SPECTROMAXx with iCAL 2.0
Worldwide the Metal Analyzer of Choice
The Thermal Ceramics business of Morgan Advanced Materials makes a range of fibre and refractory high temperature insulation products used to reduce energy consumption in industrial processes. Its products are also used in passive fire protection applications.

We have extensive experience working with customers all over the world to engineer, design and install high performance insulation in operating environments from 500°C to 1600°C (932°F to 2912°F). We have a proven track record for helping customers to improve operational efficiency and respond to changing environmental pressures.

The Thermal Ceramics business produces a variety of market leading brands including: Superwool® low bio-persistent insulating fibre, Pyro-Bloc® modules, Min-K®, WDS® and BTU-BLOCK™ Microporous products and JM™, K® and TJM™ Insulating Firebricks (IFBs).
industry news

PMT vs CMOS; Dycer Engineering and Foundry graduates; NFTN supports Gauteng Foundry Training Centre; Atlantis Foundries welcomes Pieter du Plessis back to the helm as CEO; Aluminium foundry doyen Charles Rowe passes away; SAIF and AFSA submit application to Department of Environmental Affairs to exclude spent foundry sand as a hazardous waste product; Denel PMP assets up for sale; South Africa bans all scrap metal exports for two months; Hulamin announces they are the first aluminium semi-fabricator to achieve emissions milestone; The 5-inch high bargain ‘brass ornament’; Nelson Mandela’s gold-cast hands; ArcelorMittal South Africa; China’s manganese ore imports rise by 39% month-on-month in June.

international news

New process combines best of 3D printing and metal casting; Brazil’s Asia steel scrap export route blooms amid renewed trade opportunities; Production of high-tech components for the BMW iNEXT starts in Landshut; Historic Saarbrücken Gusswerke finally shuts down; 3D printing technology optimises pistons for the powerful Porsche 911 GT2 RS; Tesla’s single-piece Model Y casting has not been kept a secret; What’s the difference between a $20 and $200 cast iron skillet?; First 3D printed sump cover for F110 engine; ExOne launches sand 3D printing network powered by over 40 binder jetting machines; 3D Systems opens up 3D printing applications with new materials; GA-ASI completes first test flight with metal 3D printed part; Improve wear characteristics with cryogenic processing.

product review

Foseco’s Dycote Safeguard products extend die service life; Grinding Techniques offers complete grinding solutions for the foundry industry; Superwool XTRA low biopersistent fibre for iron and steel; Metkon’s Micracut sample preparation equipment.
Over the past few months, the COVID-19 outbreak has, for most of us all over the world, changed our daily life in many ways. Like many of you we have been working from a home office situation and we have all had to adapt to new ways of conducting business while combining work hours with the need and desire to care for our families. Luckily I do not have the extra worry of organising a daily learning schedule and fun time for children because the daycare facilities and schools are closed. However, as I have said previously, treat this as a privilege because there might never be a time again to spend such quality time with your children and family.

The harm done by this pandemic and the handling of it by governments that have put in place mind boggling regulations, will never be known. Presidents and Prime Ministers were regarded as heroes at the beginning of the pandemic – those that took tough stances and put in place hard lockdown measures – but as time wore on their decisions became foggy and more geared towards appeasing political colleagues rather than the citizens and public that they are supposed to serve. One wonders how many of them (the leaders and their political parties) would survive a snap election. As many bury themselves in more controversy the future for them at the next voting day looks bleak. I should qualify this and say that it wouldn’t apply to those that occupy these positions in first world countries where the majority of the citizens are allowed to vote and they vote with their head and not through fear of repercussion.

We all know that we are living in challenging times and have to adapt. We have been put in a position that is beyond our control. This makes us edgy but we have to show extreme patience. More so than we are used to showing. We have to be disciplined in our behaviour, show empathy, show respect and many other attributes that we may have been lacking in the past. We have had to make hard decisions and experience all sorts of emotions. Including anxiety about health and finances, uncertainty about the length of the quarantine and lockdowns, anger over loss of control, a sense of loneliness and, ultimately, fear of the unknown.

Although, the world as we have known it is going to be very different going forward, we have to be optimistic and positive. In my June 2020 comment I emphasised think local and buy local. It is encouraging to see on various social media platforms that this same thinking is being promoted, and not for commercial gain – just for the love of the country and our fellow citizens. It would be even more encouraging if our leaders worried more about this than the feeding frenzy that they seem to be in. Imagine how exciting it would be if our unemployment rate dropped down to five per cent or even 10%. The excitement of all those companies and jobs that would have been created. The excitement of all the citizens because they have full tummies. The excitement because of all the creativity that would emanate from a positive circumstances. The excitement of corruption being curtailed and that you are willing to pay taxes and as a result the country would not have to borrow money. There are many more to mention. It is possible. We all just have to work together.

Challenging and exciting times

South African Institute of Foundrymen

The aim of the SAIF is to promote and develop within Southern Africa the science, technology and application of founding for individuals and involved industries.

Council Appointments for 2020

Chairperson – Glen Dikgale
Deputy Chairperson – Janley Kotze
Treasurer – Vacant
Other Directors – Enno Krueger, Nigel Pardoe and Didier Nyembwe
Elected Members – Kevin van Niekerk, Andrew McFarlane, John Taylor, Nigel Brains

Address Details
University of Johannesburg Metal Casting Technology Station – Metallurgy; Room G101, John Orr Building, Corner Siemert and Beit Street, Doornfontein, Johannesburg, Gauteng.

Postal Address:
P.O. Box 14863, Wadewille, 1422.
Website: www.foundries.org.za

Executive Secretary
Tel: +27 (11) 559 6455;
Fax: +27 (11) 559 6526;
email: mbiljon@uj.ac.za

Western Cape:
Phiwe Nene
Cell: 072 606 0913;
email: phiwe@live.com

Dates for future SAIF activities
2020 Annual Awards evening - TBA
2020 SAIF Annual Golf Day - TBA
Some things are very good at absorbing moisture...

...your mould should NOT be one of them

Novaset 745

Excessive mould moisture in Alkaline Phenolic binder systems can lead to the generation of hydrogen gas, a major cause of gas defects in castings. Applications with thin-walled castings, high sand to metal ratios and high temperature castings are particularly susceptible to this kind of defect. In many cases defects are only found later, after settling, machining and/or X-ray testing, procedures that cost valuable time and money.

Novaset 745 resin, available from Dzanetech, has proved time and again to substantially reduce moisture absorption in the mould, and that translates into far lower scrap and rework rates.

Tap into tech that saves you time and money
PMT vs CMOS
The paradigm shift in metal analyser detector technologies

The photomultiplier tube (PMT) used in some metal analysers, for high-end applications, is one of the few vacuum tube technologies still manufactured for industrial use.

However, an analyser based on PMTs suffers from inherent shortcomings. For example, it’s sharply limited in the number of elements it can detect. And its design makes it difficult or sometimes impossible to add new elements.

Fortunately, the solid-state revolution is finally catching up to this legacy application. Advanced complementary metal oxide semiconductor (CMOS) detectors made with proven integrated circuit technology have been developed for a new class of analysers. These equal or exceed every benchmark of PMT-based performance. Example: They render reliable results on a greatly expanded number of matrices, elements, and compounds, and can add new ones via simple software updates.

That’s good news for large foundries and primary producers of steel, aluminium or copper as well as secondary metal processors, aerospace and automotive companies, testing laboratories, and governmental or academic labs.

A new white paper Spectro Analytical Instruments details PMT issues as well as CMOS-based flexibility, sensitivity, stability, speed, and more.

Background: The principles of OES
The instruments discussed here are classed as arc spark optical emission spectrometry or arc spark OES analysers. Analysis begins when a metal sample is placed on the spark stand. The stand is internally flushed with argon gas to prevent contamination by elements in the air. An electrode several millimetres from the sample discharges a high-voltage impulse, or spark, which arcs to the metal. The spark vaporises or depletes some of the sample material, atomising and ionising it. This excited material emits energy, which becomes electromagnetic radiation, or light.

Specific spectral wavelengths of that light are characteristically emitted by specific elements. So each element has unique emission spectra, or analytical wavelengths. And the intensity of the light is directly proportional to the concentration level of a given element in the excited sample.

Emitted light reaches the optical system, and its wavelengths are separated by a diffraction grating. The light is directed onto a detector array and associated readout electronics, which provide data to allow the analyser’s software to quantify each light wavelength and intensity. Result: The user can identify and measure each element in the sample.

Note that the process involves numerous complications. The relevant wavelengths encompass the entire ultraviolet
In terms of sample throughput, Spectrolab S meets the metal market’s need for ultra-high-speed measurement. For example when analysing low alloy steel, it can deliver highly accurate measurements in less than 20 seconds.

Emission profiles are complex. Iron (Fe) alone possesses more than 4 000 different analytical emission lines.

Of course, each component of the OES process is important. But the part played by the detectors is especially critical.

The white paper discusses topics such as:
- The trouble with tubes
- The pros and cons of CCDs
- The CMOS solution
- Maximising flexibility
- PMT: One detector, one line, no flexibility
- CMOS+T: Full-Spectrum coverage for maximum flexibility
- Achieving sensitivity and precision
- Ensuring Stability
- Accelerating speed of measurement
- Enjoying industrial-strength durability
- Drawing on dependable manufacturing sources

**CMOS+T: Full-spectrum coverage for maximum flexibility**

CMOS detectors are not limited to one detector, one element. So in the Spectro's analyser, via a dedicated mirror, all of the thousands of pixels on the CMOS detector are exposed to all light lines emitted from the sample. Thus, in addition to efficient single-element focus, the system can capture full coverage of every wavelength on the entire relevant analytical spectrum simultaneously, from 120 to 780nm. This full-capture range exceeds anything possible with a PMT-based analyser.

Spectro’s proprietary CMOS+T technology delivers flexibility that allows the instrument maker to design the optimal optical configuration for each customer, regardless of application. For example, users may specify any combination of the 10 standard primary metal producers’ matrices: Iron (Fe), aluminium (Al), copper (Cu), nickel (Ni), cobalt (Co), magnesium (Mg), titanium (Ti), tin (Sn), lead (Pb) or zinc (Zn).

**Conclusion**

Spectro Analytical Instruments possesses years of experience designing metal analysers using both PMT-based and CCD-based detectors. In fact, a previous model of their flagship metal analyser Spectrolab offered a hybrid PMT/CCD system, designed to maximise these technologies’ complementary capabilities.

The continued development and optimisation of CMOS semiconductor detectors has transformed the paradigm. Today, using an all-CMOS detector array, coupled with Spectro’s proprietary CMOS+T technology, instruments such as the new Spectrolab’s analyser have proven to meet or exceed every aspect of both CCD- and PMT-based performance.

To view the full version of the white paper visit: https://www.spectro.com/landingpages/sma-spectrolab-wp-pmt-vs-cmos-the-paradigm-shift-in-metal-analyzer-detector-technologies

For further details contact Spectro Analytical South Africa on TEL: 011 979 4241 or visit www.spectro.com
What to change will obviously vary from company to company and industry to industry. Often, the answer to this question is presented to us by external forces. For example, changes in products will typically be dictated by customers. Changes in processes may also be customer-dictated, especially if they are based upon the need to increase quality or reduce product costs.

Also, changes in service are often customer-dictated, but they could be brought about by competition, as well. A competitor that changes a warranty period or a policy on installation or delivery charges may force other companies to follow suit in order to stay competitive.

Once we understand what to change, the focus shifts to how to sustain the change.

Dycer Engineering and Foundry’s Managing Member John Gawler was very unhappy with the performance of his business and as he says: “I needed to change what we do and how we approach things. I am now focussing on transforming the business. But before I could do that I needed to understand and learn what changes could be made so that the business performs and has a future.”

“The need for talent in manufacturing is a challenge extending beyond just machining, fabrication and casting - services that Dycer Engineering and Foundry primarily offers. Manufacturers in all sectors are constantly trying to find solutions that will endorse their thinking of increased productivity and reduced costs. Different manufacturers serving different industries certainly have their own unique
The Leading Specialist in No Bake Equipment in South Africa

- Continuous Mixers 3 - 100TPH
- Fast Loop System, mould sizes up to 3.5M x 2.5M
- Carousel Moulding Plants, mould sizes up to 1.6M x 1.2M
- Manipulators from 350kg to 15T
- In-Line Semi-Auto Flood Coaters
- Mechanical Sand Reclamation 1 - 40TPH
- Secondary Attrition up to 10TPH
- Chromite Separation Plants up to 10TPH
- Thermal Reclamation from 250kg/Hr up to 12 TPH
- Core Shooters 2.5 - 100L

sinto

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goals and needs. However, stepping back to look at the broader picture often reveals more similarities among disparate operations than one might think.”

“If you’re curious about putting this kind of knowledge in context and staying abreast of the broader economic forces driving the industry that you are in you should have a bird’s-eye view of the industry. In an industry that is continuously changing and always becoming more sophisticated, it’s critical to stay abreast of the latest technology and processes. Although no one can precisely predict the future of manufacturing, new manufacturing trends and technologies are becoming commonplace and proving to be effective and efficient within manufacturing facilities around the globe, which helps manufacturers foresee what processes and technologies are here to stay, at least in the near future.”

“The transition in all industries over the last decade has been overwhelming in some respects but, also challenging and rewarding. To keep up-to-date with these changes you either have to take a hands-on approach yourself or employ a workforce that has the kind of wisdom and energy to embrace these changes, or do both.”

“When it comes to our company, we look to our people to make a difference. We follow a few simple steps to ensure we are creating a working environment that they can flourish in. However, we are always interested in hearing about how individuals are trained and educated for careers in manufacturing.”

“At the same time we are keen on giving graduates an experience in manufacturing before joining the workforce or continuing their search for jobs. We have a close cooperation with the University of Pretoria, where I have just attained my Master of Science: Engineering Management, and will have students working as interns. This helps to bridge manufacturing and education as well as opening a door to community involvement that could be useful for other shops and OEMs in our industry.”

**Graduation**

“I graduated last year at a somewhat late stage in life, when I was 61, and it only took me two years to complete, the required time. I specifically chose this degree because I wanted to enhance my understanding of running a business even though I had already done that for 25 years. The Engineering Management degree covers most of the areas required to run an engineering manufacturing, processing and fabrication business.”

“The subjects we covered included systems engineering and management, production and operations management, technology management, people management, financial...
management, strategic management, engineering asset management and maintenance management."

“The programme is offered on a part-time, modular basis over two years. Participants are typically professionals, entrepreneurs, project managers, technical managers and scientists who are currently fully active in their careers. The time available for class attendance is hence limited. Student/lecturer contact is considered to be crucial. In view of the above, candidates are expected to free themselves completely from other duties during class contact block weeks.”

“I found the contact with other participants very enlightening. The course deals with all aspects that a modern engineer/manager will have to deal with in the work environment. It offers a perfect balance of management and engineering combined and has opened my thoughts to new ideas on how to run my business, which is exactly why I decided to become a student again.”

About Dycer Engineering and Foundry

The core business of Dycer Engineering and Foundry is the production of casting products. The company has been in operation since 1925 and has a strong history of innovative and high-quality products. The company’s main focus is on the production of gray iron, nodular iron, ductile iron, and other advanced alloys. The company is committed to providing high-quality products and services to its customers, and is constantly looking for new opportunities to expand its market share. The company’s philosophy is based on a commitment to quality, innovation, and customer satisfaction. The company is also committed to the protection of the environment and is constantly looking for new ways to reduce its environmental impact. The company’s success is built on a strong foundation of quality, innovation, and customer satisfaction, and the company is looking forward to continuing its success in the future.”
supply of quality spare parts and the design, manufacture and refurbishing of a wide range of components and parts, which involve machining, cutting, bending, welding and assembling in our machining and fabrication shop and making patterns and casting parts in the foundry.

The company was established in 1992, operating from a garage in Nelspruit, Mpumalanga, supplying parts to a bus company that was located in the same town.

“Very early on we could see there was a need for local manufacture of parts and components to replace very expensive parts that we were sourcing from agents, as well as manufacturing parts and components that were difficult to find for older model vehicles. Initially these were made by other engineering companies but eventually we took the step of moving the business to Johannesburg and started our own engineering company with an emphasis on machining. The business was later moved to Pretoria where it is now situated and we have subsequently added fabrication and the foundry operation to our engineering capabilities,” explained Gawler.

“Although initially the emphasis of the company was the distribution of automotive and industrial components, we have subsequently manufactured and supplied product to a broad spectrum of other industries including food, mining, defence and general engineering.”

CNC machining

“Manufacturing began in 1998 when we acquired a few conventional machines. We now run a CNC machine shop that has nine CNC machines - both lathes and machining centers up to and including fourth axis – and manual lathe and milling machines. Of the CNC machines on the floor there are five Victor Fortune machines.”

“Both our machine shop and fabrication facility are located in the industrial area of Watloo, Pretoria. Fabrication includes press brake bending and MIG, TIG and spot welding of a wide range of materials.”

“This facility also houses assembly and sub-assembly operations.”

“Quality is verified through the manufacture of our own fixtures and jigging, which ensures precision and repeatability of component manufacture as well as a department that includes CMM and other measuring equipment.”

“We cannot offer all the manufacturing services that we would like to. Instead we have a reliable and extensive network of subcontractors that work closely with us to supply specialised services such as surface finishing, specialised coatings, grinding, gear cutting, laser and water jet cutting, polyurethane, rubber moulding, laboratory services and specialised machining.”

Design

“Our design department utilises one of the world’s leading 3D design packages, which enables us to take a product from concept to completion. SolidWorks is the design software we use, Mastercam is our CAM package and JobShop is the management software we have invested in. These packages ensure that designs and processes are optimised to ensure reduced design times and ultimately, reduced costs for the customer.”

The foundry operation

“We offer a complete casting service from patternmaking, casting and machining, right up to final assembled product if required.”
The foundry started as a need from our own machine shop to avoid the ongoing disputes that are typical in this industry when all processes are subcontracted to different suppliers, the pattern goes to one, the casting to another, and the machining to yet another, and if something goes wrong no-one is accountable. Customers can order fully machined and assembled castings should they require them so they only have to deal with one supplier.

“We are able to cast the following materials: SG irons - mostly SG 42 but with the capability to do up to SG 80 and austempered ductile irons (ADI), irons - alloyed irons such as nihard and chrome irons, steels - commonly A2 but alloy steels as well, aluminium, brass and bronze alloys, stainless steels and zinc.”

“We can cast up to approximately 450kgs in SG irons, cast irons, brass and bronze alloys, up to approximately 400kgs in all steels and up to approximately 200kgs in aluminium, SG and cast iron make up about 70% of the material cast every month.”

“The services of specialised heat treatment companies are used and larger castings can be outsourced to other foundries that we work closely with. We also use an independent
“Quality is verified through the manufacture of our own fixtures and jigging, which ensures precision and repeatability of component manufacture as well as a department that includes CMM and other measuring equipment.”

The core business of Dycer Engineering and Foundry is the supply of quality spare parts and the design, manufacture and refurbishing of a wide range of components and parts, which involve machining, cutting, bending, welding and assembling in the machining and fabrication shop and making patterns and casting parts in the foundry. The company has nine CNC machines – both lathes and machining centers up to and including fourth axis – and manual lathe and milling machines. Of the CNC machines on the floor there are five Victor Fortune machines.

Quality is verified through the manufacture of our own fixtures and jigging, which ensures precision and repeatability of component manufacture as well as a department that includes CMM and other measuring equipment.”

Laboratory for verification purposes and analytical work to identify materials. However, we have our own spectrometer that we use for internal control. “We have our own internal patternshop but make use of outside contractors should demand require so. Patterns and core boxes are generally made from wood or resin, and we do utilise our own machine facilities for specialised patterns.”

“The melting platform includes a 350kg and a 600kg induction furnace and a resistant coil furnace for the aluminium. These furnaces are relatively new and we replaced the old oil-fired furnace that we first started with. We cast up to 25 tons gross in material on average every month.”

“Our investment in the foundry demonstrates that we are continuing to live up to our commitment to the customer – to be a reliable supplier of a wide range of engineered components on an ISO 9001:2008 platform. At the moment 16 staff are employed in the foundry.”

“With my close relationship with the University of Pretoria we are jointly looking at improving processes in the foundry and these result in research projects for students.”

“The latest investigation is a research project that will lead to improvements in casting scrap rates in a jobbing foundry casting ferrous and non-ferrous materials and using a chemically bonded sand system, which is our foundry. As we all know the processes are basic however, the variables are numerous, and the control of them where possible is essential. It will entail the student gaining a full understanding of all the processes involved in a foundry so that an understanding of causes of scrap castings can be accurately determined.”

3D printing services

“Another relatively new service that we offer is 3D printing. We are not in the business of selling the equipment used in the process but rather we sell our services as a bureau. Prototyping, additive manufacturing, 3D scanning and reverse engineering are other services we offer.”

“We are proud to be a small but highly focused team of professionals who provide you with engineering solutions for a wide range of industry sectors.”

“We are slowly implementing change but as we know, change is not easy, and maintaining change can be even harder. However, now that I am a ‘learned student’ change will be more manageable and ultimately more successful.”

For further details contact Dycer Engineering and Foundry on TEL: 012 804 2331 or visit www.dycer.co.za
Casting partnerships towards success

It is imperative to enhance the manufacturing competitiveness of South African foundries to increase local content and exports.

The National Foundry Technology Network (NFTN) exists to advance the competitiveness of the local foundry industry, especially distressed foundries through a range of support services.

The NFTN is an initiative of the Department of Trade, Industry and Competition (the dtic). Through technical interventions, skills development and enterprise development, the NFTN works to:

- Build foundry capacity technology, tooling and process through support;
- Support the industry with quality standards;
- Support foundries with regulatory compliance; and
- Skills development with accredited core foundry skills.

For more about our support services, or assistance to link up with a suitable foundry to meet your production requirements, contact nftn@csir.co.za or visit www.nftn.co.za.

The National Foundry Technology Network is an initiative of the dtic managed by the CSIR.
The foundry industry in South Africa had for years been envious of what a number of its international counterparts were offered by their industry bodies in terms of training and research. The South African Institute of Foundrymen (SAIF) and its members had explored numerous options but there was always a financial constraint.

The SAIF is involved in a variety of initiatives to tackle the need for skills development and education in the foundry industry. The advent of government sponsored training courses in 2010, which the SAIF was tasked to be custodians of and implement, led the SAIF to spearhead an initiative to create a hub for practical foundry related skills training and technology transfer in the greater Gauteng region.

The outcome was that the first molten-metal pour took place on 19 September 2013 at the Ekurhuleni East TVET College (EEC), Kwa Thema campus in Springs, Gauteng and ignited a new era in training in the foundry industry in South Africa.

The Gauteng Foundry Training Centre (GFTC) was officially launched and opened in September 2013. The GFTC is set up in an 800m² facility in EEC that includes a Lauds 1 to 3TPH high-speed continuous mixer with a Lauds Auto-Blend 3000, which is a temperature sensitive blending dosing system for the mixer and a Lauds multi-loop line that enables the cores and patterns to be moved with ease and returned to the mixer for a continuous moulding operation. In situ there is the Lauds LCT1 compaction table for mould compactability and to ensure optimum surface finish and quality is maintained throughout the moulding process.

Included in the equipment supplied by Lauds is a 6L hydraulic jobbing cold box core blower complete with the Lauds vertimix batch mixer and pump set, which feeds directly into the Lauds skip hoist delivering mixed resin cold box sand to the core blower on a fully automatic basis.

Feeding all of this is the Lauds sand delivery system, which includes a fully automated 5TPH pneumatic conveyor with all the necessary controls for the five ton dry silica sand hopper. The hopper feeds the two Lauds mixers and has a vent unit attached to ensure no dust is present during operations of the filling cycles.

The Lauds scrubber ensures all fumes from the cold box production inside the cabinet are neutralised ensuring a green environment for the students to work in.

Most of the laboratory equipment is from Simpson Technologies and includes a sieve shaker, sand rammer, a universal strength testing machine, a permeability machine, sand moisture tester, a shutter index machine and a muffle furnace.

The equipment

The GFTC is set up in a 800m² facility in EEC that includes a Lauds 1 to 3TPH high-speed continuous mixer with a Lauds Auto-Blend 3000, which is a temperature sensitive blending dosing system for the mixer and a Lauds multi-loop line that enables the cores and patterns to be moved with ease and returned to the mixer for a continuous moulding operation. In situ there is the Lauds LCT1 compaction table for mould compactability and to ensure optimum surface finish and quality is maintained throughout the moulding process.

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Scientific and Precision Solutions (SPS) supplied the Bruker Q2 ION metals analyser, reported to be one of the smallest and lightest ultra-compact spark emission spectrometers for metals analysis available. The spark spectrometer Q2 ION primary applications and metal matrices

Atlantis Foundries donated a 50kg induction melting furnace with cooling tower and hydraulic power pack and a refractory sand mixer as well as core boxes, patterns and flasks, ladles, tongs, jack stands, a scrap storage bunker and a microscope to the GFTC
include copper, aluminium and iron for smaller foundries, inspection companies, metal recycling and metal fabricators. Besides the classical analysis workflow, the Q2 ION offers a dedicated workflow for positive material identification (PMI).

In the melting department HPT have supplied the 50kg cast iron induction tilt melter. Custom designed and manufactured in South Africa by HPT, it is equipped with the latest IGBT based induction power supply unit, which offers lower energy consumption, a smaller footprint, and up to a 70% reduction in the cooling system and up to 50% reduction in power components as compared to similar products, says HPT. Maintenance is made simpler by the modular design, and automation comes in the form of intelligent fault diagnostic menus, automated functions like pre-heat/sinter, remote monitoring and diagnostic functions and it is very operator friendly.

The non-ferrous department has been equipped with a new 50kg aluminium furnace and another 50kg furnace that was donated and subsequently refurbished before installation.

The latest measuring and testing equipment available that offers greater carbon and temperature measurement accuracy and speed in cast iron production applications, has also been installed. This includes a fixed Digitemp-E temperature measurement instrument, a Carbon-Lab E instrument for fast carbon determination in liquid steel, a handheld portable DigiLance IV instrument with memory and wireless communications for temperature measurement and the MeltControll Software, all supplied by Heraeus Electro-Nite.

Equipment donated by Atlantis Foundries

In 2018 the GFTC benefitted with a donation of foundry related equipment that was being used in an artisan training centre hosted at Atlantis Foundries. The subsequent closure of the training centre resulted in Atlantis Foundries donating a 50kg induction melting furnace with cooling tower and hydraulic power pack and a refractory sand mixer as well as core boxes, patterns and flasks, ladles, tongs, jack stands, a scrap storage bunker and a microscope. All of this equipment is now installed.

NFTN patternshop equipment support

Current GFTC Manager Errol Beling was appointed at the beginning of 2014 and immediately set about bringing in the third element of training over and above the melting and moulding programmes, which is patternmaking. Beling has been a patternmaker all his life since starting as an apprentice in 1986. His last position in industry was Patternshop Training Manager at Scaw Metals.

"The foundry side was well catered for but the GFTC was lacking on the patternmaking side. I immediately ‘commandeered’ a carpentry/woodworking facility on the EEC campus and began turning it into a patternmaking shop," said Beling.

"This has now culminated in November 2019 with the installation of seven new machines including a new heavy-duty panel saw, a new thicknesser and a new vertical band saw. We now have a state-of-the-art patternmaking workspace that we can provide practical training in while at the same time keeping the carpentry students happy."

"The installation also included a new dust control and air filtration and extraction system that is linked to external silos."

"All this new capital expenditure would not have been possible without the support intervention supplied by the NFTN and the support of the management at EEC. They have been very progressive in their efforts to make the college a recognisable institution for foundry training," said Beling.

Students

The inauguration of the GFTC in 2013 was boosted with the announcement that 20 students were chosen for a pilot project to complete their apprenticeships at the GFTC. The pilot group of students selected for 2014 had their course fee sponsored by the merSETA. Students also received a stipend during their work experience phase conducted at foundries. Students could also apply for a grant for their travel and accommodation during the pilot phase.

Over 50 students have now qualified at the training centre.
and the latest intake of 33 students began their 3-year course in August 2019. They are made up of 16 moulders and 17 patternmakers.

Accreditation for foundry training and trade testing

“The equipment donated by Atlantis Foundries was indeed installed over the past 18 months or so, also with support from the NFTN, and is now in use,” explained Beling.

“However, one of my main objectives when I joined the GFTC was to ensure that the right framework and initiatives were put in place to establish the GFTC as a fundamental training facility with the specific curricula required for the foundry industry to be accredited. Working with the merSETA and the Quality Council for Trades and Occupations (QCTO) was essential in the design, implementation, assessment and certification of occupational qualifications, including trades. The accreditation was crucial to the NFTN to ensure that students receive accredited training approved by the QCTO to acquire artisanship qualification.”

“The merSETA encompasses manufacturing, engineering and related services. The merSETA is a key partner in the development of the GFTC’s curriculum to ensure that the quality of the training is of the appropriate standard.”

“At this stage we only have the moulding and patternmaking curriculum accredited and we are close to completing the process for melting.”

“I am also accredited as an assessor for trade testing on the patternmaking side and we use outside assessors for the moulding trade test. We are still offering melting training and the individual trade test can be done at a later stage.”

“We also send the students out to commercial foundries for practical training. However, the foundries have to be merSETA accredited and at the moment we only have three foundries in South Africa - Prima Industrial, MIS Engineering and Auto Industrial - that are accredited.”

“At the moment we are the only institution in the whole of South Africa that is accredited to carry out trade testing in the foundry industry. We are limited to cast iron but in the future we will also encompass steel.”

NFTN support for consumables, tooling and staff

“A well-functioning foundry training centre not only needs staff but also consumables and tooling. Besides myself I also have three staff that provide the training and give the lectures to the students. We have a patternmaker, a moulder and a metallurgist that is UI trained. All of them are fully qualified to train the students.”

“The artisan programme encompasses a knowledge component, a practical skills component and a work experience component and is aimed at school leavers and new entrants into the foundry industry.”

“The practical skills component constantly requires consumables such as new tooling, temperature sensors, inoculants, coatings, binders, coal dust, resins and others to manufacture the castings. And then of course there is the timber for the patternshop. We are grateful to the NFTN for their ongoing support of our consumables, tooling and other materials. Without these products the GFTC could face closure,” said Beling.

“Since the GFTC undertook the process to become accredited, the NFTN has viewed them as a strategic partner performing an important role in bridging the skills gap in the foundry sector, allowing artisans to get certified in the skills needed for a foundry. Therefore, the NFTN has provided support to provide consumables for trainees for the past few years,” said Sandy Majatladi, Programme Manager for the NFTN.

Beling ended with: “With a strong focus on engineering programmes, the Ekurhuleni East TVET College, Kwa-Thema campus boasts the only National Foundry Training Centre in South Africa, a fact that we are proud of. However, without the support of Ms Happy Sibande, Principal of the EEC and her staff we would not be making the progress that we are. The EEC has six campuses in the area and we are able to draw students from all of these campuses. Let us hope our model is transferred to other areas in the country in the future.”

For further details contact Errol Beling on TEL: 082 776 0680 or email errolbeling@gmail.com

The new dust extraction equipment that was installed at the GFTC patternmaking training shop

The patternmaking training shop with the new equipment installed
Atlantis Foundries produces automotive castings for the commercial vehicle industry

Atlantis Foundries produces automotive castings for the commercial vehicle industry. Daimler/Mercedes-Benz South Africa took control of Atlantis Foundries in 1999, and achieved record production of 60,000 tons cast in 2012. The overall melting capacity of the foundry now stands at 100,000 tons per annum.

Daimler Trucks AG

Daimler Trucks AG, a division in the Daimler Group, is one of the world’s largest manufacturers of heavy and medium trucks for the commercial vehicle industry, with more than 35 primary locations around the world and around 100,000 employees. All Daimler Trucks & Buses activities are conducted at Daimler Truck AG.

Daimler Trucks AG has seven brands under one roof: Bharat Benz, Freightliner, Fuso, Mercedes-Benz, Setra, Thomas Built Buses and Western Star. In 2018 Daimler Trucks and Daimler Buses delivered a total of more than one and a half million trucks and buses to customers.

The Head of the Daimler Truck engine plant in Mannheim, southwest Germany, Andreas Moch, made the announcement in a recent statement issued to employees. He confirmed that after rounds of productive negotiations that Pieter du Plessis would once again take charge of the foundry as its CEO.

“We are really happy to have du Plessis back in the family. We look forward to our collaboration and working together to achieving a safe and prosperous future for Atlantis Foundries and Daimler Trucks.”

A simple answer lay at the end of the seemingly difficult question as to who would navigate Atlantis Foundries on its new voyage now that it was under the Daimler Truck fleet again, Moch continued: “Daimler and du Plessis stayed in contact for a long time and I’m convinced he will steer Atlantis Foundries within the family of Daimler Trucks in a way which is beneficial for both Atlantis Foundries and the Daimler Truck network as well.”

Earlier this year, this publication exclusively reported that Daimler Trucks AG was set to acquire Atlantis Foundries, five years after previously parting ways. Daimler AG, commonly known and referred to as Mercedes, is a German multinational automotive corporation, headquartered in Stuttgart, Baden-Württemberg.

Castings SA last caught up with du Plessis at the GIFA 2019 that took place in Düsseldorf, Germany. Always at the forefront of what the latest technologies and innovations on offer could add to the foundry industry, du Plessis was no different in his opinion then. He expressed his eagerness at the continued role that artificial intelligence and the smart foundry would have on the foundry industry, and especially what it could do in respect of improving product quality and cost efficiency.

Du Plessis stated of his appointment: “In order to build a better future for Atlantis Foundries, our corporate values must be the guide in this process. Respect, Passion, Integrity and Discipline. They must be believed and lived every day; our actions must bear testament to our values.”

“We need to unite behind our common goals and objectives. Firstly, we need to navigate the COVID-19 pandemic and its severe economic impacts. Neither Daimler nor Atlantis Foundries are immune to the economic realities of the pandemic. Secondly, we need to integrate back into the Daimler Truck family bearing in mind the lessons from the past. Lastly, we need to develop our medium-term and long-term strategy keeping in mind the Daimler Truck 2039 strategy,” said du Plessis.

Du Plessis takes the reigns from Christoph Ewers who will now take over the role of Commercial Director at Atlantis Foundries. Before du Plessis re-joined Atlantis, Ewers was the only executive member of the board and had been leading the foundry.

Atlantis Foundries welcomes

Pieter du Plessis back to the helm as CEO
Aluminium foundry doyen
Charles Rowe passes away

It is with deep regret and sadness that we announce the passing of Charles Rowe (75) in June 2020. He was a doyen of the aluminium foundry industry prior to his retirement from Ajax Manufacturing.

Charles was Managing Director of Ajax Manufacturing, one of the largest and oldest aluminium foundries in the Western Cape, retiring after 42 years with the company in 2011.

Charles retired from Ajax Manufacturing after the company was bought by Sicame, a giant French-based multi-national business, with interests in supplying electrical connectors to power stations and other industries requiring these types of components. After 26 years at the helm, this provided him with the opportunity to bow out.

Ajax was established in 1952 by Doug Murray and Ted Hall and has had a long and interesting history. After moving location a number of times over the years, a new foundry was built in 1967 in Auckland Street, Paarden Eiland.

Charles’ late father, Charles Rowe Senior, bought a half share of the business from Doug Murray in 1962. He joined Ajax in September 1969 as foundry manager, having worked for Alcan foundry in Birmingham for nearly two years. At that time the main lines for aluminium castings were for the street and industrial lighting industries and gutter brackets.

In 1971 the company was sold to Tube Investments. Doug Murray and Charles Rowe Snr remained on as joint MD’s for four years. On their retirement Charles was made a director and ran the business. In 1976 General Electric acquired Tube Investments’ shares and the foundry then developed street lighting dies for their range and an increasing number of castings for other industries. Charles bought the shares from General Electric in 1985 in a management buyout and appointed a board of four directors. They then modernised the foundry, making a major capital investment in pressure machines for the foundry and in house toolroom.

One of Rowe’s lifelong passions was motor sport. He became involved at an early age, preparing his first saloon car for racing in 1970. The following year he won his Western Province colours for saloon cars. In 1974 he won the WP Formula Ford Championship. Sponsors BP had an award for their ‘Driver to Europe’ programme, for which Rowe was chosen. Unfortunately the sponsors were unable to fulfil their obligations due to the global fuel restrictions at that time.

Charles married Edie in 1974 and gave up competitive motor racing. Instead, he wrote and passed the required exam for clerk of the course and for 3 years was involved on the main circuit, as well as the go-kart circuit at the now Killarney International Raceway. He continued to enjoy motor racing ‘from turn two’ with his son Graham and lifelong friend, Rowland Stanton (who was his mechanic when he raced).

His interest in motor sport extended to having a workshop at home, where he spent time modifying cars and enjoyed being creative and fixing other things. For example he rebuilt a 1947 Willy’s Jeep and had great fun off-roading with it, being an ex-4x4 Club member. He was also directly involved in the preparation of a VW Polo, sponsored by Ajax, for the VW GTI Challenge for a number of years. His son Graham was the driver, so it was a real family team effort. He had some podium finishes in the car during the 4 years that he raced it.

As a highly respected member of the foundry industry, Charles was also active in the Cape Chamber of Industries. He served on the executive committee for 5 years and later, when the body merged and became the Cape Chamber of Commerce & Industry, he continued this service. He also served on the committee of the Cape Institute of Industrialists, becoming President in 1989. The following year he served on the Electra Show committee.

Charles’ wife Edie’s unstinting and wonderful support over all their years of marriage, through thick & thin, has been a real inspiration! He was a really dedicated family man, who enjoyed nothing more than their frequent family gatherings, being with his children Graham and Carmen, daughter-in-law Angi and grandchildren Ethan and Tatum.

Charles had a wonderful sense of humour, an extraordinary ability to fix things, was a keen fisherman & raconteur & had a large circle of loyal friends. He enjoyed many a challenge and would love to design anything from scratch to suit the requirement. During lockdown he made a pedal for Tatum’s bicycle as hers had broken, and not being able to purchase one, he simply made it. He loved helping others wherever he could and was happy to be useful, right up to his last days.

When asked what he intended doing during his retirement, Charles said a giveaway would be his retirement planning advisers, Fishmore & Doolittle, with a bit of tinkering in his workshop.

Charles will be greatly missed by his family, his ex-colleagues at Ajax, his long-standing friends & everyone who knew him. RIP Charles.

Eds note: “Our sincere condolences to Edie, Graham and Angie, Ethan and Tatum, Carmen and the extended Rowe family for their great loss. Charles was a valued and long-time contributor to my magazines Castings SA and Metalworking News.”

18 castings sa vol 21 no 2 August 2020
Our Research & Development is focused on industry innovation and customer driven advancements and support (e.g. casting defect analysis). With a fully equipped research foundry, our scientists test and refine our products before ever reaching your doorstep. Quality is our guarantee! We advance your casting. One of the world’s largest suppliers of foundry chemicals, with a comprehensive product and service portfolio of binders, coatings and auxiliary foundry products.

SI Group
The Substance Inside

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We live in a world of increasing scarcity. There is limited raw natural resources, financial resources are often not enough, and acquiring land for waste disposal is getting even more difficult and costly. Government ought to set policy directions aiming for efficient use of resources based on society, keeping in mind that the end goal is to give a spotless, sound and attractive living environment to residents for present and for the future. They should likewise take a look at how to support re-use of by-products of industrial manufacturing in other processes to make other products, such as spent or waste foundry sand. Manufacturing is the backbone of any modern economy and the foundry industry is a very crucial part of manufacturing. It provides critical inputs to most of the manufacturing sectors, with mining, automotive, and general engineering being the largest industries it supplies. Challenges faced by the industry include waste management regulations.

Foundry sand is a high-quality uniform sand that is used to make moulds and cores for ferrous and non-ferrous metal castings. The metal casting industry annually uses millions of tons of foundry sand for production. Over time, foundry sands physically degrade until they are no longer suitable for use in moulds. Consequently, tons of sand is discarded each year.

**Foundry sand and spent foundry sand composition**

Foundries use sand moulds to cast metal. Silica sand is the most common sand that is used, but chromite sand is used at some foundries. In order to maintain the shape of the mould, a binder of some sort must be added to the sand. There are two main types of binding systems:

- **Green sands** use clay as the binder. The sand base can be silica or chromite sand.
- **Chemically-bonded sands** use a chemical binder and a catalyst to bond the sands. Typically the sands are made up of 1.4% binder of which 30% is catalyst i.e. 0.4% catalyst.

There are six main chemically-bonded systems with different additives which are used at the majority of foundries, namely:

1. Alkaline phenolic
2. Furane
3. Acid cured phenolic
4. Pepset (Phenolic urethane gas cured)
5. Cold box (Phenolic urethane)
6. Sodium silicate

The material that has exceeded its usefulness for casting moulds remains the responsibility of the operators to dispose of properly. The obvious solution, landfiling it, carries costs, so the availability of other options (e.g. road foundations, soil enrichment agents) means more flexibility for the foundry holding the sand bag.

However, the discarded foundry sands have remarkably consistent composition and are generally considered a higher quality material than typical bank run or natural sands used in construction.

Recycling of foundry sand can save energy, reduce the need to mine virgin materials, and may reduce costs for both producers and end users. Use of foundry sand as a fine aggregate in construction applications offers project managers the ability to enhance green sustainable construction by reducing their carbon footprint.

Based on the raw materials, additives, and the casting process, and information obtained through literature review, the spent foundry sand to be disposed of may be expected to consist of the following:

- **Silica or chromite sand** – the sand becomes physically modified through repeat heating and mechanical abrasion to the point where it is no longer suitable for use in the foundry. However, the sand would be expected to remain chemically inert, and not be a source of COCs.
- **Additives** – Various chemicals or other components are added to the sand. The maximum concentration of these compounds in spent foundry sand is based on the percentage of compounds added to the original sand. The initial additives to the foundry sand comprise <1.5% of the total mixture. In addition, the chemicals that are added to the sand are expected to be largely thermally decomposed during the casting process. Organic compounds formed...
during thermal decomposition of the additives can condense within the moulding sand, while some of the additives away from the sand-metal interface may not decompose.

- Metals and metalloids – Foundries cast a variety of different metals, including steel, iron, aluminium, brass etc. Some of the metals (and impurities within the metals) may be transferred to the moulding sands during the casting process. Metals may also be present within the raw material sand.

Environmental protection agencies encourage foundries and foundry sand recyclers to consult regulations to ensure planned uses are consistent with government and local beneficial use and waste-management programmes and that the chemical and physical properties of the sand meet applicable environmental limits, engineering performance criteria, and other requirements.

Advancing the environmentally sound, beneficial use of industrial materials, such as spent foundry sands, provides substantial opportunities for addressing climate change and air quality, enhancing local partnerships, reducing costs, and working toward a sustainable future.

The development of SMEs is a vehicle for addressing the triple crisis of poverty, unemployment and inequality. The New Growth Path (NGP) and the National Development Plan (NDP) both identify SMEs as the main drivers of economic growth and employment creation. Using spent foundry sand can reduce the cost of input material. The reduced input costs have a potential to trigger new SMMEs. In the brick manufacturing industry, radical economic transformation should entail the systematic promotion of an entrepreneurial culture and creating a supportive environment through financial and non-financial support initiatives to ensure the production of mass quality bricks, efficient production techniques, access to markets and creation of decent jobs. It is therefore recommended that the legislation be reviewed and spent foundry sand delisted as hazardous waste. Regular testing of the sand from the foundries is recommended.

The SAIF and AFSA application to Department of Environmental Affairs to exclude spent foundry sand as a hazardous waste product is based on recent studies and assessments done locally where a human health risk assessment approach was followed to assess the risk related to re-use of spent foundry sand. The recommendation is that the spent foundry sand rather be used for making of concrete bricks and for constructing a road sub-base.

The application was submitted at the end of July 2020.
A joint meeting of the South African Parliament’s Standing Committee on Finance and Select Committee on Finance, held on 3 July 2020, has heard how the country’s bleak financial outlook as a result of the COVID-19 pandemic is requiring significant action to reduce the economic effect of the disease and associated lockdown, including major reform within state-owned enterprises such as local defence company Denel.

Examining public submissions on the country’s proposed supplementary budget for 2020, representatives from the Treasury noted that South Africa had entered the COVID-19 pandemic at a time when it was already in a weak fiscal position. The result of this had meant that the country was needing to identify pathways out of the forthcoming economic crisis, which ranged from stimulus packages to austerity measures, as the potential threat of a 50% unemployment rate looms.

Denel PMP has put its casting and rolling plant and cutting and cupping plant up for sale as part of its turnaround strategy. In a tender published on 30 June, PMP invited bids to buy its Casting and Rolling Plant and Cutting and Cupping Plant in Pretoria West, which it described as a going concern. Closing date for bids was the 3 August 2020.

In 2019, Denel announced it was going to dispose of equity stakes and exit loss-making businesses as part of its turnaround strategy, including Land Mobility Technologies (LMT) and PMP. In June this year, Denel said it also intends to exit or dispose of Denel S3, Gear Ratio, its properties division, the PMP Foundry, the aerostructures business, Mechem, Spaceteq, Densecure and Optronics.

In the presentation to parliament discussing the 2020 supplementary budget, National Treasury announced planned reforms for state-owned companies, including Denel. It specifically mentioned the disposal of non-core assets like Hensoldt and LMT, obtaining strategic equity partnerships for Denel Dynamics, Denel Land Systems and Denel PMP, and consolidating Denel Properties with Eskom and Transnet Properties.

Denel PMP has been struggling financially for some time. According to the latest Denel annual report, the division made a loss of R213 million for the 2018/19 financial year, up from a loss of R154 million in 2017/18 and R44 million the year before. Revenue has also been declining, going from R444 million in 2017/18 to R225 million in 2018/19. Revenue was R583 million in 2016/17.

“PMP will be very difficult to break even in its current form within the next few years. So we may have to do something drastic there,” Denel Group CEO Danie du Toit said in November last year. Du Toit has subsequently resigned after only 18 months at the helm.

PMP, which employs nearly 900 people, develops and manufactures a wide range of small-calibre ammunition (5.56 to 12.7mm), including the 27mm cannon of the Saab Gripen, the 30mm cannon of the BAE Systems Hawk, 20mm cannon of the Rooivalk and 30mm CamGun – the latter’s ammunition is interchangeable with the Mk 44 Bushmaster II, allowing customers of this weapon to use it. PMP manufactures Russian calibre ammunition (7.6 x 39mm and 23 x152mm) and is working with Norway’s Nammo on marketing their small arms and cannon ammunition range. PMP also manufactures the 20×42mm Inkunzi and Inkunzi strike weapons.

PMP also produces power cartridges, rocket motors and canopy fragilisation systems for the safe ejection of pilots from aircraft; Probit rock drill bits for the mining industry and primary explosives and explosive products for commercial use in the private sector.
South Africa bans all scrap metal exports for two months


At the beginning of July 2020 the Minister of Trade, Industry and Competition (the DTIC), Ebrahim Patel, issued a trade policy directive to the International Trade Administration Commission of South Africa (ITAC) to urgently look into measures to help support the metals industry which, as a result of COVID-19, is facing several severe challenges due to increased global demand for raw materials and a significant price increase for all main inputs into the sector.

The downturn in global manufacturing resulting from COVID-19, has led to the amount of scrap metal available locally and internationally being dramatically reduced and, as a result, prices have increased sharply. Local mini-mills and foundries have made representations that they are struggling to survive and are calling on government to help protect their investments, save jobs and livelihoods.

"Scrap metal is an essential material for the domestic processing industry, which itself is crucial for the South African manufacturing industry and for infrastructure development. Due to the steep global increase in prices and reduced economic activity, the industry has called on government to urgently assist. I have therefore issued a trade policy directive to ITAC to urgently investigate the market conditions around the demand-supply imbalance in the scrap metal industry as a result of COVID-19. The objective of this investigation is to determine appropriate amendments to the Price Preference System guidelines which can address the shortage in affordable good quality scrap metal," says Minister Ebrahim Patel.

No ferrous and non-ferrous waste and scrap of any kind may be exported for a period of the investigation unless ITAC determines that it will not be used by the domestic processing industry. This will not affect existing export permits or applications made before the date of the notice in the government gazette. ITAC has been directed to complete its investigation within a period of two months.

"Our long-term plan for the industry, which was announced by the Minister of Finance during his budget speech in 2019, and which is widely agreed upon within the sector, is to introduce an export tax on scrap metal as soon as possible. Whatever measures we take now are temporary to deal with this immediate challenge created by the COVID-19 pandemic, but they also lay the basis for the new Steel industry Masterplan," Minister Patel said.

The metals value chain is central to South Africa’s industrialisation and has significant linkages to infrastructure, construction, mining and a range of manufacturing industries. The three largest consumers of metal products in South Africa are the construction industry, the mining industry and the transport equipment manufacturing industry which together account for approximately R750 billion or 15% of SA’s GDP and employ nearly two million people (both formal and informal).

The scrap metal industry in turn is of critical importance as a supplier of raw material into primary and secondary metal production. The industry contributes R15 billion to GDP and employs about 350 000 people, many of whom are involved in informal collection. Metals are reusable and maintain their useful properties once they have been processed and ultimately scrapped.

Scrap metal is also important as a feedstock in the production of downstream metals due to the relatively lower energy consumption and its lower carbon footprint versus other metal production processes. It is widely seen as a strategic resource and many countries have scrap metal policies and regulations in place to support the development of their domestic metal producing industries. Over 30 countries impose some sort of restriction on scrap metal.

In 2013, a Price Preference System (PPS) administered by the International Trade Administration Commission was introduced by Minister Patel (then the Minister of Economic Development), regulating the export of ferrous and non-ferrous scrap, by not allowing the exportation of scrap metal unless it has first been offered to domestic consumers at a discount to the international price at the time of sale. While the PPS has provided greater certainty of affordable scrap metal supply to the local industry, a policy decision has been taken by government to introduce an export tax on scrap metal. The DTIC and National Treasury are thus working on implementation of an export tax on scrap metal, which is expected to be put in place in due course.

The South African government continues to put in place measures to support the beneficiation and availability of good quality affordable scrap metal to foundries and mills. As announced by President Ramaphosa during his State of the Nation Address in February this year, government is working with industry stakeholders to develop a master plan for the entire steel and metal fabrication value chain. Key parts of the plan are expected to be circulated to industry stakeholders for comment.

In addition, the DTIC has established an inter-governmental working group to increase efforts to combat illicit trade of scrap metal with the help of the South African Revenue Service (SARS). In October 2019, SARS announced a fine of R500 000.00 on the owner of a Durban-based metal recycling company, which pleaded guilty to several charges relating to the illegal exportation of mixed copper and brass scrap.

Click here to access the gazette


For further reference herewith the description of goods and tariff headings:

- Ferrous waste and scrap, re-melting scrap ingots of iron or steel (7204);
- Copper waste and scrap (7404.00); Nickel waste and scrap (7503.00);
- Aluminium waste and scrap (7602.00); Lead waste and scrap (7802.00); Zinc waste and scrap (7902.00); Tin waste and scrap (8002.00);
- Tungsten (Wolfam) waste and scrap (8101.97);
- Molybdenum waste and scrap (8102.97);
- Tantalum waste and scrap (8103.30);
- Magnesium waste and scrap (8104.20);
- Cadmium waste and scrap (8107.30);
- Antimony waste and scrap (8110.20);
- Manganese waste and scrap (8111.00);
- Beryllium, chromium, germanium, vanadium, gallium, hafnium, indium, niobium (columbium) rhenium and thallium waste and scrap (81.12).

For further details contact Sidwell Medupe, Departmental Spokesperson, on TEL: 012 394 1650 Mobile: 079 492 1774 or email: MSMedupe@thedtic.gov.za
Hulamin announces they are the first aluminium semi-fabricator to achieve emissions milestone

Aluminium products manufacturer Hulamin reports that it has become the first global aluminium semi-fabricator to have a greenhouse-gas (GHG) emissions target approved by the Science Based Targets initiative (SBTi).

The SBTi mobilises companies to set science-based targets and boost their competitive advantage in the transition to the low-carbon economy. It is a collaboration between CDP (formerly the Carbon Disclosure Project), the United Nations Global Compact, World Resources Institute and the World Wide Fund for Nature (WWF).

Hulamin’s science-based target provides a clear roadmap that aligns with the ambition of the Paris climate agreement to limit global warming to below 2 °C above pre-industrial levels, while pursuing efforts to limit warming to 1.5 °C. It sets out how much and how quickly the company will reduce its GHG emissions.

Specifically, Hulamin intends to reduce absolute Scope 1 and Scope 2 GHG emissions by 30% by 2030, from a 2018 base year. The company also commits to reduce Scope 3 GHG emissions by 24% for every tonne of aluminium produced by 2030, from a 2018 base year.

In terms of the SBTi, science-based targets are validated by technical experts and can help to safeguard a company’s growth and profitability by keeping business relevant and competitive during a transition to a low-carbon economy. By setting targets that align their business with global efforts to avoid the worst impacts of climate change, Hulamin is positioning itself to thrive as the global economy transitions to a low-carbon future.

Hulamin CEO Richard Jacob says that: “On the global environmental stage, humanity has an important role to play in preserving the future. From the person in the street to our food producers, those in the conservation of forest and fauna and even our large-scale mining and manufacturing industries, we are all on a journey to preserve our globe for the next generation.”

He adds that Hulamin takes this role seriously and is proud to be active participants in making a contribution to limiting climate change.

“To this end, I am pleased to be a partner with the Hulamin team who have worked diligently and responsibly to commit to ensuring the limitation of greenhouse gas emissions from all our production facilities.”

Jacob encourages all Hulamin’s fellow industry role-players to make the same ambitious commitments to sustain our planet.

WWF Science Based Targets and member of the Science Based Targets initiative steering committee global lead Alex Farsan said: “The aluminium sector has an important role to play in the transition to a net-zero economy. By setting targets that align their business with a clearly defined pathway to future-proof growth, Hulamin is positioning itself as a leader in its sector to thrive as the global economy transitions to a low-carbon future.”

The 5-inch high bargain ‘brass ornament’ that turned out to be a Susini masterpiece

Christie’s specialist Milo Dickinson reveals the extraordinary tale of a lost Renaissance bronze found in a $15 box of bric-à-brac in South Africa.

“I t is rare that something of this quality appears from out of nowhere. That it was found in a box of odds and ends in South Africa is a lesson to us all that there are still many great works hidden away, ready to be discovered,” says Christie’s Old Masters specialist Milo Dickinson in an article on the Christies website.

Dickinson is referring to a 5-inch-high bronze cast of a peasant resting on a staff, bought for just R260 (around £12 or $15) by a couple in South Africa. Described as a brass ornament, the sculpture was offered as part of a box lot, containing other miscellanea including an aeroplane-shaped shelf and a pair of Gouda vases.

In retirement the couple have attended local auctions ‘as a hobby and to keep busy’. Once home, the couple began to research the bronze cast online, but to no avail. After further investigation, they made startling headway. They contacted Gillian Scott-Berning, a Christie’s consultant in South Africa, who in turn reached out to Dickinson in London.

The specialist in Old Master paintings and sculpture instantly recognised it to be a lost work by Antonio Susini (1558-1624), a Florentine sculptor widely considered today to be the finest bronze caster of the Renaissance.
Susini came to prominence in the early 1580s as the principal assistant to Giambologna (1524-1608), one of Italy’s most important Mannerist sculptors. In Giambologna’s workshop, Susini specialised in preparing the moulds of his master’s models for casting, and finishing these statuettes when cast. Their collaboration continued even after Susini set up his own workshop in 1600.

Today bronzes by Susini can be found in The Met, The Getty and the Victoria & Albert Museum in London, and are highly sought after by collectors at auction.

In 2019, a late 16th-century bronze of the rape of a Sabine, attributed to Susini and cast from a model by Giambologna, fetched a staggering €4,493,200, setting a new world record for the artist at auction. Five years previously, in 2014, Christie’s sold a smaller bronze figure of Venus drying herself, attributed to Susini, and cast from a model by Giambologna, for £1,058,500.

“Susini was famous for casting bronzes with very fine, sharp, angular edges with an added patina that reflects light in a brilliant way,” says Dickinson.

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Danielle Bochove of Bloomberg Businessweek writes that in May 2003, Nelson Mandela - the late former South African president, winner of the Nobel Peace Prize, and hero to millions - sat down at the dinner table of his house in Johannesburg and laid his right hand, palm side down, into a lump of cold dental putty. A team of technicians from the precision-casting division of Harmony Gold Mining Co. was present to supervise, and Mandela chatted amiably with them as they worked, pausing to sip coffee with his free hand. The silicon-based putty had been chilled to make it harden more slowly, but the men had only six minutes of malleability to work with, time they used to get the material into every wrinkle and crease, almost perfectly capturing Mandela's fingerprints as well as the scars from his hard labour on Robben Island. Then they poured more on top to encase his knuckles and fingernails.

Harmony would use the moulds from that day to create resin replicas, then a casting of Mandela's hand in 99.999% pure gold. This prototype was to be the first in a series: At least 27 gold hands, weighing 5.7 pounds to 8.8 pounds each, to mark the years of his imprisonment, followed by silver versions for each month, and finally thousands of bronze copies to mark each day. They would be sold to raise money for the Nelson Mandela Children's Fund, the charity to which he devoted much of his time in retirement and serve as advertisements for Harmony's casting expertise in the process.

Throughout the making of the moulds, Mandela was "amazingly helpful, patient, and funny, and he kept everyone entertained with stories," according to an account in the company newspaper, Harmonise.

That may well have been the happiest that Mandela ever felt about the project. Not long after the castings were made, he became concerned that too many people were profiting from 'Mandela art,' a cottage industry that included selling sketches he purportedly drawn and putting his face on dishes, teapots, and commemorative tchotchkes. After Mandela dispatched a team of lawyers to shut down the trade, Harmony stopped producing hands, leaving only a tiny initial batch. The project was largely forgotten. Except, that is, by Malcolm Duncan. Then a 47-year-old auto parts entrepreneur, Duncan had met Mandela a few years before, during an event at a cancer clinic in the township of Soweto.

Like many who came face to face with the legend, Duncan was overcome. "I couldn’t talk, because he was so humble," he recalls. "I had such a lump in my throat." When Duncan learned about the hands, he had to have them. Not long after the castings, he managed to buy four gold examples. He’d wanted two more but couldn’t get them before the project was shut down.

Read more at: https://www.bloombergquint.com/businessweek/how-nelson-mandela-s-golden-hands-became-an-art-world-albatross
FROM LIFT-OUT TO BALE-OUT FROM ALUMINIUM TO BRONZE

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Steel producer ArcelorMittal South Africa (AMSA) will idle two blast furnaces in the country’s economic heartland to curb the effects of a collapse in global demand and forecasts it will record more than one billion rand in interim losses.

The company said the first half of this year had proved to be an incredibly difficult period given the extraordinary and widespread impacts on social and business freedoms wrought by the global COVID-19 pandemic.

“Further, AMSA’s operations had already been negatively impacted on by weaker than anticipated demand, production interruptions as a result of loadshedding and raw material train cancellations and delays owing to an increase in cable theft during the first quarter of the year.”

“The consequential stop-start impacts of these events are beginning to materially impact on the reliability of plant and equipment, and diluting the improved underlying performance of the business.”

AMSA remains steadfast in making the difficult decisions to position the business for sustainability through these future-shaping events. Consequently, having reassessed its strategic asset footprint for 2020, it has been decided to idle blast furnace C at Vanderbijlpark, and the Vereeniging electric arc furnace until demand recovers,” it stated.

Seeks import protection on hot-rolled coil and heavy beams

AMSA has submitted two separate applications to the International Trade and Administration Commission of South Africa (Itac) requesting import protection on hot-rolled coil (HRC) and heavy structural beams respectively. The HRC application seeks to extend an 8% safeguard duty already in place beyond its August 2020 expiry date.

The safeguard duty is imposed in addition to the 10% base protection that applies to HRC imports into South Africa, as well as to most other primary steel products.

In 2017, AMSA secured a safeguard duty on HRC for a three-year period, beginning in August of that year and instituted on the basis of a sliding scale. The initial duty rate was 12% above the 10% base protection level. The safeguard duty then declined to 10% from August 2018 and then fell to 8% from August 2019. The group’s application to Itac was for an extension of the safeguard duty at a rate of 8%.

It is also reported that AMSA had made an application for protection on heavy beams manufactured at the Highveld Structural Mill, in Mpumalanga. The eMalahleni mill was restarted in April 2017 after Highveld, which entered business rescue in 2015, concluded a contract manufacturing agreement with AMSA. In 2019, AMSA announced that it intended buying the mill, which is Africa’s only producer of heavy structural steel. The proposed transaction had yet to be completed, but Verster indicated that AMSA remained interested in the acquisition.

AMSA had not requested a specific level of import protection to be imposed on imported heavy structural beams, but had instead outlined its case to Itac for the imposition of a safeguard duty.

The group indicated that imports decreased to 300,000 tons during the period, when international trade had been negatively affected by COVID-19 lockdowns. The company said imports still represented 19% of apparent steel consumption of 1.8-million tons, which itself represented a 26% year-on-year decline.

“Major source countries of imports are China, Europe, Japan, Russia and Taiwan, with China and, particularly Russia, proving to be the most disruptive,” said CEO Kobus Verster.

“Itac made an assessment in September 2019 that Russia no longer qualified for exemption from safeguards on HRC products. 10 months later, the decision is still to be gazetted and implemented, despite numerous letters from the company urging action.”
China’s manganese ore imports rise by 39% month-on-month in June

Our raw materials continue to be exploited.

China imported approximately 2.18 million tons of manganese ore in June, a rise of around 39.3% from about 1.57 million tons in May 2020, according to the latest available Chinese customs data, reported recently in MetalBulletin.

June’s volume is also 7.3% higher than the 2.03 million tons imported in the same month of 2019, the data showed.

Among the total volume imported in June 2020, around 724 794 tonnes (33.2%) came from South Africa, one of the largest producers of manganese ore in the world. This compares with the 582 766 tons that the African nation supplied to China in May 2020.

The significant increase in the manganese ore imports in June was attributed to the recovery in ore shipments from South Africa following the easing of nationwide lockdown measures that were previously implemented in late March 2020 as part COVID-19 restrictions.

South Africa remains China’s top manganese ore supplier followed by Australia.

If you compare these figures to those in 2019 China imported 411 912 tons of manganese ore from South Africa in October, followed by 364 587 tons from Australia, customs data showed.

China imported 1.33 million tons of manganese ore in October, down from 1.36 million tons in September 2019.

Essential mineral sources

South African author, translator, and a graduate of Stellenbosch University Elise Lombaard recently wrote in the publication NewEurope that China has bought out our government, our operational mines for uranium, chrome, aluminium, gold, and other essential mineral resources. Outside Messina near the Zimbabwean border with South Africa a Chinese town is being built for workers for a mine, chrome and steelmaking factory, a power plant using coal and several industries. The mines in Namibia and South Africa pay no taxes because China does not buy uranium at the international price but at a daily price that will ensure that the mines are bankrupt and working at a loss.

“China is attempting to procure Canadian and Australian uranium mines so that it will have sole recourse to uranium on earth,” she said.

To read the full article – China, the coloniser of Southern Africa - visit https://www.neweurope.eu/article/china-as-colonist-of-southern-africa/

China takes control of South Africa’s foundry chrome sand - where to from here?

It is also said that a Chinese Government consortium bought the controlling shares in Samancor.

“This acquisition, that was already agreed and paid by the end of 2019, has not been formally announced out of fear for the section 11 of the Competition Commission requirements.”

“This deal will have a huge impact on the chrome market going forward as Samancor is still the biggest holder of reserves in South Africa. Many of these are not currently being mined or explored.”

“With that being said, we all are acutely aware that the Chinese only support the Chinese and the biggest question on the global foundries’ lips at GIFA 2019 was: What is going to happen if metallurgical grade prices continue to fall and if Samancor (China) opens up all the reserves and ships material to China? We have seen the trend of falling metallurgical grade prices continuing until today.”

“None of the other mines will be able to sustain their current production levels if their 90% metallurgical grade pricing is affected by the low prices demanded by the Chinese and given their dominance in the market. As you know most mines only produce 10% maximum foundry sand and it is very dependent on the metallurgical grade prices to keep the underground operations going.”

“With falling metallurgical grade prices, many of the older underground operations with older technologies will not be sustainable and with the growing demand for UG2 and Lumpy, the majority of the underground mines will not be viable.”

“This will affect the foundries globally as China’s main concern is not supplying foundries worldwide but will firstly look after their own stainless steel requirement as this was the strategic reason for buying Samancor.”

“As expected, many of the South African ferrochrome smelters and underground mines are closing. The lack of electricity as well as the general direction in which China is steering this market is causing many smaller companies to also go into business rescue, like Azure, Hernic, Mogale Alloys, Sinosteel and many others.”

“This will have a major impact on the foundries too as most of the underground mines are now no longer sustainable for the majority of the chrome producers. Only the low cost Ug 2 (by-product from PGM Mines) material will be produced as it is cost effective and in demand by China.”

There is also interesting reading about: The great Samancor ‘heist’ reported by Daily Maverick’s amaBhungane Dewald van Rensburg at https://www.daily Maverick.co.za/article/2019-10-02-the-great-samancor-heist/
New process combines best of 3D printing and metal casting

A British manufacturer says it has combined the best of 3D printing and casting by offering a wide range of materials without the high costs and limitations of tooling. Every manufacturing process has its limitations, whether it is traditional casting or direct 3D metal printing. High tooling cost and long lead-time are challenges of the traditional casting process whilst material compatibility is a restricting factor for direct 3D metal printing.

Enable Manufacturing’s process, called Additive Casting, can now produce components in more than 130 metals. The high tooling cost of metal casting has been reduced by making moulds with additive manufacturing.

Direct 3D metal printing companies typically do not offer a wide range of materials for customers to choose from. If the desired material is not amongst these choices, engineers must design parts in alternative materials and therefore cannot use these parts for the final production process, potentially duplicating the development time for a part.

Also, getting new materials approved that are well suited for direct 3D metal printing can be a long and onerous process, cancelling the main advantage of obtaining parts quickly.

By offering more than 130 metals with the Additive Casting process, engineers can be confident from the outset that Enable can make their parts in the desired material. And because prototypes can already be produced with the final material specification, these parts will already be suitable for mass production, saving engineers time and cost.

Wide range of materials for many applications

Whilst it is sufficient to use a standard material such as AISI 316L in most cases, there are also parts that require additional material properties that are not readily available with direct 3D metal printing.

In some applications including aerospace and heavy industry, parts often require a higher fatigue strength and the properties of AISI 316L would not be enough. In this case, using AISI 316L requires a more frequent replacement interval, adding material and labour cost. Alternatively, engineers could switch to a different material with higher fatigue strength such as AISI 420 and end up with a stronger part that will not need to be replaced outside of normal maintenance cycles. AISI 420 is not available for the direct 3D metal printing process but is a standard material used in Additive Casting.

Also, in the maritime industry, AISI 316L may sometimes not have sufficient anti-corrosion properties. To increase the corrosion resistance of a part can either be achieved by applying a coating, which will add additional cost, or by switching to a less common but more corrosion resistant material such as Hastelloy C276, which is also not available for the direct 3D metal printing process.

These are just two examples of where using direct 3D metal printing would compromise the performance of the part due to the limitations of available materials. Enable can not only manufacture parts in these metals but can also do so without the limitations of tooling and long lead-times.

For further details visit Enable Manufacturing www.enable.parts

Brazil’s Asia steel scrap export route blooms amid renewed trade opportunities

Brazilian sellers have ramped up containerised exports of steel scrap into South Asian markets over the past year but this explosion in export sales is unlikely to be a long-term trend, sources have told Fastmarkets.

Scrap collectors and processors in the country have traditionally sold the vast majority of their stocks in the domestic market, with only the excess being exported. But waning Brazilian demand and decreasing domestic prices since the second half of 2019 have led them to seek
buyers further afield. South American and European nations had been taking a much larger share of Brazilian scrap volumes before 2019 but Bangladesh has become the main destination of Brazil’s scrap exports in the past few years.

**Brazilian ferrous scrap exports up 1.7% in June amid tumbling domestic demand**

Brazilian ferrous scrap exports increased 1.7% in June, compared to the same month in 2019, due to lower domestic consumption that has led to yards shipping more material to South Asia, data from the country’s ministry of economy showed.

The country exported 76 649 tons of ferrous scrap in May 2020, up from 75 344 tons the year before. Bangladesh, India and Pakistan were the main destinations, accounting for 86% of the volumes. Brazil shipped 24 418 tons to Bangladesh, 21 227 tons to Pakistan and 20 121 tons to India in June 2020, according to the ministry.

Ferrous scrap exports from Brazil totalled 316 145 tons in January-May 2020, up by 63.3% from 193 610 tons in the corresponding period of 2019, according to the data.

Containerised scrap from the country has been offered at very competitive prices to both Bangladesh and India since the start of the year, often enticing mills to opt for Brazilian material over competitors from regions such as the European Union and the United States.

Should Indian demand for scrap continue to rise while mills return to the market following the easing of lockdown restrictions in India, some consumers will find that their traditional suppliers may not be able to fulfil their requirements, and therefore rely on Brazil for this.

The United Arab Emirates, which is the largest supplier of scrap material to India, introduced a four-month scrap export ban from May. The United Kingdom, which is the second largest supplier of material to India, has seen domestic collection rates of scrap fall sharply during its own lockdown period. Combined with a continued shortage of material and strong demand from Turkey, this has pushed up UK prices.
Preparations to launch the all-new BMW iNEXT are progressing at full swing. The company intends to start production of this new model in 2021 at its Dingolfing plant.

The other German plant, in Landshut, has started production of the first high-tech components for the iNEXT, which is envisioned as the first hardware-ready for autonomous driving. The Lower Bavarian BMW Group Landshut plant again assumes its role as an innovation driver for the automotive future: With a number of important high-tech components, it will give the BMW iNEXT, which starts rolling off the assembly line in Dingolfing from 2021, a face. The innovative kidney grille – the ‘eye’ – for the BMW iNEXT will be produced there.

The technologically complex kidney grille is vital for highly-automated driving. It allows the integration of camera technology, radar functions and further sensors required for highly developed driver assistance systems into the front end of the vehicle. The BMW Group Landshut is investing a total of over 50 million euros in innovative components for the BMW iNEXT and future vehicle models.

Apart from the grille, the Landshut plant will also produce further innovative components for the cockpit and the electric drive system for the iNEXT, but also structural components made from carbon fibre compound materials such as CFRP, for example. The light metal casting department provides the housing for the future electric drive motor and also developed the globally unique Injector Casting Process (ICA), whereby the electric drive system for the BMW iNEXT does without rare earths.

The BMW Group Plant Landshut is one of 31 BMW Group production locations in 14 countries. At the Lower Bavarian component location, around 4 000 employees produce light metal cast components for engine, suspension and body, plastic components for the vehicle exterior, carbon body components, cockpit and equipment options, electric drive systems, special motors and drive shafts.

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As the competence centre for the future technologies lightweight construction and electric mobility, the Landshut plant is not only merely involved at an early stage in development processes for the production of new vehicles. At the Lower Bavarian location, components for the groundbreaking BMW i models or the flagship of the BMW brand, the BMW 7 Series, are also produced. Moreover, the BMW Group’s Lightweight Construction and Technology Center (LuTZ) is based in Landshut. There, specialists from the most diverse faculties jointly conduct research on innovative high-tech-materials as well as on tailor-made mixed construction concepts and production processes for the mobility of tomorrow.

The BMW iNext is set to become the new technological flagship of the Bavarian car maker.
The fact that the last shift has been carried out at the casting works in Saarbrücken, Germany after 270 years may have to do with the reality that Volkswagen Group Germany (VW) had terminated its contracts with Bosnian supplier Prevent Group, who had only acquired the Neue Halberg-Guss company in 2018, and VW were not about to renew the contracts. It was reported that 70% of castings orders came from the automotive OEM.

The Saarbrücken foundry was closed at the end of June. The foundry was just a ball in the bitter dispute between VW and the supplier Prevent. The automaker and its struggle with the Prevent Group triggered a week-long strike. Prevent damaged relationships with important customers with horrendous price increases. As a result, orders were lost and the company has not recovered from them.

“The employees of the Saarbrücken Gusswerke fought, went on strike, hoped and yet lost. The insolvent company has no future. After more than 270 years, the foundry has closed down.” Other representatives of politics and unions also made similar statements laying the blame and responsibility squarely on the Prevent Group.

They “ruthlessly looted the company,” said Oskar Lafontaine, leader of the Left Group. IG Metall district manager Jörg Köhlinger said the company had “been blatantly ruthlessly bled” and CDU faction economic spokesman Marc Speicher said the Prevent Group had carried out a ‘predatory and brazen exploitation of the foundries.’ “The owners had squeezed out over 100 million euros out of the company.”

A total of around 1,000 jobs lost
The Saarbrücken engine block foundry had been in trouble for a long time. The company filed for bankruptcy in September 2019. At the end of November 2019, around 600 of the 1,000 employees had already been released. Initially, the administrator had found an investor, but then two major customers withdrew their orders. According to the company, the insolvency administrator had made every effort to win new orders.

Neue Halberg-Guss GmbH manufactured engine blocks, camshafts and cylinder heads. The company’s clientele includes Volkswagen, Daimler, Opel, BMW, Deutz, Scania, Iveco, and Perkins.
Automakers are experimenting extensively with 3D printing for all variety of automotive parts from simple interior trim pieces to parts as complex as brake callipers. Porsche is taking the technology a step further by experimenting with 3D printing engine internals.

Mahle, a German parts supplier, and Trumpf, a 3D printer manufacturer, helped Porsche make 3D printed pistons that can survive in a high-performance engine. The company 3D printed a set of six pistons for the 911 GT2 RS with high-purity metal powder using what it calls a laser metal fusion process. Heat generated by laser beams melts the powder surface into a pre-determined shape, so this is far more advanced than your neighbour’s kid’s 3D printer.

Porsche manufactured a set of six 3D printed pistons through a powder-bed fusion technology from Trumpf. The 911 GT2 RS is equipped with forged pistons as standard, but their potential for use in future high-performance engines is practically exhausted. Improvements have only been possible with changes that could no longer be realised using conventional production methods. In contrast, additive manufacturing makes it possible to implement a so-called bionic design in which material is only used in those locations where forces are transferred. For this topology optimisation, the engineers used a special design method that is matched to the specific conditions of 3D printing. Working with project partners Mahle and Trumpf, it has therefore been possible to reduce the weight of the pistons by 10 per cent and to validate the quality and performance capability of the topological structures with measurement technology from Zeiss.

“We’ve always made sure that we always err on the safe side. Our simulations show that there is a potential weight saving of up to 20 per cent per piston,” says Frank Ickinger, a member of Porsche’s advance drive development department, said in a statement.

The second goal was the integration of an annular cooling duct behind the piston rings. This duct has a special cross-sectional shape and is closed like a tube apart from inlet and outlet openings for oil. Such a structure can be produced only by means of an additive manufacturing process. Thanks to this additional cooling, the temperature of the component has been reduced by more than 20 degrees in the piston ring area, which is subject to extreme thermal loads. The combination of all these measures makes for optimised combustion with higher pressures and temperatures, resulting in greater efficiency.

“Thanks to the new, lighter pistons, we can increase the engine speed, lower the temperature load on the pistons, and optimise combustion. This makes it possible to get up to 30hp more from the 690hp (515kW), twin-turbocharged engine in the 911 GT2 RS while at the same time improving efficiency,” said Ickinger.

The 911 GT2 RS is equipped with forged pistons but as the world moves towards futuristic high-performance engines, the forged pistons cannot deliver the needed performance. One of the goals of this project was to reduce the weight of the pistons and with 3D printing, a topology optimised design can easily be manufactured to reduce material and ultimately the weight of the system.

There’s no word yet on whether 3D printed pistons are as durable as forged pistons. And, similarly, Porsche hasn’t announced whether it plans to put them in a production car, let alone when or how much they will cost.

Porsche did say it has identified other applications for the technology. It introduced 3D printed seat cushions in May 2020, and it offers 3D printed versions of about 20 classic-car parts that are no longer in regular production, such as a clutch release lever that fits the 959.

“This manufacturing technology is also technically and economically interesting for Porsche for special and small series as well as motorsports,” the company said.
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When Elon Musk was interviewed in an episode of the Third Row Podcast earlier this year, he noted that the Model Y crossover’s rear underbody would eventually be built with a single-piece casting. This is quite a bold target, and one that can make the Model Y into one of the most cost-effective vehicles on the market today, electric or otherwise.

“The current version of Model Y has basically two big high-pressure die-cast (HPDC) aluminium castings that are joined and there’s still a bunch of other bits that are attached. Later this year we’ll transition to the rear underbody being a single-piece casting that also integrates the rear crash rails,” Musk remarked.

There are many advantages to using a single-piece cast for the Model Y. The vehicle could be built in a relatively simple manner by using fewer parts, helping the company optimise its production costs. Developing such a design only takes a lot of time and effort, as indicated by Elon Musk in the podcast.

“It gets better. The current castings, because you’ve got to interface with so many different things, we have to CNC machine the interfaces and there’s a bunch of things that have to be joined. They have datums on them and that kind of thing. The single-piece casting has no CNC machining – it doesn’t even have datums. It took us a lot of iterations, by the way, to get there,” the CEO added.

It appears that Tesla is now at a point where it is ready to pursue the Model Y’s single-piece cast. As indicated in a recent report on SAE Automotive Engineering, Tesla has purchased a machine from the IDRA Group, an Italian firm that makes HPDC equipment.

What is rather interesting is that the machine that Tesla purchased is a gargantuan piece of equipment capable of producing the Model Y’s special components. The machine that Tesla purchased, called the IDRA OL6100 CS, features an upgraded locking force that’s specially designed for the Model Y’s castings. Interestingly enough, the OL6100 CS is fondly dubbed as the ‘Giga Press’ due to its size and power. The machine is 19.5 metres long and 5.2 metres high, and it weighs a whopping 410 tons. That’s roughly as heavy as five Space Shuttles.
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3D Systems opens up 3D printing applications with new materials

3D Systems has added five new materials to its polymer 3D printing portfolio as the company aims to address a broader portfolio of additive applications for its Figure 4 technology.

The new resins include Figure 4 Rubber-65A BLK, Accura Fidelity, Accura Bond, Accura Patch and Jewel Master GRY, with each catering to specific uses across industrial and casting applications.

“Our team has continued developing new materials across our plastics portfolio to address a broader set of production applications and providing data sheets with key test results and performance specs to make it easy for our customers to make the optimal material choice for their needs. Our material scientists and technical experts have leveraged decades of experience to engineer these high performing materials to deliver accurate, economical, and repeatable results to enable our customers to maintain competitive advantage,” said Menno Ellis, SVP and general manager, plastics, 3D Systems.

Investment casting applications

For investment casting applications 3D Systems has introduced a new casting material called Accura Fidelity alongside two post-processing materials, Accura Patch and Accura Bond.

Fidelity is an ultra-low viscosity, antimony-free resin with clean burnout that is designed to create patterns for a variety of castable metals, including titanium and aluminium alloys.

Nancy Holt, director of operations, 3D Systems On Demand commented: “The low viscosity of this material facilitates better drainage and faster cleaning of the patterns, resulting in an expected increase in throughput by up to 30% as we move into full production with this material. The ultimate test is in its castability, and our foundry customers are providing very positive feedback.”

Meanwhile, the new UV curable class of post-processing materials can be used with any 3D Systems SLA resin for creating larger parts and for patching during post processing. Accura Patch is designed to fill QuickCast pattern drain holes, while Accura Bond is a high viscosity material created to join printed patterns together.

Improve wear characteristics with cryogenic processing

Cryogenic processing, the deep chilling of tool steel so that the molecular makeup of the metal is brought to cryogenic stillness in order to improve wear characteristics, is not a new technology. In the past, tool makers would bury components in snow banks for weeks or even months to improve their wear resistance. Castings were always left outside in the cold for months or years to age and stabilise.

Today’s dry process is computer controlled, using a prescribed schedule and maintained at -150°C for a particular time before slowly returning the parts to room temperature. Prior to the deep cryogenic step, many tool steels require a preconditioning step consisting of a short temper. After being subjected to the deep freeze, the materials must be tempered to about +150°C. This temperature varies for different materials, and the processing time varies for different material cross sections.

Cryo processing improves performance and increases the life of metalcutting tools, blades, punches, dies, slitters, shears and knives, and increases abrasive wear resistance, raises the tensile strength and decreases brittleness with only one permanent treatment. It creates a denser molecular structure and closes the grains structure, resulting in a larger contact surface area that reduces friction, heat and wear. Cryogenic treatment changes the entire surface, not just the surface. Subsequent refinishing or regrinding operations do not affect the permanent improvements of the processing.

When the cryo treated tool does wear, the degree of wear reportedly is less severe, slower and more uniform. Therefore, less material must be removed to re-sharpen it. Customers have reported a material removal rate of less than half the normal material removed in re-sharpening. Cryo treating reduces the cost of the product by having longer tool life, less scrap, fewer rejections and above all, less costly downtime. Gains between 50% and 500% may occur, depending on the component structure and previous heat-treating. Every application is unique and the benefits for each one is application specific. There is no blanket prediction that can be made or previous results used to guarantee the same results for every operation. Each one has to be tested.

Cryogenics is not a substitute for heat treating. Instead, it simply adds the finishing touch to the heat treating process. It completes the austenite-to-martensite conversion in tool steel.

Another benefit of cryo treating is its ability to make the grain structure more uniform, which ultimately improves dissipation of heat beneficial to the racing industry.
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General Electric (GE) recently shared the results of their year-long partnership with the US Air Force (USAF) to create additive manufacturing solutions for their aircraft supply chain. GE Additive and GE Aviation proposed the collaboration in 2019 for the Air Force to adopt metal additive technology to address gaps in readiness, sustainment and affordability. The Rapid Sustainment Office (RSO) oversaw the application and scaling of technology. This also marks the first time the GE Additive and GE Aviation departments will be working together for an external customer.

Several aircraft fleets will be entering their sixth decade of service, and with it arises challenges in sourcing and producing spare parts. GE expressed that the advantage of using additive technology is its speed.

“Speed is additive’s currency, and by applying our additive experiences with the LEAP fuel nozzle and other parts additively printed for the GE9X, being able to offer an end-to-end solution and also applying lessons learned of a robust certification processes, we’ve been able to accelerate the pace for the USAF,” says Lisa Coroa-Bockley of GE Aviation.

The sustainment propulsion division also added that focusing on re-engineering legacy parts while using additive technology to manufacture traditional cast parts will also improve USAF supportability.

The two teams from GE and the Air Force worked using a ‘spiral development’ process - a concept more familiar in software development - meaning that complexity and scale will increase in each phase. The first phase was launched this year where they met their first major technology milestone. The team was tasked with identifying GE Aviation spare parts for the F110 and TF34 engines. Additive processes were able to be integrated for the F110 engine sump cover which can be commonly found in F-16 and F-17 aircrafts.

“Compared to other parts on the F110 engine, the sump cover might have lower functionality, but is incredibly important. It needs to be durable, form a seal and it needs to work for the entire engine to function – which is of course critical on a single engine aircraft like the F-16,” says James Bonar of GE Additive.

Additive Concept Laser M2 machines running cobalt-chrome were used for the first additive sump cover builds at GE’s Additive Technology Centre (ATC) in Cincinnati. GE says that preliminary work on the sump cover is already finished and that they are currently ahead of schedule. They will be working further on their metal additive airworthiness plan for the Air Force and look forward to meeting more milestones across each phase of the programme. Phase 1b will be focusing on sump cover housing and a family of parts on the TF34 engine that has been in service more than 40 years.

For further details contact Multitrade 3D Systems on TEL: 011 453 8034 or visit http://multitradedistributors.co.za/page/3d-printing

ExOne launches sand 3D printing network powered by over 40 binder jetting machines

ExOne has announced the launch of an international Sand 3D printing network made up of more than 40 binder jet printing platforms throughout North America.

The network has been set up to provide greater access of ExOne’s sand 3D printing technologies to manufacturers working in industries such as aerospace and automotive.

Through this service, ExOne S-Max and S-Print platforms will be deployed by premium patternshops and foundries to provide high-quality 3D printed sand moulds and cores to manufacturers within typical timeframes of three to five days.

The network is able to 3D print sand cores as monolithic units, helping to remove labour, errors and scrap during assembly, while also supporting customers with the design and simulation of products. It is comprised of S-Max and S-Print machines spread throughout the United States, Canada and Mexico, with the former boasting a build volume of 1 800mm x 1 000mm x 700mm and the latter a build volume of 800mm x 500mm x 400mm. ExOne’s machines can also support an array of foundry materials including aluminium, bronze, copper, nickel-based alloys, iron, magnesium, steels, titanium and zinc.

“The new ExOne Sand 3D Printing Network can help manufacturers easily locate an ExOne sand 3D printer that best meets their needs,” commented ExOne CEO John Hartner. “What’s more, our network can help ensure a steady supply of sand moulds and cores for metal castings, especially during a crisis, as well as enable restoring of key parts that may be difficult to ship during the ongoing COVID-19 pandemic.”

Learn more about ExOne at www.exone.com
What’s the difference between a $20 and $200 cast iron skillet?

A cast iron skillet should retain heat well and put satisfying sears on all sorts of food. So what makes the $200 versions better at that than the $20 ones?

New cooks can be intimidated by cast iron cookware’s need for seasoning, the age-old soap or no soap cleaning question and the seemingly infinite crackpot cast iron hacks, writes Will Price of Gear Patrol. Fundamentally, cast iron skillets are heavy, brittle, sear machines with a reputation for fussiness. So why would you buy a $200 version of a pan - like Butter Pat’s Heather skillet - instead of a $20 version, like Lodge’s popular 10.25 inch skillet? Here’s what you need to know to decide for yourself.

Cooking surface

The most apparent difference between the Butter Pat and the Lodge - and between most new-era, premium cast iron skillets and Lodge - is the cooking surface. Lodge’s skillets are rough and feel like heavy metal sandpaper to the touch, a texture created by sand-based machine casting and no finishing process. Butter Pat’s skillets - and those from Smithey, Field Company, Stargazer and Lodge’s own Finex - are smooth, but not all for the same reason.

Products from Finex or Smithey are sand cast but machined (often by lathes) into a silky smooth cooking surface. Butter Pat’s, however, is cast smooth and thin by hand. The details of this process are proprietary, but, according to its website and company founder and lead designer Dennis Powell, are based on manuals and guides from the 1800s, when cast iron was king.

Functionally, the smooth surface affords an immediate near-non-stick cooking experience. Delicate foods like eggs or fish are far less likely to stick on a less porous surface. The want for a smooth surface is strong enough to have spawned dozens of hugely popular YouTube tutorials on the subject of sanding your Lodge (or other comparable, frugal choice) to a smooth finish. There is a ripple effect that comes with a smooth cooking surface versus a rough one. Consider...

Ease of cleaning and seasoning

A smooth surface releases hardened and stuck food particles more easily than a porous one, and though smooth-cast and machine-cast skillets are not perfectly smooth (there are microscopic dips and holes even in seemingly smooth iron), they certainly let go of food with less of a fuss. This goes for both cleaning and cooking - smooth cooking surfaces are less prone to grabbing hold of cold chicken skin than the rougher Lodge.

Many, like Powell at Butter Pat, also suggest seasoning comes to a smooth skilet significantly easier than a rough one, citing vintage skillets’ smooth surfaces as an example. There was very little to no mention of seasoning processes as we know them today in cast iron’s heyday. Home cooks of the day opted for a “grease it up and cook” style.

Weight (mass)

More than any other feature, mass is what separates cast iron cookware from its stainless steel, carbon steel, aluminium and copper counterparts. Its incredible mass grants it unchallenged heat capacity - sometimes called heat retention, or the ability to remain hot after food is placed in it - and more even heating. For cast iron cookware nuts, mass is a hotly debated subject.

The modern Lodge 10.25-inch skillet weighs 5.35 pounds, while Butter Pat’s Heather skillet comes in at 4.8 pounds. The half-pound difference isn’t a surprise - Butter Pat’s skillets are cast with extremely thin walls, like the cast iron skillets of old, while new Lodges are rather chunky comparatively, the result of mass production.

From a cooking perspective, the change is insignificant - both skillets, once properly heated, will climb and stay at high temperatures, even when confronted with the thickest and coldest of steaks. Pragmatically, half a pound less strain while tilting the pan for a baste, tossing vegetables or lifting a pie from the oven is noticeable.

That said, both are leagues heavier than skillets of the same size made of different materials. All-Clad’s category-leading clad stainless steel skillet weighs 3.5 pounds, while de Buyer’s famed carbon steel skillet is 3.8 pounds. Copper and aluminium cookware are lighter still. When comparing cast iron skillets, lighter is typically considered better, even if only from a convenience standpoint. When comparing cast iron skillets to skillets made of other stuff, the weight is its money-maker and the reason we still cook with them.

Verdict

Unsure about this whole cast iron skillet thing? Get a Lodge. The investment is low and it demonstrates the base functions of cast iron skillet cooking as well as the pricier Butter Pat (or similar, modern era cast iron cookware makers). Butter Pat’s skillets will take to seasoning better, release food more easily and, thanks to its small-batch hand casting process, are lighter and easier to tool around with on a stove or over a campfire, but they don’t boast inherent advantages in the capacity to sear food.
GA-ASI completes first test flight with metal 3D printed part

General Atomics Aeronautical Systems, Inc (GA-ASI), a US aeronautics company, has completed its first test flight with a metal 3D printed part featured onboard its SkyGuardian Remotely Piloted Aircraft (RPA) system.

GA-ASI’s strategy for scaling metal additive manufacturing across its RPA platforms has been supported by AddWorks, the consultation service of 3D printer OEM GE Additive, since the first half of 2019.

Working with AddWorks since then, the GA-ASI additive manufacturing team reached a milestone in February 2020 when it performed the company’s first test flight of a metal 3D printed part – a NACA inlet made in titanium Ti6Al4V – on a SkyGuardian RPA.

“With the GE Additive AddWorks team, we were able not only to achieve our short term objective of qualifying the NACA inlet, but we also worked together on a number of additional application development and qualification efforts, which are continuing into 2020 and beyond,” commented Elie Yehezkel, senior vice president of Advanced Manufacturing Technologies for GA-ASI.

Accelerating the adoption of metal AM

Founded in 1993, GA-ASI is a leading manufacturer of Remotely Piloted Aircraft (RPA) systems, radars, electro-optic and related mission systems. It is an affiliate of General Atomics, the US energy and defence corporation.

GA-ASI already has significant experience with polymer-based 3D printing, and only recently made strides in developing its metal additive manufacturing roadmap. After establishing the required ecosystem to support metal additive manufacturing applications, the GA-ASI AM team identified a series of parts and families of applications with potentially favourable business cases.

The company partnered with GE Additive’s AddWorks team in April 2019, to support the acceleration of metal laser powder bed fusion (LPBF) additive manufacturing at the company, while also strengthening the qualification of both its products and processes. AddWorks provides a step by step consultation service for adopting 3D printing, which begins with defining the business case, building a team, and identifying funding opportunities.

Saving time and costs with metal additive manufacturing

Amongst its pipeline of suitable components for metal additive manufacturing, GA-ASI identified the NACA inlet to be a strong business case for the first metal 3D printed part for the SkyGuardian programme. GA-ASI identified the NACA inlet to be a strong business case for the first metal 3D printed part for the SkyGuardian programme, after assessing part criticality and programme impacts. NACA inlets, developed by the National Advisory Committee for Aeronautics, are a type of submerged air inlet that has found application on many types of air and ground vehicles.

Through its consultation service, the AddWorks team supported the process and production readiness of the NACA inlet with improved design and risk reduction.

3D printed as a single piece on a Concept Laser M2 machine, the inlet now delivers a cost reduction per part of more than 90 per cent, weight reduction of over 30 per cent, and tooling reduction of approximately 85 per cent. The GA-ASI team is now applying best practices and knowledge to its wider NACA inlet part family and several other components and subsystems.
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Foseco’s latest range of Dycote Safeguard die coatings increase die operating life by up to three times compared to conventional coatings. Poor die coating service life leads to reduced productivity and increases the risk of rejects due to poor casting surface quality.

Foseco’s range of Dycote Safeguard die coatings have been developed specifically to maximise the service life and maintain surface quality for critical aluminium components such as aluminium wheels and cylinder heads.

Dycote Safeguard products are nano-ceramic coatings designed to be applied on top of existing insulating Dycote base coatings, and have been proven to increase lifetime up to 300%. Best results are achieved when Dycote Safeguard is applied using the Foseco Dycote spray gun, which ensures a very consistent and uniform coating layer application. The extended life achieved with Dycote Safeguard coatings reduces the frequency of coating touch-up operations and also complete mould cleaning and re-coating operations, thereby reducing die downtime and maximising productivity.

Improved casting surface finish consistency has also been noted.

For more information contact Foseco on TEL: 011 903 9500 or visit www.foseco.com
Grinding is an integral process of removing unwanted material from a casting or workpiece. In today’s industry, the grinding process is used on a broad range of ferrous and non-ferrous metals, and on non-metallic materials from rough snagging and dimensioning to the development of fine finishes. In most aspects, grinding is similar to milling, turning or other metal cutting operations. Importantly, the difference of grinding from these operations is what gives it a real value for a broad range of production processes.

Instead of using a relatively small number of cutting edges per tool to remove material, a grinding wheel contains many thousands of hard and tough abrasive grains that move against the workpiece and cut away tiny chips. Because grinding is essentially a more gradual, less harsh method of machining a workpiece, a host of variables may be controlled with a far greater degree of precision.

In a foundry the grinding process is mainly used to accomplish stock removal. Stock removal or rough grinding, is an operation in which completed part tolerance and finish are secondary to getting the raw workpiece to an intermediate size or degree of finish. The most common types of stock removal in terms of grinding are rough snagging, swing frame grinding, portable grinding, cutting-off and steel conditioning. The primary objective of this type of grinding is maximum material removal in a minimum amount of time.

Because stock removal, in most instances, is rough grinding that brings the workpiece to approximate dimensions, most stock removal grinding is done off-hand. This means, either the workpiece or grinder is handheld, and the quality and quantity of grinding are left to the skill and stamina of the operator.

Snagging is a type of stock removal most often used in foundries, to clean and dimension castings after they’ve been poured and have cooled. Gates and risers are removed, as well as stubs, fins, parting lines and accidental surface roughness. For castings small enough to be picked up and brought to the wheel, floor stand grinders are most commonly used, with the casting being hand held and cleaned as necessary.

Swing frame grinders are used on castings which are too large to be brought to the wheel. Rather, the entire grinder is suspended on a jig over the work area, and counter balanced in order for the operator to press the wheel into the workpiece.

Portable grinding is one of the most widely used kinds of stock removal in foundries. The grinder is powered by air, an electric motor or a flexible shaft. For heavy-duty jobs, such as cleaning a casting or removing a large weld bead, the wheels used and simply termed portable or hand program wheels. Raised hub wheels are used in most portable grinding jobs where the grinding requirements are not as severe. These wheels are also known as depressed centre wheels. They are often used to smooth down flat and curved surfaces for painting and finishing, to clean up weld lines, and to clean and smooth corners and joints.

Cutting-off is an abrasive application where the grinding wheel is used as a saw, cutting entirely through the workpiece instead of grinding its surface. In foundries, cut-off wheels are used to trim gates and risers from castings.

Mounted grinding wheels, more commonly known as mounted points are small grinding wheels with special shapes, mounted permanently on a steel mandrel. Mounted points are commonly used in foundries for cleaning and polishing difficult to reach spaces on the workpiece.

Grinding Techniques’ Andor range offers specifically developed and engineered grinding wheels to offer both high stock removal and optimum results when it comes to swing frame grinding and snagging.

With the Superflex hand operation cutting and grinding wheels you will easily find the right product to suit any grinding application. Apart from the Andor and Superflex range, Grinding Techniques also stock a wide variety of mounted points, tungsten carbide burs and a range of coated abrasives inclusive of flap, Velcro and fibre discs and sanding belts.

For more information contact Grinding Techniques on TEL: 011 271 6400, email info@grindtech.com or visit grindtech.com
Superwool XTRA low biopersistent fibre for iron and steel

Superwool XTRA, a low-biopersistent fibre, meets stringent environmental requirements in addition to high-temperature tolerance and improved pollutant resistance.

lining iron and steel furnaces is critical to extend the life of the furnaces and to protect the purity of the metals being heat treated. Therefore, choosing the best material to meet these needs is crucial. For many years, the first-choice material for the industry has been refractory ceramic fibre (RCF), which can withstand the extreme temperatures within the furnace and has strong resistance to pollutants.

However, RCF has environmental, health, and safety (EHS) concerns. After numerous studies, RCF was classified as a category 1b carcinogen in Europe and is considered a substance of very high concern (SVHC) under REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals).

There’s already pressure from European legislators to find safer alternatives, under the Carcinogens Directive, where technically possible, substitutes to RCF should be used. RCF is currently under consideration for further regulation in Europe, which will make the use of RCF more difficult with constraints and stringent controls likely to come into force.

This is compounded by the increasing commitment of major industrial companies and trade associations to improve green standards, placing the onus on the fibre industry to find alternatives that match the performance of RCF without adverse effects.

Backed by almost 10 years of research and development and more than 30 months in trials at customer furnaces, Morgan Advanced Materials’ Thermal Ceramics business has launched Superwool XTRA, a material that delivers the performance of RCF without the inherent EHS risks associated with it.

Since the 1990s, the Superwool brand has been a mark of quality in creating low bio-persistent (LBP) fibres that minimise health risk to furnace installers, operators, and other factory employees. Morgan Advanced Materials has achieved major advances in the performance of LBP fibres through Superwool HT and Superwool Plus grades.

A different fibre

Superwool XTRA delivers the strength that industrial applications need, both in terms of its resistance to high temperatures and pollutants, but also its improved EHS credentials.

With a classification temperature of 1,450 degrees C, Superwool XTRA offers a performance equal, and in many cases superior, to RCF. The fibre is unusual in that it expands when heated to close shrinkage gaps at high temperatures. This is reversible, so when it cools, the shrinkage gaps return and are visible. Once heated again, it expands and closes the gaps again.

This means there is no reason to fill the shrinkage gaps with blanket - the normal practice for RCF. With a two per cent shrinkage, open gaps with RCF normally require an installer to fill these gaps with thin blanket. This is not only time-consuming, but more material is required, adding to costs.

In terms of EHS qualities, Superwool XTRA is exonerated from any carcinogenic classification under nota Q of directive 97/69EC.

A key benefit is Superwool XTRA does not form crystalline silica, a common by-product when many refractories are heated to high temperatures. Having a fibre that produces no crystalline silica is a major breakthrough for the industry, which enhances EHS compliance.

For further details contact Morgan Advanced Materials on TEL: 011 908 0108 or visit www.morganthermalceramics.com.
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**Micracut 152**

The Micracut 152 accommodates diamond and abrasive wheels up to 150mm diameter and the speed range is between 0 and 1000rpm. The gravity feed loading design minimises sample deformation. The sliding weight arm with counterweight allows precise force application. The digital micrometer enables the operator to set the cutting width with a resolution of 1 micron. The digital micrometer is interchangeable and the customer can mount other types of micrometers if and whenever required. The coolant tray is removable from the front of the instrument for easy cleaning.

The Micracut 152’s cutting chamber is fully enclosed by a transparent hood. Blade dresser is optionally available. At the end of the cut, an audible signal notifies the operator. An optional cutting table attachment is available for manual cutting of extra flat large specimens and PCB’s.

**Micracut 202**

The Micracut 202 is built on a precisely manufactured heavy duty aluminium frame providing stable and vibration resistant base for precision components and linear bearings. The cutting compartment is fully enclosed. The front sliding door and side cover can be completely opened for easy access and handling to all sides. The powerful cutting motor (1.1kW) has variable cut-off wheel speeds from 300 up to 4 000rpm allowing both high speed and low speed cutting. A wide range of clamping tools can be used on the T-slotted moving table. The optional X-axis table with motorised drive mechanism positions the specimen with high positioning accuracy. An optional vacuum sample holder provides precision grinding on the Micracut 202 with pre-defined amount of material removal can be carried out by using a diamond cup wheel. An optional stand can accommodate all Micracut specimen vices with dovetail plates. The height of the cut-off wheel (Z-axis) can be adjusted automatically. Diamond, CBN and abrasive cut-off wheels up to 200mm diameter can be used. By height adjustment (Z-axis), the wheel wear is easily compensated. Different flange sets are available, which can be selected according to the requirement of maximum cutting capacity or maximum wheel support. Various clamping tools and accessories are available for different specimen geometry and applications.

For more information contact SPS – Scientific & Precision Solutions (formerly IMP Scientific & Precision) on TEL: 011 916 5000 or email info@spsrsa.co.za or visit website www.spsrsa.co.za
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