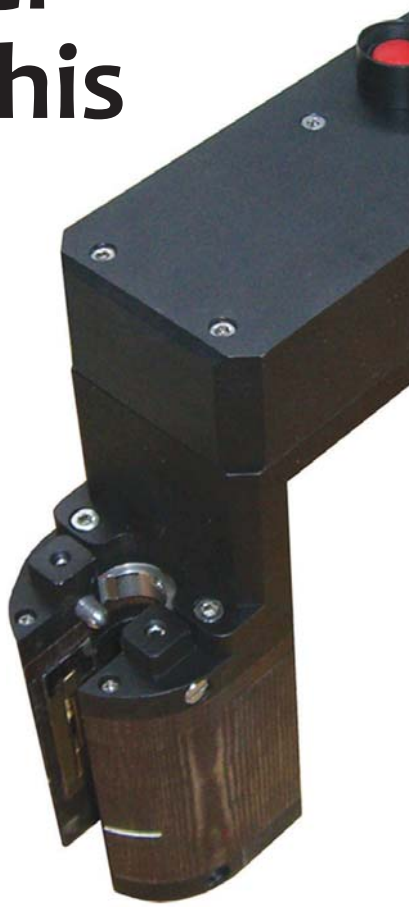
It doesn't get any smaller or more effective than this

The HX 16 Orbital Weld Head for compact cooling systems sets new standards and reduces secondary processing times



It's all in the name of the new orbital weld head from Orbitalum Tools GmbH in Singen, Germany: HX 16. HX stands for heat exchanger and for the welding of pre-mounted elbows in tight pipe bundles of heat exchangers into a pipe coil. At present, there is no other solution as effective as this one in the world.

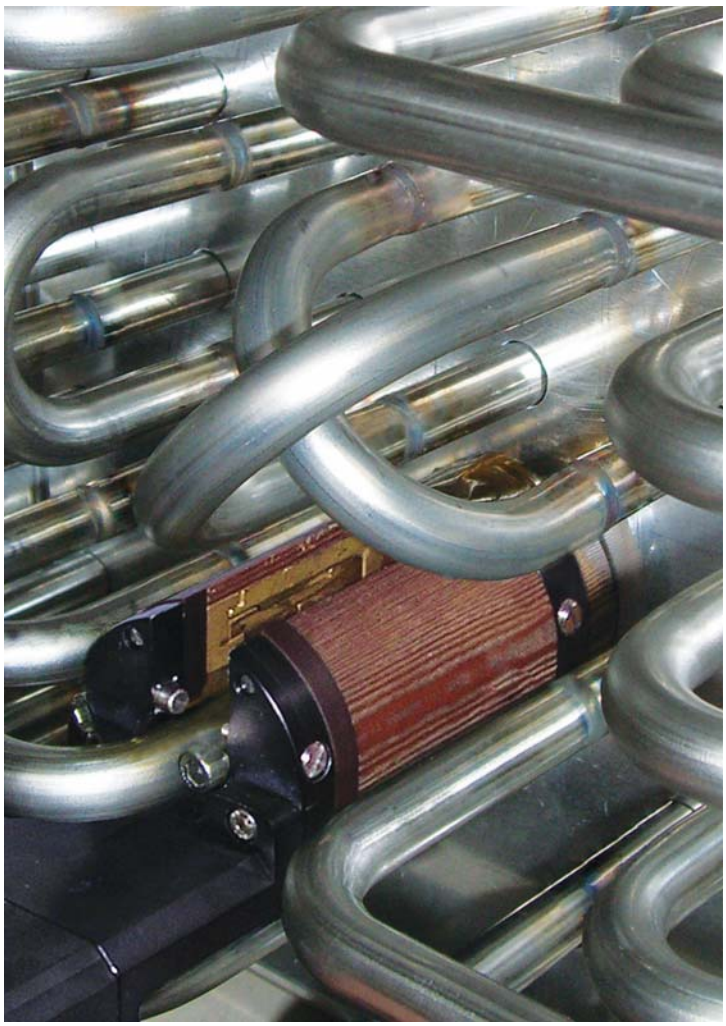
Traditionally, complex heat exchangers for cooling systems were made of copper, and the pipe elbows for it were soldered. The high price of copper prompted manufacturers to switch over to stainless steel for production (material number 1.4402, DIN XCrNiMo 17-12-2, US standard AISI 316). Stainless steel can only be joined economically, reliably and in high quality with tungsten inert gas (TIG) welding in conjunction with mechanized orbital welding. All open orbital weld heads or closed weld tongs commonly available on the market require lots of space for being positioned between the individual pipes of a pipe bundle, which would reduce the effectiveness of the heat exchanger and enlarge its size.

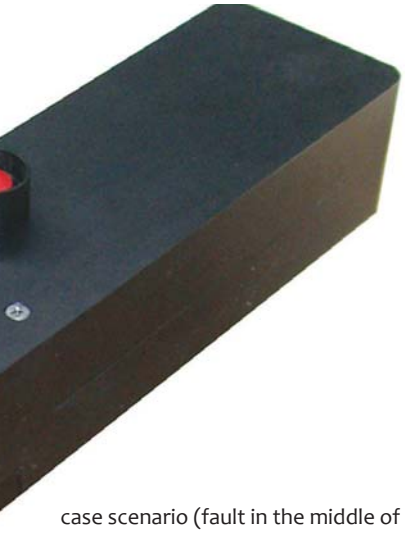
A pipe spacing of only 24 millimeters is sufficient for the HX 16 from Orbitalum for extremely easy positioning and clamping, thanks to its outer diameter of only 60 millimeters.

Industry standard

This minimum dimension has since become the industry standard, as design engineers from every well-known air-conditioning technology manufacturer in Germany, Italy, France and India design their air-conditioners accordingly, i.e. stainless-steel pipes with an outside diameter of 15 to 16 millimeters (wall thickness of 0.5 to max. 1 millimeter). Only the length of the elbows varies depending on the manufacturer's design, which is why Orbitalum supplies the weld head in three different lengths.

The ingenious orbital weld head scores points in the areas of economy and efficiency when compared to conventional weld heads. A "wall" with pipe outlets can be fully fitted with elbows before joining and then welded in any order. For conventional orbital tongs, the principle of fit elbow, weld, fit elbow, weld etc. applies, always starting from the center of the pipe sheet and working outward. If quality testing reveals a faulty weld later on, all elbows must be disconnected and new ones must be welded on in the worst





case scenario (fault in the middle of the bundle) due to the accessibility factor. With the HX head, only the affected elbow would have to be replaced. This design-based advantage also makes the Orbitalum system the ideal tool for unbeatably cost-effective repairs. The head is only 1.5 kilograms in weight. In contrast to open tongs with a cumbersome hose assembly, all connections for power, gas and cooling water are permanently integrated in the HX.

All orbital welding power sources from Orbitalum automatically detect the head and its properties so that the operator only has to call up his or her specified joining program and start the joining process before beginning to weld.

Two on one

To increase productivity, the operator can work with up to two HX heads on one machine in an alternating fashion, which reduces conversion times and downtimes considerably.

For this purpose, only the optionally available Orbitwin Switching Unit is required. By pressing the respective start button of the weld head being used, the previously assigned program is automatically called up from memory. The weld head which is not being used is locked in the interim and can be positioned for the next welding task in advance.

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Driving down the cost of energy

While the increasing cost of energy is a constant concern, there is little doubt that the need for electrical power will increase over the next several decades. The Department of Energy predicts that the demand for electricity will increase 50% by 2030. Despite recent events in Japan, at least some of this energy will be supplied by nuclear power generation.

Existing U.S. nuclear power plants were constructed using 1960's and 1970's technologies, relying mostly on manual techniques. New nuclear power plants overseas have incorporated automated GTAW and other higher deposition welding processes. Automated GTAW narrow gap technology is now sufficiently advanced, that the next generation of power plants are being designed to incorporate this technology, which reduces the cost of components and assemblies of the most critical parts of the power plants.

Automated wedling system

AMI has supplied automated orbital welding systems for a unique project at GrowHow UK Ltd's fertilizer plant at Ince, near Chester. The Ince site produces one million tons of fertilizer annually, providing essential nutrients for grass and arable farming, and needed to install a new converter vessel in its ammonia synthesis gas loop. When faced with welding the 18" (457mm) diameter, nearly 2.5" (63mm) thick stainless steel pipes, contractors Fabricom called upon AMI's expertise to provide an automated welding system that could guarantee weld quality and speed unachievable by a manual process.

They provided full training to the Fabricom engineers, and supplied three Model 415 power supply and Model 15 weld head systems to enable welders to work 24 hours a day, and complete the project with minimum plant downtime. The Model 415 power supply gave GrowHow the reliability of an automation controller, designed to meet the challenges of the most demanding welding applications. Completing the system was the Model 15 large diameter pipe weld head, with a specially adapted chisel torch nozzle designed to accommodate the GrowHow's Chemical Works relatively narrow compound bevel optimized during the welding development phase. This was the first time GrowHow had used automated orbital welding, and they selected the system for its reliable repeatable high quality across all welds. In a situation where the quality of every weld is vital, the ability of the equipment to cope with the thickness of the pipe wall, and, maintain weld integrity under extremely high gas pressure and temperature gave the company significant advantages.

Compact package

The Model 415 is primarily designed to work with AMI's orbital and fixed automation weld heads. It can control third party positioners and welding manipulators. The 400 A 100% Duty Cycle power supply contains all the hardware and control elements of a welding automation cell in a highly integrated compact package. At the heart of the power supply is an industrial computer programmed via a 12" (305 mm) touch screen or keyboard. The intuitive graphical user interface (GUI) makes programming easy using

NGT Sytem with M415 standard welding industry terminology and clearly organized input fields. The M415 has many standard hardware and software features. The standard programmable functions are Welding Current Control; Arc Voltage Control (AVC); Wire Feed; Rotation/ Travel Control; Hot Wire Voltage Control; Oscillation.

Hostile environment

Petroleum refineries and petrochemical power plants both employ large (16-24"; 406-610mm) valves to control and direct the flow of various chemicals, including superheated steam. Each of these various fluids present unique challenges to the valve internal mechanisms, exacerbated by the common presence of very high pressure. Because of the hostile environment, the valve seats are usually manufactured from Stellite, a cobalt-chromium alloy that is noted to maintain hardness even at high operating temperatures. This material, while ideal for the application, is difficult to apply, and hard to machine. Since replacing a valve is usually not a viable option, given the extensive ASME B31 requirements associated with the cutting out and re-welding a new valve in place, in-situ repair is a desirable alternative.

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