

FAST

FASTENING & ASSEMBLY SOLUTIONS AND TECHNOLOGY



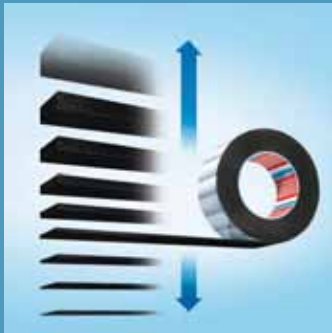
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Automotive success will lead to fastening opportunities



The UK car industry just seems to plough on relentlessly. In May the sector hit its highest level of output since 2004 and according to the Society of Motor Manufacturers and Traders (SMMT), there were 141,146 cars manufactured in UK factories, a rise of 42.2% over May 2011. Car production has increased by 17.3% in the year to date. Of those cars built in the UK, a total of 120,120, a very respectable 85%, were for export.

This success demonstrates the strength of the UK automotive manufacturing industry and the high level of opportunity that must be waiting the plethora of lower tier industries supplying its components. It might also demonstrate why the automotive sector continues to attract high levels of international investment. And there's more encouragement from engine manufacturers whose output increased by 13.4% last May, taking the total for the year so far to over a million units.

Automotive manufacturing turnover in 2011 was £55 billion – a 12% increase on 2010, SMMT calculates. Combined car and commercial vehicle production last year reached 1.46 million which was a 5.1% rise on the 2010 total. Vehicles made for export were up 14% last year and were valued at more than £30 billion. And Britain is making them cleaner. Apparently carbon dioxide emissions from manufacturing were down by more than 13% per vehicle produced last year.

Looking to the future, we can expect that by 2015 the number of cars produced could reach an all-time high of two million vehicles in the year. SMMT chief executive Paul Everitt said: "The automotive industry is continuing to lead the country's economic recovery, increasing manufacturing output, delivering record turnover and exporting a greater proportion of cars than ever before, all while reducing our environmental footprint."

Despite the tough economic climate, the automotive sector has continued to perform above expectations, demonstrating the significant role it has to play in a rebalanced economy. The industry is also at the forefront of the drive to a low-carbon economy attracting investment in the research, development and manufacture of low and ultra-low carbon technologies, creating new jobs and growth opportunities throughout the supply chain and introducing attractive products that are reducing transport emissions as well.

Britain must be making good cars. Take a prestige level manufacturer which is German owned but still very British in its design and character. Bentley is selling all they can make and the World's car buyers are coming back for more. The company's half year results for 2012 show continued strong growth. Sales are up in every region leading to a global increase of 32% with 3,929 cars delivered to customers.

The US has re-emerged as Bentley's number one market with deliveries up by 25.7% (1,140 cars). Sales in China also remain extremely strong with results up 55.7% or 1,059 cars delivered. Bentley's flagship Mulsanne sold strongly in both markets and saw an overall increase of 30% as the Diamond Jubilee Special Edition and Mulliner Driving Specification became available to customers. At the same time, the new Continental GT underscored its popularity with customers around the world. Deliveries of the premium coupé, which is now available with W12 and V8 engine options, increased by 48.5%. Bentley's strong performance in its two largest regions was underpinned by an increase in sales in all other regions. In Europe results were up 22.9% with 607 deliveries to customers, and in the UK they increased by 4.5% with 557 deliveries to customers.

So in these days of austerity, it appears that manufacturing records are still being broken. Just last month, BMW's UK engine plant shipped the three-millionth engine to be produced at the Group's UK engine plant at Hams Hall, near Birmingham.

None of these results or records would be possible without such key elements of manufacture as components and assembly systems. Naturally, in the editorial office of this journal, we consider fasteners and adhesives to be an essential element of the components arena, especially in a month when scientists finally identified the Higgs Boson after 50 years and billions of euros of investment in research. And when you look at the findings, this elusive particle is no more than a simple fastener binding together other particles to form our universe.

Paul Gay, Editor
editor@fastmagazine.co.uk

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There's £100 to be won for the correct answers of the quiz on our Tailpiece page. Sort out some tricky engineering trivia questions and win a cash prize



FASTCOVERSTORY



FAST Exhibition returns to Birmingham

Following a very successful event in April at the Harrogate Pavilions, the FAST & IASE Exhibitions will return to the hugely popular and centrally located National Motorcycle Museum on 18th October this year. Positioned just outside the NEC, the venue offers abundant free parking, and the organisers have again arranged for a free bacon roll and brew to be waiting for all pre-registered visitors on arrival, as well as a free museum pass otherwise priced at £8.95.

Visitors will see all that's topical in low cost fastening in areas including anti-vibration and vibration-proof fasteners, mechanical locking, washers, captive fastening, press joining and clinching, as well as structural adhesives. This will enable design and production engineers to compare fasteners with a view to reducing assembly costs.

Entry to the FAST & IASE exhibitions is free and one registration provides a badge valid for both events. Pre-register now at www.fastenerexhibition.com

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Automotive engine design is dictating lighter engine blocks with thinner walls which presents an interesting challenge for the sealant supplier



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Don't risk it ... Secure it!

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Sourcing fasteners and standard parts gets easier for designers

Some of the latest fastener installation tools and systems reviewed

FASTUPDATES

Motor industry giants to co-operate on new technology

The top executives of two giant motor manufacturers met last month to agree a development plan between their two companies for the technical design of future vehicles.

Akio Toyoda, president of Toyota Motor Corporation (TMC) and Norbert Reithofer, chairman of the board of management of BMW AG, met at BMW Group headquarters in Munich to announce the planned expansion

joint development of architecture and components for a future sports vehicle, collaboration on powertrain electrification and joint research and development on lightweight technologies.

The two executives also signed a joint statement to reconfirm their companies' shared intention to strengthen the long-term, strategic collaboration between them. Reithofer explained: "We aim to further strengthen our competitive position in sustainable future technologies. We signed a MoU to this effect today. Toyota and the BMW Group share the same strategic vision of sustainable individual future mobility. Together we have a great opportunity to continue leading our industry through this transformation."

In March this year, the two companies signed a binding agreement on collaborative research in the field of next-generation lithium-ion battery cells. In addition, the BMW Group and Toyota Motor Europe entered into a contract under which the BMW Group will supply highly-efficient 1.6 litre and 2.0 litre diesel engines to Toyota Motor Europe, starting in 2014.



The BMW i8 Concept has an all-electric engine and a range of about 150 km

of their existing cooperation initiated in December last year. The two companies signed a memorandum of understanding (MoU) aimed at long-term strategic collaboration in four fields: joint development of a fuel cell system,

Jubilee Clip maker responds to market needs

Gillingham-based manufacturer **L Robinson** has expanded its Jubilee Clip portfolio with a constant velocity joint boot clip, which it is offering in convenient packs of 15 (10 x 40-110mm plus 5 x 25-50mm).

The world's oldest manufacturer of worm drive hose clips does not deal directly with end-users but sells through a network of automotive wholesalers. Nevertheless, the company used the occasion of last month's Commercial Vehicle Show to meet truck and van operators and gain useful feedback on how its products are being used in workshops, as well as identify potential new opportunities.

Joint managing director Ian Jennings explained that it was during last year's CV Show at the NEC that he and his colleagues realised there was a gap in the market for a constant velocity boot clip sold separately to additional, expensive components which are not always required. "Some of the operators we spoke to were becoming quite frustrated so we went back to find a solution and our new CV boot clip pack is the result," he commented.

"We've already secured our first order, which was for 500



packs, while the general feedback from visitor's to this year's CV Show was extremely positive," Jennings added.

L Robinson & Co was founded by Commander Lumley Robinson RN – Ian Jennings' great-grandfather – who took out the patent on his original worm drive hose clip in 1921; it is now widely acknowledged as a design classic.

L ROBINSON & CO 01634 281200

South Staffordshire College gets together with Araldite



College students will be asked to devise a video which showcases the properties of Araldite adhesives

Huntsman Advanced Materials has agreed a business association with South Staffordshire College, which will involve students from engineering and media courses in development programmes. Two joint projects will enable students from very different disciplines to take part in assignments that will require application, hard work, entrepreneurship, inspiration and timeliness in equal measure.

The Araldite brand has recently re-launched in the UK although it is still fondly remembered for its campaign featuring a car stuck to a poster site of the early 1980s. Now level 3 media students from the college's Lichfield Campus will be working on an equally challenging task. They will be asked to devise and pitch a viral video which showcases the properties of Araldite adhesives to consumers. Following a Dragons-Den style interrogation with representatives of

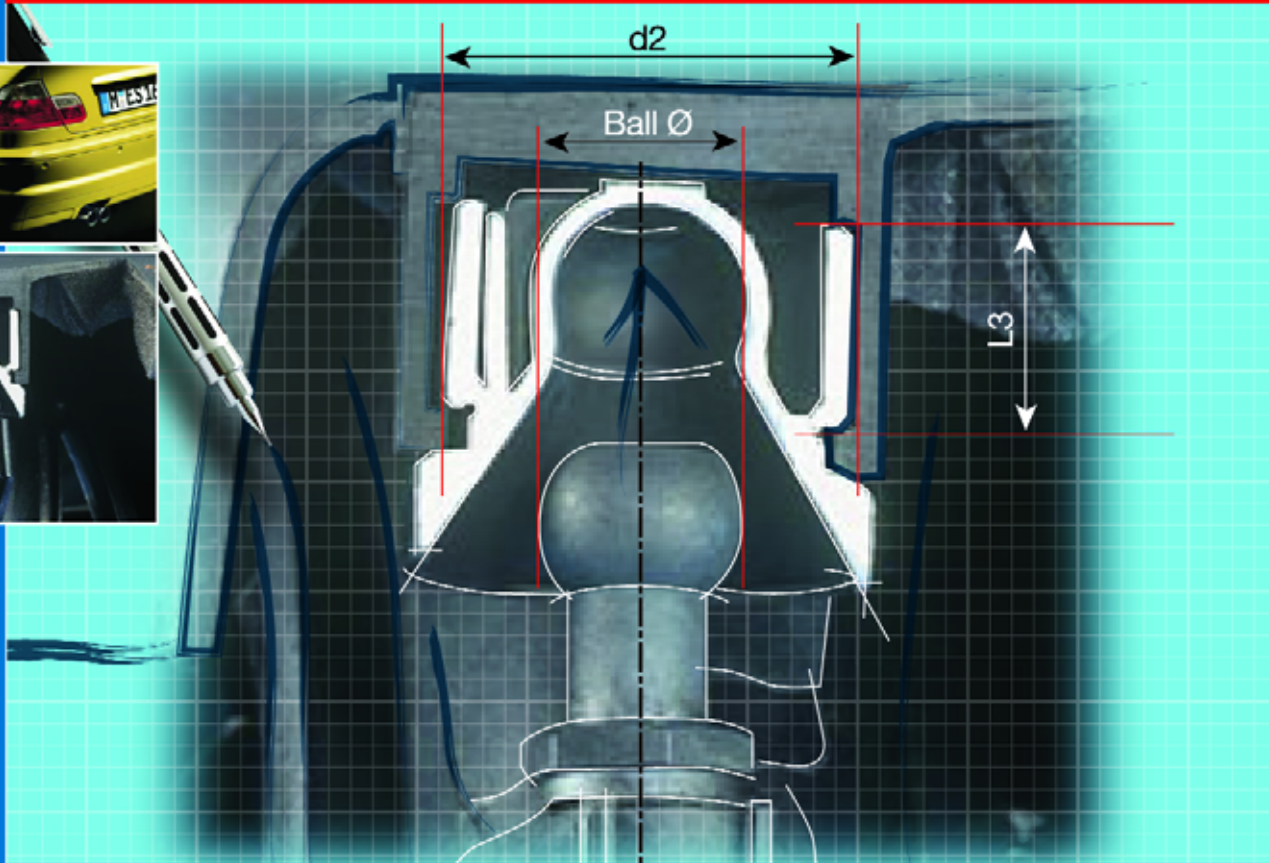
South Staffordshire College, Huntsman Advanced Materials and Araldite's creative agency Tregartha Dinnie, the preferred concept will then be taken to production against a tight deadline.

Director of Commercial Operations at South Staffordshire College, Michelle Dowse, explained: "Everything we do here at South Staffordshire College is focused on helping our students into work, either as valuable employees or as budding entrepreneurs in their own right. This programme with one of the world's leading consumer adhesive brands is an exciting initiative that will fire the students' innovative spirit but also teach them about planning, deadlines, presentation skills and team working. I am delighted that Araldite has chosen us as its partner."

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FASTUPDATES

Climb Kilimanjaro for Meningitis UK

Meningitis UK has challenged the readers of FAST to climb the awe-inspiring Mount Kilimanjaro, the highest mountain in Africa, to help save lives from meningitis.

Both seasoned walkers and brave novices can sign up for this remarkable climb from January 2013.

The trip of a lifetime to Mount Kilimanjaro takes place from January 17 to 27 and covers a variety of diverse terrains, from jungle to volcanic craters, en route to the picturesque snow-capped Uhuru peak, the highest point in Africa at 5,895m high. The chal-

lenge, called The Big Trek, promises to push participants to the limit while helping to raise funds towards wiping out meningitis.

Thousands of people die from the disease each year and taking part in a charity challenge is one of the ways in which people can help raise money towards finding a vaccine.

To find out more about these exciting challenges, please contact Liz Gough on **0117 303 3343** or email **lizgough@meningitisUK.org**, or visit **www.meningitisuk.org**.

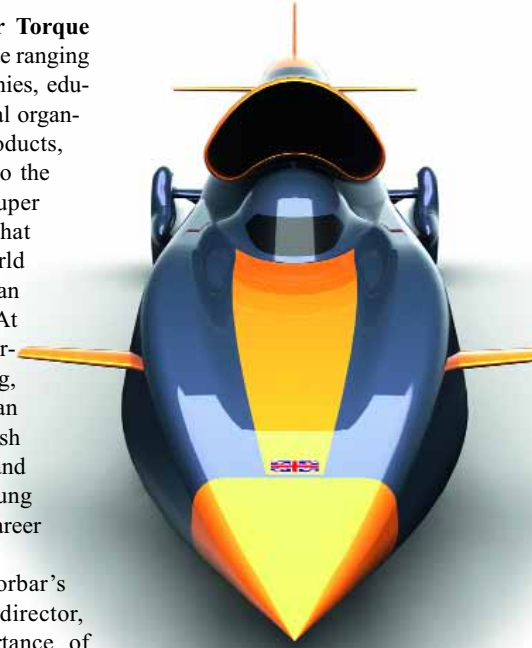


Bloodhound bid gets more sponsors

Banbury based **Norbar Torque Tools** has joined the wide ranging list of specialist companies, educational and professional organisations supplying products, services and expertise to the Bloodhound SSC (Super Sonic Car) project, that aims to push the world land speed record to an incredible 1,000 mph. At a time of resurgent interest in UK engineering, Bloodhound acts as an exciting focus for British experience in this area and an inspiration for young people considering a career in this absorbing field.

Philip Brodey, Norbar's sales and marketing director, emphasised the importance of setting accurate torque to fastenings on a vehicle that would be subjected to exceptional stresses induced by speeds well beyond the sound barrier. "This is an ambitious and adventurous project that is a great way to advance and promote technology. There are likely to be useful practical spin-offs as well as an increased public awareness about how engineering can be an enduring passion as well as a rewarding profession."

The 7.5 tonne Bloodhound SSC is jet and rocket propelled and capable of accelerating from 0-1,000 mph and back again to zero in just 100 seconds. Its jet and rocket engines generate a thrust of 47,000 lbs, the equivalent of 180 F1 cars. Pressures impacting on the vehicle include 30 tonne suspension loadings and



air pressures of up to 10 tonnes per square metre.

Bloodhound SSC will be driven for this record breaking bid by Andy Green, who set the existing land speed record of 763 mph driving Thrust SCC in 1997. The new land speed record attempt will take place in 2013 in the Northern Cape desert region of South Africa, along a track 19km long by 500m wide, which required 10 million square metres of desert to be cleared by hand of rocks and other obstacles. Further information about the project and its history can be found at www.bloodhoundssc.com.

NORBAR TORQUE TOOLS
01295 270333

Feedstock prices force composites price rise

Scott Bader Europe increased the prices of all its manufactured composite products in Europe from May this year, subject to existing customer contracts. The price of the company's Crystic unsaturated polyester, vinyl ester, DCPD, and all other manufactured composite products went up by 90%/tonne.

Bob Garner, European sales manager for Scott Bader Composites Europe explained that the price rise is once again in response to continued increases in the costs of key oil based feedstock raw materials. "These sustained raw material increases, which are beyond our control, effectively force our business to

implement this increase. Market conditions remain volatile and uncertain as our industry attempts to mitigate these costs wherever feasible," Garner commented.

Scott Bader claims it remains committed to working closely with customers across Europe to find practical ways reduce the

overall impact of these necessary price increases for the long term sustainability of its business. It actively looks to help customers maximise product and process efficiencies through technically-led partnership projects.

SCOTT BADER
COMPOSITES EUROPE
01933 663100

Sustainability marks the pattern of economic growth

Bonding tapes specialist **tesa** is making significant headway with its second international environmental programme, which sees the company setting measurable targets and regularly reviewing company processes with a view to ensuring constant quality, environmental protection and occupational safety.

The on-going monitoring and improvement of specific key indicators, such as the reduction of energy consumption, carbon dioxide emissions, use of solvents, VOC emissions and waste, have long been an integral part of

the company's approach to environmental management.

In this reporting year, as in years past, tesa has once again further reduced emissions of volatile organic compounds (VOCs).

Since the current environmental programme started in 2007, the company has reduced volatile organic compound (VOC) emissions by 49 per cent overall in relation to comparable production volumes.

This is connected directly to the on-going development of tesa's production technologies,

where solvent use is eliminated wherever possible. While it is not yet possible to eliminate solvents from every step of the process of manufacturing technical adhesive tapes, emissions can be avoided as far as possible even when traditional technologies are used.

By integrating labour intensive reclamation and cleaning processes to make the re-use of solvents possible, tesa's Hamburg plant provides a good example of how the company is working to keep emissions to an absolute minimum.



Get the right tools for the job

● The introduction of the company's ACXplus range – a new category of double sided tapes for constructive bonding – has already caught the attention of some major industry sectors, including automotive, signage, construction, solar and building supplies markets.

As part of its on-going tesacoheasion programme, a customer orientated programme that aims to provide the best available customer care, the business

has also developed a range of dispensers, applicators and hand tools to facilitate both in-line and manual processes.

Handheld tapers offer options across the range of tape sizes and applications and customised application systems have also been developed in close consultation with customers to provide a fully bespoke service.

TESA 01908 500235

NEWS IN BRIEF

Engineers specifying **Huntsman Advanced Materials** can now take advantage of mobile apps for Android, BlackBerry and iPhone with product selectors enabling identification of the right Araldite industrial adhesive or composite formulated system that meets their specific needs by process or application. Users can also find out about the latest news on Huntsman's developments or applications and access product descriptions either on the apps or by emailing Huntsman to request information or technical data sheets.

HUNTSMAN ADVANCED MATERIALS +41 61 966 84 22

Adhesives and Specialty Chemicals distributor, **Ellsworth Adhesives** has redesigned its website with many new features to meet the growing needs of their customers. Visitors will now be able to browse by market, use an enhanced product comparison and filtering feature, search for related products and documents and check out their order history. Registered users will also have access to detailed information about past orders and will be able to replicate previous orders and store multiple shipping addresses for their various needs. The site is now live.

ELLSWORTH ADHESIVES
01355 231122

Correction to FAST April
Due to a typographical gremlin, we erroneously reported the operating temperatures of a Binder Fastener Systems adhesive. There was a mix-up between the degree symbol and the zero character for which we apologise. The adhesive mentioned on page 8 of FAST April edition can in fact be used in low temperature applications down to -30 degrees C and up to temperatures of +160 degrees C and can be used in the most demanding technical applications.

BINDER FASTENERS 01782 525780

FASTUPDATES

Fastener laboratory is fully commissioned

A-LAB, **Anixter Fasteners'** independent testing laboratory in Gloucester is now fully commissioned. The facility, which has been independently audited by UKAS and accredited to UKAS/ISO17025, offers a comprehensive range of fastener testing and failure investigation capabilities.

Commenting on the new laboratory, costing over £450,000 to commission and establish, Richard Hawker, vice president

of technical services, said: "One of Anixter's core values is quality and our culture is focused to deliver a zero defects standard, whilst supplying over 14 billion components annually, world-wide. As part of this commitment we have invested heavily in our technical capability. Our UKAS accredited laboratory not only tests products that we supply, but also provides an independent investigation and product verification service."

The services offered at A-LAB fall under the five headings of metallurgical, mechanical, chemical, failure investigation and product finish testing. The full list includes a plethora of tests that require extensive specialist equipment, including optical emission spectrometers as well as plus facilities to undertake specific tests such as salt spray testing.

The tests that Anixter subjects components to measures their integrity and performance to stan-

dards compliance and beyond. Metallurgist, Lee Pugh explained, "At A-LAB in Gloucester we offer over 25 different tests to scrutinise the integrity of a huge array of components. We work to the most exacting standards of a broad range of industries, covering the specifications of BS, ISO, ASTM and Ford."

ANIXTER
01202 865213



CNC technology makes better springs

William Hughes has adopted CNC technology to process spring hard wire into spiral springs. Unlike other manufacturers who use soft wire which is then hardened and tempered to give the required characteristics, William Hughes uses CNC technology to process spring hard wire into the required shape. The spring is then stress relieved and finished resulting in a spring that is faster to produce, has a lower

cost, looks better and has better performance characteristics.

Clock springs as they are sometimes inaccurately known are a type of torsion spring. The use of profiled or square wire, allows high performance parts to be engineered for applications in awkward or confined spaces. The difference between a spiral spring and a clock spring is that a spiral spring has a few coils that do not touch each other generally

delivering less than one full rotation whereas a clock spring has many coils, usually fitting into a confined casing.

CNC technology means that tooling for new springs can be manufactured more quickly and at a lower cost. Even small batch quantities can be quickly and economically produced for prototyping or low production runs.

The company's product range includes compression, tension

and torsion springs in many bespoke configurations, wire forms, PCB test points and spring wire. Stringent quality checks to ISO 9001:2008, TS 16949 and AS 9100, combined with the latest design, production and distribution techniques ensure continuity of supply, rapid delivery and competitive prices across the range.

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FASTUPDATES News analysis

High performance composites influence the business agenda

From a historical perspective, a mixed set of factors have affected the composites industry, crossing socio-political, technology, marketing and environmental issues. Philippe Michaud discusses how the market has evolved to place the development of high performance composites technologies firmly on the agenda as a key enabler across a number of market sectors

Composite technologies have come a long way in a relatively short time and have made high performance composites an extremely attractive option for original equipment manufacturers (OEMs). Because they are lightweight, they bring performance advantages to numerous applications.

Focused on producing high quality, complex and lightweight parts, many industries are addressing how to strike a balance between speeding up parts manufacturing, reducing investment costs and producing excellent results. Processing capabilities have thereby fallen in the spotlight with the onus on the requirement for better, high performance technologies.

In the automotive sector, lowering vehicle weight is driven by the need to create overall better fuel efficiencies and enhanced power to weight ratios. Recent

years have seen high levels of activity in the global electric vehicles (EV) industry. However, electric vehicles having particularly heavy batteries, efforts are focused on how to make them as light weight as possible in order to achieve a better performance.

Government directives did originally spur initiatives to reduce carbon emissions, but what we're seeing now is both pull from the market and push from the OEMs, focused on the delivery of enhanced vehicle performance. By and large, these influencers are mostly responsible for the significant growth in the composites market today.

More and more manufacturers are evaluating their carbon composites processing methods and realising the benefits of high speed resin transfer moulding (RTM) for part-a-minute production. Huntsman's resin systems for high pressure RTM and compression moulding are already proving their ability to offer advanced processing properties and significant production time savings for direct processing, with the former enabling production cycles as short as three minutes and the latter providing even shorter cycles of less than a minute.

There are differences in opinion across the automotive industry concerning just how much weight can be saved, but insight and the widespread adoption of this technology shows that when processed accurately, significant weight savings and the associated



New materials enhance technical performance in the fabrication, repair and assembly of aircraft components on airliners such as the Airbus A320

benefits of enhanced power-to-weight ratios will follow.

Aerospace advancement

Moving from one market in relative infancy to another in a more advanced stage, it would be apt to say that the aerospace market has been enjoying the benefits of composites for many years. From a research point of view, the next technological challenges centre on the exploration of new processes that reduce manufacturing times and new materials to enhance the technical performance in the fabrication, repair and assembly of aircraft components on short to medium range airliners such as the Boeing 737 or Airbus A320.

Priorities for wind energy

Wind Energy is another key market for composites and blade

manufacturers are very much focused on the continuous improvement of wind turbine performance. Requirements for developing higher performance materials with an emphasis on lowering toxic risk while sustaining very good processing conditions is another key area in which Huntsman is actively concentrating its efforts.

Technical and market developments over the past two decades have turned this once marginal application into a global giant, which is also fast becoming one of the world's largest markets for composites.

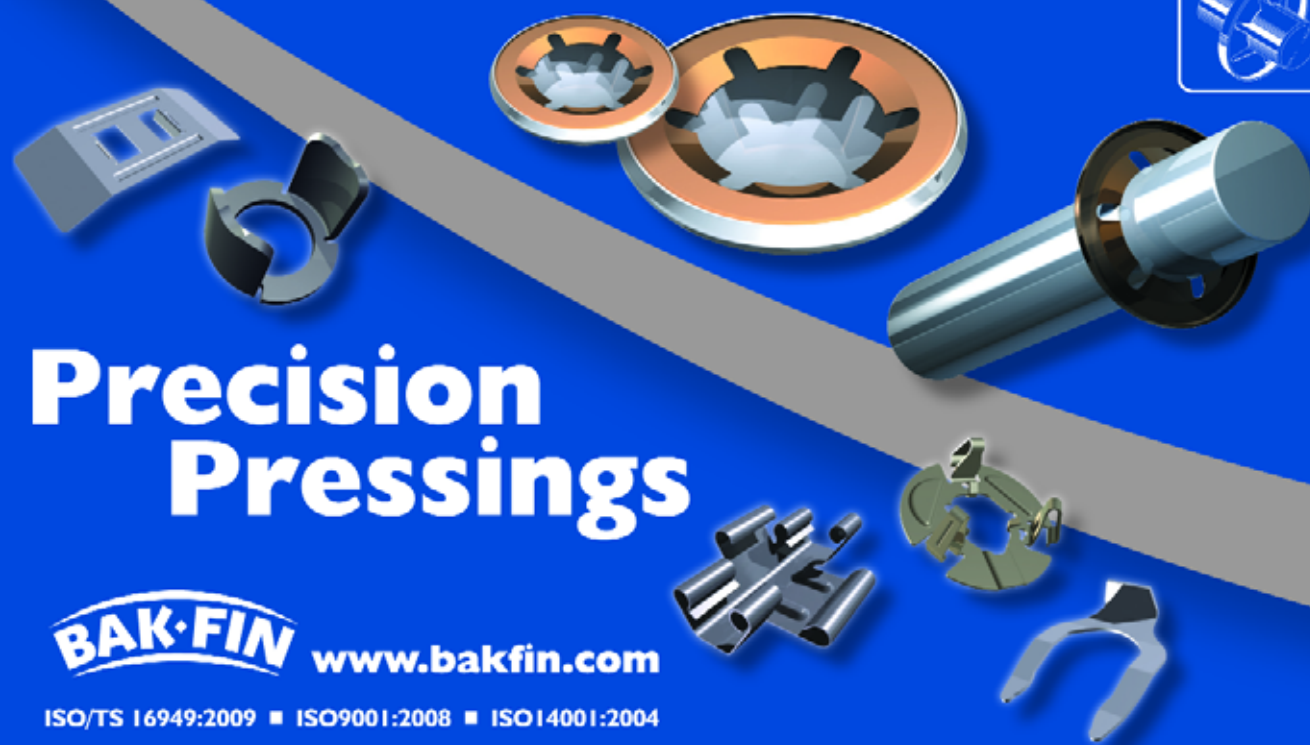
Wind energy is undisputedly the number one choice in Europe's efforts to move towards clean, renewable power and is expected to power industry, business and homes with clean electricity for many years to come.



RTM was used to make the engine air box for Ferrari F430

Philippe Michaud is Huntsman Advanced Materials technology director
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FASTCASE STUDY

Exotic material clip protects a fuel pipe



A leading supplier to the European automotive industry approached Jet Press to solve an unusual fastening requirement, which required a plastic clip to secure a fuel pipe where that clip was also capable of earthing the pipe as protection against electrostatic build-up.

The solution developed and provided by Jet Press involved the use of carbon nanotubes (CNT), which are tube-shaped carbon cylinders, about one ten-thousandth of the thickness of human hair. When dispersed in the main polymer mix, in this case, impact modified nylon 66, the CNTs allow any part moulded from this mix to demonstrate electrical conductive properties.

Getting the best from these modern materials required moulding techniques that had to be specially modified and controlled to make the part with a constant conductivity.

“Products manufactured in this way offer major advantages over other conductive solutions based on carbon black, carbon fibres or metals.” explained Martin Belcher, technical manager at Jet Press. “They provide, a decreased risk of chemical contamination, homogeneous electrical conductivity at low loading, processing benefits, elimination of residual voltage hot spots, decreased weight of the final part, and retention of key mechanical properties.

“In this particular application, a metal clip would risk damage to the fuel line and would need a secondary fixing such as a screw to hold the clip in place. [The solution] developed by Jet Press was able to provide the customer with all the properties required of the product, at the lowest in-place cost.”

Jet Press manufactures and distributes specialist fastening solutions to a wide variety of industry. For over a quarter of a century the company's technical team has been devoted to providing the best solutions for its customers, relying on a huge product resource and specialist knowledge at its disposal.

Development services include: plastic injection moulding includes colour matching, steel pressing, cold forming, die-casting, multi-axis machining, dip moulding, assembly and kitting; CAD modelling for release directly into customer CAD software. Sampling techniques include STL/SLA solid modelling, sample mould tooling and hand-made spring steel samples.

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FASTUPDATES

Manufacturing times slashed by automated welding

Arc Machines Inc (AMI) has given the biggest supplier of air-cooled heat exchangers in South Africa a triple boost by reducing manufacturing times at a plant in Johannesburg by up to 75%, winning the company more orders and helping it receive an innovation award.

GEA Aircooled Systems in South Africa is delighted it turned to AMI for automated orbital welding equipment after winning a major contract from a South African petrochemical giant to supply an Incoloy 825 alloy air-cooled heat exchanger. Because restricted access to the air cooler tubes limited the amount of manual welding that could be used during the manufacturing process, GEA ordered two of AMI's Tube Welding Model 207 Power Supplies, together with the M9-2500 and M9BT-1500 weld heads. These solutions have helped the company to complete the contract a month ahead of schedule - much to the satisfaction of the client.

GEA's International Welding Engineer, Angel Krustev, reckons that the success of the project and the resultant further orders it has received for air-coolers from the same customer, can all be put down to the performance of AMI's orbital welding equipment.

Krustev commented: "We knew of the reputation of the AMI brand for years and have not been disappointed. We welded more than 1,000 welds on 1 inch tubes in space with very restricted access. It reduced the manufacturing time by 60-75% and has tremendously increased our productivity."

Krustev has already recommended AMI's automated orbital welding equipment to other GEA companies and has used the M9-1500 weld heads for developing a new welding application that won the bronze medal at the GEA Annual Innovation Contest, a competition which is open to the organisation's multitude of companies worldwide.



The flexible M207 tube welding power supply is suitable for a lot of diverse industries. It has been designed to work with all AMI's orbital fusion weld heads and is capable of welding tubing and thin wall pipe. The internal memory of the machine stores up to 100 different welding schedules for quick access.

High-integrity, sanitary welds are easily reproduced at the touch of a button to meet or exceed the specifications required by many

sectors including, semiconductor, food and beverage, pharmaceutical, aerospace, and nuclear industries.

Other features include dust and moisture-proof soft touch membrane switches - ideal for cleanroom use and harsh environments - internal printer, external memory port, three-position key switch to limit operating or programming access to the user and optional remote control to allow welding function overrides

and access to any four pre-determined welding schedules.

GEA in South Africa is the latest company to benefit from Arc Machines' automated orbital welding solutions, boosting its order book thanks to the excellent performance of the equipment it has purchased so far - and plans to buy more of in the future.

ARC MACHINES UK
01327 312 787

Arc Machines claims to have been setting the standards for automated orbital TGAW/TIG welding since it was first established in 1976. The company now has the largest product range on the market and a reputation for the highest manufacturing standards, customer service, workmanship and quality of materials.

The company's long history of developing orbital welding applications for industry sectors that include nuclear, oil and gas, offshore, shipbuilding, petrochemicals, power generation, pharmaceuticals, food and beverage, dairy, aerospace and defence. Today AMI provides sales, maintenance, support and training for a wide range of precision power sources, control systems and weld heads suitable for numerous environments and applications.

AMI orbital welding equipment is utilised on a wide variety of pipe diameters, wall thicknesses and materials to produce precision welds, deliver superior performance and achieve consistent higher standards.



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FASTCASE STUDY

Chiller vehicle bodies assembled faster

The demand for refrigerated vehicles has been growing sharply, in part due to the increasing consumer preference to do grocery shopping on line and have them home delivered. In response to this increase in demand, Solomon Commercials, a leading European manufacturer of temperature controlled refrigerated vehicle bodies, looked for cost effective ways to increase output from their existing production lines.

This was achieved, without compromise in build quality, by re-engineering a long established assembly process. The company eliminated the need for riveting bodywork panels together, switching to using only **Scott Bader's** Crestabond M1-30 primer-less methacrylate (MMA) structural adhesive; productivity increased by over 50%.

Previously, Solomon Commercials assembled vehicle body panels by mechanical fixing with rivets, and then switched to bonding with a polyurethane (PU) adhesive. To gain a better bond strength and significantly improved productivity, Solomon Commercials has now switched to using Crestabond M1-30 to bond all

the aluminium sections to glass reinforced plastic (GRP) panels and the outer aluminium profiles to vehicle boxes, saving up to four hours in build time. Crestabond M1-30 provides all the long fixture performance needed for their refrigerated vehicle body applications.

Crestabond M1-30 was selected from the range, as its working time of 25 - 35 minutes and fixture time of 60 - 80 minutes gave optimum flexibility on the shop floor using only one structural adhesive for all applications. The added benefit offered by Crestabond structural adhesives is that they are primerless, with none or only minimal surface cleaning needed of the substrates to be bonded; this also saves production time and assembly costs. The bond strength and fatigue resistance of Crestabond M1-30 is ideally suited for body panel assembly applications with GRP and aluminium; typical mechanical properties for Crestabond M1-30 of 17-20 MPa for tensile strength, a tensile modulus of 750 - 1000 MPa and an elongation of > 100% are quoted by Scott Bader, based on laboratory test results. As Crestabond has been proven in other demanding structural adhesive applications, such as in boat hulls, Solomon Commercials has a high degree of confidence in its long term adhesion strength and structural performance for their refrigerated vehicle bodies.

The significant increase in shop floor productivity for Solomon Commercials, with overall reductions in assembly times by up to four hours, depending on the vehicle size and specification, were cost effectively achieved by applying the Crestabond adhesive using MeterMix Systems supplied Sulzer Mixpac DXH pneumatic



Solomon Commercials increased productivity by over 50% by switching from a PU adhesive to a primer-less methacrylate structural adhesive for bonding their refrigerated vehicle bodies.

dispensing hand guns used in combination with a Sulzer Mixpac DXR refilling station. Significant material cost savings are made using this type of system, as the refilling station uses bulk 20 litre pails of Crestabond M1-30 and activator, serving a multiple number of pneumatic hand guns as needed on the shop floor.

Sulzer Mixpac DXH pneumatic guns have the benefit of point of application metering and mixing of the 10:1 ratio MMA adhesive from pressure assisted, refillable adhesive and activator reservoirs located on the gun. MeterMix Systems is based in Rushden, Northamptonshire and is the official UK distributor for Sulzer Mixpac DX systems. For a limited number of applications, manual hand guns with Crestabond M1-30 400ml co-axial cartridges are also used on the assembly lines.

Solomon Commercials has been carrying out refrigerated truck and trailer conversions for more than 30 years, custom

building refrigerated bodies onto truck and lorry chassis to specific customer needs. Michael Solomon, director for Solomon Commercials commented: "Scott Bader has become an important supplier partner to us. This is down to a combination of having high quality adhesive products and their invaluable technical help and support. They also worked closely with our operations team to ensure a smooth introduction of the Crestabond adhesive into our production process. Overall, we feel we have backed a winning horse to help us stay ahead of our competition and achieve key business goals."

There are five Crestabond adhesive options in the current 10:1 range, offering manufacturers a choice of working times from 5 minutes up to 90 minutes and structural bonding and gap filling up to 50mm.

SCOTT BADER 01933 663100

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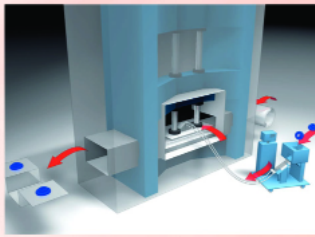
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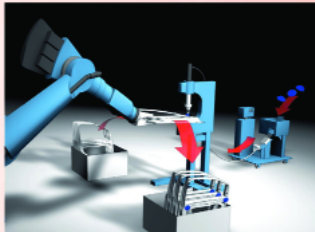
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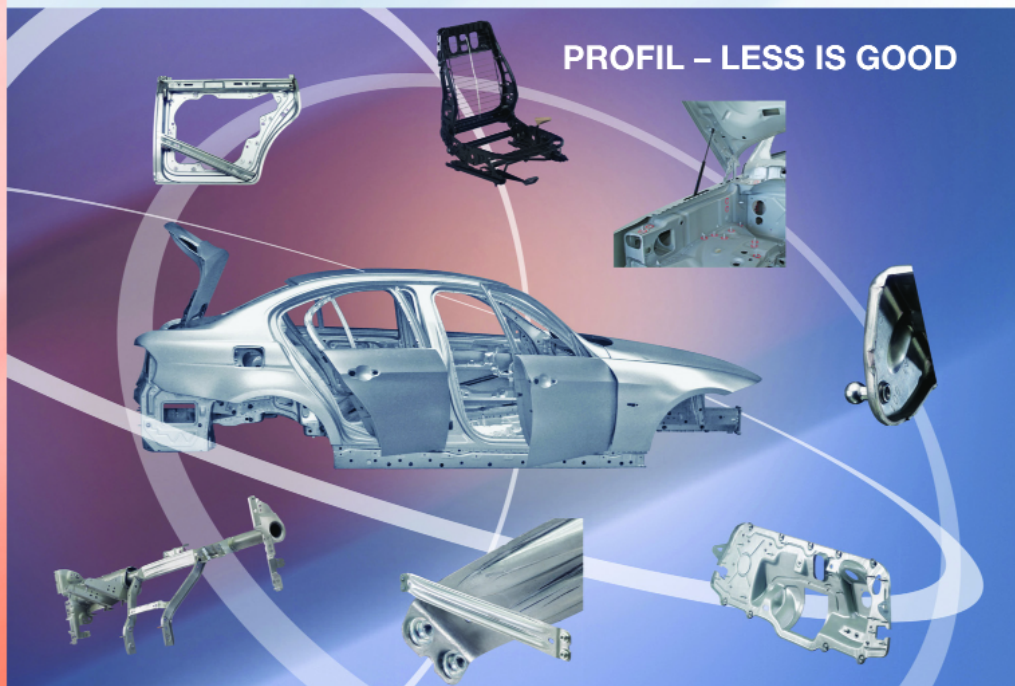
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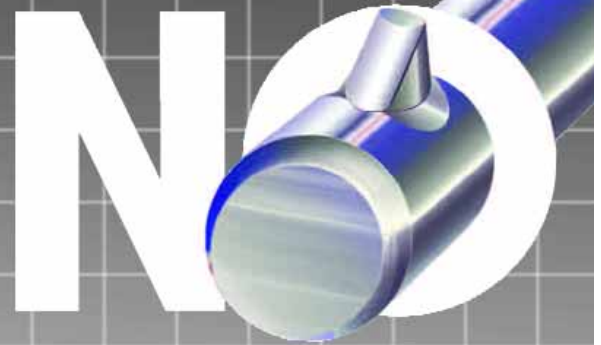
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Bolt tension measurement speed coal cutting

Caterpillar is using bolt tension measurement technology on special versions of its Longwall mining shearers which are used in very challenging underground environments where vibration is a constant factor. The shearers have a reputation for maximum structural integrity and service life and rely on the performance of **RotaBolt** fasteners to not only assure integrity but also improve maintenance checking.

The shearers can cut and load more than 5,000 tonnes an hour and feature a one-piece main-frame design. Special versions of the shearers with split main-frames are available wherever there are underground conditions that limit transportation. The mainframe is split into three separate units and tension measuring

bolts up to 6 m in length are being used to join the sections together. The RotaBolt technical team has worked closely with Caterpillar over the last five years evolving mainly M64 and M80 fasteners which have ranged from 1 m in length to over 6 m. In joining sections of the main-frames together, the fasteners are operating as mechanical jack tensioners, accurately measuring the correct tension, with loads of up to 250 tonnes.

Feedback from operational teams in mines across Asia and Europe has been very positive, reporting enhanced underground assembly and disassembly as well as assured structural integrity.

JAMES WALKER ROTABOLT
01384 214 442



Hot melt adhesive spells end for cracking mattresses



Traditionally the adhesive technology used in the mattress manufacturing process has utilised an adhesive designed for use in packaging. Whilst it does the job, the traditional packaging adhesive lacks flexibility and can ultimately affect the standard of the finished product and in turn the quality of the night's sleep offered.

Adhesive specialists **KMS** has developed and gained accreditation for a new generation of hot melt adhesive, specifically for mattress manufacturers. The new hot melt Intact H906 can be used in all types of existing hot melt system and has been specially developed for manufacturers who require a superior pocket sprung mattress assembly. The unique adhesive has exceptional bonding properties to non-woven materials, PU foam and textiles. It has the correct open and setting time for automatic pocket spring assembly machinery and melts easily in the glue tank.

Unlike standard hot melts, the material remains highly flexible, helping to prevent the cracking noise and poor adhesion that is commonplace with inferior grades, such as those designed for use in

packaging that have been traditionally used in pocket sprung manufacture.

Intact H906 is already used by leading mattress manufacturers who have found that not only does it provide a stronger bond, it has also improved the sound of the mattress, eliminating the cracking noise associated with other hot melts.

With manufacturers competing in a tough environment the use of superior materials in the production process can add a competitive advantage, Fred Dunn business development manager at KMS Adhesives explained. "We only manufacture the best quality adhesives and using a packaging hot melt for the pocket sprung within mattresses was not consistent with our aim of providing the very highest quality," he added. "We are so confident that this will revolutionise the way that we make mattresses in the UK, we are offering a free supervised trial. [The adhesive] can be easily demonstrated on any production line without the need to change any equipment to ensure that production continues."

KMS 0845 381 1100

Q & A

Explaining the characteristics of nylon

Neale Lancaster has been selling fasteners for 25 years. Here he answers some frequently asked questions about materials and trends he has been asked over the years



Neale Lancaster is sales director of Richco International Company Ltd, responsible for sales to the UK and European Distributors. With over 25 years of technical sales experience working for Richco in Europe, the Far East and NAFTA regions, Neale leads a team of technical sales people working with OEM's to offer standard and custom fastening solutions in the electronics industry.

How would you describe the Richco product offering?

Since 1954, Richco has been manufacturing and designing the world's most comprehensive array of innovative engineered component solutions. We specialise in predominantly plastic fasteners including cable management, circuit board hardware, wire routing products, cable ties, clips, clamps, LED hardware, grommets, fibre optics, and telecommunication accessories among others.

What materials can you supply?

A large portion of our products are made from the thermoplastic nylon.

Nylon is used as a generic name for the polyamide (PA) group of polymers. We use this because as a general family the PA group is low cost, rigid, translucent, has good temperature stability, abrasion and fatigue resistance.

Tell me a little more about the characteristics of nylon?

All nylons are considered hygroscopic. This means that they can absorb or release moisture based on environmental conditions. Nylon is more hygroscopic when compared to most other polymers. Let's use a household example: compare the relative wetness of fabrics when you move clothes from the washer to dryer. Nylon will be wettest of the synthetics, followed by polyester, then acrylic. Acrylic clothing will be almost completely dry after the spin cycle because it absorbs virtually no water.

Moisture acts as a plasticiser. A Plasticiser is something that increases flexibility, workability, or stretch ability. Dimensional and physical property changes take place during moisture absorption. Moisture absorption and rate of

absorption is dependent on the temperature, the relative humidity of the environment, and the wall thickness of the specific part.

Various nylons within the nylon family can absorb different amounts of moisture. The lower numbered nylons such as 4/6, 6, 6/6, absorb more than higher numbered ones such as 11, 12. PA can be tough when the moisture content is right (2-3% @ 20°C) but dry products tend to become brittle. In general, moisture absorption may lead to an increase in toughness and reduction in stiffness and strength at room temperature. Or in other words, dry parts will have a higher tensile strength but will become less flexible, more brittle and less impact resistant. Moist parts will have a lower tensile strength but will be more flexible, less brittle and more impact resistant.

During the manufacturing process parts become completely dry. Right after moulding they are in a state referred to as dry as moulded (DAM). For this reason nylon parts are often conditioned after processing to optimise the physical properties. Parts are shipped with the proper amount of moisture (liquid water) added in the sealed bags. Over time the moisture is absorbed into the dry as moulded parts.

What is the temperature range of Richco parts?

The material temperature range varies greatly with the type of plastic used. The majority of our products have a raw material specification (RMS) number associated with the material from which it is made. You can see a list of the materials and adhesive specifications at the back of our printed catalogue.

We do not use the term 'operating temperature range' or 'application temperature range' of parts. Instead we use 'material temperature range'. If the material is not UL listed then the temperature is taken from the raw material data sheet. If the material is UL listed, the relative temperature index (RTI) is used. The value is simply the maximum temperature at which the material retains a majority percentage of its properties. This is not the temperature rating for parts. It is the temperature rating for the material.

What technical support do you offer?

By far and away the most helpful tool for our customers over the last year has been the ability for them to download 3D models direct from our website. We now have an online library of over 10,000 parts all available for immediate download. Secondly, we offer free samples; if you see a part in our Edition 30 catalogue we will have samples stock available for delivery to you in 24 hours.

For custom part design, our design team will run moldflow and stress test software to ensure product design is robust and identify stress points in the design and manufacturing process to make sure we give the right part the first time and thereafter.

What if I don't see the part I need in your catalogue?

For over 50 Years Richco has been directly collaborating with customers to produce innovative custom products. Our New Product Development team has an extensive practical knowledge of the processes, materi-

als and design methods required to engineer solutions for you. We can take your design or concept from an idea to a production part. Improving and optimising a good design to make it a great design. It's a common misunderstanding that custom parts are expensive and have a long development time. Through our experience and innovative tooling solution a custom part may be the solution that you need without compromising your application, cost or processes. Many custom part examples can be seen on our website by clicking on the Custom Product Page in the Quick Link box.

What does Richco have planned for the future?

In the very immediate future our New Edition 30 catalogue was published in June. This includes 83 new product lines relating to over 2000 new products, our intention is to continue to broaden the range and depth of the products we offer.

What market trends are you seeing?

We continue to see the need for smaller products. Two recent new product introductions to meet this demand include our dual locking circuit board supports (DLCBS-5/6/7 series) with smaller locking wings. Designed for mounting PCBs this new range now only take up a minimal 8mm of PCB real estate, ideal for densely packed circuit boards. The second is our MCC-1-01A-BK micro cable clamp, designed for small cables up to 1mm diameter, this adhesive backed cable clip has an overall height of just 2.5mm, ideal for tidying up cables on PCBs or chassis.

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Innovative cleanliness compliance concept

To fulfil the latest requirements of the vehicle building industry, manufacturers must identify and quantify any particle contamination present in their components. FAST examines a cleanliness concept that can run right through the manufacturing cycle

The VDA 19 guideline and the ISO 16232 standard define new requirements for the automobile industry for verifying technical cleanliness. The Cleancon cleanliness concept developed

are defined in the customer requirements profile, the environment is analysed, surface and inspection specifications are recorded, and the packaging is specified. Then during production, the entire process is accompanied by cleaning processes. In the cleanroom, the parts are micro-cleaned, anti-friction coatings are applied as necessary, and the components are packaged.

In the VDA 19 compliant cleanliness analyses, an adapted extraction method is used and the particle size distribution and gravimetrics are investigated. And finally, the components are placed in Cleanpack multi-layer packaging to preserve cleanliness, with an internal layer that secures the components and an outer layer that can be printed or marked according to individual requirements.

The system eliminates the need for an external specialist firm that microcleans the fasteners before they are used in assembly.

The company suggests that a comparison of the Cleancon process to the conventional process leads to a clear conclu-

sion that the number of metallic particles is reduced dramatically. This is accompanied by improved assembly security and the opportunity for further component miniaturisation, which translates into higher power density and smaller structures.

A new cleanroom design provides conditions similar to those of a high-class cleanroom. This is where the fastener components come at the end of the production process for microcleaning using advanced equipment, for the application of anti-friction coatings immediately after cleaning, and for cleanliness-preserving packaging in Cleanpack containers.

The latter two operations safeguard component cleanliness against the effects of external downstream process steps. The special internal layer of the Cleanpack packaging provides antistatic protection and mechanically secures the components so they cannot move relative to each other during transport, unlike bulk transport, putting an end to post-production particle contamination.

ARNOLD +49 7947 821 170



Using the Cleancon process dramatically reduces the number of metallic particles

by Arnold Umformtechnik goes a step further and provides a process that encompasses cleanliness requirements all the way from production to the customer application.

All OEMs currently rank electronics failures as the top cause of vehicle problems. Consequently, the technical cleanliness of not only electronic components, but also pneumatic and hydraulic components, used in brakes, engines and chassis, is increasingly a matter of concern for the automobile industry. With the ongoing trend of increased performance and reduced size of units and modules, microscopic particles on component surfaces can easily cause malfunctions.

Arnold Umformtechnik says it has come up with a suitable solution in the form of its Cleancon cleanliness concept, which consists of five steps. First limits

Round the clock CAD availability

In situations where fastening components are needed, design and development departments in the automobile and electronics industries are faced with the challenge of reducing costs by using innovative fastener technologies. To achieve this goal, access to design data in electronic form is increasingly important.

ArnCAD has been developed as a solution to this challenge. This engineering tool combines a portfolio of innovative fastener components for the direct assembly of metals and plastics with the advantages of an electronic design database. To ease the incorporation of fastening components into the user's drawings and applications, CAD data in 2D and 2D form are now available online. The high-quality data can be used in every CAD system and can be included directly in the design process by means of a simple download.



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Accurate welding is no pipedream

Investing in new equipment designed during a period of economic uncertainty is a bold step but one that appears to have paid off for Arc Machines. FAST discovers that that a recently launched welding power supply system is taking the UK market by storm

Developing new technology for manufacturing high purity piping systems can take about two years and cost around half a million pounds, a considerable investment in time and money, but Arc Machines Inc (AMI) had no doubts that a sophisticated but easy to operate power supply for orbital welding applications would appeal to those requiring affordable, hassle-free automated orbital welding equipment.

AMI is providing access to automated orbital welding that can not only be bought off the shelf and operated after only a few minutes of training, but also offers substantial operational cost savings because it can be used with a wide range of weld heads and those of competing suppliers.

The thought process behind the concept is one of the reasons why it takes just minutes for an experienced orbital welder to be fully trained on the new equipment, therefore significantly reducing time required for training welding operatives.

Experienced welders can start programming the power supply and setting up multi-level, multi-pass programmes after only a few minutes training. And less skilled welders can also be taught in a fraction of the time needed to learn comparable systems.

Specifically designed for joining high purity tube and fittings, the Exel EPS-1500 can be used on a range of tube diameters, making it ideal for many industry applications including semiconductor, biopharmaceutical and aerospace.

One of the first UK firms to purchase the system is Cambridgeshire-based Orbital Fabrications, which specialises in the assembly of gas and fluid handling systems and supports companies in many



A 12in touch screen uses three dashboard screens to control the entire weld process

different industries. The company's expansion plans have included doubling the capacity of its machine shop and adding a bespoke projects facility, so flexibility is an important issue for the company, which prides itself on producing high quality and reliable work.

The EXEL EPS-1500 power supply has allowed Orbital Fabrications to adopt a far more flexible method of working with a minimum of change downtime and allows the business to undertake a more diverse range of new projects, as chief executive officer, Philip Pearson, explained: "The EPS-1500 is universal because it operates with a cross-section of different manufacturers' weld heads, is compact and has a continuously adjustable weld level instead of a step level. The cost was no more expensive than any other comparable welding

system so it was not only a highly viable purchase but has also assisted Orbital Fabrications with future proofing. [It] allows coverage of all sectors of the industry and adds another string to our bow. If a job comes along, then the equipment's continuous up or down slope, will provide the solution."

Equipped with a 150A power supply, the unit weighs just 23kg and has a patented weld schedule. Other features include intuitive 12in high resolution software driven touch screen, which uses just three dashboard screens to control and monitor the entire weld process.

Supplied with a high level of connectability, the equipment has two USB ports that interface with peripherals and memory sticks for storage of weld schedules and back-up. There is also a network connection allowing for long distance real-time weld monitoring over local networks and the internet

Fully microprocessor controlled, the machine's weld parameters are set by the power supply which records the weld schedule for each size and wall thickness of tube or pipe in the unit's memory. These can easily be recalled and modified for different materials with any subsequent changes logged by the system.

Another key advantage of the EXEL weld heads is their ability to be set up for many different kinds of components without the need to retool. Other features include a large clamping surface for the electrode to ensure optimum conductivity with precise and stable control, the ability to weld in very close proximity allowing easy access and flexibility in the design and joining of miniature fluid systems.

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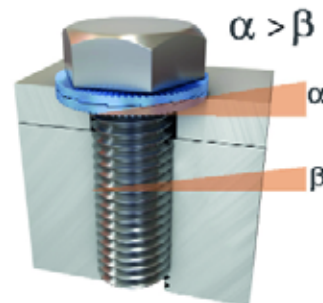
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A new turn on an aerospace fastener

An Anglo-French collaboration has led to the development of a new aerospace fastener which launched at this year's Farnborough Air Show. Paul Gay looks at Rivnut Aero

Entente cordiale between France and the United Kingdom still rides high despite the current economic malaise stifling Europe. And in this particular case of rivet nut technology, it all stems from the German company Böllhoff.

A new product has been developed primarily for the aerospace industry which is suitable for thin plates. A rivet nut provides the depth of thread required while a threaded insert provides the required strength and load distribution. The new component includes a Rivnut made by Böllhoff in France, with a HeliCoil from Böllhoff Armstrong fitted into it. The result is the Rivnut Aero which was launched at this year's Farnborough International Air Show held earlier this month. The product is intended for fitting into very thin plate or non-metallic panels, as found in Formula 1 and the aerospace industry.

The Rivnut Aero essentially combines the benefits of both Rivnut and HeliCoil. The user is presented with a high resistance self-locking insert nut which provides a resistant thread on carbon steel and aluminium plates. The design prevents unscrewing and plate sliding and is very flexible in use because of its all-in-one installation kit.

The shank is made of 316L stainless steel, which ensures the necessary corrosion resistance and mechanical characteristics. The HeliCoil Screw-lock helical thread insert prevents unscrewing and plays its part in providing the desired connection performance. The threads can be silver-plated to prevent binding.

The design has some real advantages. The Aero combines Rivnut's advantages of blind installation, reliable and reproducible results and possibility of checking the swage quality during the fitting operation with those of the HeliCoil, which include efficient and durable anti-unscrewing to ISO 2320, a high wear

resistance of the thread as well as excellent resistance to vibrations and thermal shocks.

Thanks to HeliCoil's characteristics, the same insert can be used for aeronautical (MJ) or ISO (M) section bolts. High resistance bolts can be used while ensuring that the bolt remains the weak element in the assembly and is easier and cheaper to replace.

No additional finishing is required after setting the Rivnut, even with coated or painted components. Thus blind rivet nuts and studs can be fitted at any stage in the production process, making their use extremely versatile. The short time it takes to set a Rivnut means that blind rivet nuts and studs have clear economic advantages compared with many other types of fasteners, which may rely on cumbersome presses and tools. This blind rivet nut can be safely made and remade without loss of performance so Rivnut is also most suitable for fixing removable panels for maintenance and inspection purposes.

Böllhoff Armstrong serves three main markets for its products and the tools to fit them. The company concentrates on the aerospace, automotive and general engineering industries. The distribution route accounts for 60% of production with 20% exports. The rest is sold direct to manufacturers.

Materials used include 18-8 stainless, Nimonic 90, Inconel X750, Zenon 100, Phosphor bronze and special alloys. To offset the galvanic effects of dissimilar materials, components are plated with cadmium, silver, zinc and Tiodize.

Böllhoff claims that Rivnut blind rivet



nuts are the most versatile solution for adding a load carrying thread to thin-walled workpieces. They can be installed into plastic or even ceramic components and into all metals. The blind setting technique means that rivet nuts and studs are often the only fastener solution for hollow sections, housings or where access is limited to only one side of a component.

Commenting on the threaded insert element of the Rivnut Aero, Lee Burgoyne managing director of Böllhoff Armstrong said: "Although it's just like bending wire, some material cost £100,000/tonne. We all like to fly, so it's nice to know that [when we're up there] our components will stay on."

The 1904 Entente Cordiale ended a millennium of hostility between France and the United Kingdom. Long may it last.

BÖLLHOFF ARMSTRONG 01482 325425

ADHESIVES IN MEDICAL DEVICES

High performance bonding and sealing for medical devices

Medical devices demand the highest level of quality and reliability. FAST discusses the adhesive materials used in their manufacture which must be biologically inert, corrosion and temperature resistant and have the durability and strength to perform flawlessly under a variety of conditions

Choosing the best assembly method can be an exacting design task. This is especially true when joining dissimilar materials and when bonding certain plastics. Frequently, materials with the best engineering properties for sterile medical applications are the most difficult to join. For these difficult-to-bond substrates and for many other medical devices, adhesives provide the optimum – indeed often the only – assembly method.

In selecting an adhesive it is important to look at the entire assembly process, including the preparation of substrates and the dispensing and curing of the adhesive. The process must be controllable and consistent to comply with the myriad of regulations governing the manufacturing process.

Often the limitations of the process considerations placed on the adhesive's properties will narrow the choice significantly. But the correct choice enables



The stainless steel cannula is bonded to the polycarbonate hub using a UV acrylic

medical device manufacturers to speed product development and manufacturing cycles, typically for disposable-, sterile- and non-sterile reusable devices.

Single, multiple and non-sterile

In order to meet the ISO 10993 regulatory requirements for bio-compatibility, all elements of disposable devices, including adhesives, must resist the sterilisation process used by the device manufacturer. Typical applications include: fluid and drug delivery sets, catheters, infusion products, syringes, hypodermics, injectors and cardiovascular & cardiopulmonary surgical devices.

Sterile reusable devices may be used a number of times and are re-sterilised each time. Examples of these products include surgical instruments, endoscopes, laparoscopes and arthroscopes. The introduction of polymers able to withstand repeated exposure to autoclaving temperature has greatly expanded the number of different sterile reusable devices now available.

There are many medical products however where bio-compatibility is not an issue. These products include orthopaedic and rehabilitation equipment such as wheel chairs, braces, hearing aids and prosthetic devices as well as imaging, monitoring and measuring equipment. Non-sterile reusable devices can be bonded with standard adhesives, not specifically designed for medical device manufacture.

Chemical bonding

Mechanical fastening, insert moulding, thermal bonding and solvent welding – they all have merits but also many shortcomings that can be addressed by adhesive bonding. The ability to join different material, such as thermoplastic, thermoset plastic, elastomer and metal, is a very important advantage of adhesive bonding. When compared to other methods adhesives offer design advantages, speedy assembly, increased production efficiency and in many cases increased production



Either UV or cyanoacrylate adhesives are used on balloon catheters as the adhesive is under a high peel load when the balloon is inflated



Choosing the best method for assembling medical devices can be an exacting design task

efficiency as well as quality and improvement in overall product performance.

Adhesives are good gap fillers and have the ability to form an hermetic seal between two substrates and create even stress distribution. Furthermore, when the total cost of a finished medical device is considered, adhesives are frequently the most economical assembly choice.

Technology leader, Henkel, has a wide range of speciality adhesives available for bonding and sealing disposable devices. These are sold under the Loctite brand. The majority are dispensed in liquid form and are converted to a solid state through the curing process that can be instigated by heat, moisture, light, surface initiation or the mixing of reactive components.

What often sets Henkel apart from its competitors however is the added-value it provides, a complete solution from providing expert advice on joint design, through development trials and into automated production. Stand-alone manual, semi-automatic and automatic dispensing equipment is available off-the-shelf or for integration into high-speed production systems. Henkel also regularly undertakes the design of bespoke automated systems.

No single adhesive will satisfy all needs. Designers and engineers must balance a variety of adhesive properties to obtain the required bond strength and provide an appropriate seal. In addition to the adhesives physical properties, quality and consistency, product toxicity and sterilisation durability must be factored in.

The Loctite medical adhesive range falls into three basic categories: light cure acrylics, cyanoacrylates – some of which can also be UV cured - and finally epoxies.

Cured by UV or visible light, this range is typically chosen for the assembly

of transparent materials. The adhesives are supplied as one part, solvent-free liquids or gels. So there is no need to measure or mix and they offer a long pot life. Cure times are typically from 2 to 60 seconds and cure depths in excess of 13mm are possible. Flexible to rigid formulations are available in a wide range of viscosities and as they cure on demand, parts alignment is easy and effective. High structural strength is assured.

Superglues

These one-part, room temperature curing adhesives, also known as cyanoacrylates, are available with viscosities from water-thin liquids to thixotropic gels. Superglues offer excellent adhesion to most substrates, making them particularly suitable for challenging applications. They are ideal for joining flexible and rigid plastic, latex, rubber and metal substrates to themselves or each other.

An important benefit of cyanoacrylates is that, when used in conjunction with a primer, they will bond to the lower surface energy plastics such as polyethylene that is commonly used in medical device manufacture.

Five main types of cyanoacrylates are available for sterile medical device assembly: general purpose for bonding dissimilar materials in any combination; surface insensitive for porous, acidic or mildly contaminated substrates; thermal cycling that are able to withstand temperatures up to 120°C and alkoxy

ethyls for low odour and low blooming characteristics.

In recent years a UV curable grade has also extended the choice. Instead of applying an activator the part can be exposed briefly to a UV to cure the seal. It's an ideal solution for automated production, says Henkel Loctite.

Epoxies

Epoxies are extensively sold into industry for a wide variety of applications and are typically two-part products that require accurate mixing of the resin and hardener. Single part epoxies are also available where the resin and hardener are pre-mixed but these usually require refrigerated storage and a heat cure. Epoxies are extremely versatile due to the large number of combinations of epoxy resins and hardeners that are available, each of which can give a different cured polymer.

A number of grades are available (approved to ISO 10993) for the medical industry and these usually have excellent



Materials with the best engineering properties for sterile medical applications are often the most difficult to join

adhesion to metals and some plastics but will be out performed on non polar plastics by the cyanoacrylate/primer adhesive systems. They have good temperature resistance and are often specified where parts will be subjected to repeated autoclaving cycles. The advances include high bond strengths and excellent durability but are relatively slow curing compared to cyanoacrylates and UV curing acrylics.

For a complete guide to Loctite products for medical device assembly visit: www.loctite.com
HENKEL LOCTITE ADHESIVES 01442 278000

ADHESIVE FORMULATION

Speciality building blocks for adhesive formulators

The key to success in helping the formulators of adhesive or composite solutions to achieve market differentiation is based on producing speciality chemical building blocks that meet customer's expectations. FAST explains how specialist materials manufacturer Huntsman has achieved this by focusing on a four-pronged approach based on performance enhancement, cost reduction, formulation processing optimisation and limitation of toxic substances

Huntsman Advanced Materials relies on a four-pronged approach to the building blocks it manufactures to formulate modern adhesives. This approach is predicated on performance enhancement, cost reduction, formulation processing optimisation and the limitation of toxic substances wherever possible.

Huntsman's core competencies lie in synthesis and formulation and the company utilises these skills to add new and innovative high performance materials to its range of proven and qualified building blocks in the drive to enable market differentiation for formulators in the areas of adhesives and composites, focused on the delivery of mechanical and thermal performance improvement.

Take resins and hardeners, for example: TGMAP type Araldite MY0610 offers very high mechanical and thermal properties. In comparison to TGMDA resins, such as Araldite MY 721, higher modulus can be achieved with similar thermal resistance (see figure 1).

Another example is tri-functional, TGHPM type epoxy resin Tactix 742 provides higher glass transition temperature resistance than any other resin.

Dicyclopentadiene based, novolac epoxy Tactix 556 presents the lowest moisture absorption among any other epoxy resin (see figure 2) but diaminodiphenylsulfone hardener Aradur 976 offers thermal resistance and stability, as well as chemical resistance.

Tougheners and flexibilisers

Specially modified epoxy/rubber adduct Araldite LY 1146 improves impact resistance, adhesion on contaminated surfaces and corrosion resistance. While working at higher temperature than epoxy/rubber adducts, Flexibiliser DY 965 provides

good impact resistance and adhesion to metal (see figure 3)

Other resins including benzoxazines, such as Araldite MT35600, are a special class of thermosets, exhibiting extremely good thermal and mechanical properties while Kerimid and Matrimid polyimide resins are a range of polyimide and bismaleimide resins suitable for long term resistance above 200°C.

Reducing formulation costs

While reducing the cost of formulations can be achieved through the careful selection of raw materials, the manufacturing process is also pivotal to the delivery of sustainable solutions. Reducing the number of mixing or synthesis operations, lowering production time through easier incorporation and reducing the investment in manufacturing equipment are all examples of the factors that strongly influence the final cost of a formulation.

With access to a number of complementary global production facilities, the company offers off-the-shelf or customised, high quality and cost effective products and services for formulators within blends (of resins or hardeners), master-batches, as well as pre-adducted chemicals.

Blends of liquid bisphenol A based

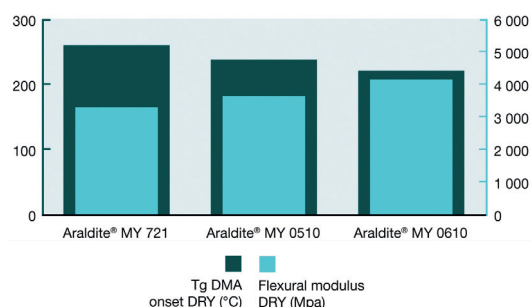


Figure 1: Comparing the modulus that can be achieved with similar thermal resistance

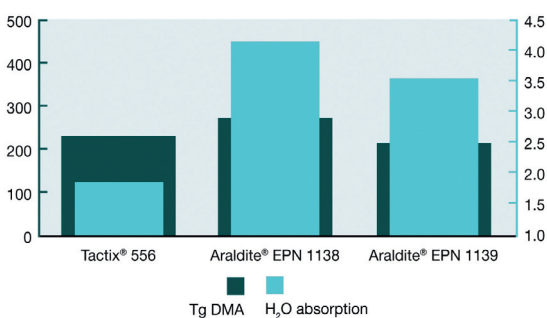


Figure 2: Moisture absorption among epoxy resin

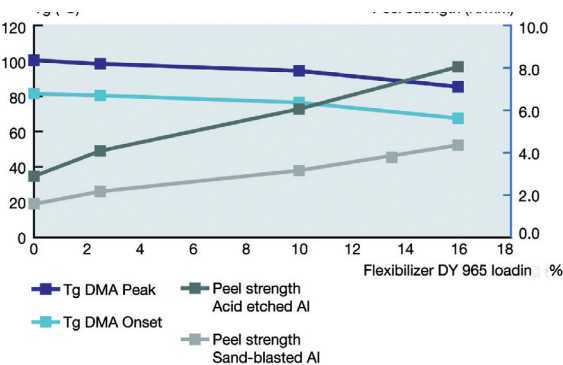


Figure 3: Studying impact resistance and adhesion to metal surfaces

epoxy resins with reactive diluents, such as Araldite BY 158 or Araldite BY 157, or blends of solid bisphenol A epoxy resins

and epoxy novolac resins such as Araldite GT 7220 illustrate the wide offering of Araldite blends.

Similarly, the company's Araldite and Aradur master batch concentrates can be diluted into final formulations to provide high quality homogeneous dispersions. Examples of this are Aradur 1571, a viscous dispersion of solid latent hardener into liquid epoxy resin or the Araldite DW series of concentrated coloured epoxy pastes (see figure 4). Also, Araldite or Aradur adducts allow easier introduction into formulations or are used to provide better control for several properties or behaviour such as the polymerisation time.

Formulation optimisation

One of the main characteristics of any type of formulation is its ability to be processed in an easy, efficient and cost effective way. Rheology and curing kinetics are among the most important influencing parameters: formulators are often looking to achieve the lowest final viscosity or for low viscosity building blocks that allow introduction into the formulation of larger amounts of other components without negative influence on the ease of processing.

Gaining control over curing kinetics is essential for determining whether a formulation is suitable for the intended application and process. To help formulators to develop their systems with ease, Huntsman provides low to very low viscosity building blocks: from mono or multifunctional reactive diluents such as Araldite DY-E or Araldite DY-T, to high purity distilled resins such as Araldite PY 306, Araldite GY 285 or Araldite MY790 (bis-phenol A or F based resins) or the tri-functional and structural resins Araldite MY 0510 and Araldite MY 0610 (see figure 5).

For adjusting the curing profile, Huntsman also provides several chemical families of hardeners and accelerators. For low to medium thermal resistance applications polyamidoamine hardeners allow gel times at room temperature from 60 minutes (Aradur 250) to more than 15 hours (Aradur 100). For medium to high thermal and structural applications, amine based formulated hardeners offer gel times from 5 minutes (Aradur 2992) to more than 15 hours (Aradur 3489). Solid latent hardeners and accelerators, take Aradur 3123 imidazole for example, pro-

vide long latency in combination with high thermal and mechanical performances (see figure 6).

Limiting toxic substances

The European Union, government and company policies concerning the toxicity of chemicals are becoming more stringent. REACH, the European Community Regulation on chemicals provides a good illustration of this: Companies must register each chemical substance they wish to sell in Europe, and REACH also calls for the substitution of the most dangerous chemicals wherever suitable alternatives are available.

In backing the initiative, Huntsman supports chemical formulators by initiating the registration all of the substances present in its various ranges. Huntsman is also committed to support customers in any kind issues they can face in term of regulation of chemicals.

The company has also decided to withdraw, wherever technically possible, the toxic substances from its ranges of components. For example, Aradur 43-1 and Aradur 46-1 are now Bisphenol A-free hardeners. In Rhodetal 210 polyamide-imide resin, NMP solvent has also been substituted as has nonylphenol in hardeners such as Aradur 15-1 or Aradur 3275.

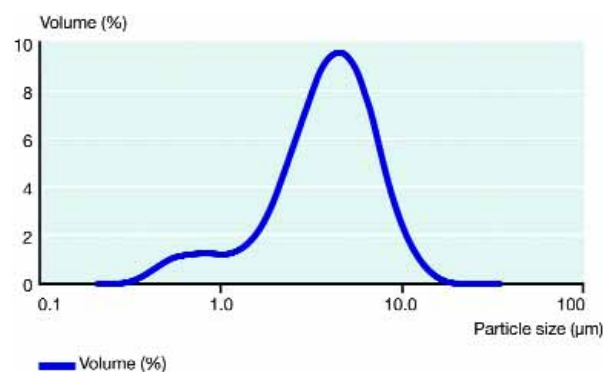


Figure 4: Master batch concentrates can be diluted into final formulations

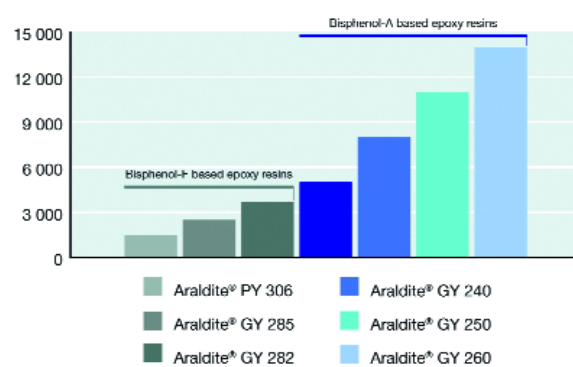


Figure 5: Comparing the viscosity of building blocks

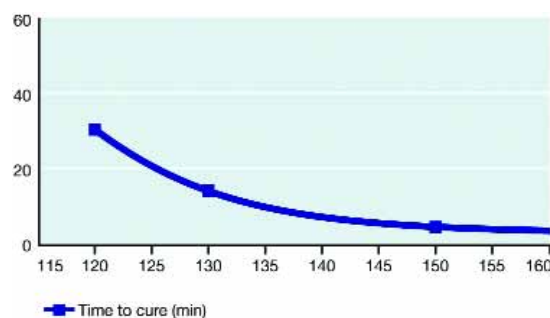


Figure 6: Solid latent hardeners and accelerators provide long latency in combination with high thermal and mechanical performances

Huntsman is a global manufacturer and marketer of differentiated chemicals. Its operating companies manufacture products for a variety of global industries, including chemicals, plastics, automotive, aviation, textiles, footwear, paints and coatings, construction, technology, agriculture, health care, detergent, personal care, furniture, appliances and packaging. Originally known for pioneering innovations in packaging and, later, for rapid and integrated growth in petrochemicals, Huntsman today has more than 11,000 employees and operates from multiple locations worldwide. The Company had 2011 revenues of approximately \$11 billion. For more information about Huntsman, please visit the Company's website at www.huntsman.com.

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Maintaining strength in thin sheet fabrication

From lowly beginnings in a Pennsylvania garage, PennEngineering has grown into a global fastenings manufacturer and celebrates its 70th anniversary this year. Paul Gay describes how the company's self-clinching technology has developed over the decades

As materials are being made lighter and thinner, on environmental grounds, they have to be made stiffer to support the same loads. Hard, thin materials are notoriously difficult to join either by welding or by mechanical means. Lighter materials derived from aluminium and its alloys are also difficult to join thermally and lack strength when they are drilled or pierced to apply a fixing. The same can be said of exotic non-metallic materials such as reinforced plastics and composites.

Load carrying threads

It was 70 years ago this year when K.A. Swanstrom, the founder of Penn Engineering Manufacturing, designed a self-clinching fastener that provided load-carrying threads in metal sheets too thin to be tapped. Being easy to install, the product provided an effective solution to the problem of joining thin metal sheets which were becoming more common in manufacturing.

Swanstrom produced his innovative design with four machines in a garage at Doylestown, Pennsylvania but this simple operation soon gave way to a modern

facility in Danboro, as manufacturers and engineers alike recognised the benefits of self-clinching fasteners. The new products not only reduced time, labour, weight and inventory on many assembly jobs, they also opened up a whole new world for engineers and designers, making a wide assortment of thin-metal designs possible for the first time.

A UK subsidiary PEM International was established as a distributor in Doncaster, England in the 1970s and today, PennEngineering, the identity adopted by the company in 2000, is a global operation with two manufacturing facilities in the USA, another in Galway, Ireland and extensive factories in China.

The Irish operation grew from an acquisition of Precision Steel Holdings of Galway, a provider of turned screw machine parts made in 2001. Now known as PEM Fastening Systems Europe, this 55,000 square foot facility supplies screw machined products to European customers as well as supporting US operations.

A PEM nut is an internally threaded fastener, that when pressed into ductile metal, displaces the host material around

the mounting hole, causing it to cold flow into a specially designed annular recess in the shank of the fastener. A serrated clinching ring prevents the fastener from rotating in the host material once it has been properly inserted. Thus the nut becomes a permanent part of the host material offering strong, load bearing threads in relatively thin sheets of metal. The generic term for this type of fastener is self-clinching nut.

German seats

A current day use of the technology illustrates its benefits over other joining methods. In the German automotive sector, there is a company producing seat rails for three of the leading car manufacturers. In recent times, there has been a need to reduce component weight for environmental considerations while retaining strength for safety reasons. This has meant that the seat rail has become thinner but is now made from a harder material so self-piercing fasteners and even welding are no longer an option. The result is that the majority of road cars made in Germany have their seats attached with self-clinching fasteners.

PEM's latest offering nylon insert self-locking fasteners provide a reusable, non-metallic prevailing torque thread lock to prevent threaded mating hardware from loosening in service due to vibration or other application-related forces. The trademarked nylon hexagonal locking element eliminates potential galling, any need for lubricant or the use of chemical locking methods or patches.

Types include PL (steel) and PLC PEMHEX (stainless steel) self-clinching fasteners and Type CFN steel broaching fasteners. All install permanently in thin metal sheets and their reliable threads easily accommodate mating hardware during final attachment of components..

Detailed specifications and free part drawings for these RoHS-compliant fasteners can be accessed at www.pemnet.com

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ENGINE SEALANTS

Ford extols the virtues of liquid gasketing

Automotive engine design is dictating lighter engine blocks with thinner walls which presents an interesting challenge for the sealant supplier



Oil pan joint on a Volvo S16 engine using Loctite 5900 silicone

The Ford one litre Fox engine has received instant acclaim and will soon be manufactured across the globe. Designed at Ford's Dagenham Diesel Centre (DDC), it has the highest output per displacement of any high rate production engine on the market with a power output of 125 ps. This radical and revolutionary engine will be standard in the Ford Focus and many other future models and includes a lot of technological improvements including the use of Loctite 5900 room temperature vulcanising (RTV) silicone for sealing the highly stressed joints.

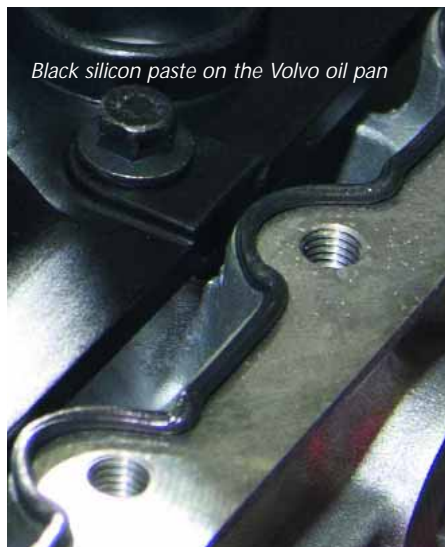
Tsunou Chang, Ford's Liquid Sealing Specialist explained: "The Ford design rules dictate that the walls of an engine block should be a certain thickness. But progress comes out of challenging those design rules and our designers had proved in studies that half the wall thickness was do-able. But that meant the RTV process had to hold the engine with half the wall thickness and that presented Henkel with a challenge."

This engine is small and highly stressed, four times that of a standard engine. This is a common trend and one to which Henkel gasketing products have responded. To meet the need for a more flexible product to accommodate the increased vibration, Henkel recommended its Loctite 5900 silicone for sealing oil pan and front cover joints on the Fox engine, a thixotropic black paste that performs excellently in engine oils.

Also used on the Fox engine is Loctite 5182, an anaerobic gel adhesive. This has been modified specifically for Ford's use for sealing cam caps. Sealant beads are small on this engine in line

with its profile and it is therefore essential that the gel is dispensed bubble-free to ensure no bead breaks occur that could compromise the bond. As a result this product is now centrifuged during the production process to prevent such an occurrence.

Loctite 5182 was also a contender for the fuel pump cover seal on the Sigma engine manufactured at Ford Bridgend.



Black silicon paste on the Volvo oil pan

This is a new EcoBoost engine that is also highly stressed and although Loctite 5182 proved the perfect choice for the small Fox engine, tests confirmed that a higher performance anaerobic sealant would be needed for the larger EcoBoost. Swift development and testing processes ensued resulting in Henkel's introduction of Loctite 5188, its new best-in-class product for anaerobic gasketing.

Liquid gasketing

Loctite RTV and anaerobic products create self-forming gaskets that provide a perfect seal between components, with maximum face-to-face contact, eliminating flange face corrosion. A low pressure seal is formed immediately on assembly, with full cure in 24 hours giving a joint that won't shrink, crack or relax. And these products are ideally suited to automatic dispensing, meeting Ford's cycle time requirements with maximum repeatability.

Although the automatic application of the Loctite products involves the same, or similar, capital expenditure as hard gasketing it is its ongoing flexibility where substantial cost savings are found. Chang explained further: "Engines have different bolt-hole patterns and coolant routes with varying numbers of ports. The major benefit with RTV is that these variations can be easily programmed so that we can process different engines on the same production line. This simply isn't viable with hard gasketing."

Relaxed tolerances

Another benefit of Loctite liquid gasketing is that it allows rough surfaces to be joined, no secondary finishing is necessary. And this represents an important production cost saving. Also the mechanical interlocking produced by joining rough surfaces creates a stronger bond.

With the emergence of new materials such as titanium aluminium alloys this is an important consideration as with Loctite RTV surface pitting isn't an issue.



The complex sealing pattern created during cam cap sealing on the Ford Sigma Engine is achieved using 5182 anaerobic sealer applied with a robot.

By comparison hard gasketing carries a variety of Ford production rules with regard to surface finish and is therefore a much more demanding technology to apply. And another plus point for RTV is reduced inventory over conventional gaskets.


Better stress distribution is also an important performance benefit of Loctite gasketing and this has a positive effect on warranty. It requires much lower clamping forces than a compression gasket that tends to relax under dynamic load and decrease in thickness, with subsequent loss of bolt tension in the flange joint and the potential for leakage.

Henkel's relationship with Ford now spans forty years. It is Ford's preferred single source supplier of industrial adhesives and sealants for engine production throughout the world. It's a great accolade for this manufacturer of the Loctite brand and testimony to the performance of its products. But more than that it is the result of Henkel's characteristic focus on customer support that allows companies such as Ford to continuously push the boundaries of technology and gain competitive edge.

HENKEL LOCTITE ADHESIVES 01442 278000



Highly flexible anaerobic Loctite 5188 is used to seal the fuel pump cover on a Sigma engine.

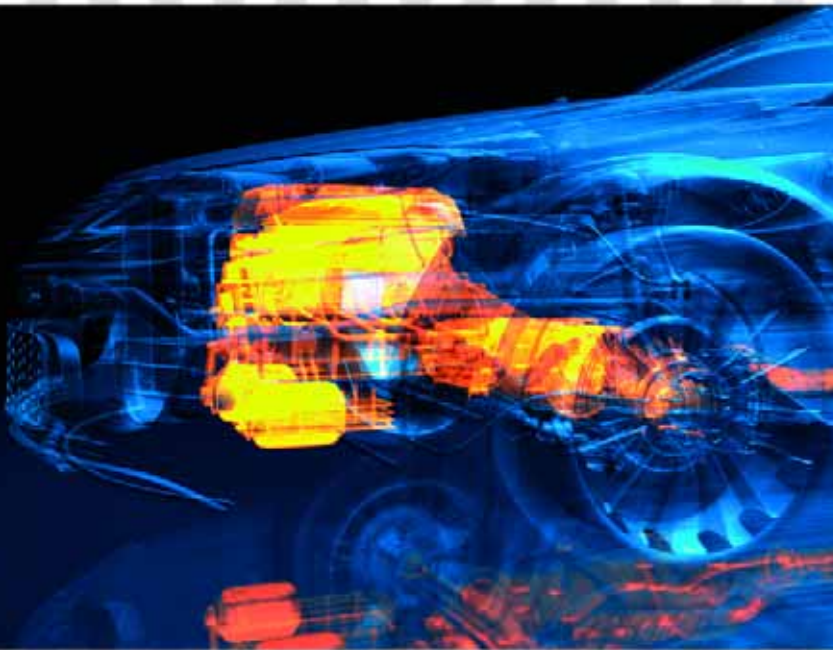

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Struggling to Keep It Together When the Heat Is On?

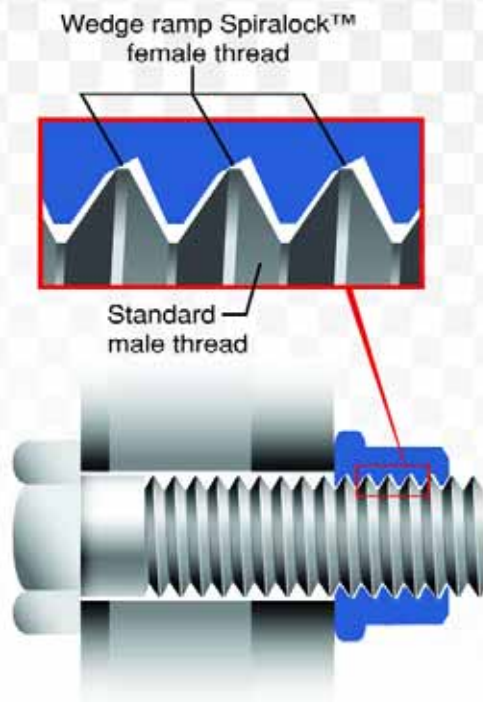


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Don't risk it... Secure it!

At a time when metal theft, vandalism and crime are on the increase there has never been so much emphasis on using security nuts, bolts and screws. Paul Gay describes a range of fasteners that can help combat the problem

The adage 'if it's not red hot or bolted down, it will disappear' is truer today than it ever was. With ever increasing materials' prices, the value of scrap metals has escalated dramatically so that the adoption of secure fastening techniques has become very important to the fabricator. It has become vital that when valuable objects are bolted down, they stay bolted down.

Innovation in the fastener industry is never far away and in a timely fashion, a range of security fixings and tamper resistant nuts and bolts has been developed by Hafren, which has become the leading brand for specifiers and designers in the security fasteners sector.

Hafren has been supplying security fasteners and fixings to many industries since 1995 and prides itself in being able to offer solutions to today's ever increasing problems arising from crime, vandalism and petty theft. A company spokesman suggested: "The biggest problem we face is a lack of understanding of the products available and the application of security fasteners."

Many people will be aware of the more popular security fasteners such as a security hexagon with a pin. But over the



When objects are bolted down, they should stay bolted down

The fastener guide for the security conscious

The Sentinel (see picture A) is a one-way permanent screw that can be installed by using a standard pozi screwdriver. The screw turns in fine but the driver is unable to undo the fixing. The Kinmar system (picture B) is available in both permanent and removable form in either nut or bolt form and is described as the most versatile security fastener system yet.

The Armour Ring (picture C) is a simple conical shaped metal collar which can be hammered over any existing standard hexagon nut or bolt rendering it tamper resistant. While the Nogo (picture D) is a case hardened fastener cover, which encloses any standard nut or bolt and is virtually impossible to destroy without serious power tools.

The oval pan head screw (picture E) is a deceptive oval headed security screws that a glance looks like an ordinary stud or rivet but you'll need special tools to dismantle the fixing.

The Solok screw (picture F) is a drive system that ensures all customers have their own one-of-a-kind driver socket. Each system has a coded drive that can only be torqued with its own driver.

As its name implies, the shearbolt (picture G) is tightened by a hex-head on the top of the bolt which shears off once the desired torque is achieved. All that's left is a perfectly smooth domed bolt which cannot be removed with normal tools.

The two holed screw (picture H) can only be fastened with a special driver and cannot be removed with standard tools.



years, Hafren has developed a wide range of security fasteners available with many patented items which always get the same reactions: 'I never realised all these were available' or 'If only we had known about these before this problem arose'.

The application for security fasteners can be extremely diverse. Hafren security fasteners have been used worldwide in areas such as a monkey enclosure in a Zoo to an international railway station and from a hand grenade to an antique urn outside a stately home. There is a park in East London where much activity has been going on in recent months. A centre-piece at this venue is a substantial steel structure, taking the form of a sculpture. And to dissuade the local traders from removing the attraction piece by piece, the sculpture has been secured to its foundation with the Kinmar nut system, which is virtually impossible to undo.

Security fasteners can save time and money. One end user said: "If only we had used Hafren security fasteners, we could have saved replacing £40,000 of signs which were stolen for their scrap metal value."



Objects such as sculptures can be secured to their foundation with the Kinmar nut system

HAFREN SECURITY FASTENERS 01686 621 300

HOW TO: SECURE

Demand grows for secure off-road vehicles

A rotary latch system has been developed to offer the off-highway industry increased security and safety

The increasing importance of driver safety and comfort and the overall security of construction vehicles are the most common areas of concern for off-highway equipment operators and constant areas for improvement for equipment manufacturers. From a security perspective, the theft of off-highway and construction vehicles is rising constantly and it is estimated that, in the UK alone, it is costing the construction industry close to £1 billion each year.

As a consequence, Southco works closely with OEMs to develop sophisticated components and systems that offer greater protection for vehicles by integrating access control and electromechanical

locking devices at the point of entry. The company has developed what it terms a 'complete' rotary latch system solution, from actuation to latching, to meet this growing demand from the off-highway sector for increased security of machinery and construction equipment, and enhanced safety of operators.

The R4 rotary latch system is an access solution which presents a flexible package in each of its three constituents – the rotary latch, cable and actuator. This system is specifically designed for exterior and interior off-highway applications such as entry doors, engine covers, baggage doors, access panels, tool boxes, truck hoods and storage compartments. It

comprises a variety of actuators, together with cables to connect latches to actuators for remote latching, a wide array of latches and trigger options to meet the requirements and preferences of customers, and a range of accessories to complete the system.

Southco is a leading global provider of engineered access solutions, including latches, locks, captive fasteners, hinges, handles, and other accessories for applications in the marine, networking, telecommunications, computer, automotive, aerospace, mass transit, off-highway/construction, RV/caravan, industrial machinery and HVAC industries.

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www.savigny-oddie.co.uk

TOP TIPS: DESIGNING WITH HARDWARE

It all hinges on the design

The humble hinge is taken for granted by designers and users alike. FAST looks at how innovation has extended the availability and convenience of recent developments

Elesa, always renowned for innovation, have taken a new look at its standard hinge and now has a patent pending on the CFP hinge which has three pre-determined settings to allow fixed but temporary positioning of guards, doors, flaps or panels at 80°, 120° or 170°. Each position is held by a simple click spring mechanism, ensuring that one-handed operation is easily achieved, keeping the panel in position for ease of access in installation or maintenance.

A significant step toward equipment safety and integration is demonstrated by the CFS hinge for hazardous areas which has a built-in security switch to suit Category 1 areas and works so as to switch off equipment when a door or panel is opened. This is a great aid in industrial environments where it helps to ensure operator safety. Alternatively, the CFS may be used to remotely indicate status, perhaps for access monitoring. Construction is an integral glass reinforced technopolymer unit ensuring a tamper-proof installation and easy assembly.

Similarly, hinges with adjustable friction are a simple and really simple solution which allows users to set the opening force of the door so that it may stay partially open, or will dampen down the action of the wind in outdoor situations.

Innovation has driven forward the size and variety of hinge ranges



The Elesa 237 die-cast hinge are suited to all applications where greater strength and rigidity are required for doors on cabinets, panels or access hatches in the electrical, heating and ventilating or machine tool industries. The range offers hinge sizes in 40mm, 50mm or 60mm formats and features matt black epoxy coating with stainless steel hinge pins. Operation is to a maximum of 270°, which ensures full access by virtue of a wide angular opening, and fitment is easily achieved by use of 5mm, 6mm or 8mm countersunk bolts.

CMM hinges are in matt black finish

with either studs or countersunk fittings and in sizes 40mm, 50mm and 60mm – their lay-on flap style design permits full 180° opening. Sister variant CMZ has the unusual feature of slotted hole fixings for cylindrical head screws which allows for a significant measure of adjustment up, down, or in rotation. The CMM-SST range of lay-on stainless steel hinges is designed for use on doors, panels and cases in the food and pharmaceutical industries – where their corrosion-resistance and easy-clean electro-polished finish will be much appreciated.

Elesa has boosted its standard range with variants and specialist types. Its range of plastic, metal and stainless steel hinges now includes the CF series – with the CF itself offering tamper-proof and double pivot hinges, as well as the CFH type in especially common sizes, and the ? size CFG. Opening angles of 0-90°, 0-270° and 0-335° are provided in a piano hinge style but in larger sizes – this gives a unique interlaced appearance.

The CFA/F offers blind fixing with a 90° stop to prevent over-opening of adjacent doors. Coupled with this, the company now offers the CFM surface

The UM1000 lift off hinge from Specialty Fasteners is designed for the roadside enclosure market where high security and corrosion resistance are required. Available in right- and left-handed forms and made from 316 stainless steel, it is ideal for use in aggressive environments and is supplied complete with backing plates and fasteners. The design of the hinge with its bevelled edges and backing plates resists attempts to prise it off the door often leading to destruction of the door before the hinge fails.

SPECIALTY FASTENERS 01803 868677



mount hinge in reinforced polyamide based technopolymer and a companion version in die-cast zinc alloy. CFM hinges offer a variety of fixing methods and a full 270° opening for situations where it is useful to fold a door or access hatch fully out of the way.

There is clearly a wide range of plastic hinges on the market and often it is necessary to put a significant weight of equipment on even small doors. , therefore the following notes are offered as a guide to choosing a convenient type and the correct number of hinges appropriate to the door being hinged.

Nigel Pritchett, managing director of Elesa UK has produced a helpful white paper which will help designers find the relevant data in the literature and calculate maximum working load before elastic deformation sets in. There is also a formula for calculating load at breakage, which can then be used for safety verification. The document is available from the company's website www.elesanow.co.uk.

ELESA 01526 322670

The ubiquitous toggle latch comes today from EMKA in a multitude of variations under its 6000 program which includes many types in stainless steel. Toggle latches with their associated catch plates find application in situations where rapid fixing and release are required. This is often called for on packing cases, storage boxes, transit cases, access panels, cabinet doors, vehicle onboard storage compartments and similar.

The range includes simple low cost wire toggle latches, either without lock or with padlockable facility; these are

complimented with spring loaded versions. Additional functionality is addressed by a special section of the program which encompasses latches with claw links and with compression facility. Larger types feature integral adjustment for length of the claw, thus enabling full pull down to be achieved over a long period of usage. Catch plates in both straight pull and 90° options are available.

A selection of 3D CAD files and any part or the product catalogue can be downloaded from www.emka.co.uk.

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INTELLIGENT CABINET COMPONENTS

TOP TIPS: DESIGNING IN HARDWARE

Sourcing fasteners and standard parts gets easier for designers

While smaller components such as fasteners are undoubtedly important to the overall quality of a new machine, it is no great secret that design engineers don't spend weeks deliberating over the correct toggle clamp or index plunger. FAST discovers the importance of computer aided design in the supply of standard parts



WDS manufactures over 60% of its products at its production facilities located next to the stock room

When designing a new machine a design engineer has to source and specify many component parts. There is an obvious choice when it comes to buying-in key electromechanical components such as motors, inverters, gearboxes and roller chain. But in every machine there are hundreds of smaller components that literally hold the equipment together. The temptation for design engineers may be to start designing these, which can slow-down the design process and ultimately reduce the company's competitive edge.

Depending on the type of machine being designed, there are any number of fastening components and standard parts that need to be considered to ensure that the equipment will operate efficiently and reliably. Each of these components is designed to solve one of a thousand potential problems the designer needs to overcome. No design engineer can be expected to have the required expertise to design from scratch, or even source and specify, each component on their own, especially when you take into consideration the vari-

ations in size and materials that each component has available. Speeding up the machine design process by sourcing readymade components and standard parts at the CAD stage can reduce the potential time to market for any new machine design. Compressed design time can also translate to reduced test and production development time; using components that are already tried and tested, with known performance envelopes avoids additional testing and prevents surprises further down the line that can be time consuming and costly to rectify.

Outsourcing the supply of fasteners and small mechanical standard parts at the design stage has been made possible only by accessibility to the instant download of readymade computer aided design (CAD) files. John Blair, manufacturing manager for WDS, commented: "Machine designers are our entry point to the market and so providing fully annotated CAD drawings was the only way forwards, we started supplying the entire file on CDs, but even that is slow compared to today's on-the-fly web solution. CAD drawings have to be provided instantly, any time of the day or night. Once a product is designed-in, why bother making it when we probably already have it in stock? We will even manufacture fasteners, fixtures and fittings to order, one-at-a-time if needs be.

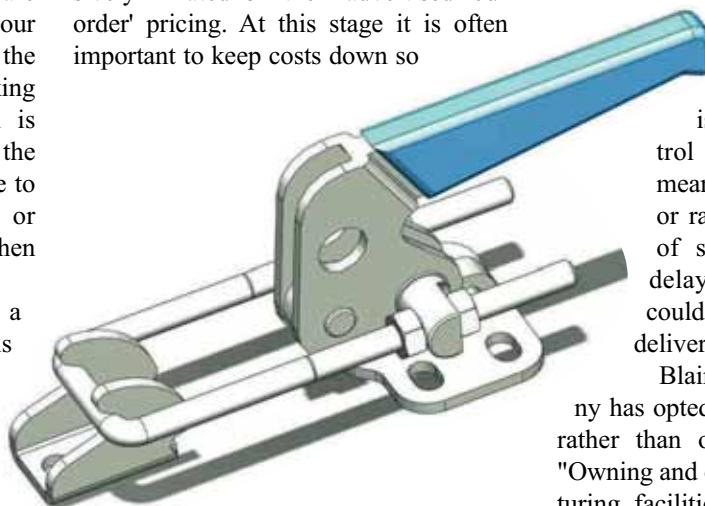
"Our sales and technical support teams all have hands on experience in the manu-

facturing and design industry and are directly involved in the operations of our manufacturing facilities. Working with the design engineer's drawings, and talking with them directly, our sales team is trained to find the ideal component for the application at hand. They are also able to assist with the design of specials or bespoke components from scratch when necessary.

"When a product is modified, or a bespoke component is designed, it is allocated a CS number at the point of customer sign off. These numbers are held on file to be easily accessed in the event of a second order. The CS numbers are never deleted, meaning we can make repeat batches of the same product on request year after year."

In the formative stages of a project it is very common for a small order of just one or two of each component to be made. A lot of bulk suppliers of smaller components operate minimum order numbers or small order surcharges which can be mas-

sively inflated on their advertised 'bulk order' pricing. At this stage it is often important to keep costs down so



John Blair, manufacturing manager for WDS: "... providing fully annotated CAD drawings was the only way forward."

you should ensure that your supplier operates with a degree of flexibility to your budgetary constraints.

Delivery times also need to be consid-

ered. While most orders for common parts can be met with a quick response for most stockists, it is rare that they control the manufacturing which means that extremely common or rare components may be out of stock, resulting in a long delay. Bespoke components could also be subjected to long delivery conditions.

Blair explained why the company has opted to invest in manufacturing rather than outsourcing its production. "Owning and operating our own manufacturing facilities translate directly to the quality of service that is experienced by the customer. By maintaining complete autonomy over the manufacturing of the product portfolio, [we are] able to operate a lean manufacturing process that ensures each part is re-stocked at appropriate times and to the right levels."

WDS COMPONENT PARTS 0113 290 5845

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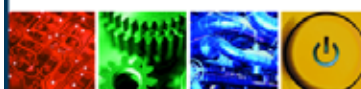
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Images courtesy Fisker Automotive

This is the fantastic new Fisker Karma hybrid electric sports car.

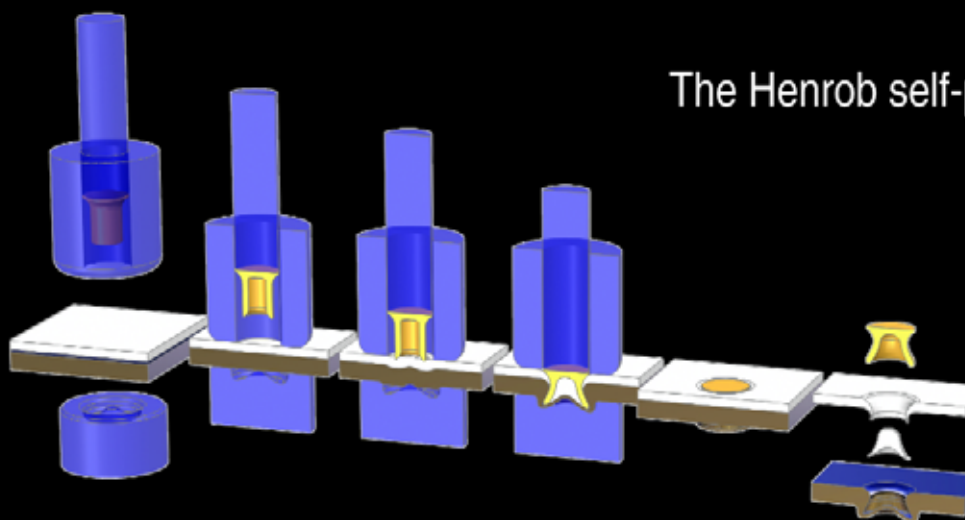
Boasting a revolutionary drivetrain delivering a huge 959ftlb of torque, a 0-60 time of 6.3 seconds and a top speed of 125 miles per hour, the lightweight aluminium body structure requires absolute strength, rigidity and reliability to handle the high stresses imposed.

Fisker rely on Henrob self-pierce fastening technology to provide the structural integrity necessary to cope with this highly demanding and ground-breaking vehicle concept.

Henrob self-piercing rivets are used, together with adhesives, throughout the body structure to join a wide range of aluminium sheet and extrusion.

Henrob self-pierce fastening systems integrate seamlessly into manual or automated production lines.

With a cycle time similar to spot welding, but without the heat, sparks or fumes, it's no wonder that Henrob self-pierce riveting is becoming the fastening method of choice for forward thinking manufacturers around the world.



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PRODUCT REVIEW: FASTENER INSTALLATION

Servo press tool has wireless telemetry

A recently launched electromechanical, servo press module includes wireless telemetry which transmits force signal data to a control system. The Type 2157B NCFT from **Kistler** is also for use in cleanrooms to ISO standards. These new features make the module particularly suitable for use in processes with small test and joining forces, such as sensitive press-fit operations and test routines in the medical and precision product sectors.

The compact mechanism, integral piezoelectric force monitoring in the ram and two predefined measuring ranges from 0.05 kN to 1.5 kN make the new modules ideal for use in assembly and joining processes monitored by force-vs-displacement.

Advantages include easy selection of the ideal measuring range, a high overload factor and modest user spare parts inventory. Complex drive profiles with a maximum speed of 400 mm/s and displacement repeatability of 0.002 mm can be achieved.

The new NC servo press mod-

ule provides ultra-high precision measurement of extremely small forces directly on the tool holder under actual process conditions, without the need to mount a sensor on the ram. This eliminates any possibility of the measurement signal being impaired by dynamic characteristics of masses or moving cables.

Many medical consumables are required to be manufactured under cleanroom conditions. The NC joining module Type 2157B meets the stringent, cleanroom production environment requirements defined by ISO 14644-1 Class 8 as standard and Class 7 conditions can be met with minor adaptation.

The new NCFT augments the range of NC servo press systems from Kistler. Five series now provide seamless coverage of measuring ranges from 0.05 to 600 kN. They are available not only as a system subassembly but also as complete manual workstations for development, prototyping or small-batch production.

KISTLER INSTRUMENTS
01256 741550



Responding to customer need

Tappex says it has responded to market demands with the development of a new and improved range of hand installation tools for use with the Trisert and Trisert-3 inserts in thread sizes from M2 to M10. And thanks to a customer survey, carried out previously, these components come complete with an alignment bush.

The 031 tools features an extended nose for restricted access and depth control, an hexagonal drive for universal

ease of installation with retained alignment bush and is finished with a chemical black for durability and professional presentation.

The product is said to be suitable for R and D, repair and general maintenance purposes. It was designed by Tappex and is manufactured in-house in the UK along with all fastening products tooling produced by the company.

TAPPEX THREAD INSERTS
01789 206600

Riveting tool high on savings

A fully automatic blind riveting unit from **Gesipa** is capable of setting 40 rivets per minute, increasing productivity and saving time and cost by some 50% compared to conventional blind riveting tools.

This all is possible due to the automatic loading of blind rivet into the gun's working position. With no skilled staff required, it has a capability of integrating into full automatic production lines.

GAV 8000 eco is the standard unit without the process control monitoring whereas GAV 8000 electronic is available with process control monitoring and is widely used in automotive production lines. All versions can be equipped with three different versions of setting pistols for ideal adaptation to the workstation and



for best access to the rivet locations.

The GAV is usable as part of a complete production system or in self-sustained configuration and both versions can be integrated in robotic systems. Using a fully automatic system combined with a multi axial robot within a regulated, fast and safe production process offers advantages like high precision, economic efficiency, short cycle times and high flexibility.

GESIPA 01535 212200

Light weight installation tool saves time

A lightweight Rivetnut installation tool incorporating some timesaving and ergonomic features has been introduced to the OEM market by **Rivetnut Technology Systems**. The AP4 runs on 7bar compressed air and will set Rivetnuts from M3 to M10 and their Imperial equivalents.

Rivetnuts are loaded with a push onto the threaded mandrel and a single trigger stroke completes the upset and run off cycle.

The tool weighs just 1.65kg and is claimed to be easy to use. A quick change of thread size and pulling stroke require no special tools and can be performed at the work station. The air intake is fully adjustable through 360 degrees and can be positioned according to the application requirements or the operator's preferences.

RIVETNUT
TECHNOLOGY SYSTEMS
01296 330331



FASTPRODUCTS



Rocfast toggle latches range extended

The Rocfast brand, available at **FDB Panel Fittings**, is expanding with a comprehensive range of toggle latches which have the advantage of being quick release but with the added benefit of not extending into the case or equipment being fastened.

The new range offers the user a wide choice to suit most industrial applications; for everything from simple containers, tool boxes, industrial canisters, banding and cladding applications, to sophisticated medical and marine equipment.

Rocfast latches are manufac-

ured from either cold rolled steel or stainless steel, and feature many options including adjustable, vibration proof models to provide gasket pull up, with key or padlocks and some with a secondary locking feature to prevent accidental unlocking.

Latches are naturally complemented by a wide variety of matching strike plates as well as straight or curved links, while integral springs are also available on selected styles for their anti-vibration characteristics.

FDB PANEL FITTINGS
020 8568 1616

Quick adhesive solution for Ford components

A quick and simple solution was required to provide added security for one of Ford Components Manufacturing laminated metal shim pack products. Known as edgepeel, the pack provides a number of shims, to specific customer requirements, that can be quickly and easily selected at the point of assembly thus speeding

up production. These thin steel shims are normally held together by their oil coating, but in a specialist application, a more robust solution was sought – and supplied by adhesive specialists Intertronics in the form of Dymax Multi-Cure 6-621 and a Fisnar adhesive dispenser.

The system, which is designed to provide bonding with easy dispensing and fast UV/visible light cure, was tested on the oil coated laminate steel shims and proved entirely successful by virtue of the extremely tiny bond line achieved on the edge of the shims – and by the presence of an oil coating – the two factors combining to enable just the right level of adhesion for the task at hand, providing stable adhesion during storage and transit as well as clean separation when needed.

INTERTRONICS 01865 842842



Machine component suits thin gauge material

Mini indexing plungers from **Elesa** are an important part of many machines as they offer a quick, tool-free and positive positioning system in a very small package, consistent with standard engineering practices and suitable for fitment to even thin gauge sheet metal down to 3.5mm.

The GN822.1 series features steel or stainless steel bodies with stainless steel plungers and internal spring. The manually operated knob is matt black in polyamide technopolymer. Two variants are available in plunger

sizes 4mm to 7mm with normal default of pin extended and type C with the default of the pin retracted. A simple 90° turn of the operating knob either retracts or extends the plunger pin to suit the equipment process.

ELESA 01526 322670



Viscoelastic solution allows stress dissipation

Technical tapes specialist **tesa** has developed a range of adhesive tapes, which will guarantee optimal strength for constructive bonding on materials with different surface characteristics, the company says. **tesa** claims it has taken the chemistry involved in tape production forward a generation.

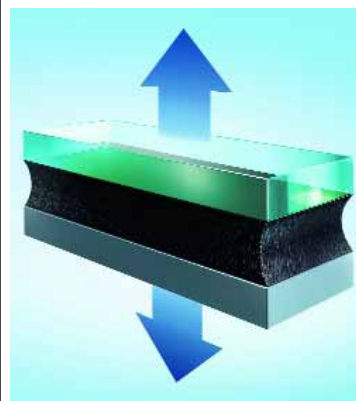
ACXplus technology enables the tapes' chemical components to withstand the dynamic and static stresses that constructive bonds are subject to, particularly in outdoor applications. During the life cycle of a component, static and dynamic forces act upon the constructive bond. In outdoor applications there will be temperature variations to contend with and often the effects of high wind loads, water, UV light or

even exposure to chemicals. Dissimilar materials also show different elongations when temperatures change, creating extreme physical stresses that need to be dissipated for the bond to be durable.

Jeremy Smith, UK marketing manager explained: "When two materials with different thermal elongations, for example aluminium on steel or deco glass on composite fibre, are bonded, ACXplus will deliver a consistent bond irrespective of the conditions in which the application is found. The special balance between elastic and viscous performance does not only secure an optimal wetting of different surfaces, it also allows absorption of dynamic forces and vibrations and stress relief in the bonded joint."

The key performance benefits in stress dissipation are available to this product up to three times its own thickness. In other words, a 0.5mm tape can compensate for expansion in bonded materials up to 1.5mm, it is claimed. Coupled with its ability to compensate for different expansion rates, the product offers both low and high temperature impact resistance.

TESA 01908 500235



Seamless seals for corrugated packaging

QuikDot is a new packaging technology from **Glue Dots International** (GDI) which takes the form of a pressure sensitive adhesive applicator designed to seal corrugated packaging seamlessly for use in the food and beverage industry. According to GDI, QuikDot Pro is a convenient alternative to cumbersome tape pads and hot melt glue guns. It has been designed for time savings and ease of use and it fits easily into the palm of the hand.

This compact adhesive applicator is claimed to be durable and has been engineered to apply the right amount of adhesive every time. The refillable, pocket-size design offers a new level of flexibility and convenience, while the high impact polycarbonate body stands up to rugged every-



day use, it is claimed.

“When food and beverage packs are broken, returns can be costly and time-consuming,” explained Bruce Church, General Manager – Glue Dots International. “This applicator and custom adhesive formula offers a new market for Glue Dots International products, and we are excited about the opportunities it will open for our prospective customers and distributors.”

GLUE DOTS INTERNATIONAL
01274 551966

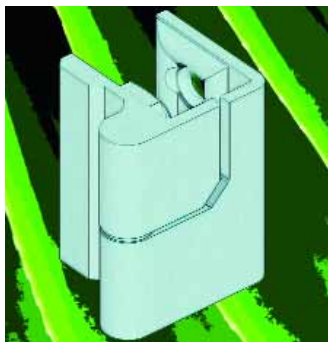
Stainless hinge suits larger cabinet doors

The 1110-U120-PH from **EMKA** is a lift-off hinge with a simple screw fixing. The design optimally maintains the integrity of cabinet doors – by requiring only screw hole punchings – not cut outs, and so usefully aids door rigidity. The strength comes from AISI 316 castings with fine-

ground finish with a simple elegant design which enables rapid door removal by a simple lift-off process for installation of doors or for straightforward equipment maintenance.

This hinge program in stainless steel accommodates 26mm door returns with 180° opening. This is ideal for use on adjacently situated suites of cabinets in corrosive wash down environments or for harsher situations e.g. offshore installations where often larger and heavier doors are needed. Matching stainless steel L and T handles as well as swing-handles are available as are some 500 extruded rubber sealing profiles for door sealing.

EMKA 024 7661 6505



T-bar works as a convenient key



Another product launched under the Rocfast banner from **FDB Panel Fittings** is a T-bar that provides two hexagonal keys of 8mm section for operating standard inserts in compression and quarter turn locks, for use in IP65 sealing of cabinets and enclosures.

The 8mm keys are also useful for 8mm socket head screws used in mounting of handles, hinges, panel ware or control and switchgear equipment.

FDB PANEL FITTINGS
020 8568 1616

Hinge features built in safety switch

The **Elesa CFSW IP67** hinge has its own built-in multiple safety switch, so that in the event of accidental opening of a control cabinet door, machine panel or safety door, it automatically shuts off the power so protecting the operators of machinery and production equipment. This 180 degree hinge is paired with its equivalent mechanical hinge, the CFMW so creating a tough, safe installation.

The CFSW is double insulated and approved AC15 (IEC 60947-

5-1) and DC13 (IEC 60947-5-2) for usage up to 400V-4A (AC15) – it is available with different combinations of contacts with positive opening. These robust units are tested to over 1 million operating cycles, are totally tamper-proof, and can be quickly and easily installed.

Standard configurations are 8 pole connector or 8 core cable in 2m or 5m lengths. 180 degree opening is normal but other operating angles may be specified.

ELESA 01526 322670



FASTPRODUCTS

Six tapes satisfy all masking needs

3M has consolidated its portfolio of masking tapes for the general industrial marketplace to offer a simplified range of six core products to meet virtually all masking needs.

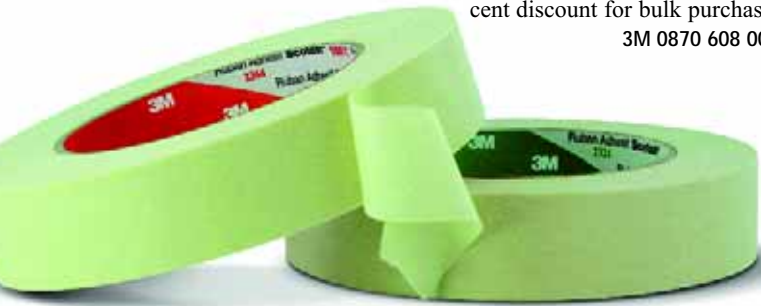
The range is now colour-coded according to temperature performance – from room temperature general purpose masking tape, which has a blue core, to 160 degree version, which has a red core. This straightforward system allows the end user to differentiate between multiple types of tape on the shop floor; helping to associate the correct performance level with the job at hand.

Kirsty Horsfall of 3M's

Industrial Adhesives and Tapes Division explained: "The new range has been reduced to just six variations that are suitable for a multitude of applications from bundling and sealing to paint masking or protecting a surface from scratching, with a variety of temperature performances and adhesive qualities. This simplifies the selection process and means that customers can quickly make the right choice."

To celebrate the launch, 3M has introduced its Masking Tape Range Guide for customers and has reduced the prices of its paper masking tapes. All six products are also available in case and pallet quantities with up to 31 per cent discount for bulk purchases.

3M 0870 608 0050



Door hinge gets connected

With the growing popularity in electronic door locks and door security controls, hinge maker **Cooke Brothers** has reported a real surge in demand for its range of multi wired conductor/power transfer hinges. While some electrical devices operate perfectly well with battery power, for long-term durability and endurance many of the latest locking systems are specifically designed for mains supplied and transformer controlled continuous power source.

The Phoenix range of fully concealed wire conductor hinges are designed for use with electronic entry controls and can be supplied with 2,4,6,8 or 12 wires capable of carrying up to 24V at 2A. The specialist silver-plated, high strength wires are specified as PTFE Insulated equipment wire, RoHS compliant and tested in accordance with BS3G210 AND BS3G230.

Phoenix conductor hinges are available as a standard option in the popular slimline (pictured), concealed bearing, dual bearing and LoadMaster ranges, together with certain patterns of the company's continuous hinge range.

For specification purposes these conductor hinges are classed as non-load bearing.

COOKE BROTHERS
01922 740011



Adhesive bonds dissimilar materials in seconds

A resilient, low-viscosity, moisture-resistant adhesive designed for rapid bonding to a wide variety of plastic and metal substrates has been made available by Intertronics. DYMAX Ultra Light-Weld 3013 forms high-strength, environmentally resistant bonds for appliance assembly, bond joint and sealing, plastic window bonding, and plastic assembly and dispenses easily for precise quantity and placement of adhesive.

Intertronics managing director Peter Swanson explained: "This is a really useful and easy to use adhesive which not only speeds production cycles, but also fluoresces blue under low-intensity UV allowing for in-line quality control utilising optical scanners." This solvent-free, worker-friendly adhesive cures in seconds on exposure to ultraviolet and visible light – even through UV-blocked plastics – allowing for increased produc-



tion speed and lower processing costs.

The product is claimed to be ideal for applications requiring the bonding of dissimilar materials, something that cannot be done with traditional welding methods and other types of adhesives. Substrates suitable for bonding with this material include transparent or translucent acrylic, metal, polycarbonate, PVC alloys, ABS, polyurethane and polystyrene, as found in production of white goods, automotive assemblies and domestic equipment.

INTERTRONICS 01865 842842

UV Spot cure system is managed for long LED life

Jenton has been marketing the Lumen Dynamics Omnicure LX400+ LED UV Spot cure system, a high irradiance LED UV multi head solution for a wide range of UV curing applications, including medical device bonding, electronics assembly and optoelectronics.

Utilising the latest UV LED dies, the unit has been designed specifically to reduce UV bonding manufacturing costs through faster curing times, reduce cost of service items, higher power efficiency and superior control (with monitoring capabilities), whilst supporting a wide range of UV curing adhesives.

The instrument maintains full control of up to 4 LED heads simultaneously or independently, offering maximum flexi-

bility for manufacturing setups where single or multiple foot pedals are needed to control a number of curing stations. It uses the latest UV LED technology to provide high irradiance at three different wavelengths and is equipped with patented Intelli-Lamp technology, monitoring the temperature and operating hours of the UV LED heads to optimise a lifetime guarantee of 10,000 operating hours or three years, whichever comes first.

JENTON INTERNATIONAL
01256 892194



FASTPRODUCTS

Self-clinching studs reduce stress on panels



Self-clinching studs from **PEM** have been designed with large-diameter heads to provide particularly robust solutions for heavy-duty attachment applications. An enlarged, non-flush stud head distributes the axial tightening force over a large area, resulting in improved pull through performance, reduced compressive stress on the panel, and development of full thread strength.

All four types of these RoHS-compliant studs offer cost-effective alternatives to weld studs by enabling easier installation with fewer production steps.

Type HFE steel studs install permanently in steel or aluminium

sheets as thin as 1mm with hardness of HRB 85 (or less) and HB 165 (or less). Thread sizes range from M5 to M8 and standard stud lengths are available up to 50mm. Type HFH steel studs for high-strength applications meet Grade 5/Property Class 9.8 tensile requirements and install permanently in steel or aluminium sheets as thin as 1.3mm with hardness of HRB 85 (or less) and HB 165 (or less). Thread sizes range from M5 to M10. Unified thread sizes are also available for these studs.

Types HFG8 (unified) and HF109 (metric) high tensile strength studs provide solutions for the most demanding applications.

Detailed specifications, CAD models, and performance data for this family of large-diameter head studs can be accessed at www.pemnet.com

PENNINGENGINEERING
+353 91 7471186

Repair kit cuts downtime for maintenance engineers

Leading industrial parts supplier, **WDS**, is providing maintenance engineers with a fast and convenient solution for reducing downtime and repair costs on machines and equipment that are out of action due to damaged threads. The company has launched a comprehensive kit for re-threading holes in equipment, such as machine beds, pump flanges, castings, gearbox housings, bearing mountings (etal) - quickly and at low cost.

Extremely easy to use, and with no special engineering experience required, the WDS repair kit is supplied in a convenient




carrying case that is compartmentalised for easy selection of drill bits, taps, insertion tool and wire thread inserts. The wire thread inserts themselves are manufactured from high quality 204 stainless steel. They are supplied in five thread sizes: M5, M6, M8, M10 and M12. The first four sizes are provided in quantities of 25 off, and 10- off for the largest, M12, size.

Replacement thread inserts are subsequently available in packs of 10. Each thread size is available from stock and can be dispatched for next day delivery.

WDS COMPONENT PARTS
0113 290 5845




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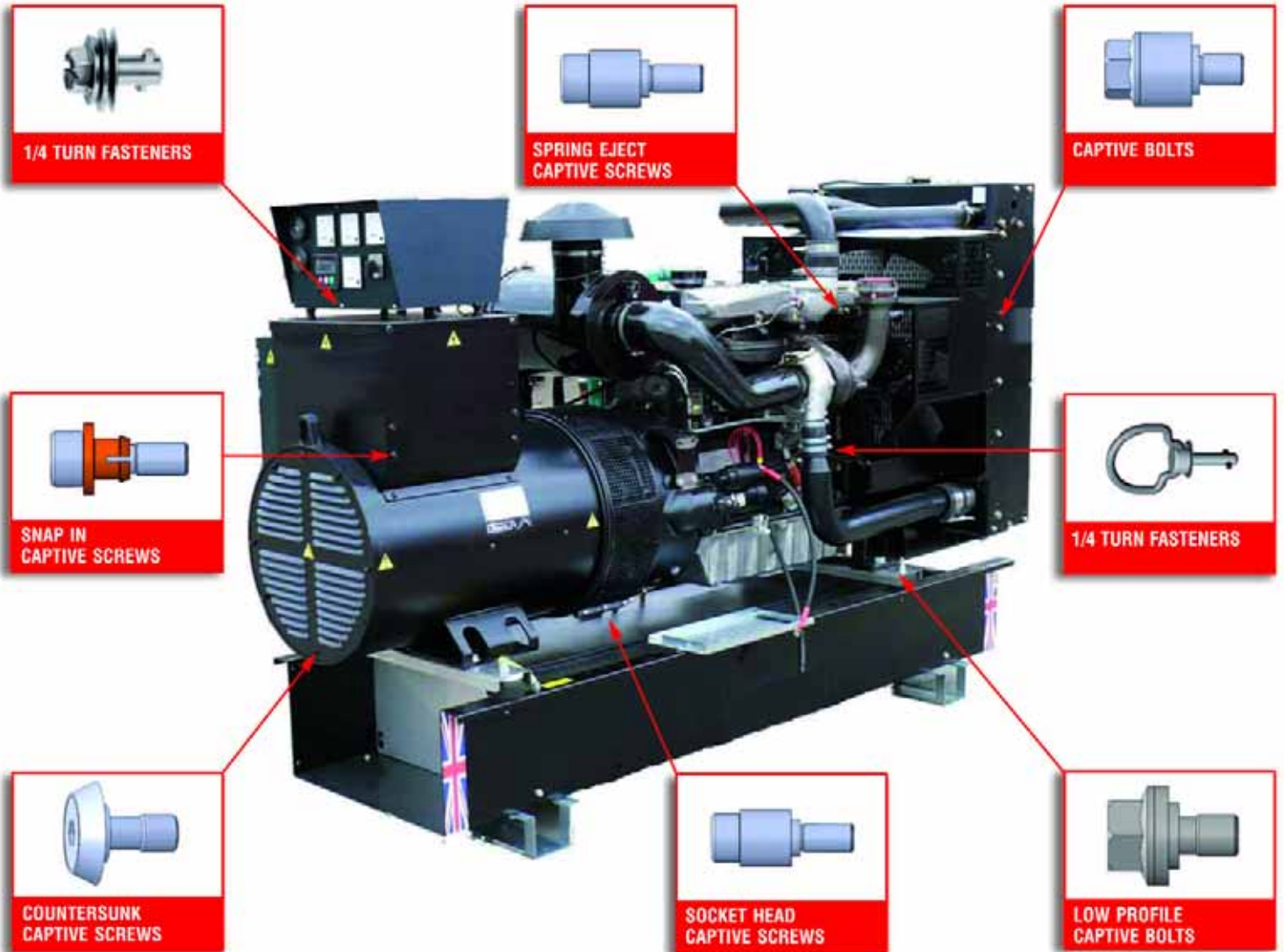
SpecialtyFasteners UPDATE

CAPTIVE FASTENERS

The new machine directive requires fasteners on removable panels to be captive. Specialty Fasteners have a range of Captive Bolts and Quarter Turn Fasteners to help you meet this criteria.

Hand or tool operated with just a 90 degree rotation to open or close Quarter Turn Fasteners provide fast panel access and the fastener is securely retained in the panel by a substantial retaining ring.

Captive Bolts, where the bolt is captivated in a bush riveted to the panel, replace standard fasteners and consideration needs to be given to the joint design to enable the captive bolt to function correctly. SFC have a range of designs to help you meet the directive and will be glad to discuss your application.



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www.specialty-fasteners.co.uk

Two component silicone is flexible with high temperature resistance

Offering a blend of high performance properties, **Master Bond MasterSil 153** is often used in a variety of bonding and sealing applications involving optical, electrical, aerospace and medical devices. As an addition cured system, it does not require air for complete cross-linking. It can be cured over wide surface areas as well.

This two component silicone features easy handling with a one to one mix ratio by weight and its paste consistency allows for precise application. It has a low exotherm and long working life of 5 to 7 hours at room temperature. It is a self-priming system, which enhances its bonding abilities to a wide variety of similar and dissimilar substrates, including most metals, plastics, glass, ceramic and cured silicone rubber. This translucent silicone is also serviceable over the wide temperature range of -50°C to over 200°C.

If stored in its original containers, MasterSil 153 has a shelf life of 6 months. It is available in a variety of packaging sizes including 1/2 pint, pint, quart, gallon and five gallon container kits.

MASTER BOND +1 201 343 8983



Castors for high temperature environments

Made from solid zinc plated steel or stainless steel with a speciality phenolic wheel ensuring durability, a range of castors from **Moss Express** can withstand

temperatures of up to 260°C.

The castors are claimed to be ideal for use in high temperature environments such as moving large cast products through pow-

der coating processes and also for heavy trolleys in large scale supermarket bakeries.

They are available with a bolthole or plate fixing in a vari-

ety of wheel diameters in steel or stainless steel and can be delivered next day to anywhere in the UK.

MOSS EXPRESS 0845 7585070

gluegunsdirect.com[®]

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tec glue guns

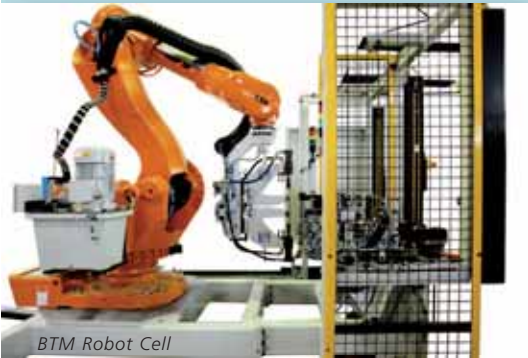
tecbond adhesives

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Below are typical examples of how Tog-L-Loc® can also save on the cost of consumables such as rivets, nuts & bolts, weld tips and adhesives.



BTM Robot Cell



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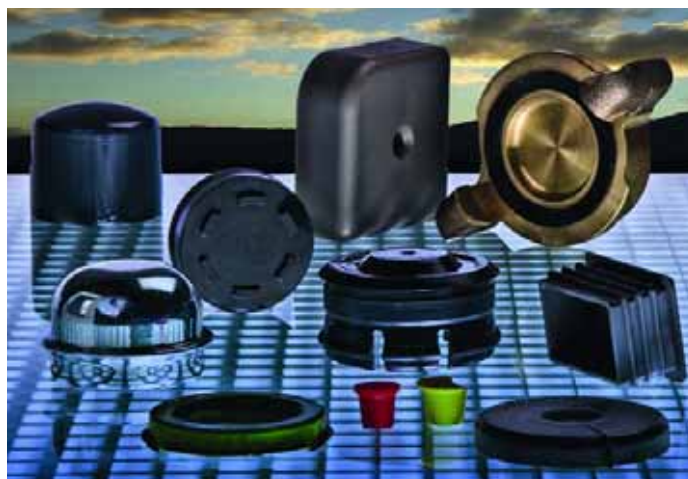
End caps provide the finishing touch

There is an increasing demand for custom made end caps that finish off and add value to a wide range of products. Manufacturer **Blue Diamond Technologies** recognises that not only do they enhance appearance, they can also be designed to prevent the ingress of dirt or dust and, in the case of furniture legs for example, spread the load alleviating damage to floor coverings.

Although there are ranges of standard end caps available, most users recognise the benefit of having them specially made so as not to compromise the design of the overall item. Blue Diamond can manufacture end caps in a range of materials including any

plastic, rubber, polished metals or alloys to provide a contrasting or a near seamless match to existing finishes. Caps can be threaded or push-fit and, with careful design, it is often possible to produce a universal component that will meet a range of applications, reducing costs and inventory.

The company will handle the complete production process including design and prototyping and the manufacture of low cost tooling. Autodesk Inventor software is used for 3D mechanical design, product simulation, tooling creation and design communication. Rapid prototyping results in a physical prototype that can be used to check fit,



function, ergonomics and aesthetics. This allows the customer to make detailed adjustments before finalising the design.

Because Blue Diamond is able to ship in bulk, shipping costs are minimised providing

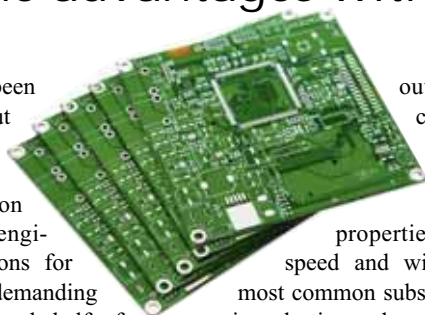
further savings for the customer. Stockholding facilities are available and Kanban and JIT delivery can also be accommodated.

BLUE DIAMOND TECHNOLOGIES
023 8025 8966

Conformal coatings combine silicone advantages with UV speed

Sil-Mid has been on the lookout for high performance and fast production throughput engineered solutions for difficult and demanding applications on behalf of its customers. The company has recently taken on a series of Novagard Solutions products, which combine the performance advantages of silicone with processing speeds of UV cure. Product characteristics range from very thin coatings to a paste-like consistency. All formulations are 100% solids, so there are no solvents to handle or report.

Tests of Novagard UV 800-260 demonstrates cure with extremely fast processing speeds and also incorporates a secondary, moisture cure chemistry for shadow areas of the coating. The product is thought to be the only UV curable silicone conformal coating to be listed with UL 746E approval for conformal coatings of printed circuit and control boards for indoor and



outdoor applications.

The product exhibits silicone properties with UV speed and will adhere to most common substrates including plastics and metals. It offers the thermal stability, weather resistance and dielectric properties expected from a silicone with service temperatures of -54°C to 260°C.

When used as a potting and encapsulating UV cure silicone, the product eliminates the mixing of two-component materials and oven cure cycles by using UV cured potting and encapsulating compounds to safeguard delicate electronic elements.

Low cost electronic devices continue to get smaller and perform increasingly complex tasks. This builds a demand for innovative materials such as the UV cured conductive silicones that are also available for these applications to help increase productivity and reduce costs.

SIL-MID
07730 099621

Abrasion resistant adhesive is serviceable at cryogenic temperatures

The EP30D-10 elastomer system from **Master Bond** offers the strength, flexibility, performance, and adhesive qualities traditionally associated with epoxies, along with the toughness and abrasion resistance of polyurethanes. This two component adhesive is resistant to thermal cycling and chemicals including water, inorganic salts, acids, and alkalis.

Serviceable over the wide temperature range of 4K to 220°F, EP30D-10 has been successfully used in numerous cryogenic applications.

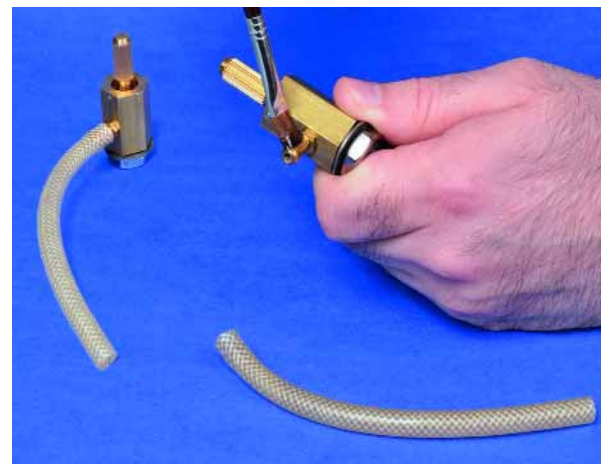
It cures at room temperature, or more rapidly at elevated temperatures. Parts more than an inch thick can be cast and cured without undue exothermic development.

Featuring excellent electrical insulation properties and optical clarity, EP30D-10 is often used in casting and

encapsulation applications in the electronics, aerospace, OEM, MRO, and optical industries.

Once cured, the system develops a tensile strength of 1,500 psi and an elongation exceeding 150% at 75°F. It bonds well to a variety of substrates including, metals, wood, concrete, glass, vulcanised rubbers, and many plastics. The adhesive does not contain any solvents or diluents and is formulated to cure with minimal shrinkage.

MASTER BOND
+1 201 343 8983



FASTPRODUCTS

Aluminium fasteners facilitate lightweight construction



Aluminium screws from **Arnold Umformtechnik** are finding uses in the joining of magnesium components in transmissions, housings as well as load-bearing and stiffening applications. Alufast fasteners are especially useful with material pairs exposed to thermal stress as they significantly enhance the security of threaded fastener joints. Aluminium screws weigh only one-third as much as equivalent steel screws so with large volumes, the weight savings can be significant.

The type 6056 aluminium

alloy used for Alufast fasteners has a proven track record of durability for joining magnesium components with threaded fasteners. The material has good characteristics for thermal expansion, corrosion resistance and recycling. At the same time, Alufast products fulfil stringent requirements for retention of clamping force, thermal stability and weight reduction, the maker claims.

Alufast fasteners also exhibit good corrosion characteristics in contact with magnesium. The relatively small difference in electromotive force significantly reduces the risk of corrosion compared with steel fasteners. The mechanical properties of the screws are practically stable under long-term stress at temperatures up to approximately 150 °C and brief temperature excursions up to approximately 180 °C do not pose a risk.

ARNOLD UMFORMTECHNIK
+49 160 9890 8602

Hardware catalogue covers enclosures and accessories

Spelsberg ELS, which claims to be Europe's leading manufacturer of non-metallic electrical enclosures, has released a short-form catalogue for 2012/2013 that features an overview of some of its market leading new enclosures and accessories for general electrical applications. The catalogue also focuses on some of Spelsberg's most popular enclosure ranges and cable entry accessories while providing key technical information to help simplify the specification process.

Also included in the catalogue are some of Spelsberg's innovative enclosure accessories including the IP67 Klikseal insert - which allows installers to make a compact, watertight cable entry in a matter of seconds - and DIN Rail mounted terminal products. The catalogue's concluding pages feature technical information to allow users to compare the featured products' performance capabilities and simplify the specification process.

SPELSBERG ELS
01952 200716

Mechanical struts suit heavy weight category

Associated Spring has launched a range of mStruts to complete its current offering, which now includes everything from high quality gas struts to fully stainless models. Particular success has been seen with manhole covers, inspection covers/panels and refrigerated vehicle applications where low maintenance, repeatable loads and temperature are a particular concern.

Recently the company has been working closely with automotive, foundry and commercial vehicle businesses on numerous engineering projects. From production line health and safety solutions to bespoke systems, the company's engineering team is constantly pushing the range to be more versatile and fit with the customer's needs, it is claimed.

With their proven long life, the mStruts are showing that they are a long term cost saver for their customers when compared with gas struts in similar applications. With over 70,000 stock items and new ranges of 316 type and stainless steel springs, Associated Spring says it is confident of meeting all customers'



needs, no matter how big or small.

ASSOCIATED SPRING 01386 443366

Stop locks keep things in place

The GN702 four position indexing stop lock from **Elesa** is designed for the location and retention of drawers, access doors and panels and offer a low cost and simple solution for the engineering designer. Stop locks having a standard red latch with black mounting flange are used extensively on aircraft, fire engines, ambulances and similar service vehicles where rapid manual operation is needed with robust performance.

The GN702 features a flange for surface mounting or mounting with M8 female thread or with standard rounded square hole for lock style fitment. Latch material is zinc die with red plas-

tic coat and integral indexing mechanism which holds the latch at each of four 90 degree positions until overridden in operation and turned to another position.

ELESA 01526 322670



Tapes launch puts strength at a premium

Resisting breakage or tearing under tensile stress is one of the most important properties of materials used in fixing, securing and sealing goods in applications such as palletising, bundling, end tabbing, transport securing and carton sealing. The launch of a premium tape by **tesa** has been designed to enhance the levels of tensile strength and abrasion resistance currently on offer. This high strength filament tape also offers improved tear resistance and better adhesion properties than its existing filament tapes.

Premium filament tapes are claimed to provide an essential tool where safety matters. With

an impressive elongation at break of 15% they also offer extremely high tensile strengths. All tapes in the filament range offer good tear resistance and are the strongest ever to be produced by the company. Even if damaged on one side, the backing will not break and objects held by the tape will remain tight and intact.

The general purpose tapes, tesa 4591 and tesa 4590, launched earlier in the year, are suitable for use in room conditions <math><40^{\circ}\text{C}</math> and offer easier unwinding features as well as a tensile strength up to 250 N/cm.

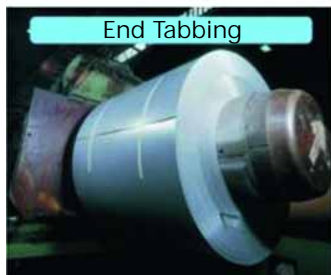
TESA
01908 500235



Bundling



Fixing



End Tabbing



Bundling



Transport Securing



Palletising



Heavy Duty Carton Sealing



Fixing

Coloured looms satisfy customer demand



Micro Plastics' International has added colour to its polyethylene and nylon lines of wire routing split loom. To satisfy customer demand, the company now offers all sizes of its nylon split loom in orange, to accommodate applications where identification is critical to safety. In addition, the polyethylene split loom is now available in red, yellow and green, the products are described as perfect for organising cables and managing cords into colour-coded bundles, when building

assembly systems.

This highly flexible, kink-resistant corrugated tube has an easy opening seam down the side for simple and quick insertion and removal of wires. Coloured split loom comes in six standard sizes, 1/4, 3/8, 1/2, 5/8, 3/4, and 1 in. Extruded from durable materials, the products are resistant to many temperature and corrosion conditions. Free samples are available upon request.

MICRO PLASTICS INTERNATIONAL
02476 614 320

Gantry style production oriented robot

Low cost versatile robots are becoming increasingly popular in the manufacturing environment and the latest Fisnar F5200N gantry model from **Intertronics** is no exception. Offering flexibility for dispensing operations, the machine joins a large range of dispensing robots including form-in-place gaskets, adhesives, potting, coating and filling.

The strength of the Unitop F5200N lies in its ability to create its own working area, enabling the system to be mounted on any work surface. The system is suitable for use on any type of platform requiring a gantry type mounting with open access under the robot. It is also good for conveyor fed automation or can be installed in work cells operating as a slave robot, allowing users to create their workstation.

Intertronics points out that the robot comprises a control module, a teach-pendant and an artic-

ulated-gantry. It has a working area of 200 x 200mm with a resolution accuracy of 0.001mm. Using the teach pendant, the dispensing robot supports windows compatible dispensing software and can store and retrieve up to 100 programs, the equivalent of 400,000 points.

Reliability and accuracy feature strongly in the F5200 with resolution of 0.001mm/axis derived from its micro-stepping motor controlled via USB/RS232 interface, the company claims.

INTERTRONICS 01865 842842



FASTTAILPIECE

A different slant on secure fastening

A few years ago **Tappex** developed a bespoke, threaded fastening solution for a Home Office application used to secure lavatory seats to their cisterns in Prisons. Reportedly, there had been occurrences of the traditional fastening being undone and the seat becoming a loose item useful in the projection of inmates frustrations when subsequently either thrown at each other or prison staff. The Tappex solution involved a shear nut which left a

tamper-proof fastening for the seats.

It has since been trademarked Vandlguard and subsequent applications have included the secure retention of high value electronics and telecoms equipment, security barriers and fencing.

The product is machined from a solid female threaded sleeve consisting of an inverted cone section blending into a hexagonal nut-form. The installer runs the Vandlguard along the length of a

male thread until the cone makes contact with another surface. The nut section is then used to continue to build a clamping force but at an approximate pre-determined torque, the nut will shear leaving the inverted cone section onto the male thread. In practice it is impossible to remove the cone by hand or even with simple tools. Cutting equipment or a strong pipe wrench are the only way to shift it.

TAPPEX 01789 206600



Spring innovation helps motorcycling veteran

Justin Rokohl is a US war veteran who was injured while on active service in Afghanistan. Justin had a childhood dream that one day he would own and ride a motorcycle. Once his tour of duty as a marine was completed, he would have the funds to buy his dream machine but then came the rude awakening of the roadside bomb incident which put paid to his military career and effectively ended his biking ambitions.

But not so because thanks to an innovative product called LegUp LandinGear designed and supplied by motorcycle specialist Chopper Design, Justin is still able to enjoy motorcycling, despite losing both his legs.

The landing gear was designed to help disabled riders

or those with knee or hip problems, to be able to support a heavy motorcycle at slower speeds. If the rider is unable to balance the machine for himself, a set of small wheels automatically deploy as the cycle slows down to speeds below 8MPH, making riding safe even for those with physical disabilities. LegUp operates using torsion springs (arrowed on picture) which were specified when Lee Spring Engineering worked on the design in its development stages.

The project is described in a video courtesy of *Design World Magazine*, which can be found at: <http://www.youtube.com/watch?v=LDpmO4ZguUo>

LEE SPRING
0118 978 1800



£100 CASH QUIZ!

Win a cheque for £100 from the publishers of FAST Magazine! Submit your answers by faxing this completed entry to us on 0845 280 1587 or emailing them to quiz@fastmagazine.co.uk with your name, job title, company name and contact number. A draw from all correctly answered entries will be made in the FAST Magazine office on 1st September and the winner notified by phone and email. The winner will also be announced in the next issue of FAST Magazine, published in October 2012.

1. Which aero engine manufacturer made a name for its sleeve valve engines in the 1930's?

- Pratt & Whitney Bristol Rolls-Royce

2. Where was legendary F1 figure Sir Frank Williams born?

- Fakenham South Shields Dartford

3. Michael Rutter won a TT title in June this year at an average speed of 104mph. What powered his machine?

- Ethanol Petrol Electricity

4. Where was the world-famous clipper the 'Cutty Sark' made?

- Tyneside Dumbarton Southampton

5. In 1891 future car maker Henry Ford took a job as an engineer at which company?

- Detroit Stamping Co Thomas & Ford Shipping Co
 Edison Illuminating Co

6. Which distinguished fighter and test pilot left a legacy in his name that still helps young people carve a career in aviation today?

- Roland Beamont John Cunningham Eric Brown

Last issue's winner was Brian Gerrard, Engineering Manager, Lostock Engineering. Congratulations Brian! The correct answers were:

- Cheese was once made in what subsequently became the JCB factory.
- Marie Curie was born in Poland.
- Fairey made the aeroplane which Peter Twiss piloted to a new world air speed record in 1956.
- Professor Sir Magdi Yacoub is a world famous heart surgeon.
- Rudolf Diesel's engine was granted patent number 608,845 on 9th August 1898.
- Andre Citroen's father was a diamond merchant.

Our thanks to the many readers who entered.



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