

Press Release

The experts' choice



Fig. 1: Food and beverage industry with installations from Krones. The welding joining technology comes from Polysoude, France. - Photo: Krones AG

Best quality for parts in contact with the product

Market leader, Krones AG, founded in 1951 in Germany, designs, develops, manufactures and installs systems around the world for filling and packaging technology, conforming to the High-Purity Standards. Krones AG provides systems worldwide to breweries and drink manufacturers as well as to the food, chemical, pharmaceutical and cosmetic industries. In order to maintain its dominant market position, Krones must take into account all general conditions in its installations and particularly, the specific interconnection of all individual aggregates in complying with the highest quality criteria. As a result of this philosophy, Krones AG has become a global market leader, filling or labelling more than one in four bottles throughout the world. The plant in Flensburg, approximately 5 kilometres from the Danish border, is the company's most northerly production location. Bottle cleaning systems, pasteurisers, crate washers and steam tunnels are constructed, manufactured and assembled there. The Krones' MetaPure bottle-to-bottle PET-recycling plant is also located at the plant, together with the pilot plan for cleaning and product treatment. Many corporate approvals recognise the high quality of Krones' recycling for direct use of containers which come into contact with foodstuffs.

Continual investment in joining and, in particular, the latest welding technology, is key to the famous Krones quality. "Everything that is produced here has to be welded – and it has to be extremely high quality according to the High-Purity Standards," explains Frank Schimpf, quality inspector at Flensburg. "To achieve this, we have harmonised almost all worldwide relevant regulations to create our own 'B+' standard." Special attention is paid to the stainless steel parts of the installation that touch the product. Consequently, the proportion of automated TIG orbital welding is increasing steadily at Flensburg where, as in its other plants, Krones trusts in technology from the world market leader, Polysoude.

Automated Orbital Welding Technology should be used whenever possible

Recommendations, regulations and standards on surface finishes, which will subsequently come into contact with customers' products such as drinks or medicines, define the required quality of stainless steel welded connections, conforming to both European and American laws. The book "Hygiene in Food Processing"⁽¹⁾ written by world's leading experts provides a comprehensive and authoritative publication of good hygiene practice for the food and beverage industry. The authors focus on hygienic equipment design which strongly recommends the use of automatic orbital TIG welding for pipework.

A good manual welder could produce quality welds, however, an automated orbital welding machine, guarantees quality together with sustained consistency. Only in this way can the quality, which Kronos supplies, be produced repeatedly, whilst at the same time ensuring high levels of efficiency. Automated orbital welding delivers the smooth weld seams required for adequate cleaning. The seam roots end flush with the internal pipe wall and there is minimal heat input with only the lowest levels of oxidation, which can be removed easily by etching, if necessary.

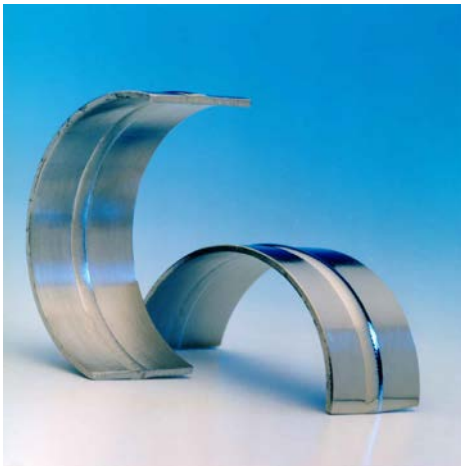


Fig. 2: The hygienic, aseptic, sterile and particle-free design of the weld seam surface is smooth and clean, enabling thorough cleaning as product residue cannot adhere and no germs can settle. These are properties which can normally only be met by using automated TIG orbital welding - Photo: Polysoude

Orbital TIG welding – when quality is the primary concern

When high quality welds are required, orbital TIG welding is the ideal technology for tube-to-tube or tube-to-tubesheet welding applications. With or without filler wire, this is a stable, reliable process that can be used on steel, stainless steel, titanium and nickel and aluminium alloys, for example. The development of a welding program guarantees a high-quality weld through automation. The welding cycle can be repeated as often as necessary with the same result. On all of these machines, the welding parameters can be checked and compiled into a printable protocol for guaranteed traceability.

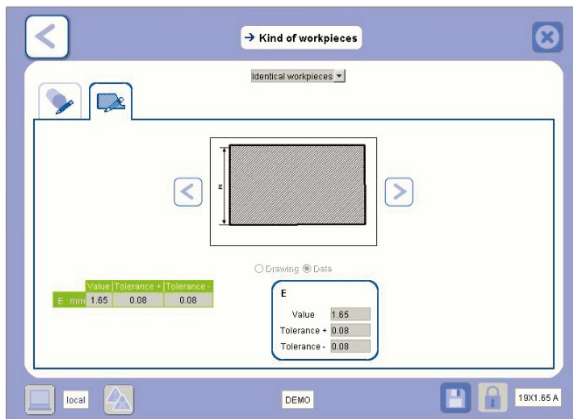


Fig.3: A guaranteed reproducible welding result – for example mechanical parameters for tube-end preparation, documented by the Polysoude P4 system

The efficiency of this equipment is due to a precise programming facility. Unlike power sources of the last generation, the P4 from Polysoude, allows the operator to find matching weld programs by using a touchscreen or personal computer (PC). The user specifies basic information, relating to the size and material of the tubes to be joined. The system consults its in-built database to find similar applications, or suggests weld parameters determined by progressive calculation. The proposed welding procedure can finally be optimised by an expert help menu or Welding Assistant. Modern orbital welding equipment is designed for real-time monitoring of the key weld parameters; a complete weld protocol can be generated and stored, or outputted as a printed document.



Fig.4: Orbital welding equipment on stainless steel tube

Preferentially, fusion welds are carried out using portable inverter power sources, combined with closed orbital welding heads. The closed chamber welding heads, such as Polysoude's MW range, are especially designed to meet the requirements of hygienic applications. Inside the welding head, the shielding gas flows directly to the weld zone. Thus, all welds are oxidation-free, complying with hygiene requirements.



Fig.5: High-quality welding results – work on tubes and fittings is carried out primarily using closed welding heads (photo Polysoude)

Krones' welding specialist is invariably pleased with the benefits of this welding system: "We have programs at our disposal in the machine with which we can create a provisional welding instruction (pWPS) simply by entering the nominal diameter, wall thickness, type of material and current. Now, welds and pWPS created in this way have satisfied every process test carried out by independent test centres. All pWPS were able to be adopted as welding instructions (WPS = Welding Procedure Specification). The quality requirements demanded by all of the regulations can be called up at any time with guaranteed repeatability."

Conclusion

"The benefits are obvious", explains the welding expert, "we manufacture in all German plants at the same quality level in accordance with these stipulations; they are valid for all molten welding processes on steels, titanium and alloys thereof." Flensburg managers agree about the evaluation of the possibilities offered by the P4 for documenting the joining process: "When compared with conventional machines, the logging process and its significance are considerably better". Both X-ray and destruction tests show that documentation and reality go hand in hand. There has not been a single complaint, despite more than 100,000 welds being made per year.



Fig.6: Orbital welding equipment on stainless steel tube with backing gas for the oxidation-free welds (photo Polysoude)

This is why automated TIG orbital welding of pipe components is continually increasing in importance. The process, as provided by Polysoude, has a huge impact on quality, as it creates the smooth weld seams required for comprehensive cleaning, together with a weld seam sealed flush with internal pipe walls, essential factors for the germ-free production of drinks, food and pharmaceuticals.

References

- (1) Woodhead Publishing Series in Food, Technology and Nutrition no.88 titled "Hygiene in food processing" edited by H. L. M. Lelieveld, M. A. Mostert J. Holah and B. White, Cambridge, UK*