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SAIW

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Journal of the Southern African Institute of Welding

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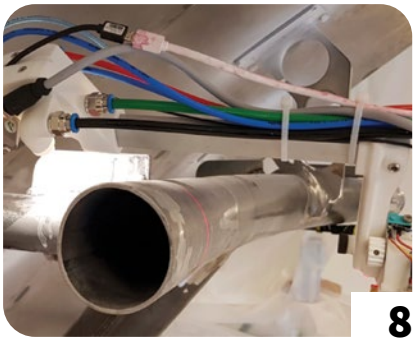
FEATURES

REGULARS



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I'm an International Welder

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SAIW

Southern African Institute of Welding

Contact SAIW on (011) 298 2100 or visit www.saiw.co.za

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I am pleased to report that The Welding Federation for Africa (TWF) is up and running. On October 21, our first webinar was opened by newly elected TWF president, Ayo Adeniyi. Over 150 people from across the continent attended.

SAIW has signed an SLA with the TWF for a range of certification schemes, including ISO 3834 Company Certification in particular, but also training, qualification and certification of welders, fitters, welding inspection personnel; and pressure vessel inspectors. Our SAIW Inspector L1 and L2 Welding Inspector courses are already very well known in Africa and TWF wants to use these as the basis for an Africa-wide TWF Inspector Qualification and Certification programme.

I believe strongly in alliances and, in another joint venture, we have formed The Welding Innovations Network together with the Canadian Welding Bureau; HERA from New Zealand and the Indian Institute of Welding. The idea is to use the best available world experts to deliver webinars that cut across geographical boundaries.

SAIW has a history of inviting global experts to deliver seminars in major centres around the country. These were always expensive to organise and attendees had to take the day off work to participate. Seminars were, therefore, few and far between.

The Welding Innovations Network is a vehicle for securing the services of world experts to deliver webinars. We have started with a series by Professor Pingsha Dong from the University of Michigan, who has done a lot of work setting up welding standards in the US. We began by presenting a course on the design of welded joints in the Western time zone for the Americas. We recently completed the last part of this course for Africa and Europe and the course will now be taken across to India, to cover the Afghanistan, Pakistan and Bangladesh area; and then on to New Zealand to cover the Pacific Rim and the East.

Two follow up courses by Prof Dong, 'Residual stress and distortion control' and 'Advanced fatigue and fracture analysis methods', are also being planned. We are on the lookout for other topics and world experts who are willing to work with us, though, and suggestions would be welcome.

We are also excited about the Mpumalanga Stainless Initiative (MSI) and SAIW's recognised role within it. The Steve Tshwete Local Municipality (STLM) in Middelburg is home to several steel, petrochemical and beverage production facilities. As a result, the municipality's manufacturing sector contributes 17,2% to local GDP, higher than the manufacturing contribution from the province and the nation. Steel beneficiation is a cornerstone of the MSI, which presents a sizeable market opportunity for SMMEs. This would require artisanal skills such as welding, however, and SAIW is planning to establish a satellite branch in MSI's facility to meet these needs.

The past few years have been all about restructuring, COVID and recovery. Next year is about growth, starting with our practical welding school. We have put together an exciting 'I'm an International Welder' campaign, which we are launching in this issue of *African Fusion*, with a career decision tree and infographics on career paths that the SAIW can provide. We see a key role for certified welders with in-demand skills, who can attract good wages anywhere in the world. We are also putting a programme together combining open days with bursary opportunities to promote awareness of the value of SAIW's NDT and IIW welding co-ordination programmes.

We hope that the industrialisation of Africa, together with the advantages of the African Continental Free Trade Area (AfCFTA) will promote strong and sustainable African growth and, with the re-industrialisation of South Africa, that we can restore manufacturing's contribution to national GDP back to above 20%.

John Tarboton

The MSI, industrialisation and welding capability

SAIW executive director, John Tarboton, and business development manager, Etienne Nell argue the case for using industrialisation through manufacturing and construction as the key driver of economic growth, and outline SAIW's plans to collaborate with the Steve Tshwete Local Municipality (STLM) and the Mpumalanga Stainless Initiative (MSI) to unlock this potential.

The South African Government recently announced that welding had been identified as one of the 13 scarce trades, while indicating that there would be a strong demand for welders to be employed on infrastructure and other strategic programmes; such as the War on Leaks and the new oceans economy programme, Phakisa.

"Also, the skills of our welding workforce are trailing behind these of other countries with respect to delivering the consistent quality welds necessary in the power generation, petrochemical, mining and fabrication industries," notes John Tarboton, SAIW's executive director.

"But we at SAIW view these realities as a call to action rather than a reason to despair" he adds. "Without excellent welding skills for the installation, maintenance and repair of equipment and the delivery of plant components, products and services, South Africa's chances of getting foreign direct investment and growing local markets will be seriously hampered," he argues.

"We therefore need properly qualified artisan welders with the required skills to enable local companies to benefit from this demand, which will establish one productive industrial platform as the foundation for the next," he suggests.

Industrialisation to drive GDP growth

"Commodities-based growth from 1994 to 2006 resulted in a per capita GDP compound annual growth rate of only 1.95% – and this reduced to 0.5% from 2007 to 2019. A manufacturing-led growth path is at the heart of the industrial strategy of President Cyril Ramaphosa's administration. This is because industrialisation through manufacturing and construction leads to economic growth and, most importantly, to the creation of quality jobs with high labour absorption rates," argues Tarboton.

"In metals manufacturing and construction, welding is the enabling technology that allows these activities to take place. Welding, as a career choice, is able to absorb unskilled, poorly educated people and give them in-demand, well-paid, quality jobs," adds Nell.

Tarboton cites a recently conducted SAIW survey which shows that 29% of SAIW students originate from Mpumalanga. He goes on to quote *The Local Economic Development Analysis* for Steve Tshwete Local Municipality (STLM), which reports that STLM is a manufacturing hub for Mpumalanga and home to a number of steel, petrochemical and beverage production sites. This results in the manufacturing sector contributing 17.2% to STLM's GDP, significantly higher than that of the province and the country as a whole.

"The report also noted that 'steel beneficiation, which is currently being leveraged by the Mpumalanga Stainless Initiative (MSI), presents a sizeable market opportunity for SMMEs and could be expanded' and that 'this would require artisanal skills such as welding', says Tarboton.

Nationally, following nearly two years of robust talks facilitated by Dr Bernie Fanaroff, South Africa's Steel Master Plan was signed by representatives from business, labour and government. The plan has been developed on three pillars:

- Boosting demand for steel and steel products, primarily by reviving South Africa's stalled public infrastructure roll-out, driving localisation or import substitution and by leveraging the market access being created through the implementation of the African Continental Free Trade Agreement (AfCFTA).
- Addressing supply-side constraints, including electricity disruptions and tariff hikes, logistics bottlenecks, uncompetitive inputs and inadequate skills, and

The Local Economic Development Analysis for Steve Tshwete Local Municipality (STLM) report noted that The Mpumalanga Stainless Initiative (MSI) presents a sizeable market opportunity for SMMEs and that 'this would require artisanal skills such as welding'.

research and development.
- Implementing cross-cutting interventions, including the creation of a Steel Industry Development Fund, to be capitalised through the introduction of a levy of between R5/t and R10/t on all steel sold domestically, whether it be produced locally or imported.

"The timing of this master plan may be opportune in the context of the STLM-led long-term plan to establish a Centre of Excellence (CoE), with the SAIW being seen as a key partner: an incubator of steel fabrication SMMEs by assisting in addressing inadequate skills. In addition, the Steel Industry Development Fund or the R1.5-billion Downstream Steel Development Fund through the IDC, may be made available to graduates from the MSI incubation programme to establish new SMMEs at the Centre of Excellence," Tarboton notes.

SAIW's MSI presence

Collaboration between the SAIW and Mpumalanga's Department of Economic Development and Tourism began in 2013 when a permanent SAIW presence in STLM was proposed. After further discussions in recent times, it has been agreed that a welding school should be established at the Mpumalanga Stainless Initiative (MSI) in Middelburg, with the longer-term view that SAIW becomes an anchor tenant at the Centre of Excellence.

In phase one, SAIW has proposed establishing a satellite facility in STLM at the current premises of the MSI. This would initially comprise a ten-bay Welding School, with SAIW providing welding power sources, workshop equipment and a fume extraction system. Should some additional capital expenditure be made available, the SAIW would then transform this facility into a fully-fledged Welding School.

To establish market demand, it is anticipated that the SAIW and the Department of Economic Development and Tourism arrange a joint presentation for industries in the STLM who employ welders, for example metal fabricators. This potential market could be identified through the membership of MCCI was well as STLM local economic development contacts.

In phase one, SAIW has proposed establishing a satellite facility at the premises of the MSI. This would initially comprise a ten-bay Welding School, with SAIW providing welding power sources, workshop equipment and a fume extraction system.

"SAIW needs a show of interest by companies willing to appoint 10 or so aspiring young apprentices on three-year apprentice contracts. The apprentices would then undergo both theoretical and simulated practical training at the newly established facility in accordance with the newly registered QCTO Occupational Welder Qualification; together with authenticated training at the workplace, the quality of which will be overseen by qualified artisans employed by apprentices' fabrication companies," explains Nell.

"This programme is based on dual-system apprenticeships that combine technical education together with simulated practical training – at the newly established Welding School –and extensive authentic work experience in the employer's facility. Programmes such as these are far more likely to deliver skilled, capable and properly qualified artisan welders to support economic growth," he says, adding that they also deliver increased availability of intermediate welding skills from apprentices on work experience.

The success of the Welding School would depend on the participation of local industries, mines, and fabricators to adopt the programme, recruit apprentices and offer apprentice contracts. "If we are to raise the bar in welder training to align with international benchmarks, then industry must play its part," Tarboton tells *African Fusion.*

"With this SAIW Welding School we aim to help grow the provincial economy through industrialisation, using the enabling technology of welding to grow the manufacturing sector and, ultimately, to create in-demand jobs for local and international projects," he adds.

A second phase of SAIW involvement is also being planned: "Following the successful establishment of the Welding School we hope then to expand our MSI-based service offering to include some of our flagship courses, such as Welding Co-ordination, Welding Inspectors and Non-Destructive Testing training by our highly qualified and experienced staff.

"This would make it a lot easier for the large percentages of students who are already coming to SAIW from Mpumalanga," Tarboton concludes.

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Building and integrating Africa's manufacturing capacities

The Welding Federation (TWF) held a webinar on the 21 October at which Ayorinde (Ayo) Adeniyi of the Nigerian Institute of Welding reviewed manufacturing in Africa through the 20th century, the practices that have caused Africa's growth in manufacturing to stagnate and the new concepts being implemented by TWF to industrialise and add value to economies across the continent.

Market friction across Africa's industries has reached a level beyond the capacity or capability of any single member state. The isolated approach that has been applied by a number of member states through the decades has made no significant impact on accelerating GDP growth. Rather, it has established a premise for stagnated capacities and growing friction across Africa's industries.

Africa is still absorbed in the misconception of benchmarking economic growth on her array of natural resources. Although the continent boasts an impressive 10% of global oil reserve, 40% of gold deposit and a host of others, her continuous embrace of an evidently erroneous practice is inconsistent with evolving realities and compounded by her growing responsibility to an emerging 2.5-billion persons' needs with massive infrastructural deficit.

According to a Goldman Sachs report of 2019, commodities have accounted for only 30% of Africa's GDP growth since the year 2000. This economic model, which was tightly embraced by all of Africa throughout the last century, therefore favoured her economy for a limited window of time. Weak performances of Africa's economy in the latter half of last century revealed the need for a new construct towards improving Africa's growing but under performing economy.

In reality, Africa's poor approach, embraced for too long, resulted in more harm than just underperforming economies, but also deeper cuts and stagnation of capabilities that have and still do characterise her industries. The collection of decades that make up the years between 1980 and 2020 is in some way regarded as Africa's golden decades. Within this window of time, Africa experienced some of her most explosive economic activities. A situation which offered a plethora of opportunities to build and expand her problem solving capacities, premised on the volume of investment inflow. Unfortunately, her industrial adventures were centred mostly on her immediate interest i.e. natural resources, without extensive consideration of the fragility of economies heavily dependent on theses. This triggered a gross imbalance in the relationship between Africa's growing economies and her manufacturing capabilities to solve her industrial challenges. Despite the avalanche of economic activities during this window period, Africa's experienced a slow and linear progress in terms of her manufacturing capacity development drive. A situation yet to be addressed.

Market frictions across Africa's industries are more engineered than real, through uncensored inflows of parties with vested interests; and an unequal basis for competition against established systems with nurtured economic interests in Africa's maturing markets. Africa continues to engage her energies and focus in attempting to counter business interests rather than focusing on addressing the frictions of her industries thereby growing and sustaining capacity to solve problems.

The best way to make it easier for new industrial investment is to develop and deploy capacities for solutions with fairness, quality and consistency. Africa would be better served if she deployed her energy to address industry friction effectively rather than deploying measures to hold onto historical economic interests, which may never be eliminated. Without a strategy change, this problem could be with us forever!

The need to engineer a strategy at deeper levels in order to manage value chain activities in her industries requires Africa to have better control and knowledge of industrialisation. This can best be achieved through an effective and efficiently integrated system of interaction across Africa's industries. A system is needed that is based on establishing a wider network that goes beyond the socio-political manipulations of member state governments; a system initiated, evaluated and professionally managed for evidential impact in addressing real industry challenges.

At the presentation of an IIW International Welding Specialist Diploma to Joseph Jarrell of Aveon Offshore are, from left: David Adidi, Examination and Certifications, NIW-ANB; Joseph Durotoye, GM, Aveon Offshore; Joseph Jarrell, Welding Specialist, Aveon Offshore; Ayo Adeniyi, CEO, NIW-ANB; and Hamza Boutaleb-Joutei, Welding Engineer, Aveon Offshore.

The proposal to effect an integrated system goes beyond national talk-shops and changing nomenclature of qualification and certification schemes for unsustainable deals. A well-engineered dynamic to effect management efficiency over the pace, quality, economics and how manufacturing impacts on Africa's GDP change is necessary.

Effectively and efficiently implemented, the manufacturing and service sector are both sure to stir job creation along every step of the welding value chain, including active engagement of Africa's learning institutions. The path of positive GDP growth can be continuous if such an integrated system is applied with steady commitment to continual improvement.

To get involved in the new Africa awakening, get involved with the TWF.

www.weldfa.org

Advanced inspection services for a more sustainable future

For the SAIW Member Profile in this issue, African Fusion talks to Johan Gerber, managing director of DEKRA Industrial RSA, about his company's unique range of high-level inspection services and its digitalisation and sustainability ambitions for advancing the safety and reliability of industrial plants in Africa.

DEKRA Industrial RSA has its roots in South Africa as a leading NDT Inspection service provider called Raysonics. Founded in 1984, in the Vaal triangle, to offer NDT services to the petrochemical and power industries, by 2005, Raysonics had become the market leader.

"Raysonics was acquired by the DEKRA Group in 2013 and our name was changed to DEKRA Industrial in 2014. We opened a SANAS-accredited metallurgical laboratory in 2015 and in 2020 – in partnerships with Africa X, Swift Academy, Wilco Trading, JigSaw and JJ VR Trading – we established the QCTO-accredited DEKRA Institute of Learning, which offers a suite of around 4 000 online HSE training courses, skills development training, and learnerships, some of which focus on health and safety requirements for the local industrial sector," Gerber tells African Fusion.

The Global DEKRA Group operates two divisions: DEKRA Operations and DEKRA Service Division. "We fall under Industrial Inspections in the Service Division, which is based in Europe and is divided into several pockets of excellence with R&D and implementation expertise on a wide range of advanced technologies: robotic inspections; drones; lift inspections; specialised wall thickness techniques; online monitoring systems; and a host of other custom-designed solutions based on real needs and experience across the globe," explains Gerber.

"Our worldwide coordinator for this division is Bennie Groenewald, who is based in Cape Town. Bennie is the global business line director for NDT and advanced NDT (aNDT) for the DEKRA Service Division, Industrial Inspection. He is responsible for all DEKRA countries where these service are provided; as well as those who would like to start using them, providing support and assistance for: NDT Data handling and storage; organic development and business expansion; certification processes, skills and knowledge transfer; and the digitalisation of DEKRA's NDT and aNDT offerings.

Bennie was a certified Level 3 NDT Inspector with us here in South Africa, so he knows us and gives us excellent access to the most appropriate advanced technologies and information available," adds Gerber.

"With Bennie's help, we identify Service Division initiatives already successful in Europe that can implemented in South Africa. Now available in South Africa are specialised drone inspections; online monitoring systems; lifting inspections for overhead and vehicle-mounted cranes and forklifts; a digitised wall thickness scanning technique called FST for boiler tubes; and various robotic inspection systems for nuclear plant," he says.

DEKRA has also recently partnered with a company based in Houston Texas making use of a robot for inspecting fuel storage tanks. "The robot is able to inspect 95 to 97% of a tank floor while submerged in diesel, petrol, paraffin or jet fuel," he tells African Fusion.

"A company of our size cannot survive by offering entry-level MT, PT, UT and RT services. There are more than 300 companies currently registered with the department of Health in South Africa for the use of RT Isotopes, and a very small number of these have more than 30 qualified NDT technicians.

We don't try to compete in this price-driven market segment. We differentiate our services by using high-end technologies for niche and critical inspection applications. With the backing of our global Service Division, we have the advantage of access to purpose- designed solutions using advanced inspection techniques that are available and ready to deploy for critical industrial applications," he notes.

He cites the in situ inspection of electrical generators as an example. "Using a KIRR or ARGIS system, which are DEKRA-designed robots that can carry out phased-array UT, visual and conductivity NDT technologies, we can inspect the service condition of power generators without removing the rotor. All we need is an 18 mm gap to confirm the condition of the conductivity, retaining ring, windings and core. This is an advanced and purpose-designed solution to solve a specific inspection problem," he continues.

In addition, DEKRA's robot systems have been used to inspect various nuclear reactor pressure vessels, a task that takes in excess of 10 days to complete using traditional methods. Gerber says that DEKRA managed to complete a full reactor inspection in four days and 18 hours, which "we believe was a world record".

"It is through unique high-level services such as these that we are able

A remotely operated underwater vehicle used to conduct visual and ultrasonic testing in hazardous environments such as nuclear pressure vessels. The system can be used at depths of up to 50 m.

to stay competitive in this very cost-sensitive market," he says.

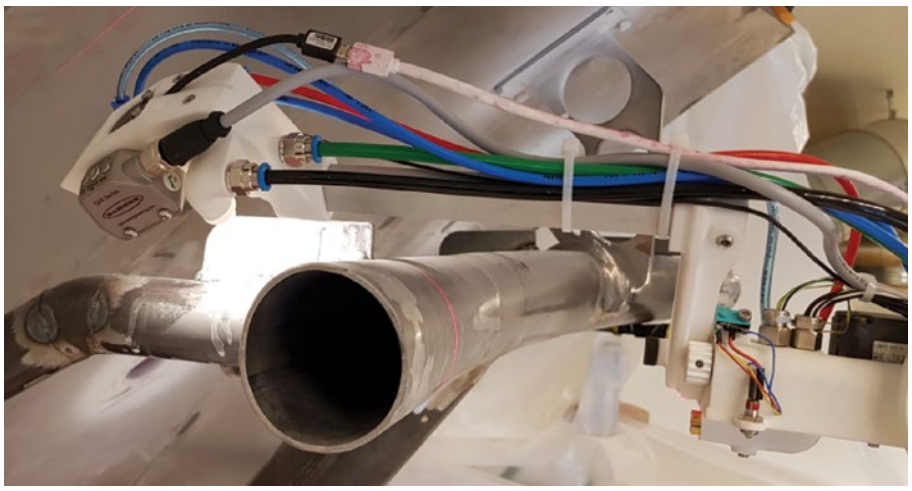
He reveals that DEKRA Industrial has adopted a 'one stop' and total inspections solution strategy. "As well as being able to inspect tank floors for corrosion using UT with the product inside, we are also IWH (Institute of Working at Height)-certified to do rope access inspection, or we can use our Scorpion robot, or we can do LIDAR volumetric inspection using a drone. We are also now accredited by the Corrosion Institute of South Africa to include sand blasting and repainting services where necessary.

"And across all of our services and methods, we have maintained our NOSA five star rating, won seven consecutive NOSCAR safety awards and, as of March 2021, accumulated 5 000 000 injury-free hours, proving that we live by our slogan: A global partner for a safe world."

Into the future, Gerber reveals that a new company slogan is being introduced in the next few years to highlight digitalisation and sustainability. "In my opinion almost all major disasters could have been avoided had proper inspections techniques been adopted by properly qualified people. One missed defect, one wrong interpretation or one ignored indication can result in catastrophic disasters. Almost all accidents can be prevented by applying effective inspection techniques that produce accurate results, which are interpreted by competent people capable of making engineering-based decisions," he argues.

To solidify its ability to more cost-effectively use inspection to prevent disasters, he says that DEKRA aims to fully digitalise within the next four years. "By then, our inspection results will all be delivered electronically in digitised formats. The results will be uploaded into the Cloud, giving clients and their engineering specialists immediate access to the results in a digital format, which makes it much easier to use the data for engineering analyses.

This is already being done using phased array UT inspection equipment. One of our technicians was recently doing an inspection in Middleburg, while our Level 3 NDT Inspector was watching and analysing the data from Cape Town and an experienced DEKRA phased-array specialist in France was overseeing the set up and calibration of the instrument being used. This makes immediate, reliable and accurate results available for interpretation by experts anywhere in the world, with the actual inspection being done in a completely different part of the world," he relates, adding that this makes real-time remote analysis cost-effective and practically implementable.



An automated visual (VT) and dye penetrant testing (PT) system with an automated PT nozzle attached to a 3-dimensional head. The manipulator can also be used as a carrier for repair tools as well as end effectors for a J-groove inspection. The system is qualified for nuclear environments.

Also already in the company's armoury is an autonomous drone capable of flying safely without any tethering or communications network. "This system can fly down a mineshaft into an area where there has been a rockfall, totally autonomously – without the need for a GPS or network signal. It uses LIDAR to produce a map of the area and it will automatically and seamlessly stitch the image into a 3D contour map. The system is currently being used for vertical shaft inspections and it can complete a scan of a 100 m mine shaft in four minutes," he notes.

Highlighting the role DEKRA is starting to play in the field of predictive plant maintenance, integrity services and asset management, Gerber says that the company has partnered with a data analysis and artificial intelligence (AI) specialist. "We are the preferred partner for the supply of digitised NDT results to this company for incorporation into its predictive models and programmes.

Whenever we do a failure analysis, for example, we will do the full analysis on the failed component and then also inspect comparable sound components. Using both sets of data along other engineering parameters, more and more accurate AI models can be developed to better predict and protect plant components."

In terms of sustainability, Gerber suggests that DEKRA aims to be a carbon-neutral company by 2025, by incorporating energy-efficient and renewable technologies into its operations and buildings – and globally, by adding electrical vehicles to its fleet.

"Our services offer high levels of integrity so as to reduce risk and, ultimately, to extend plant life and lower total plant ownership costs. We see investment opportunities all over Africa, particularly in the renewable space, and we believe the continent offers a very exciting future for our company," Gerber concludes.

www.dekrarsa.com

DEKRA has access to an autonomous drone capable of flying safely down a mineshaft without any tethering or communications network. The system uses LIDAR to create a map of the inaccessible areas safely, easily and quickly.

ESAB's new Fabricator Pro EM series: reliable, efficient and affordable

ESAB has launched the new Fabricator Pro EM series of heavy-duty, inverter-based systems for MIG/MAG and stick welding. Offering energy savings, reliability and affordability in a modern inverter-based and microprocessor controlled package, these systems are ideal for meeting Africa's rugged fabrication, onsite construction and shutdown needs.

For fabrication and construction firms that need reliable and efficient welding systems that can withstand rugged industrial environments, ESAB South Africa has introduced the Fabricator Pro EM 400i and EM 500i inverter-based welding power sources and associated wire feeders. Optimised for welding carbon or stainless steel with 1.0, 1.2 or 1.6 mm diameter solid and flux-cored wires, Fabricator Pro inverters also offer an advanced MMA/Stick/SMAW welding option.

The units use inverter-based technology to offer increased welding performance, improved portability and energy efficiency and more advanced controls to boost weld quality and productivity — all at highly affordable prices. The Fabricator Pro EM 400i has an output rating of 400 A at 60% duty cycle, while the Pro EM 500i is rated at 500 A at 60% duty cycle. Both power sources measure 1020x500x865 mm and weigh 75 kg, which is up to 65% lighter than conventional technology units. They are driven off three-phase primary power voltages of between 380 and 415 V with a variation tolerance of ±10%, and input frequencies of 50 and 60 Hz are accommodated.

Housed in a weather-protected IP23-rated case, the Fabricator Pro has an air tunnel cooling design that isolates electronics from dust, oil, metal shavings and other airborne contaminants. Thick metal side panels provide impact protection, yet the design enables easy access for service and maintenance. Large feet provide ground clearance and extra protection for the chassis, while its two ergonomic handles are crane rated. Because of this rugged design, ESAB offers a 3-year warranty on these power sources.

Inverter-based advantages

The new Fabricator Pro units feature inverter-based power transformation technology. They operate at 87% electrical efficiency, which is a 30% improvement over step-regulated power sources, so they lower primary power consumption and are more environmentally friendly. An energy saving mode reduces power consumption to less than 50 W when the machine is idle. The welding power sources also have a power factor of 0.93, lowering primary amperage requirements, which can allow more machines to be used on the same circuit breaker or reducing the incidence of nuisance trips.

Jannie Bronkhorst, product manager for Welding and Automation at ESAB South Africa.

Inverter technology also provides a faster response to changing arc conditions. Coupled with microprocessor controls, the technology enables ESAB to incorporate additional functions to enhance welding performance while simplifying operation.

Using highly visible LED displays and controls with easily understood terminology and symbols, operators start welding by selecting from one of three options: solid wire, cored wire or MMA. If a wire welding process is selected, operators then select the correct wire diameter (1.0, 1.2 or 1.6 mm) and gas type (100% CO_2 or mixed gas) and the Fabricator Pro will then automatically choose the best parameters for that combination. Users can also adjust welding wire feed speed (amperage) and voltage independently if desired.

Additional controls allow operators to adjust inductance, which can reduce spatter, enhance bead-wetting action and create a flatter bead profile when MIG/MAG welding in short circuit transfer mode. Users can also set crater fill voltage and amperage at the end of the weld to prevent crater cracking, with the crater fill function activated by setting the welding machine torch control to four touch (4T) or 4T repeat mode.

For MMA welding, adjustable Arc Force provides additional amperage in low voltage situations to prevent the electrode from sticking to the work piece, which can deliver increased penetration.

The EM 500i inverter-based welding power source, part of ESAB's new Fabricator Pro EM series, is being launched locally by ESAB South Africa.

Easy connectivity

Quick connectors at the back of the Fabricator Pro make it easy to connect to the wire feeder, with power being supplied via a 24 V socket. Water-cooled versions feature a water cooler integrated into the power source and a quick connection for the torch. The optional trolley features a low, easy loading platform to hold a single gas cylinder, while a wheel kit for the power source is also available.

Key power source advantages include:

- The Fabricator EM Pro is a rugged and reliable welding system for heavy applications: delivering 400 A or 500 A at 60% duty cycle.
- There are three variants: a 500 A unit with integrated torch cooling, and two 400 A units, one with and one without the torch cooler.
- Energy savings advantages accrue from the high power factor, high efficiency and low idle power.
- The machines offer a lower cost of operation and deliver all the added benefits of an inverter technology at a similar price to a conventional transformer machine.
- The machines are built with integrated, wide and large wheels and a gas cylinder support to facilitate moving the whole system around the workshop. Two side cable handling supports are also included.
- A wide voltage tolerance gives more stable welding output.
- Variable inductance control offers better arc performance and control.
- IP23S ingress protection enables their use anywhere, for field and workshop applications.

Two feeder options

ESAB offers two wire feeder choices specifically for use with the Fabricator Pro. The Feed 364 features a four-wheel drive stand protected by a steel case and plastic cover to shield the wire spool, which accepts 200 and 300 mm spools weighing up to 18 kg.

The Pro Feed 364 is an open, sled-type feeder that can accommodate larger spools; it also features a powerful 4-wheel drive stand. Both feeders offer voltage and amperage control at the feeder. When ordered as part of a package, the Fabricator Pro comes with the ESAB PSF torches, specified as either air- or water-cooled in a variety of duty cycle ratings.

Key wire feeder advantages include:

- The feeders are protected with cover for the feed-wire coil.

The Fabricator Feed 364 features a four-wheel drive stand protected by a steel case and a plastic cover to shield the wire spool.

- They have simple, clear and easy to operate panels, with functions on the front for faster and easier adjustments.
- 2T, 4T/4T repeat functions offer greater welder comfort on long weld beads. The 4T and 4T repeat functions allow welders to work with two different parameters, switching between them using the torch trigger.
- They are robust: The EM Pro 364 is constructed in thick and resistant steel that guarantee durability in the most aggressive environments.
- A robust wire feeding mechanism with four drive wheels guarantees durability and efficient wire feed traction.

The Fabricator Pro comes with the ESAB PSF torches, specified as either air- or water-cooled in a variety of duty cycle ratings.

- Steel handles make for easy lifting and transportation.

"At ESAB, we exist to shape the future of welding and cutting. We connect fabricators with the widest range of products under our industry-leading brand portfolio with the latest technologies to solve virtually any industrial challenge," says Jannie Bronkhorst of ESAB South Africa. "Then we back this up with our knowledge, experience and passion to help fabricators to be more productive than ever before.

"The new ESAB Fabricator Pro EM welding machines offer a simple, very versatile and dependable option for welding contractors that regularly have to set up at remote and rugged construction facilities. They really are an ideal solution for African fabricators," concludes Bronkhorst.

esab.com

Specifications for Fabricator Pro EM 400i and EM 500i inverter-based welding power sources.

	Fabricator Pro EM 400i	Fabricator Pro EM 500i
Mains supply:	380-440 V ± 10% three phase, 50 or 60 Hz	380-440 V ± 10% three phase, 50 or 60 Hz
Permitted Load at 60% Duty Cycle (MIG/MMA)	400 A	500 A
Permitted Load at 100% Duty Cycle (MIG/MMA)	310 A	390 A
Current Range (MIG/MMA),	30-400 A	30-500 A
Voltage Range (MIG)	15.5-34 V	15.5-39 V
Efficiency at Max Current	83%	87%
Power Factor Max Current	0.93	0.93
No Load Power	< 50 W	< 50 W
Dimensions	1020x500x865 mm	1020x500x865 mm
Weight, Kg	75 kg	75 kg
Enclosure Class	IP23S	IP23S
Application Class	S	S
Insulation Class	H	H
Wire- Feeder	Feed 364	Feed 364
Wire-Feed Drive	4 Roll	4 Roll
Wire Feed Speed, m/min	2.0-20.0	2.0-20.0
Wire Spool Capacity, kg	18	18
Max Spool Diameter, mm	300	300
Wire Dimensions (MS/SS/AL) Cored Wire	1.0-1.6	1.0-1.6
Wire Dimensions (cored wires)	0.8 -1.6	0.8 -1.6

Towards intelligent GMAW

African Fusion talks to Paul Kah: President of the Cameroon Welding Association (CWA); a delegate of IIW's Technical Commission XII for Arc Welding Processes and Production Systems; Professor in welding technology at University West in Sweden; a journal reviewer for *Welding in the World*; and the author of a new book: *'Advancements in Intelligent Gas Metal Arc Welding Systems; Fundamentals and Applications'*.

Paul Kah is from Cameroon. He studied there to become a teacher, graduating in 2001. He did a professional Master's degree in science and technology teaching, a five-year in-service programme sponsored by the Cameroon Government, which he completed while teaching in high schools with some part time work at the University of Cameroon.

He then applied to continue his studies overseas and received positive offers from universities in Finland, Denmark and Germany. "I chose Finland and, in 2005, I started my second Master's degree at Lappeenranta University of Technology (LUT) in Finland, this time in Science in Technology. I graduated in 2007 and was intending to return to Cameroon, but my supervisor invited me to continue my research for a PhD, which I started at LUT in 2007. I was then working on hybrid GMAW/laser welding, which involved using state-of-the-art equipment and control features in both of these complex welding processes," Kah tells *African Fusion*.

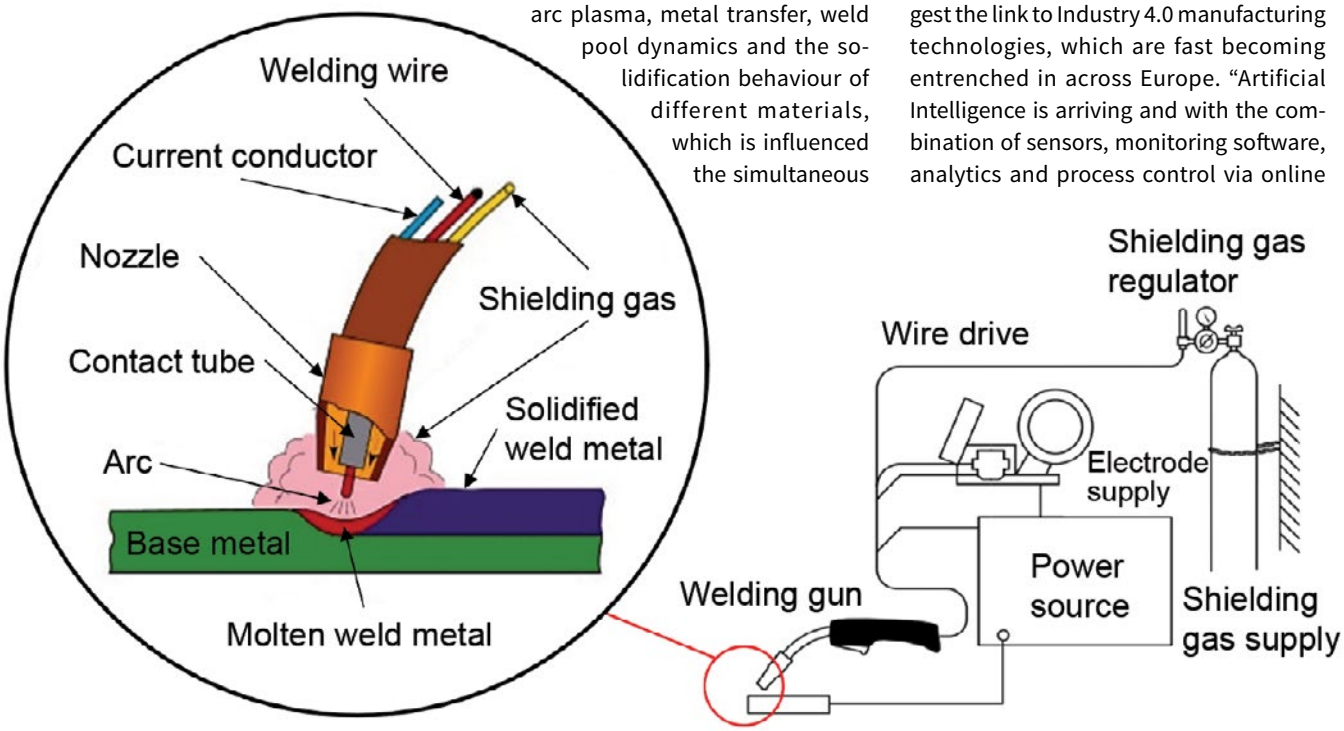
He finally submitted and graduated in 2011 and was immediately offered a post-doctoral research and teaching post. After another five years, he applied for a position as an assistant professor. "I was then re-evaluated and promoted to associate professor, so I stayed in Finland until 2020. Then, while applying for a full professorship at LUT, an opportunity opened up at University West in Sweden, so I applied and was awarded a post as a full professor in welding technology," he relates.

As well as having written over 100 technical papers in his career, many in the field of advanced welding process monitoring and control, Kah's most recent publication is a book on Gas Metal Arc Welding (GMAW) that he began to write back in Finland in 2017. "Scandinavia is very strong in modern welding equipment with advanced sensing, digital and software capabilities to control welding processes. To come to grips with these technologies, though, I felt there was a need to understand the underpinning fundamentals of the welding arc the complex interactions between arc plasma, metal transfer, weld pool dynamics and the solidification behaviour of different materials, which is influenced the simultaneous interplay of material in the liquid, plasma, gaseous and solid states," he explains.

Called *'Advancements in Intelligent Gas Metal Arc Welding Systems; Fundamentals and Applications'*, the book was finally published in June this year. "I came to Sweden in February of 2020 and, because my first year was less intense and my family was still in Finland, I took the opportunity to focus intensively on completing the book.

From experimental studies of GMAW welds, numerical models have been developed to examine the complex phenomena in a GMAW process, which include electromagnetics, heat transfer, fluid flow, metal transfer, microstructure evolution and thermal and mechanical effects. The studies and models have significantly improved our understanding of the welding physics and have enabled improved optimisation of welding process parameters and more reliable prediction of microstructure evolution and as-welded properties.

'Intelligent systems', he says, while capturing the general nature of modern digitally controlled equipment, also suggest the link to Industry 4.0 manufacturing technologies, which are fast becoming entrenched in across Europe. "Artificial Intelligence is arriving and with the combination of sensors, monitoring software, analytics and process control via online

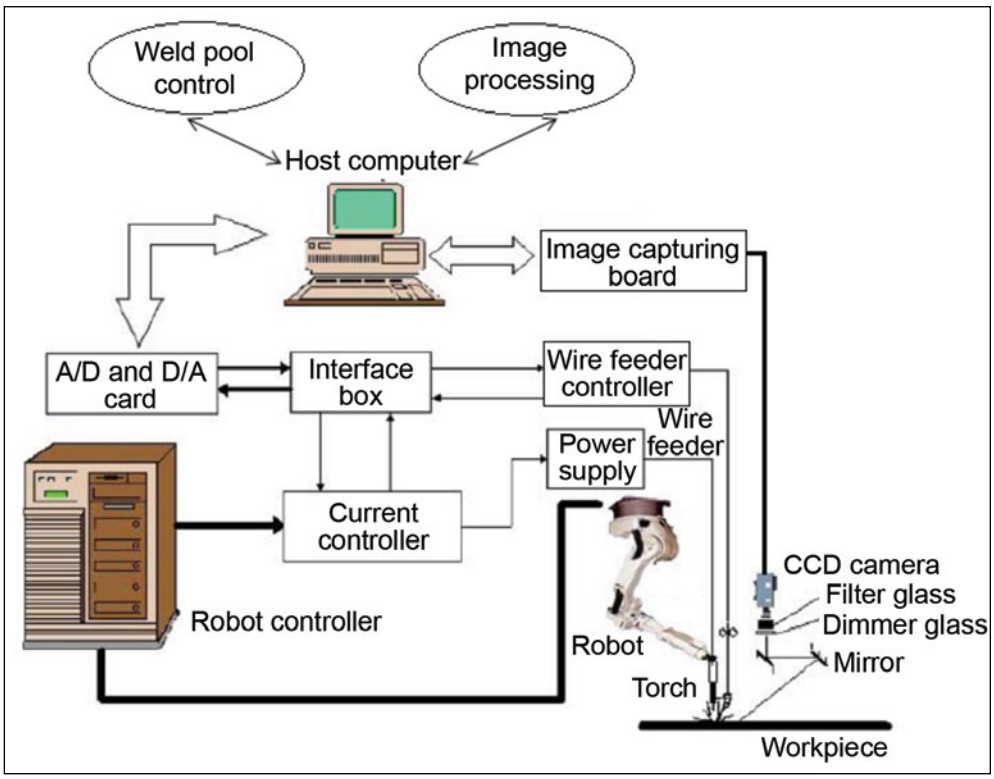


A schematic diagram showing some of the complex interactions involved in the GMAW process.

and/or offline technologies, it is already being adopted in parts of the welding industry," he says.

Describing the fundamental welding process control strategy for GMAW, he says that the key focus is on the wire feed rate, the current waveform and the associated voltage: the idea being to optimise droplet transfer efficiency. "This helps us to establish process stability and consistency and, via continuous monitoring, we can track and react to disturbances and rebalance the key parameter to restore stability. This relates well to Industry 4.0, which, at the state-of-the-art, is now being advanced to Industry 4.5.

In support of the need for this book, Kah points to an estimate that over 50% of global domestic and engineering products contain welded joints: "GMAW is currently the most commonly used fusion joint method in product manufacturing, due to its many advantages: applicability for most common industrial metals; suitability for all weld positions; the potential to produce for high-quality welds: its high welding speed; and the fact that it is ideally suited to automation.



A real-time weld pool control system of a welding robot with computer vision. The integration of robotic science, sensor technology, monitoring and control systems, artificial intelligence and other relevant technologies in practical welding applications gives automated systems the ability to make human-like decisions.

"Although GMAW has been used for many decades, the importance of further advancements in GMAW cannot be underestimated," he continues. Fabricators are all looking for more efficient production strategies, resource savings and quality improvements," he notes.

Paul Kah's book provides an overview of the various aspects associated with GMAW, starting from its theoretical basis and ending with the characteristics of industrial applications and control methods. Additional sections cover ancillary processes associated with welding and welding control, such as fuzzy logic, artificial neural networks, and others.

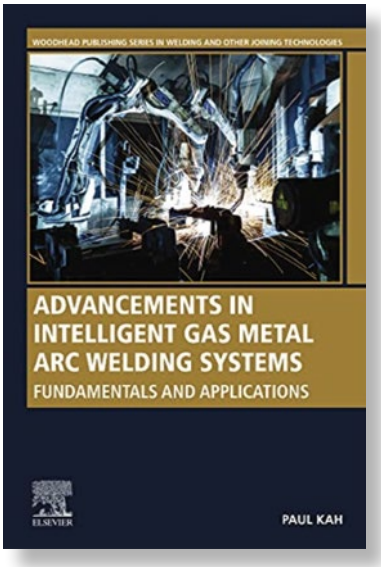
"In view of the increasing industrialisation and urbanisation of modern society, the future looks promising for welding, and it will continue to be an important, productive, and cost-effective manufacturing method. However, steps must be taken to attract skilled personnel into the industry. In addition, changes must be made to accommodate the changing demands of modern society and working life, most notably with respect to the expanded use of welding automation. The welding industry, particularly in Africa, must embrace all modern-day technological tools to keep pace with the rest of the world," he believes.

Advancements in Intelligent Gas Metal Arc Welding Systems covers recent advances in the development of gas metal arc welding and experimental studies of GMAW processes, sensing and control of GMAW processes, process optimisation and new applications of GMAW. Readers can gain knowledge across a comprehensive range of welding issues.

Written to be directly useful to welding professionals, the book is also ideal for professionals in the field looking to identify and solve GMAW-related problems: topics and chapters can be accessed and read in any order.

"As modern manufacturing shifts towards automated technologies, research in the field of intelligent robots with the ability to make human-like decisions has been a topic of much interest. This has led to investigations into the integration of robotic science, sensor technology, monitoring and control systems, artificial intelligence and other relevant technologies in practical applications of intelligent robotic welding. Using computer vision, for example, important information can be gathered about the overall behaviour of a welding system.

Professionals, welding and manufacturing engineers, materials scientists and researchers in the fields of manufacturing engineering, welding, joining, materials science, metallic materials and welding require knowledge of this area of modern welding practice, as do engineers studying for the IIW IWE certificate and students at Bachelor, Masters and Doctoral levels, who represent the future of our welding industry," Kah concludes.



To find out more about Paul Kah's book or to order a copy, scan this QR code.

Welding stainless steels without impacting corrosion resistance

Michael Fletcher, a metallurgist with extensive experience in welding and NDT and a consultant to Huntingdon Fusion Techniques HFT® and other manufacturers across the globe, explains why welding and weld finishing can cause in stainless steel to corrode and some of the ways that weld purging solutions can be used to minimise this risk.

Most industries using stainless steels do so because of their resistance to corrosion. Industry sectors such as dairy, food and pharmaceutical manufacturers and the semi-conductor producers are major users, since the end products must be contamination free and the presence of any corrosion products can have serious consequences.

Stainless steels and other alloys containing chromium owe their resistance to corrosion to the formation of a very thin (10-5 mm) transparent surface layer of chromium oxide. This layer provides a passive film that acts as a barrier to penetration by an invasive environment. When heated to a high temperature in the presence of oxygen this film increases in thickness until it becomes visible – the colour becomes darker with increasing film thickness.

At a critical film thickness the film becomes unstable and begins to break down. The fractured zones created offer sites for localised corrosion. Four principle mechanisms are involved: Crevice corrosion; Pitting corrosion; Stress corrosion cracking; and Microbiologically induced corrosion (MIC).

Crevice corrosion is the localised corrosion of a metal surface attributable to the proximity of another metal such as a weld. It is a locally accelerated type of corrosion and is one of the major corrosion hazards in stainless steels.

Figure 1: Crevice corrosion adjacent to a stainless steel pipe weld.

Pitting corrosion produces attacks in the form of spots or pits and takes place at points where the passive layer might be weakened. It occurs in stainless steels where oxidation has reduced the passivity. Once the attack has started, the material can be completely penetrated within a short time.

Stress corrosion cracking (SCC) is characterised by cracks propagating either through or along grain boundaries. It results from the combined action of tensile stresses in the material and the presence of a corrosive medium. It can be induced in some stainless steels by adverse heat treatments such as those occurring in weld heat affected zones.

Figure 2: Stress corrosion cracking in welded joint.

Microbiologically induced corrosion is promoted or caused by micro-organisms, typically in industries related to food and beverage processing. It is usually referred to by the acronym 'MIC' and is common in welded sections.

Weld decay of stainless steel

Reduction in the protective chromium content can lead to a phenomenon known colloquially as 'weld decay'. During welding of stainless steels, local sensitised zones (ie, regions susceptible to corrosion) often develop. Sensitisation is due to the formation of chromium carbide along grain boundaries, resulting in depletion of chromium in the region adjacent to the grain boundary, which produces very localised galvanic cells.

If chromium carbide depletion reduces the chromium content to below the necessary 12% required to maintain the protective passive film, the region will become sensitised to corrosion, resulting in susceptibility to intergranular attack.

Reduction in mechanical strength

Another consequence of chromium loss during welding is the effect on mechanical properties. In chromium/molybdenum/vanadium materials, for example, developed for their high temperature creep resistance, enhanced hardenability, wear resistance, impact resistance and machinability, any reduction in chromium content can affect these properties.

Stainless steel welded joints are common problem areas. Well made, they offer a smooth transition from one section to another, high strength and are cosmetically attractive. However, the welding process itself can lead to significant loss of corrosion resistance in the joint area and a reduction in mechanical properties unless precautions are taken to prevent oxidation.

The welding process

Welds carried out on almost all metals with inadequate inert gas coverage will oxidise. The effect is even noticeable with many stainless steels. To some, the discolouration due to oxidation is an inconvenient feature that can be removed after welding, but this may be difficult and, in any case, costly, especially if access is restricted.

Unfortunately, any oxidation can result

directly in a reduction in corrosion resistance and in some cases loss of mechanical strength. This is significant in dairy, food, pharmaceutical and semiconductor pipe applications where stainless steels are employed principally for their resistance to corrosion.

The inert gas used routinely during fusion welding to protect against oxidation needs careful consideration. It will come as a surprise to many that oxygen contents as low as 50 ppm (0.005%) in this protective gas is rarely totally effective.

Effective protection is thus essential and this is achieved by surrounding al of the surfaces around the joint being welded with an inert gas such as argon or helium. The gas shield associated with a GTAW torch will protect the upper surface of the joint, but the inside surfaces of pipes and tubes also need special attention.

Dedicated equipment and procedures have evolved over the past 25 years to achieve this. Called weld purging, this technology meets the need for total internal protection.

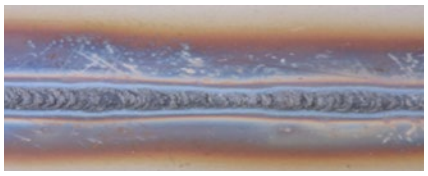


Figure 3a: The result of an unprotected underbead in welded austenitic stainless steel.

Figure 3b: To ensure no discolouration occurs, the oxygen content needs to be reduced to 20 ppm (0.002%).

Pipe and tube purging

Systems for weld root protection are based on sealing the inside of a pipe on either side of the weld zone, then displacing the air with an inert gas. The seals must be reliable and leak tight, effective and easy to insert and remove. The inert gas must be of a quality commensurate with the need to protect the molten metal. Gas flow should be laminar to maintain a high level of protection and pressure controlled to offer adequate coverage but without expelling molten metal from the joint.

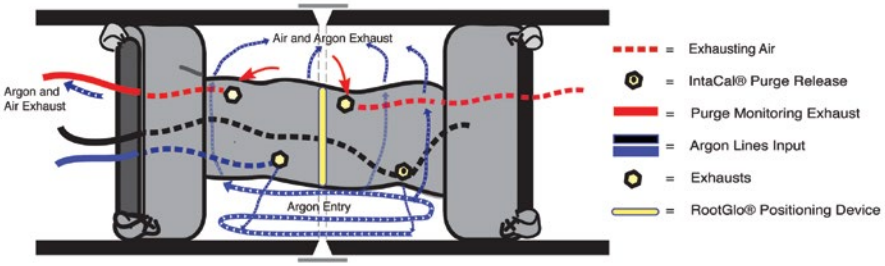


Figure 4: A diagram representing pipe and tube purging concepts.

Figure 5: The inflatable PurgElite® system from the Argweld ® range for tubes of between 25 and 610 mm in diameter. Diameters up to 2 235 mm can be accommodated using QuickPurge® systems.

Early and with hindsight, primitive systems involved the use of paper, card, wood and polystyrene discs. Often these provided at best poor sealing and on occasions burst into flames, while satisfactory removal after welding presented challenges. Ensuring that all oxygen had been removed during purging was left entirely to the skill and experience of the operator.

There were regular incidences where protection proved to be inadequate and the joint had to be re-made with consequent expense and loss of time. It comes as a surprise that these practices are still used, even by some prominent fabrication companies across the world.

The most effective solutions are based on the use of inflatable dams and fully integrated systems are now available covering pipe and tube diameters from between 25 and 2 400 mm.

Residual oxygen measurement instruments

Any effective weld purge process needs to be supported by suitable oxygen detecting equipment. Weld purge monitors have now been developed to meet the need for reliable, robust and sensitive measurements. For reactive and refractory alloy welding these must be capable of accurately measuring oxygen levels down to 10 ppm.

As an example, the PurgEye® 600 instrument manufactured by Huntingdon Fusion Techniques reads down to 10 ppm with extreme accuracy and has a display range from 1 000 to 10 ppm.

The entire Argweld product range is supported by an extensive library of publications including Technical Notes, White Papers, Conference Proceedings and peer-reviewed International Articles. These are available on-line by application to Huntingdon Fusion Techniques Ltd.

Figure 6: The Argweld® PurgEye® 600 monitor has a USB connection and data logging capability allowing the operator ease of data transfer without the need for a computer connection.

Conclusion

Resistance to corrosion is clearly a significant issue in applications where pipework cleanliness is crucial in ensuring product quality. The use of globally well-proven accessories such as purging equipment and monitoring instruments is vital if loss of chromium during welding is to be prevented.

Afrox GasReach with Miller ArcReach: A 360° construction site solution

Johann Pieterse, Afrox Business Manager for the Manufacturing Industries, talks about the expanding range of Afrox 360° application solutions for the welding industry. An exciting development is the combination of Miller ArcReach technology with the Afrox GasReach solution, an Afrox-developed Multi-User Pressure Panel (MUPP) for distributing gas to multiple welders working at height and in other difficult-to-reach locations.

"Afrox started working on the development of its Multi-User Pressure Panel (MUPP) in 2019, at the request of the HydraArc team, which was experiencing welding at height issues during general maintenance on boilers. The key problem was the need to lift argon gas cylinders up into the boiler to give welders access the shielding gas needed for TIG weld repair procedures, and the space taken up by such cylinders on narrow walkways and cramped work areas," says Pieterse.

"We proposed, designed and tested a solution that leaves the gas cylinders on the ground in a safe, secure, and convenient fenced-off area, with a single steel reinforced high-pressure gas hose delivering shielding gas into a pressure-regulated MUPP with eight outlet valves near the welders. Conventional shielding gas flowmeters are connected to the outlet valves, and the pressure in the unit is increased to a level just sufficient to equalise shielding gas flow to each of the eight welders, irrespective of which of the eight valves are opened or closed."

Initially designed for GTAW, the solution has proven effective for any gas shielded welding process, including GTAW, GMAW, FCAW and MCAW. In addition to solving the cylinder clutter problem in power generation boilers, the system has also provided a safer solution to cylinder handling in other industries, where welding is often done on suspended platforms, limited access locations or other workstations where space for equipment is limited.

To further complement the GasReach offer, Afrox has recently introduced Miller's ArcReach technology. The key feature of this technology is that Miller has eliminated the need for a control cable between the power source and the ancillary equipment. The communication between the power source and the equipment is done via the welding cables: pure and simple.

"This means that we can immediately increase the distance from the power source up to a hundred metres, thereby getting rid of the clutter and only taking the ancillary equipment into hard-to-reach places. It also eliminates the high level of maintenance required by qualified personnel to maintain control cables and torch extensions on site," explains Pieterse.

Miller ArcReach technology combined with the GasReach MUPP shielding gas delivery system from Afrox offers an ideal 360° solution for welding at height and in difficult-to-reach locations.

Key to making ArcReach possible is Cable Length Compensation (CLC™), which automatically ensures that the voltage at the arc matches the required set value. CLC™ compensates for the voltage drop in the long cable lengths between the power source and the remote components, which provides the welder with the exact set values of voltage and current.

ArcReach technology can be used with multiple arc welding processes. A welder can use GTAW to weld an open root, and then change directly to SMAW for the fill and cap by simply unplugging the GTAW torch from the Miller ArcReach Stick/TIG remote and plugging in the SMAW electrode holder. The system automatically senses the process change and switches from GTAW mode to SMAW mode. Polarity Reversing technology automatically changes the polarity from DCEN to DCEP and the current (amperage) control is done directly on the remote.

Likewise, if the welder needs to switch to GMAW or FCAW, the welding cables can be connected to an ArcReach suitcase feeder, while the multi-process power source remains well away from the workstation. The ArcReach suitcase feeder is also available in a smaller 8-inch version, which is ideally suited for use in workspaces with small access openings.

Maximum benefit and cost savings are ultimately realised when the Miller ArcReach SmartFeeder is connected to the power source, because then the open root and the fill and cap welding can be done with the same equipment, the same wire and the same shielding gas. This advanced technology enables the welder to use RMD,

a pulse-modified short-circuit mode, to deposit a perfect single-run open root much faster than when using the conventional GTAW process. In addition, RMD eliminates the need for a hot pass, with the result that the GTAW process in conventional large bore pipe welding is replaced with a process that is often five times faster than depositing the conventional GTAW root and hot pass.

Once the root has been welded, the welder can immediately switch the wire feeder to GMAW-P mode and start to rapidly fill the weld. Capping is done using the same mode.

The process is ideally suited for welding with solid or metal cored wire, which eliminates slag formation and slag inclusions. Using metal cored wires adds even more productivity gains and cost saving benefits, so it is recommended that a metal cored wire is used whenever a suitable product is available. Compared to conventional processes, RMD and GMAW technology is at least three times faster than conventional GTAW and SMAW, and the resulting savings are often more than 80% per kg of deposited weld metal.

Numerous procedures for this Afrox 360° solution have now been successfully qualified. These include carbon steel, stainless steel and low alloy creep resistant steel applications. The procedures have been successfully applied in large bore boiler pipe repairs, workshop build-up and cladding, as well as in-situ repair welding and replacement welds in power generation boilers and petrochemical gasifier plants. They offer per metre welding cost savings of up to 80% compared to traditional GTAW and SMAW procedures.

Welding parameters can be programmed and stored directly onto the SmartFeeder, or welders can store their own programs and settings on a memory card. These optimised settings are then immediately available to the welders as soon as their shift start, and there is no need to spend valuable production time optimising the settings at the start of each shift.

The latest Miller addition to this system is a remote induction-heater system, which offers fast, safe and precise pre-weld heating of up to 315 °C. The system is powered via the welding cables from the same multi-process welding power source used with the remote, the suitcase feeder or the SmartFeeder. A separate induction power supply is no longer required. The system controls and records the entire pre-heating cycle and interpass temperatures, which enables the contractor to save on the cost of hiring an external heat treatment contractor and eliminates delays caused by the schedule of an external service provider.

Once pre-heating is done, the welder can immediately start welding, with an absolute minimum of set-up delay and without the need to move away from his or her onsite welding station.

Miller ArcReach technology, for which Afrox is the exclusive agency, combined with the GasReach MUPP shielding gas delivery system, offers an ideal 360° solution. The combination of Miller and Afrox equipment and quality delivers advanced technology, first-class consumables and high purity shielding gases directly to where they are used, eliminating the need to return to the power source to make parameter adjustments or to manage numerous shielding gas cylinders around the point of work. This provides optimum productivity when welding.

'Don't walk, weld' is the key Miller phase used to describe the benefits of ArcReach. This points to the time saving and safety advantages that result from removing the need for welders to walk to and from the power source and their welding stations.

ArcReach systems are powered by the extraordinarily robust XMT 350 FieldPro with Polarity Reversing technology, which includes Auto-line that auto adjusts to any input voltage from 208 to 575 V. The same power source can be used for all the different ArcReach combinations described above. Originally launched in the early '90s, the Miller XMT power source technology is constantly improved and updated, and the power sources are well known for their reliability and robustness. The ArcReach technology can also be used with some of the well-known and reliable Miller engine drives, without losing any of the high-end control capability.

Afrox's GasReach solution uses its Multi-User Pressure Panel (MUPP) with eight outlet valves close to the welders to avoid having to transport heavy gas cylinders to high and difficult to reach places.

The FieldPro range of equipment enables welders to access and switch between different welding processes without having to leave the workstation. Weld don't Walk!

The Afrox MI Team has been using its 360° Application Solutions Programme to solve real customer problems, thereby adding value to customers for a long time. A survey of the customer site provides valuable information to create a proposition for solving a problem or increasing profitability, and this is followed by implementation of the solution and ongoing customer support.

The Miller ArcReach and Afrox GasReach combination offers new and unique opportunities to improve welding profitability and safety in a wide range of industries, taking modern welding technology to levels and places not previously imagined.

www.afrox.co.za

Air Liquide and Oerlikon strike new partnership

African Fusion talks to Air Liquide's Hard Goods Manager, Willie Burger, about an exciting partnership that has been struck between Air Liquide in South Africa and Oerlikon for the local distribution, supply and support of the premium Oerlikon consumables and welding equipment.

"Whilst we already offer a full range of consumables and hard goods, from our in-house Ultra Arc wire brands to our Gemini electrodes, and have existing partnerships with welding equipment OEMs for the supply of premium equipment and consumables, our latest partnership with Oerlikon offers us an alternative premium option," begins Burger.

"We can offer Oerlikon products at highly competitive prices, particularly to fabricators who are already using our gases and other products," he continues.

"We see Oerlikon as an interallied complement to our gas offering, particularly with respect to flux cored welding wires. The brand fits perfectly into our total welding service offering, positioning Air Liquide to meet all the welding needs of our clients on all levels. We are therefore offering a full range of Oerlikon welding consumables and equipment."

"In spite of the many global ownership and local distributorship changes that have taken place over the years, the Oerlikon name still carries weight in the South African market," Burger tells _African Fusion_. "The Oerlikon welding consumables that we offer, however, are the latest formulations coming out of Europe rather than the limited range that used to be manufactured here in South Africa," he adds.

Burger acknowledges that the niche premium brand appeals to discerning customers with historical preferences towards Oerlikon. "There are still a lot of people in South Africa who continue to want to couple the Oerlikon brand with Air Liquide's ArcalTM new generation gas offer. Certain consumables such as Oerlikon's Fluxofil 14 HD and the Fluxofil 19 HD seamless flux cored wires offer exceptional performance, while the OP 121 flux and the OES 2 submerged arc wires are loved and well regarded by many," he says.

Many of Oerlikon's stainless steels and other special alloy products also have an excellent reputation in South Africa, while every-day electrodes such as Fincord M E6013 and Oerlikon Supercito LH electrodes are still in high demand. "There are still fabricators that will accept nothing less than Oerlikon. We have tried to convince customers to use alternatives, often without success, so it makes total sense to bring the Oerlikon option back into our range," he adds.

Many of Oerlikon's stainless steels – such as the Supranox RS 316L – and other special alloy products still have an excellent reputation in South Africa.

On the machine side, Burger cites the exceptionally rugged welding power sources and the pioneering MIG machines that predate the modern all-digital and networked machines. These have evolved into the modern Oerlikon welding machine range, which retains all of the fundamental reliability while incorporating the latest advanced digital capabilities.

The CITOARC range of MMA and TIG-LIFT units for example, offer exceptional arc control handled by a microcontroller, very low network distortion and they consume very little power. "We are also bringing in the new CITOSTEP range of GMAW machines, which set the standard for MIG and flux-cored welding for light industrial

fabrication, maintenance or repair work," he says, adding that units range from the CITOMIG 210 A machine to CITOSTEP 355C, 425S and 505S synergic units. At the high-end, we are awaiting the CITOPULS III 420 synergic pulse units that offer reliability in harsh conditions with easy portability for on and offsite work and superior arc welding behaviour," he notes.

Burger says that Oerlikon is a high quality brand for those who don't mind paying a little more for a well-engineered and very robust machine. "We are not simply importing stock and selling it, though. This is a market driven exercise. We are exploring the interest that is out there and building the range depending on customer preferences and requirements. When clients want particular consumables or machines, we are more than happy to bring these in specifically for them, and thus expanding the range. That way, we hope to arrive at ideal stocking levels that match local needs. We are willing to supply anything that Oerlikon makes, however," Burger assures.

He emphasises that existing customers who are already using Air Liquide's shielding gas range have the added advantages of being able to match it to a machine and a consumable. "For Oerlikon 14 HD flux cored wires, for example, an M21 gas mix is recommended, which is an argon/CO_2 gas mixture with a CO_2 content of between 15% and 25%. We have two such mixes, ARCALTM Force and INARC 25, and we are actively encouraging people to partner our New Generation gas range with the Oerlikon brand.

"This further rationalises the attractiveness, cost effectiveness and quality of the premium basket of welding products and solutions Air Liquide is able to offer clients in South Africa," Burger concludes.

www.airliquide.com/south-africa

Oerlikon OP 121 flux and the OES 2 submerged arc wires are also loved and well regarded by many fabricators.

Smart orbital welding station ultra-high purity welding

To cope with the rising modern needs of semi-conductor manufacturing facilities across the globe, along with new pharmaceutical developments being developed to produce the huge number of vaccines for the fight against COVID 19, Polysoude has launched Smart Welding Station P3 UHP (ultra-high purity).

In the field of semiconductor production, extended tube networks are needed to supply clean room installations with ultra-pure gases and liquids, to keep the atmosphere inert, for etching and rinsing.

The preparation of pharmaceuticals depends on steam and germ-free water for sterilisation, diluting and injection purposes. The high-quality tubes for the network assembly are usually connected by welded joints, which must meet extremely stringent surface finishing standards.

Cleanroom equipment manufacturers and suppliers of related components such as tubes, valves and fittings produce these welds in their workshops, whereas cleanroom builders must perform the welds on site. The required joint quality, however, can only be met if all of the welding is done under clean room conditions.

The ultimate goal of Polysoude's P3 UHP concept is exclusively for these cleanrooms. The Smart Welding Station P3 UHP is designed with welding heads of the type UHP 500 or UHP 625. These orbital TIG welding heads produce joints of unrivalled quality without cracks, pores and roughness.

Closed chambers provide perfect gas protection to avoid heat tint of the tubes and they reduce particle emission to maintain the cleanroom's pure atmosphere. The gas cooled UHP type welding heads allow autogenous welding of thin-walled tubes with diameters of between 1.6 and 6.35 mm. As precision welds require precision adjustment, the welding current can be programmed in steps of 0.10 A.

With a weight of only 17 kg the P3 UHP power source is the lightest automatic welding station on the market and can be carried without hoisting equipment, which is comfortable in the workshop but especially advantageous if used on site.

Polysoude's Smart Welding Station P3 UHP systems with closed-chamber welding heads are designed for ultra-high purity orbital welding of tubes and fittings.

The Smart Welding Station P3 UHP is ready for Smart Factory application; it interfaces perfectly with the Industry 4.0 process and the related OPC-UA protocol. Together with the wide range of available accessories, the Smart Welding Station P3 UHP can deliver unrivalled tube connection quality, which meets or exceeds even the most stringent specifications, easing the demands on cleanroom operators.

www.polysoude.com

Your challenge is to JOIN materials made of metal. You know how to weld constructions for bridges, machines and power plants. In your job you do not need "a" solution, YOU DESERVE the best. Our offering includes a unique portfolio of welding application services, high end welding consumables, accessories and welding machines – we are your Full Welding Solution Provider.

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voestalpine Böhler Welding
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ONE STEP AHEAD.

Barnes Fencing enhances operational efficiencies with SYSPRO

Barnes Group, a local manufacturer and distributor of fencing, steel and galvanised products for the construction, mining, agriculture and hardware industries in South Africa and abroad, has successfully consolidated its production and enhanced logistics efficiencies by adopting SYSPRO ERP solutions for metal fabrication industries.

SYSPRO 8 offers better than ever flexibility to best suit a company's needs and budget, on-premise or in the cloud.

Barnes Fencing Industries is a principal manufacturer of steel products, including, wire and fencing for the construction, mining, agricultural and hardware industries. Established in 1993, this multifaceted producer services a large network of clients in South Africa and abroad.

The Group found itself in need of a fully integrated Enterprise Resource Planning (ERP) solution to consolidate its production activities and enhance operational efficiencies. After an exhaustive due diligence process, SYSPRO was selected based on its ability to assist with its change management efforts.

The Barnes Group made the transition from Pastel to SYSPRO in 2014 and has since migrated most of its subsidiaries to SYSPRO. The company is currently running SYSPRO 8 and the migration of its Botswana operation is under way.

By implementing SYSPRO, Barnes Fencing has been able to consolidate production activities at its various facilities as well as co-ordinate the logistics of transporting considerable volumes over a wide area. Based in Johannesburg, the company also has operations in Botswana and Namibia.

Current demand in the market has necessitated the need to split orders according to available stock at hand. As a total solution provider which prioritises customer service, Barnes Fencing endeavours to deliver according to the material it has available, ensuring customer stock levels are replenished as quickly as possible.

Ronnie Baijan, financial manager of Barnes Fencing, says: "We needed to optimise vehicle load and route planning to improve fleet turnaround while remaining efficient. SYSPRO has helped us contain distribution costs such as fuel through optimal planning of routes and loads."

With SYSPRO 8, Baijan says there has been a noticeable improvement in the way the business is run. "It's a lot more streamlined," he says. "Having one totally integrated system has enabled us to significantly improve our operational efficiencies as we have a holistic view of all facets of the business."

The ability to connect to SYSPRO remotely was also a substantial benefit during the lockdown imposed to contain the COVID-19 pandemic, when most of the management team was working offsite.

Commenting on the upgrade to SYSPRO 8, Baijan says it was a well planned and executed implementation. "Both our internal team and the SYSPRO consultants maintained a positive outlook and contributed directly to the outcome. It's great knowing that we had SYSPRO's support every step of the way," he says.

SYSPRO is a leading, global Enterprise Resource Planning (ERP) software provider, specialising in key manufacturing and distribution industries. The company's industry-built solutions and services are designed to make things possible.

Industry-specific ERP solutions empower customers to take the next step – whether it is expanding into new territories, adding new product lines, transforming business processes, or driving innovation. Through ERP software, customers gain access to solutions, processes and tools to assist in the management of data for key business insights and informed decision making. Our solutions are scalable and can be deployed in the cloud, on-premise or both: and accessed via the web on any device to provide customers with choice and flexibility.

With a strong commitment to channel partner growth, SYSPRO customers are backed by a team of global experts that drive maximum value from its IT systems and business solutions. Committed to addressing the unique needs of customers, the company's solutions enable clients to adapt easily and remain resilient.

Its ERP solutions are evolving in line with industry trends and leverage emerging technologies that enable partners and customers to secure a digital future and to gain a competitive advantage.

www.syspro.com

SYSPRO's ERP systems of today need to be immediate and mobile, much like social media platforms.

Pipeline welding solutions for high quality and high productivity

On Wednesday October 14, voestAlpine Böhler Welding's global product manager for full welding solutions, Francesco Ciccomascolo, presented the company's new pipeline welding solutions, which are soon to be rolled out across Africa and the Middle East. *African Fusion* reports.

In the pipeline industry, perfect pipeline girth welds with consistent mechanical properties paired with high productivity and low repair rates are key priorities. Böhler Welding's latest GMAW/FCAW orbital welding solutions, which guarantee repeatable high quality welds with reduced downtime, can bring these benefits to cost-sensitive pipeline contractors, begins Ciccomascolo.

The new solutions minimise repair rates, thanks to the fine-tuning of the high quality diamondspark flux cored wires; the manipulation and wire feeding precision offered by Böhler Welding's pipeRunner orbital welding system; and the stable electric arc performance of the TERRA 400 PRM welding power source.

Ciccomascolo says that Böhler Welding's full welding solution is, for example, ideal for pipeline contractors that want to introduce mechanisation in their welding process within a limited budget. Key benefits of the solution include easy installation and user friendly operation, while narrow gap preparations, site bevelling machines and internal pipe clamping systems are all unnecessary.

Bohler Welding's new pipeRunner is a state-of-the-art programmable mechanised GMAW/FCAW orbital system designed for girth welding of pipelines and process piping.

Manual root and hot pass: mechanised fill and cap runs

At the start of the solution is the use of the TERRA 400 PRM power source for manually welding the root and hot pass. This can be done with SMAW electrodes or by completing a manual GTAW root. Once these two passes are completed, however, the flux-cored process is used for the fill and cap weld passes, which are laid down using Bohler's pipeRunner orbital bug and the diamondspark range of flux-cored wires for pipeline welding.

Trial welds on Grade API 5L X 70 pipe with a diameter of 910 mm and a wall thickness of 15,0 mm were successfully completed with five layers. The root consumable used was the FOX CEL (E6010), Bohler's cellulose electrode designed for vertical-down welding of pipelines. This electrode is especially recommended for root run welding and offers good deposition efficiency and speed economy, particularly when compared to vertical-up welding. It also offers excellent gap bridging characteristics, and outstanding impact strength values.

The hot pass was completed using SMAW, using the FOX CEL 80-P (E8010-P1). This cellulosic electrode meets the strength requirement of the API 5L X70 pipe and was designed for vertical-down welding of high strength pipeline materials.

For the fill and capping passes, the diamonspark X70 RC-Pipe (E91T1-K2M-JH4) consumable was used with the weld metal being deposited using a pipeRunner moving vertically up from the 6:00 o'clock to 12:00 o'clock positions in the clockwise and counter clockwise directions of the pipe. A seamless rutile nickel-manganese alloyed flux-cored wire, the X70 RC-Pipe is the perfect match for this pipe material and also ideal for multilayer welding of carbon, carbon-manganese steels and high strength steels with Ar-CO_2 shielding gas, typically M21.

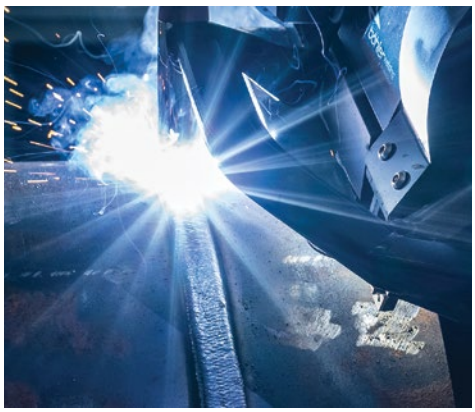
Featuring excellent weldability in all positions and giving an excellent bead appearance with very low spatter losses, the slag produced is also fast freezing and easy to remove. The exceptional mechanical properties of this wire, particularly the low temperatures toughness values, and the low diffusible hydrogen content produced in the weld metal make this consumable especially suitable for pipeline applications.

This procedure enabled a defect-free, high quality joint with an excellent bead appearance to be completed in five layers with outstanding productivity results. Compared to a comparative joint completed using a full cellulosic SMAW procedure, the use of pipeRunner with the diamonspark flux-cored wire reduced arc time by 51% and total welding time, including fit-up, by 66%, while net savings in terms of the mass of the consumables deposited amounted to 46%.

Terra 400 PRM Pipeline

The Terra 400 PRM pipeline welding power source is a robust and reliable three-phase, new-generation, multi-process inverter designed to suit the needs of orbital pipeline welding while also capable of root and hot pass runs in manual or semi-automatic welding mode. The 400 PRM is equipped with a special display to manage all the

Together with the Terra 400 PRM pipeline welding power source, the pipeRunner enables high productivity pipe welding, particularly when using Böhler's diamondspark flux-cored welding wires for mechanised fill and cap runs.



A view of the clean weaved capping layer of a pipe weld completed using pipeRunner.

welding processes involved, and an RC 100 MP remote control specifically designed for pipeline use.

The compact and robust design of Böhler Welding's Terra welding machines makes it possible to use them in a variety of working environments, even in confined spaces. Suitable for MMA, dc TIG and GMAW/flux-cored processes, the machines deliver power in the 150 to 500 A range. The machines are built to cope with heavy loading and harsh environments while guaranteeing accurate and consistent welding parameters.

pipeRunner

Bohler Welding's new pipeRunner is a programmable mechanised GMAW/FCAW orbital system designed for girth welding of pipelines and process piping. This is a state-of-the-art in-house Böhler Welding system that is designed from premium components, mostly manufactured in Germany and chosen to optimise system performance and reliability.

An intelligent intuitive and logical arrangement of all operating elements such as the welding torch, positioner, spool-holder, release lever, circumferential band, etc, makes setting up this system easy and quick. With all the electronics incorporated, the system still weighs only 14 kg, making pipeRunner one of the lightest welding bugs on the market. Modern dc brushless electric motors are used to ensure accurate and consistent travel speeds and high reliability, and the modular design approach lends itself to possible upgrades.

The system was designed with vertical up FCAW welding in mind, but vertical down welding using GMAW is also possible. The device can easily be switched between clockwise (CW) and counter clockwise (CCW) welding around the pipe and the user friendly and comprehensive remote control gives the operator access to all manipulation functions using one hand.

With respect to programming, proprietary software is already included, which is compatible with all standard PCs, and an optional heavy duty tablet is also available. Welding parameters and sequences for up to 11 different passes can be programmed.

In terms of ergonomics, optimised weight distribution makes the unit particularly easy to handle compared to conventional bugs. A 4-handle aluminium spaceframe makes for easy lifting, comfortable transportation and handling in any position. The adjustable welding torch is mounted on the upper part of the frame and the wire feed unit also works as an integrated pedestal on the opposite part of the frame, assuring a comfortable, stable operating position. The system comes with a high quality box and suitcase to make it easy to transport to and from the site.

diamondspark seamless flux cored wires

The seamless design of Bohler Welding's diamondspark flux-cored wires ensures low diffusible hydrogen content with no moisture pick up during storage and handling, reducing the risk of hydrogen delayed cracking and wormholes. The diamondspark X RC Pipe product range is copper coated, which gives excellent current transfer and reduced contact tip wear. These wires are known for trouble-free feeding, which further increases arc time. The pipeline-optimised flux recipe guarantees a thick slag to support the molten weld pool when travelling up, but the slag is easily detached.

Pipeline-dedicated wire formulas further improve the weld metal mechanical properties, keeping high toughness while delivering high productivity. diamondspark X RC Pipes are suitable for sour service and, using the diamondspark X70 RC-Pipe (N), are NACE compliant up to the X70 Grades, which means they can be used for pipe materials exposed to H_2S in oil and gas production environments.

For voestalpine Böhler Welding, being a full welding solutions provider means acting as a partner for pipeline contractors through the weldTECH Application Services, which include a team of welding engineers experienced in pipeline construction, Francesco Ciccomascolo concludes.

Scan the QR to see voestAlpine Bohler Welding's pipeRunner in action

Horizontal torch movement	65 mm
Vertical torch movement	30 mm
Oscillating width	0-60 mm
Torch head inclination	±25°
Oscillation speed	0-350 cm/min)
Travel speed	0-1.6 m/min
Wire diameter	1.0-1.6 mm
Oscillation weld time	Individually adjustable
Weight	14 kg (excl spool)
Dimensions	480×400×260 mm
Maximum wire feed speed	19 m/min
Maximum welding current	300 A (100% (CO_2)

Böhler Welding pipeRunner specifications.

Cosmo Academy: local skills for local industry

African Fusion talks to Emma Britz, head of training for the Cosmo Training Academy, about the Academy's evolving training offering, all built around meeting local industry needs to meet specific skills requirements and preparing local young people for employment.

Initially set up to train welders for the local construction and fabrication industries, the Cosmo Training Academy has evolved into a service driven training centre that provides an array of artisan, development and learnership courses. "We are still true to our roots, though. We offer a QCTO-accredited three year welding apprenticeship course. We currently have two students going through this programme, one in his first year and another in his second. They are both apprentices at Water Skills, a South African specialist company in the design and construction of turnkey water and effluent treatment plants," says the academy's head of training, Emma Britz.

On the welding side, she says that Cosmo has also developed short courses based on the IIW International Welder diplomas, Modules A, B and C for Fillet, Plate and Pipe welding, respectively, coupled with the process specific options preferred by the candidate's employer. "We have compiled our own learner guides for these modules, based on IIW requirements, which involve a two week theoretical component followed by a practical welding component, all of which is done here in Silverton," notes Britz, adding that one of the Academy's local students is currently completing his second IIW diploma.

Recently completed is a contract with Ford to train 18 of its fitters with basic trade skills, which included, Basic Electricity, Basic Pneumatics and Basic Generic Welding. "These artisans are now back at Ford's assembly plant in Silverton having completed these courses in batches of six students over the past few months," Britz tells _African Fusion_.

In response to COVID, she says that the Cosmo Training Academy has also started to offer its learnerships on its online platform. "We offer several full time one-year Learnerships such as Business Administration; End-user Computing and Wholesale and Retail, for example. We now have three learners doing our full-time Health and Safety Level 2 Learnership using the new online platform," she says.

The practical work is done at the Academy itself, but the coursework is being presented online. The host company for this course is Averge Technologies, the turnkey solutions provider of energy, telecommunications, networking, and construction services to industrial clients.

"This course is useful in any construction or fabrication environment. We have now moved over to online presentations with a live tutor delivering the support and leading students through coursework activities. Further practical work takes place here, while the students will go back into the workplace to do the summative assessment at the end of the course," she explains, adding that Cosmo is also reworking several of its IIW, Merseta and Services SETA courses for delivery of the knowledge components via the online platforms.

"Local businesses tend to send one or two of their people to us, for specific practical welding courses or for product training on the welding machines or cutting equipment they have bought from Cosmo Industrial. Then our own specialists will train the candidates or welders on the equipment they will be using. This ensures that, when customers buy a machine from the Cosmo Group, they are enabled to get the best possible value for their purchase," Britz explains.

"We are often asked to develop and deliver specific and customised training courses for industries and businesses finding themselves needing to upskill their people to meet immediate needs. Also, though, a lot of parents approach us on behalf of their children who, when looking for work, often find they don't have the skills that are needed. Because we at Cosmo know what industry needs, through the direct contact we have with local industry, we are able to recommend appropriate training and, once completed, we can often approach the companies we work with to consider employing successful students," says Britz.

"Local companies sending people for training are usually eligible for Skills level support and Tax relief, and we are also in a position to help companies to access this support," she adds.

The Cosmo Training Academy now also does legal liability training: First Aid, Firefighting and Health and Safety. "We train people to safely use forklifts and lifting equipment; to work at height on scaffolding; we deliver Occupational Safety Certificates for Welders; and we offer HIV awareness programmes, all to help companies to comply with HSE workplace requirements," she says.

The Academy is now introducing management qualifications, a supervisors techniques course, for example, which is now accredited by Merseta. "Going forward, we are looking to incorporate more soft skills into our offering, such as Customer Service, a course that is now developed and ready to be uploaded as an online offering.

"We strive to meet the needs of our local community, ensuring that the companies around us have suitably skilled people for their continued success, while also contributing to reducing unemployment and creating better and more sustainable jobs," Britz concludes.

Cosmo has developed short courses based on the IIW International Welder diplomas, Modules A, B and C for Fillet, Plate and Pipe welding.

cosmotraining.co.za

ArcWorld: Yaskawa's quick-start robotic welding solution

National projects manager for Yaskawa Southern Africa, Sean Low, talks about ArcWorld, a Yaskawa robot welding innovation that offers affordable, compact and very simple to install robotic automation.

Yaskawa Southern Africa is in the process of supplying its first three ArcWorld robot welding systems in South Africa. "The first two of these systems have already been delivered, while the third will be arriving in mid-November and the jigs by mid-December. We will then install the jigs into the cell, set up the communications, do some calibration to match the real jig alignment with the virtual models used for path programming and, within days, these systems will be producing parts," says Yaskawa SA's Sean Low.

The systems have been brought in by the Tier 1 automotive manufacturing supplier, AeroKlas Duys, one of the companies in the supplier zone for Ford in Silverton. "AeroKlas Duys first came to us looking for custom-built robot cells, but immediately saw the benefits of our compact and integrated ArcWorld robot welding systems and ordered three of them," adds Low.

These ArcWorld systems will be used to manufacture the rear bumper step assembly for the new Ford Ranger and Amarok. "They have chosen to couple the systems with SKS welding equipment, the European brand that has been Yaskawa's longstanding equipment partner. They will be using SKS's KF pulse GMAW welding process. All the welding procedures have already been developed and the robot programming done offline – before the jigs have even arrived – by working off 3D CAD models of the jigs using Yaskawa's MotoSim offline programming software," he notes.

ArcWorld systems are designed for quick start-up and high productivity at low investment costs. The concept is a completely integrated and compact solution made to be as easy as possible to deploy. "When a system arrives at a customer's workplace, it is designed to be removed from the container and put onto its wheels on the floor. It can then be quickly moved into position, connected to power and fitted with the welding jigs.

The systems come with built-in jacking bolts that enable the whole cell to be firmly supported above its wheels when in use and, if the customer decides to change the assembly flowline for any reason, the jacks can be raised, the power unplugged and the whole system simply wheeled to its new position on the assembly floor.

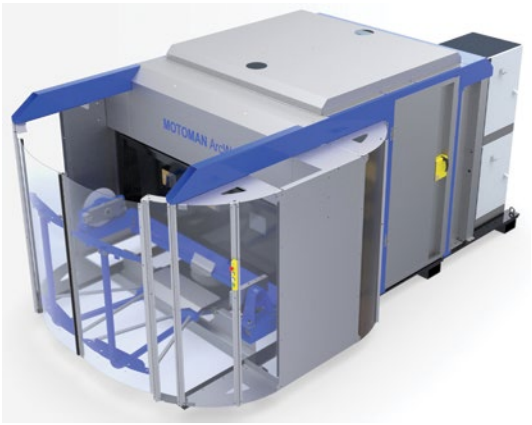
ArcWorld Systems are all built in a common frame with a sheet metal cabin around them. Everything is integrated, interconnected and merged together as a single machine. Systems can have one or two robots, with various positioners such as turntables, head- and tailstocks and a host of others. These are customisable from a catalogue of options to suit the specific fabrication needs, while retaining considerable amounts of flexibility.

ArcWorld's two stations with one robot are ideal for separate work flows, for example, while a model with one station and two robots offers excellent utilisation of floor area – and robot options with 1.4 m or 2.0 m reach are selectable.

The systems being installed at Ford have two robots each and have a total footprint of 2.5 m by 5.0 m. Worktop positioners come in standard configurations with 1.6 m or 2.0 m wide tables and are built to match standard jig mounting configurations.

"While these are used with SKS welding power sources, we can couple ArcWorld robot systems to any welding machine brand, including our own Moto Weld brand. Automotive OEMs often like to retain global consistency, so we are happy to pre-install any brand of equipment into our systems.

"Another big advantage is that, being enclosed cabins built in Europe to EU standards, they come with the required



stringent European safety features, so no additional guards or light curtains are needed to comply with local requirements. All the customer need do is provide a fume extraction point and a power connection and make the shielding gas accessible, which makes installation very rapid and risk free," Low suggests.

"Yaskawa SA has come through challenging COVID times and we are now experiencing a boost in enquiries with a number of new projects going ahead. The pandemic has driven manufacturers to rethink their processes with automation and robotics featuring strongly in reducing health-related risks.

"Coupled to this change, is robot welding training and our training centre is very active. Training for robot operators is essential, so with every one of our systems, we offer a training course to ensure we are growing the skills base of robot operators. The SAIW Robot Welder course is also ongoing to meet the need for operators who can better react to welding related problems.

"By delivering this easy to install, flexible, compact and cost-effective solution, ArcWorld is making it easier than ever to integrate robotics into welding processes," Low concludes. ***arcworld.eu***

Direct torch extraction ensures clean hall air

The VacuFil high-vacuum torch extraction system from KEMPER is in use at Aebi Schmidt Nederland, helping to protect welders and ensure that the air in all areas of the manufacturing hall remains clean.

The quality of the air in the manufacturing hall of the Dutch manufacturer, Aebi Schmidt Nederland, was already at an acceptable level, but as a rule, it tended to be very close to the maximum legal limits. This was clearly not good enough with regard to the health of its employees.

By international comparison, the Netherlands already has one of the lowest workplace exposure limits for production plants. However, the company wanted to improve the air quality in order to push the concentration of hazardous substances even further below the prescribed limit of 1.0 mg/m^3, particularly in the welding shop.

"One focus at Aebi Schmidt is on improving working conditions," says facility manager Steven Koenderink. "Air quality was a central issue here." The company wanted to ban, completely, hazardous substances with lung-damaging, toxic or even carcinogenic effects, such as those associated with the MIG/MAG welding process used to manufacture heavy steel components.

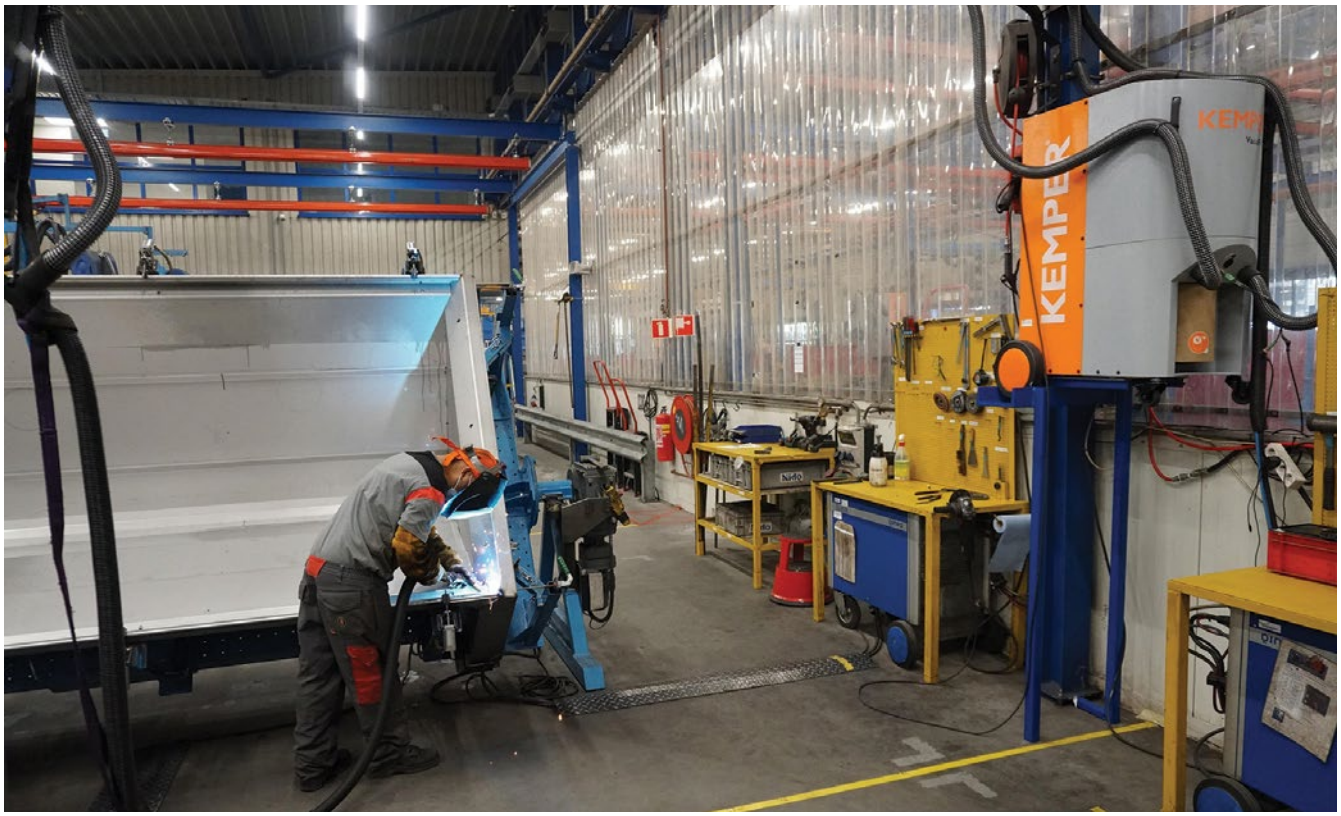
Increased demand in recent years had generated more welding work. The company's development into the world's leading supplier of systems for cleaning and clearing traffic areas as well as maintaining green spaces also brought with it higher protective welding equipment requirements. Aebi Schmidt wanted to continue this legacy with a healthy and satisfied workforce, particularly since employee health is playing an increasingly important role in the competition for the brightest minds.

In the search for a supplier of extraction technology, KEMPER GmbH from neighbouring Germany came up trumps, "Mainly because of the positive test experiences and the comprehensive advice we received in the course of our decision-making process," recalls Koenderink.

To protect automatic welding equipment and operators, KEMPER installed a push/pull general ventilation system in the welding robot gantry, which captures rising welding fume at a height of around 4.0 m above the equipment.

Mobile high-vacuum extraction units for flexible production

The requirements for the system specified the cleanest possible hall air compatible with production needs, that is, the extraction systems for hazardous substances generated during welding were required to perform effectively while maintaining flexibility in production, within a fixed budget.



High-vacuum systems with connected extraction torches capture welding fumes directly at the point of origin while tracking of the source of fume as the welder moves the welding torch.

KEMPER adhered to these specifications from the outset and put together a customised protective welding equipment concept for Aebi Schmidt. To allow for possible adjustments to the welding shop layout, the manufacturer decided on mobile extraction units. The German company recommended a welding fume extraction solution using high-vacuum systems with connected extraction torches. Benefits of this solution include the immediate capture of welding fumes directly at the point of origin; and fume source tracking because the extraction point moves with the welder's torch.

As these systems continue to evolve, they are becoming more popular – but their reputation for being difficult to use still persists. Despite initial scepticism, Aebi Schmidt agreed to a comprehensive test. In just a few days during which the VacuFil 250 system had extracted the welding fumes exceptionally effectively, the manufacturer was convinced of its effectiveness, with the result that Aebi Schmidt ordered several units for deployment.

13 VacuFil-250 units for 26 workplaces

KEMPER delivered a total of 13 VacuFil 250 high-vacuum systems to the Dutch company. Because they can each be coupled to two extraction torches, Aebi Schmidt employees are able to weld safely at 26 workstations at the same time. The systems are matched to each other in terms of extraction capacity, so that the welding fumes are optimally captured without destroying the protective shielding gas envelope.

Unlike other extraction systems, such as extraction hoods on adjustable arms, extraction is integrated into the torch and is therefore moved by the welder. This allows for reliable extraction of the hazardous substances at the point of origin via a nozzle integrated into the torch.

This means Aebi Schmidt achieves high production capacity as well as clean hall air for its employees. Even at high welding intensity, the VacuFil-250 units extract high levels of smoke and dust in continuous operation with a maximum output of 250 m^3/h – without any loss of quality, even when two employees are welding at the same time.

Thanks to the particularly high filter quality provided by the special KemTex® ePTFE filter cartridges with surface filtration, the systems permanently filter out more than 99.9% of captured smoke particles. Even particles smaller than 0.1 µm cannot escape back into the environment after extraction.

In addition, automatic filter cleaning avoids welders having to interrupt their work to deal with saturated filters. Instead, the hazardous substances enter a special disposable container incorporated into the systems, which isolates the extracted dust, enabling contamination-free disposal and container replacement.

Additional general ventilation system for the welding robots

When it comes to protecting welding equipment, Aebi Schmidt, in cooperation with KEMPER, identified a general ventilation system to capture welding fumes during automated welding processes, while also provide protection for operators and employees. KEMPER installed a push/pull general ventilation system in the welding robot gantry, which captures rising welding fumes at a height of around 4.0 m above the equipment.

On one side, special extraction openings capture the hazardous substances. A customised ducting system then transports them to the central WeldFil filter system installed outside the hall.

After separating the particles that are hazardous to health, the system returns the purified air to the outlets. Because the outlets are positioned a few metres away and in-line with the extraction ducts, a constant horizontal air flow is created, which channels the welding fumes rising towards extraction ducts. In addition, displacement outlets on the floor support the natural buoyancy of the welding fumes.

Recirculation of the cleaned and already heated air also makes this principle energy efficient. To further improve air quality, a two-way distributor allows some of the air to be discharged to the outside while fresh air from outside is being introduced.

Thanks to the comprehensive protective welding equipment measures, the air quality in the manufacturing hall at Aebi Schmidt has improved significantly: "The air pollution control technology at our workplaces and in the robot gantry exceeds our expectations," says Koenderink.

"Our welders are very happy with the improved air quality. We are always amazed at how many harmful hazardous substances the systems actually capture when we change the dust collection containers." As a result, he says, welder awareness of their own health has increased immensely. And after an initial changeover to the new systems, even the handling of the extraction torches is now very easy for the welders.

www.kemper.eu

Extraction torches and torch parameters

The closer to the point of origin the better: This is the unanimous advice of protective welding equipment experts for effective welding fume extraction. This is because if fume is extracted directly at the point of origin, it cannot enter the welder's breathing zone or escape further into the hall.

For this reason, extraction torches are superior to other systems because the collection elements are closest to the point of origin. But there's a catch! The extraction capacity must be individually designed for each torch so as not to interfere with the welding process. This depends on the various parameters of different torches.

With this in mind and in order to create more transparency for the parameters relevant for torch extraction, the German Welding Society (DVS) has recently launched an appeal for torch manufacturers to make their data freely available on a platform created specifically for this purpose.

With regard to this data, KEMPER had already done preliminary work in recent years. On its own measuring stand, the manufacturer has measured more than 100 torch types from different manufacturers, thus establishing a unique database. This is an integral part of the VacuFil-i high-vacuum product series from KEMPER. At the push of a button, these units provide the correct extraction capacity for the torch in use and automatically adjust this capacity continuously during operation.

www.kemper.eu

Welding innovation plus technology for better quality and productivity

African Fusion talks to the technical director of Arcstrike, Sean Blake, about an innovative and sophisticated polishing, pickling, passivating and marking solution for stainless steel.

Nitty Gritty pickling and passivating machines use inverter-based power sources under sophisticated electronic control to create an electrochemical cell between a stainless steel surface such as a weld and an application pad coated in one of the company's chemical solutions.

ArcStrike is a new company founded on the principle of introducing innovative technology to the local welding market, with a view to making a difference with respect to the quality and productivity being achieved by fabricators and manufacturers. An example of a technology being introduced into South Africa by ArcStrike is the Nitty Gritty range of sophisticated pickling and passivating equipment for stainless steel welds and surfaces.

Traditionally, stainless steel welds are pickled using very strong pickling acids such as hydrofluoric acid (HF) and nitric acid for passivating. These chemicals present significant handling and safety concerns. The Nitty Gritty alternative couples electrochemical cleaning machines with a range of chemical solutions with safer acidity (pH) levels carefully matched to the process and application.

These Italian machines use inverter-based power sources under sophisticated electronic control to create an electrochemical cell between a stainless steel surface such as a weld and an application pad coated in one of the company's chemical solutions. In the simplest systems, the sponge or cloth pad is dipped into the solution before being wiped over the treatment surface. The more sophisticated Nitty Gritty versions, however, use a pump to apply the chemical solutions to the applicator, so that dipping is not required. The electrically charged pad is continuously wiped over the treatment area of the weld or stainless surface.

During pickling, the electrochemical current passing between the plate and the brush breaks down the oxide layer on the stainless steel surface, effectively removing it. When re-passivating to build up the oxide layer to the thickness required to transfer optimum corrosion resistance to the stainless steel below, passivating pastes are used with oxidising acids such a nitric or citric acid and, according to Nitty-Gritty, phosphoric acid also enhances the natural process of passivation.

The principle is not new and transformer-based and welding machine-based versions are available, but these machines are all dipping based and use the simplest of power sources to provide the electrochemical current. Welding machines tend to be designed to strike an arc, which can easily happen when being used for cleaning, resulting in micro pits, which are potential sites for pitting corrosion. Electronic control built into Nitty Gritty inverters prevents this. Accurate current control avoids heat generation, which will cause increased consumption of electrochemical solutions and wear on the cleaning pads. Energy consumption is also significantly improved by using inverter technology, compared to transformer based alternatives.

A key aim of adopting electrochemical cleaning is also to improve safety. The solutions used are all more dilute and therefore safer than traditional HF acid for pickling and nitric acid passivating solutions.

And while slightly stronger electrochemical solutions are used with Nitty Gritty equipment for polishing and cleaning heavy weld oxide layers, for lighter oxide layers a neutral solution is available that is ideal for use in food and pharmaceutical applications, where strongly acidic solutions will react adversely with the nutrients or pharmaceuticals of the end products.

Nitty Gritty offers a simple chemical colour test to determine the grade of the stainless steel being treated, so that the correct treating chemicals can always be identified. A passive layer tester is also available to ensure optimum corrosion resistance has been obtained.

In addition to cleaning, these machines can permanently mark stainless steel surfaces with logos or product numbers using a selective electroplating or micro-etching process.

Other products in the Nitty-Gritty range include Pickle & Clean and Deox & FIT, which are alternatives to pickling pastes and gels that are ideally suited to the food and medical industries where aggressive chemicals may not be used. A tape or a wipe is first used to clean the area being treated before a neutralising solution is applied to the cleaned area.

"We are striving to help fabricators to improve their quality and productivity and to reduce their welding costs," says Blake "So we are on the hunt for technologies, clients and services that will achieve this.

"We also wish to improve the lives of welding personnel, by introducing cost-effective services to help welders, welding co-ordinators and welding inspectors to achieve their professional goals," Blake concludes.

www.arcstrike.co.za

The Nitty Gritty range of sophisticated pickling and passivating equipment for stainless steel welds and surfaces.

AWC widens distribution of Böhler Welding range

Head of AWC, Gerhard van Wyk, talks about advancing the availability of the Böhler Welding product range in South Africa and across the African continent.

While owned by Afrox, AWC is a totally separate entity that is solely responsible for the Böhler Welding product range in South Africa. Officially registered as the African Welding Company, AWC now operates as the principal distributor for Böhler Welding in South Africa and in selected sub-Saharan Africa countries, with direct links to Böhler's global networks and all of its manufacturing facilities around the world.

Böhler Welding has taken the strategic decision to invest in growing its presence on the African continent. This is evident from its investment in the joint venture with Afrox at the Brits consumable factory, in which Böhler now has the controlling share and full management responsibility. This shows strategic intent for the future of its consumable range into Africa.

The goodwill generated by this deal sparked the opportunity to form AWC as a new distribution vehicle exclusively dedicated to the Böhler Welding product range. A key advantage is that AWC has access to Afrox's warehousing and financial strengths and to its network of local distribution outlets.

AWC operates as a competitor to Afrox with respect to customers, pricing sales and marketing. "We go to market with a world-class Böhler product that can compete against all other quality brands of welding consumables and equipment, including Afrox," says the head of AWC, Gerhard van Wyk.

AWC has established formal commercial arrangements to use the facilities at 11 local Afrox outlets to house Böhler products, while two more will soon be finalised. These products will be made available for click-and-collect or direct delivery orders placed via AWC's national call centre or online platform. This gives AWC a nationwide network for delivery and collection services, a national footprint and a presence in all major centres.

In addition, there are several Afrox/Linde outlets across Africa that are being approached to become part of an extended AWC network.

With a current focus on Böhler- and UTP-branded consumables being used by existing Böhler customers across the region, AWC has a growth agenda and is systematically expanding the currently available range. Well-known for its premium electrodes and consumables, Böhler has recently moved into manufacturing more affordable general-purpose products, such as its Böhler AWS E6013 General Purpose MMA Electrodes and the low hydrogen Böhler AWS E7018 Electrodes. These are very competitively priced and ideal for routine every-day use.

Niche CrMo and stainless consumables for the oil and gas, power and nuclear industries are also readily available, along with the cost-effective ECOspark solid wires for GMAW welding and Böhler E71T1 flux cored wires. On the other end of the spectrum, AWC can also supply Böhler Welding's premium Diamondspark range of seamless cored wires for the most demanding robotic and mechanised applications.

"We have the advantage of being able to source products from factories around the world. The UTP high-end products and solutions tend to be manufactured in Germany, but we can also access more economical products from Asia, while the Brits factory offers an increasingly important localisation opportunity for products manufactured in Africa," Van Wyk says.

Globally Böhler services key international construction and fabrication customers with know-how and holistic solutions that readily apply for similar needs anywhere in the world. "AWC can funnel this global expertise to our local clients, helping them to raise their quality and productivity," he adds.

"Locally, we are a small team of competent and dedicated people, supported by Böhler Welding, with access to some of the world's highest quality welding products and a wealth of technical support from all over the world. In addition, we have an extensive network to deliver directly to customers, without having to rely solely on third party distributors.

"With these relationships in place, we can compete with the best in the world," Van Wyk concludes.

www.africanweldingco.co.za

Böhler is well known for its premium electrodes and consumables, but has also recently moved into manufacturing more affordable general-purpose products.

First Cut and GSI confirm merger of interests

First Cut, a leading South African provider of cutting, welding and grinding consumables and equipment, has entered into a merger of interests with respected industry stalwart Gas Safety International (GSI), which provides certified gas safety training and quality gas equipment to a wide range of sectors.

The agreement becomes effective from 01 November 2021, and will see these two world-class companies – which together have over a century of industry experience – collaborating closely. This opens up pivotal expertise and opportunities across both businesses; as well as leveraging mutual access to customers, suppliers, market sectors and geographic areas.

MD of First Cut, Andrew Poole, explains: "By joining forces with GSI, we can strengthen and expand our offering even further. Having been in business for some 65 years, First Cut has long been acknowledged as a leading South African distributor of cutting and grinding consumables and equipment – and we have more recently extended our expertise to include a welding division."

"GSI, as a premier gas safety products and training company, is an excellent, synergistic service provider with which to join forces. The new relationship will strengthen our service offering, providing our customers with even more choice of products and solutions – as well as access to the highly-respected training experience and expertise offered by GSI's MD, Peter Rohlssen, with regards to gas safety training, consulting and auditing.

In addition, welding safety training, consulting and risk auditing will be offered by GSI's Welding Engineer Robert Lawrence," Poole explains.

Rohlssen continues: "I have been very pleased that through this agreement with First Cut, we have achieved a true 'meeting of minds'. We share the same company values of honesty, integrity and reliability, which have given rise to a tremendous inter-brand chemistry. The trust between both companies is also a strongly cohesive force, which will enhance our businesses and inter-company synergies even further," he says.

"I will remain at the helm of GSI, which will continue as a separate brand, entity and team 'as is'; while working collaboratively with First Cut to expand and explore mutually strategic and advantageous opportunities. This includes ensuring that through this merger, the legacy I have built up since founding GSI back in 1985 will continue – so that the enormous knowledge and experience will be preserved and our client base will also continue to be serviced."

Rohlssen notes that First Cut has a very strong reputation as a respected and trusted brand with a long-standing client base and expertise; as well as an enviable portfolio of international suppliers, a wide national footprint and well-developed infrastructure.

"All this represents huge value for GSI, as it expands our geographic footprint and service offering enormously," he says.

Poole adds: "This merger of interests will provide First Cut and our clients with access to GSI's coaching, training, guidance and risk auditing services. Furthermore, our recently established welding division will also be strengthened – not only through Peter's expertise, but that of his team. The whole strategy fits together beautifully!

"We will be combining a portfolio of excellent international suppliers, and this will allow us to boost our joint offering: providing our customers with an even wider choice, and importantly, with our combined ability to deliver the appropriate solution for their applications and requirements."

GSi MD, Peter Rohlssen and the MD of First Cut, Andrew Poole.

Both Poole and Rohlssen are adamant that stringent safety is critical when it comes to working with gas – irrespective of the sector. "We improve gas safety through our strict adherence to compliance regulations; as well as providing clients with the benefit of our significant industry experience via our gas safety training and risk audits," explains Rohlssen. "Gas safety standards must be applied in any sector where gas is used, including welding. It should however be noted that the applications are certainly broader than the industrial sphere alone: including the mining, medical, pharmaceutical, agricultural and domestic markets.

As such, GSI adheres to stringent compliance standards and conformance in line with both South African and international standards at all times. Its training and product portfolio is also fully aligned to SANS 10238, and suppliers comply with European standards, many of which are included in SANS 10238.

"In addition, our gas safety training material is accredited by the Engineering Council of South Africa (ECSA). We are the only company locally to have achieved this, and it means that engineers who attend our courses can earn their requisite continuing professional development (CPD) points," he advises.

"This again demonstrates how First Cut's and GSI's thinking is aligned. From First Cut's perspective, we too adhere firmly to strict quality and safety regulatory compliance. Safety is the 'North Star' or 'guiding light' – as well as the key differentiator for our two companies. It is what defines and directs us: we share a mutual dedication in this regard, and will not ever compromise on it.

"We look forward to working closely, growing our mutual offering to clients, and going from strength to strength," Poole concludes.

First cut and GSI

Having produced its first band saw blade in 1956, First Cut now has 65 years of industry experience as a leading South African distributor of cutting, welding and grinding consumables and equipment.

The merger with Alexander and Poole in 2001 and the acquisition in 2002 of Band Sawing Services, led to the company expanding into capital equipment. Since then, First Cut's capital equipment division has grown exponentially to specialise in metal cutting, sheet metal processing, CNC bending and punching machines, and tube and pipe processing.

First Cut has also invested substantially in its service programme enabling the company to provide repairs and maintenance services for a wide range of machines, from entry level band saws to state-of-the-art CNC controlled drilling and cutting lines.

In 2021, a new welding division was introduced as an integral part of the fabrication and manufacturing value chain, while the recent merge of interests between gas safety training stalwart GSI, further strengthens this offerings.

Employing some 240 people, First Cut is based in Benrose, Gauteng but has a national footprint and distribution facilities across South Africa.

Metso Outotec opens efficient laser welding unit

Metso Outotec is opening a new laser welding unit, customised for demanding production conditions, at its filtration technology centre in Lappeenranta, Finland. The new laser welding unit will add to the centre's manufacturing capacity and enable the production of higher-quality welded structures in a safer and more environmentally friendly manner. The value of the investment is approximately €1-million.

"Investing in an efficient laser welding unit is one example of our desire to focus on being an industry leader in filtration and other Metso technologies. In Lappeenranta, we produce several types of filters used in demanding industrial applications and the technology centre for solid-liquid separation, which we opened in 2015, serves customers around the world," says Markku Teräsvasara, President of Metso Outotec's Minerals business.

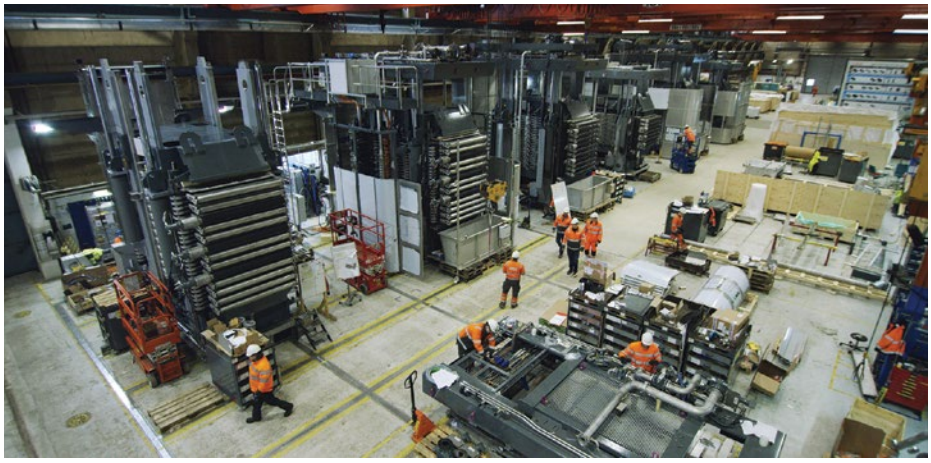
"In addition to Lappeenranta, we provide filtration technology to customers worldwide from Turku and Suzhou in China. Our filtration equipment is used, for example, in the mining, chemical and food industries. All of them require reliable filtration to ensure high quality of their end products," says Jussi Venäläinen, Vice President of Metso Outotec's Filtration Business Line.

"We have a long legacy of filtration expertise - our first filters were made as early as the 1930s in Sala, Sweden. Our selection of filtration technologies is the largest in the field, and their energy, emission, and water efficiency is in a league of its own. Most of the filtration solutions are part of our Planet Positive range of products. Our filters are safe, easy to use, and quick to maintain, and their high level of automation enables continuous optimisation and remote support. We also provide comprehensive filter maintenance, including lifecycle services," says Jussi Venäläinen.

Metso Outotec has carried out more than 14,000 filtration tests and delivered more than 5,000 filters for various applications worldwide. Most of the filters are sold under the Larox® product name along with Metso Outotec corporate branding.

In Finland, industrial filter production began in 1977 in Lappeenranta under Larox Oy. In 2009, it continued under Outotec (Filters) Oy, and, after the Metso Minerals and Outotec merger, the filtration technology centre became a part of Metso Outotec. The Lappeenranta site employs approximately 200 people.

www.mogroup.com



Metso Outotec's new laser welding unit enables the production of higher-quality welded structures for its industrial filter products.

Dekra Industrial receives 7th consecutive NOSCAR award

Dekra Industrial SA has received another NOSCAR safety award and retained its place in the NOSA five-star and the NOSA integrated five star system during the current review period.

"Winning a renowned international safety award is one thing. However, to be the recipient of this award for seven consecutive years is an achievement which speaks volumes about who we are and what we aspire to as a company," says Health Safety and Environment Manager, Carina Kleinhans.

"Our business intention has remained clear: to entrench a safer culture within and outside of the workplace, in line with our parent company Dekra's globally-stated intention to be market leaders by 2025: offering the highest quality non-destructive testing, inspection and advanced technology – coupled with the best service – with safety as our key priority. "The NOSCAR award is bestowed on companies that demonstrate the very highest standard in safety compliance; and Dekra Industrial is proud to be included in these ranks," Kleinhans says.

"Our sincere thanks and congratulations go to the passionate dedication and efforts of Carina and her HSE department – as well as the rest of our management and staff – for the effort they have invested in creating a safety culture within our company, and maintaining HSE compliance of such a high standard," says Johan Gerber, MD of Dekra Industrial.

"The fact that we have achieved RD 0034-compliance – a nuclear safety compliance standard – and are also one of the few NDT companies locally to hold ISO 45001 certification, is clear evidence of our ongoing quest for improvement. In addition, this 7th NOSCAR award proves once again that we 'walk the talk' to the ultimate safety and benefit of our valued staff and clients," Kleinhans concludes.

www.dekrarsa.com

Testing pitting and corrosion with eddy current arrays

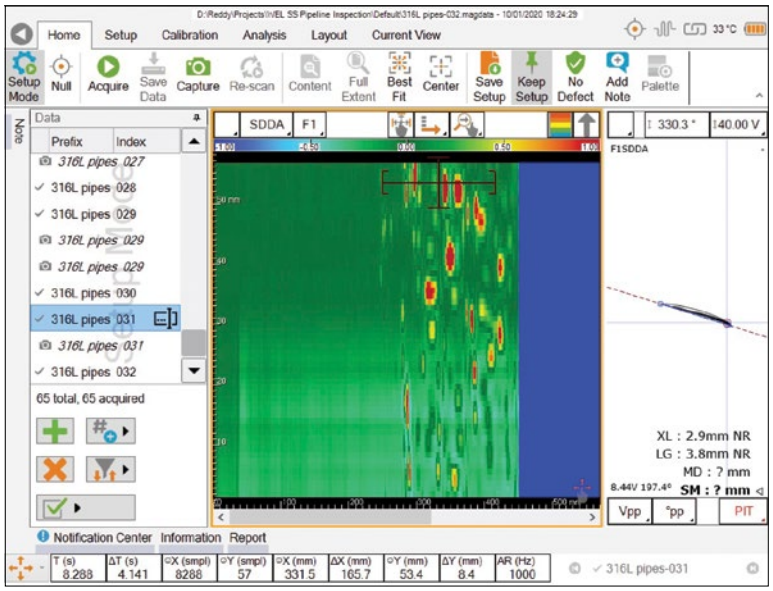
With the advances of technology in the field of eddy current array, corrosion pitting can easily be detected and sized. Grant Meredith, technical manager for inspection company, Applus, in Australia, explains the process for inspection of 316L stainless-steel to detect and size corrosion.

Multiple coil eddy current array testing of a pipe.

The eddy current array inspection technique gives instant and rapid results when scanning large areas of non-ferromagnetic piping. The advantages of using eddy current array testing over conventional surface probe coils is that, in one scan sweep, large areas are scanned and defects in all orientations as well as rounded types can be easily detected with high sensitivity.

To validate the process prior to use, reference samples were manufactured from a section of a 316L stainless steel spool piece. Based on depth sizing for the technique, with due regard to the limitations based on the selected frequency for the inspection of 150 kHz, this enabled accurate measurements of pits of up to 3.5 mm below the surface, which is the depth of penetration limitation and makes deeper measurements inaccurate.

In order to establish a scanning sensitivity, and as a means of sizing corrosion pits, a reference sample was manufactured as per the details in Table 1. The sample was used to establish calibration curves for measurement purposes. Creation of a depth curve is necessary to allow for the sizing of different diameter pits at varying depths. This is based on the volume of material lost at each pit site. Using a range of created calibration depth curves, more accurate sizing using eddy current array technology becomes possible.



An eddy current array corrosion scan showing a 3.0 mm deep XL pit.

The sample and calibration point discontinuities created for this process were manufactured with round bottom holes (RBH). The reference sample has varying diameters as well as depths. A depth curve for each diameter was created to simulate small, medium and large pits. A calibration scan was then done to establish the calibration curves between the measured and real pit sizes. A theoretical curve was created for 3.0 mm pits to allow for the sizing of larger (XL) pits.

With the system calibrated using multiple diameter and depth points, scans were carried out on a corroded pipe sample. As can be seen in the example scan, accurate measurements of pitting corrosion could be recorded.

When analysing a selected pit, the dimensions are taken to measure against calibration curves for SM (small), MD (medium), LG (large) or XL (extra-large) pits. The cursors can be used to measure the dimensions of the pit and the relevant sizing curve can be selected to get the depth measurement from the depth curve.

Eddy current array technology is a quick and easy method for detection and sizing of both isolated and cluster pits, giving good sensitivity to quantifying both size and depth.

www.applus.com/au/en

Examples of surface corrosion on stainless steel piping.

The specifications of the sample manufactured. Note: Round-bottom holes (RBH) are selected as they better represent the cross-sectional shape of isolated pits.

Hole Diameter Ø	Round bottom hole depths					
	10%	20%	40%	60%	80%	100%
1.0 mm @ 90°	0.305 mm	0.61 mm	1.22 mm	1.83 mm	2.44 mm	Through
1.5 mm @ 180°	0.305 mm	0.61 mm	1.22 mm	1.83 mm	2.44 mm	Through
2.0 mm @ 270°	0.305 mm	0.61 mm	1.22 mm	1.83 mm	2.44 mm	Through

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Everyone's talking about it,

BUT WHAT IS ERP?

The Information Technology industry is renowned for acronyms which are often widely used but not fully understood.

ERP, for example, is an acronym for Enterprise Resource Planning. Broadly speaking, it refers to a category of business management software - typically a suite of integrated applications - that organizations use to collect, store, manage, and interpret data from its many business activities.

A good ERP system becomes the central nervous system of a company, continuously sending millions of messages to and from its various parts to ensure the whole is functioning at its peak. It does this by providing an ever updated view of core business processes by coordinating business resources - cash, raw materials, production capacity - with the status of business commitments - orders, purchase orders, and payroll. The applications that make up the system share data across the various departments such as manufacturing, purchasing, sales and accounting.

An ERP system has multiple benefits that help with overall business performance management for any organization - by providing intelligence, visibility, analytics and efficiency across every aspect of a business's supply chain, giving one source of truth, and enabling seamless digitalization as and when new technologies emerge.
There are countless reasons for businesses to adopt an ERP system. Here are the most important:

Reduce costs and save money in the long run. By reducing administrative and operational costs through automated processes, ERP allows users to proactively prevent delays, stoppages, wasted time, resources and expenditure.

Streamline business processes and operations. Because data is available in a centralised location with complete visibility across all functions, decision makers can track processes and accurately determine and maintain optimum inventory levels.

Improved consolidation. Without ERP, many businesses are forced to use different programs in different departments. By using common databases maintained by a database management system ERP eliminates this.

Supply chain visibility and optimisation. A robust ERP system provides a real-time picture of the entire supply chain and connected processes, making it easy to reduce planning cycles and control production scheduling.

Respond faster to market conditions. ERP provides data analysis and reporting that assists businesses to rapidly react to changing market requirements and unforeseen events, then make informed decisions and determine realistic forecasts.

Traceability. ERP has the capacity to track all stock – anywhere along the supply chain - including defects and hazards, down to the smallest levels of individual parts and ingredients to mitigate the risk of recalls.

Improve customer satisfaction, service and relationships. Implementing ERP enables you to keep your promises by producing enough of the right product, at the right price, at the right quality, at the right time.

Digitally transform your business with mobility and flexibility. As technology advances, your ERP system will seamlessly incorporate it and adapt it to your changing needs, whether on premise, in the cloud or even on a mobile App.

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