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Johann Pieterse, MI Technical Manager of Afrox, highlights Afrox's long history of applications development for assisting its customers in implementing complex projects efficiently and safely.

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July-August 2025

FEATURES

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SAIW2.0
from legacy to leadership

I am pleased to say that after 78 years of traditional service, the SAIW is now transforming into a modern, digitalised provider of fit-for-purpose services and support for the welding and inspection industry.

We have now appointed Vicus Burger as the new executive director, which demonstrates our commitment to driving operational efficiency and excellence. His experience in transformational business leadership and the integration of artificial intelligence into administrative processes will be instrumental in helping us to upgrade operational systems to meet modern benchmarks.

At the heart of this renewal is the transformation of service delivery levels and the provision of better support for our students and staff, SAIW personal and corporate members, all welders, and welding-related businesses in Southern Africa. To do this, we are implementing AI-driven business systems to help us manage all of our interactions and transactions.

We have already established a new central Student Management System that will soon be accessible from a new SAIW website under development. This AI-driven system will replace a traditional database that required a lot of human input with a comprehensive automated system that will manage every aspect of a student's records, from the time they enrol to the time they qualify. It will include ID-number and contact detail verification at the onset; it will give access to the course programmes and, on registration, to the materials; it will manage examinations and automatically upload results; and as soon as all of the criteria have been met, it will automatically create and upload a student's course certificate.

We also want to support our staff better, so, as well as developing a new and easily accessible HR system, we are striving to modernise access to materials and to automate the generation and marking of examinations. We have employed a younger generation of experienced lecturers who are more open and familiar with these systems. This will remove some of the more time-consuming and bureaucratic tasks they previously had to do, so that they can concentrate on supporting the development needs of their students.

It is important to note that the SAIW's core purpose remains rooted in raising quality standards for welding. We want to make it easier for people to access the help they need to achieve the necessary quality standards. This means easier access and lower costs for our courses, and better technical support to help fabricators solve welding problems. We enable South African industry to succeed, to be more globally competitive, and to be ready to deliver to world-class standards.

For welder training, we are continuing to expand our use of Virtual and Augmented Reality (VR and AR) solutions, which we believe can significantly reduce the costs associated with welder training, making it far more accessible to young South Africans. We have to uplift our youth, get them enthusiastic about new technologies, and prepare them to build new infrastructure in support of South Africa's economic growth.

VR is an important first step in this regard. It doesn't involve consumables, plate, weld preparations or PPE. And students who achieve 80% scores for a VR welding process can be far more quickly qualified on a real process, making the welder training more time-efficient and cheaper.

We are in the process of putting together a mobile welder training school built using converted shipping containers. The school will have a small VR-welder training room and a classroom, both powered using solar panels. We will be able to transport the whole facility on a low loader to any school or college to expose learners to welding and inspire them to join the profession.

We are also considering coupling this initiative with entrepreneur training and marketing support to encourage more young people to set up and succeed in their own businesses.

Finally, I would like to point out that South Africa is part of Africa. In recent years, the SAIW and the Nigerian Institute of Welding (NIW) jointly founded the Welding Federation Africa. With the IIW's support, we hope to expand our training initiatives across the continent so that instead of importing scarce skills into our continent, we can be exporting them.

Joseph Zinyana

Navigate application development

African Fusion talks to Johann Pieterse, MI Technical Manager of Afrox, about Afrox's long history of applications development for assisting its customers in implementing complex projects efficiently and safely.

"Afrox strives to provide solutions to Industry Partners that greatly improve productivity, reduce production time and cost, while ensuring better safety for artisans," begins Johann Pieterse.

Afrox has a long, rich history of developing technologically advanced solutions, supporting industries from petrochemical, mining, power generation, right through to complex construction projects. Afrox's expertise and application capabilities lay the foundation for a successful project. A notable example is a solution Afrox developed a few years ago, which is currently being utilized in the construction of a new steam boiler for a paper producer in Richards Bay.

Another example of a technologically advanced solution is the Afrox Gas Reach MUPP service offer. During shutdowns at power-generation sites, welding occurs in boilers at typical heights of 70 m, where the norm has always been to used stick (SMAW) welding electrodes because to get cylinders of shielding gas, people and equipment into these boilers has always been very difficult and a potential safety risk, "and lifting cylinders is a real mission" Pieterse adds.

"Because of the danger of a cylinder falling, a designated drop zone has to be established every time a cylinder is lifted or removed from a working platform. Over and above the time it takes to arrange a crane, it takes about 20 minutes to take each full cylinder up and another 20 minutes to get the empty one down again, so easily over an hour of a welder's time might be wasted while the shielding gas is replaced," Pieterse tells AF.

Furthermore, using multiple gas cylinders on raised platforms also creates significant other risks, not only because they need to be moved from the crane area to where the gas is required, but there may also be excessive numbers of hose connections running along the platforms, creating tripping hazards and increasing the chance of hose leaks, contributing to weld failures. This identified risk can expand the number of safety inspections required on a platform.

"A few years ago, we received a request from one of our customers to develop a solution to effectively and safely perform TIG welds at height in the boilers. Shielding gas and welding solutions are at the core of our business, and we strive to do whatever we can to assist customers in using our products effectively, efficiently and safely," Pieterse says.

The Afrox multi-user pressure panel, or MUPP, has proved effective wherever several welders working in a confined space or at height need access to shielding gas.

Afrox responded to the call, and the Afrox MUPP offer was developed, specifically with welding at heights in mind! The MUPP not only improves productivity, but it also makes the site a lot safer. This is because the shielding gas cylinders, which can weigh up to 100 kg when full, remain on the ground in a safe, secure and convenient fenced-off area. Nobody has to ever lift a cylinder onto or handle it on a platform, he explains.

The multi-user pressure panel, or MUPP, has proved effective wherever several welders working in a confined space or at height need access to shielding gas. Importantly, it enables more efficient gas shielded welding processes such as TIG/GTAW, MIG/MAG/GMAW, MCAW, and FCAW to be used in far more difficult to reach places.

The shielding gas feeding each MUPP is supplied from manifolded cylinder pallets (MCP) of the specified shielding gas required, which are available in convenient bundles of 15 cylinders per pallet that can be managed from the ground. A single high-pressure braided-steel hose connects each pallet of gas to a pressure-regulated MUPP in the welding area, which has eight connection points to independently supply up to eight welders at the same time without cross-interference.

On boiler projects such as the one currently in progress at Richards Bay, this enables the contractor to locate an MUPP

and complex projects with Afrox

Afrox has developed a solution for high-integrity pipe welding based on the use of metal-cored arc welding (MCAW) consumables with modern power sources such as the Miller XMT FieldPro.

The shielding gas feeding each MUPP is supplied from manifolded cylinder pallets (MCP) of the specified shielding gas required, which are available in convenient bundles of 15 cylinders per pallet that can be managed from the ground.

at three different levels where work is being carried out. Each welder simply connects the gas hose to a point on the MUPP for regulated access to the shielding gas they require.

"Every welder can pre-set their gas flow, and this will be retained, no matter how many other welders are welding at that time," Pieterse assures.

Afrox's metal-cored arc welding solution

Further, in support of the boiler industry and introduced several years ago, Afrox developed an application for high-integrity pipe welding based on the use of metal-cored arc welding (MCAW) consumables with modern power sources such as the Miller XMT FieldPro.

Traditionally, high-integrity pipe welding has always been done using gas tungsten arc welding (GTAW/TIG) for the root pass, followed by shielded metal arc welding (SMAW/stick) for the fill and capping runs. "This traditional way is still widely accepted and few are willing to consider alternatives," Pieterse says, adding that this is neither cost-effective nor productive.

"When Miller XMT FieldPro machines first became available, we started to develop pipe welding procedures that used metal-cored welding wire and the machine's RMD function for root welding, followed by the ProPulse mode for the fill and capping runs," says Pieterse.

This welding procedure is currently being used for the construction of the Richards Bay boiler, not for large bore pipes, but for all of the long structural welds required. The contractor estimates that the switch to using this procedure, which is coupled with the use of the Afrox MUPP, Argoshield Universal gas, and the Hobart MEGAFIL seamless metal-cored wire, will increase welding productivity on the project by up to 2-3 times, while maintaining weld integrity.

"We sell productivity," says Pieterse. "From carefully selected products from some of the leading brands in the world, we develop solutions that can deliver on all of a customer's needs, be it for boiler construction, shutdowns, chemical or petrochemical plants, ship repair, fabrication, or any other welding-related project or need.

"And we offer the backup needed, including training the welders that will be working on the site. For the Richards Bay project, for example, we took our equipment to the contractors' labour broker in Witbank to train the welders on the metal-cored arc welding process using Miller's RMD and ProPulse options," he relates.

In addition, he says that safety, health, the environment, and quality are non-negotiable in Afrox. "Any welding application solution we develop incorporates this ethos, particularly where gases are involved," Pieterse concludes.

www.afrox.co.za

The Miller Pipeworx family of products, available exclusively from Afrox in South Africa, is purpose-designed for onsite pipe welding.

SAIW appoints Vicus Burger as Executive Director

The Southern African Institute of Welding (SAIW) has announced the appointment of Vicus Burger as its new Executive Director, an appointment that marks a significant step in the SAIW's ongoing strategic renewal plan.


Vicus Burger, SAIW Executive Director. Photo: Klarene Wattenbach

Vicus Burger joins the SAIW with a wealth of experience, a strong commitment to excellence, and a forward-thinking vision that aligns seamlessly with the Institute's core values of speed and customer centricity. His approachable leadership style and innovative mindset are expected to propel the SAIW into its next chapter of growth and success.

SAIW President Joseph Zinyana says, "Vicus's appointment is proof of our commitment to operational efficiency and excellence. His leadership will be instrumental in implementing our strategic initiatives, such as the integration of Artificial Intelligence into administrative processes and the upgrading of operational systems to meet the latest standards."

A timely revival

The appointment takes place against the backdrop of the SAIW's 78th anniversary and commitment to expanding its presence in Africa, making courses more affordable, and introducing subject matter experts for specialised subjects. As a result, Burger's leadership will be crucial in driving these initiatives forward, ensuring that the SAIW continues to evolve into a modern, fit-for-purpose service provider for the welding and inspection industry.

"The SAIW has historically stood at the forefront of the welding industry, both locally and globally, representing a benchmark of technical excellence, innovation and professional development. As we step into a new chapter, I am committed to building on this proud legacy and igniting a bold renaissance that will position the Institute once again at the apex of global leadership in welding science, skills development and industrial impact," says Burger.

With a career rooted in transformational leadership, Burger also brings a proven legacy of turning organisations into high-performing, future-ready enterprises. "My leadership philosophy is anchored in a passion for empowering people, a relentless focus on exceeding customer expectations, and an uncompromising pursuit of operational excellence, innovation, and sustainable growth," he adds.

Digital prowess

Burger notes that digital transformation will play a vital role in the Institute's future: "Central to this revitalisation journey will be the deployment of innovative digital technologies, including artificial intelligence and automation, to revolutionise internal operations, member engagement and skills development platforms. This digital transformation will not only modernise the Institute but will also unlock new capabilities, increase productivity, and enhance the value we deliver to our stakeholders, locally and abroad."

Beyond organisational goals, Burger sees a broader national mission. "This renewal represents a much larger ambition: to contribute meaningfully to the broader transformation of our country's industrial base and the revitalisation of Johannesburg's Central Business District.

"By developing world-class technical skills and fostering inclusive economic growth, we aim to become a driving force in South Africa's journey toward industrial excellence and social progress. Together with our stakeholders, partners and the wider welding and manufacturing communities, I look forward to shaping a future of strength, innovation, and pride in the South African Institute of Welding," he concludes.

www.saiw.co.za

Vicus Burger: from mechanical engineer to AI-leader

After graduating from the University of Stellenbosch in the mid-1990s, Vicus Burger began his career as a mechanical engineer, initially with the mines and later with Smiths Manufacturing in Pinetown, KZN, as a test engineer for automotive air-conditioner designs. While at Smiths, Burger developed a world-class air-conditioner/heat exchanger performance test facility. "That is where I first learned how to program. I coded that whole HVAC facility using Visual Basic," he tells *AF*.

In 1996, Burger joined the fast-moving consumer goods (FMCG) company, Unilever. As a project manager in the Soap factory, he was responsible for replacing a 9.0 m shell-and-tube heat exchanger. He also developed a system for managing drawing office resources and job scheduling. On becoming the assistant factory maintenance engineer for Unilever's Personal Products Factory in Durban, he implemented maintenance projects and developed the batch logging systems required by the Medical Control Council. Then in 1999, he became the factory engineer for Unilever's largest aerosol filling operation in Africa. "Unilever had an excellent professional development programme for engineers, and the FMCG industry is continuously changing," he says.

From 2000 to 2005, he joined South African Breweries. "My most senior position there was as the Group Engineering Manager for Maltings, where I was responsible for managing multiple sites with large capital and maintenance programmes. The SAB Caledon plant, one of the largest Malting plants in the southern hemisphere, was under my care," he adds.

He then entered the world of business development and began to do turnaround projects: transforming customer service and logistics at Mondelēz; resolving capacity constraints at PepsiCo manufacturing plants without capital investment, while delivering the best Q4 results and reducing workplace injuries by 80% and consumer complaints by 25%; and as Manufacturing Director for Africa at Reckitt, he implemented service level improvements and increased performance from 85% to 97% in just four months.

In 2015, Burger joined Cell C, where he developed expertise in data science and big data. "I had to lead a massive information-based transformation programme for the business. After two years, I was moved to the strategy department to lead the commercial network strategy.

After a few more years working for hospitality solutions provider Thyme Global, transforming their enterprise reporting to include data-driven decision-making through advanced business intelligence, Vicus Burger decided to focus full-time on his own AI-focused SR71 Consult business, which he founded in 2020.

www.linkedin.com/in/vicus-burger-8527ab5

Lemogang Maclean: Shaping the future of welding excellence

With over 15 years of experience spanning power generation, petrochemical and railway industries, Lemogang Maclean is a beacon of inspiration for SAIW students, welding technologists, inspectors and professionals across the welding community.

Lemogang Maclean's story resonates deeply with those who aspire to elevate standards, champion innovation and leave a lasting impact on the welding industry.

Her academic foundation is as robust as her professional achievements. Armed with a qualification in Physical Metallurgy, a long list of certifications in welding, including IWT welding qualifications and an MBA, she combines technical precision with strategic insight, enabling her to tackle complex challenges with clarity and confidence.

As an IRCA ISO 9001:2015 Lead Auditor and certified International Welding Technologist (IWT), she mastered the art of bridging the gap between rigorous technical standards and forward-thinking leadership. Her expertise in ASME codes, AWS standards and welding quality management has made her a sought-after authority in the field.

At the Southern African Institute of Welding (SAIW), Maclean serves as a Senior Welding Technologist Lecturer, where her influence is nothing short of transformative. She brings a unique blend of expertise, enthusiasm and empathy to the classroom, inspiring students to push beyond their limits and embrace the pursuit of excellence.

Her ability to break down intricate concepts, whether explaining the nuances of weld imperfections or the intricacies of quality control, has earned her admiration from students and colleagues alike. Through her specialised courses, she equips the next generation of welding professionals with globally recognised skills, empowering them to compete on an international stage.

Before joining SAIW, Lemogang Mclean made significant contributions as a Supplier Quality Development Engineer at Gibela Rail Transport Consortium. There, she spearheaded initiatives to enhance supplier performance, mitigate risks, and drive quality improvements across the supply chain. Her leadership was instrumental in securing ISO 3834 and EN 15085 certifications for multiple suppliers, unlocking access to international markets and fostering sustainable growth. Her work not only elevated industry standards but also demonstrated her belief that quality and profitability are not mutually exclusive; they are interdependent pillars of success.

What truly sets her apart is her infectious passion and unwavering commitment to fostering a culture of excellence. Her vibrant energy, punctuated by her signature loud laughter, creates an environment where learning is engaging and collaboration is joyful. She champions continuous improvement, safety and innovation, inspiring those around her to strive for greatness without compromise.

Her mantra, 'enter classrooms, seek knowledge, and doors will open', is more than a catchphrase; it's a reflection of her journey from a metallurgical trainee to an industry leader who now shapes the future of welding technology.

Maclean's impact extends beyond technical expertise and classroom instruction. She is a mentor, a role model and a catalyst for change, encouraging SAIW students and professionals to embrace challenges, pursue certifications, and view education as a lifelong journey. Her story is one of breaking barriers, defying expectations, and proving that dedication and knowledge can open doors to limitless opportunities. Whether guiding a student toward their first welding certification or advising a company on achieving international quality standards, her influence is profound and far-reaching.

Senior Welding Technology lecturer Lemogang Maclean has an unwavering commitment to fostering a culture of excellence.

As a trailblazer in welding technology, Lemogang Maclean is not just building careers; she is forging a legacy. Her relentless pursuit of excellence, coupled with her ability to inspire and uplift, makes her a true leader in the SAIW community and beyond.

To aspiring welding technologists, inspectors and students, her journey serves as a powerful reminder that, with passion, hard work and a commitment to learning, anyone can shape not only their future but the future of an entire industry.

In Lemogang Maclean's words

What made you choose welding as a career?

"During my recesses when I was studying Metallurgical Engineering, I would visit industries to explore potential career paths. I explored foundries and material testing laboratories, but nothing clicked. Then one day, I was watching a documentary on TV showcasing the construction of cruise ships and aircraft, which included cutting, shaping and welding processes. That moment sparked a connection, and I knew I wanted to pursue welding after completing my metallurgical studies."

When did you join the SAIW, and what do you like most about your role?

"I joined as Senior Welding Technology lecturer on the 1st of April 2025. I thrive on the energy of students eager to learn and grow. It's fulfilling to see them recognise the power of knowledge in driving innovation and changing lives.

"The learning process is mutual – students bring valuable experiences and perspectives, keeping me updated on the latest developments. A day spent sharing my expertise and passion with students is a day well spent!"

What are your hopes for your future and the future of the SAIW?

"I aspire to continue inspiring students to reach their full potential, break educational barriers, and prepare them for real-world challenges.

"For the SAIW, I envision it becoming a hub for welding and related technologies and research, expanding its global and local partnerships to create better and better opportunities for students."

AWT: Towards exemplary 21st-century manufacturing

_AF_ talks to Thulani Mngomezulu, General Manager-CEO Designate of 2Roads Group company, Applied Welding Technology (AWT), about the company's new strategic direction towards becoming a renowned 21st-century manufacturer of critical engineering components.

Established in 1987, Applied Welding Technology (AWT) operates out of a fully integrated facility in Kempton Park near Johannesburg, offering comprehensive welding, machining, fabrication and testing services.

With a primary focus on welding and machining critical parts, AWT has always excelled in working with a wide range of materials, rebuilding critical worn components with base materials and cladding surfaces using Stellite, Inconel, bronze, stainless steel and Monel, among others. Whether rebuilding 10 t vessels or small-bore 32 mm nozzles, the company has the welding, machining and heat treatment capabilities to deliver comprehensive remanufacturing solutions for industries using the full spectrum of advanced materials, such as power generation, petrochemical and mining.

In addition to its well-equipped factory, AWT has dedicated onsite teams for specialised welding tasks. These teams have successfully executed repairs on valves, pumps, fans, valve chests, diffusers, and other equipment. Most notable is the company's expertise in performing seat replacements on welded valve bodies, including gate and non-return (NRV) valve types.

Quality control and assurance are fundamental to the company's processes. "We continuously improve our processes, diligently monitor every step and conduct industry-standard tests at all the necessary hold points, accompanied by meticulous documentation to ensure the highest standards of excellence," says Thulani Mngomezulu, the recently appointed General Manager-CEO Designate of AWT.

Notable projects

Turbine Valve Components: "Our largest project so far this year has been the refurbishment of turbine valve components for the Majuba and Duvha Power Stations. In general, this work involves machining, weld build-up, cladding – primarily with Stellite – and final machining to tight tolerances in line with OEM's specifications and instructions. "This is highly specialised work that the AWT team has been able to successfully execute based on previous experience and in partnership with the OEM," he says.

Cladding of cast iron butterfly valve disks: Another area of expertise AWT has developed in recent years is the welding of large cast iron components. This is one of the most challenging materials to weld and requires particular welding procedure specifications and tight control of the welding operation. "In recent months, we have successfully applied austenitic cladding to cast iron discs ranging from 600 mm to 3 000 mm in diameter and up to 11 tonnes in weight," Mngomezulu reveals.

Re-Stelliting at Kusile: AWT has been providing in-situ machining and re-Stelliting of valves and other plant components at Kusile Power Station since June 2021. "We are delighted to have completed this contract in May this year, and to have received a positive end-of-contract review from our client. Throughout this contract, AWT demonstrated that we can consistently deliver high-quality work, even under extremely demanding conditions, therefore ensuring that our clients receive maximum value from our services," he adds.

Re-imagining the future

AWT is expanding its site project footprint beyond its traditional South African market. Examples of this are recent assignments carried out in Mauritius and Ghana, which involved repairs on turbine components for a client operating within the power generation environment. "We are currently working towards developing organisational capabilities that will enable us to achieve our long-term strategic goals. We are strengthening our collaboration with our 2Roads sister companies to enhance our customer experience while improving synergies between these companies. We also remain committed to quality-enhancing systems such as the ISO 3834 standard certification compliance to international construction codes and local power generation and petrochemical industry requirements," he tells _AF_.

Appointed in October 2024, Thulani Mngomezulu has been charged with formulating and executing AWT's new strategy. His credentials in the South African petrochemical and welding industries make him ideally suited to the task. "For the past few years of my career, I have been largely focused on welding technology, but I started my career in mechanical engineering, so I bring manufacturing and machining expertise into AWT, as well," he says.

AWT has a workshop in Kempton Park and onsite teams for specialised welding tasks. These teams execute specialised weld repairs on valves, pumps, fans, valve chests, diffusers and other equipment.

Machining a cast-iron component. AWT excels in repairing critical worn components with complex base materials and cladding surfaces using Stellite, Inconel, bronze, stainless steel and Monel.

Having matriculated from Tisand Technical High School in Esikhaleni, KwaZulu-Natal, Mngomezulu studied mechanical engineering at Durban University of Technology, graduating in 2004. "While still at university, I did practical experience training at the local Engen refinery. This was my first introduction to South African industry.

"My first permanent job was with Sasol Synfuels, where I was a mechanical technician doing maintenance and installations on new and replacement plant equipment: pumps, piping, general structures, vessels, tanks, and heat exchangers, for example. After about two and a half years, though, I moved back to Engen as an equipment inspector," he says.

During that time, Mngomezulu studied for his Level 1 and Level 2 Welding Inspector and other inspection/testing related qualifications through the SAIW. Then in 2011, he joined the SAIW as a consultant in the Technical Services department, at the time when ISO 3834 Company Certification first began to be rolled out. He was with the SAIW for five years, during which time he also qualified as an IIW International Welding Technologist.

In 2016, he was invited to join Lincoln Electric Middle East and Africa as the Technical Applications Manager, responsible for supporting and developing applications and demonstrating equipment for the full suite of Lincoln Electric welding and cutting equipment and consumables, from plasma cutting systems through to all of the manual, semi-automated and automated welding process solutions.

During his time at Lincoln Electric, Mngomezulu continued to study, with an increasing focus on developing his business management knowledge and skills. He completed a Post Graduate Diploma in Business Administration (PDBA) from Wits University in 2020; went on to get a Financial Modelling & Valuation Analyst (FMVA) qualification from the Corporate Finance Institute® in 2021; and in September 2023, he was awarded a Master's degree from the University of the Witwatersrand in Innovation Studies.

Above: AWT's Simphiwe Shongwe is setting up a CNC machine for a new job: "Our vision is clear: we are working towards becoming an organisation that exemplifies the 21st-century manufacturing enterprise," says Thulani Mngomezulu.

Right: The company has the welding, machining and heat treatment capabilities to deliver comprehensive remanufacturing solutions.

A modern manufacturing vision

During 2024, with the current CEO, Ross Tudhope, looking to retire, 2Roads and AWT began to search for a suitable candidate to take the reins at AWT. "I was initially approached by someone from 2Roads. Then AWT got involved, and after a few months of discussions, we agreed that I would join as General Manager and CEO Designate. Since then, I have been working closely with Ross while also being charged with developing a strategy for sustainable and innovative growth.

"I am currently involved with all the different departments, trying to set up how we want to do things in the future. It's about managing change, in everything from what we want from our personnel, the training and development that is required to get there, and the technologies we need to adopt, develop and assimilate to ensure that we can compete and succeed. The AWT team has an interesting mix of talent, and everyone is looking forward to building our future together," Mngomezulu tells *AF*.

"Our vision is clear: we are working towards becoming an organisation that exemplifies the 21st-century manufacturing enterprise, and this will be largely about our capabilities and how we continuously reorganise ourselves," he says.

"There are two ways to think about our future, from the perspective of where we are now, and from a vision of where we could be in three, five and ten years. Our history is largely about refurbishments, remanufacturing and lifetime extensions of critical, high-value, precision plant components, and we are very good at this.

"Going forward, however, we are gearing ourselves up to also support the new greener industries, not only the renewable energy sector, but other emerging industries as well, in support of global sustainability," he explains.

"We understand that it's not going to happen overnight, but together with our new vision, we have been reflecting on what drives us: our mission to help our customers build and maintain reliable systems and our contribution towards a sustainable future – along with our values: Respect, Integrity, Trust, Customer focus, and Quality.

"Based on these pillars, we are determined to transform Applied Welding Technology into a renowned and exemplary manufacturer of the critical components needed for a sustainable 21st century – and effectively support the needs of our customers in South Africa and beyond," concludes Mngomezulu.

https://appliedwelding.co.za

How meaningful data and digitalisation can improve welding

Matthias Schaffitz, Application Engineer at Wolfram Industrie, talks about Industry 4.0 and how digitalisation, process automation and programming are increasingly replacing the role of craftsmen in welding applications.

Although welding technology already collects data metrics such as current, voltage and welding speed, process control and weld quality monitoring still rely heavily on the welder's expertise. The human ability to flexibly respond to tolerances in the welding joint through a combination of optical pattern recognition and acoustic perception still surpasses the potential of machine systems.

The more automated a welding robot is intended to be, the more complex and precise the preparatory work must be. This means that the intuition developed by welders through years of experience must be translated into a logical machine language.

Interdisciplinary approaches and close, cross-generational communication are essential for making the digitalisation of welding processes truly effective and fully leveraging the potential for higher process stability, resource efficiency, reproducibility and traceability.

A 2024 study by BearingPoint, conducted in collaboration with Munich University of Applied Sciences, found that 100% of surveyed companies in Germany were already engaged in implementing Industry 4.0. However, none had fully completed the transformation: On a scale from 'not started' (0) to 'fully implemented' (10), all responses ranged between 1 and 8.

Given this background, it is unsurprising that 81% of companies plan to invest in Industry 4.0 in the coming years.

The welding experts at Wolfram Industrie have already observed how challenging this transformation can be in practice. While their customers show great interest in the digitalisation of welding production processes, they also express significant uncertainty about its implementation.

How can production lines be digitalised without replacing all existing machinery and personnel? How should the process chain be designed to remain simple and profitable in day-to-day operations, preventing welders from resorting to manual welding due to system complexity? Most importantly, how can digitalisation be implemented in a way that results in measurable resource savings and efficiency gains?

In order to digitise the welding industry, the welders' intuition, forged through years of experience, must be translated into logical language.

Matthias Schaffitz, an application engineer at the Wolfram Industrie GmbH research and production centre in Winterthur, Switzerland: Photos courtesy of Gesellschaft für Wolfram Industrie, mbH.

No data hoarding, but meaningful monitoring

From a technical perspective, purchasing new Industry 4.0-ready systems is easier than retrofitting existing machinery, but such an investment rarely makes financial sense for most companies. Fortunately, even older generation welding machines offer opportunities for data collection, such as monitoring current, voltage, coolant levels, or component movement, for example. However, many sensors, according to common industry standards, lack the high resolution required for detailed monitoring of welding processes.

To track electrode wear, shielding gas effects or gas turbulence, for example, a resolution of more than 1 000 data points per second is necessary. Additionally, standard values such as current and voltage can be difficult to measure in tungsten inert gas (TIG) welding, as the high-voltage ignition used requires specially designed arc voltage measurement systems.

Yet, even with the availability of high-resolution measuring devices, the key to Industry 4.0 implementation lies in balancing what is measured against how the data can be meaningfully analysed. So, how can this balance be achieved?

Resource efficiency and process reliability

Digital monitoring competes with a highly skilled counterpart: experienced welders and their intuition.

A resolution of more than 1 000 data points per second is required for recording electrode wear, shielding gas influences or shielding gas turbulence during welding.

Due to their three-dimensional spatial awareness, humans can quickly recognise optical patterns and acoustic anomalies. This enables experienced welders to react flexibly, compensating for tolerances in the weld seam and making them less dependent on precise pre-processing.

The more automated a welding process becomes, however, the more meticulous and precise the preparation must be. The increased setup time has led to the perception that digitalised welding processes are only worthwhile for high production volumes.

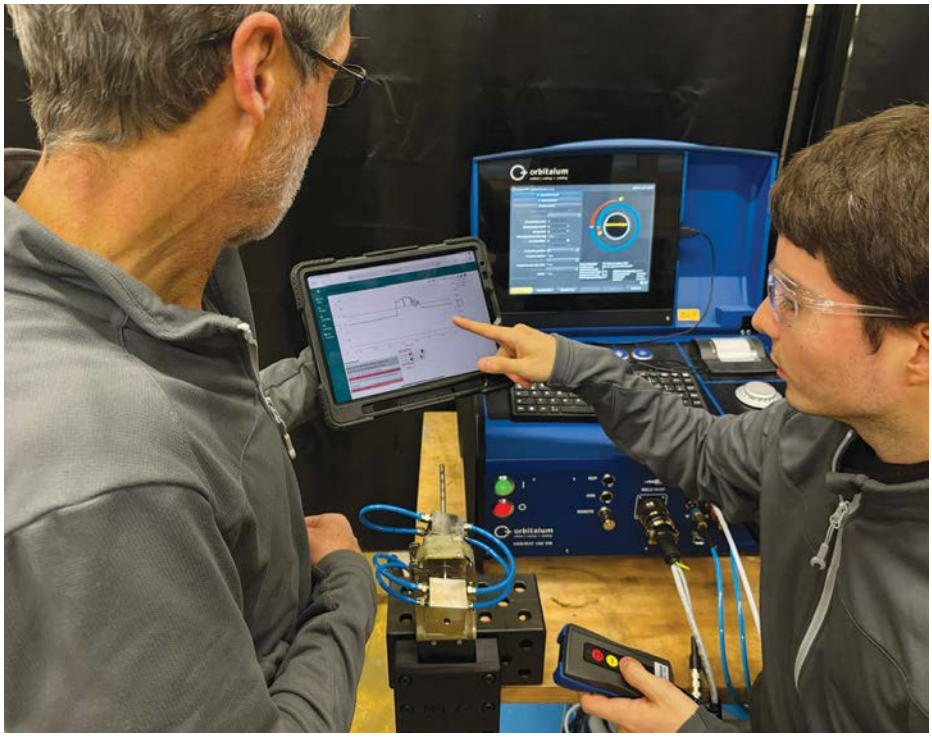
However, time is not the only resource significantly impacted by welding digitalisation. Automated processes can also reduce material waste, as fewer rework operations are needed, and a consistently high quality is easier to replicate. Given that metals are resource-intensive and costly materials, efficiency and process stability gains can become evident even in small-scale production. The prerequisite for this is correct machine settings and minimal production tolerances. In other words, the expertise and professional intuition of welders must be translated into a logical, programmable language.

Linking human expertise with digital information flow

At this point, two different information flows collide: that of craftsmen and that of programmers. This also raises a generational question, as traditional manual welders tend to belong to an older demographic, while operators are generally younger.

To effectively merge the deep knowledge of traditional craftsmanship with the rapid data flow from real-time monitoring, the prevailing distrust between both groups must be overcome. Traditional welders would benefit from gaining an understanding of digital data processing and process control, while operators and programmers should strive to grasp the principles of the welding trade.

Automated processes can reduce material waste as less reworking is required, and high-quality results are easier to reproduce.



The key to a successful digital transformation of welding technology lies in the communication and methodological expertise of traditional manual welders and modern operators.

The key to a successful digital transformation in welding technology lies in communication and the methodological competence of both sides. To support its customers in this transition, Wolfram Industrie collaborates closely with research institutes, system manufacturers and end users. The initial goal is to establish the necessary foundations for each production environment to assess relevant data and establish realistic monitoring capabilities. Based on this, the effort required for pre- and post-processing of workpieces in automated welding processes can be optimised, setup times minimised, and resource consumption in daily operations reduced – ensuring that the vision of higher process stability, resource efficiency and traceability promised by Industry 4.0 does not remain an empty promise.

https://wolfram-industrie.de

State-of-the-art consumables for the sugar industry

Franz Rosenblattl, Business Development Manager for voestalpine Böhler Welding Wear Protection and Special Applications, outlines the successful development in Brazil of a new consumable metallurgy for enhanced performance and weldability during roller arcing in sugar mills.

The sugar industry is one of the oldest and most influential sectors in the global agricultural economy. From colonial roots to modern-day industrial production, sugar has shaped economies, diets and trade policies across the globe.

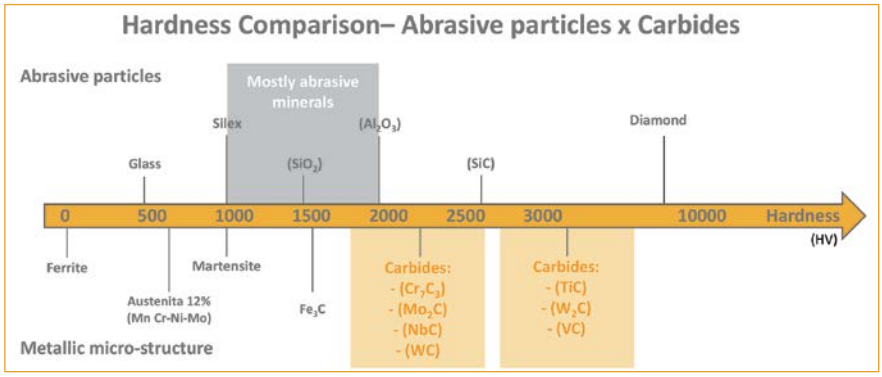
Today, the sugar industry faces a complex mix of opportunities and challenges, ranging from changing consumer preferences to the need for continually increasing production volumes to remain competitive in the global market. Many of these problems can be mitigated by optimising mill performance using better welding technologies.

Welding is a critical factor in several stages of the sugar milling, including:

- The efficiency of the sugarcane preparation system.
- Maintaining hydraulic load, oscillation and rotation.
- The surface conditions of the mill rollers.
- The opening setting of rollers during milling.
- The adjustment of trash plates.
- The feed of cane/bagasse into intermediate mills.

Enhancing the extraction index

In a sugar mill, the most important parameter for its efficiency is the extraction index.

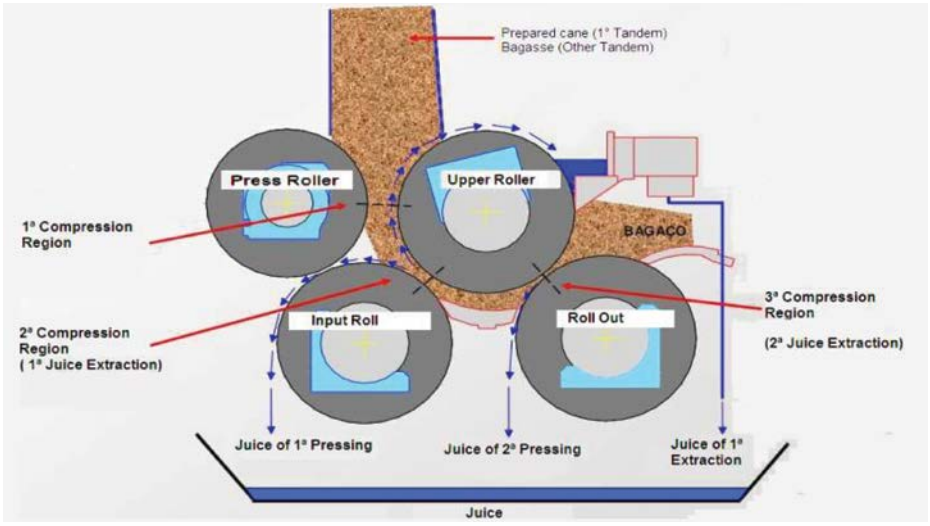


A comparison of the hardness profiles of various hard materials with the new UTP Vanadium consumable.

UTP, part of the voestalpine Böhler Group, has partnered with a leading sugar mill in Brazil to enhance this key production index.

Their joint initiative focuses on optimising the extraction process through the application of hardfacing technology – a wear-resistant coating technique that significantly extends the lifespan and performance of processing equipment. By reducing mechanical wear and improving operational efficiency, this innovation aims to boost overall sugar yield and reduce downtime, offering a strategic advantage in this highly competitive industry.

Applying roller arcing in mills is a basic operation at production plants during the on-season. The arcing application is carried out via a manual welding process using coated electrodes. The hardfacing material deposited during roller arcing protects the inside of the mill from wear and tear caused by sugar cane impurities such as grit and soil, improves sugar cane input levels, and aids juice extraction.



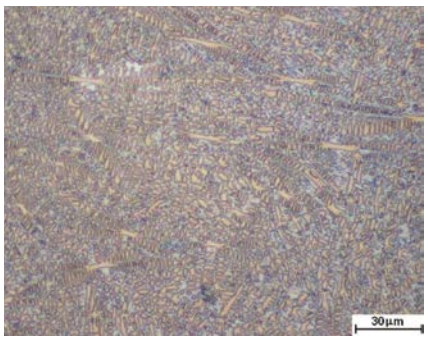
The cylinders or rollers of a sugar mill are arranged so that the intersections of their centres form isosceles triangles.

The sugar milling unit

Classically, a milling unit is composed of cylinders or rollers arranged so that the intersections of their centres form isosceles triangles. Cylinder spacings are set depending on their positions to optimise the extraction of juice, which is used downstream to produce sugar or ethanol.

A tandem mill in sugar cane processing consists of a series of roller mills. Each mill typically includes three rollers, two at the bottom and one at the top, through which the cane passes. The crushed cane (bagasse) moves from one mill to the next, with each stage extracting more juice. A tandem roller mill configuration increases extraction efficiency and throughput.

Sugar roller arcing using hardfacing welding consumables is used to improve mill efficiency for several reasons. First, it assists in feeding the cane by increasing the compaction load applied to the bagasse layer. This also helps to minimise reabsorption. In addition, roller arcing helps protect the sides of the grooves against wear, it increases the tonnage of cane that can be processed per season and raises the milling speed (t/hour).



The microstructure of the weld deposited by the new UTP Vanadium SG consumable includes eutectic carbides in martensitic matrix, with chromium and vanadium carbides.

UTP solutions for roller arcing in the sugar industry include alloys based on abrasive mineral impurities and other novel alloy concepts. Hard facing electrodes and cored wire consumables are available, with the UTP VANADIUM product line offering tailored solutions for the sugar sector.

The existing roller arcing consumable

Several years ago, UTP developed a specialised electrode specifically designed for arcing applications in the sugar industry. This electrode still stands out from standard products available on the market due to its unique composition and performance characteristics. It has been successfully implemented in various regions, including South Africa, where it has demonstrated excellent wear resistance, improved arc stability, and enhanced deposition efficiency. This electrode is currently known as UTP Vanadium 500.

Designed for resisting low to moderate wear, UTP Vanadium 500 promotes the formation of a hypereutectic alloy containing chromium carbides along with small amounts of vanadium carbides.

The new state-of-the-art consumable

In a recent breakthrough, UTP has been able to develop hypereutectic carbide alloys containing higher amounts of vanadium carbides than UTP Vanadium 500, which can resist much more severe wear conditions. This electrode is currently being called UTP Vanadium SG.

Table 1 highlights the compositional and performance differences between the existing and the new consumable designs.

Advantages of the new design

The new design promotes a martensitic matrix rich in chromium and vanadium carbides, offering one of the highest available levels of wear resistance. The consumable metallurgy replaces the formation of hypoeutectic carbides with hypereutectic carbides, along with the formation of several other carbides with hardness and abrasion resistance superior to previous-generation hypoeutectic carbide consumables formulations.

On the left, the new UTP Vanadium SG consumable for roller arcing produces a sharper grip with more arcing material than the original UTP Vanadium 500 consumable on the right. This not only enhances the wear resistance of the crusher rollers but also improves the sharp grip, which leads to increased production efficiency.

The interactions between the elements vanadium, silicon, chromium and carbon in the new severe duty metallurgical design not only improve weldability and wear resistance but also leave the surface of the teeth of the mill rugged. This improves the 'sharp grip', resulting in a considerable increase in the tonnage of sugar cane that can be milled and raises the potential milling speed.

For the UTP Vanadium SG electrode, specifically tuned parameters have been optimised, most notably the weldability when applying the consumable in a liquid sugar syrup environment, and the ability to achieve the 'sharp' surface finish. This has been achieved by increasing the silicon (Si) content to modify the viscosity of the molten weld metal. Higher Si content contributes to arc stability by producing a more stable and controllable arc and improving wetting behaviour under these harsh conditions.

Silicon also promotes the formation of ferrite, which enhances the hardness and strength of the weld metal.

Conclusions

By optimising the composition of carbide-forming elements, the service life of wear parts in sugar mills can be significantly extended. With decades of experience in this field, voestalpine Böhler Welding UTP is the market leader in Brazil and, through collaboration with renowned sugar plants, a pioneer in developing innovative solutions for wear protection.

UTP is currently working on a project to realign its wear protection segment, which will include renaming existing products. UTP Vanadium 500 will continue to be offered in parallel to the new alternative solution, but both consumables will be renamed.

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UTP roller arcing electrode	Typical chemical composition (%)	Typical Hardness	Wear resistance	Weldability
Original: UTP Vanadium 500	5C, 23Cr, 0.4V	60 HRC	Moderate	3
Severe duty: UTP Vanadium SG	4C, 28Cr, 0.6V	62 HRC	High	5

Table 1: A comparison of the composition and performance of the original UTP Vanadium 500 hardfacing electrode for roller arcing and the new severe duty UTP Vanadium SG consumable. Key weldability criteria: ignition and arc stability. Scale: 1: poor, … 5: excellent.

Swift-Cut Pro: for best-in-class CNC plasma cutting

With advanced industry-leading features as standard, combined with easy-to-use and intuitive software, ESAB's Swift-Cut Pro range is a high-end cutting solution at an "amazingly" low price. Willie Burger, product manager for Mechanised Cutting, PPE and Gas Equipment at ESAB South Africa, explains.

"The Swift-Cut Pro is our baby machine," begins Willie Burger, ESAB South Africa's Mechanised Cutting, PPE and Gas Equipment product manager. This because ESAB also offers a wide range of large and very large cutting solutions, such as the Combirex™ PRO, which combines plasma and oxyfuel cutting heads on a large gantry; and the Suprarex HDX, a heavy duty, high-performance cutting machine that can be customised to use up to four plasma torches at the same time.

"The Swift-Cut Pro system is our everyday plasma cutting solution, which comes in four different sizes to meet the cutting requirements and budgets of small and larger fabricators," Burger tells *AF*.

"It's an awesome little machine at an amazingly low price for what you get, especially for those that have tended to farm out their cutting work because they couldn't justify the expense based on in-house volumes. The Swift-Cut Pro is an affordable solution; it is simple to install and use and it delivers excellent cut quality, which makes it a viable option for anyone contracting out their cutting work," he argues.

Numerous features

Highlighting some of the notable features, Burger first lifts out the system's Intelligent Torch Height Control: "There is no need to manually set the torch height, this is done automatically through voltage sensing. This means the plasma arc is always at the optimum height for the cut, which both improves the cut quality and extends consumable life compared to conventional torch control systems," he explains.

A laser crosshair is used to accurately find the torch start position. In addition, if the plate is not 100% flat or sitting slightly skewed on the table, this laser-based referencing and aligning system will map out the exact positions and heights of reference points across the plate to correct for any inaccuracies. So the cut quality will not be affected if the plate is skewed, and no parts being cut will fall off the edge of the plate.

"As well as for cutting and piecing, the Swift-Cut Pro also has engraving or marking options. This enables part numbers to be etched onto each component, and bending or joining lines to be marked to make downstream forming and assembly processes easier," says Burger.

A Swift-Cut Pro 3000 is on show and available for demonstrations at ESAB South Africa's premises in Elandsfontein, Germiston.

To suit the widest possible range of general cutting needs, the system is available with four different table sizes: the Pro 1250 (1 250×1 250 mm), the Pro 2500 (2 500×1 250 mm), the Pro 3000 (3 000×1 500 mm) and the Pro 4000 (4 000×2 000 mm).

The plasma power unit supplied with all of these Swift-Cut Pro tables is ESAB's Cutmaster A120, which offers 120 A of plasma cutting power at a 60% duty cycle and 100 A at 100% duty cycle. The A120, weighs only 28 kg and provides more than enough power for general CNC cutting tasks on a machine bed, which is limited to a thickness of 25 mm. The system also needs clean and dry compressed air at between 7.0 and 7.5 bar and delivering flow rates of around 300 ℓ/min.

SwiftCAM and SwiftCNC software

Easy-to-use SwiftCAM software is designed to enable anyone with a basic knowledge of computers to operate a Swift-Cut Pro CNC plasma cutting system. Minimal training means that a system can be productive almost immediately, maximising the investment value from the start, notes Burger.

Almost any CAD drawing format can be accommodated: DXF and DWG files can be directly imported and even JPG images can be converted for cutting. The software automatically applies lead-in/lead-out for quicker programming, and automatic nesting of parts is available to maximise sheet usage. Part-in-part nesting is also incorporated, where parts are nested in the scrap areas of other parts to fully utilise sheet material.

An Advanced Drawing Importer makes it easier to clean, scale or delete items within problematic drawings, and a parametric shape library of 89 configurable shapes is included.

The ESAB Cutmaster weighs only 28 g and offers 120 A of plasma cutting power at a 60% duty cycle and 100 A at 100% duty cycle.

On the CNC side, a G-Code Browser allows the operator to start cutting from any individual profile within the G-code, while a cut recovery function allows the user to start from any position along the cut path to maintain cut accuracy and reduce waste.

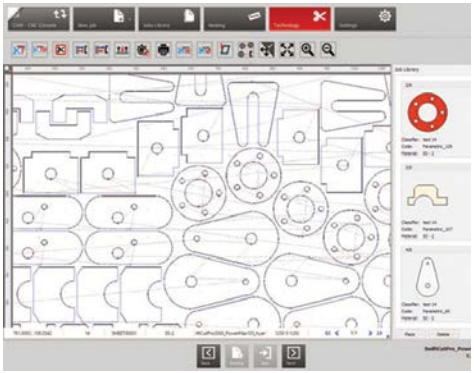
After-sales service and personnel

"We also take pride in helping our customers to succeed after making a sale, by helping them to get the absolute best results from their Swift-Cut Pro. Whether a customer needs remote assistance, advice or an engineer's visit, we've got very capable people to support them," Willie Burger assures, adding that this is mostly about

The Swift-Cut system features Intelligent Torch Height Control. The torch height is set automatically through voltage sensing, so the plasma arc is always at the optimum height for the cut.

support, not just maintenance and repair. "We can help with programming, nesting and optimising the machine's performance and cut quality, for example," he says.

The Swift-Cut Pro system, he says, is ideal for jobbing shops across Africa that service the needs of local manufacturers and suppliers for steel-plate products such as control cabinets, ducting, chutes



Automatic nesting of parts is available to maximise sheet usage. Part-in-part nesting is also incorporated, where parts are nested in the scrap areas of other parts to fully utilise sheet material.

and signage. "In many places in Africa and South Africa, there may not be an easily accessible cutting service or profile shop. The Swift-Cut Pro enables fabricators with low-level needs to invest in an in-house solution, which can then become an additional income-generating service for other workshops in the area," he suggests.

"In-house work can be done more quickly and without delivery delays. And getting these machines up and running is easier than ever, making returns on investment very quick, even if the machine isn't fully loaded," he concludes.

Welding repair centre highlights B.E.D.'s commitment to technical excellence and customer service

The expanded service, repair and calibration workshop at Bolt and Engineering Distributors' new national distribution hub in Wadeville highlights the B.E.D. Group's commitment to technical excellence and customer service. *African Fusion* meets the service team and talks to Group Welding and Cutting Division Manager, Craig Bister, and Welding Repair Centre Manager, Mario Calado.

The B.E.D. Group's calibration, service and equipment repair team, from left: Craig Bister, Dylan Benade, Curtis McClue, Kobus van Dyk and Mario Calado.

B.E.D.'s national distribution centre was set up in August 2024 in a fully renovated building in Wadeville, with a focus on improving logistical flow and accommodating the Group's growth. As well as housing the distribution warehouse and logistics centre, the facility includes a boardroom, offices for the national product managers, and an expanded B.E.D. welding service, repair and equipment calibration centre.

"While we have had a welding repair workshop ever since we first took on the Fronius brand, we have reinvested in this new and expanded facility to meet our growing need for service and support for our key welding and cutting brands: Fronius and GYS welding machines, and Messer and Hypertherm plasma cutters," says Craig Bister, Group Welding and Cutting Division Manager, adding that other brands of welding and plasma cutting equipment can also be accommodated.

"In addition, we represent the Reeflex brand in South Africa, and while we can do repairs for our key customers, these are manufactured locally, so we do not do the warranty work and there is no need for us to hold spares," he adds.

Rapid assessment, quotation and turnaround

"The service work comes mostly from our 11 nationwide branches, and they will typically have customers who use several different brands," Bister suggests. "For the machine brands we handle – that are not limited to our partner brands – we will strip the machine down upon arrival, and assess it to identify the faults, before putting together a quotation for the repair, free of charge! All warranties are also honoured by the repair centre.

Our proactive approach to stockholding is key to rapid delivery times and for our brands, we have invested in spares stock and management systems to ensure that we can get a customer's welding equipment back in service quickly. We have Fronius and GYS control and power boards on our shelves, along with a full complement of the typical electronic components used in these and other welding machines. This enables us to quote for a repair within 48 hours of receiving a machine, and if the quote is accepted, our turnaround target is another 48 hours," Bister tells AF.

The new Fronius 2.0 calibration system enables welding machines to be rapidly calibrated and returned into service. The service can also be offered on GYS machines and machines from most other suppliers.

B.E.D.'s Wadeville welding service, repair and calibration centre – and the same facility at its branch in Cape Town – are both certified by the B.E.D. Group's international welding partners, including Fronius and Hypertherm.

The workshop is also supported by four fully equipped mobile demonstration and assessment vehicles, which enable B.E.D. to deliver on-site assessments, training and welding support services throughout the country. "We can service and repair a wide range of welding machines – including robotic and semi-automated systems – and critical spare parts such as IGBTs (Insulated-Gate Bipolar Transistors) are always available," he adds, pointing out that typically, B.E.D. assists customers experiencing wear-related faults, electronic component failure, calibration drift and issues linked to inconsistent weld quality. With the rise of semi-automated systems and demand for machine uptime, B.E.D. is also often requested to repair circuit boards, replace IGBTs or carry out full refurbishments.

The Fronius 2.0 calibration system

To enhance the calibration services for B.E.D. customers and assist them in meeting ISO 3834, EN/IEC 60974-14 and SANS 347 compliance standards, the company has invested in a state-of-the-art Fronius 2.0 calibration system. Fabricators

of safety-critical structures such as pressure vessels for rail and road vehicles need to achieve consistent weld quality. They need to know that the actual welding voltage, current and wire-feed speed delivered by their welding equipment is always the same as the meter readings. Regular welding equipment validation and calibration ensure that this is the case.

"We have bought a new Fronius 2.0 calibration system to enable us to rapidly calibrate and return a welding machine into service. This service can also be offered on any other welding machine brand, including GYS machines and machines from other suppliers," says Bister.

In the B.E.D. service, repair and calibration workshop, Mario Calado, Welding Repair Centre Manager, is on hand to demonstrate the calibration process. He is assisted by experienced Kobus van Dyk, Instrumentation Technician, and apprentice in training, Dylan Benade.

At the starting point, Calado says: "We always need to make sure that the machine is safe. So we do an insulation test to check that the contacts are isolated from each other. If a welder touches a machine and gets a shock, it is a clear sign that something live is touching where it should not," he says.

For recent Fronius machine models, the firmware of the machine is always updated, so that any new features and improvements can be included. Then calibration of a machine can begin.

The welding machine and the Fronius 2.0 calibration system are connected via the SpeedNet OPTi control cable and the welding power and earth cables. After adding some customer details, the Fronius 2.0 calibration system puts a range of welding loads onto the power source and instructs the machine to 'weld' at different currents and voltage levels. "For Fronius machines, the protocols are automatically set for each model, so for this calibration, we start at 400 A and 36 V, and it will then step down in five 90 A steps to 40 A and 10 V.

"The system can offer standard (within 2.5%) and precision (within 1.0%) accuracy, and if the welding machine can deliver the parameters within the ranges requested, then the metering will be automatically calibrated to match the actual currents and voltages within the selected range. A certificate is then provided to the customer, which verifies the machine accuracy," Calado explains.

On older Fronius power sources and non-Fronius brands, the Fronius 2.0 calibration system is not able to do calibration and verification automatically, but it does have a manual option. The B.E.D. technician sets each recommended current and voltage setting on the welding machine and enters these into the system. The Fronius 2.0 Calibration system will then feed back the actual measurements, one by one, and highlight 'OK' or 'not OK', with the measured difference. If the dials or digital meters need to be adjusted, however, this has to be done manually before retesting.

By offering optional professional calibration services as part of their repair process, B.E.D. helps fabricators to keep their welders safe while ensuring they can achieve consistent weld quality that meets client requirements. "This is a value-adding way of improving our customers' welding productivity – and of extending the useful life of their welding assets. By maintaining their welding machines, cleaning them regularly, blowing out the iron filings dust, and sending them in to us for an annual status check and calibration, fabricators can reduce downtime and rework, while helping welders to produce better quality work," concludes Craig Bister.

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Safety and NDT in complex, high-risk environments

As part of DEKRA Global's SEMEA region, DEKRA Industrial RSA is positioned to offer expanded services across Southern Europe, the Middle East and Africa in safety, training and NDT services. The company's Managing Director, Johan Gerber, explains.

A key aspect of DEKRA Industrial's success is its ability to respond to industry realities. "We operate in high-risk sectors where the margin for error is razor-thin," notes Managing Director Johan Gerber. "Whether working in petrochemical plants, power stations or confined industrial spaces, our teams apply expertise and behavioural safety principles to prevent incidents before they happen."

The challenges facing South African industry – including mental fatigue, overwork and economic strain – are top of mind for the company. "One of the biggest hazards today is complacency," Gerber cautions. "Employees are under pressure, and it is easy to slip into shortcuts. That is why our training also addresses mindset and awareness: focusing on practical, repeatable habits that reinforce safety," Gerber explains.

DEKRA Industrial's internal culture campaign #WhyIWorkSafe encourages personal ownership of safety and integrates human connection into its HSE protocols. This approach, combined with an investment in digital tools and AI platforms, provides the company with real-time data on performance, reaction times, and improvement areas.

A DEKRA NDT Inspector performs radiographic testing (RT) of butt welds using Gamma radiation.

A holistic safety offering

From advanced inspection services and NDT (non-destructive testing) to Learning Management System (LMS) training and occupational development, DEKRA Industrial and the DEKRA Institute of Learning – the company's adult-based education and training division – provide a fully integrated safety solution. Together, these two arms of the business combine operational precision with human-centred training, delivering measurable value to clients across high-risk sectors.

As Johan Gerber explains, NDT is not just for critical failures: "There are thousands of examples where a potential hazard is identified and prevented daily. These include detecting hydrogen leaks in turbine systems, identifying defects in boiler tubes, which, if not repaired, could lead to load shedding, and uncovering serious faults during inspections at high-risk industrial sites. Any one of these could have escalated into a catastrophic incident without early intervention," he advises.

This proactive approach is embedded in the DEKRA culture. The company continues to assist clients in mitigating and reducing risk, maintaining regulatory compliance and ensuring long-term operational safety through a blend of global innovation and local execution.

Safety is a deeply embedded value at DEKRA Industrial. "It is more than a department: it is how we operate, how we think and how we grow," says Gerber. "Whether it is through advanced training, on-site inspections, or the digitisation of compliance systems, we believe that safety is the foundation on which everything else is built."

This commitment is reflected in DEKRA Global's implementation of the Net Promoter Score (NPS) as a key performance indicator Group-wide. The company recently achieved a global NPS of 55.7, an increase of 1.1 points from 2023. A score above 50 is considered excellent according to Bain & Company benchmarks, indicating high levels of client trust and loyalty.

Alongside customer satisfaction, DEKRA Industrial has rolled out targeted LMS training across its teams on global standards for compliance, data protection and information security. "We have ensured that every employee, from field staff to managers, has access to clear, structured training modules," explains Chris Mörsner, Head of Training and Consulting at DEKRA Institute of Learning. "This includes sessions on anti-corruption, personal data handling and safeguarding sensitive information. We believe knowledge is a safety tool in itself."

The organisation's 10th consecutive NOSCAR Award, awarded in 2024, further underscores its industry leadership. Conferred after a rigorous audit process, the NOSCAR represents more than just compliance - it signals a culture of ongoing, proactive safety management. The company also achieved its highest-ever NOSA audit score in 2024 and continues to record zero lost time injury frequency rates (LTIFR) and zero disabling frequency rates (DFR).

As the company enters the next 100 years of iconic global safety leadership, its strategy remains clear: to evolve with industry needs, invest in its people, and deliver a holistic value proposition to clients.

"We are proud of where we have come from and very excited about where we are going!" concludes Gerber.

https://dekrsarsa.com

Powermax SYNC: smart and simple cutting and gouging

Hypertherm® and local premier partner B.E.D. have partnered to deliver the advanced Powermax® SYNC plasma cutting solution locally, which is not only high-performing but also supported by in-depth after-sales service and a shared commitment to customer success. Tim Sivewright, Distribution Sales Manager for Hypertherm in South and sub-Saharan Africa, and Craig Bister, B.E.D. Group Manager for the Welding and Cutting division, explain.

Craig Bister, B.E.D. Group Manager for the Welding and Cutting division and Tim Sivewright, Distribution Sales Manager for Hypertherm in South and sub-Saharan Africa.

Plasma cutting, according to Hypertherm's Tim Sivewright, is fast becoming a cost-effective, high-speed cutting solution for metals up to 50 mm thick. Especially in mild steel, plasma offers faster cutting speeds than oxyfuel cutting, and better affordability than fibre lasers for mechanised fabrication.

"In general fabrication, mining, agriculture and structural steel applications where cutting quality, speed and cost matter more than micron-level precision, Hypertherm offers hand-held plasma cutting systems which are far safer, faster and easier to use than oxy-acetylene gas cutting equipment and deliver far superior cut quality. Also available are mechanised systems that are often more than adequate alternatives to expensive laser cutting options," says Tim Sivewright, adding that at the recent NAMPO agriculture expo in May this year, B.E.D. successfully demonstrated and sold a Powermax65 SYNC directly off their outdoor stand, proof of this sector's growing requirement for cutting affordability and ease-of-use.

Tim Sivewright, Distribution Sales Manager for Hypertherm in South and sub-Saharan Africa, demonstrates the Hypertherm yellow drag cutting cartridge with the Powermax SYNC® plasma cutter.

Citing another B.E.D. success story, he recalls that, during Covid, the mining sector experienced severe oxygen shortages, which paralysed oxyfuel cutting operations. "B.E.D. stepped in with its Powermax30 Air solution, the smallest in the Hypertherm range. With its own built-in compressor, this powerful little machine can deliver an 8.0 to 10 mm finish cut and a 16 mm severance cut. B.E.D. sold about 90 of these machines to replace oxyfuel systems during the worst Covid year," Sivewright informs *AF*.

If cutting any metal thinner than about 50 mm, Sivewright says that plasma cutting will be far faster than any oxyfuel cutting process, and it will deliver a cleaner finish. "The process is also safer. No flashback arrestors are required, there are no hoses, no torch and no flame, so all those safety regulations around the use of explosive gases do not apply," he says.

"The plasma process, especially when using a smart Hypertherm Powermax SYNC cutter, is also far easier to use than any of the gas cutting processes. Almost anyone can be shown how to comfortably do a severance cut in 10 minutes," he suggests.

The Hypertherm Powermax SYNC® range

On the hand-held Powermax SYNC® range of smart plasma cutters, he says that the range starts with the Powermax45 SYNC, a 45 A plasma gouging, cutting and marking system, which offers a metal removal rate while gouging of 3.4 kg/h with controlled groove dimensions of 3.2 mm deep and 6.8 mm wide. In handheld cutting mode, the 45 SYNC can deliver a 16 mm profile cut and a severance cut of up to 29 mm.

The range also includes the Powermax65 SYNC, Powermax85 SYNC and the Powermax105 SYNC, for gouging and cutting up to 32 mm material. "All the machines in the Powermax SYNC® range are designed for drag cutting, bevel cutting, fine feature cutting, extended reach cutting, controlled gouging and marking," Sivewright notes.

The smart cartridge-based system

Key to making Powermax SYNC plasma cutting easier than ever is the built-in intelligence of the single-piece cartridge for the plasma torch. "Hypertherm has revolutionised plasma cutting and gouging with its innovative range of plasma cutting cartridges, which make cutting far easier and safer than traditional plasma systems that depend on multi-component torch consumables," Sivewright continues.

"Cutting off the lifting hooks on a vessel or structure, for example, is very difficult with oxyfuel cutters, and if using a traditional plasma cutter, a significant amount of grinding will be required after cutting, because it is impossible to get a flush cut with any traditional oxy-fuel or plasma torch," he tells *AF*.

Hypertherm's FlushCut™ smart cartridge, however, makes this task easier than ever. Designed with a 45° bevel to enable the operator to slide the torch along the edge of the hook, and a nozzle angle

which directs the plasma arc horizontally, this cartridge enables a lifting hook to be cut off leaving a flat finish with only a few millimetres of residual material.

Different colour-coded cartridges have also been developed for each different plasma cutting, gouging or marking task. “As well as the black FlushCut™ cartridge, there is a yellow drag cut cartridge for easy hand cutting, a green cartridge for gouging and, for mechanised cutting on a table or tractor, we have a purpose-designed grey cartridge,” he says.

“Hypertherm is the only plasma equipment manufacturer in the world that has built its machines around this innovative, industry-first smart cartridge system. Each cartridge has an RFID identifier that communicates with the plasma power source to set the appropriate mode: drag cutting, flush cutting, gouging or marking, for example.”

The RFID-enabled cartridges also enable the power source to monitor usage and communicate with the system, providing an early warning if the consumable is nearing its end-of-life. “And although the cartridges might cost a little more than a traditional pack of separate consumable components, one cartridge lasts up to five times longer than traditional plasma tc consumables, and there is no complica ed disassembly and reassembly proces involved in changing a cartridge.

“Tool-free installation and automatic set-up reduce operator error, while the combination of improved cut quality, longer consumable life, and faster, error-free cutting lowers the total cost of ownership compared to traditional plasma and oxyfuel cutting,” confirms Sivewright.

Different colour-coded cartridges have been developed for plasma cutting, gouging or marking tasks: black for flush cutting; yellow for drag cutting, green for gouging and grey for mechanised cutting on a table or tractor.

B.E.D.’s welding, cutting and repair network

With dedicated welding service centres in Gauteng and Cape Town, B.E.D. offers customers full lifecycle support for Hypertherm products, including training, onboarding and repairs. These centres are staffed by seasoned welding and cutting experts, providing customers with highly skilled and responsive support from professionals who understand South African industry.

“Our growing branch footprint of 11 branches nationwide ensures that we can deliver welding and cutting products where our customers are, and where they are needed most. From on-site demonstrations to customised onboarding, we assist customers to deploy Hypertherm systems quickly and effectively, whether helping shop floor personnel to achieve better manual cut quality and efficiency, retrofitting local CNC cutting tables, or integrating systems into modern fabrication lines,” says Craig Bister.

Sivewright adds: “With rising competition from low-cost imports, we can offer a smart value proposition built on cutting quality, uptime and technical confidence. The Hypertherm Powermax SYNC system is designed to lower operating costs over time, while B.E.D.’s comprehensive support ensures customers can extract full return-on-investment from every machine,” he concludes. ***www.bolteng.co.za***

Malben Engineering's data-centric approach

African Fusion visits South African automotive component manufacturer, Malben Engineering, takes a tour of the facility, and speaks to Quinten Ballot, Head of Maintenance; Matthew Boodram, Welding Quality Lead; and Cheslyn Reid, Metrology and Welding Quality Systems Head, about the integral role of process control and inspection in ensuring consistent quality in safety-critical welded components.

Matthew Boodram, Welding Quality Lead; Cheslyn Reid, Metrology and Welding Quality Systems Head; and Quinten Ballot, Head of Maintenance are key members of Malben Engineering's process control and inspection team.

Founded in 1974 by Amerigo Smargiasso and five other partners to manufacture tooling and pressed metal parts for the automotive industry, Malben Engineering has continued to invest and grow throughout its 50-year history. The company has recently opened Plant 2, a new state-of-the-art Tier 1 component manufacturing facility at its Nigel premises in Gauteng, for pressings and high-level welded assemblies.

The backbone of Malben Engineering's operation remains metal pressing. Five new Yadon stamping presses have been installed in the new plant: two 630 t and one 800 t progressive presses, as well as two fully automated presses with integrated transfer systems from Siemens Automation, rated at 1 250 and 1 600 t of stamping force, respectively. The presses are an important component in the welding process.

"The consistency of metal pressings is crucial to downstream processes like welding," says Quinten Ballot. "Automotive original equipment manufacturers (OEMs) assemble using robots. As such, they cannot accept components that vary from their tight specification, as that would affect their fitment and welding processes," he explains.

Given this complexity, pressings used in the welding processes are placed in a part-specific checking fixture every 15 minutes, to ensure consistency is maintained and that the fixtures can be repeatedly used in the downstream welding process. For tracking dimensional accuracy of products off the presses, the company has equipped its metrology laboratory with CNC-controlled profile measurement systems, as well as a 3D blue light laser point cloud scanner that delivers rapid, accurate measurement data.

"We place a lot of emphasis on stabilising pressings, focusing on variation reduction and repeatability. We track all material variances – including mechanical properties – to drive press set-ups and ensure repeatability," adds Cheslyn Reid.

Welded assembly

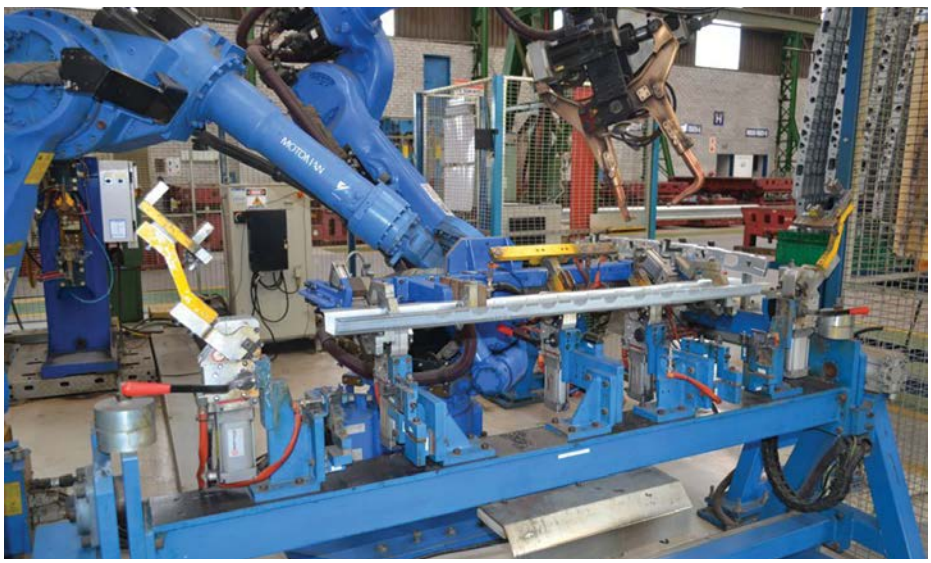
Malben has been welding components for the automotive and other industrial sectors since its inception 50 years ago. However, for the past three years, the company has been proactively improving its welding and assembled product quality with the aim of becoming a market leader in the Tier 1 automotive sector.

"The Plant 2 development was largely driven by the need to meet the specifications of the automotive OEMs in South Africa, which are manufacturing for global markets," Reid continues, adding that Malben Engineering has established meticulous standards for data collection, with a laser-sharp attention to detail around every assembly process.

"This is what differentiates us from our competitors. We have invested in statistical data control – often referred to as 'statistical process control' or 'SPC' – from start and end points of every production process. This is to ensure that each completed part fully meets the safety and dimensional accuracy standards required," he says.

The advantage of Malben's automation and attention to detail is predictability and consistency, which go hand-in-hand: "In our sector, we are doing production welding for mass production runs. So our welds must be he same, every time," says Reid.

The company is compliant with welding standards, including being one of the first in South Africa to achieve the CQI 15 quality standard. Malben is also one of the first Tier 1 suppliers to be awarded an A-rating and green status in quality, by maintaining a zero margin for defects and a rejection rate of zero parts per million (ppm).



The multi-robot assembling station for a safety-critical chassis cross member in Malben Engineering's Plant 2 facility.

Malben's chassis cross-member assembly station

Downstream of the Yadon metal presses in Malben's Plant 2 facility is a multi-robot assembling station for a safety-critical chassis cross-member. "This assembly station has two spot welding robots, a handling robot,

to welding automation

The safety-critical back panel for holding a vehicle's rear seatbelts is robotically-welded using advanced variable pulse MIG welding technology.

a projection welding robot and a sealing station," explains Quinten Ballot. "It is an excellent example of our fully automated fail-safe approach," he says.

The handling robot picks up a cross member pressing from its loading station, which initiates the cycle. The robot then swings around to the projection welder and lines up one of the holes. Using ceramic pins to centre the part, a nut feeder automatically loads a nut into position before actuating the projection welder. All of this happens within seconds and without any human intervention.

"Only if the sensor detects an in-place nut will it allow the robot to move on to offer up another hole for placing and welding a nut," he notes. This 'place-weld-check' routine is repeated until all four nuts are successfully welded into place.

"From there, the same robot turns the part by 180° and carries the assembly to a sealing station, where the sealer is applied in the required quantity and position by a sealant applicator. The part is then placed into one of two spot welding jigs on the opposite side of the cell, first ensuring that the previous cross member has been removed," Ballot explains.

The part is properly clamped, which is checked as part of the fail-safe process, and four more sensors in the fixture ensure that the nuts are all in place. Finally, a further 28 spot welds are welded in sequence by the robot to secure the brackets and to ensure the final assembly is ready to ship to the customer.

To guarantee the strength of these spot welds, the tip of the spot welding gun is redressed after every fifth cycle. "The tips of a spot welding gun are copper, and they need to transfer a high current pulse through the steel of the pressing to heat and fuse the material between the points of contact. These tips typically have a welding surface of approximately 5.0 mm in diameter to conduct the current and deliver the necessary weld nugget size. They soften and flatten with use, however, enlarging the contact surface, which drops the resistance and reduces the heating effect.

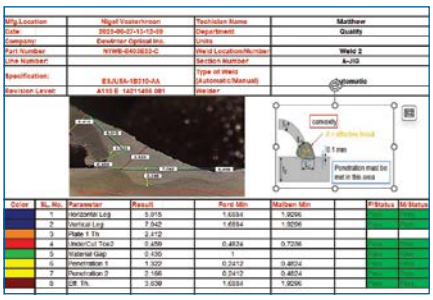
So, to retain the consistency we need in terms of weld strength, the system is programmed to take the spot welding gun to a tip dresser every five or so cycles to clean and flatten the contact surfaces back to the 5.0 mm diameter," Quinten Ballot tells *AF*.

A camera scans the dressed tip to ensure the correct size has been achieved, and the process cycle begins from scratch. The entire process – from the tip dressing frequency to the welding parameters – is verified at the start of the project, with Designs of Experiments (DOE) to validate the settings. DOEs are conducted at various intervals as processes are improved and streamlined.

Cheslyn Reid adds that Malben Engineering is currently able to successfully produce 750 000 projection welds and 1.7-million spot welds every month: "And that is based on a one-and-a-half shift pattern, so we still have spare capacity."

Weld testing and SPC

'The data will set you free' is the mantra that drives Malben Engineering's data-driven approach, which helps to ensure that the company's quality standards are met. Typically, the Malben standard is 10 to 20 % higher than the OEMs' suggested standard. The centre for collecting this data is the weld-testing laboratory.



MIG welds are routinely tested at a predetermined frequency to ensure the ongoing integrity of the production welds.

"We collect multiple samples from our production lines every day to test and measure, and all the data we collect is recorded in our SPC system for tracking and quality assurance records," says Matthew Boodram, Quality Lead of Malben Engineering's welding and testing laboratory.

For testing the strength of resistance spot welds, Malben uses a destructive peel test. This sees the weld separated using a pneumatic chisel. "We use a vernier to measure the true minimum size of the fused nugget, which is uploaded into the SPC system," he says.

One of the more complex assemblies that Malben Engineering manufactures is the safety-critical back panel for securing a vehicle's rear seatbelts. These are robotically welded using advanced variable pulse MIG welding technology. "We have developed a bracket pull test for this component, which has to withstand 6.0 kN of force. Furthermore, as with all MIG welds, we routinely test cross-section welds at a predetermined frequency to ensure the integrity of the weld. For this, we prepare weld sections from the sample, which we polish and etch to enable us to take accurate measurements under a microscope of the fusion area and leg length. This also allows us to identify any deformities such as porosity, cracks or undercuts. Additionally, we can access the gap condition, which gives us a sense of how good the fit-up was during welding," he says.

"Tracking this data using run charts on a daily basis enables us to react very quickly to changes. This is key to Malben's success," says Boodram.

Cheslyn Reid agrees: "At Malben Engineering, we consistently deliver top-quality welded components and complex assemblies. This gives us a key competitive advantage in the global automotive space, which we will continue to leverage moving forward," he concludes.

https://malben.co.za

20 years of CMT: unrivalled welding precision

Fronius, an innovation leader in arc welding, is celebrating the 20th anniversary of its revolutionary Cold Metal Transfer (CMT) welding process. Since its introduction in 2005, CMT has changed the world of welding and set new standards in precision, stability and versatility.

The highly dynamic and precise wire movement of the Robacta Drive CMT drive unit enables the reversing wire movement that makes CMT so unique.

The CMT process is based on reversing the wire-feed direction during short-arc welding to enable controlled droplet detachment during the short-circuiting cycle. This movement ensures a stable arc and minimises heat input.

This results in almost spatter-free, clean welds that have high quality and aesthetics. Another advantage of the CMT process is the low thermal load on the workpiece. This reduces distortion and deformation, which is an enormous advantage, especially when working with sheets as thin as 0.3 millimetres and temperature-sensitive materials. Precise control of the welding process helps tackle demanding welding tasks with the highest degree of accuracy.

CMT opens up the possibility of joining different materials together. For example, galvanised steel and aluminium can be welded safely and reliably. This creates scope for creative solutions in the production process.

A variety of applications in different industries

"Over the last two decades, CMT has established itself as a versatile welding process that is used in numerous industries. Sometimes, even we are impressed by the diversity and creativity with which our customers use CMT to their advantage and to solve their welding challenges," says Franziska Eichhorn, Strategic Product Manager for Fronius International.

The automotive industry, for example, uses CMT to join thin sheets and lightweight materials such as aluminium, ensuring strong and reliable connections for vehicle frames and components.

CMT has also proven its worth in the aerospace industry, where the process allows the welding of high-strength and lightweight materials that are essential for the construction of aircraft and spacecraft.

In addition, due to the outstanding stability of the welding process, CMT is used for 3D printing/additive manufacturing, and in the electronics industry, where it is used to braze components precisely.

Intelligent air gap and edge detection

CMT's back-and-forth movement of the wire has also revolutionised robotic welding with the WireSense intelligent assistance system. This significantly improves seam quality and efficiency by detecting inaccuracies and deviations in industrial production and avoiding them using the CMT welding process. The welding wire serves as a precise sensor that can very accurately determine the position of the weld and dynamically adjust it. This saves material, time and costs, as rework and rejects are reduced.

For robotic welding, any intelligent Fronius welding machine can be simply retrofitted for CMT using the CMT Welding Software Package, the Robacta Drive CMT torch, and SplitBox SB 60i R hardware components.

CMT is fit for the future

"The decisive factor is the perfect interaction of the components and the precision with which they are controlled," emphasises Eichhorn. "The harmony with which our intelligent welding machines and the CMT Robacta Drive unit –the second wire feeder mounted inside the torch – work together is still unmatched today and is constantly being further developed to meet the increasing demands of industry. And the best thing about it: CMT can be easily retrofitted to all intelligent Fronius devices," adds Eichhorn.

Over the years, Fronius has continued to perfect CMT and developed application-specific optimised welding characteristics such as CMT Mix, CMT Cycle Step, CMT Cladding and CMT Braze.

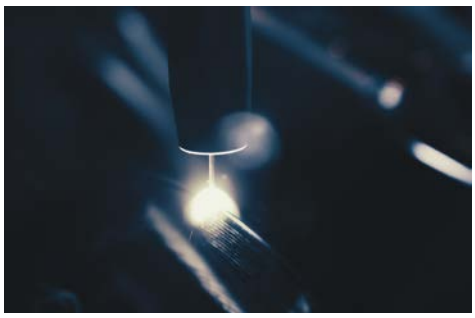
Laser Hybrid CMT, on the other hand, combines the advantages of laser welding with CMT technology. When used on high-strength steels and aluminium components, this combination boasts high speed, quality and cost-effectiveness. A highly focused laser beam that penetrates the base material with a high energy density is

immediately followed by the CMT process, which increases the seam volume and can further reduce the heat input.

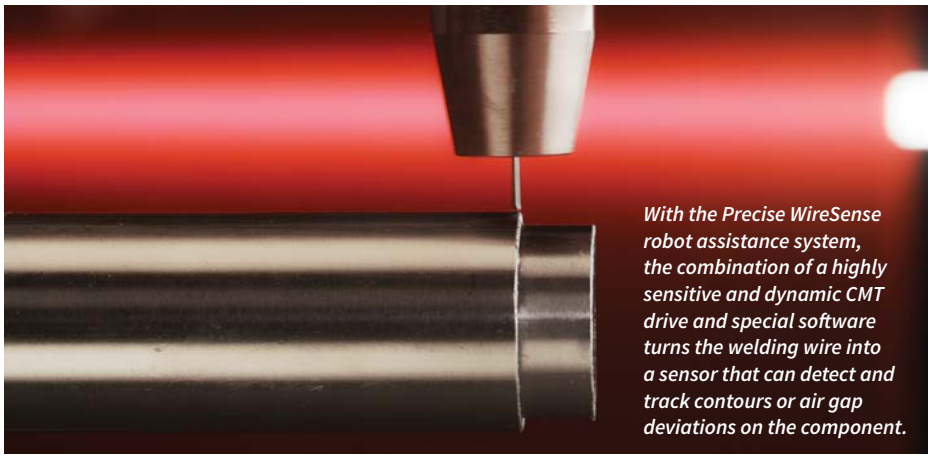
The latest achievements are the CMT Additive Pro characteristics, which are optimised for metal 3D printing, taking additive manufacturing to a new level.

www.fronius.com

CMT Cycle Step enables welders to set both the number of individual droplets per welding spot and the pause time between cycles. This allows a high degree of precision and reproducibility, as well as a flawless weld seam.



The Fronius development team has added valuable features to CMT for optimal 3D printing results. CMT Additive Pro impresses with its particularly even layer structure, high quality, and stability.



With the Precise WireSense robot assistance system, the combination of a highly sensitive and dynamic CMT drive and special software turns the welding wire into a sensor that can detect and track contours or air gap deviations on the component.

Nitraweld: the concession-free shielding solution transforming laser welding

_AF_ visits the Midrand facility of Nitralife and talks to MD Tom Sowry about his company's new Nitraweld range of nitrogen generators – the first to be developed for laser welding for delivering continuous, on-demand, high-purity nitrogen gas for modern laser welding machines.


Nitralife MD, Tom Sowry.

A nitrogen generation pioneer back in the 1960s, Sowry's father, Rob Sowry, became one of the first people in the world to commercially fill tyres for off-road mining vehicles with nitrogen. "In those days, this could only be done by renting cylinders of pure nitrogen from one of the large local gas companies, as on-site nitrogen generators were not available back then," says Sowry.

So in the 1980s, Rob Sowry started to package nitrogen generation machines that could make nitrogen on demand. Then, in 1996 – the inception of Nitralife as it is known today – the company launched its first locally manufactured on-site nitrogen generator, which was installed into the commercial transport industry for inflating tyres. "We have since supplied thousands of these systems, not only for mine tyre inflation but also for industrial, medical and food applications, such as spray painting and modified atmospheric packaging (MAP), for example," Tom Sowry tells _AF_.

Nitraweld nitrogen generators can produce on-demand nitrogen shielding gas to supply one, two or three laser welding machines.

Laser and plasma cutting

By 2014, the technology had improved significantly and Nitralife began to explore other ways in which their nitrogen generators could be used. This led to the introduction of Nitracut, an on-site solution for the booming laser and plasma cutting industries.

"We built our first nitrogen generator for laser cutting back in 2017, for a client fusing plastic. This same client brought in an industrial laser from China, and we built a machine that could supply the nitrogen gas required for a laser cutting machine. This development has completely transformed laser cutting in South Africa – and we have since sold over 250 of these into fabricators and for cutting-related operations in South Africa, USA, Europe and the Middle East," says Sowry.

These on-site nitrogen gas generators are all custom-built to provide a continuous, reliable supply of nitrogen-assist gas for laser or plasma cutting. "Producing nitrogen gas as and when needed can be done at a fraction of the cost of renting and refilling nitrogen cylinder bundles or installing a liquid bulk tank," he points out.

"The nitrogen produced is essentially free, and nitrogen gas, while preferred for stainless steel cutting, can also be used to cut mild steel, often faster than with conventional oxygen and with greater precision and detail. In addition, our Nitracut generators work seamlessly with both CO_2- and fibre laser-cutters of all brands," he notes.

NitraLife also manufactures Nitracut generators for the premium Swiss-made Bystronic fibre laser brand. One of the company's Nitracut systems is running on a Bystronic fibre laser cutter, manufacturing railway components for SBB Rail in Switzerland, cutting the steel needed for their railway network. "These fibre lasers are running 24/7, and our nitrogen generators are uniquely suited to the task of continuously producing on-demand nitrogen to exactly match the cutting need," he explains. This means less downtime, improved safety, and significant long-term cost reductions for customers.

"Our systems are all locally manufactured, with reliable supply and fast delivery – including in original equipment manufacturer (OEM) co-branded formats.

Concession-free laser welding

These days, continues Sowry, fabricators with fibre laser machines often also have laser welding machines, and these need a shielding gas to prevent oxidation. Argon and nitrogen gas are recommended for laser welding, but customers using Nitralife's Nitracut solution saw the sense in using the same gas for laser welding.

"So last year, we built a few prototype Nitraweld nitrogen generators for producing on-demand nitrogen shielding gas to supply one, two or three laser welding machines at any one time," Sowry tells _African Fusion_.

Nitrogen gas, he says, is not considered suitable for use in TIG or MIG welding, because the gas ionises in the electric arc, allowing nitrogen ions to diffuse into the weld metal, causing porosity when it reforms to N_2 gas. "However, a laser weld uses a light beam as the heat source to melt the steel, so nitrogen retains its gas-shielding properties just as well as argon does, and in

some cases, even better," he explains, adding that there are no material limitations to nitrogen's use for laser welding.

Customers report identical visual and structural weld results to those achieved with argon, but at a fraction of the operating cost.

"We are very excited about this, because with the other applications of nitrogen generators, we have always had to make small concessions – with respect to purity, for example – and we always had to also supply an air compressor with our Nitracut and Nitralife machines.

"Nitraweld machines can be plugged into the plant air that customers already have, so a specific compressor is not required. This already cuts the investment cost of an on-demand shielding gas solution for laser welding in half."

Describing how a Nitraweld nitrogen generator works, Sowry says that the nitrogen is produced on demand through polymer membrane filtration. "We can produce a continuous flow from any compressed air supply. We drop about one bar of pressure across the membrane, but for shielding, all we need is a gas flow of around 25 ℓ/min, with the outlet pressure a little above atmospheric," he explains.

"The machines are remarkably simple, but by understanding the laser welding application, we have been able to put together an ideal solution. A Nitraweld unit goes next to the laser welder and plugs into the client's existing compressed air line. No power is required, and the fabricator never has to order another cylinder again! These machines typically pay for themselves in less than a year," he points out, adding that it also makes the laser welding process much more operationally viable and financially attractive.

"Many of our customers have already switched from using liquid nitrogen on their laser and plasma cutters to using our Nitracut machines. They have seen Nitracut machines successfully supplying their cutting machines for the past six to eight years, and switching to using Nitraweld generators for laser welding offers even better return-on-investment.

"This, therefore, makes it easy for fabricators to enter the laser welding market, with a Nitraweld nitrogen generator pushing up the total package cost by a small margin. Then customers do not have to buy a regulator; they do not need a gas contract with a supplier; there are no safety issues with carrying and storing cylinders; and no downtime in replacing empty ones.

For shielding a laser weld, all that is needed is a gas flow of around 25 l/min, with the outlet pressure a little above atmospheric.

"All with no concessions and no downside. A Nitraweld generator, custom-built for the laser welding market, offers a seamless switch-over from a cylinder or bulk gas shielding alternative, with immediate and massive savings, safety and productivity advantages," Sowry concludes.

https://nitralife.co.za

Swiss Steel's premium stainless steel welding wire range

Swiss Steel is making its premium Ugitech range of stainless steel and high-nickel welding wires available for direct distribution to South Africa's fabricators. The company's MD, Mohamed Imran Kajee, introduces the range.

For nearly 18 years, Ugitech welding wires from Swiss Steel have been a preferred option for Tier 1 manufacturers of exhaust systems in the automotive sector. "These customers perform robotic welding using large, customised drums, which we supply in bulk. Now, though, we are introducing a wide range of Ugitech wires into South Africa in standard 15 kg spools, focusing on our stainless steel and nickel-based welding wires," says Mohamed Imran Kajee (Imran K), managing director of Swiss Steel in South Africa.

"We have long been supplying wires that are particularly well suited to manufacture modern exhaust systems, especially those with catalytic converters. Now the Ugitech range includes wire grades for other high-integrity work such as stainless tanks and beer kegs, which all have the relevant quality approval certifications required: VdTÜV Merkblat Schweisstechnik, the construction standard for safety-critical vessels; KTA 1408.2, the Quality Assurance standard for filler metals for nuclear power plants; and DB Systemtechnik for use in railway vehicle construction according to the EN 15085 standards," adds Imran K.

Swiss Steel in South Africa

Swiss Steel, originally a division of the global Thyssen Group, has been trading in specialty steels in South Africa since 1969. "We became part of Swiss Steel back in 2004, when our metals division was sold off. We then became Schmolz+Bickenbach.

Then in 2020, when the family that owned Schmolz+Bickenbach disinvested, our name was changed to Swiss Steel South Africa," says Kajee.

In terms of its product range, the company has always been known as a supplier of tool steels, stainless steels, and engineering steels for use in South Africa's manufacturing sector. "We are heavily involved in the plastic mould industry and the hot and cold forming sectors, supplying the steels for manufacturing moulds and dies used in presses. Our tool steels are used in low-pressure die-cast moulds for mag wheels for local OEMs, for example," he says.

"On the stainless steel side, we have also established a wide range of stainless steel long products, with properties matching various application needs, for the food processing and medical processing industries.

"Then we have our welding division from Ugitech, which gives us a fully integrated development, manufacturing and distribution service that includes Ugitech stainless steel and nickel-based welding wires and rods," Imran K tells *AF*.

Ugitech welding consumables

Ugitech has two mills, one in France and one in Italy, each equipped with a melting shop, rolling mills, finishing shops and wire drawing plants. Each mill offers direct technical support for clients anywhere in the world. "This enables Ugitech to guarantee total process control, from steelmaking to final wire drawing and packaging," notes Swiss Steel's Imran K.

Ugitech can offer premium high-quality welding consumables materials for MIG, TIG and SAW welding applications. These wires are drawn to deliver a superior surface finish for enhanced wire feeding and improved welding productivity. "Our fully integrated manufacturing process allows us to ensure a consistent quality for regular and homogeneous welding performance," he tells *AF*.

Ugitech mills are ISO 9001/2008 and ISO 14001 certified, and, as well as meeting relevant VdTÜV Merkblat Schweisstechnik 1153, KTA 1408.2 and DB standards, most have the CE mark following the requirements of EN 13479.

The available grades include austenitic, ferritic, martensitic, and duplex stainless steels as well as nickel-based alloys and copper-nickel alloys. This range, which is

Swiss Steel South Africa's Gqeberha facility. The company also has its South African head office in Johannesburg and distribution warehouses in Durban and Cape Town.

Swiss Steel is now bringing a wide range of Ugitech wires into South Africa for distribution in standard 15 kg spools.

now being made available by Swiss Steel South Africa for distribution in 15 kg spools, is summarised in Table 1. "Additional specialist grades are also available via our overseas mills," he adds.

Collaboration opportunities

"We are currently looking to collaborate with local distributors to help us distribute these excellent wires more widely across Southern Africa. We believe that the use of stainless steel is likely to grow. As well as for modern exhaust systems, the dairy industry is significant for us at the moment, where high-integrity stainless welding is essential to enable clean-in-place systems to work effectively and to prevent bacterial growth and contamination.

"We also have a strong road tanker industry for export into Europe, so CE standards are essential, and we are beginning to see interest from people manufacturing tanks and containers, including beer kegs.

"In Europe, Ugitech welding consumables are seen as one of the best for this type of application, and the introduction of 15 kg spools to the local market gives local manufacturers better access to this premium option. For anyone wanting to export competitively priced, high-quality stainless components, we believe our Ugitech wires could be the best possible choice," concludes Imran Kajee.

https://swissteel-group.com/en

Ugitech Brand	AWS A5.9	ISO 14343 - A
UGIWELD 308LM	ER 308LSi	19 9 L Si
UGIWELD 308LT	ER 308L	19 9 L
UGIWELD 4370M	ER 307Si	18 8 Mn
UGIWELD 309LM	ER 309LSi	23 12 LSi
UGIWELD 309L	ER 309L	23 12 L
UGIWELD 309LMo	ER 309LMo	23 12 2 L
UGIWELD 316LM	ER 316LSi	19 12 3 LSi
UGIWELD 316LT	ER 316L	19 12 3 L
UGIWELD 310	ER 310	25 20
UGIWELD 347M	ER 347Si	19 9 Nb Si
UGIWELD 45N	ER 2209	22 9 3 N L

Table 1: Some of the premium stainless steel grades of Ugitech welding wire now available in South Africa in 15 kg spools from Swiss Steel for MIG, TIG and SAW welding applications.

Power your productivity with Nitraweld. Produce your own laser welding shielding gas on site, on demand.

Generate your own shielding gas at a fraction of the cost as you require it. The Nitraweld is compact, modular and customisable - from one welder to multiple laser welders around the factory floor.

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Why businesses trust Unique Welding

In the demanding world of fabrication, manufacturing, mining, and construction, having the right welding partner isn't a luxury – it's a necessity. And for thousands of companies across Southern Africa, that partner is Unique Welding.

Unique Welding's comprehensive Thermamax range ensures welding-related solutions can be found quickly, without calling multiple suppliers or facing weeks of delays.

With over 50 years of legacy and experience, Unique Welding has become one of the most trusted names in the welding and gas sector. What sets this company apart isn't just its history or impressive growth– it's how it continues to show up, every day, for businesses big and small. Whether it's delivering equipment to a rural workshop or advising a major industrial site on optimal welding processes, Unique Welding is built to serve and built to last.

The extensive branch network

Logistics is everything when running time-sensitive operations. That's why Unique Welding has made strategic expansion a key part of its offering. Today, the company operates 14 fully functional branches across South Africa, each positioned to provide fast, local service to clients in every corner of the country.

This isn't a hollow national footprint; it's real people, in real branches, delivering support where and when it's needed most. From Johannesburg to the Cape, the presence of Unique Welding branches means customers get personalised service backed by a nationwide system of distribution, stockholding, and expertise.

This branch network is the backbone of the company's customer-first approach: local teams who know their communities, understand their clients' needs, and can respond quickly and effectively to any request or challenge.

Backed by industry leaders

When choosing Unique Welding, clients are not just choosing a welding supply company; they are aligning with a much larger force. In 2022, Unique Welding became a subsidiary of Air Products South Africa, part of the Remgro Group and one of the country's most respected names in industrial gas. This acquisition has strengthened the company's already-solid foundation, offering clients access to the backing, resources, and innovation of a global industry leader, while providing additional layers of financial strength, strategic oversight and long-term stability.

What does this mean for customers? It means confidence. Confidence that they're working with a supplier who's financially secure, globally connected and fully equipped to scale with client businesses and to support complex projects.

A massive product range

In an industry where downtime can cost thousands of rands per hour, having what is needed on hand is crucial. Unique Welding understands this better than anyone, which is why the company stocks a comprehensive range of over 4 500 high-quality products, covering every corner of the welding and gas spectrum.

This includes: welding machines and power sources; industrial gas, gas equipment and accessories; filler metals, electrodes and abrasives; safety wear, helmets, gloves and PPE; along with tools, clamps, cables and more.

Wherever TIG, MIG, MMA, plasma cutting, or gas welding is needed, Unique Welding's Thermamax range ensures a solution can be found quickly, without calling multiple suppliers or facing weeks of delays. But it's not just about having stock. It's about having it ready, positioned close to customers at the branch level, and supported by a team that understands how to match the right product to the right application.

Fast, reliable delivery

Speed without reliability is useless. That's why Unique Welding has built a dedicated delivery fleet of over 60 vehicles, operating daily to ensure that products move fast and arrive on time.

From urgent site deliveries to scheduled supply runs, the company's logistics operations are designed with the customer in mind. Orders are processed efficiently, tracked in real-time, and handled with care from warehouse to doorstep. This reliability has made Unique Welding the go-to partner for operations that can't afford mistakes or delays. When clients place an order, they know it will arrive safely and on schedule.

In today's fast-paced industries, next-day delivery isn't a nice-to-have – it's a necessity. That's why Unique Welding has implemented a next-day delivery option for many of its most in-demand items. This service isn't just about speed. It's about helping customers stay operational, meet deadlines, and reduce costly disruptions to their workflow.

A true partner

Behind the products, the branches and the delivery fleet is a team that lives and breathes welding. Unique Welding isn't a faceless warehouse operation; it's a network of South African professionals who are passionate about what they do and who take pride in helping customers succeed.

Whether offering advice on the right machine for a process, helping to troubleshoot technical issues, or ensuring products are being used safely and efficiently, the people at Unique Welding are there every step of the way.

The business is focused on one key thing: helping Southern African industry move forward. In an environment where costs are rising, competition is fierce, and time is everything, it pays to work with a partner who understands the welding business and has the resources to keep it running.

Wherever clients are in South Africa, Unique Welding is ready to support their operation with the right products and advice – and with the right attitude.

www.uniquewelding.co.za

Electrochemical cleaning: The total solutions offering

Sean Blake of welding innovations and consultancy, ArcStrike, outlines the benefits of electrochemical cleaning of stainless-steel weld seams and weldments, and the advantages of relying on the leading global specialist in the technology, Nitty Gritty, for applications' support and to ensure safe, reliable and environmentally friendly results.

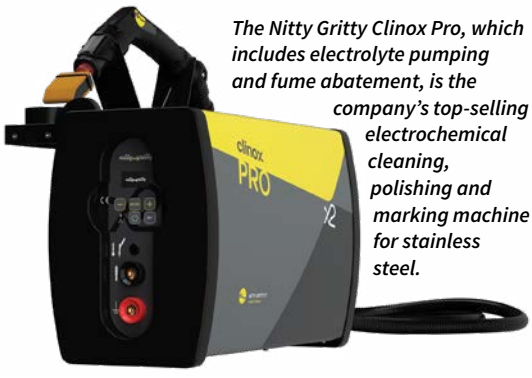
Nitty Gritty surface-cleaning and polishing machines with wide brushes are ideal for cleaning the sides of stainless-steel railway vehicles.

Nitty Gritty's range of chemical cleaning solutions is designed for use on stainless steel welds and surfaces, as a replacement for legacy paste-based pickling and passivating processes, explains Sean Blake of ArcStrike, a local stainless-steel specialist and the distributor of Nitty Gritty chemical cleaning machines and consumables.

Pickling is done to remove impurities from the surface of stainless steel, such as rust, scale, heavy oxidation, and the heat tint from welding. Pickling produces a chromium-rich layer, which then promotes passivation, the process in which surface chromium reacts with oxygen to form a protective layer on the surface of the material. This perfectly sealed and self-healing passivated surface layer gives stainless steel its corrosion resistance.

Dangerous legacy methods

The legacy process for pickling and passivating stainless steel has always been to use a thick pickling paste, which is spread onto the area being treated by hand with a brush. This paste is usually a mixture of hydrofluoric acid (HF) and nitric acid (HNO_3), which are both aggressive, corrosive and dangerous chemicals. "The HF reacts with the surface of the stainless to remove the top layer of iron and oxides, while the HNO_3 reacts later, reacting with chromium to build the passive layer," Blake tells *AF*.



The Nitty Gritty Clinox Pro, which includes electrolyte pumping and fume abatement, is the company's top-selling electrochemical cleaning, polishing and marking machine for stainless steel.

Pickling paste is dangerous! Hydrofluoric acid, which causes severe burns if touched and is toxic if inhaled, is subject to work exposure limits of around 3.0 ppm for 15 minutes, while nitric acid is also highly corrosive, causing lesions on the skin, eyes and mucous membranes on contact. Nitric acid emissions are also generated during the process, which contribute to acid rain and smog and are harmful to the ozone layer. A work exposure limit of 4.0 ppm for 15 minutes applies.

Rinsing and disposal are other disadvantages. Large amounts of rinse water are required to remove the used paste. This water becomes acidic and contains residues of heavy metals, so containment, treatment and safe disposal are essential, adding to the costs.

Electrochemical cleaning, the safer alternative

"Nitty Gritty has been developing this process for over 30 years, exclusively focused on the surface quality of stainless steel welds and weldments," says Blake.

Electrochemical cleaning machines use an inverter to generate a current flow for pickling and polishing processes. This alternative solution enables more dilute acids to be used, making the process a safe, eco-friendly, productive and economical way to restore weld joints and surfaces of stainless steel weldments.

"Nitty Gritty electrochemical machines have three functions. As well as pickling and polishing, cleaning machines have permanent marking functionality with an optional marking kit," he adds.

The Nitty Gritty's Bomar electrolytes used in the process are mild and less toxic, with some classed as non-dangerous chemicals. For pickling, there are three options: Neutral Bomar (blue), which is a mix ideal for food and beverage and pharmaceutical products; TIG Bomar (green), a much lower pH but still classed as non-dangerous; and Brill Bomar (red) is the most aggressive and can be used for electro-polishing as well. These are applied using one of many 'torch' designs with various brush size options, and an advanced transmission delivery system that ensures optimal electrolyte flow onto the workpiece.

"After electrochemical cleaning, a spray-on, wipe-off finishing solution called INOX Fit is used, which also degreases and neutralises the surface. No further cleaning, rinsing, or post-processing is required," Blake points out. "While there is a small amount of waste effluent that should be disposed of responsibly as it contains heavy metals, since there is minimal rinse water and no need to dilute and neutralise, the volume tends to be a fraction compared to the legacy method," he adds.

The total solution advantage

Nitty-Gritty, thanks to its R&D efforts over 30 years, has a complete range that can deal with any type of weld and on any thickness. "Nitty-Gritty machines are suitable for easy jobs and complex stainless-steel tanks, and the company is continuously developing new products and solutions to advance the process," says Blake.

A wide range of different machines and accessories is now available: from small machines with brushes to get access into small areas, such as single spot welds, to surface-cleaning and polishing machines with wide brushes, such as the sides of stainless railway vehicles.

"Compared to using pickling paste, which will invariably result in visible etch marks on the finished surface, Nitty Gritty electrochemical cleaning solutions deliver excellent visual quality to stainless steel products," Sean Blake concludes.

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