceramic stave components are available from Morgan Advanced Materials in a combination of lengths and widths, ranging from 10mm to 165mm, with thicknesses ranging from 10mm to 40mm. They can be manufactured to specific a range of angular specifications allowing for large diameter assembled rings to be created. Larger or smaller sized staves outside these dimensions can also be created. Various additional geometries are available with a choice of specially machined notch grooves to allow easier integration and soldering of connecting wiring and customised angle apertures to manufacture substantially larger diameter and lower frequency transducers. In addition, Morgan offers stave sub-assemblies and pre-stressing of stave sub-assemblies complete with a range of insulated flexible wire terminals.

Suitable materials for sonar transducers include PZT400 and PZT800 series piezoelectric formulations, which are both considered as ‘hard’ materials and therefore suitable for underwater naval operations. These piezoelectric formulations ensure low dielectric and mechanical losses in the transducer for optimum acoustic output and efficiency. Multi-element piezoelectric rings are used to ensure that the coupling coefficient of the transducer is substantially higher than for the single monolith piece ring with radial poling. When driven to high power, the joints and ceramic are subjected to high levels of tensile stress, therefore some level of pre-stress is necessary to lower the rate of expansion. This is achieved through a customised process of circumferentially compressing the ring, and consolidating the whole assembly in epoxy resin.

Free flooded rings are one type of efficient transducer benefiting from this manufacturing technology. This transducer is simply a radiator, which provides omni-directional coverage from the axis of the ring. Free flooded rings provide numerous benefits such as high power handling, low mechanical quality factor and virtually no performance changes due to hydrostatic pressure.

Frederic Pimparel, Technical Manager for Morgan Advanced Materials, said: “We work closely with our clients in the defence and security industries to listen and really understand their challenges. The launch of the stave shaped component range reflects our commitment to radical innovation and to bringing to life the products that our clients want and need. We believe that this ethos to work for our customers is what allows us to retain our position as leader in the design and manufacture of electro-ceramic products for the security and defence markets.”
Morgan Advanced Materials introduces new Syncarb Z2 e2 crucible

The Molten Metal Systems business of Morgan Advanced Materials, has further extended its acclaimed Syncarb Z2 crucible family with the introduction of a new crucible designed to provide longer service life and increased energy savings for customers in the aluminium processing industry.

Designed specifically for aluminium melting and holding applications, the Syncarb Z2 e2 product has undergone extensive laboratory and field testing with results confirming an operational performance that surpasses alternative crucibles in the areas of durability and reduced energy consumption.

The entire Syncarb Z2 line is composed of isostatically pressed, hybrid ceramic bonded crucibles with a high silicon carbide and graphite content. They display a higher breaking strength, due to an improved granulation process, resulting in increased resistance to damage and higher stresses during operation and handling. The new Z2 e2 also brings a number of material and structural advantages to help improve crucible performance and foundry operations. As well as offering a 56% higher transverse breaking strength than some other energy efficient crucibles, the Z2 e2 maintains integrity at relatively higher values due primarily to the granulation of the mix, processing parameters and advanced materials used.

In addition, through its advanced glaze technology, the Z2 e2 showed an average 10% increase in oxidation resistance over competing products in both five and ten day Loss On Ignition (LOI) tests. Morgan has been able to develop a crucible that has been scientifically proven by an independent laboratory to achieve superior thermal conductivity over all working ranges while maintaining a standard wall thickness. This achievement results in increased energy efficiency and savings for those operating in an environment of fluctuating and increasing energy prices.

Furthermore, while thermal conductivity will degrade over time as any crucible oxidises, the oxidation process occurs slower in the Morgan Syncarb Z2 e2 crucibles. This reduced degradation, combined with a higher thermal conductivity, results in further energy savings compared with alternative products, throughout its lifetime. All this translates to longer run times, more cycles, less energy usage and an overall melting solution advantage.

The entire product line has already proven itself in harsh environments such as copper melting and refining in numerous customer operations throughout the world. Carl Bednark of MetalTek International commented: “We’ve experienced a very dramatic improvement in average crucible life with Z2 crucibles versus other products used in the past – two times the life in fact. We expect the Syncarb Z2 e2 crucible to have a major impact on our operations.”

“With the development of the Syncarb Z2 e2, we have created a crucible designed specifically for optimum energy savings and efficiency,” says Brandon Kruse, Global Product Manager for Morgan’s Molten Metal Systems business. “We are genuinely excited about its future, which promises to have a positive impact on foundry performance and our customers’ bottom line.”
Morgan helps power up innovative Durathon batteries for GE Energy Storage

Morgan Advanced Materials is supplying a range of critical components and technology solutions for GE Energy Storage’s high-performance Durathon® Batteries.

Durathon Batteries are designed to provide safer, more efficient and cost effective energy storage, distribution and utilization. GE Energy Storage uses the battery modules to build complete energy storage solutions for the telecom, energy management, power generation, grid operation, back-up and motive power industries.

GE Energy Storage’s Durathon Batteries have been developed to act as uninterruptible power supplies for facilities where reliable back-up power is essential, such as hospitals and data centres, as well as providing energy to sectors as diverse as telecommunications and transportation. Capable of storing energy during quiet periods and then releasing it at peak times, the Durathon Sodium-Nickel Chloride chemistry is also being increasingly specified for power generation, grid operation and energy management applications.

Morgan’s expertise in advanced ceramic formulations and manufacturing processes has helped GE Energy Storage support the development of the Durathon chemistry. Each cell within the battery has to be hermetically sealed to guard against chemical leakage and then be connected to other cells in a module which is thermally insulated to ensure the temperature of its external surfaces remains within 10°C to 15°C of the ambient temperature. Preventing chemical leakage is of critical importance to the performance and service life of the battery. For the battery collars, therefore, Morgan recommended Sintox™ FA, a specially formulated aluminium oxide ceramic for its superior bonding strength, resistance to chemicals at elevated temperature, and electrical insulating properties.

The metallising is specially formulated to create a strong hermetic bonding combination with the Sintox™ FA material which is chemically resistant to the corrosive environment within the cell structure, provides high strength and joint integrity for the lifetime of the battery.

Yannick Galais, commercial manager at Morgan Advanced Materials, commented: “We were delighted to partner with GE Energy Storage to help create the next generation of sodium metal halide batteries. Our application engineers and technical team have worked very closely with GE to provide a customised, specific solution to enable the battery to perform effectively in a temperature range between 260°C to 300°C. This low temperature range allows GE to offer a cost-effective solution compared with other technologies operating at higher temperatures. Our Sintox™ FA material was specified for the battery collars due to its excellent bond strength and resistance to chemical attack, both vital factors for ensuring the batteries continue to perform consistently during their lifetime. This is particularly important where continuity of service is absolutely critical, such as in hospitals, while data centres need to be sure they can rely on a consistent source of energy supply for data protection reasons.”

Durathon Batteries provide more energy in half the space and a third of the weight as equivalent wet-cell lead acid batteries. They are a cost-effective, modular-based power solution to meet the needs of telecommunication offices, data centres and other industrial applications that require consistent energy supply. The building-block design of Durathon batteries allows customers to easily add more modules should demand for back-up power increase, without needing a complete system re-design or experiencing any interruption of service. Mechanically stable at high temperatures and chemically inert, Morgan’s Sintox™ FA material ensures that Durathon batteries deliver a consistent supply of energy across a broad range of highly demanding applications.
Morgan launches latest high-performance sensors to medical industry

Morgan Advanced Materials, a leading manufacturer of highly-engineered products for the medical industry, has launched a new range of high-performance air inline and occlusion sensors for the medical sector.

Capable of delivering non-invasive air bubble detection and accurately measuring pressure changes in tubes leading into the body, the new range provides a highly precise means of monitoring safety-critical events in medical products such as infusion pumps, enteral feeding pumps, dialysis equipment and other fluid-handling applications.

The latest air in-line sensor technology has been developed in response to the large variation in tube sizes and materials used in the medical market for drug delivery and fluid management. Morgan now offers three standard designs accommodating a large range of tube sizes.

Key features of the new air in-line sensors include optional digital electronics, which can be programmed to detect air bubbles of different sizes depending on requirement and provide an output reading of air bubbles detected. The technology is available in an established flat surface option and an innovative curved design, which offers enhanced performance and greater sensitivity across a larger range of tube sizes. It does not require external clamping, while its highly engineered shape delivers reduced signal settling time, enabling faster set-up for operators and improved stability signal over time.

The range is fully tested to the IP68 rating, sealed to guarantee total protection from dust ingress, and capable of withstanding the prolonged effects of immersion under water, as well as being RoHS compliant.

Morgan Advanced Materials occlusion sensors enable medical professionals to quickly identify blockages in tubes leading into the body. The highly sensitive, high-performance and durable sensors can be used with thin-walled tubing to identify negative pressure caused by upstream blockages and positive pressure triggered by downstream blockages. The Morgan range does not require a disposable cassette, unlike many products on the market.

Richard Miles, Business Development Manager at Morgan Advanced Materials, commented: “We have developed these advanced sensor solutions to deliver the highest levels of accuracy and consistency when monitoring air bubbles and pressure changes. A key benefit to our designs is that they can be tailored to meet individual customer requirements, to guarantee we provide exactly the right solution. “Our sensors are available separately, but in many instances multiple sensing solutions are needed to meet with safety requirements, such as optical or micro switch sensing of correct tube insertion, temperature sensing and multiple bubble detectors to determine bubble flow direction.

All these requirements can be supplied as one sensor, designed to meet with the customer’s exact requirements with the benefits of reduced BoM items, reduced assembly time, and a very compact footprint.”
SONAR breakthrough for Morgan

October 2013

Morgan Advanced Materials has launched a new range of large piezoelectric (PZT) ceramic blocks specifically for use in the defence and commercial sonar markets, thanks to a major breakthrough in the company’s manufacturing capabilities.

Using an innovative new process, Morgan Advanced Materials can now press, fire and machine blocks and other shapes of components up to a thickness of 45mm. Resulting in the production of considerably larger components than those previously manufactured at the plant. The larger blocks can also offer a much lower thickness frequency output than their smaller counterparts, resulting in enhanced imagery and range for SONAR at lower depths for 2-2 and 1-3 composite applications.

Manufactured in a wide range of sizes and frequencies to suit customer requirements, the new range is available in machined thicknesses up to 40mm in PZT Navy I and Navy III types, and up to 45mm in PZT Navy II, Navy V and Navy VI types. Larger sizes are available on request, while thickness and frequency variations can also be tailored for in order to meet a customer’s specific requirements.

The new range of blocks will typically be supplied with fired-on silver electrodes as standard to ensure good adhesion for soldering and bonding, and to a thickness which can safeguard durability in high-drive applications. These components can also be manufactured with evaporated nickel electrodes. When manufacturing into 1 – 3 composites, the blocks can be machined without metallisation.

Richard Carus, product sales manager for Piezo Components at Morgan Advanced Materials, said: “We have a rich heritage in the design and manufacture of PZT ceramics, and as a market leader in the field we continue to push the boundaries of technology. This latest manufacturing-led innovation has seen not only a major breakthrough in manufacturing process capabilities enabling us to manufacture thicker components, but has created a new range of products for our defence and commercial sonar customers. We believe this breakthrough opens the door to further additions to our large components range.”

Morgan produces plasma cavity for Australia’s Helicon Double Layer Thruster gas plasma space engine

September 2013

Morgan Advanced Materials, a leading supplier of high purity Alumina custom-made, high precision ceramic components, provided a prototype plasma cavity for the Helicon Double Layer Thruster (HDLT), a new gas plasma space engine for use on satellites being developed by the Australian National University (ANU).

Gas plasma engines are used in electric propulsion, a technology becoming more and more popular, because it uses “greener” propellants, rather than more toxic chemicals.

Engineers at Morgan provided design feedback and a review of tolerances before developing the cavity prototype, made of its proprietary material, AL300, a high purity alumina known for its excellent electrical properties. After developing an in-house process to produce the components, Morgan was able to achieve first pass success, getting prototypes into ANU’s hands with an extremely short lead time so the finished components could be used for the space-qualification testing.

The project, under the direction of ANU’s Space Plasma, Power and Propulsion Laboratory, is funded by the Australian Space Research Program, Astrium, an aerospace manufacturer that is a subsidiary of the European Aeronautic Defence and Space Company (EADS), the Surrey Space Centre, ANU, and Vipac, a multi-disciplinary technical consultancy.

Zachary Waddle, Engineering Manager at Morgan Advanced Materials, worked closely with ANU to develop the component. The AL300 97.6% purity Alumina has been used for decades in extremely high-voltage applications, as well as RF applications. “The material had been successfully used in the manufacture of plasma generation components and also for high voltage insulation used in new and emerging scanning electron microscopes, so I thought it would be an excellent match for this project.” He adds, “It was very gratifying to be able to help a customer with such a unique requirement, and to collaborate on the technical specifications to get prototypes into their hands quite quickly.”

www.morganadvancedmaterials.com
Morgan launches Firecrete FP – the optimum solution for building hearths for stoves and fireplaces

October 2013

Thermal materials technology specialist, Morgan Advanced Materials, announces the launch of Firecrete FP, a new self-flowing refractory castable product developed to offer tile and hearth manufacturers a technologically superior alternative to vermiculite board.

The first product of its type from the company, Firecrete FP has been developed to meet the specific requirements of an expanding stove and fireplace market which has led to the evolution of a range of refractory products for building hearths.

Firecrete FP is a versatile and flexible product suitable for use with wood-fired and pellet stoves, as well as fireplaces. It possesses high mechanical strength, enabling the use of thin layers without compromising the strength of the structure. Its fine grain delivers a uniform, low porosity surface which enables easy cleaning.

The new product incorporates a number of additional characteristics resulting in significant advantages when compared with other competitive materials. The flow properties and density of the product allow moulds to be light and re-usable over long periods. As the material is hydraulic setting, it is prepared by simply mixing the powder with clean water. There is no need for custom equipment or complex machines and it can also be mixed by hand. Firecrete FP is self-flowing and has excellent resistance to thermal shock. Also, because of its formulation, it is not necessary to dry out or fire the tiles before use.

The use of special binders and high refractory raw materials give Firecrete FP tiles exceptional heat stability, with minimal shrinkages up to high temperatures. This also enhances colour durability throughout the range of usage temperatures and improves the aesthetics of the finished products.

Harald Kaune of Morgan Advanced Materials says: “Firecrete FP is a valid alternative to pressed vermiculite. It boasts excellent insulation properties alongside excellent mechanical strength and abrasion resistance. Traditionally, refractory tiles, custom cut to a thickness of 40-50 mm, are used for wood fed fireplaces. By using Firecrete FP, it is possible to reduce tile thickness by 50 per cent. This allows manufacturers to increase the number of insulation layers to improve thermal performance and efficiency.”

As a result of its distinctive features, Firecrete FP also has potential for use in solar towers and photovoltaic installations. It is also ideal for applications where it is difficult to apply pre-shaped insulation materials and dense custom sized tiles. Moreover, it will accommodate ducts and connections for fumes exhaust in furnaces, kilns and industrial boilers.

Morgan Advanced Materials announces range of precision glass tubing and rods

October 2013

Morgan Advanced Materials announces that its Technical Ceramics business offers a range of precision glass tubing and rods, ideal for electronics, telecommunications, and aerospace applications, including miniature fuse bodies, glass-to-metal seals in integrated circuit packages, glass lenses for erasable/programmable read only memory (EPROM), and read only memory (ROM).

Using proprietary glass forming processes, the business can manufacture small or large quantities of glass tubing and rod to precise tolerances. With a large portfolio of glass compositions, Morgan can develop materials whose coefficient of thermal expansion precisely meets the expansion properties of components being sealed.

Compositions of borosilicate, including those made of the well-known K-glass material, are used for Kovar sealing, microwave, and fuse casing applications. Soda lime compositions can be used for dumet sealing, a known method to seal copper leads using soda-lime or lead glass, and compression seals, while soda barium options are ideal for compression seals.

Morgan manufactures precision glass products in accordance with ITAR regulations and can support any products that are components within an ITAR application, including laptops, peripherals, and cockpit communications sensor systems.
Superwool® Plus delivers hot transport solution for Nugteren Transport

Morgan Advanced Materials’ technical prowess and inventiveness were put to the test when Nugteren Transport BV, a Dutch-based company involved in the transfer of large loads and units, made contact with staff in the company’s Netherlands office.

Nugteren Transport BV needed to design a safe and effective method of transportation for hot steel ingots that ensured the ingots would lose minimal heat during transit and tasked Morgan with finding a solution. Previously, during transportation, the steel ingots cooled from a temperature of around 800°C to approximately 50°C, and then were re-heated at the customer’s site — a process which consumed a significant amount of time and energy.

Under the new system, the steel ingots would be loaded at a typical temperature of 600°C and expected to arrive at the customer having cooled by no more than 50°C over a five-hour period — negating the need for an expensive and time-consuming re-heating process. This meant finding an effective insulation solution for the vehicle trailers in which the ingots would be carried.

Moors Ovenbouw BV of Diessen were engaged to undertake the project. The first step was to insulate the floor of the trailer, making it safe, while maintaining sufficient strength to handle the loading of heavy ingots to a total weight of 25 metric tons. The floor also needed to provide an airtight joint between the trailer and the insulated hood placed over the load.

The floor was constructed using a base layer of Superwool® Plus Blok from Morgan Advanced Materials. A low biopersistent fibre product designed for high-temperature insulation applications. Superwool® Plus Blok was chosen for a number of reasons: its light weight of 320 kg/m³; its combination of strength and flexibility; its ability to cope with the 25 ton steel load without cracking or deforming; and most importantly, its 30% improved insulation value when compared with calcium silicate board - minimising heat loss and therefore saving energy. The Superwool® Plus Blok was covered with a layer of sand and the frame edge was made of Morgan’s JM26 Insulating Firebricks which gave the structure sufficient strength to handle the initial load of the hood before making an airtight seal.

The hood was constructed from a steel casing which can be demounted for loading and unloading. A 100mm thickness of stack-mounted Superwool® Plus 128kg/m³ was used in the lining of the hood. The stack mounting optimised the strength of the lining – a key consideration given that while the vehicle would be travelling at speeds of up to 80 kph (50 mph), with the associated vibration and forces created by stopping, starting and turning. Superwool® Plus delivers energy-saving benefits by maximising the number of fibres available in the insulation layer, thereby reducing thermal conductivity. As a result, it minimises the total energy lost while having a more compact footprint than many other insulation materials.

Initial tests delivered impressive results. While the system was designed to maintain a temperature fall of no more than 50°C over a five-hour period, Nugteren Transport BV reported that the temperature fall over that time was actually less than 25°C. Even when the ingots were left in the vehicle over a full weekend, products loaded on a Friday still reached the customer on the following Monday at a temperature of 375°C. Furthermore, over the duration of the test, the external temperature of the hood did not exceed 70°C, the maximum temperature allowed by the RDW (Dutch Department of Transport).

Bennie Lekkerkerk, Business Manager for Morgan Advanced Materials in Benelux, commented: “Superwool® Plus offers a clear advantage over other materials through its distinct chemical formulation. By optimising the number of fibres in the insulation layer, we can deliver an effective energy-saving solution that offers significant benefits. Optimising the fibre index allows us to reduce the thickness of insulation used and also gives great benefit in strength and vibration resistance of the fibre. “Nugteren Transport BV has seen at first hand the benefits of using Superwool® Plus fibre. As well as delivering substantial energy-saving results, the highly engineered material is environmentally friendly, with EU waste regulations classifying the material as unhazardous.”

October 2013

www.morganadvancedmaterials.com
Morgan Advanced Materials secures prestigious Canadian government contract

Morgan Advanced Materials through its Composites and Defence Systems business has been awarded two highly significant contracts by the Canadian government to develop its next generation of lightweight, high-performance body armour inserts.

The two contracts run until March 2016 with the option for production to extend until March 2021. Morgan’s Composites and Defence Systems business specialises in the use of highly engineered composite and ceramic materials for defence applications including vehicle armour, combat helmets and body armour as well as a variety of similarly demanding commercial uses.

Duncan Eldridge, President of Morgan Advanced Materials - Composites and Defence Systems, commented: “We are delighted to have secured these two prestigious contracts which confirm our excellent reputation within the industry. Morgan is proud to support Canada in pursuit of its Soldier Systems Technology Roadmap objectives with this development, which is also central to the technical strategy of our business. The new plates underline a core commitment by the Canadian government to develop the protection of soldiers in the military."

Morgan has structured the development programme to closely follow objectives outlined in the Canada First Defence Strategy including building upon Canada’s Key Industrial Capabilities for protecting the soldier.

Morgan Advanced Materials delivers superior insulation solution to wind farm

Exceptionally high-temperature resistance, a low installed thickness and low weight are just three key benefits of Morgan Advanced Materials FireMaster® Marine Plus blanket, which has been installed on offshore convertor platforms in the North Sea. The installation is part of a significant wind farm development providing power for homes and businesses in Germany.

Electricity transmission grid operator TenneT commissioned Siemens Energy and Prysmian Powerlink to construct a power grid connecting a series of offshore wind farms to shore. Each farm contains a number of high-voltage, direct current convertor platforms, fabricated by Nordic Yards, with a foundation support structure and topsides that incorporate conversion equipment, workshops, a helicopter deck and accommodation quarters. Each platform transforms low voltage power generated by the wind farm into high voltage power, and converts it into efficient, low-loss direct current.

With each convertor platform housing significant quantities of hydrocarbon products that can produce fire temperatures of up to 1100°C and 4000m2 of transformer rooms requiring 60 minutes resistance against hydrocarbon fuel fires, an efficient fire-resistant solution was essential. Morgan Advanced Materials supplied its low-density FireMaster® Marine Plus blanket to meet the specific requirements of the project. The high-performance FireMaster Marine Plus blanket ensures temperatures of 140°C on the internal face are not exceeded, while withstanding temperatures of up to 1100°C on the fire-exposed face.

Weighing less than 6kg/m2, the lightweight material only needed to be provided at a thickness of 80mm to offer the necessary fire protection. The reduced thickness of the FireMaster Marine Plus blanket also helped make best use of space, with the system taking up approximately 40 per cent less space than alternative materials.

FireMaster Marine Plus blanket was installed on two platforms last year, and will also be fitted on a third platform later this year. Allan Beeston, Global Manager – Fire Protection at Morgan Advanced Materials, added: “FireMaster Marine Plus blanket is fully certified by DNV, underlining the fact it has been tested to rigorous fire protection standards. As well as its thermal capabilities, the importance of reducing weight for maritime applications cannot be underestimated. Excessively heavy topside structures can create problems when modules are lifted into place. Extra support strength for the structure may also be required, leading to increased costs. FireMaster Marine Plus blanket offers a 25-50 per cent weight reduction compared with traditional mineral wool and alternative materials available on the market.”
Three leading defence companies have formed an exclusive partnership to bid for the continued support and upgrade of the Ministry of Defence’s Mastiff, Ridgback and Wolfhound fleet of Protected Patrol Vehicles (the Mastiff family of vehicles).

The three companies - Morgan Advanced Materials, Ricardo and Ultra Electronics - are all UK-based and owned, with their technology development in the UK. The combined expertise, experience and history of innovation of these companies provides an outstanding option to support and enhance the unique capabilities of the Mastiff family of vehicles for the foreseeable future.

Morgan Advanced Materials’ Composites and Defence Systems business (formerly NP Aerospace) has world-leading expertise in specialised armour technologies. It designed, developed and integrated UK-specific, specialised armour protection and electronic systems into the entire Mastiff family of vehicles from base platforms purchased from the USA. Morgan also implemented and operated the spares support processes, including configuration management, stocking and supply chain management, which kept the fleets running during combat operations.

Ricardo is renowned for its automotive engineering expertise and was responsible for the initial design, development and engineering of the Foxhound vehicles, manufacturing all 376 units ordered to date. Ricardo was prime contractor on the Vixen and RWMIK+ upgrade programmes and has also undertaken a project for the Defence Science & Technology Laboratory (DSTL) to identify improvements to the fuel efficiency of Mastiff vehicles. Ultra Electronics is an international pioneer in vehicle information and power systems and has worked extensively on behalf of customers including the MoD, US Department of Defense and leading Tier 1 suppliers into the defence sector. Ultra is currently under contract to provide multiple electronic systems for the Warrior Capability Sustainment Programme and Scout SV development. It is the only Tier 2 supplier involved in all aspects of Generic Vehicle Systems Architecture (GVSA), Generic Soldier Architecture (GSA) and Generic Base Architecture (GBA).

The three businesses are complementary in their technological capabilities, maintain critical competencies in-house and have the financial backing of substantial parent companies. This has enabled them to demonstrate remarkable agility and innovation in meeting demanding requirements for protecting UK soldiers over the last decade. This collaboration creates an agile partnership which maintains that capability in the UK and offers the possibility of optimising electronic and power system synergies between vehicle, future soldier and base systems.

The MoD will shortly award contracts for Post Design Service, Coherence and future upgrade work. Morgan will lead the group and is bidding as prime contractor.
Carbon brushes from Morgan improve generator reliability and reduce wind turbine maintenance costs

Morgan Advanced Materials Electrical Carbon business announces that its range of carbon brushes are ideal for wind turbine applications, with new designs and materials that are resulting in longer brush life and increased generator uptime.

Morgan’s globally available brush grades are created to be environment-specific, offering maximized performance in low or high load conditions. Leading-edge laboratory equipment, coupled with years of experience in carbon brush technology, has led Morgan to develop advanced materials to address the environmental extremes experienced by wind turbines, including scorching heat or corrosive sea salt. The brushes are also engineered to deliver high performance in low-humidity atmospheres, a common environmental factor affecting many wind farms. The field-tested carbon brushes are backed by unmatched application engineering, customer service and global reach to support demanding environments. They offer exceptional performance, and feature low friction due to their superior film formation. In addition to being able to endure extreme atmospheric conditions Morgan’s range of carbon brushes are tolerant to contamination and provide an excellent lifespan with minimal slip ring wear and a low brush to brush wear differential. Despite their relatively small size, carbon brushes and related assemblies are a critical component in a generator’s overall efficiency and output. Morgan’s carbon brushes are ideal for wind turbine generators that are subjected to extremely harsh environments, along with other challenges, including sudden changes in wind speed, very low humidity, and the on/off cycling of the generator unit. Their superior design also results in lower maintenance costs and significantly improved generator reliability.

Strategic partnership between Morgan Advanced Materials and Grundfos moves into a fifth decade

Morgan Advanced Materials has further extended an existing long-term agreement with pump manufacturer Grundfos to supply to seven of the company’s manufacturing facilities around the world. A strategic business partnership that has flourished for more than 40 years has now entered its fifth decade.

Through one of Grundfos’s longest supply relationships, Morgan Advanced Materials supplies approximately 40 million products a year. These include ceramic bearings and shafts and carbon thrust washers which are utilised within the same pumps as their ceramic counterparts. The relationship with Grundfos is one of many key strategic partnerships held by Morgan with leading edge manufacturers across the globe based on Morgan’s proven ability to deliver innovative solutions to support new product development across a variety of industry sectors.

A key factor in the success of this particular relationship between the two businesses has been the close involvement of Morgan in many of the cutting-edge strategic development projects undertaken by Grundfos.

Typical of this was Morgan’s early contribution to the design work that went into the development of a highly innovative new line of circulator pumps, launched as the MAGNA3 and the new ALPHA2 product lines in 2012. Recognising its supplier’s contribution to its ongoing product innovation, Grundfos named Morgan as its Supplier of the Year in both 2008 and 2011, making it the only company to have achieved this honour twice.

Commenting on the continuation of the strategic partnership, Grundfos vice-president Klavs Hornum, who is responsible for group purchasing, said: “We demand supreme quality from our suppliers, both in terms of product and service, and that is what we have seen from Morgan Advanced Materials over the past 40 years. We enjoy a high degree of mutual respect, which is essential when we are looking to involve a supplier at the early stages of strategic development work, and we value the contribution that their teams make to our design processes.” Liam Shaw of Morgan says: “We look forward to the next phase in our relationship with Grundfos. We very much recognise the value of ongoing strategic partnerships such as this one in fostering innovation and best practice, and optimising value for end users.”
Morgan Advanced Materials launches single-rod 36kv live-line capacitor range

Morgan Advanced Materials, a world leader in the design and manufacturing of innovative material solutions, is extending its electro ceramics portfolio, with the launch of a new range of single rod live-line capacitor assemblies for use on system voltages up to 36kV.

The new range is constructed from ceramic dielectric materials that exhibit a high AC breakdown strength, enabling them to operate continuously on a 36kV system line, and a negligible change of capacitance with applied voltage. They also offer a significant volumetric efficiency saving over designs where two rods are connected in series to meet voltage test requirements.

Live-line capacitors are built into capacitor divider circuits which are connected to medium system voltage lines where they are used to sense the presence of voltage. The signal derived from the low voltage side of the capacitor divider can also be used to monitor supply failure and circuit conditions.

Building on the success of Morgan’s 24kV system capacitors the new range complies with all qualification and routine production tests as detailed in IEC60358. These include a power frequency test to 70 kV RMS/min, the ability to withstand a lightning impulse of 170kVpeak and partial discharge capability of less than 5pC at 40 kV RMS.

The range boasts a capacitance range of 15pF – 80pF with dimensions (including two brass terminals) 17mm diameter x 81mm in length.

Dave Edwards, HV&RF technical manager for Morgan Advanced Materials, said: “Morgan has manufactured live-line capacitors since the early 1990s. Over the years the capacitance range has been extended by the introduction of new dielectric materials.

Morgan announces FireMaster® FireBarrier™ high performance fire protection

Morgan Advanced Materials announces the availability of FireMaster® FireBarrier™ 135 sprayed refractory cement, offering superior fire protection and simple, cost effective installation. FireMaster® FireBarrier™ 135 is ideal for concrete tunnel lining fire protection and the fire protection of ventilation shafts, escape tunnels and refuges as well as critical systems such as water mains and communication cables.

FireMaster® FireBarrier™ 135 has been specially developed for the high temperatures that may occur in tunnel fires. Unlike most other products used for tunnel fire protection, it can withstand repeated and prolonged exposure to high-temperatures. It can be installed onto concrete or metal substrates using standard spray equipment and featuring very low spraying wastage during installation, its single layer application makes it fast and easy to install. It is adhesive to most construction materials and can be installed quickly, helping to reduce labour costs while maintaining the final product’s quality and proven reliability. FireMaster® FireBarrier™ 135 has extremely high adhesion strength – typically eight times its weight, allowing fixings to be attached directly to it. It can be trowelled flat to provide a high-quality surface finish that can be used as the final tunnel lining surface (with optional painting), avoiding the need for expensive secondary cladding. The material can also be cast into sheet form and installed as a dry board or shape for applications where spraying is not convenient.

Comprehensive and extensive testing of FireMaster® FireBarrier™ 135 per the RWS fire curve and required by NFPA 502 has proven that the material resists environmental conditions found in tunnels, making it ideal for tunnel fire protection. FireMaster® FireBarrier™ 135 is resistant to water jet sprays used to clean tunnel lining, and will not spall when subjected to water hose sprays at high temperature, increasing fire-fighting safety.

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