

The Britestar 1600: the electrolytic cleaning solution from SA's Starweld

Steve Hutchinson of Starweld talks about the newly launched Britestar 1 600 W electrolytic stainless steel weld cleaning solution, which has been designed and developed in South Africa out of the company's Boksburg premises near Johannesburg.

Stainless steel is an alloy composed mainly of iron (Fe) with the addition of 10.5 to 12% chromium (Cr) as the primary alloying element. When exposed to normal atmospheric air, chromium reacts with the oxygen in the air to create a protective layer on the surface of the material. "This passive layer is very thin, but strong enough to prevent additional oxygen and moisture from penetrating and attacking the bulk material underneath. This is why stainless steel possesses unparalleled anti-corrosion properties," begins Steve Hutchinson of Starweld.

The intense heat from the welding process damages the stainless steel's protective oxide layer, resulting in discolouration, and rendering the material susceptible to rust and bacterial infestation. This is a major concern, particularly in sensitive manufacturing sectors such as the health-care and food industries.

"It is vital, therefore, that post weld cleaning takes place in order to restore the weld's integrity, durability and appearance," he adds.

There are several traditional methods for cleaning stainless steel welds:

- Mechanical methods, using powered stainless-steel grinding discs and wire brushes or rotating plastic brushes, for example.
- Pickling, which involves the use of

extremely strong and hazardous acids, such as hydrofluoric or sulphuric acid. This removes any oxide scale and heat tint, while dissolving steel flecks on the stainless steel surface.

- Passivation is a vital process that must follow pickling after the corrosive pickling paste has been removed to allow the protective oxide layer to reform. But passivation can also be applied on its own to restore or reinforce the protective layer on a stainless steel surface.

The mechanical method uses consumables such as grinding discs and brushes. The process also demands considerable physical effort. Accidents may occur if the equipment is not used correctly. Mechanical cleaning can also leave scratches and sometimes miss spots, leaving room for possible further corrosion to occur. Also, whilst removing contaminating particles, this process does nothing to restore the passive layer on the stainless steel surface. "It can provide a solid prerequisite for this to occur naturally over time, but there is no guarantee that the chromium oxide layer will form fast enough to prevent the reappearance of rust," Hutchinson points out.

Pickling, while thorough in removing annealing colours, results in a time delay between when the chemical is applied and when the actual pickling process begins. Over-pickling can occur if the chemical is



The Britestar 1600 chemical cleaning, etching and marking machine makes use of an electrolytic process, passing a low voltage electric current through a mild chemical solution.

not passivated once the weld cleaning is complete. This can result in either pitting or thinning of the metal.

In addition, there are serious risks to both human health and the environment when using these highly corrosive and toxic chemicals, which demand meticulous safety measures to be used at all times.

Furthermore, the disposal of the used chemical can present problems, especially in an environment where food, beverage or pharmaceutical products are being produced. Pickling solutions are also costly and cannot be used very efficiently since large quantities of the solution are wasted during the process.

The Britestar 1600 electrolytic cleaning machine

Starweld's locally developed Britestar machine uses a completely different process, Steve Hutchinson tells *African Fusion*. "The Britestar makes use of an electrolytic pro-



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cess. This is done by passing a low voltage electric current through a mild chemical solution. A current-conducting carbon fibre brush is used to apply the solution to any discoloured areas of the stainless steel, which removes the damaged surface oxides and passivates the chromium-rich surface layer at the same time," Hutchinson explains, adding that the current conducting fibre brush used is able to reach in between the ripples in the weld bead, ensuring that thorough and instant cleaning takes place.

Hutchinson outline ten reasons for adopting Starweld's Britestar for cleaning welded stainless steel:

- 1 A fast and immediate solution:** The Britestar electrolytic cleaning process is efficient and undoubtedly faster than traditional mechanical or chemical cleaning techniques. This method stands out in that it is a one-step process that ensures the immediate restoration of the passive layer, mitigating any risk of further corrosion.
- 2 Ultra effective:** This process will not only remove imperfections on the surface that the welding process has caused, but it will instantly restore the passivating oxide layer required to return the stainless steel to its protected state. The mechanical grinding process may remove dirt and discoloration from the welds, but it does not assist in restoring the protective layer. It relies on the slow unassisted process of the protective layer returning naturally. During this delay, the welds and the plate are



Above: This process will not only remove imperfections on the surface that the welding process has caused, but it will instantly restore the passivating oxide layer required to return the stainless steel back to its protected state.

Right: The chemicals needed for electrochemical cleaning using the Britestar 1600 are locally available and very affordable. In addition, small quantities can perform large amounts of cleaning, making the system an economical stainless steel cleaning and repassivating processes.



vulnerable to further contamination.

3 Versatile: The Britestar 1600 has both an AC and a DC menu. The AC menu performs the cleaning function, and the DC menu is designed to polish the stainless material.

4 Cost effective: The chemicals needed for electrochemical cleaning using the Britestar are very affordable, and the fact that small quantities can perform large amounts of cleaning makes it the most economical stainless steel cleaning and repassivating process.

5 Easy to operate: A simple push button operating system has been developed, with a digital display screen that confirms the menu selected as well as the power setting. In addition, there is a standby control that mutes the machine's power when not performing the cleaning, allowing the brush to be laid down on a steel work piece without harm.

6 Electrically safe: The Britestar operates at low output voltages, well below the maximum permissible South African Occupational Health and Safety Requirement, eliminating any risk of electrical shocks, even if wet hands come into simultaneous direct contact with the brush and earth.

7 Energy efficient: The advantage of being inverter based, means that the electricity consumption is extremely low, unlike transformer-based machines.

8 South African designed and manufactured: Being South African designed and manufactured not only means the pricing of the unit is substantially

less than units manufactured in Europe and in the USA, it also guarantees servicing back-up and future availability of both the cleaning solution and consumables.

9 Lightweight and portable: The Britestar power source weighs a mere 6.0 kgs, and has a pick up strap to enable it to be lifted with one hand. It is powered off a standard 220 V, 15 A socket. A robust holdall carrying case houses the unit, the cleaning brush cable and earth cable. All this makes the Britestar machine easy to transport and ideal for site work.

10 Extended warranty period: The Britestar power source has a 24 month warranty period. This includes all the electronic components in the unit, giving the purchaser complete peace of mind when making the purchase.

"The Britestar 1 600 electrolytic cleaning machine is designed for any company involved in the welding of small to medium size stainless steel components. It is also ideal for contractors performing onsite work in food, beverage and pharmaceutical factories, where rapid, safe cleaning is preferred.

"This system removes the risk of manufactured products being contaminated, while also overcoming the problems associated with the disposal of large volumes of chemicals post cleaning," Steve Hutchinson concludes.

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