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- Aerospace Report
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TYROLIT POWER

TYROLIT'S patented technology eliminates backlogs by sanding, helping to increase productivity by as much as 90 percent

TYROLIT POWER is a sanding system that uses abrasive strips to prepare surfaces. Particularly industries that need to sand large surfaces such as the manufacturing of wind turbines, aerospace and shipbuilding are profiting from this new technology.

Traditionally, hand-held orbital sanders are used to sand large surfaces. This entails hours of manpower and large amounts of waste. In one case study, it took eight men 64 hours to sand one section of a wind turbine blade mould using orbital sanders.

TYROLIT POWER was able to complete the same section in just eight hours with one operator.

Although sanding costs can be dramatically reduced, the main benefit of TYROLIT POWER is its ability to increase the speed of the production process. This helps manufacturers to reduce backlogs caused by work-intensive sanding and fewer backlogs means more production.

Additionally, TYROLIT POWER has raised the benchmark for health and safety. The device reduces dust while offering an ergonomically friendly solution to sanding. Moreover, White Finger Syndrome, caused by continuous use of vibrating hand-held machinery such as an orbital sander, is no longer an issue. This debilitating condition can lead to loss of feeling, reduced dexterity and severe pain in the fingers. Due to the design of TYROLIT POWER, white finger syndrome can be eliminated providing a care-free solution for both operator and employer.

"Rarely does a product come along that truly changes the way we do things. TYROLIT POWER is one of those products," says Johnny Nelander, product manager for TYROLIT POWER. "A leading manufacturer of wind turbines has completely replaced their old sanding methods with TYROLIT POWER, saving millions of Euros and reducing backlogs in its production."

TYROLIT POWER is transforming the sanding process of many industries. To get more information on how it could benefit your business contact:

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Tel: 01788 824500
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www.tyrolit.com

GrindTec looks set to grow

Leading trade fair for grinding technology so far unimpressed by weakening economy

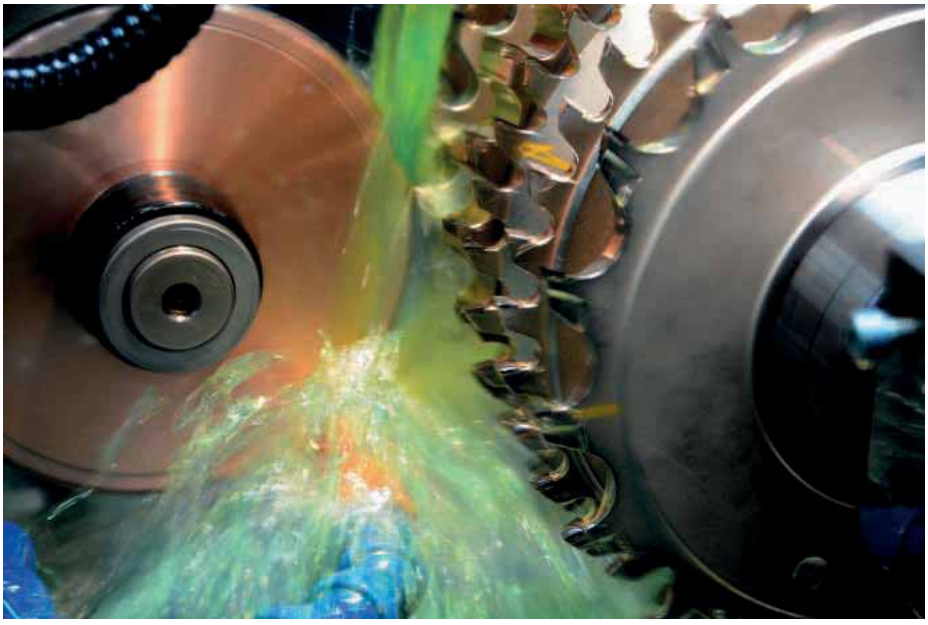
Even though the economic engine is stuttering and the industry association VDW has only recently revised its forecast downwards, GrindTec will be bigger than ever in 2020. As at the end of September, 528 exhibitors had registered, 41 percent of them from outside Germany, representing 31 countries. Almost a third of the international participants now come from Asia.

Thanks to the new exhibition Hall 2, the occupied area will grow by a about 2,500 m². The decisive factor for this development is the disproportionate expansion of the participation of the leading machine manufacturers. Visitors to GrindTec 2020 can therefore look forward to an unprecedented wealth of innovations.

GrindTec organizer AFAG is realistic about the expected number of visitors: "At all past events, we had steadily increasing visitor numbers. We do not expect any further growth for 2020, as the economic conditions are currently lacking. We would not be dissatisfied with the 19,000 visitors from 2018. Especially since GrindTec has always appreciated the high professional competence of its guests. In addition, the vast majority of decision-makers in their companies have a lot to say: 27 percent have absolute decision-making authority, 37 percent make decisions and 20 percent are involved in an advisory capacity."

GrindTec 2020: an unbroken run for the leading trade fair for grinding technology

With a large proportion of the exhibition space already booked, GrindTec acts like a magnet for suppliers of grinding technology. 80 percent of the areas reserved for the show have now been allocated. More than 500 exhibitors from 28 countries have already registered, including leading machine manufacturers. What is striking is that the top companies in grinding technology will be represented almost completely with enlarged exhibition stands. Insiders conclude that more innovations will be presented at GrindTec 2020 than ever before. One thing is certain in any case: with an occupied area of 53,000 m², the upcoming event will be the largest so far.



Top five nations the same as ever

There are still no changes in the ranking of the most important exhibitor nations. Germany ranks first with 60 percent, followed by Switzerland, Italy, China and the USA. In total, these countries account for 86 percent of all exhibitors. The trend towards internationalisation of GrindTec is clear. The still modest share of foreign exhibitors of 13 percent at the premiere, is increasing with each event. In 2010, it already amounted to 35 percent. In 2018, 43 percent of the companies came from abroad. This development is also reflected in the number of nations represented: in 1998, just six countries were represented at the start and at GrindTec 2018 there were already 30. Ultimately, it is this ever-increasing participation of grinding technology companies from all over the world that is driving the growth of the industry's leading forum, with Asian grinding technology suppliers increasingly involved in the show.

GrindTec 2020 runs from 18th to 21st March 2020 at the Messe Augsburg.

For further information, contact:

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GrindTec

GrindTec 2020

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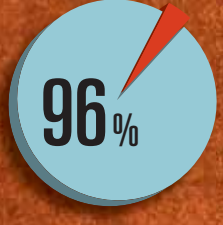
Willingness to recommend



Intention to participate again

96% of the exhibitors* are expected to participate again in 2020.

*Gelszus Messe-Marktforschung, Dortmund

Great results for the 643 exhibitors, top grades by 19,100 visitors from 54 nations!

Information + participation documents
www.grindtec.de

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The cutting edge of technology

Galway hosts Medical Technology Ireland 2019

Galway Racecourse was the venue for Ireland's and one of Europe's premier medtech events this year, the Medical Technology Ireland 2019 Conference & Exhibition, which took place from September 25-26, showcasing innovative products and solutions for the medical device design and manufacturing sector

Tom Mulligan, Ireland correspondent, reports

Ireland is one of Europe's largest medical device design and manufacturing centres and, as a globally recognised centre of excellence, is home to more than 300 companies employing about 32,000 people, with nine of the world's top ten medtech sector companies having operations in the country. Ireland is also the second-largest exporter of medtech products in Europe.

The issues: better health care, lower costs

Globally, pressures on health care systems have resulted in a greater focus on enhanced efficacy of treatments and cost reductions. Medical Technology Ireland addressed these issues through its two days of discussion and presentations between high-quality attendees within a comprehensive programme that included more than 15 conference presentations covering the critical technology and business issues shaping the future of the medical technology sector. The programme also included two highly topical workshops: the Women in MedTech Forum, highlighting how women are making an impact in the sector; and the Start-Up & Innovation Academy, demonstrating the business strategies new companies need to adopt in order to become established in the competitive field of medtech. The event also featured three floors of exhibits with more than 200 companies showcasing their products and services.

Visitor numbers were in excess of 1,200 and included manufacturers, clinicians, academics, entrepreneurs, managers of start-ups, financial specialists and other suppliers to the sector attending a combined conference programme defining present and future medical device trends, encouraging wide-ranging discussions on new developments, and on how these are improving the quality of life and increasing life expectancy for patients worldwide.

Conference programme: a prestigious speaker line-up

The conference opened with an address by J.P. Gilmartin, deputy president of Galway Chamber, and featured a prestigious line-up of invited speakers, including: Professor Fengzhou Fang of the School of Mechanical and Materials Engineering, University College Dublin talking about nano-manufacturing technology; Ben Davison of micro-machining, moulding and printing specialist company Precipart describing how to move efficiently from prototype to full production by using metal 3D printing as a means of reducing development time and costs; David Alarco of Nypro Healthcare on the race for a qualified health care additive manufacturing solution; Ronan Benson, senior industrial designer at medical device designer and contract manufacturer Synecco discussing the utilisation of the IEC 62366 usability engineering standard to understand and optimise how users interact with medical devices; and Drew Forbes of US company Fort Wayne Metals describing new nickel-free alloy technologies being developed to address concerns over nickel allergies from long-term implants.

Several business topics were discussed within the conference programme: sessions included an overview of the changing EU regulatory landscape, and presentations on how to make the most of R&D tax credits and practical approaches to innovation in pre-market studies.

Women in MedTech Forum

Chaired by Fiona Neary, commercial director of the BioExel partnership programme and innovation operations manager at NUI Galway, the Women in MedTech Forum proved a big success, attracting more than 100 people to listen to a prestigious line-up of speakers that included speakers from Boston Scientific, Medtronic, Creganna Medical-TE, Merck Sharp & Dohme and the Learning Reservoir, Galway and featuring discussions that included topics such as mentoring, balance and diversity in the workplace.

Start-Up & Innovation Academy

A second workshop, the Start-Up & Innovation Academy, was held in partnership with Medical Technology Ireland on the second day of the conference, a number of key support organisations in the West of Ireland region bringing together some of the best investment-ready start-ups to pitch to potential business angels and

investors. The Academy also featured a brief presentation on the extensive range of supports for start-up and early-stage companies in the region.

International exhibitor line-up

Complementing the conference programme and the two workshops were the three floors of more than 200 exhibitors ranging from component suppliers, precision tooling specialists, medical device designers, and contract manufacturers, to printing, packaging & labelling specialists, services suppliers, business advisors and consultants, including metal component, metal finishing, device assembly and precision tooling specialists. The exhibitors included:

XL Precision Technologies, a UK-based specialist in the manufacture of laser-cut tube components and micro-machined components for cardio, endo- and neuro-vascular devices including a range of metal components from flexible hypo tubes, Nitinol micro-machined components and complex sub-assemblies.

Irish company Allied Automation, dedicated to the design and precision engineering of customised automated equipment for medical device companies and offering mechanical design, precision tooling, process control and safety systems, and R&D.

European Springs & Pressings Ltd offering engineering expertise in the spring coiling, wire forming, pressing and medical stamping industries across multiple metals, with coiling from 0.03 mm to 65 mm.

Carby Corporation, a US manufacturer of very-high-precision deep-drawn metal components for the medical, aerospace, military, automotive, electronics and other industrial sectors.

Danish company Stansomatic A/S, a producer of punched and drawn parts in all types of metals and steel made using hollow die tools and modern automated punches.

Blueacre Technology, a precision micro-machining specialist for the medical device and other advanced manufacturing

industries, using the latest technology in laser machining, Swiss CNC and electropolishing finishing.

Germany-based Klingel Medical Metal produces high-precision CNC turned and milled parts with complex geometries and tight tolerances. The company is an ISO 13484:2016 certified full-contract manufacturer of customised components of materials with low machinability for use in orthopaedic, cardiovascular, minimally invasive and robotic surgery and medical devices.

Fort Wayne Metals, a leading manufacturer of precision wire-based products, including centreless ground bar, strands, cables, and subassemblies, used in medical devices. FDA-registered and ISO 9001, AS9100D, and ISO 13485 certified, the company offers numerous alloys, including Nitinol, titanium, and stainless steel.

Deringer-Ney Inc., a global leader in the manufacture of platinum group metal alloys and precision biocompatible components for the medical industry such as dental implants, interventional and implantable devices.

Schivo, a company that supports medical device, instrument or sub-component builds from prototyping, design for manufacturing/assembly to full product build and test. In house capabilities include machining, additive manufacturing, fabrication, coatings and electro-mechanical assembly for the build and packaging of devices or subassemblies ready for shipment.

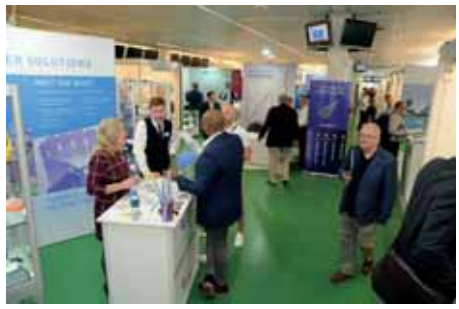
Sandvik Materials Technology, offering its EXERA range of alloys, wire forms and wire components, enabling wire diameter range and coating types to be combined to match specific applications in various industries.

Alpha Precision Ltd specialises in the design, build and support of complex tooling together with fixturing and production manufacture for the medical device industry.

MedNet GmbH, a component and service provider for medical device manufacturers that offers standard components and sets as well as customised parts and assemblies from polymers and, precious, metals.

Impact Ireland Metals is the exclusive distributor in Ireland and the UK for Boston Centerless Precision Ground Alloys, supplying precision ground bar materials for close tolerance CNC Swiss machining applications for the medical device industry.

US company MW Medical Solutions



develops specialised products for the medical and pharmaceutical industries, including precision wire forms, metal stampings, a wide variety of spring designs, tubular components, and related product assemblies.

Since 1992, Swiss company Parmaco Metal Injection Molding AG has been a manufacturer and developer of highly complex serial parts in steel and high-grade alloys, manufactured using metal injection moulding with excellent surface finish for the medical, automotive and other industries.

PI Medical (Prince & Izant Company) is a leading high-purity precious and non-precious materials supplier to global medical device manufacturers and supplies products such as ultra-fine wire, marker bands/ring electrodes, and micro-machined components.

Solid Solutions Ireland is a SOLIDWORKS reseller with extensive experience in the CAD and engineering industries. The company recently introduced 3D Printing to its portfolio of products, partnering with 3D Systems and Sindoh 3D WOX to bring a wide range of 3D printers to the Irish market.

Precipart engineers and manufactures custom mechanical solutions for the medical technology sector. As an ISO 13485 registered supplier, the company's core competences include high-precision micro-machining, moulding and printing; gears and motion control solutions; and finished instruments.

Telsonic AG has been designing, manufacturing and supplying ultrasonic equipment since 1966 with Telsonic UK being established in 1977. Telsonic UK offers a comprehensive range of ultrasonic modules and systems for plastic and metal welding, cutting, sieving, and splicing applications.

Next year's event, Medical Technology Ireland 2020, takes place at Galway Racecourse from September 23-24, 2020. For further information visit **www.medicaltechnologyireland.com**

Medical application solutions from Rollomatic

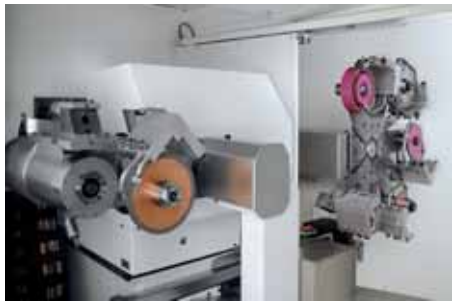
Rollomatic, whose 5- and 6-axis grinding machines are widely used throughout the UK and Eire for the manufacture of cutting tools, also offers these machines for the production of medical components of various kinds. These include grinding machines for the manufacture of medical drills, routers, burrs, saw blades, screws, reamers and surgical tools such as bone milling cutters.

Rollomatic has many references within the medical industry, with most users opting for the 6-axis Rollomatic 629 (now designated as 630) grinding machines, in either XS or XW variants.

Medical components are mostly manufactured using Rollomatic's own latest generation Virtual Grind (VGPro) grinding software, although Rollomatic has also supplied specially developed programmes for certain parts. Rollomatic software also comes with free-of charge lifetime updates that allow end-users to always have the best and latest software available to them at no additional cost. The VGPro software includes a fully integrated 3D simulator for both the component being machined as well as the machine, allowing collision checks to be made prior to actual production.

The main advantage of these Rollomatic machines is the kinematic arrangement of the sixth grinding axis that is particularly needed when looking to grind saw blades. The 6th axis enables the grinding wheels to be inclined and this makes it considerably easier to grind past the centreline on a given part without damaging an adjacent tooth or feature. Even more importantly, the contact point of the wheel to the component remains constant over the entire grinding path instead of it altering as the wheel travels around it, which is the case on 5-axis grinding machines. The use of the 6th grinding axis also ensures that more freedom to use optimum grinding paths is made possible due to the angular inclination of the wheel. This allows medical parts with very complex forms to be ground.

These machines are equipped with highly accurate linear scales with a resolution of just 0.00001 mm, as well as on the rotary grinding wheel spindle axis. Furthermore, the latest Rollomatic machines have linear motors in place of ball screws. The biggest advantage of linear motors as opposed to ball screws is the absence of moving parts,



which enables them to achieve a much higher positional accuracy and repeatability. These two factors are extremely important to the medical industry, where accuracy is everything and every part must be identical across large batches. The surface finish of medical parts is also often critical and is improved by using linear motors on the grinding machines. The sealed for life/no maintenance aspects of the linear drives ensure that less or indeed no maintenance is needed and these factors help Rollomatic to offer its industry-leading, unlimited hours, 3-year parts and labour warranty that is free of charge on all new Rollomatic grinding machines.

The Rollomatic 6-axis grinding machines may be specified with automatic wheel changers and the changer on the 629XW machine has six positions to accommodate up to 24 grinding wheels with fast change times. Large capacity robot-based pallet loaders for unmanned automated operation with a part load time of just over eight seconds are available and the machines' high efficiency synchronous grinding spindles allow tools of up to 20 mm in diameter to be ground with ease from the solid blank.

Rollomatic is represented in the UK and Eire by Coventry-based Advanced Grinding Solutions Ltd.

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Life at the cutting edge is never easy and for tool makers the competition is strong and to stay ahead you need to invest in the very best. Rollomatic offers class leading grinding solutions, Magnetfinish brings micron accuracy to cutting edges to improve tool life by up to 400% and Platit enables small to medium sized tool makers to coat their own tools in-house. Talk to us about your tool manufacturing needs.

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Collaborating with a manufacturer to improve process efficiency

by Nathan Ford, national product manager at FEIN

For operators of grinding and metal finishing equipment, finding ways to improve the efficiency of processes is an ongoing challenge. One of the best ways to achieve this is by ensuring the appropriate power tools are used for each individual application.

Working in collaboration

In order to ensure that the most efficient machine is selected for each application, collaboration between a power tool manufacturer and the tool operator is key. The two must work in unison, with the manufacturer taking the time to fully understand the requirements and acting as a consultant to advise on how current processes can be improved.

Effective collaboration enables a manufacturer to take into account the required size, power, ergonomics, cost and efficiency, in order to recommend the most suitable tool possible for the particular application. However, there is no one size fits all approach to this and each situation would have to be assessed by its own merit. For example, one application might require a more powerful tool which speeds up the process to increase the volume of work. Another, however, may require a product with improved ergonomics and reduced vibration to reduce the amount of fatigue on the operator or a product which is multifunctional to reduce the overall number of tools required to complete a job.

Carefully considering each application

Using machines which are not suitable or do not have the necessary power for a particular application can dramatically half efficiency and, over the lifetime of the tool, can also lead to downtime and subsequent penalties for missed deadlines. Taking the time to consider each application and select an appropriate power tool for the job is, therefore, crucial.

For applications such as surface finishing, there may be the need to use multiple products to ensure the correct finish. For example, where deep surface scratches are present there would be a need for a variable speed grinder followed by a variable speed polisher. This variable speed polisher could also be fitted with differing attachments to create satin and brushed finishes. Varying sizes, speed and power of tools should be selected dependent upon accessibility, operator requirements and abrasive specification.

How does this work in practice?

The positive impact of collaboration was seen in recent work with an industrial power tool user at a specialist fabrication facility. FEIN consultants were able to work closely with the team to ascertain the applications and the company objectives and provide a suitable product to achieve the solution.

In this case, the applications looked at covered weld preparation, weld dressing and deburring for mild and stainless-steel products. The company had clear aims and wanted to improve efficiency whilst reducing the overall cost using an improved grinder and abrasive combination and increase production while reducing health and safety issues for users.

After taking into account the precise requirements, we were able to work closely with those carrying out weld preparation, weld dressing and deburring before recommending the WSG17-125P compact angle grinder. This machine is 89 percent more powerful than the company's previous

900w machine, significantly improving efficiency and increasing production.

With reducing health and safety issues a key concern, the tool also features a number of user protection features including kickback stop, restart protection, soft start and electronic overload protection.

Hand arm vibration is another serious health and safety concern for operators and the WSG17-125P helps to minimise this issue due to reduced vibration values when compared to their previous tooling. This allows for increased trigger time which in turn leads to increased productivity. Higher levels of vibration can also occur as a result of excess pressure from user error, or incorrect power settings so our consultants worked closely with the operators themselves to provide training and advice on the optimal settings and pressure required for the power tool, helping to further reduce vibration.

We also recommended the FEIN WSG 17-70 Inox compact variable speed grinder for processing stainless-steel products. This product increases life of finishing abrasives and reduces heat transfer, reducing the need for secondary working and making it the ideal tool for stainless steel application. The tool removes more material than comparable angle grinders and keeps users safe with all the features from our WSG 17 machines but with the added benefit of variable speed.

Our consultants also carried out product demonstrations while on site to perform a free demo of each tool. This is an important part of the process which allowed the operators to see, first-hand, the performance of the tool, with any queries answered there and then by an expert.

Improving site efficiency

Manufacturers should be seen as an extension of the team, working with those within the workplace to achieve the same objectives. By working collaboratively with a power tool manufacturer, operators of industrial power tools can not only improve efficiency and productivity but also prevent a number of health and safety issues.

Collaboration between end users and manufacturers can create tangible benefits. An example of this is FEIN's work with Calder Sheetmetal. Calder Sheetmetal Ltd is a company based in West Yorkshire which specialises in sheet metal fabrication. The team at Calder Sheetmetal require the use of angle grinders on a daily basis in order to carry out applications such as deburring, sanding and cutting.

The company was having serious issues with the longevity of the existing grinders which were constantly breaking down. While these tools, manufactured by a FEIN competitor, were relatively cost effective to purchase initially, the fact that Calder Sheetmetal had to continually send these away for repair and replace them was leading to mounting costs for the company.

On top of the costs of replacing the grinders on a regular basis, the lack of robustness of the current tools was also leading to significant downtime for Calder Sheetmetal. Each time an existing grinder would fail, the company had to contact the distributor, who would then have to contact the manufacturer to arrange collection. The machine would then either be sent away for repair or the company would be required to purchase a new one and wait for its arrival. This long process was affecting the company's efficiency and capability to carry out the necessary work to deadlines, something it simply could not afford. In an attempt to solve the issues, Calder Sheetmetal decided to seek a more reliable product and contacted metal working power tools specialist, FEIN.

Calder Sheetmetal needed to know that the product would stand up to industrial deburring and cutting. On top of this, the company also required a high level of service and an assurance that any issues would be quickly resolved. After discussing the requirements, Neil Meeson, consultant at FEIN, recommended the WSG 8-115 compact angle grinder. Due to its solid metal gearbox head and reliable motor, this particular product provides maximum service life, making it ideal to satisfy the needs of the customer.

In order to demonstrate the quality of its products and provide expert advice, FEIN offers regular free demos to customers who are considering a new purchase. Neil

Meeson provided Calder Sheetmetal with a demo of the angle grinder, allowing the company to see, first hand, the overall quality of the tool. During the demo, he was able to demonstrate some of the grinder's additional benefits, including the fact that the tool's carbon brushes last up to 30 percent longer and that it has a better vibration performance than comparable angle grinders.

Speaking of the high level of service provided, Calder Sheetmetal, says: "First and foremost we're really happy with the robustness and overall quality of the product. We were going through grinders at such a pace resulting in significant downtime and extra costs for the business. The team at FEIN was fantastic from the very start and carefully considered our requirements, providing us with expert advice before recommending a product that has been perfect for our needs. The extra level of service provided by Neil has really made all the difference and we know he's always on hand to help with any issues we have."

In stark contrast to the weak performance of the grinders that Calder Sheetmetal had previously used, which were failing, sometimes with weeks of purchase, FEIN provided the company with an initial eight angle grinders which are still in great working condition 18 months later. Neil Meeson and the team have continued to react extremely quickly to any issues and the company has experienced significant total cost savings and improved efficiency as a result of no longer having to repair and replace its grinders on a regular basis.

For more information on improving the specification of power tools, visit: **https://fein.com/en_uk/** or to arrange a site visitation and consultative product offering, or email: FGB_demo@fein-uk.co.uk.

FEIN Industrial Power Tools UK Ltd
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Email: sales@fein-uk.co.uk
www.fein-uk.co.uk

UNITED GRINDING Digital Solutions to the fore at EMO

Everyone is talking about Industry 4.0. This means the fourth industrial revolution. After mechanisation, electrification and automation we now have digitalisation. Machines and their components are digitally networked with one another and with their environment. The aim of this networking is to simplify and optimise processes and thus to maximise the value creation chain. In the digital factory, also called the Smart Factory, there will be no more unplanned machine downtimes and resources will be optimally used.

"A Smart Factory isn't simply created overnight. It is necessary to focus on certain areas," explains Christian Josi, project manager at Fritz Studer AG. For UNITED GRINDING the basic principle applies, that all further developments should lead to a customer benefit. "We work closely together with our customers," Josi explains. But what is UNITED GRINDING specifically working on?

The Group has been developing digital assistance systems and services for industry 4.0 since 2017 under the brand UNITED GRINDING Digital Solutions™. This helps customers to simplify processes, raise machine efficiency and increase overall productivity.

The first digital products from UNITED GRINDING are Remote Service, Production Monitor and Service Monitor. These solutions can be divided into specific fields. They describe the universe of the digital assistance systems of the Group:

Connectivity
Digitalisation means networking human, machine and system. This is the first step. Without a network, data cannot be processed and there can be no communication about the overall process in the production environment.

Usability
Digitalisation simplifies things, even the operation of complex tool grinding machines. Intuitive machines can be operated in a uniform manner to simplify the work and reduce training time. An individualised user interface shows each user what they need for their daily work. This simplicity leads to greater efficiency and fewer opportunities for error.

Monitoring
Digitalisation enables transparency, the prerequisite for identifying the potential for improvement. Clearly structured data, available at any time, even remotely, enables transparency with the potential for improvement.

Productivity
Digitalisation ensures maximum capacity utilisation and therefore increases productivity. Networked and clearly visualised data that has been enhanced and evaluated by the many years of experience of the Group forms the best foundation for decision-making when it comes to optimal machine operation, improved utilisation, reduced maintenance costs and higher productivity.

Elimination of unplanned machine downtimes
Another focus is on unplanned machine downtimes. The UNITED GRINDING Group tackles this topic methodically, as a Group. With UNITED GRINDING Digital Solutions, the customer will receive a tool which helps optimise his production. In other words, the machine will only be stationary if this is planned and calculated. The Group adopts the Predictive Maintenance approach here. In order to make this possible in future, the data of the individual assemblies and components are recorded and analysed. Different measured variables are needed to form a clear picture of the individual assemblies and components. This requires continuous learning and is an ongoing process. "Once there is a clear vision, suitable strategies and measures can be precisely planned and the right tools developed," explains Christian Josi.

Another product within UNITED GRINDING Digital Solutions is Remote Service. This means that if an assembly or component fails, despite Predictive Maintenance, the problem can be reported to the responsible Customer Care Organisation at the press of a button and the customer can be offered optimal support.

With the use of new technologies and digitalisation, manufacturers must never lose sight of the benefit for the customer. UNITED GRINDING consciously focuses on the individual customer and his requirements. The new technologies and digitalised products must ultimately have a positive effect on the value creation chain. But what is the role of people in the digital factory? "Doubtless the requirements will change and different competencies will become important. However, people will remain an essential part of the system in future," says Christian Josi. Because the fourth industrial revolution should ultimately serve people, not vice versa.

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A new lease of life for your machine

45,000 operating hours - this is how long or even longer that a 15-year old cylindrical grinding machine is in use. Anything that does this much will suffer from wear and this particularly shows itself in the geometry and precision. High time to give the machine a good overhaul. A machine overhaul at STUDER makes an old machine into one that is as good as new; in other words, a machine that has the same tolerances as when it was first delivered. If the requirements on the machine have also changed, the machine can be configured and retrofitted to the customer's requirements during the overhaul.

An S40 was in use at LMT Kieninger for 14 years. The company specialises in highly demanding machining tasks and manufactures special tools for die and mould making. "The S40 was the Rolls Royce of grinding machines, but the machine still wears over time and after intensive use," admits Heiko Braun, group manager of Cylindrical/Surface Grinding and Assembly.

It was clear to LMT Kieninger that it should send the cylindrical grinding machine to the STUDER factory in Switzerland for an overhaul. STUDER loaned a machine for around three months and took care of everything from A to Z, i.e. from collection through to customs formalities. "We were very satisfied with the loan machine. Apart from a few little things, we were able to continue grinding as usual," sums up Heiko Braun.

The special feature about a machine overhaul at STUDER is that it is the only company to refurbish the machines' guideways to the original specifications. After the assemblies have been reinstalled, the machine geometry is equivalent to that of a new machine. Heiko Braun comments: "This point in particular really convinced us. We notice the difference. Since the overhaul we have been grinding with the precision of a new machine. I can only recommend a machine overhaul. Everything went without a hitch, the investment has paid off and a 1,600 mm machine is worth its weight in gold for us."

Rebuild – new from old

A rebuild, or a machine overhaul, makes sense and not just economically. The operator gets his familiar machine back and continues where he stopped before the overhaul. But he is full of enthusiasm, because his old machine is like new. In the STUDER factory, the specialists disassemble the machine into all its individual parts. The guideways are completely refurbished, the assemblies overhauled, the wear parts in the electric cabinet replaced, hydraulic and lubricating system as well as all valves. If old spare parts can no longer be obtained, STUDER provides an alternative solution. The casing and components are sand-blasted and then given a fresh coat of paint. After assembly the geometry is like that of a new machine. Commissioning is carried out by STUDER Customer Care, including a functional and geometry inspection, all CE-compliant.

Christoph Jenzer, managing director (head of AVOR) and Edgar Stich, managing director (head of production) in front of one of the many STUDER machines at Ingold Tools AG

In one example, Ingold Tools AG has been producing high-precision and complex parts for spindle, compressor, hydraulic and general machine manufacturing with 25 employees since 1946. The machinery includes a variety of CNC-controlled and conventional machines, including robot-automation solutions for turning, milling/drilling, honing, lapping, barrel finishing, sand blasting, laser marking as well as surface and cylindrical grinding. The cylindrical grinding shop already has several conventional and CNC STUDER machines. A further machine is currently being overhauled in the STUDER production halls. This is an 18-year old S21 with two external

spindles and continuous fine adjustment of the turret wheelhead (B-axis fine), which the two managing directors Christoph Jenzer and Edgar Stich recently took on as a second-hand machine. The S21 will not only be updated in line with the latest developments, but will also be retrofitted to suit the needs of Ingold Tools AG. The cylindrical grinding machine will have an additional internal grinding spindle for internal cylindrical grinding and the relevant fixture for swivelling the tailstock into the park position. The S21 will also have a new spindle cooling system with its own circuit, as well as a hydraulically swivelling dressing unit. So that all grinding machines have the same mounting, the universal tool headstock will also be upgraded from MK4 to MK5.

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Multi-technology machines and production cells

ELB-Schliff has made a leap forward in the development of intelligent manufacturing cells for complex parts. The centerpiece of this development is the 5-axis (option: 6-axis) millGrind BL10 machining centre, which is able to perform CD-creep-feed grinding, high-speed grinding, milling, drilling, probing and laser cladding operations in one clamping.

Thanks to the high axis speeds, the auxiliary processing times are reduced to a minimum. The machine is equipped with a powerful spindle which is suitable for milling and drilling at up to 10,000 rpm. The overhead dresser is specifically designed for high-productivity creep-feed grinding, providing customers a competitive edge. Additional dressing devices can be installed on the worktable to generate flexible grinding wheel profiles. This is primarily intended for interpolating dressing with diamond form-rolls.

The toolchanger enables simultaneous exchange of the overhead dressing roll and grinding wheel. The magazine has room for up to 60 tools, which can include grinding wheels, dressing rolls, measuring probes as well as milling and drilling tools.

The measuring probe is operated by a flexible software package. Clamped unmachined parts can be measured to automatically compensate for positional and clamping errors, and measurements of finished parts are also possible within the usual limitations for measurements on a machine.

Recently, the company has gained extensive experience in the design and implementation of automated manufacturing cells. Flexible cell designs are now offered to customers around the globe. Particularly in the field of turbine components manufacturing, there is a growing demand for cell solutions allowing complete machining of different component families of various lot sizes.

The number of grinding centres in the cell depends on the variant diversity, the number of operations on the individual workpieces, the lot sizes and the annual quantities. In addition to the grinding machines, the cells consist of coordinate measuring machines, handling devices (usually rail-guided 6-axis robots) and a marking station. Optionally, additional components can be added, such as a milling machines for deburring operations, component cleaning systems, material testing systems, automated clamping and unclamping stations.

The cell controller is a computerised monitoring, control and data acquisition system. In detail, the main tasks can be summarised as follows:

Job management and recipe management, if necessary, connection to customer ERP and/or PPS systems

Control of the part flow between the individual cell components

Component data and cell data management and individual reporting functions:

KPI evaluation and trend analysis

Axis compensation management

Error message management

EH&S and emergency stop management

User administration

Clamping technology is of particular importance in automated complete machining. Exact positioning of the workpieces in the fixture is not always possible. Before processing, it is therefore expedient to measure the position of the components in the fixture using a coordinate measuring machine within the cell. The measurement results are then converted into compensation data and assigned to the respective processing machine by the cell control on a component-specific basis. Inside the cell, the components, fixtures and tools can be clearly tracked via RFID chips or data-matrix codes and operating errors are thus virtually eliminated.

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Cylindrical grinding machines from JUNKER are all about efficiency

Framo Morat increases process reliability and quality with Lean Selection speed

Framo Morat GmbH & Co. KG, a specialist in gear wheel and drive technology based in Baden Württemberg, is proof that electromobility also means great opportunities for suppliers. The Eisenbach Company ranks among Black Forest suppliers always involved in intelligent structural and technological change, as demonstrated by the company's over 100-year-long history. With roots going back to the watchmaking industry, its product portfolio is typical for the region and range from gear wheels, planetary gears and worm gears to entire geared motors.

"Our company group has grown by 44 percent in the last six years in terms of turnover. One of the biggest drivers behind this positive development is the field of electric bikes, but we've also been involved in the field of electric cars for ten years," reports Alexander Denz, head of Industrial Engineering at Framo Morat. The company is also well established in the field of medical and rehabilitation technology, storage and conveying technology, regenerative energy and automation technology.

Framo Mortat GmbH's also ramped up the business relationship between the drive specialists and the JUNKER Group: "We've been working with the high-precision technology from JUNKER for a decade now. As part of our growth strategy, we continue to develop our core skills and in the field of cylindrical grinding operations we are much better positioned in terms of quality and process reliability. The two Lean Selection speed grinding machines from JUNKER now play a significant role in this," says Alexander Denz.

The two cylindrical grinding machines have proven their high-speed in single or multiple-shift operation. The customer wanted an economical and, above all, flexible machine concept which could fulfil all grinding assignments, from one-off production to production of small or large volumes. The machines are equipped with CBN grinding wheels and operate at peripheral speeds of up to 140 m/s. Some of the benefits of these machines include longer tool service life and dressing intervals.

Alexander Denz (right), head of Industrial Engineering at Framo Morat, is extremely pleased with the external cylindrical grinding machine from JUNKER. Framo Morat and JUNKER have been working together successfully for many years. Matthias Doll (left), regional sales manager at JUNKER looks after the company (Source: JUNKER)

More flexibility in the grinding processes

JUNKER's Lean Selection speed provides the necessary flexibility for grinding a wide range of workpieces from a variety of industries. "We grind diameters from 8 to 80 mm for shaft components with teeth and a component length of 40 to 460 mm. Our production batch sizes range from 200 to 2,000 workpieces per year. The new machines give us more flexibility with the peel grinding process compared to the grinding process with corundum as there is no need to change the grinding wheel between different workpieces," explains Alexander Denz. The high-speed grinding machines also deliver better quality by grinding the entire outside contour in a single clamping set-up. The integrated measurement devices in the collar and longitudinal position are key control and monitoring systems during grinding. The Lean Selection speed enables flexible grinding through the use of the plunge cut method as well as the peel grinding method. Framo Morat is part of the change in the supplier industry. Those who hold their own in times of technological change are also keen to further ensure future success with an investment such as the two Lean Selection speed grinding machines. As Alexander Denz explains: "Thanks to this investment, we are now also able to produce parts that we didn't have in our portfolio before." He continues: "Before we didn't achieve the required level of quality in regard to teeth widths for the oil pump gears. We had a lot of rejects which had to be sorted out by hand. Now we can offer our customers better quality thanks to the Lean Selection speed."

The Lean Selection speed grinds the oil pump gear in a single clamping set-up with maximum surface quality. (Source: Framo Morat)

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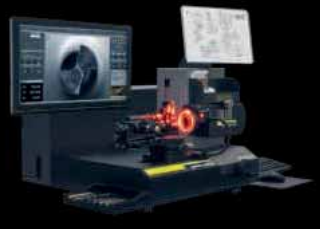

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The latest GEARS inline

Issue Six of GEARS inline unveils many innovative products from Klingelnberg, as it currently ventures into a brand-new market. With the VIPER 500 MFM, the company is solidifying its presence in the field of cycloid gearing and thus also the world of robotics. Thanks to the Oerlikon G 35 Bevel Gear Grinding Machine, new perspectives on efficiency are opening up for the aviation industry as well. The advances in individual machine and software components point to one thing overall: time and again, the system supplier is able to leverage ultra-efficient processes within the context of complete, "fit-for-Industry-4.0" solutions.

With the VIPER 500 MFM, Klingelnberg is entering the market with a pioneering technological achievement that is opening up completely new avenues in the processing of cycloid gearings. For the first time, the company has developed a machine that meets the required strict tolerances as standard, often eliminating the need for the time-consuming and costly measuring and pairing of components as a result. This allows for significant cost reductions in production. The machine was demonstrated live for the first time at EMO 2019 in September and the current issue of GEARS inline provides interesting insights into the evolution of this sophisticated technology.

Dual-spindle machine with vertical concept really takes off

These developments give fresh momentum to the aviation industry as well. With the Oerlikon G 35 Bevel Gear Grinding Machine, the gearing specialist has implemented a new machine design for the 5-cut method. As a result, the manufacture of aviation gearing as regards efficiency is really taking off. To achieve this, the system provider has combined proven technology with new ideas. The new issue of GEARS inline reveals what this looks like in detail.

Innovative features for the Speed Viper

There is virtually no other machine design that realises high-volume generating grinding in large-scale production better than the Höfler Speed Viper cylindrical gear generating grinding machine. Not only has it earned the trust of the industry, it has also won an iF Design Award. New features now focus on the noise behaviour of transmissions, while also extending the service life of grinding wheels. This proves that even successful technologies can continually evolve. All features of the Speed Viper family are designed to realise high-volume generating grinding in series production in an Industry 4.0 environment, with a focus on cost-effectiveness.

Measurement directly on the machine: KOMPASS shows the way

Process networking is an essential requirement for Industry 4.0 and includes direct measurement "at the source", i.e. on the machine tool. This is the only way to establish truly clear references to the production process on the one hand and reduce the distances and wait times for measurements in the measurement lab on the other. Both of these significantly increase productivity and quality. KOMPASS is Klingelnberg's system for workpiece measurement directly on the machine tool. The current issue of GEARS inline sheds light on everything that goes into "measuring on the machine tool".

Service life calculation for bevel gears

When designing bevel gears, seemingly contradictory objectives must be reconciled, i.e. minimal space requirements, maximum load capacity, noise reduction in the transmission and production feasibility on the machines on the shop floor. Yet one question is seldom posed: what about the structural durability of the toothed gear? The latest GEARS inline provides the answer to this question.

Klingelnberg's KIMoS software package plays a central role

Tactile or optical measurement? With Klingelnberg precision measuring centres, it's not a question of "either/or".

Klingelnberg's P series successfully combines the advantages of tactile and optical measurement in one system. On the market since 2018, hybrid measuring technology is already a much valued "all-rounder" for precision measurement. With the precision of the tactile 3D NANOSCAN and the speed of the optical HISPEED OPTOSCAN, these machines are ideally prepared to handle all measurement tasks. The new issue of GEARS inline shows exactly how this works.

Digital solutions: fit for Industry 4.0 processes

Established in the last issue as a dedicated column and brimming with information in the current GEARS inline, a number of articles on software solutions from Klingelnberg show how important the entire Digital Solutions division is for the company. The enhanced functional scope of GearEngine, the integration of the OPC Unified Architecture (OPC UA) data interface, the integration of machine tools and measuring machines, as well as the workflows on and off the machine with SmartTooling and efficient production monitoring with Smart Process Control: Klingelnberg is advancing all of these developments with the goal of continuing to be a leading innovator in modern, software-driven production processes.

More efficiency in production processes: this is the clear objective under which all of Klingelnberg's developments as a systems supplier can be summed up. The latest issue of GEARS inline again focuses on the many questions and challenges behind efficient and effective toothed gear production, as well as providing the answers that Klingelnberg provides.

To order the latest issue of GEARS inline, contact the Marketing Department by calling 0049 2192 810 or by sending an email to marketing@klingelnberg.com with "GEARS inline" in the subject line.

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Leading manufacturer announces acquisition at EMO

Danobat acquires Hembrug Machine Tools to strengthen its position in the field of finish hard turning

Machine tool manufacturers Danobat and Hembrug, leader in finish hard turning, announced the acquisition at EMO Hannover. The operation represents a step forward in the sectoral diversification and internationalisation strategy of the Danobatgroup, an industrial group to which Danobat belongs. The sum of the two companies, which combine their grinding and hard turning expertise, provides the machine tool market with a new cutting-edge offer.

Hembrug has a strong presence in Europe and an extended network in North America and Asia. In 2018 it had a turnover in excess of 14 million euros. Danobat is a market leader in machine tool manufacturing of grinding machines, with an annual turnover of 130 million euros. The acquisition gives Danobat's customers a better and wider choice between the two complementary technologies grinding and hard turning.

Hembrug customers will benefit from the extended service network of Danobat, a service engineer in the United States is already been trained. Furthermore, Danobat's excellent grinding expertise will be of use in Hembrug's new hybrid hard turning/grinding machines. In return, Hembrug will also make use of Danobat's automation solutions and Industry 4.0 offerings.

A step forward

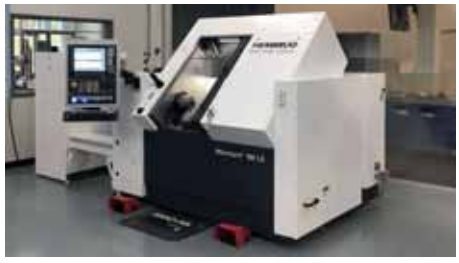
To show off this new alliance, Danobat exhibited one of Hembrug's most representative machines, the Mikroturn 100LS, on its stand at EMO. It is an example of the state-of-the-art technology that the Dutch firm offers in precision hard turning. It joins the other seven latest generation and high technological value machines that Danobat showcased at the fair.

CEO of Danobat, Xabier Alzaga, highlighted the relevance of incorporating the high prestige brand Hembrug at a press conference at the show: "We are experts in the generation of innovative technological and high added value solutions. Our mission is to offer a response adapted to the requirements of our clients, based on our in-depth knowledge of the industrial manufacturing technologies. As of now, our catalogue is extended with first rate, cutting-edge, precision hard turning solutions, complementing our current range of grinding, turning and measurement solutions."

CEO of Hembrug, Robert Nefkens will remain at the helm of the company. He highlights that "accessing Danobat's global platform and the competitive advantage of joining the two complementary technologies grinding and precision hard turning is a big step forward. This can be highly beneficial for our customers," he says.

Danobat is the market leader in machine tool manufacturing of grinding machines geared towards solving the problems of each client with customised solutions. It has an annual turnover of 130 million euros, is strongly internationalised and has production plants in Germany, Spain and the United Kingdom and centres of excellence in these countries as well as Italy, the USA and China. It forms part of the Danobatgroup, an industrial group that employs 1,300 people and is part of the Mondragon Corporation.

Hembrug Machine Tools designs, builds and sells high precision hard turning machines and hybrid machines with hard turning and grinding capacity. With its headquarters in Haarlem in The Netherlands, the company has manufactured ultra-precision turning machines with in-house hydrostatic technology since 1969. It is a healthy profitable company and in 2018 it had a turnover in excess of 14 million euros. Hembrug employs more than 60 people and is present in the bearing industry, mould & die sector and the precision industry sectors. It has since had a strong presence in Europe and has in the last decade extended its network in North America and several Asian countries.



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Evo Quinto – freedom on the five

"Up to now, the production equipment limited the possibilities of the developer. In the future, these possibilities will be limited by his imagination," explains Agathon sales and service manager Daniel Felber. The reason for that is the new Evo Quinto grinding machine. It is Agathon's latest and pioneering invention. The outstanding feature is the freedom of movement of the fifth axis. To be more precise, the A-axis of the Evo Quinto swivels continuously between -51 and +236 degrees. This empowers users to machine parts with more complex geometries, such as grooving inserts, in one clamping operation completely on three sides, on circumference, radius and with chip breakers. This includes tangential grinding on both sides of the rim, so that chamfers can be ground on both sides and without reclamping.

No reclamping means increased productivity and precision. It also means that valuable time is saved. The integrated and precise measurement of the workpiece thickness and the fast IC measuring probe also contribute to an acceleration of the machining process. The flexibility of the Evo Quinto is further supported by a larger swivelling range also on the C-axis and by the possibility of machining larger workpieces with an outside diameter of up to 80 mm. The Evo Quinto is also impressive in terms of stiffness: "Our design engineers have achieved the perfect balance between unlimited flexibility and high rigidity," says Daniel Felber.

The Evo Quinto is based, as its name suggests, on the existing Evo platform. Future users will benefit from this in two ways. Firstly, from day one, they will have access to a wide range of proven hardware and software options. The customer will not only receive an outstanding machine but a complete solution package, which he can configure according to his specific needs. The second advantage is that the Evo Quinto, like all Agathon machines, will be easy to operate. Daniel Felber is convinced that: "The system change will be simple and convenient for users who have previously used machines from other suppliers." The

training will progress fast, so that both experienced and first-time Agathon users can quickly use the Evo Quinto throughout its full range of functions. This applies to the creation of slim and complex programs, particularly for demanding applications.

At the EMO 2019 Agathon presented a prototype of this world first. The next opportunity to experience the Evo Quinto live will be at GrindTec in Augsburg from March 18th to 21st 2020.

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Increased productivity with Costa investment

The addition of a Costa MD 4 plate grinding machine to FLI Structures has increased productivity by 1.5 persons per week, while safety levels at the Gloucestershire-based company have improved immensely.

Andy James, works manager at FLI Structures, recognised a shift in customer requirements and the need to include a plate grinding machine to the offering which covers the telecoms, highways, rail and energy industries. As an existing customer of Ficep FLI Structures was working with a plate processor and a number of other machines, so Andy James' first call was to Ficep sales manager Chris Berriman.

"We looked at other machines and we've spoken to Ficep before about plate grinding machines, but at that time it didn't seem like the right choice for us. Now that plate grinding and welding is more relevant, we started looking for another machine, got talking to Ficep about another machine and happened to mention the plate grinding to them. They told us they have an agreement with Costa. I researched into this and found this to be a good choice for us. This machine had better options to other machines that we looked at, for example edge rounding."

After being impressed with the extras offered by the Costa, Andy James visited a UK reference site to see the machine in action. He took some samples to check the machine quality and capability, while also having the opportunity to ask detailed questions about the machine.

The success of the demonstration quickly led to a sale and the Costa was installed and commissioned in July this year. The benefits of the machine were quickly established as Andy James explains: "Before the machine was installed, we were losing a day and a half and one and a half men per week in terms of the time it took and labour to do what the machine does. We have one person running both machines including the plate line too as they're next to each other so really we've gained a person and a half per week."

The addition of the Costa has also improved health and safety at the company:

"We've always been safety conscious when it comes to angle grinders and we pay attention to the risks of hand arm vibration syndrome." Utilising the Costa machine eliminates the risk of HAVS completely.

Chris Berriman adds: "Francis and Lewis have been a Ficep customer since 2000 and over the years have purchased 15 x different machines for different application, Andy is one of our many customers that are reaping the rewards from the Costa machine."

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New Centre of Excellence

Industry leader Saint-Gobain Abrasives celebrates opening of brand-new headquarters and distribution centre

Saint-Gobain Abrasives (SGA) UK has celebrated the relocation of its head office and distribution centre with an informative and engaging open event for employees, local dignitaries, customers and press.

Previously based at the old Universal Grinding Wheel Co. Ltd site in Doxey, Staffordshire for over 100 years, the new state-of-the-art Saint-Gobain Abrasives building, named Unicorn House, is now located in Stafford on the Redhill Business Park.

The event began with an overview of the history of abrasives in the UK and a portfolio of products, sectors and industries that it works within, followed by an update on where Saint-Gobain Abrasives UK is as a company today.

Afterwards, delegates were shown around the new facilities at Unicorn House, including the company's new Centre of Excellence, testing and training facilities, customer services department and the impressive new distribution centre.

The new Centre of Excellence and training facilities permit SGA to showcase its products and solutions and the value that they offer. It will also allow for the training of customers in a classroom-like environment, but more importantly the ability to conduct hands on product training, ultimately building confidence through demonstrating product benefits, specifying tailored solutions and of course promoting safe use.

Adrian Hough, country manager for Saint-Gobain Abrasives UK, comments: "We hosted this event to thank our employees and key stakeholders for all their hard work and support in making this relocation such a huge success.

"We also wanted to showcase our new customer training facilities, for which we received a great deal of positive feedback.

In particular, our brand-new Centre of Excellence and training provision allows us to conduct hands-on product training in a workshop environment, demonstrating best practices and helping to improve awareness on how to use abrasives safely.

"Here at Saint-Gobain Abrasives we are more than aware of the environmental impact of such a big move and we are fully committed to our sustainability goals. During our move, we ensured zero items went to landfill, through a combination of recycling materials and donating items where possible to charity."The location of Unicorn House was chosen with improved efficiency in mind, with one of the key benefits being simplified transport routes, which enables commercial traffic to be moved away from the town centre to ease congestion and pollution."

Today, in the UK & Ireland Saint-Gobain Abrasives represents a team of around 150 employees, across three sites. The manufacturing plant in Eccleshall, located on Raleigh Hall Industrial Estate, produces bonded abrasive products mainly serving the aerospace market.

The Staverton site near Cheltenham manufactures super abrasive products for applications where precision and performance are key, such as the medical, aerospace and automotive sectors.

Unicorn House in Stafford is at the heart of the UK business operations providing customer services, an extensive training area and the company's main distribution centre that will hold UK stock, helping meet customer delivery expectations.

Abrasives in Stafford can be dated back to the nineteenth century, with rubber bonded wheels being manufactured at Castle Works since 1893. Shortly after, Universal Grinding Wheel Co. Ltd registered to sell vitrified wheels and manufacturing started at the Doxey site.

In the 1950s the Doxey Road factory was the largest of its kind in Europe, covering a 44-acre site. When Saint-Gobain acquired both Universal Grinding Wheel Co. Ltd and Unicorn Abrasives in the late nineties, a multi-million-pound investment was made to the Doxey factory, renovating building infrastructure and automating production processes. A decade later, production started at the Raleigh Hall site in Eccleshall. A significant investment ensured the site specialised in manufacturing excellence to support the UK aerospace market.

After these major investments, the final stage was to improve core operations in Stafford, which oversees an abrasives portfolio of highly recognisable brands and serves many markets, from aerospace and automotive, to DIY and construction.

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Continued grinding success with Krebs & Riedel

Founded in 1895, Krebs & Riedel has been manufacturing high quality standard, diamond and CBN abrasives for over 100 years and can count leading UK engineering companies such as Delphi Technologies amongst its ever-growing customer base. AGS holds around £50,000 worth of CBN wheels in stock for Delphi, offering them a same day/next day delivery on special pre-profiled grinding wheels for its Bahmuller cylindrical grinding machines, also represented by AGS here in the UK. Krebs is constantly introducing new types of wheels with improved grain structures and novel bonding systems that enhance grinding wheel quality and optimise performance.

Advanced Grinding Solutions supplies Krebs wheels to several top UK gear manufacturing companies who are able to call off specially profiled wheels for gear production on fast deliveries. Under agreement, Krebs can keep customer's blank wheels in stock and upon order will profile these to suit and then supply within just two or three days.

Another niche area that Krebs & Riedel has been active in is the supply of smaller diameter CBN wheels for jig grinding machines as used on Hauser or Moore machines. Often end users don't wish to purchase large quantities of wheels and Krebs is able to supply high precision jig grinding wheels in batches as low as five pieces. Diamond and CBN wheels that have been manufactured by Krebs and Riedel for more than 20 years are available from 3 mm to over 900 mm in diameter with peripheral grinding speeds of up to 160 m/s.

Krebs & Riedel has also launched a brand-new range of carbon fibre bodied grinding wheels called HI-COMP; a new wheel body variant for CBN and diamond abrasives. The high proportion of carbon fibre used to form the Krebs Hi Comp wheel hubs guarantees maximum strength with minimum weight. Depending on the process requirement different sizes are used and this ensures optimal and customized solutions to meet end users' specific requirements. Having been under development for over two years, the HI-COMP wheel bodies are up to 75 percent lighter than comparable steel-based ones. This not only guarantees easy handling for engineers during installation but also dramatically decreases the load on the grinding spindle during grinding.

HI-COMP wheels also provide much better vibration damping characteristics compared with conventional steel grinding wheel bodies. This is useful not only for interrupted cut grinding but for standard cylindrical grinding as well. The grinding process due to the changed conditions of contact combined with the abrasive behaviour of the Hi Comp body's superior harmonics is vastly improved and results in improved surface quality on the ground component. Compared with standard steel hubbed grinding wheels, having exactly the same grade and type of CBN or diamond abrasive, finer surface finishes in the region of a 20 percent improvement are readily seen.

While the initial cost of purchasing carbon fibre hubbed wheels is higher than standard steel-based ones, the cost difference is very quickly recouped due to achieving faster grinding times and improved quality and so the wheels quickly pay for themselves. It should also of course be understood that Krebs wheels are always able to be sent back for re-coating/refurbishing and therefore after the initial purchase the carbon fibre hub can be used numerous times before it eventually requires to be replaced.

The damping effect of the carbon fibre stops a large proportion of the vibrations from the grinding machine and its spindle

from reaching the cutting edge of the grinding wheel and the overall damping effect is up to five times better than if using a similar grade of wheel but with a conventional steel or aluminium body. Tests have also indicated that end users of the Krebs Hi-Comp wheels are also seeing vastly improved wheel lifetime because the wheels require to be dressed far less often with savings of 20-30 percent plus being made possible depending upon stock removal rates and wheel speeds etc. As Krebs carbon fibre hubbed wheels are considerably lighter allows grinding at far greater cutting speeds without the risk of overloading expensive grinding spindles. This, combined with the damping characteristics, allow substantially faster grinding times to be achieved.

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Filtermist International unveils two upgrades at EMO 2019

One of the world's leading manufacturers of oil mist collectors introduced two upgrades at EMO 2019, the world's leading trade fair for the metalworking sector.

Filtermist International, which celebrates its 50th anniversary this year, unveiled F Monitor 2/2+ and FX Fusion at the show in Hannover, both new developments that will improve the effectiveness of its systems and ensure filtration requirements meet the pressures of modern-day manufacturing for more speed and higher-performance.

Co-located with sister company Absolent AB, the UK-based company had one of its largest ever presences in Germany and complemented these debuts with its full range of globally renowned oil mist collectors and technical expertise.

F Monitor 2 and 2+

Filtermist launched an improved version of its F Monitor, a monitoring system that advises machine operators when the extraction unit needs servicing and warns them of any potential blockages to avoid reducing the effectiveness of the system.

The F Monitor 2 features Bluetooth connectivity that allows it to link to a dedicated app on a smart phone or tablet, enabling the user to adjust the time, air flow, temperature and vibration levels to suit particular applications.

Also available is the F Monitor 2+. This includes additional functionality to measure vibration and motor temperature via a sensor that attaches directly to the Filtermist motor.

Both models use a globally recognised traffic light system of coloured warning lights to alert machine operators when an oil mist collector needs servicing, or if any of the filters are blocked.

When everything is working to optimum levels the monitor displays a green light, an amber warning light comes on to indicate that the operator needs to arrange a service and the monitor lights turn red if urgent inspection is required.

The F Monitor 2 and 2+ are currently available as a standalone accessory and can also be retrofitted to the complete Filtermist range.

FX Fusion

Filtermist also showcased the new size Fusion filter, which has been designed specifically to fit onto the company's FX4002 and FX5002 models, creating FX Fusion.

With the same functionality as the S Fusion neat oil mist collector, FX Fusion will help customers in the automotive, aerospace, medical and high value engineering industries solve their neat oil, high-pressure extraction requirements.

Modern machining processes have seen machine tool manufacturers increase speeds and feeds to improve efficiencies, meaning the surrounding technology has also had to adapt. The introduction of high-pressure coolant, often using neat oil, can result in a high-density mist containing large volumes of submicron particulate, either blocking or passing through many traditional oil mist filters.

Designed for the larger FX models, FX Fusion combines a hi-tech synthetic self-draining media filter with Filtermist's proven centrifugal technology, offering a cost-effective alternative to other products in the high-pressure coolant market.

"Filtermist has exhibited at EMO for many years and it is always a highlight in our calendar," comments Filtermist international CEO James Stansfield. "Our expertise has always been focused on oil mist extraction, but recent developments mean we now offer dust extraction, welding fume and smoke extraction, ducting and much more. Absolent Group is growing all the time and we are very proud to be playing a key role in its development."

Filtermist International and Absolent AB are both part of Absolent Group, which operates a number of other companies that are dedicated to industrial air filtration.

The EMO stand was also used to showcase the capabilities of electrostatic filters manufacturer Bristol T&G

The new and improved F Monitor 2+

Filtermist's new FX Fusion filter on the FX4002 model

International GmbH, as well as UK manufactured FastClip ducting and products manufactured by the recently acquired Montreal-based air pollution control specialist Diversitech Inc.

Filtermist's ethos is to protect people by ensuring cleaner, safer, more productive workshops.

Established in the UK in 1969, Filtermist manufactures a range of compact, quiet and efficient oil mist collectors, which are trusted by world leading manufacturers to effectively remove oil and coolant mist, fume and steam from workshop air.

Oil mist is created by machine tools spraying high pressure oils and coolants onto metal components to keep them cool during manufacturing operations including milling, drilling, turning and grinding. Exposure to airborne oil mist particles can cause a number of occupational diseases, including skin conditions, respiratory problems and even cancer. It can also pose a fire/slip risk and can damage sensitive electrical equipment if left in the atmosphere.

Filtermist's oil mist collectors use centrifugal force to separate oil mist particles from the air, clean oil drains back to the machine for re-use or collection and clean air is returned to the workshop.

The company offers local support in more than 60 countries worldwide through a network of approved distributors and subsidiaries Filtermist Asia Pte and Filtermist (Shanghai) Ltd.

Absolent Group includes Absolent AB, Avani Environmental International Inc., Bristol T&G International GmbH, Diversitech Inc., Dustcheck Ltd, Multi-Fan Systems Ltd, DCS Limited, Gallito Ltd, Cades Ltd, SMK AB, Kerstar Ltd and Ecogate Ltd in its portfolio.

Services offered include oil mist, smoke and fume extraction, dust control, VOC abatement, production waste extraction and industrial ventilation.

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Nederman's Insight into dust and fume collection

To accomplish its core competence of supplying clean air to industry, Nederman is setting its sights squarely on the Industry 4.0 revolution with its new Nederman Insight platform. Dedicated to retaining its position as global leader in the supply of clean air, Nederman has always placed great emphasis upon helping customers meet the most stringent requirements and regulations.

The manufacturing industry is constantly striving for better quality and lower costs whilst also meeting increasingly stringent rules and regulations in areas such as the environment, safety and working conditions. Nederman Insight provides the user with much more than a filter and far more than raw data. Nederman Insight provides customers with key insights that help them get more out of their filters with less effort and less cost.

How it works

Nederman Insight puts information at the fingertips of the user wherever they may be. It provides valuable data on how a filter is working and it also helps to build a broader understanding of the filtration system, its performance, maintenance needs, associated costs and potential improvements. The Insight technology incorporates a series of sensors that monitor conditions in the filtration system. From the sensors, data is securely uploaded to the cloud via an Industry 4.0 gateway. This data can easily be read and interpreted via the Nederman Insight web-based user interface and dashboard.

What this gives the end user is round the clock access to real time and historical data that enables optimisation of filtration systems and an understanding of how to utilise it fully. This system performance is complemented by a risk management alert feature that informs the user when action is required to prevent extended downtime and keep the workplace safe. This feature also helps meet the longer term need for environmental compliance, while reducing the potential for incorrect filtration management.

This alert system ties-in with maintenance schedules and the access to historical data and the ongoing control of performance data will enable end users to plan maintenance needs. Nederman experts will help interpret the data and advise on settings, adjustments and product management strategies. The improved awareness and maintenance of the filtration system will allow businesses to detect problems before they arise. By resolving issues or replacing spare parts in good time, customers can avoid unplanned stops and the associated costs of unscheduled downtime. With increasing demand on sustainability, Nederman Insight gives the user greater control of energy consumption, emissions and safety.

Whilst these benefits of the Nederman Insight system are genuinely impressive, the world leading innovator can also offer considerably more features and benefits. The Nederman Insight 'Action Centre' will track filtration system performance and

quickly identify issues, providing a full overview of filter operation via one or more dashboards with drill-down functions. Nederman is continually evolving the Insight platform by adding advanced modules that give greater functionality and more valuable insights into an air filtration system.

Nederman has a long history. Founded by Philip Nederman in 1944, the company became a pioneer in developing solutions for air pollution control inside production facilities, protecting workers health and improving their workplace. Nederman has continued to develop products and systems for a safe, clean and efficient workplace, and today has the markets most complete range of products and services to protect people, planet and products from harmful effects of industrial processes.

In 2010 Nederman acquired Dantherm Filtration and in 2013, EFT (Environmental Filtration Technologies) was acquired, doubling the company in size and forming the world's leading company within industrial air filtration, supplying solutions for air pollution control for both the inside and the outside of factories.

Since 2003, Nederman's sales have grown from SEK 735 million to SEK 3,553 billion in 2018. The positive development has been achieved through expansion of expertise, product portfolio and services. Two major acquisitions were made in 2010 and 2012, and in 2018 another two acquisitions of companies with leading technology in industrial air filtration were completed.

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Two new solutions from AirBench

AirBench Ltd has announced an upgraded range of AOF Oil Mist Filters. The AOF range is designed for extraction of oil mist and smoke from machining applications. AOF units can be machine mounted or supplied with separate stands where required.

AOF is designed to use the wind shear principle for initial separation of mist from airstreams. As the contaminant loading on the fan is very low, typically they do not suffer from loss of impeller balance and so can be serviced in-house at relatively long intervals.

Units are supplied as standard with a high-grade final filter with an estimated life of up to 3,600 working hours. Usually available from stock and supplied complete with all parts required for mechanical installation, AirBench can solve most mist extraction issues quickly and simply.

AirBench also supplies the OMF range of stand-alone coolant mist filters, which are designed for continuous operation and can be configured to provide a central system supporting multiple machine tools.

For more information or a site survey; or visit **www.airbench.com/mist**

Stop operators blowing coolant into the atmospere

The New BD1000 from AirBench helps control coolant problems.

AirBench BD is a self-contained blowdown station for the removal of coolant and swarf from machined parts. An operator can simply place parts in the cabinet, lower the screen, and use the integral blow gun to clean parts using factory compressed air. An integral venturi system assists with capture of coolant and the filter system in the base of the unit is easily replaced when full.

The new 1,000 mm wide BD1000 joins the existing 500 mm wide BD500 and is designed for longer components. Both models run solely from factory air supplies with no requirement for electrical connections, making them ideal for location next to machine tools for regular operator use.

Maintenance is minimal with only occasional filter pad changes required. To arrange a trial or visit, visit **www.airbench.com/bd**

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Dust extraction specialist exhibits at UK's premier engineering event

Dustcontrol UK exhibited its range of centralised vacuum systems at the tenth anniversary of the Advanced Engineering show last year, showcasing its powerful DC-11 Module at this prestigious event.

The DC 11-Module, which comes in several models, is an optimised stand-alone unit for source extraction and industrial cleaning. It has been designed to service up to six normal extraction points or several cleaning outlets at a time, and is modularly built, meaning it can be tailor-made to suit any engineering environment.

The company, based in Milton Keynes, has over 45 years of experience in developing dust extraction solutions and centralised vacuum systems to fit client requirements in the engineering industry. It is an expert in capturing dust at its source, both where and when it's created.

For further information on Dustcontrol UK's products, contact:

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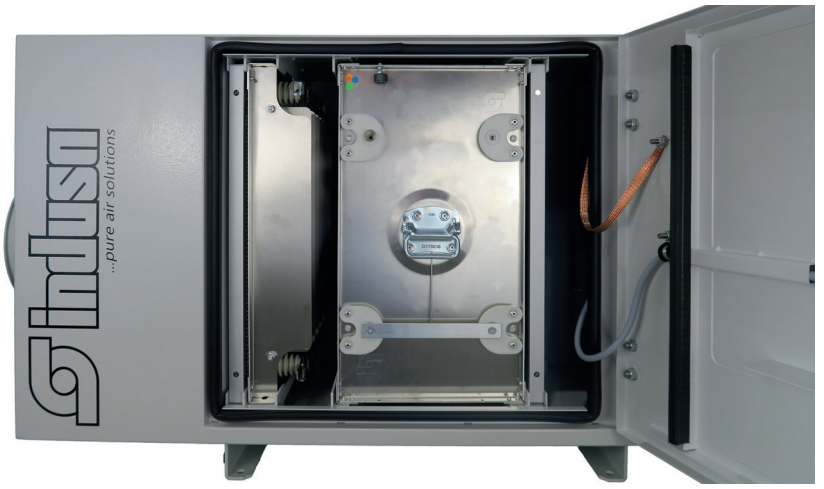
Creating complete coolant systems with electrostatic mist extraction

Fluid and filtration specialist oelheld UK Ltd and air purification expert indusa GmbH are celebrating the anniversary of their official partnership delivering custom-build centralised and individual oil mist extraction systems for UK toolmakers and precision grinders.

Keen to support customers with all elements of the coolant journey, the partnership positions the UK firm to offer complete fluid solutions incorporating, correct coolant selection, filtration design and enhancement, strategic maintenance planning, Local Exhaust Ventilation testing and now mist extraction.

Managing director of oelheld UK Ltd, Pete Mangan says: "We want to provide customers with a single point of support for all elements of their fluid systems and the addition of mist extraction to our portfolio means we can do just that. Having worked with indusa on a number of projects, we knew the team, the quality of their systems and that our respective technologies complement each other well, so it seemed like a very natural partnership, especially as their electrostatic Elstar range of systems are so well suited to the grinding processes many of our customers are using."

Pete Mangan, managing director, oelheld UK Ltd



Mist extraction requirements for grinding processes

Grinding oil or coolant mist is a natural by-product of the cooling process, created when the hot workpiece causes coolant to evaporate as it hits the material, forming a steam or mist after condensation. The high-speed rotational movements during machining can also throw oil into the workspace, causing a continuous spray of fine or oil droplets.

To effectively filter out this oil mist from the machine's exhaust air, the mist extraction system must be able to separate oil mist particles (<1µm in size) and maintain an airflow turnover of approximately 300 circulations per hour, being the recommended flowrate for grinding processes.

So why consider an electrostatic system for grinding processes?

For performance

Indusa's Elstar range is designed to meet these challenges. Using innovative ionisation technology, oil mist particles are separated and collected by electro-charged metal plates after having been charged themselves as they enter the system. This technology enables the system to handle exceptionally small particle sizes (from 0.01µm), filtering 99 percent of oil mist particles.

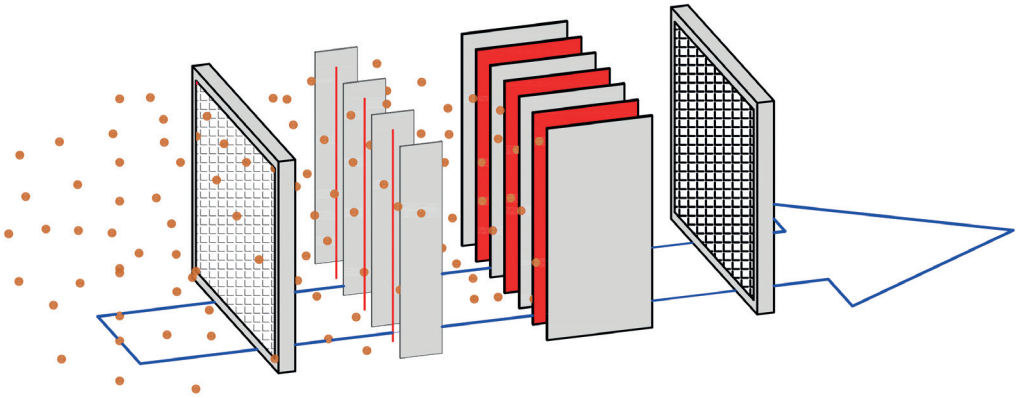
For productivity and cost savings

Compared with conventional mechanical filter systems, the pressure loss in an electrostatic system is much lower, requiring significantly less fan/ventilation power and therefore offering considerable energy saving costs.

The charged metal plates of an electrostatic system replace the traditional paper, fleece or mesh filter media and do not require replacing, reducing consumable costs considerably.

Collected oil particles can be returned to the fluid filtration system to be reused, reducing waste.

There is the potential for heat recovery to save energy costs and reduce CO^2 emissions.



For protection

Oil mist particles can be seriously damaging for inventory stock, the workshop environment, and worker's health. The sticky film created by oil mist particles can present a slip hazard, a build-up of oil mist in the machine can increase the potential for fire, and inhalation of oil mist particles can cause a number of serious lung diseases such asthma and other respiratory problems (e.g. 'heavy metal lung').

The HSE is becoming increasingly proactive around the subject of air quality. For instance, COSHH regulations require exposure levels to be controlled and most LEV systems to be tested every 14 months.

Pete Mangan concludes: "This makes regular testing and maintenance crucial to the performance of extraction systems. Many grinding machines are supplies with pre-installed extraction units but, as these tend to be top mounted, accessibility and maintenance can be difficult which can result in clogged filter inserts or incorrect airflow rates that don't de-mist the machine thoroughly enough. We would encourage anyone who has an extraction unit that hasn't been recently serviced to arrange a test."

oelheld GmbH can look back on 130 years of tradition and experience. Since its foundation in 1887 by Carl Christian Held, oelheld GmbH has established itself as a lubricant specialist. Partnership, research and human technology are core values and are traditions that the company is justifiably proud of.

oelheld works closely with numerous machine manufacturers and universities to develop products that are designed to meet the specific requirements of their machines. This kind of cooperation allows it to meet the needs of customers and adapt the fluids to the different applications.

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Is optical measurement of surface finish the best option?

by Brian Kyte, Bruker Alicona

Surface finish measurement was first developed by E.J. Abbot at the University of Michigan in the 1940's. In recent times the importance of this measurement has increased dramatically as components have become more complex and tolerances of mating surfaces have been reduced to provide more functional products.

The measurement of surface finish on machined components is a critical part of a manufacturing process. Surface finish is measured for two principle reasons: to try to predict the performance & functionality of the machined parts, such as engine pistons, fuel injection parts or ground mating surfaces and to try to control the manufacturing process.

Tactile profilometers:

A surface consists of three basic components: form, waviness and roughness. The traditional method to measure these surfaces are stylus-based surface-finish measuring systems. These use a sensitive, diamond-tipped stylus which is pulled across the surface to measure the surface finish. Stylus gauges can also be used for measurements of waviness and form, in addition to roughness. (see figure 1).

As the three basic forms of surface geometry are caused by different, they have a different affect to the performance of the part and it is common to separate them during feature extraction. This separation is achieved by the selection of filter with cut-off settings that allow the operator to select the degree of filtering that will be applied to the measured profile.

The irregularities of the machined surface consist of high and low spots created in by the tool bit or by a grinding wheel. These peaks and valleys can be measured and used to define the conditions and sometimes the performance of the surface. These are expressed by parameters, but for most cases only a few are specified which in the case of Stylus Instruments are prefixed by the letter R. Each of the parameters has its own capabilities and limitations. Often one parameter is incapable of defining a surface adequately. Therefore, a complete definition of a surface often involves two or more parameters, and in some cases, the relationship or ratio of one parameter to another.

The most common parameter is Ra, or Arithmetic Average Roughness. It basically describes the average height of roughness component variations from a mean line and provides a simple value for accept/reject decisions. But Ra is not a good discriminator for different types of surfaces as it is incapable of differentiating between "spiky" and "scratched" surfaces having the same Ra. In some territories, such as Europe the more common parameter for roughness is Rz, or Mean Roughness Depth.

Surface finish measurement procedures, general terminology, definitions of most parameters and filtering information can be found in American Standard ASME B46.1 - 2002 Surface Texture and in International Standards, ISO 4287 and ISO 428, which will be replaced by the new ISO 21920 series currently in development.

These parameters provide basic information about the surface. They were acceptable in the early days of surface measurement, however there are many limitations that arise from it.

Firstly, the information provided is 2D data and is provided by a diamond stylus which varies in size but could be as small as 2 µm. From this it is not possible to describe a whole surface from such a small sample, the measurement will be correct in that position and therefore the measurement describes the line and not the surface.

Secondly a position as little as 0.5 mm away from this line could easily have a completely different measurement, meaning that the result is dependent both on the position and the operator. (see figures 2 & 2A).

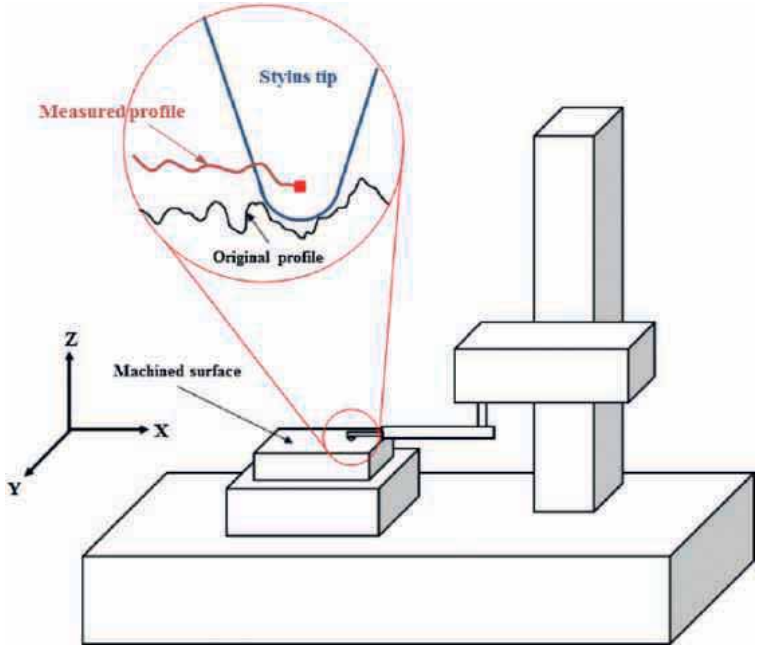

Figure 1 Schematic of Profilometer

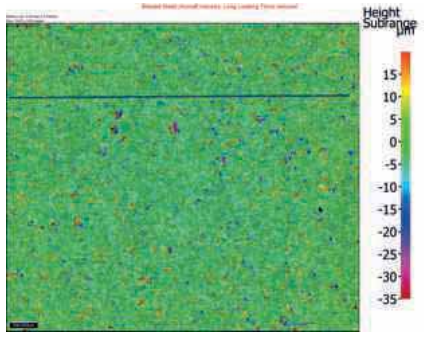

Figure 2

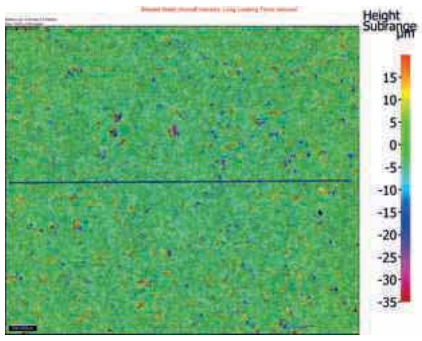

Figure 2a

Thirdly, completely different surfaces can provide the same "R" parameters, although from a function perspective the two surfaces will operate completely differently (see figure 3). Finally, the stylus can cause surface damage on soft materials.

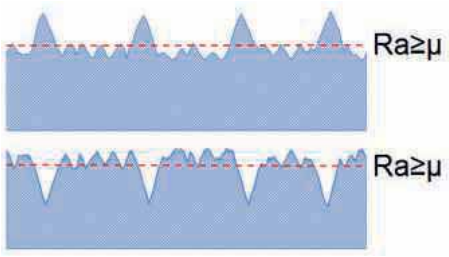

Figure 3

Optical 3D measurement

Optical 3D measurement provides a valid alternative to tactile measurement systems and a large amount of additional data not available or not easily available from tactile methods.

The parameters are described as functional parameters and are described in ISO 25178: Geometric Product Specification (GPS)-Surface texture; areal.

The first item to note is that we are now describing surface texture rather than surface roughness. This is due to the requirement that we are measuring a 3D surface over an area rather than a 2D line along a single path and therefore extracting a dramatically increased level of data. (See figure 4).

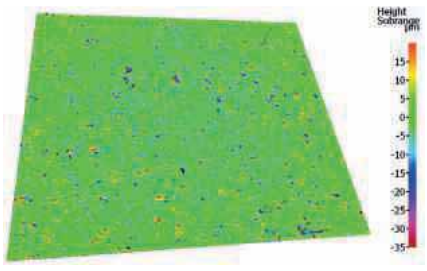

Figure 4

The process of surface data collection described here is based on the measuring principle of FocusVariation, first commercialised by Alicona Imaging (now Bruker Alicona) and a typical product is shown in figure 6.

FocusVariation works on the principle of moving the focal plane of an optical system vertically over a defined surface at a controlled rate of movement. During this process, sharp data is collected from the surface to provide a 3D natural colour view of the surface as a 3D model. Underlying this 3D representation is a 3D data set with up to 3.3 million data points and this is used to extract measurements from the surface. The dataset has an x-y size, depending on the objective used, of up to 2 x 2 mm and across this whole surface measurements can be made. This process offers many advantages to the user and the company using it:

1) It is possible to measure both profile and areal measurements on the sample. A real advantage, if using profile measurements, is that the measurement line can be positioned where needed, when viewed on the 3D representation

2) The image data is saved in a database which can be recovered for QA purposes

3) A full 3D height map view is available for evaluation

4) Full areal based parameters can be extracted at a single click. (see figure 5).

Name	Value	Unit	Description
Sa	2.711	µm	Average height of selected area
Sq	3.899	µm	Root-Mean-Square height of selected area
Sp	117.827	µm	Maximum peak height of selected area
Sv	85.136	µm	Maximum valley depth of selected area
Sz	202.963	µm	Maximum height of selected area
S10z	127.997	µm	Ten point height of selected area
Ssk	-0.635		Skewness of selected area
Sku	16.592		Kurtosis of selected area
Sdq	0.498		Root mean square gradient
Sdr	10.064	%	Developed interfacial area ratio
FLTt	202.963	µm	Flatness using least squares reference plane
Lc	250.000	µm	LambdaC: cutoff wavelength

Figure 5

Areal based parameters provide not only details of the surface finish but also data that can be used to assess the function that the surface operates in. An example would be that from the ratio of two parameters, Vmc (core material volume) and Vvc (core void volume). It is possible to assess if a surface

Figure 6 InfiniteFocus SL Profilometer

would be able to retain a lubricant. Other parameters include Ssk (skewness) Sv (maximum pit height) Sz (Maximum height) Sku (skewness) Sku (Kurtosis) and Sp (maximum peak height). Although some of these parameters may not be used in a production environment for quality and design purposes, these will be invaluable.

Conclusion:

The traditional tactile methods are well-established, work effectively in some industries and will continue to do so. The optical methods though provide the manufacturers with far more detailed information that can be used to improve functionality and reliability through the design and manufacturing process of components.

As manufactured products become more sophisticated, consumer demands for reliability and life span increases, the understanding of the surfaces that are manufactured will need to be improved. This cannot be achieved by the measurement of surfaces using single line profile gauges. Designers also need to start producing designs where these functional parameters become the norm and the appropriate references are adopted.

To look at Optical Surface Finish measurement systems, contact:

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Tewkesbury Diamond Chrome Plating partners with Delapena

We recently caught up with George Todd, managing director of Tewkesbury Diamond Chrome Plating. TDCP provides a wide range of surface treatments and processes to various industries, including aerospace, defence, oil, gas, metrology, medical and more. It utilises two of Delapena's PowerHones and one SpeedHone whilst carrying out its precision cylindrical grinding and honing services.

In 2013, TDCP approached Delapena to ask for assistance in subcontract honing on a regular component that required finishing after chrome plating. At the time, TDCP was sending the parts to a third-party company, but wished to take ownership of the process as delivery and quality was an issue from the current supplier. Delapena honed the chromed part successfully and with a good cycle time. A decision was then made by the management team at TDCP to set up its own in-house honing department, so that it would have full control of the parts, from acceptance to delivery. The company then purchased a second honing machine from Delapena, as the volume and range of parts they offered increased.

Back in January 2018, TDCP suffered a devastating blow when part of their factory was destroyed by a fire. This impacted their work for the next 18 months, with June 2019 being their first full month of production post-fire. Luckily, their honing machines supplied by Delapena were not affected by the fire.

George Todd says: "We utilise our PowerHones for defence and industrial applications. We decided to purchase the PowerHone on Delapena's recommendation. Paul Lane, global technical sales manager of Delapena, believed that the PowerHone would be a good choice for our honing processes. The PowerHone was the most user-friendly and versatile machine out of many honing machines that we looked at.

"Delapena's level of service is second to none. If we have any questions or issues with our machinery, we give them a call and they get back to us promptly with help and advice. They keep us updated on any new technologies that they believe may be beneficial to us or will help us become more efficient within our work. We also utilise Delapena's abrasives in our honing and they provide very quick lead times on their consumables. We have a strong working partnership with Delapena and we're even chrome plating mandrels for them now."

Delapena's SpeedHone is a compact machine with considerable flexibility and capability. The honing process becomes deskilled and offers both a semi-automatic and manual operation. The SpeedHone is ideal for one-off and batch production work and is capable of honing diameters from 1.14 mm to 80 mm, with an increment of one micron. The PowerHone offers precision honing of large and heavy components in small to medium batches. It is also ideal for honing prototypes, offering both thorough and blind bore honing with excellent stock removal rates. The PowerHone is user-friendly and efficient and is capable of honing diameters ranging from 25.4 mm to 740 mm.

Delapena Group has every facility required for honing, including an application centre, subcontract honing division, tooling refurbishment centre and a reverse engineering tooling centre. The company has extensive experience in honing applications, spanning over the last 90 years. Delapena has a proven track record for manufacturing high-quality products, providing top-class service and exceptional value.

Grinding & Surface Finishing would like to apologise for the incorrect photo in the September issue. This was of a very old machine and in no way represents the advanced technology the company now offers.

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ABOVE AND BEYOND **HONING**

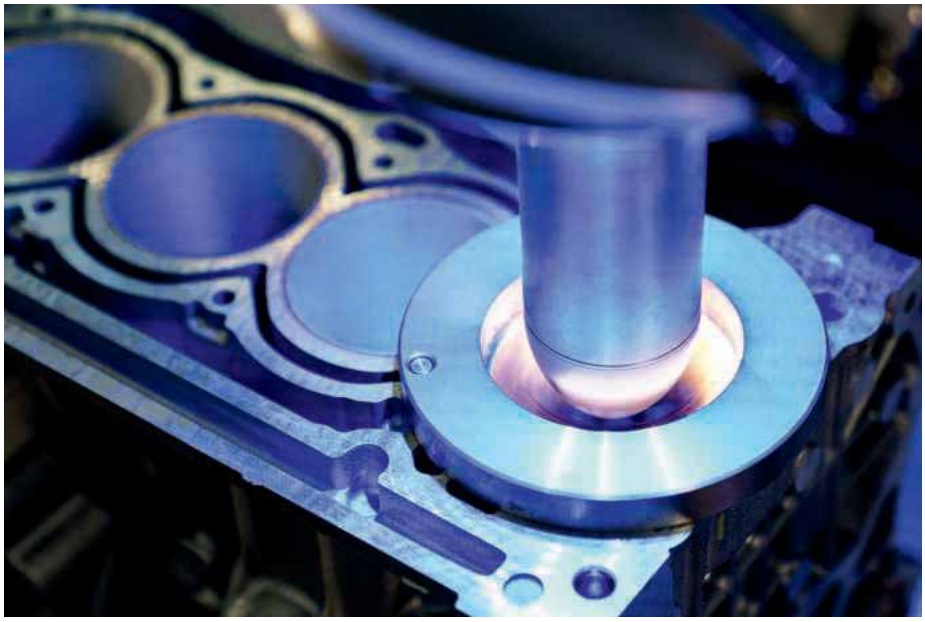
VW orders new laser technology from Gehring for high-efficiency gasoline engine

After intensive cooperation in process and technology development, Gehring will equip the Volkswagen Group not only in North America with the latest laser and honing technology for the production of coated EA 211 evo engines but also from now on the first plants in China. With this success story, Gehring once again demonstrates its competence and technological leadership in the field of cylinder machining to increase the efficiency of internal combustion engines.

The VW engine named EA211 evo has been equipped with the latest technologies to increase efficiency and is also available for natural gas models and plug-in hybrids. It thus plays a strategically important role worldwide in the further development of conventional drives and is one of the most efficient engines on the market. The coating of the cylinder liner is one of the important levers. VW will now install the corresponding production lines in China. For these lines, Gehring received the order to supply the laser roughening and honing machines. Dr Sebastian Schöning, CEO of the Gehring Group, sees the development strategy confirmed: "We are happy that we were able to achieve concrete environmental improvements together with our customers."

Dr Sebsastian Schöning, CEO, Gehring Group

The thermal coating of cylinder bores is a highly sought-after technology for increasing the efficiency of internal combustion engines. Gehring is focusing on optimising the process chain laser roughening - coating - honing. In order to produce a strong bond between the coating and the engine block, efficient roughening processes are required to ensure overall functionality. Gehring's laser roughening technology brings operative advantages. Apart from cost savings and an improved working environment, there is also a positive effect on the overall engine design. In addition to high adhesive tensile strengths with low roughness, economic advantages take effect in mass production, since no wearing tools are needed and coating material is saved. Both aluminum and cast iron can be pre-machined with the laser refining process.



The process for pre-machining cylinder liners by means of laser, industrialised by Gehring, before coating and honing brings decisive advantages in terms of operating costs, working environment and above all friction and heat dissipation. Thus, the method contributes to the optimisation of engine efficiency

The Gehring laser roughening machines have two spindles with innovative rotation optics for the simultaneous machining of two cylinder liners. The coordinated process steps roughening - coating - honing lead to low-friction and wear-resistant cylinder liners, which contribute to more compact and more efficient internal combustion engines.

With the Gehring and copperING brands, the Gehring Group offers innovative production solutions for highly efficient conventional and electrified power trains. In the field of fine machining, the company has been shaping the development of honing technology for more than 90 years and provides the automotive industry with the processes of laser roughening, coating and honing answers to the current challenges around the combustion engine. The production technology for e-mobility expands the Group's portfolio and sets new standards in the flexible series production of electric motors.

Meanwhile, Dipl.-Ing. Martin Winterstein (41) has joined the management board of Gehring Technologies Gmbh and assumes global sales responsibility for the Gehring Group as chief sales officer. Besides honing technology, the focus will be on developing the activities in the e-mobility sector and further strategic initiatives.

As CSO, Martin Winterstein will strategically develop the sales and marketing activities for honing solutions, as well as production technology for electric powertrains. Further priorities will be digitalisation and profound cooperation with the customer base. Martin Winterstein

Dipl.-Ing. Martin Winterstein has joined the management board of Gehring Technologies Gmbh and assumes global sales responsibility for the Gehring Group as chief sales officer

brings along market and technology experience based on over 15 years in the machine tool business. He acted as managing director and in other executive functions in sales, business development, product management and marketing for international manufacturers of machine tools, automation and systems. In addition, he held leadership roles and ran projects in key markets such as China, the USA, India, Korea and Russia.

The Gehring Group, a leading honing technology company, has diversified and strengthened its business in the past years by developing technology for electric powertrain production and integrating the German-Italian copperING Group as experts in this business. The result is a combination of longstanding experience as systems provider for the automotive industry and profound technology expertise for conventional and electric powertrains.

Gehring has thus positioned itself as partner for modern mobility, independent of the drive technology. Innovations and solutions from both areas were on display at the recent EMO exhibition in Hannover.

For almost 90 years, Gehring has been an expert in the area of honing technology. The portfolio of this machine manufacturer ranges from a single honing stone to honing tools up to a fully automated honing machine. As a worldwide technology leader, the company is represented globally in key markets of the automotive and supplier industry, hydraulics and pneumatics as well as aerospace technology.

Gehring Technologies Holding GmbH has its head office in Ostfildern, Baden Württemberg and has approximately 800 employees. It consists of Gehring Technologies GmbH, Gehring Diato GmbH, Gehring Naumburg GmbH as well as its international branch offices in France, USA, Brazil, China and India.

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Why is effective honing so important for hydraulics?

by Andrea Rodney, director, Hone-All Precision Ltd

Machine honing is a precision metalwork technique used to create super-flat, shaped, and super-smooth surfaces. By applying an abrasive stone anvil to cut against the metalwork and applying intense pressure and movement, pieces of any shape and size can be altered to exact material specifications.

With deep-bore hole drilling, honing can be applied during the process to create smooth, flawless tubular metal interiors and joints as well as polished exteriors. Digital CNC oversight means that turned metal pieces can be made mathematically even and flat.

When designing and building hydraulic pipelines and cylinders, metal honing is absolutely critical. Hydraulic interiors rely on precise volumetric measurements and an interior, fluid space free of dirt, to work at peak efficiency. Honing the metal helps to improve hydraulic performance in several ways.

Better quality seals

Firm, interlocking components form the backbone of any decent hydraulic system. If you're using O-Ring or male to female connectors to connect hydraulic hose or pipes, the hydraulic fluid must have an airtight passage to flow through, unobstructed by any interior faults.

Bore and flat honing helps to finish metal connecting joints by making them flush, free of flakes and chips, and by creating a circular passageway for fluid to be transferred through. It's also easier to lubricate hydraulic parts that have been honed while the machine isn't being used.

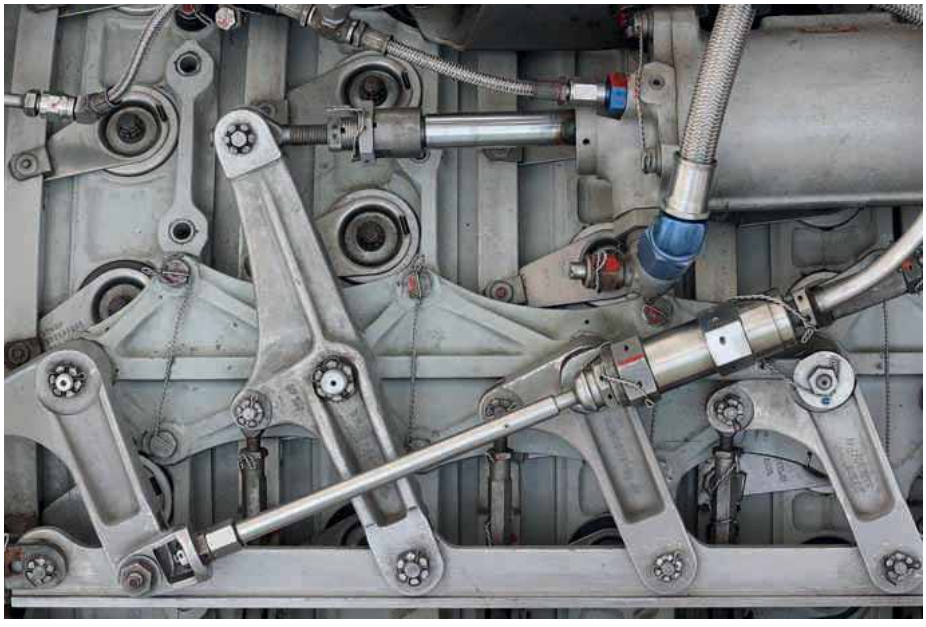
Increased part lifespan

Honing also helps to reduce the risk of a part failure. Some of the most common causes of hydraulic failure are internal disintegration of components, misaligned seals, and breaks in tubing or pipework. Finely honed metal eliminates internal inconsistencies in metalwork and ensures that the metal wears down evenly over time, avoiding the problems that come with irregularly balanced, pressurised fluid. Honing cylinders and pistons also ensures smoother, identical repetitive movements, leading to longer (but not indefinite) part lifespans.

Piston efficiency

Hydraulic pistons move back and forth rapidly in a set casing to pump liquid, move loads, and maintain tension. Keeping friction, wear, and fluid resistance at low levels is important to keep the hydraulics turning.

Honing down the machine housing, hydraulic cylinders, and pistons themselves with surface treatments can increase the performance of engines and drivers by allowing a tighter, more precise push to form. Honing also helps to keep piston enclosures and chamber connectors tightly sealed, as with hydraulic lines.

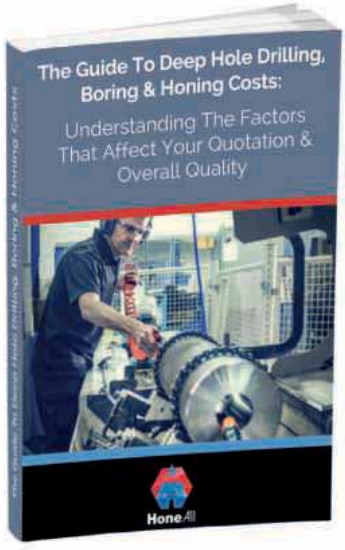


Precise inspections

Did you know that honing is also used to improve metalwork inspection? Light honing strips surface metalwork and accumulated film away, to reveal the internal structure of the underlying material. Dents, scratches, and faults are revealed. The operator can then decide whether to scrap the piece or perform further honing and cutting to repair the piece. Light honing is particularly useful as a method of inspection when restoring used hydraulic components to working order.

Reduced costs with Hone-All

Creating honed hydraulic parts in one cut, at a dedicated workshop, is often cheaper than ordering off-the-shelf metal parts and modifying them to suit your system. Hone-All specialises in CNC building, boring, and honing for hydraulic tubing, pistons, cylinders, and rams.



Hone-All is offering The Guide to Deep Hole Drilling, Boring and Honing Costs free of charge by visiting **www.hone-all.co.uk**. This handy publication explains the factors that affect your quotation and overall quality issues.

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Sunnen and ANS collaborate on friction and wear reduction technology

Sunnen Product Company and Applied Nano Surfaces (ANS) have signed a joint development program focused on ANS Triboconditioning® process that reduces friction and wear on a variety of honed parts and components.

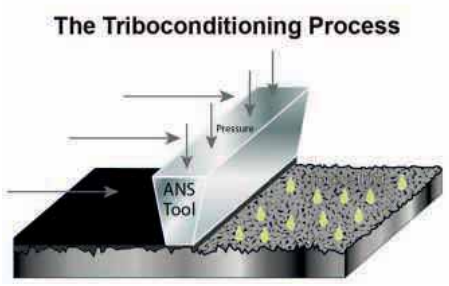
Sunnen Products Company and Sweden's Applied Nano Surfaces (ANS) have entered into a joint market development agreement to advance technology and applications based on the unique Triboconditioning process recently patented by ANS. The process reduces friction and wear on various steel and cast iron surfaces while improving surface finish, preventing seizures, and enhancing product life.

"ANS is on the leading edge of friction reduction technology," says Chris Miltenberger, president and CEO of Sunnen Products Company. "We are excited about working with ANS on the development of new products and surface finishing methods which will bring unique solutions to all segments of the manufacturing industry.

Triboconditioning is a combined mechano-chemical surface treatment process which uses a machining procedure to level off surface peaks and apply a friction- and wear-reducing compound to the component surface. Unlike spray coatings, the compound becomes an integrated part of the component structure at a nano level. The process is mechanically simple and, in most cases, can be done with Sunnen precision honing equipment. It is very cost-efficient in mass production environments, making it perfect for in-house manufacturing as a part of component manufacturers' production lines.

Key applications include automotive engine components such as valve train parts, cylinder liners, crankshafts and connecting rods, as well as industrial applications such as hydraulic motors, rock drills, pumps, chains, gears and compressors.

ANS is looking forward to combining our knowledge of friction reducing technology with Sunnen's expertise in surface finishing," said Christian Kolar, CEO, Applied Nano Surfaces Sweden AB. "The solutions under development have the potential to be a real game-changer in component efficiency and product lifetime."



Headquartered in Uppsala, Sweden, ANS offers unique surface treatment technologies on a broad range of industrial and automotive applications.

Sunnen is a worldwide leader in the manufacture of precision bore creation and finishing equipment with headquarters in St. Louis, Missouri, and manufacturing and tech support facilities in Europe, China, India and Brazil.

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Engis UK delivers complete bore finishing solutions

Engis UK is the European HQ of Engis Corporation, supplying solutions ranging from one-off electroplated grinding and honing tools, to complete bore finishing machines - all supported by experienced local technical staff.

Engis solutions can be configured to satisfy bore finishing challenges from the simplest to the most complex. For high-volume applications, Engis Single-Pass bore finishing systems provide the ideal solution, offering improved roundness, concentricity and finish, while achieving extremely tight tolerances, reliably and consistently, at a lower cost-per-part.

In addition, the company also offers a full range of tooling, with options to fit onto standard machining centres, as well as accessories such as automation and gauging packages.

Engis' single-pass bore finishing process

Traditional honing machines cannot match the benefits of Engis' single-pass bore finishing process which uses fixed-size, but adjustable, bore finishing tools coated with diamond abrasive particles. These tools pass through the bore only once, removing a specific amount of material.

By using a series of progressively larger bore finishing tools (coated with progressively finer super-abrasive particles) this process enables extremely tight tolerances to be achieved.

Originally developed for cast iron applications, Engis advances now make single-pass bore finishing suitable for hard, soft and "gummy" metals and materials, including ceramic, steel, aluminium, bronze, brass and chrome.

Small Precision Machine series (SPM)

These machines, which have been developed to provide a cost-effective solution for tool-rooms running small to medium sized parts with IDs of 50 mm or less, are available in 4, 6, 8, and 10 spindle models and offer technical features including a servo-fed column design, precision spindles, pneumatic counter balance on the head.

Large Performance Machine series (LPM)

Designed for high-volume manufacturing applications, the LPM range, available in four, six and eight spindle variants, offers superb roundness, concentricity and finish, achieving extremely tight tolerances reliably and consistently in both standard and semi-blind bores, achieving a lower cost/hole due to extended tool life, with shorter cycle times, improved bore quality, fewer rejects and the need for less frequent part inspection.

3-axis bore finishing system (FPM-3X)

The FPM-3X 3-axis single-pass bore finishing system addresses the challenge of aligning and finishing bores of large hydraulic valve bodies after stacking. The FPM-3X features full CNC controls with a Z-stroke of 750 mm, an X-stroke of 1,066 mm and a Y-stroke of 100 mm, with a slide base that can accommodate parts up to 1,350 kg. An 8-13 pocket automatic tool changer allows the machine to complete bores from rough to finish without operator involvement.

Advanced bore finish tooling

Engis' bore finishing tooling solutions include through-bore, blind-bore, dual diameter finishing, seat finishing and internal float design tools. The company is finding that single-pass bore finishing technology is increasingly replacing conventional honing for finishing internal diameter bores, having proved itself to be cost-effective for many bore finishing applications.

In standard blind and semi-blind bores, Engis diamond-plated and super-abrasive finishing tools are capable of achieving bore geometries to within 0.5 microns. Furthermore, because these tools use plated diamonds, they cut cooler, maintaining their size and achieving extremely long tool life, thus reducing the cost per finished item.

Both at the company's dedicated Bore Finishing Process Development Laboratories at its HQ in Wheeling, Illinois and at its facility in Henley on Thames, engineers are constantly working to improve bore finishing processes, for example, tooling packages are tested and refined for process optimisation, tool holders and fixturing packages are tested and prototype parts are run at various cycle rates.

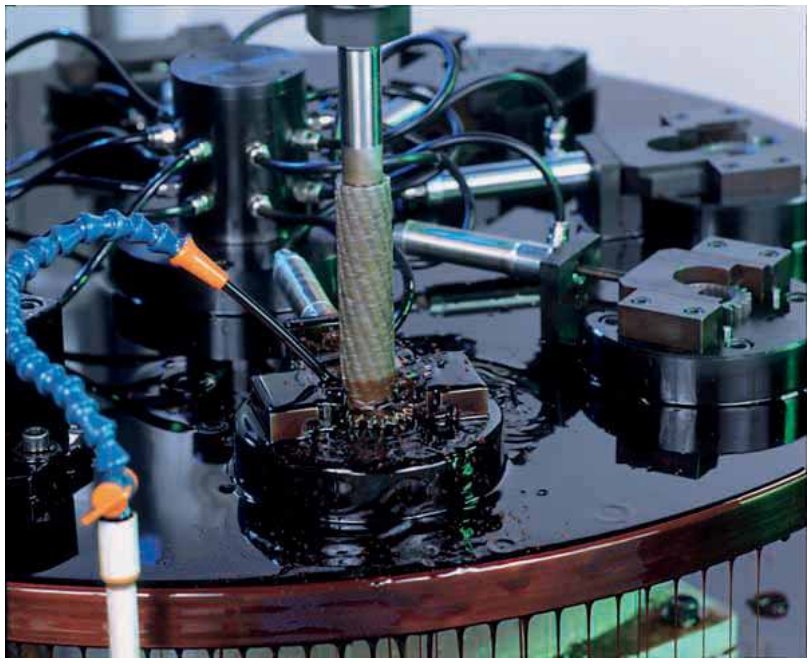
Engis UK bore finishing laboratory

One of the benefits that Engis UK offers its customers is its well-equipped bore finishing laboratory which provides technical support and expertise in developing bore geometries for applications in a wide variety of sectors including medical, pharmaceutical and automotive, using materials such as ceramics, steels, iron and aluminium. Bore geometries of between 2 mm and 75 mm diameter can be developed and tested in the UK, while for larger bores, up to 200 mm diameter, work can be carried out at the company's laboratories in the USA.

The UK laboratory is equipped with a range of bore finishing capabilities supported by leading-edge metrology equipment which can measure the cylindricity, roundness and straightness of bores to an accuracy of 0.1 micron.

The laboratory demonstrates Engis UK's belief in the importance of customers and suppliers working closely together to develop optimum solutions to manufacturing requirements, as each process, including stock removal rates, bore geometry requirements and surface finish, is studied, step-by-step, to ensure customers can achieve all their engineering objectives.

Engis (UK) Ltd is part of the Engis Corporation, a worldwide organisation established in 1938, which manufactures and markets superabrasive finishing systems for operations that demand precision surface polishing and close tolerance requirements. Engis provides products, services and technological advances in several key areas including diamond flat lapping/polishing, diamond and CBN-plated tools, bore finishing tools and machines, tool room products and accessories and R&D and technical support.



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Abrasive nylon wheel brushes provide deburring for extremely hard metal parts

When an application calls for surface finishing, cleaning, polishing, deburring, edge blending or removal of paint, rust or other contamination, a wheel brush is often the ideal solution. A type of power brush, wheel brushes are motor-driven and may feature an arbor hole or keyway that supports their use with grinding equipment or CNC machinery.

Wheel brushes are circular in shape with uniform distribution of the fill materials extending radially from the centre core to the periphery. When metal wire filaments are used, they are excellent tools for light deburring, edge blending and general surface finishing. The brushing action occurs at the edge or face of the tool on machined parts such as steel shafts, gears, turbine blades, or extrusion cut-offs.

However, when harder materials are involved, wire filaments can break off or deform, even if crimped. Although knotted wire options are available for more aggressive deburring, for today's hardened steels and alloys even this type of wheel brush does not suffice.

Instead, for the most aggressive deburring or surface finishing the solution is a wheel brush that utilises abrasive nylon filaments made of silicon carbide. Taking it one step further, diamond grit can be used for the hardest metals and alloys in use today.

The construction of these composite hub radial wheel brushes, as they are called, provides a long-lasting wheel with less filament breakage and superior performance.

For JR Precision & Welding, a machine shop in Houston, Texas, the issue of removing large burrs from machined holes in an extremely hard 4140 steel alloy part used as a muzzle brake for firearms was proving a challenge. Founded in 2017, the machine shop specialises in 3 and 5-axis CNC manufacturing, 3D printing and welding.

A muzzle brake, or compensator, is a device connected to the barrel of a rifle or pistol to help control recoil and the rising of the barrel that normally occurs after firing.

There are different forms of muzzle brakes, but most consist of a small length of tubing approximately five centimetres long. Muzzle brakes utilise slots, vents, holes, baffles and similar devices to redirect a portion of propellant gases to counter recoil and unwanted muzzle rise. Where and how these holes are placed in the muzzle brake has a tremendous effect on the influence of the brake in terms of recoil and muzzle movement.

However, when machining these holes, large burrs were forming at the oval-shaped gas ports. The cylinder was made of 4140 steel, which is a one percent chromium–molybdenum steel alloy that is generally hardened and tempered to a tensile strength of 850-1000 Mpa. The company was machining the part on a 5-axis machine in an elliptical path, which increased the size of the burrs created.

"The burrs that were created were razor sharp and thicker than we wanted them to be on each of the 4 main ports in the part," says James Mawazeb, director of operations and lead engineer at JR Precision & Welding.

This led him to reach out to a local tooling representative from Bass Tool & Supply, a leading supplier of CNC machine tools, for wheel brush options to remove the burrs in one automated operation. The rep, in turn, suggested he contact Los Angeles-based Brush Research Manufacturing. The company is known for inventing the Flex-Hone®, a tool characterised by abrasive globules that are permanently mounted to flexible filaments that are attached to a centre shaft. With its low-pressure, low-temperature abrading process, the Flex-Hone tool can remove work-hardened layers and deburr parts without disturbing the underlying metallurgical structure.

Brush Research also manufactures a wide array of wheel, cup and end brushes in a variety of sizes, filaments and grits.

Based on the geometry, location of the burrs and the hardness of the metal alloy, it wasn't immediately clear what the best solution would be. So the engineers at Brush Research suggested James Mawazeb send in several sample parts for testing in the lab.

At its surface finishing laboratory in Los Angeles, Brush Research engineers analyse customer parts that require finishing, then selects and tests the tools that will provide the best solution according to customer operating parameters.

At first, the company attempted to remove the large burrs using NamPower abrasive disc brushes. Composed of flexible abrasive nylon filaments bonded to a fibre reinforced thermoplastic base, the disc brushes contain a unique combination of

both ceramic and silicon carbide abrasive. The abrasive filaments work like flexible files, conforming to part contours, wiping and filing across part edges and surfaces to deliver maximum burr removal rates.

Although an excellent tool, the abrasive disc brushes were not sufficiently removing the burrs.

"After testing out disc brush with different depths and speeds, we decided to try an abrasive nylon wheel brush," says Elysha Cole, product support specialist at Brush Research. "It was able to easily get into the slots, push the burrs out and remove them."

The abrasive-filled nylon filaments are set into moulded cores, allowing higher filament densities and putting more cutting tips at the point of attack. In addition, the filaments are extremely durable and self-sharpening, providing excellent performance and wear life. As the brushes come into contact with the work surface, the filament grit wears off, exposing new cutting particles. In this way, the brush continues to be sharp even after repeated use.

In addition, unlike the bristles of metal brushes the abrasive nylon fibres are not prone to deforming or breaking off like wire brushes.

The product utilised to prove the concept was a 6" diameter tool with silicon carbide filaments. As the burrs were a bit heavier and the customer was not concerned about the final surface finish, the machine shop opted for 80 grit. The tool can be automated on CNC equipment or offline as a secondary deburring operation.

According to James Mawazeb, the abrasive nylon brush met all his requirements, including how well it fit in his 5-axis machine's magazine holder and existing toolholders. However, the primary concern was how much material the brush would remove.

"We didn't want the brush to affect the outer diameter measurements in a way that affected the performance of the ports," he says.

After testing the abrasive nylon brush, he says he was impressed. In addition to removing the large burrs, the brush also provided a soft edge break to the four ports so that they were not razor sharp without affecting the surface finish. "The abrasive nylon brush removes just the right amount of material," says James Mawazeb. "The surface finish actually matched what the customer wanted as well."

After proving the concept in the lab, JR Precision & Welding ultimately decided to purchase a smaller 3" diameter version of the wheel brush. The shorter trim fill has less give and so delivers an even more aggressive action.

James Mawazeb says he also tried another brush from another supplier, but he was not impressed. The filaments were angled down and the fill was not as compact as the abrasive nylon wheel brush from Brush Research. "I tried another brush, but I didn't like how it performed. When it would go over the part, it would be like it was a toothbrush, just rubbing over metal, so it didn't actually remove anything. It actually scuffed up the part more and left a horrible finish."

According to the director, the machine shop has installed the abrasive nylon brushes and the equipment is programmed for the next order muzzle breaks scheduled for production in the next month.

Brush Research Manufacturing has a long history of solving difficult finishing problems with brushing technology. As a full line manufacturer of abrasive nylon brushes, deburring brushes, automotive brushes, power brushes, twisted-in-wire brushes and the Flex-Hone tool, it is ready to assist you in finding the best solution to your finishing needs.

BRM can help you with your finishing and deburring needs. The Flex-Hone tool, also known as ball hones or the ball cylinder hone, is great for deburring, edge blending and surface finishing, while its tube brushes and other twisted-in-wire brushes are the perfect solutions for cleaning soot and carbon deposits from pipes and other metal components.

The Flex-Hone tool is available in sizes from 4 mm to 36" in 11 different grits and eight different abrasive types.

For more information, contact:

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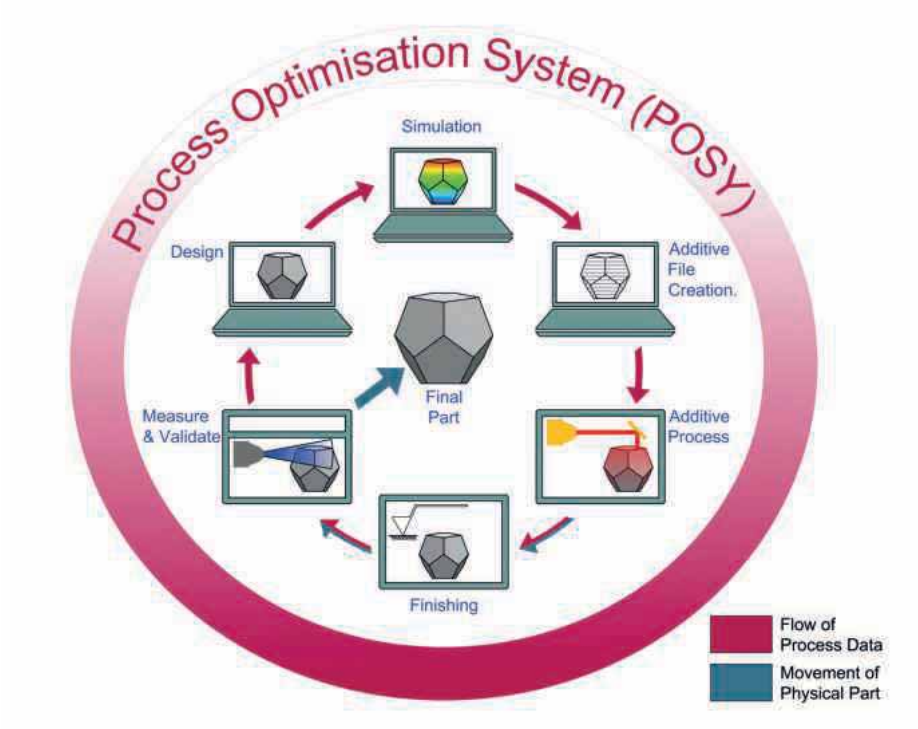
AM parts still need the perfect finish

Removing the guess work from and reducing the cost of mass surface finishing of additively manufactured parts

Advances in equipment, materials and processes for additively manufacturing metal parts continues at a rapid pace. However, surface finishing techniques have been struggling to keep up with this game changing means of producing components comprising increasingly intricate and complex shapes. Richard Ainsworth of surface engineering experts, Fintek, explains the challenges and summarises important research which aims to help AM firms establish build parameters to produce parts with finer surface finishes. This will then allow mass finishing specialists to take them to a commercially viable quality standard of finish much more effectively and at lower cost.



Schematic from MTC showing the process in developing the POSY software tool to optimise AM build parameters to produce near net shape and reduce subsequent post processing requirements

The challenge

Surface finishing alone can amount to between 40 to 60 percent of an AM component. A cost that would be deemed intolerable for a traditional subtractively-engineered part. This is the scale of the challenge facing additive manufacturers. Currently, the poor quality of surface finish of completed AM builds can make them unsuitable for some industrial applications. Post processing, such as CNC machining or linishing of individual surfaces, is time consuming as well as costly. This is suppressing AM uptake, despite the real benefits to be had.

Engineers in aerospace, automotive, medical device and other high value applications are able to use sophisticated CAD systems to develop intricate and complex shapes that fulfil their product development needs, beginning with rapid prototyping through to final build. The problem is, modern mass surface finishing methods are currently optimised to subtractively-engineered parts. A scarcity of research and information leaves AM manufacturers and mass surface finishing companies with little more than trial and error as a way forward.

However, there is light at the end of the tunnel. Last year, Innovate UK sponsored detailed research, bringing together a team of experts under the project leadership of Croft Additive Manufacturing (CAM) and that included Liverpool John Moores University (LJMU), Manufacturing Technology Centre (MTC) and Fintek.

Integration of additive manufacturing and finishing

Two key research aims were: the reduction of the variability and overall surface roughness of an AM part by optimising the build parameters and so make mass surface finishing more effective and quicker; the improvement of mass surface finishing techniques to suit the increased part complexity. Capturing process informatics from build and finishing stages, along with mechanical properties measured at key points were vital to providing data for developing a process optimisation system, a software tool, (POSY).

POSY is a tangible outcome from the project that is being designed and developed by MTC. This will help AM manufacturers to predict and set the best build parameters to achieve near net shape while maintaining tensile strength as well as reducing initial surface roughness. In addition, it will help AM part design teams to allow for the tolerances required by further post processing using mass finishing. Meeting these two objectives will enable AM parts to achieve a comparable surface smoothness to a subtractively-engineered component.

Developing meaningful benchmarks

The MTC team was also pivotal in helping to design the experimental project. At the outset, CAM additively manufactured simple test bars in stainless steel 316L, having defined a series of different laser parameters and build orientations. Surface roughness measures for each set of parameters formed the basic data matrix to begin the POSY software development. This process was repeated to create a sizable database.

A set of test bars were also produced for mechanical testing by a team at Liverpool John Moores University, who also carried out further post processing to surface finish them in centrifugal disc and drag finishing machines.

An identical set of samples were provided to mass finishing specialist Fintek, who processed them in a centrifugal machine as

well as a new generation high-energy stream finishing system, both designed and built by OTEC Präzisionsfinish GmbH.

Measurements of surface roughness before and after processing, tensile strength and mechanical properties were then supplied to MTC to use in developing the process optimisation system.

In the centrifuge machine LJMU found that roughness differed depending on if the AM bars were built layer-by-layer horizontally, vertically or at 45 degrees. During the finishing cycle, they responded differently with plastic process media over time, while vertical built bars saw the greatest reduction in surface roughness, followed by the horizontal build and then the 45 degree build as the cycle time increased. Drag finishing proved to be more aggressive over the same time scale.

Bespoke stream finishing to optimise process

Fintek found highly variable cycle times were necessary to achieve smoothing. Surprisingly, it also discovered that the usual silicon carbide media used in stream finishing was unsuccessful, sometimes resulting in pitting on the AM part surface due to its grain structure. Like LJMU, it achieved better results using plastic media. Both LJMU and Fintek found that the greatest roughness decrease occurred in the first 20 minutes with increments showing further improvement up to 80 minutes of processing time at between 190 rpm and 250 rpm.

These initial studies also showed that the rate of material removal in post processing had implications for the initial AM build. The high energy stream finishing performed best in achieving a commercially viable smoothness. As this process is capable of rapidly removing material it would need to be mitigated by designing-in material to be strategically added during the AM part build.

Complex test part

The next series of tests represented a real-world AM generated component of greater complexity. With experimental design from MTC to help validate the POSY software, CAM created an AM part comprising a series of flat, curved, inner and outer surfaces. Initial surface roughness measurements and part build parameters were supplied to MTC for inclusion in POSY. Again, CAM manufactured identical sets of test pieces for LJMU and Fintek to process.

Aerospace is driving forward the use of additively manufactured parts

The results from mechanical testing and high energy stream surface finishing were added to the developing software tool.

To refine the stream finishing process, Fintek called on the extensive laboratory facilities of OTEC Präzisionsfinish. With an adjustment of the plastic media, the SF machine proved capable of surface finishing external facets to Ra 0.05 µm in just 12 minutes, a time comparable to processing a subtractively-engineered component and much more commercially acceptable. However, the smaller internal spaces were still challenging to penetrate for current process media types.

Stainless steel test bar before and after surface finishing by Fintek and LJMU (who also conducted mechanical testing) of simple test bars additively manufactured by CAM

Validation of POSY

To validate the effectiveness of the data collated from the research and the new POSY software, a desired surface finish of an AM part was entered into the software tool which then predicted the required build parameters and orientation necessary to achieve the target. Built using this data, the AM part was tested and the actual surface roughness of the build was found to be within six percent of the software prediction. This demonstrated that by using POSY a more accurate prediction of build parameters could be made to enable the creation of a part nearer the net shape from the first build, significantly reducing costly trial and error work often required. Just as important, the surface finish of the part was already much improved in the build, subsequently requiring less post processing time.

Conclusion

As more data is added to POSY, it is expected to become even better at predicting the AM build parameters based on a target surface roughness and the known post processing method. Importantly, stream finishing represents one of the newest forms of mass finishing that is highly adaptable to inline production needs. While internal spaces and channels are still problematic, there is hope in the form of an abrasive flow polishing system being developed by CAM for just this purpose.

The project is already going 'real world' with CAM and Fintek taking on complex parts for two end users and working with them to achieve their required standards.

Louise Geekie, director at Croft Additive Manufacturing, concludes: "This is just the start. With the help of Innovate UK in sponsoring this project we have made a leap forward in understanding the correlation between AM build parameters and surface finishing. And the benefits are more than cost saving, they also come from opening up the areas of AM part applications that are beyond current technology. Further testing of different AM materials and refinements of mass finishing media and processes will provide a richer data set for the development of POSY by MTC, which creates a virtuous circle."

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Modern sheet metal processing places more and more demands on the cut parts

Modern mechanical engineering is increasingly designed and manufactured with complex sheet metal components that are hardly or no longer machined. After the cutting follows the bending, then the welding or laser welding. In between, the components are painted using various processes, surface-treated or protected against corrosion. The various production steps are connected to each other and control the machining process. This requires dimensionally perfect cut parts with the appropriate surfaces and edge quality.

Nowadays, behind the term "deburring" hides for example a whole series of other requirements such as breaking cut edges, rounding cut edges, descaling surfaces or attaching a defined radius to the edge.

Today, WEBER has a concept with the TTSC series that can solve all these tasks. With various grinding techniques, the ideal solutions are available for the individual requirements. Parallel to the technical development of sheet metal cutting from auto oxy-fuel cutting and plasma cutting to today's laser cutting technology with more than 10 kW cutting power, WEBER has modified and further developed its grinding processes.

While the conventional grinding technique of the eighties could actually deburr and break only the cross-edges of the cut sheets, WEBER already had a machining system that rounds all edges, longitudinal and transverse, almost equally well. When the laser was used to cut thicker sheets, the problem of descaling the cutting surface arises. WEBER had also developed and used a solution for this purpose.

WEBER now has its own grinding processes for the individual problems, which can be freely combined with each other in the WEBER TTSC series. For surface grinding and deburring, conventional grinding rollers are used. The subsequent edge-breaking or rounding is done with the WEBER planetary head technique. In this grinding process, pot brushes fitted with abrasives are used, which perform a double rotational movement. This patented WEBER technology with closely spaced and rotating tool carriers allows a large overlap of the machining areas, so that the same result is achieved on the entire working width of the machine.

An additional mechanically complex oscillation movement of the brush station is not necessary. WEBER uses the MRB brush head for descaling the cut surface. Here, round brushes are mounted in pairs on rotating beams, which in turn are arranged side by side. If a defined radius is to be attached, the two methods are combined. Since the machining stations are independent, the tool-related individual wear can be precisely compensated and corrected. As the WEBER brush heads consist of units arranged side by side, they can be combined with each other in a space-saving manner according to the grinding task.

For this reason the TTSC series is built with up to four grinding stations and working widths of up to 1,600 mm. The machine is controlled entirely via a SIEMENS touch panel. All axles are motorized, all drives are frequency controlled. In this way, individual machine settings can be stored reproducibly and recalled. As often in life the differences are in technical detail. WEBER focuses here on clear and comprehensible technical solutions, tried and tested as well proven technology combined with a goal-oriented and simple operation.

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Deburring and cleaning with the PINFLOW system

The deburring of workpieces is becoming increasingly important. In recent years, the performance of chip-producing processes has increased significantly. At the same time, however, deburring has commonly been done using the same methods as have been used for decades, despite the fact that the deburring working process places particularly high demands on quality and process reliability in order to be able to manufacture cost-effectively and with high quality standards in the modern highly organised manufacturing structures and for ever more complex workpieces.

The PINFLOW system offers an innovative alternative to other procedures. The workpieces which need to be deburred are placed in a piece-specific device which is found on the work surface in the machine's processing area. The work surface, together with the device and the workpieces, is vibrated horizontally using vibrators. The device, acting as a container, is filled with the deburring medium. The vibration creates relative motion between the workpieces and the deburring medium. The deburring medium usually consists of small steel balls which, during the machining process, work not only externally but also penetrate into the piece and thus produce a deburring effect even on difficult-to-access surfaces.

The PINFLOW system can be used everywhere where, for example, simple and complex workpieces need to be internally and externally deburred, where moulding sand residue needs to be removed or where the surface needs to be smoothed: deburring complex components such as hydraulic blocks, pump housings, cylinder heads, etc.; removing the cast skin from cast iron workpieces; removing moulding sand and core sand residues; smoothing and polishing; compressing surfaces; rounding off sharp edges; removing sooty carbon residues; machining steel, grey cast iron, aluminium, brass and bronze.

The vibrations caused by the machining operation are damped by special vibration dampers which the entire machine stands on. This ensures that no vibrations are transferred to processing machines placed

near the PINFLOW machine and negatively influence their processes. The processing area with vertically arranged work surface and the vibration table is completely sealed so that neither the deburring medium nor cleaning emulsion can escape. The removal of the deburring medium occurs through steady, continual movement. While the deburring medium is being removed to the reservoir, the cooling medium is isolated and processed separately. A variety of procedures are available for the treatment of the cleaning emulsion.

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Thermal deburring with the TEM system

Based in Monza, Italy, SGM S.r.l. is a leading company in the metal-deburring process and has more than thirty years of experience, originally established in 1979 under the name of STM S.a.s. The history of SGM is a succession of challenges undertaken and won against a constant desire to ride the times with innovative ideas, never relying on standardised models.

The TEM Thermal Energy Method is a process increasingly globally adopted by leading production companies in order to obtain important targets of quality.

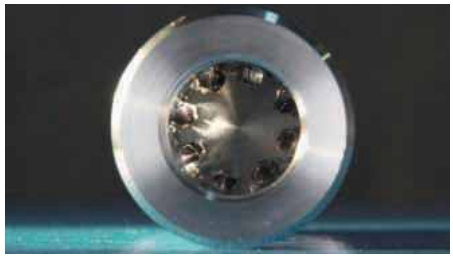
Thermal deburring is a process aimed at the elimination of burrs on the components made of oxidable materials that come from specific processes (mechanical, die-casting, etc.). The process uses, according to a chemical-physical principle, the heat generated from the ignition of a suitable combustible mixture, just as in the case of internal combustion engines.

The obtained energy uses the oxygen, contained in the original mixture, to remove burrs, waste and unwanted material present on the edges, within the cavities and surfaces more or less hidden in the treated details. Any threaded parts which are present on the particulars, are not affected by the process due to the geometry of the same thread. The pieces at the end of treatment, have a layer of oxide on their surfaces.

Materials that can be thermally deburred are: oxidisable metal parts obtained by casting or mechanical working; items made of cast iron, steel, copper and its alloys, aluminum and its alloys, not yet heat treated and free from oil or grease.

Any heat treatment has to be performed after thermal deburring. Usually burrs and scraps can be removed with a thickness not exceeding 0.1 mm for aluminum, copper and their alloys, with up to 0.3 mm for ferrous materials. It is also possible to treat stainless steel with only the heat released by the combustion of the mixture.

The thermal deburring oxidises the surface of the treated parts. To restore their original appearance a deoxidation treatment is enough.



Over the years, SGM has developed a deoxidation process without the use of acids and which is easily adoptable by any industrial reality. Today, the company uses aqueous and environment-friendly products that do not require rinsing. Industrial washing machines are equipped with an ultrasonic and vacuum creating system. The process meets the needs of ecological preparation and especially of deoxidation of thermally deburred ferrous parts, cast iron and aluminum.

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Finishing sheet edges and functional surfaces with the laser

Polishing with laser radiation is based on the remelting of a thin surface layer of the workpiece and smoothing of the surface due to the interfacial tension. The innovation of laser polishing lies in the fundamentally different mode of action (remelting) compared to conventional grinding and polishing processes (ablation). The process is suitable for many metals, glasses and thermoplastics.

Depending on the material and the initial roughness, this process generally achieves a roughness on metals in the range of Ra = 0.1 to 0.4 µm. On optical glass, a roughness of Ra <1 Nm is even possible.

Possible applications are with metals for example in mechanical engineering, the automotive industry, tool and mould making and medical technology. For glass, the main application is in processing aspheres and freeform optics. In the case of plastics, printed components are especially interesting. The special advantages of the laser-based process are the automated processing of complex 3D surfaces with high process speed. At Deburring EXPO, the leading trade fair for deburring technology and precision surfaces in Karlsruhe, the Fraunhofer Institute for Laser Technology ILT presented current developments in the field of laser deburring and polishing. The focus was on laser polishing for tribologically stressed surfaces, sealing surfaces and laser deburring of sheet edges.

The topics of deburring and polishing are becoming increasingly important in metalworking. Laser-based deburring and polishing processes are particularly advantageous for functional surfaces and demanding deburring tasks.

Rounding off cut edges and polishing surfaces

Laser deburring of sheet metal parts is one of the techniques Fraunhofer ILT demonstrated in Karlsruhe. Continuous wave lasers are the preferred choice for this application thanks to their ability to remove burrs and sharp edges quickly and reliably, in some cases at a rate of several metres a minute, and to mould the part into the required shape by means of remelting. Users can harness this melting process to create a defined shape, for example by rounding off the part smoothly and evenly.

Laser polishing techniques for metal surfaces make use of both continuous wave and pulsed lasers. Pulsed lasers with pulse durations of a few hundred nanoseconds and a remelt depth of several micrometres are a popular choice for machining ground surfaces with low roughness, for example. In contrast, continuous lasers capable of achieving remelt depths of up to 100 micrometres are a good choice for rougher surfaces, such as those formed by milling or erosion machining.

For metal surfaces, polishing rates of 1 to 60 s/cm² are achieved. The exact figure

Microfluidics made of fused silica (5x5x7 mm³) manufactured by SLE (left) and laser-polished (right)

depends on the application and laser power in each case.

"We're already seeing some interesting applications in the automotive and mechanical engineering sectors as well as in precision mechanics and medical devices," says Dr Edgar Willenborg, manager of the Laser Polishing group at Fraunhofer ILT. "Laser polishing is particularly suitable for surfaces exposed to high tribological stress, as well as for sealing surfaces and, in some cases, for areas that are difficult to access using conventional methods."

Another advantage of this method is that it can be used with many different materials, including various types of steel and some cast alloys as well as nickel, titanium and cobalt-chrome alloys and even pure titanium.

Increasing interest in laser polishing

Laser polishing is still relatively rare in industrial manufacturing. Nevertheless, the first applications are already implemented and have proven to be both cost-effective and technically viable. At Fraunhofer ILT, a dedicated research group consisting of seven scientists is working intensively on this still young topic. Though modest in size, its leader Dr Edgar Willenborg believes this may be the world's biggest research group focused specifically on laser polishing.

Laser-polished active surface cut out of a slide for die casting

Laser polishing of 3D parts

Lasers can even be used to process complex, three-dimensional parts. Working in collaboration with a special-purpose machine maker, Fraunhofer ILT has developed a machine technology the Aachen-based scientists use to continue developing and testing laser polishing for new applications. "The technology has lived up to its promise on a laboratory scale, and now we're close to seeing the first industrial applications," says Dr Willenborg. "Laser polishing primarily caters to medium levels of quality, for example to achieve technical functionalisation with a high degree of automation. When it comes to mirror-like, high-gloss surface finishes, laser polishing is not generally such a good choice."

Dr. Willenborg reports that high demand for new polishing techniques has boosted interest in laser polishing across the board, noting that this method also offers the advantage of being easy to integrate in existing production lines for smaller parts.

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Laser-polished sphere made of BK7 (radius of curvature 30 mm)

Growth leads to investment leading to more growth

From humble beginnings buying and selling nuts and bolts and other fittings from his garage 25 years ago, Roy Thurston and his two sons Neil and Dean have grown Kings Lynn-based Optima Metal Services into a leading metal stockholder, which also offers pre-fab processing services to customers using state-of-the-art laser and bending technology. Its success is a virtuous circle of growth, investment, growth that is continuing with further expansion to take it to 45,000 ft^2 of warehouse and manufacturing space.

Optima Metal Services move into stockholding began with stainless steel and aluminium, then with customer demand it added mild steel. That same customer demand then called on Optima to provide pre-fab subcontract service profiling and forming sheet and plate to order, so this circle of growth and investment began. An ongoing reorganisation of its manufacturing capability will see that capability grow further resulting in the purchase of three 10 kW lasers with 4x 2 m tables, a 3 kW laser with a 3 x 1.5 m table with tube laser capability as part of a £1 million expansion. All this investment generated more business, with the most recent 10 kW laser generating a 30 percent increase in business that required an additional seven employees to assist on the finishing side of the process, such as deburring, which was a fully manual operation. The solution to this bottleneck was to invest in a Timesavers 42-1350-RB series machine for deburring, finishing, edge rounding and laser oxide removal from Ellesco.

"Stockholding remains central to our business, but the growth in demand for us to laser cut and fold to order, offering a same-day/next-day delivery where possible, especially for customers in the local food processing sector, where breakdowns in their production, can be costly if not resolved quickly.

"We can be called on to produce anything from a one-off from a rough sketch to batches running to tens of 1,000s so we have to be able to react and this need has been central to our investment policy and it is encouraging that every time we add capacity, it generates new opportunities and business," says Optima's operations manager, Andy Knowles. "It was the same with the arrival of the Timesavers machine. Previously all our deburring and radiussing had been a manual process, which was subject to the usual human inconsistencies and was also time consuming. With the Timesaver we now get consistent quality and much faster."

The Timesavers 42 Series RB machine from Ellesco installed at Optima Metal Services is easing a deburring bottleneck and generating new business

When Optima first viewed the Timesavers machine there were some comments that the process seemed slow as work travelled past the rotating brushes on the vacuum conveyor. However, when applied to a working example where manual deburring a batch of parts was taking up to four hours to complete, the total time when using the Timesavers machine reduced to 11 minutes. "This one job was enough to convince everyone that this was a good move to make and by our calculations the Timesavers 42-1350-RB is the equivalent of six operators manually deburring. These people are now able to transfer to other elements of the business with upskilling and training."

The decision to go for the Timesavers 42-1350-RB came following discussions with Ellesco's sheet deburring specialist, Colin Moon, and a review of the potential deburring workload. The 42-1350-RB provides the optimum solution, with the bulk of Optima's work being cut from 1.5 mm to 4 mm thick material across a range of materials it provides a straightforward solution to its deburring and

radiusing needs. "For what we need, we took the decision to specify the machine with just rotating abrasive mops (brushes) and not an abrasive belt and the simplicity of programming the machine to suit the wide variety of stainless steel and aluminium that we process eliminates the need for detailed knowledge, which is the case when manually processing these materials," says Andy Knowles. "Additionally, there are definite health and safety benefits with the elimination of hand tools there is no risk of Hand Arm Vibration and associated issues with hand-held tools."

The Timesavers 42 RB series is available from Ellesco in two widths: 1,350 mm and 1,600 mm and components are fed through two sets of four contra-rotating brushes (eight brushes in total) to achieve consistent and uniform deburring, while also rounding the edges with up to a 2 mm radius on all edges of the part. The vacuum conveyor transports the parts at feed rates between 0.2 to 8 m/min and the table opening of up to 100 mm means that as well as flat parts, those with pockets and protrusions, such as louvres can also be processed. The brushes can be quickly changed to accommodate different materials and applications, with abrasives such as silicon oxide, aluminium oxide, ceramic and sprung steel tines available as standard.

A range of dust extraction systems are also available with the machine at Optima Metal Services being fitted with a W120-5.5kW Non Flam dust collector unit from Filtermist to ensure a clean working environment.

"Deburring and component finishing is an important part of the service that we offer as standard to customers. Since the arrival of the Timesavers 42 RB series the quality of finish that we are achieving has been noted

and commented on by customers. More interestingly we are seeing work come back to us as a direct result of the consistent quality that we can now achieve," concludes Andy Knowles.

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ANCA enters the skiving market

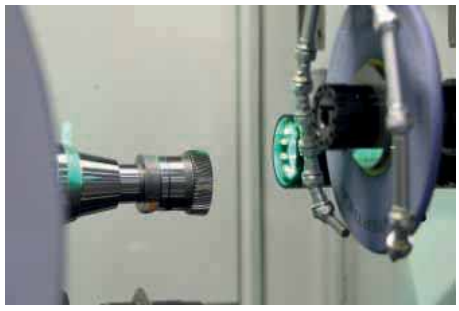
New GCX Linear meets the needs of a growing skiving cutter market

Tailored to finish all operations for skiving cutters and shaper cutters in a single setup, the GCX Linear offers a comprehensive gear cutting tool package.

Launched at EMO 2019, the GCX Linear builds on the best aspects of ANCA's proven technology to offer a purpose-built solution for manufacturing and sharpening skiving cutters. With a 5-axis CNC grinder powered by LinX linear motor technology on X, Y and Z axes, the GCX Linear also comes with features specially designed for skiving cutters and shaper cutters.

Xiaoyu Wang, product manager at ANCA says: "ANCA is responding to the increasing popularity of skiving and resulting surge in demand for skiving cutters. We want our customers to have a complete solution for manufacturing and sharpening skiving cutters and the GCX Linear will set the new benchmark for skiving cutter grinding.

"Dressing the complex wheel profile is critical and ANCA has therefore developed the latest acoustic emission monitoring system (AEMS). AEMS can be taught to pick up the right sound of perfect dressing even in a noisy production environment. Built upon supervised machine learning algorithm, AEMS ensures the wheel profile is dressed within micron accuracy with the least possible time while minimising the reduction in size."



Tailored features and industry firsts of ANCA's new GCX Linear include: motor temperature control (patent pending), minimises machine warmup time, and delivers optimal thermal stability during grinding; full process virtualisation on design station before grinding - Design, Optimise, 3D Simulation, MRR Estimation and more; in-process dressing with acoustic emission monitoring system (AEMS) and supervised machine learning algorithm; dedicated gear cutting tool software package; 5-axis CNC grinder, with LinX linear motor technology on X, Y and Z axes. 37 kW (49 HP) peak power direct drive spindle with BigPlus arbor; high accuracy headstock offers greatly improved index positional accuracy.

Introducing another ANCA innovation - Motion Temperature Control (MTC)

MTC is a patent pending innovation built into the motor spindle drive firmware. Smart control algorithm actively manages and maintains the temperature of motorised spindles in the GCX Linear. Benefits delivered by this feature include:

Dramatically reduced machine warmup time, meaning you can start grinding tools sooner, knowing the machine has reached thermal stability. This improves productivity and machine utilisation.

Consistent thermal stability of the spindle over time regardless of changes in spindle load or speed, or spindle cooling coolant temperature. This greatly improves dimensional stability of grinding results.

GCX Linear powered by LinX

Offering reliability and high performance through its unique cylindrical design LinX linear motor technology for axis motion (X, Y and Z axes), in conjunction with linear scales, achieves superior precision and performance. Specially designed for a lifetime of operation in harsh grinding environments, the LinX motors have a cylindrical magnetic field, which means there is no additional down force on the rails or machine base.

With no temperature variations (meaning no need for a separate chiller unit) and being sealed to IP67, there is minimal wear and tear so that the machine accuracy remains over the lifetime of the machine. The LinX linear motor has higher axis speed and acceleration, leading to reduced cycle times while maintaining a smooth axis motion.

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Two in one: VHybrid 360 masters grinding and eroding

Sharpening specialist VOLLMER presented its new VHybrid 360 grinding and erosion machine at EMO 2019. This machine combines technologies and experience that VOLLMER has gained in the fields of grinding and eroding over many decades. It can be used to machine Solid carbide or PCD (polycrystalline diamond) tools in one setup. The VHybrid 360 not only provides tool manufacturers with high efficiency for reduced machining times but also maximum precision. A wide range of automatic settings enable unmanned use of the machine around the clock. With the new VOLLMER tool manager, users can manage the automatic switching of up to eight grinding or eroding wheels intuitively.

Tool manufacturers can use the VHybrid 360 to grind and erode carbide and PCD tools like drills, milling cutters or reamers in one combined setup. The VHybrid 360 is based on multi-layer machining, which is implemented through two vertically arranged spindles. Here, VOLLMER is using the tried-and-tested technology of its VGrind grinding machine series. With the VHybrid 360, the bottom spindle can be used both for grinding and for eroding, while the top spindle is reserved exclusively for grinding.

The new VHybrid 360 grinding and erosion machine from VOLLMER gives tool manufacturers the flexibility to perform fully-fledged grinding and erosion processes on both standard and special tools

Combining the best of two worlds

With the VHybrid 360, VOLLMER has not only combined the best of both worlds for grinding and eroding, it has also further developed proven technologies. From the world of erosion, VOLLMER has incorporated knowledge gained through more than three decades of working with wire erosion and wheel erosion machines from different model series. The key component is the VPulse EDM erosion generator, which sets new standards when it comes to efficiency and surface quality. From the world of grinding, the ultra-modern machine concept of the VGrind series ensures high precision in tool machining: Both spindles of the VHybrid 360 are arranged vertically in the pivot point of the C axis, which guarantees high profile accuracy and enables exact grinding and eroding processes. In addition, the tool machining times can be reduced thanks to the shorter linear-axis travel distances as well as the unique spindle arrangement.

Making tool production more flexible

The VHybrid 360 can be used to produce different machine tools, which are used for machining procedures with materials such as wood, metal or composite materials. The VOLLMER machine gives tool manufacturers the flexibility to perform fully-fledged grinding and eroding processes on standard and special tools, regardless of whether the blanks are made of carbide, sintered PCD or brazed diamond tips. The machine can be used for tools with diameters of up to 50 mm and lengths of up to 360 mm. Depending on the configuration of the grinding wheels or rotary electrodes, larger diameters are also possible. An optionally available steady rest ensures stability for long tools. A new 5-axis control guarantees precise execution of the grinding and eroding processes.

Easy to operate and enables unmanned operation

A range of automation solutions enables unmanned machining around the clock: For example, the HC4 chain magazine can hold up to 39 HSK 63A toolholders. In addition, up to eight grinding and eroding wheels including coolant supply can be exchanged fully automatically in a process managed in the VHybrid 360 by the newly developed

VOLLMER Tool Manager for the first time. With this, machine operators can select the grinding and electrode sets intuitively and easily using drag and drop.

The combined grinding and erosion machine is operated based on the established VOLLMER control panel concept with height-adjustable and pivoting touchscreen. The grinding and eroding processes are programmed, simulated and monitored via the ExLevel PRO 3D software. The axes can be selected and moved with the VOLLMER multifunction handwheel. In addition, the machine has a dressing device for rotary electrodes and an integrated wheel probe for ultra-precise calibration of the grinding and eroding wheel packages in the process.

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Increase performance and productivity with custom-made special clamping devices

As a development partner, Haas Schleifmaschinen designs individual clamping devices according to specific customer requirements. You can tell at first glance that what comes along in such a high-quality package takes its task seriously. This collet chuck from Haas was developed according to customer requirements.

"A high-precision, repeatable result can only be achieved in interaction with all relevant components. This is why clamping devices are an extremely exciting topic for us," emphasises Thomas Bader, managing director of Haas Schleifmaschinen. "After all, the clamping device is the direct interface between the blank and the grinding machine and no chain is stronger than its weakest link".

The optimal clamping device, which is aligned to the workpiece, not only guarantees the highest holding forces and an exact form or force closure, the perfect clamping device is mainly responsible for the transmission of many other requirements in today's grinding operation. Automated production is particularly driven by cost optimisation while simultaneously increasing quality and process reliability. The desire for speed, precision and cost efficiency requires that all reserves are exhausted in order to be able to exploit further potential.

You can tell at first glance that what comes along in such a high-quality package takes its task seriously. This collet chuck from Haas was developed according to customer requirements

Minimum set-up costs, maximum flexibility and extreme precision

In the precision tool grinding of indexable inserts, cutting inserts, drills, milling cutters, threading tools or reamers, Haas has observed two developments for years:

Firstly, the automated manufacturing of ever smaller batch sizes. The times when tool grinders could produce the same standard product for years are a thing of the past. Today, production processes are required that are extremely flexible and efficient in mastering new tasks faster and faster. This results in significantly higher process reliability, lower control costs and consistently high precision, ergo: safe, fast, economical and repeatable. Special tasks have become standard.

Secondly, automated large-scale production. Over large quantities, extremely precise, reproducible production results must be delivered. Here, too, process reliability, cost-effectiveness and repeatability are mandatory. Here, too, complex tasks and requirements change much faster than in the past.

Conclusion: The customers demand significantly more flexibility and more efficiency in the entire production chain.

Up to the last µm

In view of the uncompromisingly high requirements in tool manufacture, a few thousandths of a millimetre are decisive for the quality of the finished product. Best surface results, highest reproducibility, increased tool life, good accessibility to the workpiece and significantly higher grinding speed can only be achieved with a perfect clamping device. The individual clamping device, as the link between the machine and the workpiece, has a decisive influence on the entire process sequence. Here Haas Schleifmaschinen works hand in hand with clamping device specialists.

Special clamping devices from Haas made-to-measure

However, there are always specific customer requirements that require special solutions. These clamping devices are made-to-measure products, adapted to a customer-specific production of very special workpieces. Here the designers leave nothing to chance. They develop the suitable clamping device for the respective task themselves, adapted to the production sequence in the Multigrind® grinding machine and to the respective customer requirements. "With our engineering know-how, we are part of the solution and therefore always at eye level with the growing needs of our customers. Haas Schleifmaschinen is known to its customers as a system supplier and not just as a machine manufacturer. This is the only way we can finally get the valuable impulses from the rapidly developing market. These impulses demand top performance from us and thus consolidate our outstanding position in the market," emphasises Thomas Bader.

Haas Schleifmaschinen has all components under control. From the Multigrind machine to the Multigrind Horizon software to perfectly matched and tested clamping devices. The big advantage for the customer: one system provider for the best possible grinding results.

The perfect drive for the perfect clamping device

With the Multigrind series, Haas has real all-rounders, which is already derived from the name. But the fact that these all-rounders are really specialists is often only discovered by customers at second glance.

Timo Zepf, product manager for Clamping Devices at Haas Schleifmaschinen, comments: "We are resolving a contradiction that has not existed for a long

time. We are responding to the demands of many customers for more flexibility and production conditions that could previously only be achieved with several different standard grinding machines."

The future of tool grinding

Particularly in the leading discipline of tool grinding, a great deal has changed over the past five years. Haas started in 2015 to develop the perfect tool grinding machine for the future. With the extremely compact Multigrind CU with integrated tool changer, production is extremely economical, repeatable, precise and fast. Due to the short setup times, even smaller special orders pay off. As a production unit with three, four or more grinding machines in series, an automated mass production can be organised that deserves its name.

Consistently eliminating risks before the start of production

Best concentricity accuracy is mandatory and can only be achieved with high-precision clamping devices. A stable design of the clamping device and its high rigidity prevent vibrations that could lead to a wobble in extreme cases. The extreme stress caused by the grinding of carbide tools bears risks which are often only recognised in continuous use. Standard clamping devices, but also many high-quality multi-range chucks, repeatedly reach their limits in continuous operation with fatal consequences in the production process. Complex maintenance, constant monitoring and cumbersome readjustment are the result, and in extreme cases quality suffers.

Thomas Bader advises: "The combination of perfect clamping technology, intelligent machine control and state-of-the-art high-tech grinding machines can realise the required potentials, and this is the only way we can turn our customers into real winners."

"The intelligent machine control software Multigrind Horizon is the brain," says Thomas Bader, "the Multigrind CU is the trained athlete and the clamping device is the hand that does everything"

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Meltham Carbide invests in Rollomatic

Meltham Carbide Precision, located near Huddersfield, has become one of the latest UK-based companies to invest in a Rollomatic CNC Peel Grinding machine.

Founded in 1976, Meltham is owned and managed by Eric Charlesworth, is a specialist manufacturer of plug gauges and components such as punches, mould and core pins, and blank carbide rods for the cutting tool industry. It has a broad customer base across a wide range of industries including Formula 1, aerospace, toolmakers, fasteners, medical and cutting tools. Meltham's capacity includes centreless grinding, surface grinding and cylindrical grinding with capabilities for producing parts in a wide variety of materials including steel, carbide and ceramic.

While the largest market for Meltham is the UK, it is also successfully exporting to countries all around the world including Taiwan, Egypt, Germany and Italy.

Eric Charlesworth had been aware of the Rollomatic tool grinding machines for some time and had identified a need for grinding his parts to a higher precision and reducing manufacturing times, in particular removing the need to transfer parts across several different machines to arrive at the finished result. He was therefore looking for a machine capable of producing parts to the highest precision in a single automatic operation; including an ability to produce large batches of parts and to run all night unmanned, while equally producing very special tools in small batches during the day.

As the purchase of the machine would be the largest single investment ever made by the company, it was of course very important that the very best and most capable machine was chosen and so investigations were carried out over some months that including visiting the MACH show in April 2018 where Eric and his colleague Peter Nash visited the Advanced Grinding Solutions stand and saw the Rollomatic NP grinding machine.

Having received a demonstration, they were attracted by the machines pinch and peel grinding method that ensures that the grinding operation is always carried out immediately adjacent to where the component is supported. This allows parts with a very large length to diameter ratio to be machined with ease with component part lengths of up to 400 times the part diameter to be ground without deflection issues and with diameters then controlled to under 0.002 mm across large batches of ground parts.

Eric Charlesworth and Peter Nash with their new Rollomatic machine

Meltham continued looking at many different grinding machines before deciding to opt to purchase the Rollomatic machine in January of this year.

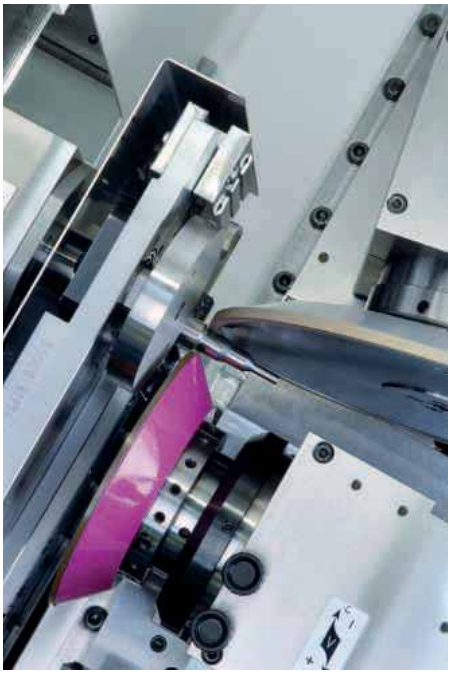
Explaining his choice of machine, Eric Charlesworth comments that the Rollomatic Shapesmart grinder is the only proven solution available in the marketplace that gives him the flexibility, degree of high precision and mirror like surface finishes that is needed to produce his components in one automatic operation. While other machines are available, these mostly do not offer the ability to both rough and finish grind in one operation and, in the case of the Rollomatic, both at the same time if desired and as a complete package he could not find better.

He further quantifies how the Rollomatic machine has improved the manufacturing efficiency at Meltham Carbide and states that just one example of how the machine has improved their efficiency is in manufacturing a set of 10 carbide punches 6.350 mm Ø x 110 mm long with a point, radius and three different diameters with 5-micron tolerances. This would have taken a full day to manufacture previously and now on the Rollomatic it takes just 15 minutes to set up and around two hours grinding time. The surface finish is also much better and the lengths and diameters are all well within tolerance.

The NP Machine Loader

Meltham Carbide decided to send engineers to Rollomatic's HQ in Switzerland for the operator training course and

commented that they thoroughly enjoyed their time in the state-of-the-art factory and that the training was excellent and while "full-on" was extremely helpful and informative.

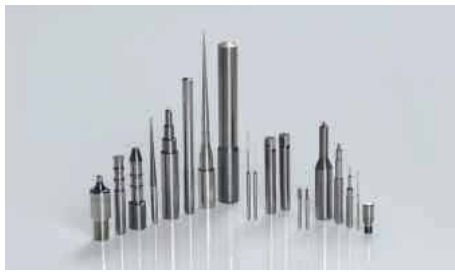


The Rollomatic NP5 in action

The Rollomatic machine that is now installed into Meltham Carbide's works has a general working range for parts from 0.025 mm to 25 mm in diameter with the autoloading of up to 1,000 parts from pallets via a fully integrated 3-axis robot loader. The multi-axis Shapesmart NP3+ machine allows for stepped diameters, angles, tapers and chamfers to be ground with ease.

The software in conjunction with the rough and finish grinding wheels setup allows users to specify multi-pass grinding operations for roughing and/or finishing to achieve the highest possible level of accuracy whilst creating superior surface finishes on tapers and radii. Even the longest of tools are produced with runout of concentricity of under 0.001 mm from this high precision grinding machine.

Renishaw and Marposs gauges are used for part positioning and for the post-process automatic gauging of ground diameters with automatic feedback to the Rollomatic machines FANUC control. This ability to automatically gauge parts upon loading and again after grinding was important to Meltham as it has allowed it to introduce



unmanned production overnight in the knowledge that parts are machined to great accuracy without the need of operator intervention and furthermore should the gauge detect any unwanted change in quality it will stop ensuring no batch work is scraped off. Eric Charlesworth comments that the best advantages the Rollomatic machine brings to Meltham Carbide is use of the 'lights out' feature which means that they can now set up a job and leave it running during the night or even over the entire weekend using the robot loader and Marposs auto measuring system.

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Highest level of cleanliness for hydraulic components

Fast and efficient cleaning processes thanks to twin-frequency ultrasound

For a manufacturer of innovative hydraulic components, extending capacity and meeting stricter cleanliness requirements were the key reasons to invest in a new cleaning system. The final choice was a single-chamber aqueous cleaning machine that incorporates 25 kHz and 40 kHz ultrasonic frequencies from Weber Ultrasonics. The simultaneous use of both frequencies facilitates fast and economical cleaning at high process quality.

Since it was founded in 1985, Hydraforce has developed into the world's leading supplier of hydraulic screw-in valves, electro-hydraulic controllers, electrical vehicle control systems and customer-specific control blocks. The products are used in industry and the mobile market, among other things for tractors and attachments, harvesters, wheeled loaders, excavators, lifting and conveying equipment, as well as hydraulic ramps. The company's success factors include the high quality, efficiency and cost-effectiveness of its products, which result from high-grade and precise manufacturing.

The new facility allows achieving very high cleanliness requirements for a wide range of parts quickly and efficiently. A major contribution here makes the ultrasound equipment (photo from MecWash Systems Ltd)

Quantitatively and qualitatively stricter cleaning requirements

This also requires the stainless steel, carbon steel and aluminium components to be extremely clean. "In hydraulic systems, cleanliness plays an enormous role in equipment quality, reliability and lifespans." "At HydraForce we take ownership of the cleanliness of our products and pride ourselves on being able to deliver products to our customers which meet the ever increasing cleanliness requirements," says Michael Gillbee, manufacturing engineering manager at HydraForce.

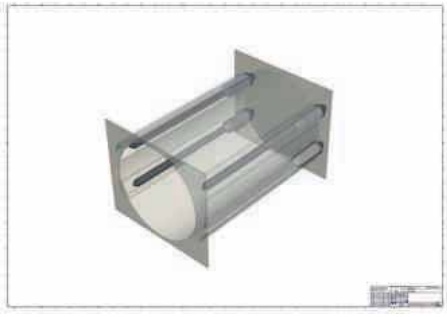
Until now, five cleaning systems from MecWash Systems Ltd, which has been a Hydraforce supplier for 19 years, were used for this purpose at the facilities in Birmingham, England and Changzhou, China. The systems manufacturer with global operations specialises in the development and manufacture of aqueous cleaning systems for complex components and parts that are required to meet strict cleanliness specifications both reliably and economically.

The constantly growing demand for their hydraulic components meant that Hydraforce recently had to expand its manufacturing capacities. This also involved the investment in a new cleaning system from MecWash. "The new system should firstly be capable of cleaning a very large number of components both quickly and efficiently. However, it must also be able to reliably work to stricter cleanliness requirements than we generally see today," reports John Pattison, director at MecWash. The soiling to be removed comprises swarf, oil and cooling lubricant residues, as well as brazing residue.

Faster and cleaner thanks to twin-frequency ultrasonic output

The system manufacturer designed a single-chamber cleaning unit for this task which employs an aqueous medium. Depending on the component, cleaning is performed as set parts or goods in bulk. To cater to both the quantitative and qualitative requirements, the new system employs twin-frequency ultrasonic output. In terms of the ultrasonic components, MecWash went with solutions from Weber Ultrasonics AG. "We have been working with this manufacturer's products for a long time and have always been more than satisfied by their high quality. We have also been impressed by the technical expertise of their employees. Last but not least, their service is always available quickly when we need it," comments John Pattison, explaining the reasons why MecWash decided to go with the component manufacturer from Karlsbad in Southern Germany.

Two Sonopush Mono HD rod transducers, each with 25 kHz (1,500 W) and 40 kHz (1,200 W) output, are integrated into the system's chamber. These patented heavy duty rod transducers can be used up to



Two Sonopush Mono HD rod transducers with 25 kHz (1,500 watts) and 40 kHz (1,200 watts) each were integrated into the working chamber (photo from Weber Ultrasonics)

temperatures of 95°C and also work reliably in 24-hour continuous operation. They therefore meet the strictest cleanliness requirements with shorter cleaning cycles and greater throughput. The ultrasonic solution is rounded off by power-adjusted Sonic Digital HS2 generators. On the system component, designed as an integrable, top hat rail-compatible unit, the power output can be controlled in the range from 50 to 100 percent in one percent steps. This facilitates optimum matching to parts-specific cleaning programmes.

The rod transducers can be operated independently or simultaneously. The latter makes it possible to meet high cleanliness requirements in short cycle times with a broad component spectrum (photo from MecWash Systems Ltd)

Integrated features such as frequency monitoring, fan control, temperature management and dry running protection ensure maximum operational reliability and contribute to the high process quality. Thanks to inclusion of a Profibus or Profinet interface, the generators can be integrated into higher-level control and/or remote maintenance processes.

"We are able to run ultrasonic with two different frequencies, either separately or simultaneously to achieve the highest degree of cleanliness across our wide range of different components," explains Michael Gillbee.

Although the two frequencies can also be used individually, the intended use is parallel operation. This allows a much larger spectrum of particles to be removed in a single cleaning process and delivers significantly better cleaning results than the existing cleaning systems, which employ only the 25 kHz frequency.

"We believe that MecWash's innovative use of ultrasonics could have many applications in precision engineering where a wide spectrum of contamination may be present. The ability to deliver such high cleanliness standards within a limited cycle time is very valuable," adds John Pattison.

Weber Ultrasonics AG develops, produces and markets solutions and components for the industrial deployment of ultrasonic technology. It specialises in cleaning, welding and cutting with ultrasound as well as in other special fields of application. The company is certified to DIN EN ISO 9001:2008 and has already won multiple awards for exemplary corporate management.

MecWash Systems Ltd specialises in the design and manufacture of a complete range of aqueous parts cleaning and degreasing systems for metal and plastic engineering components. The capabilities include laboratory analysis of complex component cleaning issues and specifying or developing specialist detergents. More information at **www.mecwash.co.uk**

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MecWash recommended by leading machine tool manufacturers

Birmingham-based volume parts manufacturer, Falcon Engineering Productions Ltd, has invested in a MecWash Solo 400 aqueous parts washing machine following several recommendations from machine tool manufacturers

Before investing in the MecWash Solo, Falcon used paraffin-based cleaning to remove swarf and grease from the parts it manufactured, but decided to change from this method as it was time-consuming and quite messy. The company sought advice from a number of machine tool manufacturers and MecWash was the name that kept on being mentioned, as managing director Laurence Foster confirms: "We spoke to a number of our contacts and they all recommended MecWash as the go-to company for cleaning and degreasing machines.

"We chose the MecWash Solo 400 due to its compact footprint and its high-performance wash capabilities and we have been extremely impressed with the results. The Solo achieves far higher standards of cleanliness than the previous method we were using which we are very pleased with."

The Solo has been developed to satisfy the needs of inter-stage, in-cell and in some cases final machined component cleaning to high standards, making it perfect for Falcon as a number of the parts it machines undergo secondary surface treatments such as heat treatment.

MecWash's managing director, John Pattison says: "The Solo is available in three sizes, all of which provide rotational washing, mist rinsing and hot air drying in a very compact footprint, saving on valuable floor space.

"Suitable for use in a wide range of manufacturing sectors, the Solo is one of our most popular machines. It far outperforms traditional dunk washers, rotary basket and tunnel washers in terms of both cleanliness and effective drying."

Falcon also installed an Aqua-Save Junior waste wash water recycling system to minimise the volumes of water used and reduce coolant wastage, as well as disposal costs.

John Pattison continues: "MecWash cleaning systems are renowned for their robust construction and ability to provide a consistently high standard of cleaning even when running almost continuously, which is vital for machine tool manufacturers whose own reputation may be at stake if they supply or recommend inferior equipment.

"Over the past 20 years, MecWash machines have proved that they can be trusted and this capability is demonstrated by the fact that we are chosen by leading machine tool manufacturers and are frequently invited to attend their Open House Events."

Pegler Group invests in latest MecWash MWX400

25 years after installing its first MecWash Midi system, one of the world's leading manufacturers of advanced plumbing, heating and engineering products is continuing to invest in what it considers to be the best aqueous component cleaning system.

The Pegler Group, based at Doncaster in South Yorkshire, distributes its range of plumbing fittings to more than 110 countries worldwide.

In 1994, the company turned to Tewkesbury-based MecWash for a washing system to replace its inefficient dunk wash machine and rotational basket spray wash machine. Pegler was so impressed with the levels of cleanliness produced and the ever-increasing throughput, it went on to install three more MecWash systems over the next six years.

During that time, Pegler has seen

significant growth and like other component manufacturers, it demands ever increasing levels of cleanliness to cater for the expectations of its own customers.

Committed to the MecWash systems and based on the excellent cleaning results over the past quarter of a century, the company has invested in the MWX400, one of the latest generation of precision cleaning systems.

Steve Potts, production engineer at Pegler Yorkshire, says: "With growth, we have seen a need to increase the levels of production and that means having a washing system capable of keeping pace without compromise to cleaning results.

"The existing systems we have still work very well and continuously maintain our high levels of cleanliness and have always been durable and reliable. The addition of the next generation MWX400 ensures even greater integration with our production systems and it can be adapted more easily for future growth.

"Most importantly, the MWX400 is producing even higher levels of cleaning standards than is expected. It is an exceptional washing system that will adapt to our future production growth and cleaning demands. It is also highly efficient, ensuring reduced costs."

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New MicroCare website helps companies with green cleaning goals

MicroCare Corp. has developed a dedicated webpage to help guide companies looking for greener and safer cleaning alternatives to Trichloroethylene (TCE). The online information is part of the MicroCare goal to share its expertise on new high-performance cleaning fluids engineered to meet strict global environmental regulations.

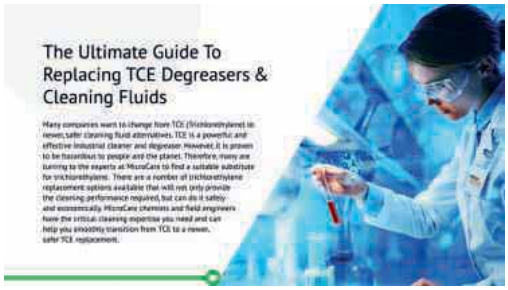
MicroCare is at the forefront in the research and development of modern cleaning fluid alternatives to nPB and TCE, but also in sharing their findings and expertise at various trade shows and events. The new webpage, appropriately titled "The Ultimate Guide to Replacing TCE Degreasers and Cleaning Fluids", provides in depth information on the potential hazards of TCE and how changes can be easily implemented into current cleaning processes.

"Many companies may still consider using TCE despite its harmfulness," explains Tom Tattersall, MicroCare chief operating officer. "There are a variety of reasons for this. It is less expensive than the trichloroethylene replacement cleaning fluids on the market today. However, the risks of using TCE far outweigh the benefits. Responsible company owners, plant managers and environmental safety and health officers are now looking for better choices that will be more efficient, easier to maintain and less hazardous for workers and the environment.

"We felt it was essential to explain why switching from legacy cleaning fluids to modern alternatives was so important. The webpage offers information on how TCE is not only putting workers at risk but is also affecting the environment by contributing to global warming.

"It also guides readers through how making the switch to safer fluorinated fluids is simple and does not always require expensive investment in new equipment."

Choosing the next generation TCE-free cleaning fluid is having a huge impact on companies who have made the switch. As well as having excellent toxicity profiles making them safer for people and the planet; they are just as efficient. Those who have made the move are also benefiting from consistent cleaning quality, improved throughput and decreased energy usage.



MicroCare advises those looking to change their cleaning methods to contact a critical cleaning expert who can determine the best TCE replacement cleaning fluid to use. To find out more about how to make the move to safer cleaning fluids visit the new MicroCare Ultimate Guide to Replacing TCE Degreasers and Cleaning Fluids at **www.microcare.com**

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Surface treatment and aqueous washing

Alton-based Turbex supplies the extensive Galvatek range of chemical cleaning, anodising, etching and other surface treatment lines. Established for over 30 years, the world-renowned manufacturer has designed, delivered, installed and services more than 600 turnkey installations in over 35 countries.

It is especially well known in the aerospace industry, as its lines are used in factories manufacturing aircraft parts and engine components as well as in the maintenance, repair and overhaul (MRO) sector. Supply of anodising plant forms a large part of the business. Such facilities comprise one or several lines and typically use TSA (tartaric sulphuric acid) or PSA (phosphoric sulphuric acid).

Chemical cleaning lines are built either for one specific purpose or as part of a larger package where it prepares parts for other surface treatment phases. Turnkey solutions are regularly supplied, complete with wastewater purification and recycling.

Turbex is looking forward to presenting its latest innovations at the MACH 2020 show next April. Photo shows the company's stand in 2018

A Galvatek surface finishing line at Finnish company Patricomp, part of the Spanish Aernnova Aerospace Corporation, modernised to enable surface treatment of aluminium components using TSA (tartaric sulphuric acid), eliminating the toxicity associated with using hexavalent chromium

Turbex is also a market leader in the UK for the supply of aqueous cleaning and drying systems for batch or in-line processing. There are over 100 standard models in the range including front- and top-loading spray washers, multi-stage automatic or manual ultrasonic systems, bench top and floor standing ultrasonic machines, precision machines with basket rotation and flood options, and tunnel cleaning lines.

Some systems use a world-patented system whereby movement of the holding basket and spray jets is individually adjustable, allowing them to rotate in the same or opposite directions. Other equipment is aimed primarily at high-precision cleaning applications in the optics, medical, aerospace, automotive, nuclear and electronics sectors, with the possibility of simulated clean room conditions.

For processing larger parts, Turbex offers the ACV range of PLC-controlled front-loading, spray washing and rinsing models. They are particularly popular for degreasing, phosphating, paint removal, derusting and descaling. Manufactured from stainless steel, the machine programme comprises single- and multi-stage units. Standard sizes range from one to three metres in diameter, although larger dimensions are available.

Non-destructive FPI (flourescent penetrant inspection) testing equipment completes the Turbex offering. Through the company's long experience of component cleaning dating back to 1981, it has developed an extensive knowledge of FPI and the techniques required for testing and reporting. Its systems utilise expertise in automation and process control to provide consistency and traceability.

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Cost-effective and reliable cleaning with CO_2 snow before precision gauging

Trends such as miniaturisation have given rise to new challenges in precision parts manufacturing. If strict tolerances are to be met, each product is carefully checked by gauging after surface precision grinding and honing processes. In order to do this, component surfaces must be clean.

With its quattroClean system, acp offers a solution capable of achieving the required cleanliness, reliably, reproducibly and cost-effectively. In addition, the dry, residue-free and environmentally neutral cleaning technology can be adapted to individual requirements. It is highly compact, easy to automate and simple to integrate into production lines and Industry 4.0 manufacturing systems.

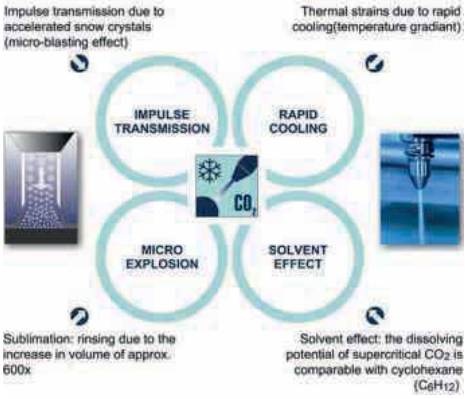
Whether it is the automotive or supplier industry, precision or micro engineering, medical technology, mechatronics, electronics or other industry sector, parts are becoming increasingly smaller. In order to ensure product quality, precision parts are gauged optically, by machine-tool probed, or pneumatically measured after machining, grinding or honing processes. The closer the measurement system can be moved to the previous production step, the better the results that are obtained. However, contaminants left on the parts' surfaces, such as processing media, residues, abrasives, chips and flaky burrs, can be a problem. They may cause measurement errors and result in parts being rejected unnecessarily.

Scalable cleaning solution with CO_2 snow

This is where the reliable and cost-effective snow jet technology from acp systems AG comes into its own. The scalable cleaning system can be easily adapted to diverse component geometries to clean complete surfaces or selective areas.

The environmentally neutral technology uses liquid carbon dioxide as a cleaning medium obtained as a by-product from chemical processes and the generation of energy from biomass. It has an almost indefinite shelf-life and is supplied in cylinders or tanks.

Liquid CO_2 is fed through a non-wearing two-component ring nozzle of the acp system and expands on exiting to form fine CO_2 crystals. These are then contained by a circular jacketed jet of compressed air and accelerated to supersonic speed. The jet of snow and compressed air has a temperature of minus 78.5°C and can be focused exactly where it is needed. When it impacts the surface to be cleaned, a combination of thermal, mechanical, sublimation and solvent effects take place. These four cleaning mechanisms enable the quattroClean system to remove contaminations, such as residuel grinding oils, polishing pastes, abrasive chips and dust from surfaces and tiny bores (blind or through). Since the cleaning step with the non-combustible, non-corrosive and non-toxic CO_2 snow is also gentle on materials, even delicate and finely structured surfaces can be treated.



The combined effect of the four mechanisms of action enable particulate and filmic contamination to be reliably removed. With this, the patented technology enables uniform, dry and repeatable cleaning, which is a prerequisite for accurate gauging results

The aerodynamic force of the jet transports the detached dirt away. This is then extracted from the cleaning cell together with the sublimated CO_2 in a gaseous state. The workpieces are dry on completion of the cleaning process, enabling them to be measured by optical, machine-tool probe or pneumatic gauging system immediately.

Process parameters, such as the flow volume of compressed air and carbon dioxide as well as blasting time, are optimally adapted for each individual application

Compact, easy to automate and targeted control

Thanks to its modular design, the compact quattroClean system is easy to adapt to specific customer requirements. This allows for manual, semi-automated or fully automated cleaning systems to be developed and integrated into existing production, assembly and packaging lines. Cleaning tests are conducted at the acp technical center to accurately determine all the process parameters for the application concerned, such as flow volume for compressed air and carbon dioxide, and the duration of the jet. Material properties and the type of contamination requiring removal are also accounted for. These parameters can then be stored as cleaning programs for flexible system control. Process parameters, such as the flow volume of compressed air and carbon dioxide as well as blasting time, are optimally adapted for each individual application.

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Deburring components for particulate cleanliness

Cleanliness specifications for particles just a few 100 micrometres in size are commonplace in many industries today. Especially in the case of machined components with complex geometries, these specifications can only be reliably fulfilled if an effective deburring process is carried out beforehand. A new solution combines both processes with rapid automation, enabling deburring and cleaning to be merged in a single highly flexible system.

Components are constantly becoming smaller and more complex. This invariably makes them more sensitive to particulate contamination, which results in higher cleanliness demands. Depending on the part and application, specifications such as "no particles larger than 200, 300 or 400 micrometres" must be met. Therefore, especially manufacturers of machined or cut metal workpieces with complex geometries need to go to great efforts to clean the components in order to comply with requirements. Despite these efforts, however, particles larger than those permitted are still often found on analysis filters during subsequent cleanliness inspections. The component, or even an entire batch of parts, will therefore not be cleared for final assembly.

Particulate contaminants are often detached burrs

The cause is often coarse and fine burrs that have been detached during the cleaning process but not completely eliminated. A further cause is handling the parts during the residual contamination check, since burrs can be broken off here as well. Burrs are undesirable fragments of material that form on machined edges, as well as on component surfaces due to material displacement, and are still firmly attached to the workpiece. Since machined workpieces often have areas that are difficult to access, such as undercuts, slots, grooves and internal and intersecting bores, they pose a particular challenge when it comes to deburring. Nevertheless, these machining residues also need to be removed because burrs could loosen in later service and impair the function of the part or even lead to a system failure. This is especially the case with cleanliness-critical components such as hydraulic parts, for example transmissions, brakes and steering systems, as well as valves and housings for motors and pumps.

Despite its significant relevance when it comes to component quality, deburring is often still seen as an unproductive manufacturing step. This frequently results in controversial discussions between users and manufacturers of cleaning systems. Especially where high cleanliness standards are required, it is therefore common today for a system manufacturer only to guarantee the required residual particulate contamination values if parts are clean and completely deburred.

High-pressure water jets for targeted burr removal

In everyday industrial processes, various techniques are employed to remove burrs. These can generally be divided into targeted and non-targeted categories. For components made of steel and aluminium with complex internal geometries, the use of high-pressure water jetting has become established to remove burrs in a targeted manner. Various deburring tools, such as different nozzles or lances, are used for this purpose. These are inserted into the bores and inner geometries to aim a jet of water directly at the burrs. The pressure of the water jet is significantly higher than the later working pressure used to guide fluids such as hydraulic oil through the component. For example, if an oil pump operates at 150 bars, the water jet used for deburring will have a minimum pressure of 300 bars. As a result, any burrs that are not removed by the process do not pose a threat during later operation of the pump.

In order for targeted deburring to be effective, production-related burrs must be defined and the mechanical processes causing them must be known in advance. This information can be used to create a part-specific deburring program, which ensures that the water jet hits the burr in such a way that it is carried away rather than pushed into the bore.

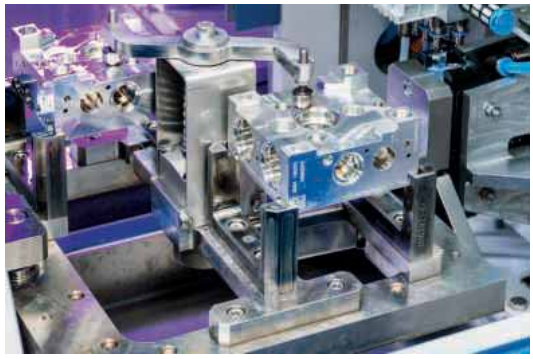
Interface problems - detaching and removing burrs

For reasons of energy and resource efficiency, the lowest possible pressures and water volumes are utilised for deburring, with the result that some chips/particles remain on the components This is because the detached burrs are not rinsed off by such small quantities of water. That is why the components are then cleaned. This is usually carried out in a separate system and mostly in the form of batch processes. Such a constellation poses several challenges for users. Among other things, two separate machines are required to solve the task of "components as clean as required". In addition, process responsibility lies with the equipment user if he has commissioned different suppliers for the two machines. Any cleanliness issues arising are often difficult to solve because the responsibility

for the overall result lies in different hands. Furthermore, cleaning parts in batch processes requires additional handling as well as specially designed workpiece carriers, and the parts are only given a general wash. The critical areas cannot be cleaned in a targeted manner.

Targeted deburring and individual cleaning in a single process

Workpieces with high cleanliness requirements are therefore ideally not only deburred as single parts, but also cleaned in the same process. However, until now very few solutions have been available. The solution lies in a brand new and highly flexible system concept. It features an integrated linear system for component handling, and automation can be tailored to customer requirements. Ecoclean's modular EcoCvelox combines a 5-axis high-pressure waterjet deburring technology with a series of processes for part cleaning and drying. The standard modules are designed for parts with dimensions of 200 x 200 x 200 mm which are fed in on pallets. The various operations can be performed in cycle times of 15 seconds per pallet, with processing time accounting for around 14.5 seconds.



Deburring and cleaning - individually configurable

The modules for deburring, cleaning and drying components can be individually configured and extended as required. High-pressure deburring can be performed with the standard single spindle and a maximum pressure of 1,000 bars (up to 3,000 bars if necessary) or with an optional HD turret that can be fitted with up to five different tools. Both options can be adapted specifically to the part in question. For component cleaning, the processes of injection flood washing, spray cleaning, ultrasonics and targeted rinsing (all combinable) are available. Parts are dried in a high-velocity air-blowing and/or vacuum drying process. The air-blowing unit can also be integrated into a cleaning module, if the cycle time is appropriate.

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New Kemet in-line cleaning system combines spray and ultrasonic

Multi-stage aqueous ultrasonic immersion lines have long been the standard way of cleaning oils and compounds from medical implants and you will typically see these lines at the end of every manufacturing process. For heavily contaminated parts, this means that filtration and regular fluid with detergent changes are needed because even with filtration and surface skimming, the level of contaminates soon effects the cleaning results.

For complex parts with blind threaded holes like stems and femoral parts, there is always the danger of trapped contamination. This can be overcome with fixture design, but lapping, polishing and cleaning expert Kemet International Ltd, along with its partner Finnsonic, now offer modular spray tanks on the Versa Genius ultrasonic systems to quickly remove heavy contamination from any surface, including hard to reach cavities and holes.

In the past, the only spray option has been a separate spray washer, but this usually means the parts need to be manually loaded from one style of basket to another and then manually transferred from the spray wash to the ultrasonic line. With Kemet's new modular spray systems, the spray tank becomes part of an automated line, taking the same basket all the way through the process with no additional manual handling needed at any point.

By having a spray tank as part of the line, it also means that heavy contaminates can be removed by spraying and then these contaminates are collected and kept separate from the ultrasonic tanks, improving greatly the longevity of the filters and extending the working life of the detergents. This dramatically improves productivity and reduces the day to day cost of running the line.

Before spray

After spray

Kemet has non foaming detergents available specifically for spray washing, meaning they can supply a full ultrasonic and spray wash turnkey solution for any challenge.

If you would like to investigate how modular spray washing could improve the efficiency and repeatability of any of your in-process cleaning requirements contact:

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Leading parts manufacturer banks on Rösler shot blasting technology

A new blast cleaning system improves workpiece quality and increases productivity. When a casting is produced, quite a few by-products are generated. Small pieces originating from spills, gates, runners and risers are returned to the casting process as recycling material. To ensure a consistently high overall quality of the raw material, it is essential that this recycling material is perfectly clean without any sand or other residues on the surface.

A renowned automotive supplier therefore decided to subject these by-products to a blast cleaning process in a Rösler multi tumbler system before they are re-melted. This blasting process offers many advantages. Besides the resource-saving use of raw materials, the effective cleaning of the recycling material increases the uptime of the smelting furnaces by significantly reducing the amount of unwanted slag.

Federal Mogul Burscheid GmbH is a global company supplying parts for passenger cars, trucks and off-highway utility vehicles as well as components for agricultural, railway and aerospace equipment. The company also supplies other OEM's active in these and other industries with premium products for maintenance and service. Among others, these include components made from steel, nodular iron, and grey iron castings.

The casting of the various workpieces takes place at various foundries, one of them located in Burscheid, Germany. To increase the company's overall resource efficiency, the spills, gates, runners and risers are separated from the castings at the shakeout station and recycled into the casting process. Prior to re-melting, the contaminants consisting of residual sand and casting scale must be completely removed from the recycling material. For this purpose, Federal Mogul is utilising a Model RMT 70-F drum shot blast machine in its Burscheid foundry. One key factor for investing in this type of shot blast machine was that, compared to other shot blasting systems, it produces significantly higher cleanliness of the recycling material.

Thanks to the unique geometry of the blasting drum, the customer chose the Rösler multi-tumbler for blast cleaning of the recycling material. The drum bottom contains a three-sided pyramid, and the inner drum wall is equipped with specially formed cams. The latter promotes a lateral mixing of the workpieces, while the pyramid in the drum bottom ensures an effective exchange between the upper and lower workpiece layers.

The customer was also impressed by the rugged machine concept that was specially adapted to foundry applications. This includes the sturdy welding construction of the machine frame made from 10 mm thick steel and the blasting drum made from 10 mm thick highly wear resistant austenitic manganese steel. Another feature of the foundry equipment version is the special heat protection of various components. For example, transport belts, plastic components, and electronic components are all heat resistant allowing continuous operation without having to wait for the recycling material to cool down. Special vents in the blasting drum dissipate the heat carried into the drum with the recycling material and thus prevent excessive heat build-up. The special foundry equipment version also includes a large inspection platform, which is easily accessible through various stairways. For quick mounting/dismounting of the turbine and blasting drum, the machine is equipped with a loading beam with trolley consisting of an electrical lifting and lateral transport device. Both ensure easy and quick maintenance of the Rösler multi-tumbler and improve the overall uptime of the blast machine.

The Gamma 400-8G turbine was specially designed for the challenging operating conditions generally found in foundries. In contrast to the traditional Gamma high-performance turbines, the Gamma 400-8G is equipped with eight instead of six throwing blades and contains a wear lining made from solid tool steel, reducing the wear of the throwing blades by up to 25 percent. As with all Gamma high-performance turbines the throwing blades are curved in the special "Y" design. Compared to conventional blast turbines the curved blades produce an up to 20 percent higher blast performance with, at the same time, lower energy consumption. Since both blade sides can be utilised, a simple turn of the blades practically doubles the expected life of the throwing blades. This is easily done with the help of a retaining bolt system and does not require disassembling the turbine.

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RÖSLER® finding a better way ...

New universal blast automation from Guyson

Renowned finishing and shot peening equipment manufacturing expert, Guyson International has created a new universal automated blast system, based on its existing Multiblast® RSB, that now incorporates roof mounted servo drives to provide saturation coverage from the attached blast guns, across the entire rotating table; allowing full blast coverage to multiple components positioned on the table.

This new universal automated blast system will prove ideal for subcontractors or manufacturers with a varied component mix of geometric sizes and shapes with a requirement for a value adding cosmetic finish, shot peening, general deburring, paint removal, aerospace MRO cleaning or surface finishing.

With a standard blast chamber dimension of 1,500 mm wide x 1,500 mm deep x 900 mm high, the cabinet is fitted with a large front opening door allowing easy parts loading access to a one metre wide, painted steel, turntable (polyurethane version available).

As standard, the Multiblast RSB comes with two Guyson model 900 guns, each with its own individual pressure regulator, allowing optimum blast coverage of components on the table. This number can be increased to a maximum of eight guns if the blast application necessitates. A blast nozzle holding clamp option enables the guns to be swapped out for cleaning whilst retaining gun position, stand-off, angle etc. Automated post blasting air wash is also provided, as standard, to remove any blast media residues and leave the parts clean for any subsequent process.

For optimum compoent blast coverage, the machine can be provided with either horizontal or vertical servo driven gun drives. Both provide 500 mm of precise traversing travel, either across the turntable for full saturation coverage or vertically stroking (up and down) taller components to provide uniform coverage, whilst the part rotates on the turntable. Component shape and dimensions dictates were the individual guns are set for the correct angle and stand-off distance to achieve overall coverage of the target surfaces and these can be easily set via a full width, right hand side door, which is fitted for gun set up, adjustment and maintenance.

A complete Guyson RSB automated blast machine installation includes an efficient Guyson model C800 twin cartridge dust collector designed to draw off and collect the dust laden air from the blast cabinet. The heavier extracted particles are deflected downwards towards the collection bin, the lighter particles are captured on the surface of the filters. A magnehelic differential pressure gauge is supplied to monitor the filter cartridge and indicate when the cartridge requires replacing. For applications where the dust represents a health hazard Guyson offer a HEPA grade 14 secondary filter. Typical dusts with health risks are nickel present in Inconel turbine blades and cobalt chrome present in old design orthopaedic implants.

All Guyson Multiblast machines are provided with a human machine interface (HMI) that simplifies operation of the automated blasting, streamlines access to control functions, and enables password-protected direct entry of dimensional data or processing parameters into the system's programmable logic controller (PLC). The panel can also display control settings, production data and system feedback such as sensor and fault indications or maintenance prompts.

This new universal Multiblast RSB blast system allows virtually unlimited scope for custom specification. The system is offered in either suction or pressure feed options, with either a turntable or single spindle for components. Various Cyclone reclamators options are available, all of which provide substantial blast media savings, improve cabinet visibility, and help with a more consistent quality finish. These can be also coupled with enhanced blast media sieving and uprated dust collectors if the application warrants.

Prospective user of Guyson automated blast systems are encouraged to submit sample components for free feasibility testing to the company's extensive development workshop located in Skipton, England.

Guyson's new automated Multiblast RSB machine

Guyson International Ltd is a privately owned family company with a world-wide reputation for excellence in the design and manufacture of blast finishing, spray wash and ultrasonic cleaning equipment, as well as being the UK supplier for all your hose and coupling requirements.

Guyson was formed 80 years ago and the company is delighted to announce that it has achieved yet another milestone, in this its 80th year of business, by being awarded ISO 9001:2015 by the British Standards Institution (BSI). This replaces the previously held 9001:2008 version.

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The No 1 choice for vapour blasting

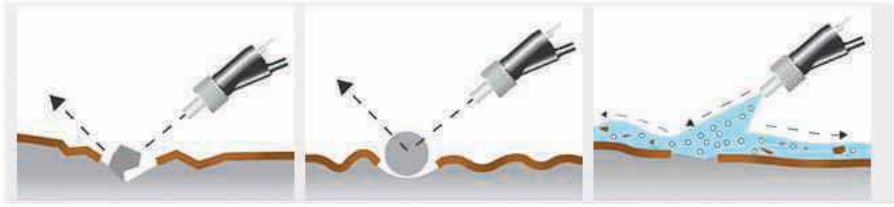
Vixen Surface Treatments is the market leader in the production of wet blasting equipment.

Founded in 1990, Vixen builds thousands of machines every year to world-renowned organisations, with the most popular range being the Aquablast® machines. These wet blasting cabinets ensure a superior finish and are a perfect alternative to dry blasting. With a dust-free process and the addition of water mixed with abrasive, parts are transformed to a like-new condition. Making this machine ideal in cosmetic applications as well as industries such as automotive, medical and aerospace. This process allows for components to be kept cleaner for longer.

The Aquablast machines are manufactured from stainless steel and are available in three different model sizes: 915, 1215 and 1515. As well as this, Vixen can offer completely bespoke models with its in-house designs team to ensure each design meets the individual requirements of any company.

One of Vixen's customers Kane Middleton, director of Outrider Motorcycles says: "Our Aquablast restores metallic items back to their original states in a safe and timely manner with minimal fuss. We've noticed the time spent on the restoration of parts has dramatically reduced as well as the increase of quality of the finished products.

"The accuracy of information and the communication from overseas was fantastic. The machine was fully operational on arrival with detailed manuals to follow. It's a very simple machine to use."



For more information on Vixen's Aquablast range, contact:

Vixen Surface Treatments Ltd
Tel: 01642 769333
Email: bethany.dean@vixen.co.uk
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Wire mesh conveyor shot blast machine

German manufacturer AGTOS offers its standard program of wire mesh conveyor shot blast machines in processing widths ranging from 400 mm to 1,600 mm.

The choice of the appropriate machine concept depends on your workpieces, the required level of performance and, last but not least, on your specific needs regarding an optimized production process. In the event that a standard model does not meet your surface preparation needs, AGTOS will develop a tailor-made blast machine concept for you. The company's team of experts welcomes your detailed questions and looks forward to helping you.

The workpieces first activate a switching threshold positioned in front of the blasting area's entry vestibule. This automatically releases abrasive to the already running high-performance turbines. This ensures that blasting takes place only when workpieces are actually in the blasting zone.

The entry vestibule is equipped with wear-resistant rubber curtains that prevent the escape of abrasive. After passing through the blasting zone, work pieces enter a blow-off zone. Excess abrasive remaining on the workpiece surfaces is removed and returned to the abrasive process loop.

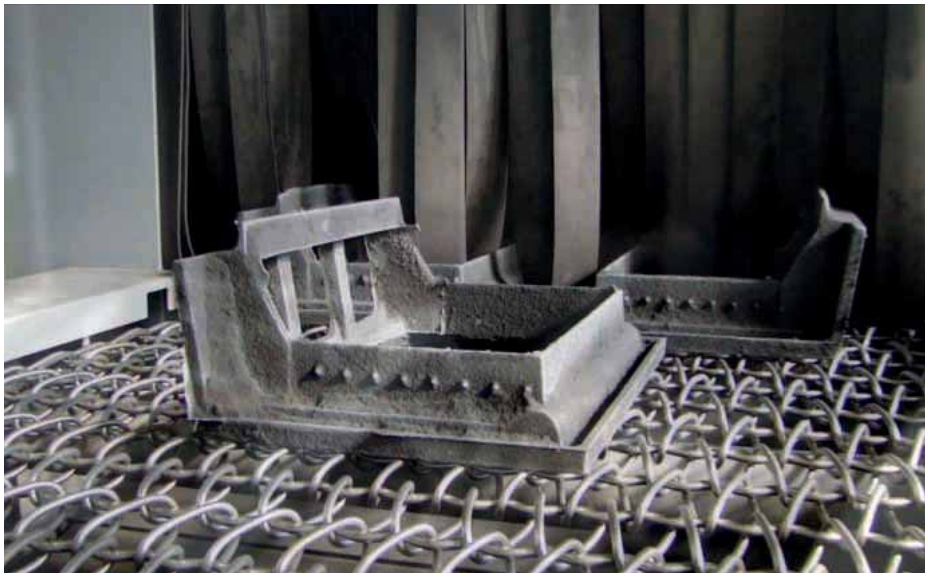
The blasting abrasive is continuously cleaned, recirculated and reused. An abrasive metering device feeds the cleaned abrasive from the abrasive storage bunker to the high-performance turbines.

A fan unit creates the partial vacuum necessary to maintain dust-free operation of the blasting unit. Extracted air is cleaned in a special filter unit.

Wire mesh conveyor shot blast machines are very flexible in their application. The fact that workpieces can be blasted simultaneously from above and below considerably increases the spectrum of work pieces that can be treated. Wire mesh conveyor shot blast machines are used for, among other things, deburring, descaling and cleaning of castings and laser cut parts.

Drum blast machine

To find the appropriate machine concept depends, amongst others, on the work pieces' size, the required performance and on your concept regarding an ideal production process. If there is no way to find a solution using a standard machine, AGTOS will be very pleased to offer you a tailor-made blast machine concept.



The workpieces are in a normal box, which will be placed into a feeder or is directly emptied. The feeder will be lifted and arrives in front of the machine door, which opens immediately. Arriving at the right height, the feeder swings and unloads the work pieces into the drum. According to the sensitivity of the work pieces this process can be made with caution. The control can be made by PLC or manually. Through this, damage is avoided. At that time, the drum is in the loading position. Before the blasting process, the machine door closes and the drum swings into an optimal position in front of the high-performance turbine. Simultaneously, it turns around its own axis.

The blasting process starts and lasts as long as the workpieces are mixed and blasted from all sides. The interior of the blasting cabin is equipped with materials that are very resistant against abrasives. The primary wearing in the direct blasting zone of the high-performance turbines is made of high-resistant, replaceable steel plates. During the blasting process the door keeps closed and could only be opened after the cabin has become dust-free. This takes around 10-15 sec. A slight low pressure exhausts the dust during the blasting process. The dust will be separated in the appropriate filter unit.

After the blasting process, the drum swings into the unloading position. At this position it is also possible to determine the quantity of the workpieces and the intensity

of unloading by using a dosed emptying. The treated workpieces arrive on a screen conveying trough which separates the residual abrasive and transports the pieces to forthcoming boxes.

It's about highly modern machines according to a well-tried principle. Because of many new technical details, the new AGTOS drum blast-machines are convincing. This unit type is very capable for treating bulk material. Compared with the widely used band belt principle there are many important advantages:

Since the drum is made of one piece, crossings from flexible and fixed machine parts are avoided, for example the clamping of workpieces. Furthermore, drums can easily and completely be emptied, that avoids double treatment of each workpiece.

Due to wear resistance perforated manganese steel is used. The size of the holes depends on the dimensions of the work pieces as well as on the graining and the quantity of the effluent abrasives. Sophisticated devices are supporting the mixing of the workpieces.

AGTOS was founded by a special group of individuals who live and breathe surface technology. Supported by a highly qualified staff, this group of experts is at the heart of the AGTOS team. AGTOS was introduced to the market at the beginning of October 2001.

The most important principle of the company philosophy is the complete satisfaction of the needs and wishes of its customers. The ultimate objective is a close and lasting partnership with these customers.

In order to achieve this ambitious goal, AGTOS has left no stone unturned:

The AGTOS team can draw on an enormous wealth of experience in the development, construction, manufacturing and marketing of turbine-wheel shot blast equipment.

With state-of-the-art production facilities at the plant in Poland and a complete warehouse facility at the headquarters in Emsdetten, these new facilities, a streamlined organisational structure and a high degree of team motivation make it possible for the company to manufacture machines and blasting units with the same consistently high quality at an economical price. This equipment line-up is complemented by a complete program of services focused on blasting technology.

AGTOS offers shotblast equipment which is tailor-made for diverse requests. It places a special emphasis on providing perfect service for customers. This applies not only to the blasting equipment we manufacture, but also to other makes of equipment. The service program includes spare parts; modernisation and performance enhancement; repair and maintenance; instruction and training.

On the basis of the surface quality specified, your internal logistics and the spatial conditions, the AGTOS equipment sales team will collaborate with you and the AGTOS project team to develop the perfect solution for you.

The decisive factors are the economic efficiency and operational dependability of the process. The employees have years (and even decades) of experience in the peculiarities of blasting technology. This, combined with modern concepts and design methods as well as innovative ideas, enables them to present optimal suggestions for your operations. A well-equipped test centre with several blasting machines also allows them to demonstrate real blasting results.

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The future is in the hands of those who explore

In the mid-1970s, two friends decided to combine their knowledge of diving and precision engineering and set about creating what has become the most respected scuba diving equipment available in the market.

Their company name, Apeks, is an anagram of the capital letters from the founders' names, Ken Smith Ainscough and Eric Partington and Apeks Marine are now part of the Aqua Lung Group.

The original spirit of precision engineering, craftsmanship and quality embraces their world class production facility in Blackburn and the fact that total control over every manufacturing process continues today makes Apeks scuba diving regulators the industry benchmark for design, quality and safety performance.

Apeks products are designed and tested to thrive in the deepest, coldest and harshest of conditions on earth, because when the environment demands, the only thing that matters is the product quality to keep the diver safe in a life support role.

The general philosophy of the company and attitude applied to the essential quality of their products is the same principle applied when selecting the equipment and determining the processes used in the production of the various components which make up the final product.

Therefore, Jon Kaneen, responsible for surface preparation and plating, set about improving the vibratory finishing process applied to oxygen regulator components and contacted a number of potential suppliers in order to gain their recommendations for improving or replacing the existing setup at the Blackburn factory.

Jon Kaneen with Richard Brent following installation of the first machine

Typical components

Apeks equipment in use

The existing multi-stage vibratory finishing process was based around two circular 380 litre machines which utilised elliptical ceramic media in conjunction with separate paste and powder compounds and an additional liquid inhibition compound. The process had been used for several years but was difficult to control and somewhat "messy ", often providing poor quality results and damaged components. Jon was therefore determined to explore alternatives.

One of the companies which Jon contacted was Walther Trowal Ltd that has a sales and demonstration facility in Birmingham and a 27,000 ft² ceramic processing media manufacturing plant in Stoke on Trent. Additionally, the company completed a purpose built 9,000 ft² dedicated warehouse and distribution centre for all of its products, on land adjacent to the factory in Stoke on Trent, in 2017.

The company was originally founded in Germany in 1931 and is a complete OEM designing and manufacturing a comprehensive range of surface finishing equipment and associated processing consumable products, including the range of ceramic media produced in Stoke on Trent which commenced in 1969. Walther Trowal therefore has a long established foundation in the industry together with a wealth of experience which continues to be developed. Indeed, the sales and technical team of 16 people based in Birmingham have a combined experience in the business and service of 323 years.

Following the enquiry from Apeks Marine, Richard Brent, UK technical sales manager for Walther Trowal, worked in conjunction with Jon to review the existing process and determining ways in which quality and production efficiency could be further improved. The objective was to explore alternatives to improve or replace the existing multi-stage process with a requirement to establish a consistent, totally uniform, damage free, surface finish upon components prior to plating.

Work on the project included free of charge empirical process trials upon sample components in order to determine specific capability of alternative processes along with a working demonstration on production volumes within the process trial and demonstration facility in Birmingham.

Upon installation of the equipment, production operators and management are reported as being delighted with the results which have resulted in a 50 percent increase in components processed per machine load, along with easier operational process parameters by way of a single stage process, a reduction in the number of chemicals and compounds used, quieter semi-automatic operation and moreover a consistent improvement in uniform quality.

Therefore, a subsequent order for a second machine was placed, which was installed and commissioned in September, in order to replace old equipment, enhance the production facility and cater for future product volumes.

Perhaps Jon and his colleagues will draw a parallel with the words of Jacques Cousteau, co-inventor of the first Aqua Lung: "The future is in the hands of those who explore."

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New, safer corrosion preventative product

Industry's growing desire for non-hazardous products that still offer the same performance is driving the introduction of a major product update by one of the UK's leading manufacturers of professional cleaning and maintenance chemicals.

Arrow Solutions, which celebrated its 50th anniversary in 2018, has launched Shield NF this week as its new corrosion preventative, dewatering and light lubricant solution and has already signed up customers from across the automotive, aerospace, rail and oil and gas sectors.

Significant investment has been channelled into updating the firm's hugely popular and approved Shield solution, with the new formula importantly now classified as non-flammable and able to remove a number of environmental and health and safety hazards in the workplace.

It has been developed to provide excellent thin film corrosion prevention and can be used to de-water and flush away residues of oil, grease and other contaminants, whilst also acting as a deep penetrant into threads and mechanisms.

Management at the Moira, Derbyshire-based firm are expecting demand to be high, with estimates predicting that over 10,000 litres will be in operation by the end of 2019.

"Shield NF is being introduced in response to the growing demand from our customers for environmentally friendly and safer products," explains Jeremy Moore, product manager at Arrow Solutions.

"There are a lot of social, financial and environmental pressures on industry to remove the use of hazardous goods and this will only increase with the prospect of new legislation coming into play. Our R&D team have come up with a solution that is no longer classified as hazardous, yet still gives the same level of corrosion prevention as the previous Shield formula."

Shield NF, which has been salt spray tested for 100 hours, offers a number of new benefits from the previous formula, including reduced evaporation, reduced cost-in-use and low odour.

Arrow Solutions' James Lomas and Lynsey Thompson

It also offers enhanced corrosion prevention and is a rapid moisture displacer, with the product available in five and 20 litre containers and in a 500 ml trigger spray, removing the need for costly aerosol disposal.

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Keighley Laboratories flying high with aerospace expansions

With the UK aerospace market continuously seeking to explore new technologies and pushing existing boundaries, competition to provide the highest quality services in aerospace is fiercer than it has ever been. Keighley Laboratories Limited is once again proving its wealth of expertise as the company seeks to expand on its already vast service portfolio of metallurgical testing, analysis and heat treatment.

The latest addition of a Leco ONH836 Gas Analyser to Keighley Labs Chemical Laboratory allows for the robust analysis of materials using inert gas fusion, enabling oxygen, nitrogen and hydrogen analysis. Using this technique, titanium-based alloys are currently in the process of being added to the UKAS 17025 scope of laboratory accreditations. Once fully accredited, Keighley Labs can offer analysis of titanium, in addition to Iron and Nickel based alloys, to the aerospace Industry. The company believes that the UK aerospace market is not being fully serviced in this area. The numerous quality and aerospace approvals required to fully support the aerospace supply chain are not held as extensively elsewhere in the UK as those held by Keighley Laboratories.

Keighley Labs has also invested in additional equipment in the machining department, including a new CNC lathe, to facilitate the quicker turnaround of tensile testing to optimise supply chain lead times. It has also increased its heat treatment inspection capacity with the addition of a new hardness tester and a non-destructive testing line to the Induction Department. Inspection staff are qualified to PCN Level 2 Magnetic Particle Inspection. As stresses are inherent in most materials, this allows any pre or post induction hardening or softening flaws to be readily identified and discussed with the customer prior to treatment.

Debbie Mellor, manager director of Keighley Laboratories Ltd explains: "We've also completed the investment programme of updating our furnace controls, allowing optimum process visibility and control of atmosphere. This ensures Aerospace equivalent standards are applied to our commercial production, which in turn ensures high quality of product. Along with further investments, we have also sought to increase our approval base, with recent Magellan Aerospace and Collins Aerospace approvals."

Keighley Laboratories Ltd has secured a foothold in the highly competitive aerospace market, not only by externally investing but also internally focusing on staff development, processes and equipment to deliver consistent technical excellence.

The company recently exhibited at Advanced Engineering 2019, where the team demonstrated that your metallurgical needs are in the safest hands possible.

Keighley Laboratories was established in 1920 and has been involved in and associated with engineering since its inception. It is a metallurgical services laboratory and a specialist in the heat treatment of metals. It has extensive experience gained from working with companies within industries such as passenger transportation, marine, aerospace, defence, rail, oil & gas.

Keighley Laboratories is respected for its ability to successfully carry out contracts of any size, duration or location within its scope, with the professionalism one would expect from a company established for more than 90 years.

When the company was established, its aim was to provide a testing facility to local engineering firms and foundries, which was as efficient as the in-house facilities of larger companies and at a competitively favourable rate with other subcontractors.

The different types of work carried out in those early days included chemical analysis, physical testing, photomicrography and foundry consultation. All of these services are still undertaken today, although over the years, market and industry changes have meant that facilities have changed vastly and the variety of services offered has now grown considerably. The Heat Treatment Department began in 1926 and has today developed into a large and modern subcontract production facility.

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Spotlight on digitisation and efficiency

What is the current and future impact of digitisation on the surface technology industry? And how can a company successfully meet the challenges of ever-changing energy and environmental regulations? Questions like these will be asked and answered at SurfaceTechnology GERMANY, the trade fair which runs from 16 to 18 June 2020 in Stuttgart, Germany.

As the de facto networking event for the entire industry, SurfaceTechnology GERMANY is the place where promising new customer leads are generated and the latest technology trends addressed. Although there is still a year to go until the fair takes place, preparations are already in full swing to ensure that coating technology users are treated to the full range of surface technology solutions, products and services from 16 to 18 June 2020.

"In 2020, SurfaceTechnology GERMANY will be a magnet for both the surface technology industry and its users," remarks Olaf Daebler, global director of SurfaceTechnology GERMANY for the Deutsche Messe group of companies. "The electroplaters are just as perfectly situated here as the end customer's design engineers, who come to find the right coating solutions for their products."

The top themes at the fair will continue to be energy efficiency and energy conservation, material and resource efficiency throughout the coating process and environmentally friendly pre-treatment.

Overall, the surface technology industry appears to be in good shape. "Taking into account the tough economic climate, the surface technology industry is generally expecting positive sales and is consolidating itself at a high level," says Dr Thomas Schräder, managing director of the General Air Technology Association within the Mechanical Engineering Industry Association (VDMA), adding however that experts were "more cautious in terms of growth expectations for the automotive and supplier industries in the second half of 2019, compared to other surface technology target markets."

The VDMA Surface Technology Association is planning another group pavilion at SurfaceTechnology GERMANY in Stuttgart. The Association's involvement will revolve around the digital integration of surface technology machines and equipment. "Surface technology companies are increasingly concerned with digitising their products," says Dr Schräder. "The joint initiative of VDMA Surface Technology and the OPC Foundation offers interested companies an opportunity to help define the interfaces for surface technology machines. The goal is to use non-proprietary interfaces to facilitate the easy, flexible integration of surface technology machines into future production, while reducing effort and overheads in the process."

An integral part of Surface Technology GERMANY includes the German Surface Technology Association group pavilion (ZVO), which will once again provide an overview of the diversity and efficiency of the electroplating and surface technology process chain. "In 2020, we'll be showing on almost 4,000 square metres of gross display space," says ZVO managing director Christoph Matheis. "Demand is high, and we're expecting more than 75 co-exhibitors to present their products, services and innovations at our Group pavilion.

SurfaceTechnology GERMANY is a horizontal trade fair covering all areas of surface technology. The most strongly represented

topics include electroplating, industrial plasma surface treatment and micro-material processing. Other services include blasting technology, thermal spraying, coating materials, surface treatment, environmental protection, services, pre-treatment, cleaning, measurement, testing and analysis. One advantage of the trade fair is its all-embracing, cross-material approach. It features coating processes for metal, plastics, wood, glass and ceramics. SurfaceTechnology GERMANY also boasts an array of established special events on numerous topics and the cross-industry user forum as the first port of call for knowledge transfer and industry networking at the fair.

Deutsche Messe Tel: 0049 711 18560 2200 www.messe.de

Ajax Tocco, the induction heating expert gets bigger and better

Three of the world's leading experts in the field of induction heating, Ajax Tocco Magnethermic Corporation, Saet-Emmedi and now GH Induction have joined forces, strengthening their position as the world's leading experts in induction heating.

Induction heating is used in many industries for various processes. In very simple terms, it is a non-contact process based on the use of transformers. An induction power supply generates an AC current through a coil/inductor and when a workpiece is placed inside the coil it heats up via its electrical resistivity to the induced current flowing through it. Processes include melting, forging, heat treating, brazing, shrink fitting, curing and welding amongst others. Basically, anything that uses induction technology to heat material, Ajax Tocco can build it and support it.

Ajax Tocco is a US-based company which has been in business since 1916 with a global support network of manufacturing and service centres including Birmingham in the UK. The business manufactures all types of induction heating equipment in sites all around the world. The Birmingham service centre, Ajax Tocco International was opened in 2004: "Here we have the UK's largest induction subcontract heat treatment facility, housing 17 different machines to harden or anneal almost any component our customers send us, from one-off prototypes to continuous batches from automotive first tier suppliers and OEMs," affirms Ajax Tocco's product sales manager, Simon Cockfield.

"The facility also manufactures and repairs inductors and coils that are used for induction heating, anything from a machined crankshaft inductor to a huge coil for melting can be accommodated," he continues. "This is all backed up by a spares

department and a service department, there to provide support to our customers' induction heating equipment for their in-house production."

Although offering a comprehensive subcontract service, Ajax Tocco, as mentioned, is also a capital equipment manufacturer, offering a wide range of induction equipment for melting, mass heating and heat treatment applications.

The acquisition of Saet Emmedi in Italy and GH Induction in Spain has strengthened the Ajax Tocco's group presence in manufacturing induction heat treating equipment, especially in Europe. This is Saet's and GH's speciality, producing highly sophisticated, state of the art machines, mainly for OEMs and first tier manufacturers and particularly for automotive transmission and steering components. Saet and GH machines also offer real time monitoring, with a system that provides remote access to the machines for troubleshooting and offsite monitoring.

Saet is headquartered in Turin, with service centres all over the world, Saet has produced over 4,000 machines since its creation in 1966 with many installed in the UK. Part of the group is Emmedi, a company at the forefront of pipe and tube welding and annealing using induction heating.

GH Induction is headquartered in Valencia and it too has sites around the world, including the USA, India, China, Germany, Brazil and Mexico. The company started manufacturing induction heating equipment back in 1964 and has grown in strength ever since. It has also produced well over 4,000 machines over the years.

"In the heat treatment sector Ajax Tocco, Saet Emmedi and GH Induction machines are used to heat treat a vast range of components from barshafts, camshafts,

crankshafts and stub shafts through to sprockets, steering racks, wheel hubs and roller bearings," points out Simon Cockfield.

"However, we believe that our real selling point is the all-round service we can provide. Leading technology machines from either Ajax Tocco, Saet or GH, a subcontract operation that customers can take advantage of either on a permanent basis or as a backup to in-house production when capacity is short or in the event of a breakdown, plus a comprehensive aftersales service.

"Depending on production volumes, some customers will start by using our subcontract service and then progress onto buying their own machines. Prototypes and trials can therefore be carried out before a machine is actually purchased.

"However, Ajax Tocco's service doesn't stop with the purchase of a machine. A team of skilled service engineers and an extensive range of spares are on hand to get machines back up and running as quickly as possible in the event of a breakdown. Inductor and coil repair are also offered from our expert team of skilled coppersmiths."

Ajax Tocco
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Saet
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Take out the stress

Stress relieve pre-heat treatment v straighten/flatten post-heat treatment

Most engineering components have a residual stress system. Such systems are inherent in bar stock, plates and, to some extent, in forgings and castings. While the residual stress system can be modified by removal of material, further forming of the raw material, and heat treatment processes, modification invariably leads to distortion or cracking.

"Distortion may be rectified by straightening or flattening operations. However, there is always a risk of breakage or cracking with such operations," cautions Roger Haw, managing director of contract heat treatment specialist Flame Hardeners Ltd.

Problems associated with changes of residual stress systems are often found in the heat treatment of rollers, shafts, and pins, together with items such as gear rings, bearing rings, guide bars, machine tool beds, and press brake tools.

Modern machining techniques have led to increased rates of metal removal and, in many cases, use of bar stock to produce complex machined parts on which 50% or more of the original material volume has been removed.

"Cases have been seen where, for the benefit of expedient delivery of cylindrical items, such as rollers and piston rods, available bar stock, has been used which can be 20 percent greater than the diameter finally required. Gear shafts, which may have been made from forgings some years ago, are now manufactured from bar stock and diameters of the length of a shaft can vary by as much as 200 percent," elaborates Roger Haw.

Problems arising from distortion during treatment can be minimised using stress relieving at intermediate machining stages as well as correct jigging during heat treatment. Such a procedure can often eliminate the requirement for straightening after heat treatment. It is a relatively low-cost heat treatment operation, undertaken under controlled parameters and often giving a predictable response, whereas straightening and flattening are risky operations due to the high risk of cracking or breakage.

"Economically, the cost of stress relieving can be easily estimated and included in the overall estimate of cost for the component," continues Roger Haw. "The cost of straightening is not easily estimated as the degree of any distortion to be corrected cannot be easily assessed."

For larger diameters of rollers, piston rods, guide bars etc., warm straightening is the most desirable process, as this makes actual straightening easier and minimises the rick of cracking. It is necessary to heat the component to a temperature in the range of 180 degrees to 250 degrees and to keep it at such a temperature for as long as possible. During the straightening operation, for larger objects there can be a requirement for several re-heats during the process.

"Over many years of processing components that may distort, we have reached the conclusion that it is far more economical to stress relieve at an intermediate machining stage, prior to heat treatment, in order to minimise or eliminate distortion or eliminate distortion during heat treatment than it is to straighten or flatten following heat treatment. A component that cannot be straightened or flattened is just a piece of scrap and often a very expensive piece of scrap," concludes Roger Haw.

Your specialist heat treatment contractor can often assist you at the design stage by recommending suitable treatment routes.

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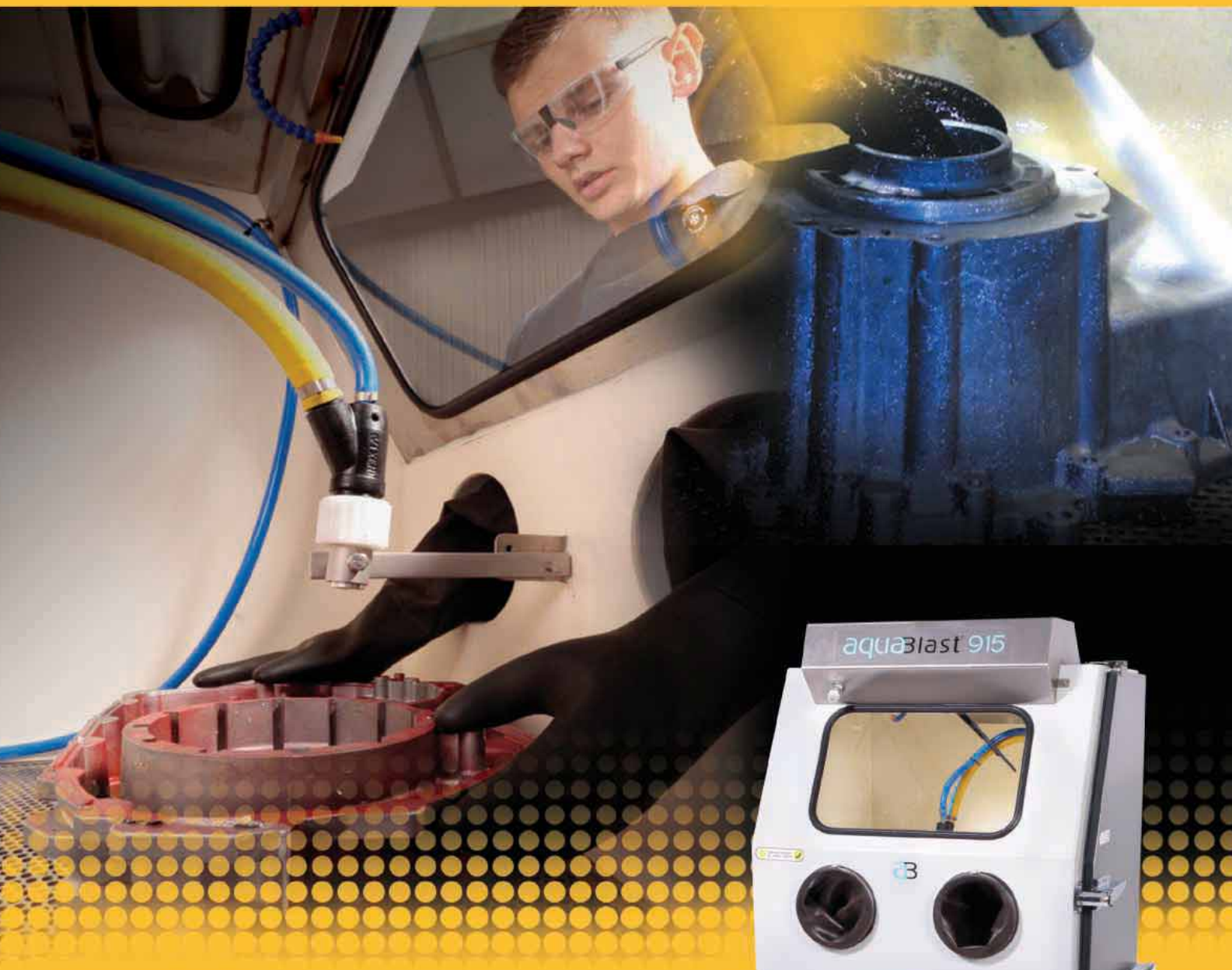

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