

castings sa

volume 14 number 2
AUGUST 2013

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castings sa

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Publishing Editor
Bruce Crawford

Editorial Board
Marc Hindle

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Wendy Crawford

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Jericho Graphic Design

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Advertising
Bruce Crawford/Wendy Crawford
Tel: +27 11 463 0489
Cell: + 27 83 628 7654
E-mail: online@engnews.co.za

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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.

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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, Wadeville, 1422.

John Davies - Tel: +27 (11) 559 6468;
Cell: 083 630 2809; email: jdavies@uj.ac.za

Executive Secretary - Tel: +27 (11) 559 6455;
Fax: +27 (11) 559 6526; Fax to email: 086 509 7045;
email: saif@icon.co.za / mbiljon@uj.ac.za

Website: www.foundries.org.za

Contact details for Western Cape:
Mike Killian - Cell: 082 442 3785

EDITOR'S COMMENT

Respecting tradition



One of the main stories in this issue is about the 50th anniversary of Malleable Castings. Further on there is the fiftieth occasion of the South African Institute of Foundrymen's Awards evening and, in the International section, James Durrans & Sons marks its 150 years in business, plus the 60th anniversary of the Inductotherm Group is featured. They are all

notable occasions and significant milestones for the various entities, respectively.

If you look at the James Durrans & Sons history, the sixth generation of the original founder James Durrans the First, Chris Durrans, is currently at the helm of the company and continuing to maintain the tradition installed by his great-great-great-grandfather. It certainly is remarkable and comforting to see that a company can survive and grow for this amount of time.

In the Malleable Castings article I have published a picture that was taken of a page in the October 1966 issue of the Foundry, Welding, Production Engineering (FWP) magazine. The reference is to the founder of Malleable Castings, Joe Peers, who had a paper published in that issue on 'Induction Melting of Cast Iron'. In those days the publishers even gave you the approximate reading time of the article.

If you look at the list of names under the SAIF credits I am sure there are a number of them that will be fondly remembered by the older generation. Some still have relatives that work in the foundry industry. In those days there was even a Natal branch of the SAIF which does not exist anymore.

There are also a number of names that are still linked to the awards that are handed out at the SAIF awards evening and other activities of the SAIF. These include the AH Guy award for an individual that has given outstanding service to the foundry industry, the Harry Holdsworth lecture that is given by the incumbent SAIF President at the annual AGM and the John Steele trophy that is presented to the winners of the SAIF's annual golf day competition.

All these gentlemen were Past Presidents of the SAIF with John Steele's involvement more so having been the Editor of the FWP magazine and secretary of the SAIF for a number of years. Sadly this year marks the 25th anniversary of the passing of John.

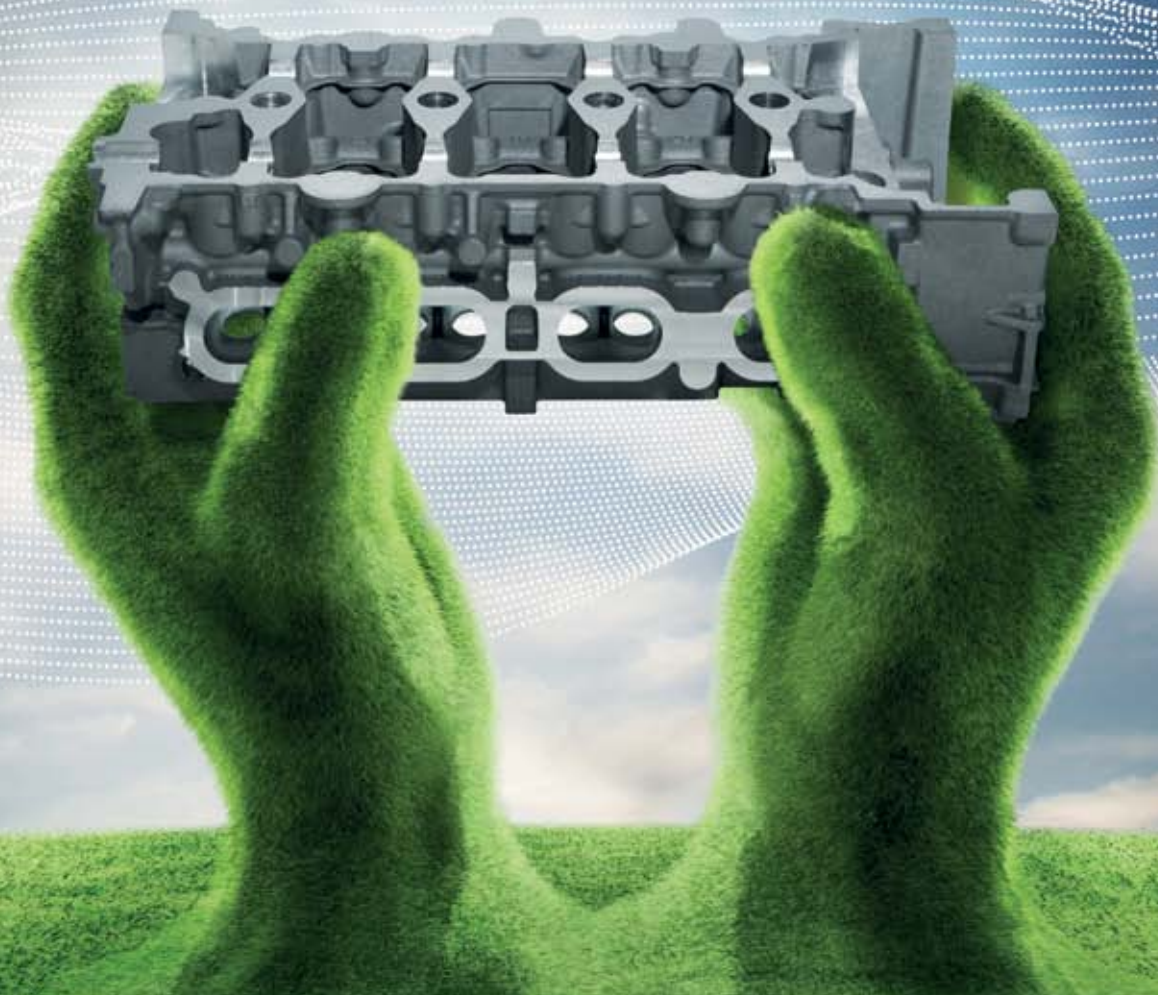
More importantly they are all linked to the tradition that oozes out of this photograph and I am sure, very proud traditionalists. The world has moved on in leaps and bounds since the turn of the 20th century and thank goodness it has, but I still believe in tradition and respecting our heritage. Sometimes we give it up too easily to accommodate the 'modern' way but with it goes the discipline that these traditions inadvertently instilled in us.

SI Group South Africa (Pty) Ltd.

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Spectro App free for Apple iPhone, iPod touch and iPad.

Working with the Spectrotest mobile metal analyzer has just got easier. Spectro Analytical Instruments, a unit of Ametek, Inc., now offers Spectro MMA, a free readout App for the Apple iPhone, iPod touch and iPad, that works with the latest version of the high-performance Spectrotest mobile metal analyzer.

Spectro initially designed the Spectrotest mobile metal analyzer for precise element analyses and rapid material identification with the metal production, processing and recycling industries in mind. The instrument is mounted on a robust, lightweight trolley. The instrument's four- or eight-meter long hose connects the sample probe to the instrument, allowing for maximum freedom of movement and ease of use, especially when performing on site analyses in tight or hard to reach places.

"The Spectrotest comes with a 15-inch display so results can be read easily even from far away," explains Marcus Freit, Product Manager for Spectro mobile metal analyzers.

"The user only needs to have a clear view of the display, something that isn't always possible with some applications."

Spectro developed the Spectro MMA App to save users from having to walk back and forth to the instrument. It uses Spectrotest-LAN to transfer the measuring results from the Spectrotest to an Apple iPhone, iPod touch or iPad. With the Spectrotest's built-in Spectrotest-LAN adapter, having a wireless network on site is not necessary. It establishes a direct connection between the two devices.

Additionally, the Spectro MMA brings important instrument parameters to the user. Depending on the work mode, for example, it informs the user if material specifications have been exceeded. The operator also can enter sample numbers with the App, saving further walking to and from the analytical instrument.

"We don't intend the App to be a remote control for the Spectrotest," emphasised Marcus Freit. "Basic settings are still made on the instrument, and its keyboard with track

ball and 15-inch display are better suited for that. The App, however, does provide the user a definite plus in terms of comfort."

The Spectro MMA App is available for free at the Apple App Store. "Apps and additional displays for the viewing and monitoring of inspection tasks, in general, offer users new possibilities for making tasks easier and provide them with a sensible extension of the analyzer's capabilities" explains Marcus Freit.

In addition to the Spectro MMA App, Spectro offers a web-based solution to display measurement results and enter sample identification on external devices. The Web App is available for the current Spectrotest and Spectromaxx models.

About Spectro:

Spectro is among the world's leading suppliers of analytical instruments for optical emission and X-ray fluorescence spectrometry. Spectro, a unit of Ametek's Materials Analysis Division, manufactures advanced instruments, develops solutions for a wide range of applications and provides exemplary customer service. Spectro's products are noted by their unique technical capabilities that deliver measureable benefits to the customer. From its foundation in 1979 until today, more than 30 000 analytical instruments have been delivered to customers around the world.

Ametek, Inc. is a leading global manufacturer of electronic and electromechanical products with over 14 000 colleagues at more than 100 manufacturing locations and over 100 sales and service centers worldwide. Ametek consists of two operating groups: Electronic Instruments and Electromechanical. The Electronic Instruments Group manufactures high-tech instruments for the process, aviation, power and other industries. The Electromechanical Group is a differentiated supplier of electrical interconnects and packaging; specialty metals; and floorcare, technical and specialty motors and associated systems.

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Fibres

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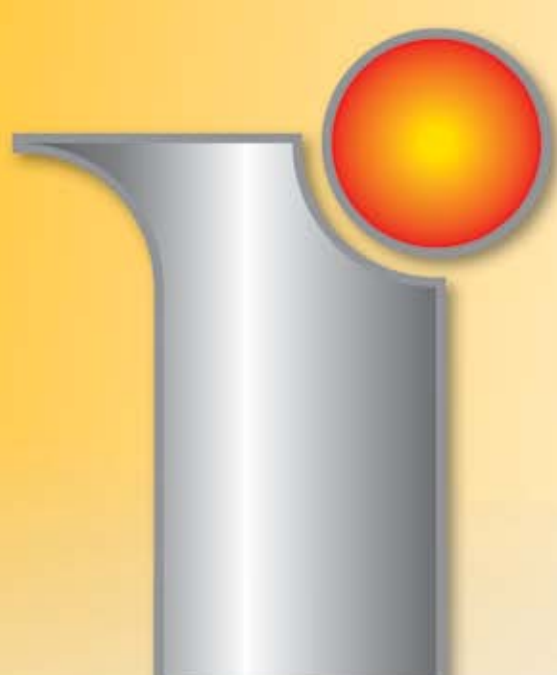
This newly introduced division supplies quality coating powders into the metal finishing industries

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Separate entities

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- Metlite Alloys is a producer of quality aluminium ingots and deoxidants.
- InsimbiAluminium Alloys is a producer of quality deoxidants.
- Insimbi Nano Milling develops, manufactures and distributes nanosized products and composites.





50th Anniversary highlights Malleable Casting's progress, achievements

The casting platform with 10 moulding lines and two pouring lines

Over 50 years of technical development and high-quality products have left a lasting impression for this foundry.

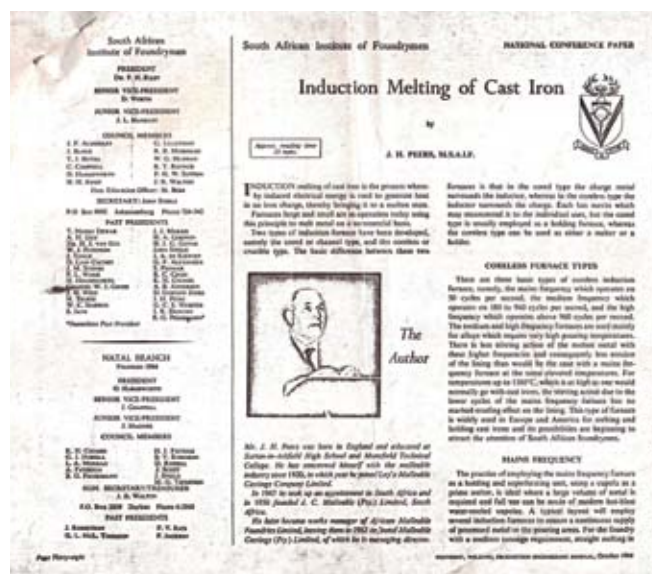
While there have been numerous changes in the foundry industry through the past several decades, Malleable Castings has been a reliable presence in this changing industrial sector. The Activia Park, Gauteng based foundry is celebrating its 50th anniversary this year, with a rich and innovative history.

The vision for superior castings and customer service dates back to May 1963 when Joe Peers, who had been in the foundry industry all his life, founded his own foundry manufacturing malleable iron castings. For most of this period there has been a family connection of Joe's in the company

with son-in-law Ben Dyson having worked for the company from 1963 until retiring in 2006 and grandson, also christened Ben, has been with the company as Managing Director since 2011.

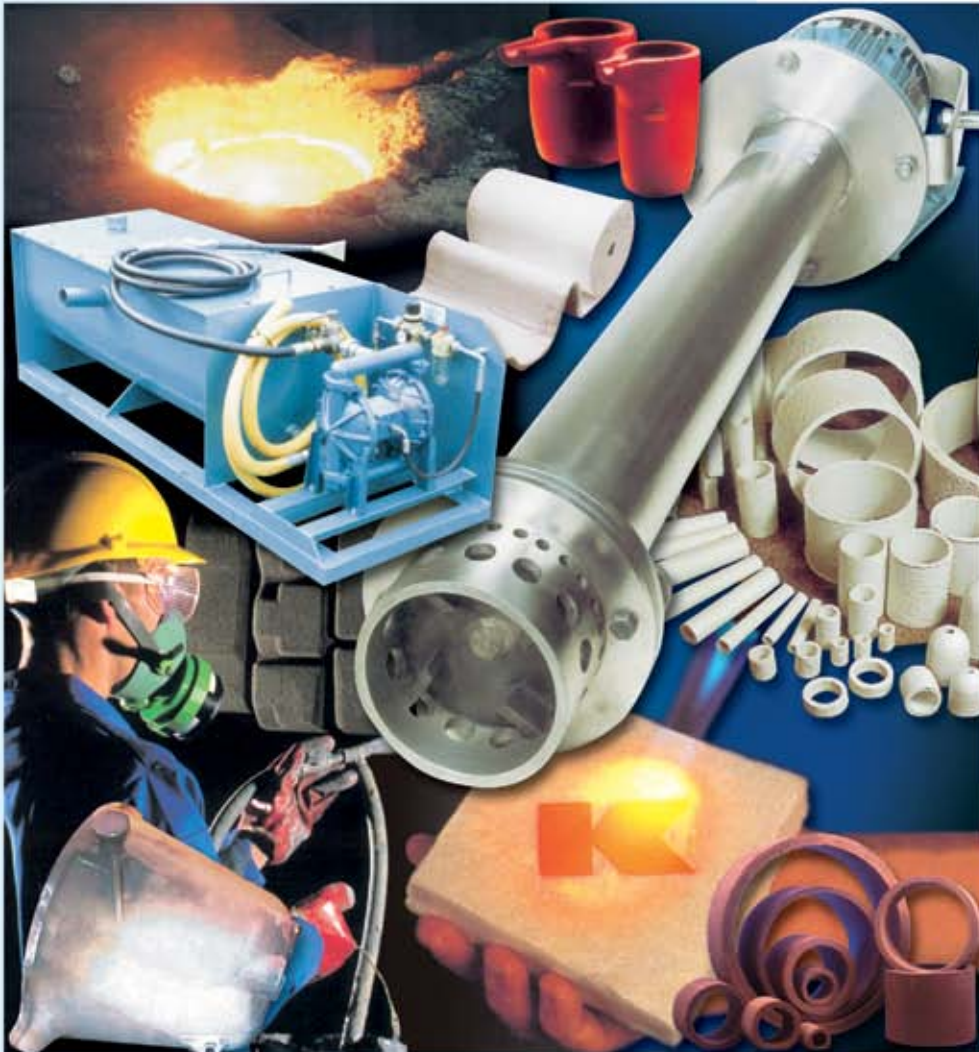


MD Ben Dyson, CEO Joe Fletcher and Foundry Manager Pradeep Singh



Founder Joe Peers was a member of the British Institute of Foundrymen and joined the South African Institute of Foundrymen when he arrived in South Africa. He would go on to be elected President of the SAIF and remained an active member during his working career

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Right: A burner body that required many trials before the company succeeded in manufacturing a casting to the client's satisfaction. One of the difficulties was due to the escape of gas from the core. The company's motto is that they rather try to fail than fail to try



Left: Spud type castings post knock off and ready for fettling

Joe Peers was born in England and educated at Sutton-in-Ashfield High School and Mansfield Technical College. His involvement with the malleable iron casting industry began in 1930, in which year he joined Ley's Malleable Castings Company Limited in the UK.

In 1947 he took up an appointment in South Africa and in 1950 founded J. C. Malleable (Pty) Limited, South Africa. He later became works manager of African Malleable Foundries Limited, leaving them in 1963 to start Malleable Castings.

Joe Peers was a member of the British Institute of Foundrymen and joined the South African Institute of Foundrymen when he arrived in South Africa. He would go on to be elected President of the SAIF and remained an active member during his working career.

The history of the company shows that Joe Peers sold the company to General Mining in the 1970s and remained on as a consultant. The company was then sold to Malbak Limited and then this Group sold it on to EC Lennings, a foundry group with a long history in South Africa.

In 1992 two private investors, Mike Jolly and Terry Burgess, took ownership and they are still the current owners.

Prevailing CEO and a shareholder Joe Fletcher joined the company in 1989 as General Manager and he was subsequently promoted to the position of MD/CEO when Mike Jolly and Terry Burgess took ownership.

Affable Joe takes up the story. "I have been with the company for virtually half its existence. In that time I have seen changes in both the company and the industry. At one time the company even operated a cupola furnace but thank goodness we have moved with the times and installed induction furnaces, with our latest one installed earlier this year."

Change from malleable iron production to SG or ductile iron production

"The biggest change in the company came when we made

the decision to change from manufacturing malleable iron castings to SG or ductile iron castings in 2005."

"The company was founded on the production of malleable iron castings and today malleable iron is still widely used in industry. At the time it was the preferred material of use as ductile iron was relatively new for foundries as it had only been introduced in 1948, and would only become recognised and commercially viable much later."

"Malleable iron is cast as white iron, the structure being a metastable carbide in a pearlitic matrix. Through an annealing heat treatment, the brittle structure as first cast, is transformed into the malleable form. Carbon agglomerates into small roughly spherical aggregates of graphite leaving a matrix of ferrite or pearlite according to the exact heat treat used. Three basic types of malleable iron are recognised within the casting industry: Blackheart malleable iron, Whiteheart malleable iron and Pearlitic malleable iron."

"It has greater ductility than grey cast iron for example, because of its carbon content (2.5wt %), silicon content (1.0wt %), and manganese content."

"Malleable cast irons may often be used in place of steel at considerable cost savings. The design and production advantages of malleable cast iron include low tooling, and production cost, good machinability without burring and also the ability to cast into complex shapes. But the microstructure and mechanical properties of malleable cast iron is affected by factors such as chemical composition of the iron, rate of annealing and also the type of graphite formed (if any)."

"Ductile cast iron, previously known as nodular iron or spheroidal-graphite (SG) cast iron (the international term is ductile iron), is cast iron in which the graphite is present as tiny spheres (nodules). In ductile iron, eutectic graphite separates from the molten iron during solidification in a manner similar to that in which eutectic graphite separates in grey cast iron."

"However, because of additives introduced in the molten



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A valve body casting with internal section done with shell core

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- Striko: aluminium furnaces
- Foundry Automation: core shooting machines
- IMF: turnkey moulding plants and systems
- Mammut: crucibles
- Progelta: molten metal treatment and automation systems for grey and ductile iron foundries
- Kennecott: FeMo
- Elkem: inoculants and nodulisers
- Ceralcast: local ceramic production facility
- CEDIE: cored wire
- RATH: refractory materials



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iron before casting, the graphite grows as spheres, rather than as flakes of any of the forms characteristic of grey iron. Cast iron containing spheroidal graphite is much stronger and has higher elongation than grey iron or malleable iron. It may be considered as a natural composite in which the spheroidal graphite imparts unique properties to ductile iron."

"The relatively high strength and toughness of ductile iron give it an advantage over gray iron or malleable iron in many structural applications. Also, because ductile iron does not require heat treatment to produce graphite nodules (as does malleable iron to produce temper-carbon nodules), it can compete with malleable iron even though it requires a treatment and inoculation process."

"The mould yield is normally higher than with malleable iron. Ductile iron can be produced to x-ray standards because porosity stays in the thermal center. Malleable iron cannot tolerate porosity because voids migrate to the surface of hot spots such as fillets and appears as cracks. Typically, the composition of unalloyed ductile iron differs from that of grey iron or malleable iron."

"The raw materials used for ductile iron must be of higher purity. All cast irons can be melted in cupolas, electric arc furnaces, or induction furnaces. Ductile iron, as a liquid, has high fluidity, excellent castability, but high surface tension. The sands and moulding equipment used for ductile iron must provide rigid moulds of high density and good heat transfer. The formation of graphite during solidification causes an attendant increase in volume, which can counteract the loss in volume due to the liquid-to-solid phase change in the metallic constituent."

"Ductile iron castings typically require only minimal use of risers. Grey irons often do not require risers to ensure shrinkage-free castings. On the other hand, steels and malleable iron generally require heavy risering. Thus, the mould yield of ductile iron castings (the ratio of the weight of usable castings to the weight of metal poured) is much higher than that of either steel castings or malleable iron castings, but not as high as that of grey iron."

"There are some cases of ductile iron castings being made without risers. Often designers must compensate for the



Zimmerman jolt squeeze moulding machines

shrinkage of cast iron during both solidification and subsequent cooling to room temperature by making patterns with dimensions larger than those desired in the finished castings. Typically, ductile iron requires less compensation than any other cast ferrous metal. The allowances in patternmaker rules (shrink rules) are usually: Shrinkage allowance can vary somewhat from the percentages given above, and often different percentages must be used for different directions in one

casting because of the influence of the solidification pattern on the amount of contraction that takes place in different directions. Shrinkage is volumetric, and the ratio of dimensions to volume influences each dimension. As ductile iron approaches a condition of shrinkage porosity, the graphite nodules tend to become aligned and can result in lower fatigue strength."

"During recent years, producers and users of ductile iron castings have observed that many potential users of ductile iron castings are not aware of the wide range of properties offered by the family of ductile iron alloys."

"Since their commercial introduction ductile iron castings have proven to be a cost effective alternative to malleable iron castings, steel castings, forgings, and fabrications. This is for a multitude of reasons and ductile iron castings are found in every field of engineering and in every geographic area of the world."

"Ductile cast irons are used extensively in automotive applications such as clutches, gears, carriers, shafts, bearings, cams and hubs. Castings are made in a wide range of sizes with sections that can be either very thin or very thick."

"Since its introduction, the growth of ductile iron applications has exceeded all expectations. Whether in an automobile component, a water pipe, or a plow, ductile iron has made major inroads to the casting market in every industrially developed country. There can be little doubt that the major motivating factor for this was "more strength for less expense" compared to just about every other cast alloy. The lesser expense comes not only from the readily available raw materials and the efficiencies of the foundry operation, but also from reduced cleaning and machining costs of ductile iron castings. The application of ductile iron is a notable engineering achievement of our age."



The new Solid State 1.5 megawatt medium frequency furnace was installed earlier this year



The quality of the metal is of top priority at Malleable Castings and here they utilise a Spectro spectrometer, which is housed in a climate controlled laboratory



Furane sand mould before coating and closing

“In our case it was not only the reasons given above but a case of us becoming more competitive in the market place as well. With the influx of all the castings from China, our decision has been vilified.”

New Solid State 1.5 megawatt furnace

“When I joined the company at the beginning of 2011 one of my briefs was to look at all areas of the foundry and come up with solutions to improve our productivity, improve quality, reduce costs and scrap rates” said MD Ben Dyson. Ben completed a four year apprenticeship with Malleable Castings doing training at Iscor, then worked at Eclipse East Plant, followed by a few years in the control and automation industry before then serving as the Managing director



A new project for a cooling jacket

designate for a well known induction furnace manufacturer where he was exposed to European training and international and local installations.

“It was kind of dejavu for me joining Malleable Castings. With all the family history I felt as though I was ‘coming home’. It was an opportunity I could not miss.”

“The foundry has operated from the same location since my grandfather purchased the land in 1961 and started the foundry in 1963. There have been additions and changes to buildings but basically the foundry has operated as a green sand foundry since the beginning. The company did make some major equipment purchases in the 80s and we still have most of this equipment operating today. This includes the Richards mill/mixer, a Speedmullor 75B and the eight Zimmermann ▶



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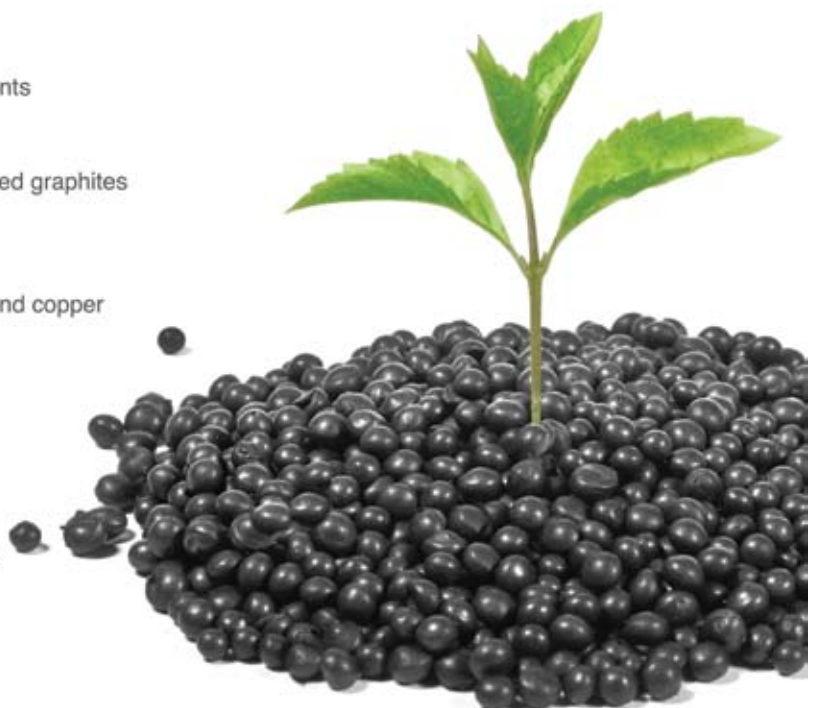
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jolt squeezing machines with match plates.”

“In total we have 10 moulding machines and we are turning over in the region of 340 boxes a day per machine. We have regularly serviced and maintained this equipment and the machines still operate as though they are new, although we are looking seriously at purchasing a fully automated moulding machine.”

“However I did have to look at our melting capacity. When I joined we had an 8 ton furnace, with a Crescenzi power pack and BBC ITMK5 cradle and two Lowenstein 3 ton furnaces, all of which are power hungry, especially during holding when not running production, which is one of the disadvantages of mains frequency furnaces. The arrival of the new Solid State 1.5 megawatt medium frequency furnace earlier this year could not have come sooner. To accommodate the new furnace we removed one 3 ton mains frequency furnace. I also introduced gas pre-heating of the scrap and this is making a difference. I constantly monitor our power usage online and make every effort to be wise during the peak periods, especially on winter tariffs. The other important factor in using furnaces efficiently is good quality scrap and good charging practice. And of course the golden rule, keep the lid closed on your furnaces. Our production is now up and we are saving on our power consumption.”

“We are very proud that our returns from customers are down to less than one percent and our scrap rate has been reduced down to between six and seven percent. This is a big improvement and we are constantly working on this.”

“The quality of our metal is of top priority and here we utilise a Spectro spectrometer, which is housed in a climate controlled laboratory.”

“Our other big challenge is patternmaking. I constantly investigate new methods of tool making. If we have a CAD drawing from our customer this is first prize but we now utilise the new technologies available, from CAD/CAM cutting to 3D printing of masters. We maintain all our own patterns.”

“The fettling area is in a separate building with the heat treatment furnaces, shot blasting and dispatch. The process flow is overall very efficient throughout the facility.”

“Our casting sizes and weights range from 0.1 kilogram to 30 kilograms, shell cores are produced in-house to satisfy the full range of castings produced and our pattern plate dimensions are 460mm x 160mm and 500mm x 160mm.”



150 Kg ladles being preheated for the next tap

“Markets supplied include mining, overhead line, agriculture, small tools, building and scaffolding, railway and automotive. Malleable Castings is a flexible foundry capable of producing cost effectively, both long production runs and shorter, lower volume orders to satisfy the full range of customer needs.”

“We specialise in the production of relatively small parts, with tight tolerances, excellent machining characteristics and very good surface finish. On request we can have the castings painted, galvanised or electro plated.”

“As standard practice we work closely with our customers to assess critically and then develop the optimum pattern and feeder system for each casting so as to build in from the start the lowest scrap rates and greatest cost efficiencies.”

Floor mouldings

This is a new area that Malleable Castings has recently ventured into. “We have had requests from clients so we are starting off small and we will see how we go. We have the space so that is not a problem,” said Joe Fletcher.

The company currently employs 120 staff with over 75% that have worked for Malleable Castings in excess of 15 years. The current capacity is 200 tons a month and presently it is casting up to 140 tons a month.

For further details contact Malleable Castings on TEL: 011 822 1503



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 General Manager
 k.duplooy@saveway-sa.co.za
 Contact number: +27 78 800 5109

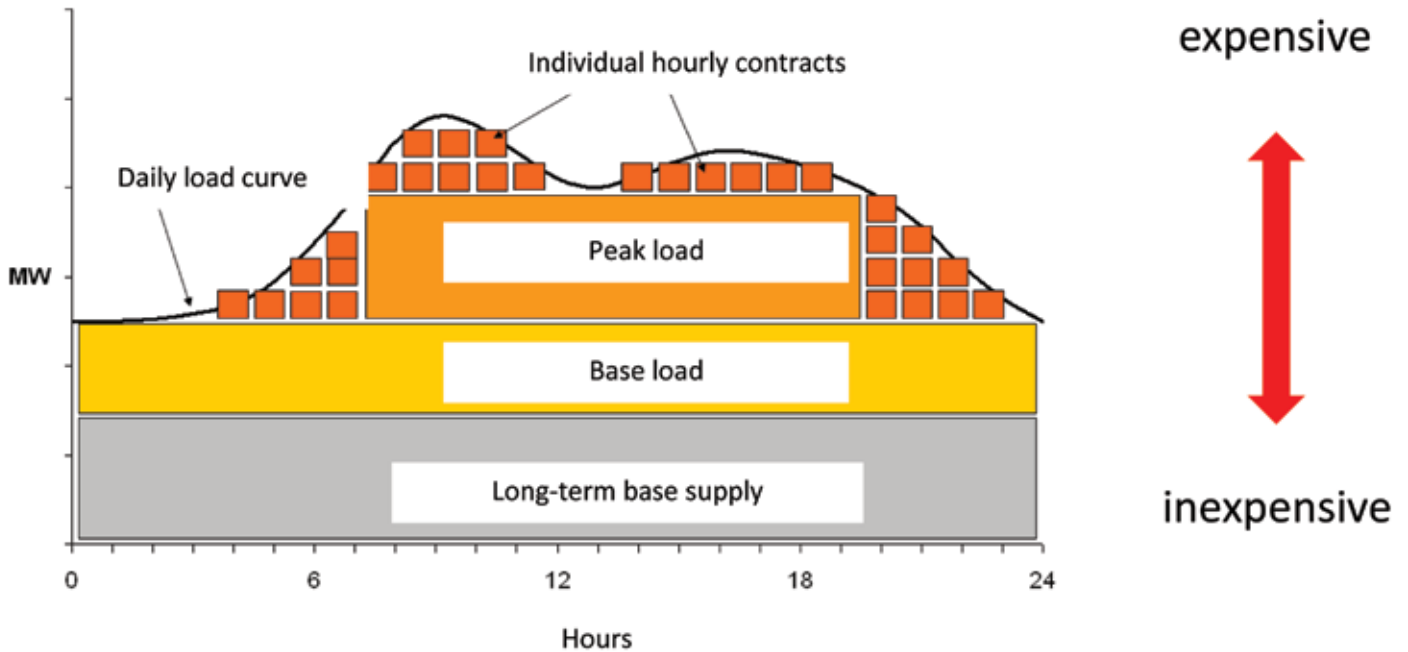
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Johannesburg International Motor Show – 18 to 27 October 2013

The Johannesburg International Motor Show (also popularly known as the Joburg Motor Show) is the single largest international automotive event in Southern Africa.

The exhibition (held once every two years) runs in conjunction with two additional shows 'Auto Shop' and the 'Johannesburg Truck and Bus Show' which collectively offer a complete representation of the motor industry, serving Sub Saharan Africa and South Africa as the host country.

This event takes place at the Johannesburg Expo Centre, Nasrec, Johannesburg, and is a comprehensive automotive lifestyle show case.

The 2011 Johannesburg International Motor Show proved a major success for all parties involved. It certainly lived up to its positioning as the leading event for the South African motor industry and its associated organisations.

The show is one of only 20 events in the world to have received international accreditation from the world motor industry organisation, OICA. This was the second show staged by the joint venture owners of the show, the National

Association of Automobile Manufacturers of SA (NAAMSA) and Expo Centre and organised by SA Show Services, under Show Director Pula Dippenaar.

The show attracted 225 161 visitors during the 11-day period, with the first two days having been set aside for the media and VIP guests only. The show enjoyed the support of more than 220 exhibitors in four sections, passenger cars, commercial vehicles and motorcycles as well as components and accessories.

The show was opened officially by the Minister of Trade and Industry, Rob Davies, and a number of important meetings and conferences were held at the venue during the show period, including the CAR Conference, where prominent local and international speakers provided plenty of food for thought. The main focus was on the passenger car section, where a record number of 36 manufacturers and distributors announced the launch of new or face lifted models. The Johannesburg Truck & Bus Show was staged concurrently with the motor show, and the media attended 24 presentations by this sector of the industry. ■

Agreement on construction of R2 billion train factory in South Africa

A R2 billion state-of-the-art train factory will be built in the "rust belt", east of Johannesburg, as part of a landmark agreement reached between the Passenger Rail Agency of South Africa (Prasa) and the Alstom-led consortium Gibela.

The factory will build modern commuter trains to replace dilapidated rolling stock.

Prasa and Gibela have successfully concluded negotiations over the major elements of the R51 billion contract to supply 3,600 coaches over the next 10 years and will sign off on all the contracts. The agreement is an important step for South Africa, which has ambitions to re-industrialise the economy through the use of state spending.

Under the original tender, state-owned freight and logistics company Transnet will build the new 35ha factory. This will be part of a larger industrial park in Ekurhuleni, where much of the country's heavy engineering firms are situated.

The successful conclusion of negotiations has contractually established the Gibela consortium as the designated supplier for Prasa's rolling stock fleet renewal programme. Prasa CEO Lucky Montana said the contract was an important milestone for South Africa, and provided the public sector with a model for leveraging procurement spend to achieve economic and industrial outcomes.

Speaking at the Africa Rail conference in Sandton, Alstom president Henri Poupart-Lafarge said the contract was the largest his company had ever signed. The deal created a platform for Alstom to establish a globally competitive manufacturing facility in Africa capable of producing trains for South Africa, and importantly, for export to the rest of Africa and other global rail markets.

"We see this as building a strong base for exporting in the future ... we need this to become a worldwide base (for train production)," Mr Poupart-Lafarge said, adding that the company was "extremely proud" to be part of a venture that will bring the much anticipated "rail renaissance" to South Africa.

Mr Poupart-Lafarge said the new train was a "fantastic product" that Alstom had recently sold to Australia, which demonstrated that the new commuter trains in South Africa would be world class. "It is the best quality Alstom has," he said.

The final contracts will define and apportion the financial and execution risks in the contract, namely the escalation in cost of materials such as steel and copper, as well as the performance of the trains.

These will be completed before the end of August, following which the contracts will be signed and presented to Prasa's board, Mr Montana said. ■



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Steel shot and grit abrasives manufacturer sets foundation for future growth

Winoa Group company Thomas Abrasives shaping its future.

South Africa's only manufacturer of steel shot and grit abrasives, Thomas Abrasives, has reported that it recently completed a number of equipment installations and process upgrades at its plant in Germiston, Gauteng that will take the company's monthly production capacity to 2 600 tons.

"Although demand has slowed over the last couple of years due to the worldwide economic crisis, the significant investment in our manufacturing plant will give us better control over the quality of product manufactured and, put us in a position to cope with the anticipated increased demand in the near future," said MD Tony Martingano.

"You could say that the latest developments in the company really started four years ago when we increased our electrical capability to approximately 4MVA in the melt shop. This entailed the laying of our own dedicated 1.8 kilometre cable from the local sub-station to our facility," continued Martingano.

"In the last 18 months there have been a number of other developments in the company. The two existing Inductotherm medium frequency induction furnaces in the melt shop were upgraded with the latest technology, which gave us significant cost savings in demand charges and efficiencies in our melting. In addition we invested in two additional bodies and coils that decreased our downtime by 45%," explained Martingano.

"In order to process this increased melting output, we invested in four new LNG (liquid natural gas) gas fired quench furnaces, each with an increased capacity of 20%. All are equipped with the latest gas safety devices according to SANS 329-2008."

"In turn, the tempering capacity of the plant had to be increased to handle the potential extra volume. Four Foster Thermal, LNG gas fired, tempering furnaces, each with water quench, were installed. The output of each furnace increased by 20% from the previously older technology furnaces purchased from an earlier producer of low carbon shot. Again, all furnaces comply with the latest safety regulations as set out by SANS."

"Crushing capacity was also increased by 40% with the installation of four further crushers, built in South Africa but based on group design. R&D on crusher wheel types led to a considerable lifespan increase of the crusher wheels, using specially produced billets from Europe."

"Environmental factors have been improved with the installation of a



The atomising process

high volume fume extraction system over the melting furnaces and further improvements have been made in the processing areas."

Management systems

"Although we have been ISO 9001 certified since 1994, towards the end of last year we were re-certified for a further three years with ISO 9001:2008. We have also achieved OHSAS 18 001 Health and Safety accreditation and are currently striving towards the Environmental ISO 14 001 management system, which should be achieved by the end of 2013. This has directly led to increased safety of our work force."

"All our employees were ABET (Adult Based Education Training) assessed during 2012 for literacy and numeracy with a view of personal growth. Stage One (literacy) will be tackled during the second half of 2013. Additionally, basic metallurgical training was offered to the melting staff to improve their understanding of the melting process and hence quality of the product."

History

Formed in 1984 as a division of Thomas Foundry (Pty) Ltd, the company began manufacturing low carbon steel shot to supply both the South African and export markets in 1985. A licensing agreement had been signed with a German company to manufacture Ferrosad steel shot for the surface preparation industries.

By 1989 it was apparent that further growth was only possible with the manufacture of steel grit and the plant was converted to a high-carbon manufacturing operation. Two years later, in March 1991, Thomas

Abrasives (Pty) Ltd was formed.

The company subsequently started manufacturing a special steel grit used in the granite cutting industry. Before Thomas Abrasives began producing this grit, 80 % of it had to be imported.

In 1994, the success Thomas Abrasives had in increasing



Four new LNG gas fired tempering furnaces, each with water quench, were installed



The four new LNG (liquid natural gas) gas fired quench furnaces, each with an increased capacity of 20%



Crushing capacity was increased by 40% with the installation of four further crushers, built in South Africa but based on group design

exports culminated in it being awarded the State President's Award for Export Achievement.

In 1995 the company was sold to a French company that is involved in the manufacture of steel shot and grit abrasives and related equipment. The company had a name change in July 2012, shortly after its 50th anniversary. The Winoa Group, as it is now known, is the largest steel abrasives manufacturer in the world with 14 production plants located in Europe, North and South America, Russia, Asia and South Africa.

Services

Today, Thomas Abrasives supplies major local and overseas manufacturers with steel shot and grit abrasives.



Product

30% of its production is supplied to local clients, including many in the foundry industry.


As a service, the company's personnel conduct free analyses of blasting

operations and equipment, and make the necessary recommendations to ensure optimum performance at the lowest possible cost. Its application specialists regularly visit its local and overseas customers, offering advice and conducting in-house training seminars free of charge.

For further details contact Thomas Abrasives on TEL: 011 821 2800 or visit www.thomasabrasives.co.za




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CSIR laser process gives ArcelorMittal an added advantage

The CSIR has signed an agreement with South Africa's largest steel producer, ArcelorMittal. The agreement follows the development of a unique laser-based process by CSIR laser engineers for the ArcelorMittal South Africa continuous caster foot rolls. The process is based on a special alloy developed by laser manufacturing experts at the CSIR and which is laser-cladded on the rollers. The new layer, which is metallurgically bonded, has much-improved wear and corrosion resistance properties.

"These casting rolls are exposed to harsh operating environments," explains CSIR welding engineer, Corney van Rooyen. "As opposed to conventional welding, the laser process is faster, and with the customised metal coating and low heat input, it is possible to apply coatings that can extend the operational lifetime of these rollers."

The technology will assist ArcelorMittal South Africa in reducing its operational costs. The process allows for maximum reuse of the rolls, with the added advantage that it extends the operational life of these rolls by at least a factor of two before resurfacing is required on rolls which are otherwise scrapped after use.

The agreement signed with ArcelorMittal covers the development aspects of the process. The CSIR has over the past five years developed the technology, but has in the last year installed test rollers at one of the continuous casters at



ArcelorMittal Vanderbijlpark Works to have their performance monitored and documented by welding engineers at the company. The results are very encouraging. "The evidence from the operational tests clearly indicate that the process and metallurgy developed by the CSIR will have a significant contribution in reducing ArcelorMittal's maintenance costs, as well as to improve the production of the plant," explains Van Rooyen. Rolls with a longer lifetime will result in significant cost

savings for a steel mill.

Previously, the steel producer used conventional welding processes to refurbish its continuous caster foot rolls.

The agreement sees the CSIR continuing its work on refurbishing worn-out rolls on other sections in the plant, using laser technology. "ArcelorMittal is very satisfied with our work and as a result, it has begun with implementation of this technology on one of its lines," notes Hardus Greyling, Operations Manager at CSIR

National Laser Centre.

Van Rooyen adds that ArcelorMittal South Africa is running similar trials on its other plants across the country. He says that the laser application process can also be used in other industries such as mining and paper and pulp industries. "This is what the CSIR is striving for, working on complex challenges and providing solutions while making our local industries competitive in the highly competitive global markets," he says. ■

Insimbi stays in the black in tough year

Insimbi Refractory and Alloy Supplies headline earnings per share fell 47%, from 5.99c to 3.15c, in the financial year to February when the group released its recent financial results.

Insimbi provides the steel, aluminium, cement and foundry industries with resource-based commodities, which include ferrous and non-ferrous alloys, as well as refractory materials, by integrating the supply, logistics and technical support functions.

The group said economic conditions in the second half of the financial year were poor but the group's results stayed in the black for the year.

Nevertheless, the group's operating results for the year to February 2013 were well below the results for the immediately preceding year, ending February 2012. Group revenue dropped only 0.8%, or R7 million, to R828 million and earnings decreased 49% to R7.9 million, down from R15.6 million in the previous year.

Headline earnings decreased by 48.3% to R7.9 million. The group said in a statement that trading conditions were difficult worldwide.

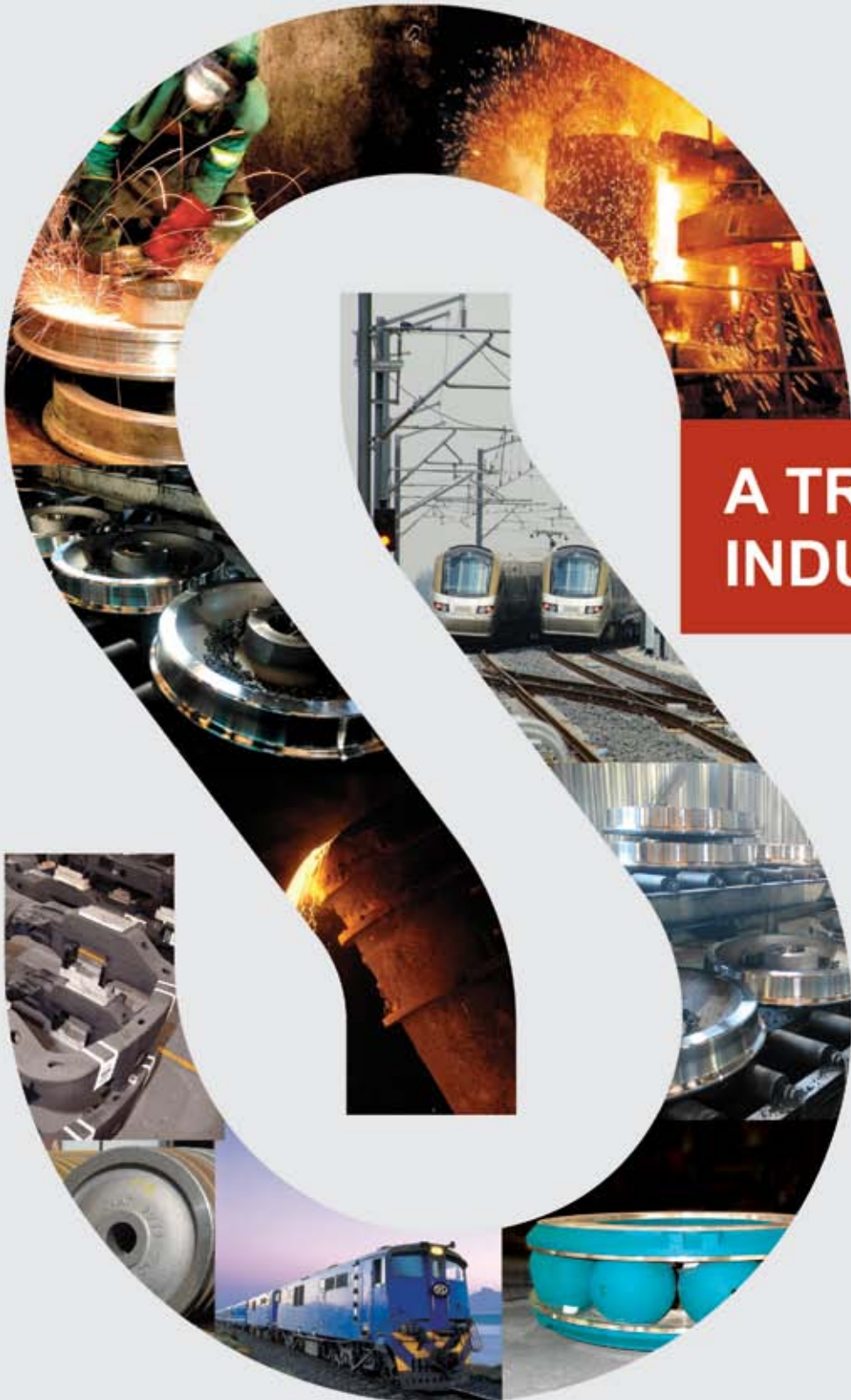
"In addition to the difficult trading conditions locally, which exhibited themselves mainly in the second half of the financial year, the Eurozone continued to suffer from retarded and even negative growth and this had a negative impact on our

exports," the group said. Trade to its traditional emerging market partners was promising but the expected recovery in Europe did not occur as Portugal, Italy, Greece, Spain and Cyprus continued to struggle.

Insimbi produced a gross profit of R83.5 million versus R90 million the previous year, a decrease of 7.3%. Gross margins were slightly down at 10% compared with 10.8% the previous year. Difficult market conditions and low commodity prices were blamed.

Gross margins were 10.6% at the end of August last year, compared with the full-year gross margin of 10%. Insimbi said its consolidated net operating expenses were well controlled throughout the financial year, being reported at R67.1 million compared with R61.1 million in the previous year, a 8.9% rise.

"I am very pleased with this, especially in light of the increases experienced in fuel and electricity during the year. Staff costs were increased in line with CPIX (the consumer price index excluding interest rates on mortgage bonds) during the period," CEO Pieter Schutte said. Group net profit before taxation was R13 million compared with R21.9 million in the previous financial year, a 40.6% fall. ■



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Platinum beneficiators call for action

The Government's plans for major beneficiation in the local platinum industry following the revival of its trade and investment agreements with Japan have been met with a lukewarm reaction from the multibillion-rand export-oriented catalytic converter industry according to local reports.

Ken Dewar, the executive director of the Catalytic Converter Interest Group (CCIG), has sketched a bleak picture for the future of the industry.

Dewar said the group had for a long time been pursuing platinum beneficiation initiatives with both the Department of Trade and Industry and the Department of Mineral Resources but had "no idea of where it's going".

He said: "We would love to have some beneficiation assistance for our industry. While government is making all the right noises, there's nothing on the table."

Trade and Industry Minister Rob Davies stated recently that the trade and investment agreement with Japan was likely to result in major beneficiation in the local platinum and agricultural sectors.

The CCIG warned last year that the industry's future was under threat because of a lack of clarity about long-term government policy and support.

It supports 5 200 direct jobs and 30 000 indirect jobs.

Dewar said that "nothing had really changed" in the past year to address the industry's problems.

The CCIG has been seeking logistical support for such things as shipping, finance costs and cargo duties because South Africa is so far away from major markets.

It said the five years of policy uncertainty while the transition from the Motor Industry Development Programme to the Automotive Production and Development Programme was debated resulted

in many new catalytic converter platforms being lost to low-cost countries such as Mexico and countries in Eastern Europe.

Dewar said the CCIG was still working on incentives and support for the industry but the Department of Trade and Industry had indicated it would not get any further assistance and support from the motor industry programme.

He said the industry had also been interacting with the Mineral Resources Department about its beneficiation programme but the department "cannot at this stage put anything on the table".

Catalytic converters are fitted to motor vehicles to reduce harmful gas emissions.

They are the top automotive component export by value, despite the value of exports declining by 16.8 percent to R16.4 billion last year from R19.6 billion in 2011. Exports amounted to R24.3 billion in 2008.

The decline in catalytic converter exports was largely responsible for the reduction in the value of automotive component exports by 5 percent last year to R36.87 billion from R38.82 billion in 2011.

This contributed to the automotive industry's trade deficit widening to a record R49.2 billion last year from R38.6 billion in 2011.

Dewar said the CCIG predicted a continuation of the decline in catalytic converter exports in coming years.

"Europe is the major destination for catalytic converter exports but is still in serious trouble. New programmes have been placed elsewhere and we are not seeing substantial [catalytic converter] investment in South Africa."

Dewar said capacity utilisation by the industry over the next four to five years was also forecast to decline to "quite serious levels at not much above 50 percent".

He said the recent strikes in the platinum industry had not been of any consequence to the catalytic converter industry because it consumed only about 15 percent of local platinum production. ■

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Mogale Alloys embarks on R170 million processing plant expansion

Mogale Alloys, a subsidiary of London-listed Ruukki Group, has awarded construction company Asenza and technology supplier Uvân Hagfors Teknologi a R170 million contract to install and manage ferroalloy refining and granulation equipment at its processing plant in South Africa.

The equipment would complement Mogale's four existing furnaces, which produce low-phosphor ferrochrome and low-phosphor silicomanganese and would, once complete, enable a significant portion of the current ferrochrome production to be converted to granulated medium-carbon ferrochrome.

This was in line with the company's objective of providing niche products in mature markets to increase profitability and optimise shareholder value.

The project would start in July, with first production of specialty alloys expected by the third quarter of 2014. Current production levels at Mogale Alloys would be maintained during the implementation phase.

Ruukki said it was considering a number of available options to finance the project, but expected that it would be financed through a combination of internally generated funds and loan capital obtained from financial institutions. ■

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With Bronze Age Foundry at its heart, a creative community concept is thriving in Woodstock

The Woodstock Foundry is a heritage building that has been renovated to combine the beautiful character and craftsmanship of the old world with the design and amenities of a modern world.

With Bronze Age Foundry (formerly based in Simon's Town) at its heart, The Woodstock Foundry at 160 Albert Road, Woodstock, Cape Town has a delightful mix of creative ateliers and stores. The relatively new development, which was opened in March 2012, houses a mixture of retail and creative studio spaces. The building it occupies dates back to 1903 and is the latest addition to Albert Road's creative community, home to an eclectic mix of retail, office, studios and workshop spaces.

The owners (Dan Steyn, Nick van Huyssteen, Otto du Plessis and Egon Tania) had the vision of renovating the site, which consisted of two separate buildings, into a single space with a courtyard at its center. The smaller of the two buildings, which is believed to have originally housed a bar downstairs and a brothel above, is now home to West Street Café on the ground floor with four studios atop. They've restored the building, which boasts a beautiful wooden staircase, wooden flooring and high ceilings, an execution that maintains its simple yet original charm. The roof and key walls of the larger building were removed and landings and stairways installed to create two stories of interconnected spaces.

"We wanted to bring the buyer closer to the maker and did so by filling the space with top notch creatives, artisans and designers. The original character of the building was retained and modern touches such as a green courtyard, modern signage and a mural of flying birds by street artist Andrew Breitenberg, enhanced the space," explained Otto du Plessis, sculptor and owner of Bronze Age Foundry.

"The concept for The Woodstock Foundry is a creative



Casting in the foundry

community that brings together different design disciplines and makes them accessible to the public. It is a destination where you can have lunch, buy some furniture, visit a barber and buy a piece of jewellery for the wife, all under one roof."

"The Tribe Coffee Roastery has recently moved in so if you are just into tasting freshly roasted coffee this is the place to visit."

The foundry

Bronze Age is a multifunctional art foundry that specialises in casting sculpture in bronze with both the lost wax and sand casting processes. Founded in 1997 the foundry provides services to artists from around the world, including the likes of Dylan Lewis, who is best known for his life-sized bronze leopards, William Kentridge and David Brown.

The design studio, which was established within the foundry in 2005, produces a wide range of products, ranging from lights, interior accessories, to the foundry's trademark bowls and exclusive, once-off furniture pieces. Inspiration is taken from nature and natural curiosities and experimenting with process based techniques. The results regularly yield weird and magical, humorous yet elegant and



Finishing touches in the workshop



Preparation of a bronze casting

1959
RIBBON FLO



1984
OMEGA 2



1970
OMEGA 1



LOTUS 24 C 1959



1994
SPARTAN I

RED BULL 2013



1998
SPARTAN II



2005
SPARTAN III



2013
SPARTAN IV

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"It is a mixture of art, design and functionality," explains Charles Haupt, co-owner of Bronze Age and head of the functional art department.

"The process of casting bronze is neither simple nor easy. It takes about 20 people, working in different departments, to complete a bronze sculpture. The foundry specialises in mould making, patination, casting and mounting. They also do restoration work, take on corporate and private commissions and run foundry courses."

"Bronze is one of the oldest metals used in the production of sculpture. We approach each artwork differently, because each work has different and unique requirements," says Haupt.

"The first step in casting bronze is to create a mould of the sculpture. Different products such as plaster or fibreglass are used during this highly-specialised task. Then wax is poured into the mould, to create a hollow wax replica of the original artwork. The wax copy is then "fine-tuned" and any imperfections are smoothed out and "gates" are added, where the bronze will be poured. The wax copy is then dunked



into a silica and then sand. This mould is then placed in an oven until the wax melts away. This creates the negative space of the original artwork. The liquid bronze is then poured into the shell. The shell is removed and the bronze sculpture is ready for the final touches."

"To cast bronze is not a cheap exercise, but each artwork is quoted according to its uniqueness. Bronze is less vulnerable to atmospheric corrosion, has

structural strength, durability and is relatively easy to work with. It also does not have the restrictions imposed by other materials. The grain of the wood or shape or size of a block of stone," says Haupt.

The move to Woodstock

"We were situated in the historic Albertyn's Stables in Simon's Town, which in its day served as slave quarters, horse stables and housing for sick sailors, for many years," explains du Plessis.

"Being based in Simon's Town meant that our business was quite isolated. Prior to moving we had looked at relocating our business closer to the city for a couple of years. Eventually, for us, Woodstock was the obvious choice as it is centrally located between the city centre as well as all the surrounds. Also Woodstock is quickly turning into the creative hub of Cape Town. After looking at quite a few options in the Woodstock area, we came upon the Woodstock Foundry building, and knew that the space had the potential for what we envisaged."

"For us it was essential to create the right mixture of tenants for the development, as this was key for the overall atmosphere of the foundry. Visitors will be able to experience the light and open spaces which blend with original features of the historic building while also, for many, to see the workings of a foundry," concluded du Plessis.

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Snam Alloys appoints Insimbi as South African distributor

Now sourcing ferrosilicon magnesium (“Fesimag”) from India.

Left with important decisions to be made by the closure of the division at its local supplier, Insimbi Refractory and Alloy Supplies has been proactive in sourcing an alternative supplier so as to ensure uninterrupted supply of ferrosilicon magnesium (“Fesimag”) to the local foundry industry.

The culmination of some worldwide supplier research and a trip to India by Insimbi management resulted in the selection of Snam Alloys as their supplier of choice.

Snam Alloys has been manufacturing products for the foundry and steel industries since 1988 and is now amongst the top three manufacturers in India. The company exports product to 35 countries and across six continents. In 2006 Snam Alloys started manufacturing operations at its joint venture plant in Lanzhou, China. This plant produces ferro silicon magnesium.

Snam has two plants in India, one at Pondicherry, a submerged arc facility with three induction furnaces manufacturing ferro silicon magnesium and ferro silicon based cast inoculants and the other at Pakala, Andhra Pradesh.

According to the company they are the only producer in India to produce ferro silicon magnesium by plunging magnesium into molten ferro silicon as soon as it is tapped

from the submerged arc ferro silicon furnace. This keeps the inherited properties of ferro silicon intact.

The company is certified to ISO 9001: 2008, ISO 14001: 2004 and OHSAS 18001: 2007 and has implemented management systems in line with the European Foundation for Quality Management and operates on the Japanese Total Productive Maintenance management system.

Ferro silicon is used as an essential alloy in the production of steel and cast iron. Ferro silicon is used to remove oxygen from steel and as an alloying element to improve the final quality of the steel. Ferro silicon is also used for manufacture of pre-alloys like ferro silicon magnesium (FeSiMg), used for modification of molten iron into and SG/ductile iron.

Snam Alloys says it is the only producer in India to collectively manufacture ferro silicon, ferro silicon magnesium and ferro silicon based inoculants.

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Scaw Metals Group: Seeks growth in Africa

As the South African government dawdles over its planned infrastructural investment programme, local steel businesses are seeking survival and growth in other African countries, according to a report in Financial Mail.

But they will need to be competitive to secure a foothold in new markets. From around the world, steelmakers with excess capacity are eyeing planned transport links and power-generation projects in Southern Africa.

Namik Ekinci, chairman of the Turkish Steel Exporters Association, who headed a delegation of steelmakers visiting South Africa recently, said the delegation was looking for opportunities to buy and sell steel in South Africa and other African countries. South Africa was a good hub for the Southern African region, and "if we improve our presence in South Africa, we know that the other African markets will be even more accessible to us", he said.

Steel has been identified by the South African government as a longer-term developmental industry, meaning it has the potential to grow downstream businesses and jobs. To do this, government believes it needs to intervene to increase competition in steelmaking. The Industrial Development Corp (IDC), government's major funding institution, has been studying the feasibility of establishing a third primary steel producer to compete with ArcelorMittal SA and Evraz Highveld Steel.

Last year the IDC underwrote the R3,4 billion purchase by a consortium of 74% of Scaw Metals Group from Anglo American. Scaw Metals is a long-established secondary steel producer selling specialised products such as grinding balls, foundry-cast products and wire rod to the mining, construction and rail industries. Primary steelmakers use iron to make steel while secondary producers use scrap metal. Scaw Metals executive chairman Ufikile Khumalo says the IDC's intention is to grow Scaw and make it competitive so it can be a global player and beneficiary.

Last year Scaw's production was similar to 2011's 674 000 tons and Khumalo expects the local market will remain subdued for some time. Scaw's manufacturing capacity is concentrated in South Africa, apart from one facility in Australia, but it has distribution centres in Europe,

Australia and elsewhere in Africa. The group plans to grow geographically, rather than its product range, though it will continue to innovate in its existing range, Khumalo says. It is eyeing growth opportunities in Ghana, Zambia, the DRC and Zimbabwe. Khumalo hopes the IDC will bring together some of its other steel investments within the Scaw group as Scaw has the capacity to manage them.

But will government intervention and protective measures help South Africa's steelmakers to compete internationally? It doesn't seem likely, yet Chinese government protection of domestic industries enables them to undercut international competitors. "If you have competitors, you are more alive and more dynamic," Ekinci says. "Don't be afraid of competition, be afraid of closed economies and protectionism."

He says production, export and import of steel are mutually dependent and are mostly positively correlated. In Turkey, he says, steel production has grown 8% annually since 2000, while imports have increased 13% and steel exports have risen even faster, by 18% annually.

But government has already intervened in South Africa to assist steelmakers like Scaw that depend on scrap metal. Scaw is one of the biggest local users of scrap steel, which is plentiful in South Africa from a range of recyclers, but has become hard to get because scrap merchants can often realise better prices by exporting the metal rather than selling it locally. In May, the International Trade Administration Commission of SA (Itac) gave notice in the Government Gazette that for the next five years scrap metal must be offered to local buyers for a period and at a price determined by Itac.

Khumalo supports this measure, but says it is not protectionism. If Scaw can source its raw materials at the best price, it can be more flexible in its pricing to its customers. The World Steel Association quotes an OECD report on its website showing that in 2009 at least 19% of scrap iron and steel, exported by a total of 34 countries, was subject to export restrictions. These were usually justified by the need to safeguard domestic supply, control illegal exports and protect local industry. ■

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Afrimat increases offer to Infrasors minorities

Industrial mineral group Infrasors' share price increased 4.69% to close at 67c per share recently, two cents above the revised offer made to minorities by its parent Afrimat.

This could indicate that some minority shareholders may not accept the offer and instead hold out for a higher price.

Afrimat, the open-pit mining and industrial minerals group that recently bought a 50.7% stake in Infrasors, said it would increase its offer to minorities of ailing Infrasors to 65c per share from an earlier offer of 35c per share. Afrimat said the offer represented a premium to the recent trading price of Infrasors of about 60c. The offer will cost Afrimat about R44 million if all the minorities accept.

Afrimat took a majority stake of 50.7% in Infrasors from March 1. Infrasors plunged into the red in the year to February 28 with a R302.7 million attributable loss compared with a R27.3 million profit the year before.

Afrimat CEO Andries van Heerden said in an interview with Business Day "It is always easier to fully own the business on a turnaround like this, so that we can focus on it fully."

He said it may take two to three years to "properly turnaround" Infrasors and extract the maximum value from its assets, but much of the unnecessary costs had already been taken out.

Infrasors blamed last year's losses on the effect of steel and transport industry strikes, scheduled shutdowns of customers due to electricity shortages, increased costs, depreciation and amortisation as well as asset impairments.

Afrimat acquired the Infrasors stake with the aim of using its turnaround abilities to extract value from Infrasors' assets.

"There are huge potential synergies," said Mr van Heerden.

"We will turn it around. It is going to take a while, but in the end it will be worth our while," he said.

He said in a statement the raised offer to minorities showed Afrimat's commitment to an effective turnaround, something he said was being "made difficult by the presence of minorities and complex management structures, which prevent Afrimat from assuming full control and bringing to bear the full extent of our management skill".

Mr van Heerden said the turnaround would demand significant effort, which made commercial sense for Afrimat only if it became the full owner. "It would make the best sense for Infrasors' minorities to exit a beleaguered stock at a more than fair price and rather realise long-term value by investing in Afrimat's sustainable stock."

Afrimat previously bought the initial 50.7% interest in Infrasors from Hanchurch Asset Management and retiring Infrasors management, for R33 million. The Infrasors' purchase was expected to strengthen Afrimat's foothold in the industrial minerals sector and expand its reach in South Africa.

Afrimat had bought the Glen Douglas dolomite mine in January 2011 and successfully turned it around. Silica is an additional complementary product.

Mr van Heerden said of the existing construction environment that while there were none of the really big government infrastructure projects such as power stations going out to tender, there was a great deal of government spending in terms of smaller tenders going into roads and low-cost housing in rural areas.

He said he had heard, for instance, that the planned level of road maintenance spending this year would be the highest ever. ■



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SAIF's 50th Annual Awards Dinner

The South African Institute of Foundrymen's 50th Annual Awards Dinner was held at the Emperors Palace, Convention Centre, Kempton Park, Gauteng on Friday 7 June 2013.

380 foundrymen, guests, wives and award winners attended this year's event, the 50th occasion of the event. The dinner was well supported by sponsors in the form of prizes for the award winners, gifts and ticket sponsors for VIP guests invited by the institute.

The SAIF would like to thank the following sponsors for their valuable contributions:

Insimbi Refractory and Alloy Supplies, Sasol Synfuels Procurement and Marketing, Foseco South Africa, Saveway Furnace Monitoring, Lil Sales, J & D Castings, SI Group, Lauds Foundry Equipment, IMP Scientific, Procor Foundry Supplies and Thos Begbie.

Awards handed out on the evening were as follows:

Non Member Diploma – Sharon Meyer for the best technical presentation presented during 2012 to the institute by a non-member. She presented a paper on "Does your foundry comply with current environmental legislation requirements?"

Sasol Synfuels Procurement and Marketing/Insimbi Alloy Supplies Award – For the highest marks achieved by a 1st year metallurgy student. Ntiyiso Makumbila of Vaal University of Technology was presented with the award.

Foseco Award – For the highest marks achieved by a final year Metallurgy Student for 2012 went to Tebogo Mokumo – University of Johannesburg.

Colin Butler Award – For the best technical presentation presented in 2012 by a SAIF member went to Carl Reinhardt for his "Competitive advantages and challenges by South African permanent mould foundries".

A H Guy Award – For outstanding service to the industry: Vic du Plooy

A special award was presented to Murray Speed for completing all the required modules of the diploma courses, and a number of merSeta certificates for NQF Level 2 & 3 were handed out to career path framework learners. ■



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South Africa's recyclers poised for court if government passes scrap export directive

South Africa's Metal Recycling Association (MRA) will take legal action against the country's government if a directive to curb ferrous and non-ferrous scrap exports is enforced, according to Mike Wilson, spokesman for MRA. This is according to a report on the Metal Bulletin website.

In January, the minister of economic development, Ebrahim Patel, published the draft policy directive in the Government Gazette, proposing that ferrous and non-ferrous scrap metal should be offered for sale in the domestic market at a discount before it can be exported.

The directive is currently open for public comment.

"This directive will affect the bottom line of absolutely everyone in the scrap industry, which will in turn affect employment in the country," Wilson said.

He noted that the cost of transporting scrap from different parts of the country to port, and then from port to an overseas customer, increases the price of scrap substantially. Therefore, he argued, domestic buyers already buy the scrap at discounted prices.

"We are engaging with the government, but the MRA is significantly down the legal road, and we will go to court the moment the government enacts on this directive," he added.

However, the South African Institute of Foundrymen (SAIF) said a reduction on input costs would be welcomed by all in the foundry business.

"We see the input cost issue as critical for the foundry industry, and we continue to engage with the recycling industry to find a feasible solution," John Davies, CEO of the SAIF, said.

"Yes, foundries will welcome scrap at discounted prices, but this is a complex issue," he said.

Foundries, he noted, consumed only about 400,000-500,000 tpy of ferrous scrap of the 3.5 million tpy of ferrous scrap produced in South Africa. About 1.6 million tons of ferrous scrap was exported in 2012.

However, foundries have been grappling with rising input costs, resulting in more than 20 foundries closing in the past 10 years. It has also been harder to source the high-quality scrap needed for foundries when they had to compete with international buyers.

"The idea of a low-cost input is attractive for the foundries, there is no doubt about that," he said. ■



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New R1 billion manganese furnace raises hopes for investment in South Africa

Signals beneficiation support.

South Africa's Minerals Minister, Susan Shabangu recently opened the largest operating furnace of its kind in the world at Samancor Manganese's Metalloys smelter in Meyerton, allowing mining giant BHP Billiton to beneficiate close to 30% of the manganese ore it mines locally and demonstrate its support for increasing value addition and downstream job creation.

BHP Billiton Manganese South Africa president Ravi Moodley said the beneficiation of close to 30% of the manganese ore mined represented the highest percentage of beneficiation in South Africa's manganese industry.

"Although the hurdles may sometimes be quite high and the issues difficult and complex, with the close collaboration between big business, communities, government, employees and all stakeholders, it can be done, right here in South Africa," said Moodley.

Shabangu said the traditional focus on mining and exporting of unbeneficiated minerals needed to be refocused towards the government's new beneficiation strategy, which provided a framework to translate the country's sheer comparative advantage inherited from its mineral resources endowment to a national competitive advantage.

The construction of the M14 furnace commenced in August 2011 and was completed and commissioned in December 2012.

Metalloys, run by BHP Billiton, is one of the largest global producers of high quality manganese alloys. The manganese division consists of two mining operations, Wessels and Mamatwan Mines, situated in the Northern Cape and the Metalloys Alloy Plant.

The construction of M14 has contributed to the expansion of Metalloys' production capacity by an additional 81 MVA. The furnace is designed to produce 120 000 tons of High Carbon Ferro Manganese (HCFMn) per annum.

The expansion programme will allow BHP Billiton to

beneficiate more than 25% of their ore production.

With the new upgrade and expansion of the electricity generation plant, all four furnaces will now contribute to energy recovery from off gasses. Energy is recovered from off-gasses in a boiler and generates steam to turn a turbine to produce on-site electricity to reduce the power demand of the entire operation. This reduces the burden placed on Eskom to supply energy to the energy intensive industry of beneficiation by more than 20%.

This, together with the focus on more energy efficient production processes will lead to an improved position with regard to energy efficiency across the production facility at Metalloys, and thus a reduction in the CO2 footprint for the site.

With this new expansion and energy efficient design, the BHP Billiton Metalloys operation has managed to reduce the emissions footprint by 8.3% above target over the last three years, while maintaining a competitive market position in a difficult global economy.

The construction of the M14 has enabled BHP Billiton Manganese to ensure that jobs of current employees are preserved at Metalloys as well as at their mines in the Northern Cape.

High-grade manganese ore is mined at BHP Billiton's Hotazel manganese mines in the Northern Cape, and at Gemco on Groote Eylandt in the Northern Territory of Australia.

Most of the ore produced is sold directly to external customers, with the rest used at BHP Billiton's own alloy smelters, which include the Metalloys smelter in Meyerton and the Temco smelter, in Tasmania, Australia. The operations are located in areas with seaborne access to world markets from dedicated deep-water ports that allow the use of large ships. The manganese operations have a workforce of 3 700 people.

The end products of the 62-year-old Metalloys smelter are high-strength structural steels, high tensile pipe steel and heavy plates, engineering steels and some stainless steels. ■

Evraz moves to sell South African steel unit to BEE group for \$320 million

International steel group Evraz has announced plans to sell 85% of South African steel and vanadium producer Evraz Highveld to a black economic-empowerment (BEE) consortium for \$320 million – the transaction would be the largest BEE deal in the South African steel sector.

A non-binding term sheet had been signed with a consortium represented by an entity known as Nemascor, about which little information was immediately available.

In fact, market observers were taken by surprise both by the size of offer and the lack of information about the BEE purchaser.

Industrial Development Corporation (IDC) mining and manufacturing divisional executive Abel Malinga said the development financier had not yet been approached on the proposed transaction. He also confirmed that the IDC was not a member of the Nemascor consortium.

However, Malinga did not discount a possible future

approach.

The company currently has a market capitalisation of around R2.3 billion, while the offer values the company at closer to R3 billion.

Further to the above cautionary announcement released by Evraz Highveld Steel and Vanadium Limited ("the Company") on SENS on 27 March 2013 and the further cautionary announcements dated 28 March 2013 and 6 May 2013, as of end of June 2013 shareholders were advised that negotiations are still in progress between the parties which, if successfully concluded, will result in the sale of Evraz plc's (LSE: EVR) ("EVRAZ") 85% stake in the Company to a black economic empowerment consortium represented by Nemascor (Pty) Ltd ("Nemascor"), for an indicative cash consideration of approximately US\$320 million (the "transaction") and which may have a material effect on the price of the company's securities. ■



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Rising scrap prices raise risks, responsibilities

Metal contamination remains a threat to metalcasting operations.

When it comes to scrap, quality is more important than ever. But, with metal prices rising the risk of contaminated materials entering the supply chain is rising too. It's a volatile moment for the metalcasting industry, and besides energy costs scrap has proven to be one of the most destabilizing factors in cost estimations. Fluctuations and uncertainty impact metalcasters' bottom line, and ultimately increased expenses have to be reflected in occasional price increases or surcharges to casting buyers, and eventually passed on to consumers.

The continued economic global gloom means consumers retain appliances for longer than ever, thus reducing available scrap. Scrap metal prices rise accordingly. However, while European and U.S. markets have seen construction slow down, activity is increasing in China, India, Turkey, and other emerging markets, so scrap demand has not slackened.

Prices may not quite be at the construction-driven highs they reached in 2008, but scrap metal indices are still rising. And, any consumer recovery will probably lead to scrap prices rising again — as demand for “big ticket” items increases — before prices fall as consumers recycle their old equipment.

With scrap yields so high, the incentives are great for unscrupulous businesses to pursue their unprincipled profits, and contaminated scrap is a potential danger in our business.

Theft is a major concern in the communities where we do business. Items commonly stolen range from manhole covers to

church roofs, and include invaluable works of art melted down for their components, at a fraction of their original worth.

More worrying still is the theft of hazardous materials. For instance, in September 2009 there was an attempted theft of 25 tons of radioactive scrap metal from the site of the Chernobyl nuclear disaster in the former Soviet Union, reportedly with radiation levels 13 times higher than what is legally permitted.

Other sources of potential scrap-stream contamination are recycled food irradiation machinery, radiotherapy equipment (lead-lined cameras are especially hazardous), oil-and-gas industry machinery and equipment, and military technology. Discarded computer parts — sometimes known as “toxic e-waste” — also may be among the worst offending components.

Foundries' common concern

Thankfully, instances of serious contamination are rare. But, keeping scrap metal in its purest form is an issue of common concern to metal processing and metal producing industries, whenever the recycling takes place. Around one quarter of all scrap metal is consumed by iron and steel foundries to produce ferrous castings, and though iron foundries tend to be among the more conservative recyclers with regard to their selection of materials, there is a concern of scrap being contaminated by debris, passed off as quality materials, and if unchecked, entering the melt — and diluting purity.

The consequences of poor metallurgical standards can be a serious loss of quality for end products. Impurities in sufficient quantities can create blowholes and porosity in the metal. Products designed with a specific tensile strength can become too brittle or too elastic, causing elongation and giving rise to a risk of fracture. Good quality scrap leads to a much better pour, and higher quality results with better consistency.

The Victaulic Forks Foundry in Easton, PA, operates advanced Disamatic pouring equipment to produce high-quality custom castings from 2 to 25 lb./0.9 to 11.4 kg, with multiple pattern changes in short order. Victaulic also operates a state-of-the-art foundry in Mexico designed to handle one-metric-ton molds in a no-bake operation, manufacturing castings in very large dimensions; as well as the largest nonferrous foundry in Canada, producing high-quality, aluminium and bronze sand castings.

Victaulic castings purchases tens of thousands of metric tons of scrap globally every year, and around 40% of this is used in the U.S. The organization has rigorous quality assurance processes and controls in place at its installations around the world. Our suppliers obtain samples and approve the chemistry of all the metals we buy prior to purchase. Shipments are sealed before dispatch to prevent contamination, and Victaulic buyers and melt foremen carry out thorough inspections upon arrival through further visual and chemical examinations.

It is good to be vigilant and the metalcasting industry takes care in this area. We may not be facing a contagion of contamination, but neither is complacency an option for us. With quality control largely left to the oversight of individual importers — and, ultimately, of the foundries that use the parts themselves — it is important to protect our industry, and the finished-product consumer. ■

Didier Vassal is the vice president for Maritime & OEM markets at Victaulic, a producer of castings for mechanical pipe joining products, with foundries in the U.S., Canada, China, Mexico, and Poland. Visit www.victauliccastings.com

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Family-owned James Durrans & Sons Limited, located in the Pennine town of Sheffield, UK since 1863 is celebrating its 150th anniversary this year. The company supplies carbon-based materials such as refractory coatings, milled coal dust and anthracite, metallurgical and petroleum cokes to manufacturers across the world, and operates from four UK factories. It also has plants in China, India, South Africa, Germany and France and customers include steelmakers, foundries, glass, refractory and furnace manufacturers.

There are four UK manufacturing sites, namely Penistone (Yorkshire), Bilston (West Midlands), Brancepeth (Co. Durham) and Scunthorpe (Lincolnshire). Each site has a particular specialisation.

Manufacturing facilities in Europe are centred in Willich (near Dusseldorf, Germany) where a centre of excellence houses a modern refractory coatings production facility. Asia and Far East countries are serviced from the refractory coatings plant situated in China (James Durrans (Tianjin) Coatings). Joint ventures are located in South Africa, India, Germany and France.

When James Durrans and Sons first opened for business, Yorkshire was awash with Victorian optimism, and the region's companies were taking the UK into new markets.

The Phoenix Works has been home and head office to James Durrans & Sons since its foundation. It is the hub of the global James Durrans Group. The business has grown constantly from its origins as the manufacturer of the patented world famous blacking.

Durrans also supplies the road, rail and aerospace sectors, power industry, oil and gas producers, telecommunications and utilities companies and chemicals firms. Products include refractory coatings, milled coal dust, anthracite, metallurgical and petroleum cokes.

Durrans makes friction products, lubricants and specialist products made from natural and synthetic graphite as well.

Situated on the banks of the emerging river Don the now



Plumpton Works in 1946



The transport fleet – lorries – in the early 1950s

3,6 hectare site remains to this day a centre of excellence with carbon materials. Its capacity and capability having grown considerably since its early days, and it now produces a wide range of carbon and speciality products consumed by customers for a vast range of industrial applications.

“To do what we know and do it well has driven the business forward for the past 150 years and the new state-of-the-art Head Office at Penistone will direct the next phase of the company's development,” said Managing Director Chris Durrans.

“In recognition of the long-term success of the company, we wanted to make a statement with our new headquarters and create an iconic building on the site where it all began.”

“I would often return from visits to our overseas operations and wish that our headquarters reflected the company's success, so that was a driving factor behind this development.”

“Additionally, we needed a fit-for-purpose building that would bring all our staff under one roof and create a modern, enjoyable working environment. As we are in a conservation area, we thought hard about creating a design that will stand the test of time and really add to the area.”



Phoenix Works and Group Head Office in 1988 – soon to be replaced by a new state-of-the-art Head Office to mark the 150th anniversary of the company

The 1040m² four-storey office building is being developed on the same site in Penistone where the firm was founded in 1863. Construction of the building, which has a curved roof structure like a rugby ball, is due for completion in September 2013.

Forty staff will move from three buildings already on the site, and talks are underway to transform some of the old accommodation into new apartments for visiting guests and staff members. Other buildings will be demolished to improve access to the new headquarters.

Durrans RMS joint venture in South Africa

Durrans RMS was formed by the joint venture between James Durrans and Sons and Resistant Materials Services (RMS) in 1999. RMS is co-owned by Kevin Nesbitt and Mike Robinson, and was founded in 1987 supplying silicon carbide and ceramic fibre materials in Sub Saharan Africa.

RMS subsequently purchased a foundry supply business Minerals Binders and Clays in 1997, which was supplying locally manufactured foundry consumables. RMS decided that the local technology was outdated and attended the GIFA exhibition in 1999 with the express purpose of acquiring up to date technologies for their entire range of products and services.

During the show Kevin Nesbitt and Peter Bird (Technical Manager of RMS) met with Chris Durrans to explore a mutual arrangement for James Durrans and Sons to enter the African market. It was decided that a JV was the best approach and that the equipment for manufacture and formulae would be the same as those which James Durrans and Sons was using in the UK. The plant was imported and set up in South Africa and went into operation in the year 2000.

Durrans RMS subsequently pioneered the use of bulk transport and bulk storage of coatings at customers' premises in South Africa. This method of operation has enjoyed considerable success and necessitated a move to new premises in 2005.

In 2004 James Durrans and Sons converted their processing plant in the UK to the Volrath mixer system allowing all the separate ingredients of the coatings to be processed in the same mixer, giving greater consistency of the coatings and speeding up production considerably in 5 ton batches.

Durrans RMS installed the identical plant in South Africa in 2005 in the new factory and started production in early 2006. This process was the first plant of this type in South Africa and has enabled Durrans RMS to supply a full range of spirit and water based coatings locally.

For further details contact Durrans RMS on TEL: 011 917 0702 or visit www.durransrms.co.za



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Maserati to introduce CGI diesel option



Maserati will introduce a diesel engine option for its 2014 Ghibli Sports Sedan. Compared to the 3.0-liter gasoline engine option, the diesel version reportedly provides at least 35% better fuel economy and 29% less CO2 emissions, yet supplies 14% more torque

Tupy to cast blocks, bedplates using SinterCast process.

Maserati, the luxury sports car builder, plans to introduce a diesel engine option for the first time in its 2014 model series, and the new 3.0-liter V6 will be cast in compacted graphite iron using the SinterCast AB process. Tupy, a SinterCast licensee, will produce the cylinder blocks and bedplates at its foundry in Joinville, Brazil.

The Maserati Ghibli is a revival of one of the automaker's legacy series, this time as a four-door sports sedan. It will be the first diesel engine offering in Maserati's 99-year history.

It also represents another marketshare gain for compacted graphite iron's progress. Diesel engine options have been offered in CGI for several model years, and recently more gas engines have been added to the list of applications.

CGI is a lightweight alternative to gray iron and aluminium for automotive component manufacturing, and Stockholm-based SinterCast is the largest supplier of process control technology for producing compacted graphite iron.

The package SinterCast developed (now in its third generation) is under license to numerous automakers and automotive foundries worldwide, and is used to cast more than 50 different components in series production.

Maserati's new engine design is based on a VM Motori diesel engine, developed jointly by Maserati and Ferrari

(both are Fiat Auto business units).

VM Motori is a Fiat/General Motors joint venture that manufactures diesel engines, and has four other products in production with SinterCast CGI castings. The Maserati engines will be assembled at the Ferrari engine plant in Maranello, Italy.

The 2014 Ghibli Sports Sedan will be available in showrooms later this summer. Its custom-built engine delivers 202 kW (275 horsepower), 570 Nm of torque, and a top speed of 250 km/hr. Even so, reports indicate it has a fuel-efficiency rating of more than 39 mpg (less than six litres of fuel consumed per 100 kilometers, SinterCast reported) in the combined driving cycle.

"The application of the 3.0 liter diesel to the top-end sports sedan sector demonstrates the versatility of the VM Motori base design, and showcases the advantages of the higher strength and stiffness of CGI in providing a full spectrum of performance, durability and refinement," stated SinterCast president and CEO Steve Dawson.

"The availability of the VM Motori engine in five diverse vehicles, ranging from off-road jeep and pick-up applications to full size sedans and luxury sport vehicles, provides another powerful example of the design benefits of compacted graphite iron," he concluded. ■

Outokumpu inaugurates world's biggest ferrochrome furnace

Inauguration marks the start of the ramp-up phase of the €410 million investment project ahead of schedule.

With the ramp-up of the world's biggest ferrochrome furnace Outokumpu plans to double its ferrochrome production to 530 000 tons by 2015.

Outokumpu's mill in Tornio, Finland is the most integrated stainless steel mill in the world. It includes ferrochrome works, melt shop, hot rolling mill and cold rolling mill in the same site as well as a chrome mine in the neighboring city of Kemi which boasts the largest known chromite reserves in Europe. An



integrated process from the mine to the stainless steel mills allows Outokumpu to improve energy efficiency of the mill, use molten ferrochrome and utilize carbon monoxide in the

production.

"Ferrochrome gives Outokumpu a unique competitive advantage as we have a cost efficient access to this important stainless steel raw material. This doubled ferrochrome capacity will cover the majority of Outokumpu's ferrochrome needs. Our chrome mine and ferrochrome works are excellent examples of environmentally sustainable mining operations. I want to thank all of our employees and partners who have enabled the successful finalisation of the ferrochrome expansion project with high quality and speed," said CEO Mika Seitovirta.

Outokumpu completed the 410 million euro investment ahead of schedule and below budget by the end of 2012. As the ramp up is ongoing, the expected ferrochrome production for this year will be approximately 400 000 tons, reaching the full doubled capacity of 530 000 tons by 2015. ■



Inductotherm Group celebrates 60 year anniversary

In May 2013, Inductotherm Group celebrated the 60th anniversary of its flagship company, Inductotherm Corp., which manufactures advanced melting, heating holding and pouring furnaces for the foundry melt shop industry.

In May 1953, Henry M. Rowan started Inductotherm Corp. with his first sale of a 60 pound beryllium copper induction melting furnace. With his commitment to superior engineering and top-notch customer service, Mr. Rowan grew Inductotherm Corp. to a company that today has more than 32 000 melt shop installations worldwide.

With the success of Inductotherm Corp., and recognising that the world market needed more advanced induction melting equipment, Rowan extended the sale of his equipment and services into Europe, Australia, India, Japan, China, and beyond. Since then, the firm has expanded not only geographically, but also into other fields of thermal processing, such as induction heating, heat treating, and induction welding, as well as vacuum induction melting and refining. Inductotherm Group is now a worldwide organization with 38 manufacturing facilities in 19 countries around the world, offering brands such as Inductotherm, Consarc, Inductoheat, ThermoTool and Radyne.

"We're proud to stand with Inductotherm Corp. as they celebrate their 60 years of business," says Gary Doyon, president and



CEO of the Inductotherm Group. "Every company in the Inductotherm Group follows the tenets that were set forth by Mr. Rowan and his team at Inductotherm Corp. – offer superior engineering, advanced technology, high quality products, and excellent customer service."

"We're continually working to provide our customers with the most advanced products in the industry today," agreed Satyen Prabhu, president and CEO of Inductotherm Corp. "For all of the companies in the Inductotherm Group, it's about delivering the most efficient equipment and systems for our customers. We're looking forward to doing this and more for at least another 60 years."

Inductotherm Group offers advanced technology for the engineering, manufacturing and service of thermal processing equipment used in the melting, heating, heat treating, forging, galvanizing, coating, cutting and welding of metals. Bringing together 40 companies with 38 manufacturing facilities located in 19 countries, Inductotherm Group delivers innovative products throughout the world. Customers rely on Inductotherm, Inductoheat, ThermoTool, Radyne, Consarc and other trusted brands in the Inductotherm Group to provide outstanding equipment and services.

For further details contact Cerefco on TEL: 011 845 3253 or visit www.cerefco.com or www.inductotherm.com



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Partners achieve milestone for near-net shape titanium

Collaborative program uses plasma arc technology to produce titanium structural parts.

Spirit AeroSystems Inc. and Norsk Titanium Components AS reported “a significant milestone” in their collaborative program to develop direct metal deposition (DMD) technology for manufacturing critical structural parts. According to the partners, they have achieved technology readiness level six (TRL6) in the project, meaning the process is able to match the standard requirements for aerospace materials.

“The aerospace industry is by far the largest and most demanding titanium segment in the world, and achieving TRL6 is a major milestone,” stated Norsk Titanium CEO Jon Andre Lokke. “We are very pleased with the cooperation and support we have from Spirit and we are now eager to complete the qualification process and start producing parts for the aerospace industry.”

Spirit AeroSystems designs and manufactures composite structural components for commercial aircraft at 10 locations in the U.S., England, France, Malaysia, and Scotland. Its products include forms for fuselages, pylons, nacelles, and wing components. It formed a partnership with Norsk Titanium to develop the latter’s DMD process to produce commercial aerospace parts in Ti6Al4V.

Norsk Titanium developed the laser-based DMD process, which produces titanium structures in “near net shape” form – rather than casting or forging shapes, or milling parts from billet stock. It’s a patented technology that uses plasma arc technology to melt titanium wire and depositing the molten material on a substrate, forming a part in near-net-shape according to a predetermined design.

The developer described DMD as the first process of its kind, capable of operating on a commercial scale to produce parts for industrial applications.



In the Spirit AeroSystems/Norsk Titanium partnership, DMD converts titanium wire into components that are 70- to 80-percent complete. According to the partners, standard milling technology for machining titanium may use only 10 percent of the raw material, and discard up to 90 percent.

In addition to reducing the amount of raw material used, the DMD process presents a faster route for design and production, greater design flexibility, and lower finishing costs overall.

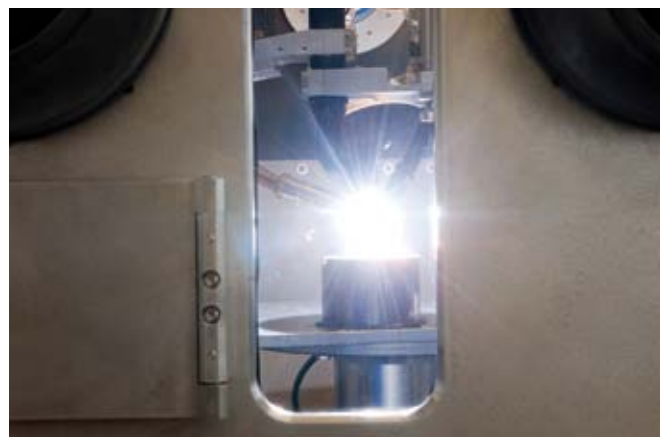
“This is a significant achievement for the aerospace industry,” stated Bill Smith, Spirit AeroSystems director of technology development. “Titanium is an expensive and difficult material to manufacture. By having near-net-shape product forms, Spirit is able to reduce costs. Additionally, this direct from digital process can reduce the time to market for new parts by at least 60 percent.”

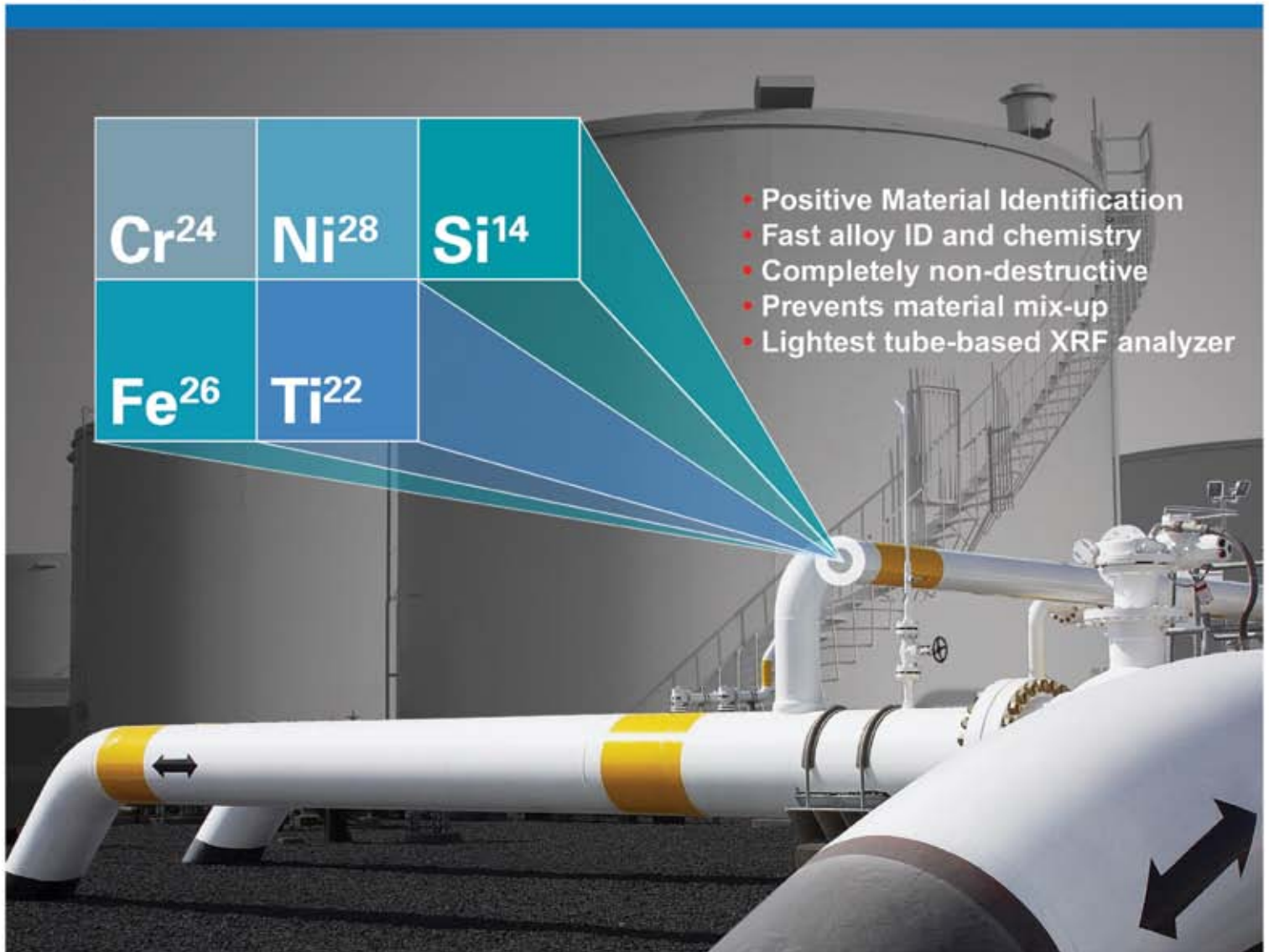
The qualification effort is expected to be completed next year, meaning aircraft designers would be able to use DMD process to produce parts for new or current manufacturing programs.

Spirit and NTiC have worked closely to develop NTiC’s DMD process for producing Ti6Al4V material for use in commercial aerospace applications. The milestone confirms the capability of NTiC’s material to meet the requirements for aircraft structural components.

Spirit and NTiC are currently working under a cooperative agreement to complete qualification of the process that will lead to widespread aerospace application. The qualification effort is expected to be complete in 2014 allowing structural designers to use the DMD process for new and existing airplane programs.

For further details visit www.scatec.no ■





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A heat treatment process which doubles strength in aluminium die-cast

Heat treatment has traditionally not been possible for aluminium high pressure diecastings (HPDCs) because they contain substantial amounts of entrapped gases that arise during the casting process. However, a process has recently been developed in Australia that provides the opportunity to gain large increases in mechanical properties.

The patented process, developed over a five-year period from 2005 to 2010 by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), overcomes these problems and provides significant improvements to tensile mechanical properties, fatigue resistance, fracture resistance and thermal heat transfer.

The process has been evaluated with a wide range of commercially produced components. All were independently assessed as having significantly increased strength and mechanical properties after treatment. The evaluations included trials on large HPDC parts (engine blocks) of up to 40kg weight.

The process is particularly effective in commonly used HPDC alloys, including CA313, CA605, A380, C380, A360, A383, ADC10, ADC12, and AISi9Cu3Fe, as well as in a number of experimental alloy compositions.

How the process works

Heat treatment of aluminium involves three steps: (1) solution treatment at elevated temperature to dissolve elements into solid solution; (2), quenching to retain the elements in a supersaturated solid solution, and (3) age hardening at a lower temperature to develop mechanical properties. Conventional solution treatments for permanent mould or sand castings are for longer periods at high temperatures; for example, 6-12 hours at 540°C. In the new process, HPDC components are heated to relatively low temperatures for short periods of time for solution treatment; for example, 10-15 minutes at 430-480°C.

The time that components are held within a specified temperature range is critical since the solution treatment procedure can be entirely non-isothermal. This step is sufficient to cause at least a partial solid solution of soluble alloying elements such as Si, Cu and Mg.

Following quenching, the HPDC component is aged to a

tempered condition, such as T4 (natural ageing at 22°C), T6 (artificial ageing at 150°C) or T7 (artificial over-ageing at 200°C).

Significance of the new process for HPDC component applications

This new process significantly expands the range of applications in which HPDC components can be used, and allows HPDC components to be re-designed using lower amounts of metal to support the same levels of load. Heat-treated HPDC components (made from recycled metal) often have superior properties to sand cast and most permanent mould-cast aluminium alloys (made from primary metal), so substitution of these castings with a lower cost, heat-treated HPDC is also possible. The process also makes possible replacement of some wrought components, particularly when loaded in compression. The automotive sector is currently the biggest user of HPDC components, and the process is attractive to manufacturers of automotive components.

HPDC is considered the most cost-effective casting process for mass production. The cost of T6 heat treatment for a HPDC component has been quoted as being approximately half the cost of T6 heat treatment for a permanent mould or sand cast product. Heat-treated HPDC components are thus substantially cheaper to produce than a heat-treated permanent mould casting or sand casting.

Reducing the amount of metal used per casting also has obvious cost benefits. If the tensile yield strength of a HPDC part is increased around 100%, then approximately 30% of the mass could be removed from the part, (taking into account design considerations, stiffness, castability etc.). This means more re-designed components can be made per ton of metal than was possible for the original design.

Designing a component with lower mass also has a substantial effect on productivity, die design and usage of consumables. As a result, the cost per part may be substantially reduced.

For more information contact Roger Lumley at CSIRO in Australia on TEL: +613 95452894; +613 95452894; email: Roger.Lumley@csiro.au

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China may scrap iron ore import licence system

China plans to scrap its decade-old iron ore import licensing system this year, an industry source said, a move that may further lift imports in a market that takes two-thirds of the world's international iron ore trade.

The move could also cut costs for domestic steel mills by eliminating licensed middlemen charging commissions for imports.

It could also mark the end of years of efforts by China to strictly regulate the trade due to worry over its growing dependence on imports and in an effort to wrest pricing power away from big miners such as Rio Tinto and Vale.

"China will open up its iron ore trade from the second half of the year," said the source, with direct knowledge of the matter, who declined to be named as he was not authorised to speak to the media.

"Import qualification licences will no longer be required in order to make the industry more market-oriented and give steel mills more choices," the source added.

China imported a record 743 million tons of iron ore in 2012, up 8 percent from the prior year.

Iron ore traders will need only the same routine licences that are issued to other importers and will no longer need approval by government-backed industry bodies such as the China Iron and Steel Association (CISA).

The licensing system was part of China's efforts to make the iron ore industry speak with "one voice" when dealing with major foreign suppliers.

The system was also meant to exclude unlicensed traders who were blamed for driving up prices through speculative buying.

That campaign proved counterproductive, however, instead creating a grey market for middlemen to rent out their permits. "I don't see any immediate impact on market prices now, but many steel mills would not need to pay extra agent fees to licensed importers for getting the raw material, which would help them reduce cost," an iron ore trader in Beijing said.

"At some point, this may be good news for miners as more buyers could help support iron ore prices and higher flow of imported raw materials may also bring pressure on domestic miners," he added.

CISA and the China Chamber of Commerce of Metals Minerals and Chemicals Importers and Exporters (CCCMC), a unit that helps regulate iron ore trade on behalf of the Ministry of Commerce, worked together to issue licences to importers.

No one at CISA or CCCMC was available to comment.

"Some traders that held licences made a huge profit by selling imported iron ore to those unlicensed buyers over the past few years and the move means that they might lose the advantage," said an iron ore trader in Shanghai.

China has been trying to reduce government interference in the workings of the market, with its new leaders also seeking to streamline approvals procedures to rejuvenate the country's slowing economy and promote economic reform. ■



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Breakthrough Alcoa technology enabling mass production of aluminium intensive vehicles licensed to industry globally

‘Alcoa 951’ Pre-Treatment Bonding Technology licensed to exclusive distributor, Chemetall.

Alcoa has announced that its breakthrough “Alcoa 951” pre-treatment bonding technology – an enabler for adhesive bonding of automotive structures – has been licensed to Chemetall in an exclusive global distribution agreement. The Alcoa technology is the new pre-treatment bonding standard for aluminium sheet, extrusion and casting suppliers across the automotive industry. Chemetall is the leading supplier of surface treatments to the automotive industry, globally.

The use of aluminium in cars is expected to nearly double by 2025 according to automotive original equipment manufacturers (OEMs), and today is already the second-most-used material to produce cars. As OEMs work to continue to make cars more fuel efficient, many are expanding aluminium use from heat exchangers, wheels, drive shafts, engine blocks, hoods and deck lids to developing aluminium intensive vehicles (AIVs) by converting the body in white, or body structure, to aluminium. As OEMs use aluminium body structures to improve fuel efficiency, new joining and assembly methods are required. “Alcoa 951” is a patented, non-chrome approach for enhancing bond durability and enabling more cost-effective, mass production of AIVs.

In customer trials, “Alcoa 951” has been proven to be up to nine times more durable than titanium zirconium applications used in the automotive industry in the past. These results led OEMs to specify “Alcoa 951” and request Alcoa to license it to other suppliers in the industry, hence the agreement with Chemetall. “Alcoa 951” technology is being incorporated into the \$300 million automotive expansion underway at Alcoa’s Davenport (Iowa) Works facility, scheduled for completion by the end of 2013.

“‘Alcoa 951’ is a perfect example of Alcoa Technology Advantage at work to create value for our customers,” said Kay Meggers, Alcoa Executive Vice President and Group President of Alcoa Global Rolled Products. “The use of this technology is helping to enable greater use of aluminium throughout the industry and helping make mass-produced aluminium-intensive vehicles possible. This ultimately saves significant fuel for consumers who say fuel efficiency is a top factor in their purchase decision.”

“We look forward to partnering with Chemetall to provide ‘Alcoa 951’ to help enable commercialization of adhesive

bonding of aluminium structures in high-volume automotive applications. This, in turn, will drive lighter vehicle weights and enable the integration of sheet, extrusions, and castings to ultimately improve fuel efficiency,” said Dr. Raymond Kilmer, Alcoa Executive Vice President and Chief Technology Officer. “The process was developed as a result of collaboration between the Alcoa Technical Center and our automotive business. We’re excited to see it commercialized.” The Alcoa Technical Center is the world’s largest light metals research facility and is located outside Pittsburgh, PA.

About Alcoa 951 Adhesive Bonding

“Alcoa 951” employs an organic, environmentally-friendly system tailored for both the aluminium substrate and the structural adhesives used for joining. The pre-treatment delivers far superior bond durability compared to conversion coating systems such as the titanium zirconium often used in the past. In fact, customer trials show its durability is up to nine times stronger than titanium zirconium.

The surface treatment is applied through an immersion or spray application in which the organic components bond with oxides present on the metal surface. The molecular structure chemically binds aluminium oxide with one end, and adhesive with the other. This creates a strong link at the molecular level resulting in lasting, durable joints for automotive structures.

The minimal level of treatment on the surface makes it essentially “transparent” to downstream steps in the automotive manufacturing process such as forming, resistance spot welding and painting.

Other commercially available conversion coatings, which generally contain heavy metals and are measurably thicker, lead to potential environmental concerns and diminished performance in other steps in the manufacturing process. The attractiveness of “Alcoa 951” lies in its repeatability and its simplicity. It does not incorporate exotic components that threaten the ability to implement the product on a large scale, and it brings the type of benign environmental impact that addresses the need for the “cradle-to-cradle” life cycle required for aluminium. ■

Morgan Advanced Materials links two divisions

Morgan Crucible, manufacturers of industrial carbon and ceramic products, reported it combined its Morgan Ceramics and Morgan Engineered Materials divisions to form a single business, Morgan Advanced Materials. It stated the “simplified structure” completes an effort over recent years to establish a unified business (“one Morgan”) that reflects its activities in various high-performance engineering sectors.

As separate enterprises, Morgan Engineered Materials has been producing carbon, silicon carbide, oxide-based ceramics and advanced polymeric composites; Morgan Ceramics has produced structural ceramic, electro-ceramic, and precious metal products.

In its announcement, the company said combining the two businesses would be a change that allows the group to promote its full range of products and technologies more effectively. It also predicted that the new Morgan Advanced Materials brand would help to position the group for growth in several markets. Those growth sectors are the energy, transport, health care,

electronics, petrochemical, and industrial markets.

“We are creating a consistent, ‘One Morgan’ business that will enable us to serve our customers better by widening the depth and breadth of expertise available to each project,” stated CEO Mark Robertshaw. “By continuing to streamline our activities we are more efficient and in a good position to accelerate profitable growth.”

The new Morgan Advanced Materials is described as a designer and manufacturer of “performance materials engineered as high-specification components, assemblies, and systems.”

Describing its new objectives, the company said much of its business involves the designing and manufacturing of precision-engineered custom parts, developed in collaboration with customers.

Morgan Advanced Materials said its new name retains “the history, strength and reassurance” of the Morgan brand, and reflects its current activities and focus for future growth. ■

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Latest high productivity moulding lines - Omega Technology

Omega Technology's remit from the foundry was to supply two high productivity moulding lines that focused on latest technology, minimum operator input and compact footprint. The technology incorporated must focus on minimising sand and chemical consumption, minimal mixed sand wastage, provide real time production data – including the amount of raw materials consumed, number of each mould component produced and the facility to store all accumulated data. The moulding lines would then have to feed a pouring and cooling system which would ultimately lead to mechanical and thermal reclamation.

The type of moulding incorporated at the foundry is far from 'typical' and therefore required a certain amount of bespoke engineering involving close co-operation between customer and supplier. This was a perfect opportunity for Omega to utilise its latest mould handling technology together with the latest generation of the IRIS pattern recognition and data logging system.

Two carousel moulding lines suitable for the phenolic urethane process were installed, each carousel having eight stations to enable fast cycle times that match with the customer's production requirement (fig 1). Each carousel has a Spartan 310P mixer, which is Omega's latest generation of



Figure 1

continuous mixer and each mixer is equipped with temperature sensitive part-3 addition which will control the part-3 according to the sand temperature – essential for any mechanised moulding line, air injection on all chemical inlets, full set of tungsten carbide tipped blades and 'smart' sand gates – high speed linear actuators that can give any required sand output at the turn of a switch. The 'smart' gate system removes the need for multiple pneumatic cylinders and means that the mixer operator can easily select a low output from the mixer when producing small mould sections or increase to maximum sand output when filling the largest moulds. Each time the sand output is changed the two resins and part-3 are also adjusted automatically.

The heart of the system is the latest version of Omega's IRIS system, where every pattern has a small RFI tag embedded inside with a unique identification number. Once the pattern is placed on the compaction table the IRIS antenna (fig 2) will identify the pattern by reading the tag number. This number will then relate to a specific recipe that is stored on the industrial PC inside the main control panel. The mixer then starts and delivers the precise amount of sand, chemicals,



Figure 2

compaction frequency as well as duration of compaction.

The production of each mould is then monitored by the PC and networked to the production office. The production supervisor can then interrogate the mixer from his office PC to see what is being produced in real time as well as how many of each mould has been made, how much raw material has been consumed and even what each individual mould cost to produce. This information can be stored on a hard drive and retrieved at a later date. The system also enables the production supervisor to set the number of each mould to be produced so if the operator forgets how many moulds he has made then the system will warn him when he reaches his production target. The main screen can also display a job card for each pattern and each job card can show important information relative to that pattern including a picture of where chills, loose pieces or sleeves should be placed.

Once the mould has cured it enters the hydraulic rollover draw machine for fully automatic, perfectly parallel mould stripping. The stripped mould is then powered out of the rollover onto the waiting coring and closing line. The empty pattern is returned to the carousel for further production.

Once the mould has been closed, it is then fed to the pouring line where the moulds are cast and then placed onto one of the available cooling lines. Once the mould has cooled sufficiently it is moved to the Gamma 12LL reclamation plant where a hydraulic wipe-off will push the mould from the casting pallet onto the shake-out deck (fig 3). The casting is retrieved by jib crane and placed in a bin for transferring to the finishing area. The

reclaimed sand is then pneumatically conveyed to the thermal reclamation plant for processing.

100% of the sand used on the carousel lines is thermally

reclaimed with only a very small percentage of new sand addition to make up for natural losses. The Richards/Omega thermal reclamation plant incorporates the patented 'dead bed' system, which enables Omega to give a 3 year guarantee for the furnace lining and gas burners. The plant also has the benefit of an integral heat exchanger that enables heat energy to be recovered from the hot sand as it leaves the furnace and fed back to the furnace as hot air. This, together with the three layers of thermal insulation inside the furnace, enables the thermal reclamation plant to run at the lowest levels of gas consumption.

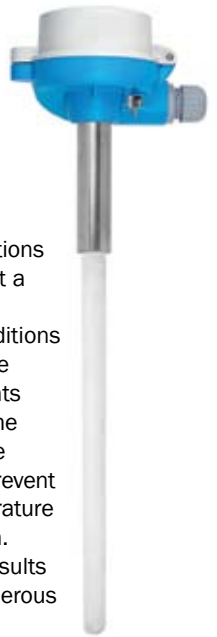
By utilising Omega's latest technology overhead costs were kept to a minimum. Additional benefits are - maintaining a consistency of quality, ability to hold production data records for future interrogation, stay within environmental legislation and maintain their position as a world leader in the production of specialised, high integrity aluminium castings.

For further details contact Peter Petersen of Mondeco Solutions on cell 079 448 1277 or email peter@mondeco.co.za or visit www.mondeco.co.za



Figure 3

Hot? So what



Innovative thermowell materials examined and tested by Endress+Hauser pave the way to even more reliable temperature measurements.

Many materials can only withstand the heat and other process conditions for a limited period. Numerous process conditions such as corrosive gases, turbulence or abrasion reduce the lifespan of various components of a thermometer: The simultaneous effect of corrosion and abrasion is often the root cause of measurement failure. For users this means that they frequently need to replace thermocouples at critical measuring points. Such measuring points increase the workload of the maintenance departments and drive up costs. Longer operating times reduce the total cost of ownership considerably.

Temperatures of 1000°C and higher are required for glass, cement production and lime burning. The actual temperatures are of central importance to control and regulate the furnaces. If the required degree Celsius is not reached and maintained at a stable level, this can impact the quality of the end product. Measuring temperatures above 800°C places particularly high demands on the measuring technology used. In recent years, materials research has provided many new materials - both in the form of metal alloys and ceramic substances. Many of these have been examined and tested by Endress+Hauser. This has resulted in thermowells that withstand extreme process conditions far longer than previously thought possible. The new

thermowell materials have been tested in applications where lifespan usually ranges from one day to just a few weeks. This is particularly the case in cement production or incineration plants. Frequently, conditions here are not only very harsh but also often change suddenly and unpredictably. The new developments have resulted in a considerable improvement in the thermowell lifespan. The thermowells both provide mechanical protection for the thermocouple and prevent the penetration of gases that initially cause temperature drifts and then unit failure as a result of corrosion.

Endress+Hauser incorporated the research results into the TAF high-temperature line. Given the numerous possibilities of combining TAF11, TAF12, TAF16, TLR11, TLR12 and TLR16 devices the ideal thermometer can be found for every application. The best possible thermowell material makes the process more reliable, accurate, manageable and stable over the long term. The advantages this affords are obvious: Maintenance costs are cut and product quality, process safety and safety at work improve.

For further details contact Trevor Fletcher of Endress+Hauser (Pty) Ltd on TEL: 011 262 8000 or visit www.za.endress.com

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Tel: 012 736 2240
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INFRA SORS HOLDING LIMITED

Ecoline Pro: The latest enhancement in Bühler's die casting machine series

With its Ecoline Pro, Bühler is launching a new cold-chamber die casting machine that seamlessly supplements its existing machine portfolio. Wherever top quality and productivity with maximum flexibility are crucial in die casting applications, this machine will be found to be exactly the right choice. Ecoline Pro comes with a locking force range of 3,400 to 8,400 kN. The shot unit creates a high degree of freedom for using a wide variety of dies, thanks to its possibility of flexible adjustment. Ecoline Pro is the ideal solution for manufacturing cast components of low complexity. It combines modern and reliable die casting technology with very easy handling and unrivaled productivity.

Easy handling

Ecoline Pro focuses on the essentials: easy handling, top availability, and flexible application. Its well thought-out design guarantees maximum productivity.

The machine is distinguished by its ruggedness and reliability. Its die-closing



unit builds upon the tried-and-tested Bühler toggle system and contributes to a high operating reliability of the system.

Ecoline Pro is perfectly prepared to meet the requirements of frequent product changes: fast setup, designed for different casting processes, and low in maintenance. This reduces service and unit costs on a sustainable basis.

The height-adjustable Ecoline shot unit operates with extremely high precision. In conjunction with the Bühler three-phase technology, it fulfills all the conditions for achieving stable production.

The Bühler multistep casting technology offers maximum flexibility in designing the cavity filling process. The plunger stroke and velocity can be adjusted during the filling phase to suit the individual requirements of the component to be manufactured.

High productivity

The operator interface of the Ecoline Pro is clearly structured and has been designed with user friendliness in mind. Also the hydraulic and electronic systems are easy to understand, thanks to their reduced number of components. This minimises the training and maintenance requirements. An integrated diagnostics tool supports users in analyzing deviations in the production process.

ASK Chemicals: A new generation of furan resins

No toxicity, easy adaptation, excellent performance.

Furan resins with a furfuryl alcohol content of over 25 % (monomeric) are classified as toxic according to the CLP Regulation, which is in force throughout the EU. This has significant consequences for warehousing and the handling of these products. The foundryman is therefore left with the choice of either continuing to work with standard furan resins or switching to alternative systems.

ASK Chemicals has succeeded in developing a new generation of furan resins, whose performance is largely comparable to that of standard furan resins, avoiding the risks of a system conversion right from the start. Magnaset™ binders

are non-toxic, have very good molding properties and produce excellent casting surface finishes. Similar to standard furan resins, the area of application is determined by the composition and the chemical characteristics.

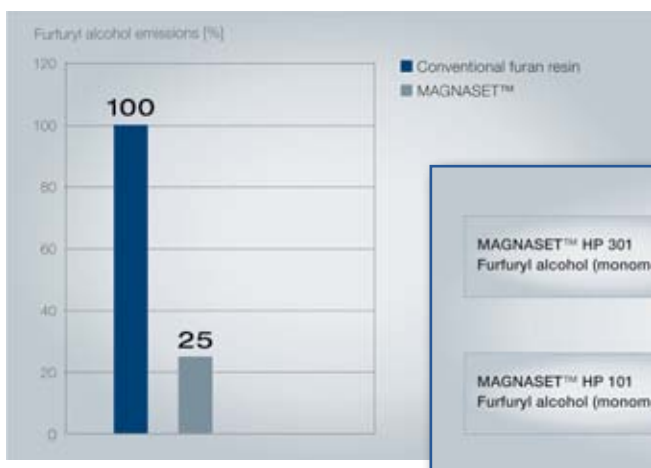
Magnaset™ binders cover the broad range of different types of casting. Magnaset™ HP 101, due to its low nitrogen content and good thermal stability, is especially suited to ductile iron and cast steel. Magnaset™ HP 301, by contrast, is an "all-rounder" for small and medium-sized castings. To cure Magnaset™ resins, PTS-containing acids can be used, such as the products Härter GS II or Härter Rapid O3 (both hardeners).

The lower monomeric furfuryl alcohol content in Magnaset™ resins can reduce furfuryl alcohol emission at the workplace by up to 80 %.

Ultimately, the new resin qualities with less than 25 % furfuryl alcohol as a monomer can be adapted to existing

processing parameters fairly straightforwardly and used without making changes to the furan resin technology.

For more information contact Applied Casting Solutions on TEL: 011 922 1600 or visit www.appliedsolutions.co.za



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Natal Refractories (Pty) Ltd

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Contact the company closest to you.

Bruker introduces the Titan Detector Shield™

A unique accessory for protecting the detector window of the S1 Titan handheld XRF analyzer.



Bruker Elemental has announced the introduction of the Titan Detector Shield™. This unique patent pending accessory protects the detector window from being punctured by sharp objects like scrap shavings and wires, while allowing rapid and accurate analysis of almost any material. This protective shield minimizes the chance that the detector will be damaged, thus avoiding the cost and hassle associated with the replacement of a broken detector window. This protection does not sacrifice any of the analytical performance of the instrument, even for the light elements like magnesium, aluminum and silicon.

John Landefeld, Executive Vice President of the Bruker Elemental Division, commented: "Handheld XRF users know that detector replacements – due to accidental puncturing – are very expensive repairs. This unique protection of the detector will provide S1 Titan owners and operators with peace of mind and better up-time."

The Titan Detector Shield™ is available for both the S1 Titan-LE, the SDD based analyzer, as well as the S1 TITAN-SP, the Si-PIN based analyzer. This optional accessory can be ordered with either model when buying a new unit.

Positive material identification (PMI)

The S1 Titan is an ideal choice for alloy analysis in quality control, PMI and scrap metal recycling or other industries requiring high temperature and high pressure. Equipment safety can be routinely ensured by verification of the alloy type required for a particular purpose. For example, more than 75% of refinery incidents are caused by having the wrong metal in service. By maintaining a strong PMI program, based on API 578 or internal procedures, it is



possible to virtually eliminate these failures. In a machine shop, the identification of an alloy may be lost as the metal moves through the shop. Using the portable alloy analyzer allows immediate identification of the alloy and ensures that a part is the proper material prior to investing a large amount of machining time and prior to shipment to customers.

Handheld XRF alloy analyzer advantages include:

- Extremely lightweight: 1.44kg including battery
- Available with silicon drift detector (SDD) or SiPIN detector
- Measure light elements Mg, Al, Si, P, S (S1 TITAN only)
- SharpBeam optimized tube geometry for more precise analysis
- Provides grade ID and complete chemistry
- 50 kV X-ray tube

The Titan SP model is the workhorse of high-temp metal alloys including iron, nickel, cobalt, copper based alloys and

many others. The Titan LE model has additional light-element capability for aluminium, magnesium, and silicon. Titan XRF analyzers use a special tube to provide the lowest measurements for Mg in metal alloys.

For more information, contact your nearest IMP branch on, Gauteng TEL: 011 916 5000, KwaZulu Natal TEL: 031 764 2821, Western Cape TEL: 021 852 6133, Eastern Cape TEL: 041 364 2544 and Free State TEL: 018 293 3333 or email: info@imp.co.za or visit www.imp.co.za



Model FP series pneumatic level switch is ideal for highly viscous and corrosive liquids

The Nohken FP series pneumatic level switch is ideal for point level switching of liquids that are highly viscous, corrosive or contain solids in suspension. This compact level switch can be easily integrated into original equipment for new and or replacement purposes.

The FP pneumatic level switch consists of a sensing head with a diaphragm and micro-switch housed in either a plastic (FP-3), die-cast aluminium (FP-1A) or SS (FP-1S) body, and is used in conjunction with a guide tube compatible to the medium being measured. As the level of the medium rises so the column of air is pushed up the guide tube into a chamber which in turn pushes the diaphragm to activate the micro-switch.

Main features

- Insensitive to highly viscous and corrosive liquids – the medium to be measured is only in contact with the

guide tube and not directly with the sensor, the guide tube can be selected to be compatible with the medium. For the highly viscous mediums a guide tube with a large diameter can be selected

- The movement of the diaphragm is restricted to 2 mm maximum thus minimising wear and tear on the diaphragm itself
- A high quality micro-switch is used and it incorporates a dead-band between set and reset points, this minimises "bouncing" in the case of turbulence of the measured medium and ensures stable operation
- Easy installation by just connecting to sensing head to the guide tube once fitted to the application

For further details contact the sales department of the Process Division of Temperature Controls (Pty) Ltd on TEL: 011 791 6000 or visit www.tempcon.co.za

There's a clear advantage to reducing scrap



Novaset 745

Scrap castings and the necessity for rework is the one factor that erodes the profitability of any foundry. We are dedicated to helping our customers become more profitable, to realise better margins, to work quicker, better, cleaner. Together with our technology partners, ASK Chemicals, we are constantly innovating new products for the benefit of our customers, striving to find solutions that will make your foundry more profitable. That is exactly what we have with Novaset 745, a resin that is used in lower dosage and which results in far fewer scrap castings and fewer castings that require rework. In addition, with Novaset 745, you optimise sand reclamation.

Look at the technical advantages -

- ▶ Improved strengths
- ▶ Higher reactivity
- ▶ Less susceptible to moisture pick-up
- ▶ Tailored co-reactants to ensure optimal working time
- ▶ Patented thermal reclamation technology
- ▶ Improved quality of casting and surface finish

Applied Casting Solutions are your technical application specialists. We will tailor our solutions for your specific requirements, assist you with sand testing, and do all we can to give your foundry the competitive edge.



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Casting Solutions

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200 Bergriver Drive Chloorkop Kempton Park Johannesburg South Africa
Applied Solutions PO Box 12055 Chloorkop 1624
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