Heinz Soyer Bolzenschweißtechnik

The BMK-8i ACCU battery-powered stud welder is well suited for in the workshop and on-site.

SRM Stud Welding Method

Durable, effective and excellent

Stud welding processes are tried and tested joining techniques, in particular when it comes to the durability and stability of the connection. The two conventional processes with drawn arc ignition or with capacitor discharge differ in the welding surface, geometry of the studs, the process sequence, the equipment technology and also partly in the field of application. The advanced SRM technology uses a radial-symmetric magnetic field and does not require the use of ceramic rings. Clean connections and an absence of welding beads are some of the advantages of the patented process belonging to welding technology specialist Soyer.

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Stud welding is an arc pressure welding process in which a full-surface welded connection is made with great strength. The front surfaces of threaded studs, pins, bushings or other bolt-shaped components are permanently connected to a workpiece under low contact pressure. A distinction is made between drawn arc and capacitor discharge stud welding. Depending on the process, materials such as steel, stainless steel and copper-plated steel can be welded - also to each other - as well as studs with diameters of between two and 25 millimetres.

Aluminium is primarily welded with capacitor discharge. Further advantages of stud welding are the minimal, or complete absence of discoloration to the rear and visible side due to tarnish. Furthermore there are no deformation of the component or warping, no leaks at the connection point, and little or no corrosion problems.

Award-winning stud welding

Heinz Soyer Bolzenschweißtechnik was founded in 1970 and is located in the Wörthsee region of Upper Bavaria.

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Attachment of fastening studs for facade installation with the BMK-10i stud welding unit.

The company specialises in stud welding technology and provides stud welding equipment and systems as well as the corresponding welding studs. The most popular welding methods are drawn arc, capacitor discharge and also the special process of magnetic field stud welding known as SRM. The globally active company has a staff of 70 and is represented in over 40 countries. Soyer has received numerous awards for the technological advancement of the various processes and the development of a whole range of user-friendly welding equipment. They have won the Federal Award for outstanding innovative achievement in the craft trades 13 times, the Bavarian State Prize four times as well as the Seifriz Prize, the Innovation Prize for Bavaria as well as numerous awards at trade fairs. Currently they hold approximately 38 patents and 14 utility models. The company's unique selling points are its SRM technology and SRM EcoWeld technology. Their product range includes about 20 devices for the workshop and the construction site. Depending on accessories and area of application other model variants are possible. Semi- and fully automated customised welding systems are also available.

Best practice in many fields

Stud welding with capacitor discharge is a proven technology especially for thin sheets. Usually weld studs of up to a maximum diameter of eight millimetres or M8 can be welded. Soyer has advanced this process for stud diameters of up to a diameter of 12 millimeters or M12. The welding process is carried out by discharging a capacitor battery in the very short time of one to three milliseconds over the ignition tip of the welding elements. The process has proven its value in vehicle construction, sheet metal processing and decorative metal design. Stud welding with drawn arc is a welding process for maximum stud loads and large diameters. Welding elements with diameters of 6 to 25 millimetres can be welded on. The welding process is carefully controlled by an electronic current source.

The process has proven invaluable for example in the fields of steel construction, mechanical engineering, shipbuilding, pre-cast reinforced concrete construction, door and window construction, building construction, civil engineering, and pipeline construction.

SRM – the trendsetter

Stud welding in a radially symmetric magnetic field (SRM) is the further advancement of stud welding using drawn arc ignition and inert gas. SRM is the abbreviation for Stud Welding in a Radially Symmetric Magnetic Field. Soyer holds several patents related to this process, including the use of the universal HZ-1 stud with flat end face and centering point. Using Soyer technology, studs with particularly large diameters of up to M16 can be welded on thin sheets. Now, a ratio of up to 1:10 of sheet thickness to stud diameter can be achieved, previously a ratio of 1:4 was only possible. SRM eliminates the need for ceramic rings, thus saving time, money and resources, and crucially there is no longer any unwelcome flange or welding bead. This means that the welded-on studs can be

Edelstahl Huber

Benedikt Huber (l.) with son and managing director Tobias Huber in front of the gas torch for biogas plants GFB 500 EVO.

used without post-processing, i.e. one continuous screw connection up to the basic material is possible. A further advantage is that there is no welding spatter. According to Soyer, the patented SRM process also offers the following benefits: less stud burn-off, no blowing effect, a reduced deformation of the workpiece, 60 percent reduced penetration depth, 60 percent less welding time and 70 percent energy savings. The advantages open up many new application possibilities, particularly in the field of automated stud welding systems as well as in mass production of components. The process has proven invaluable in very different areas, such as metal and glass construction, container and apparatus construction, machine and equipment construction, plant construction, steel construction, electrical equipment construction, vehicle construction and in roofing and metalworking.

Increased quality in plant construction

Among those using stud welding technology is Edelstahl Huber, a company from Buchloe. The company specialises in individual plant construction for dairies, breweries, and butcher's shops as well as in the construction of biogas plants for agricultural holdings. As a result of special hygiene regulations in the food sector as well as requirements in the biogas industry, stainless steel is almost exclusively processed. The know-how is provided by company founders Benedikt and Hildegard Huber. Benedict Huber was originally responsible for the maintenance and repair of technical equipment in a dairy before he went into business for himself. Tobias Huber, Benedict's son and successor, first trained as a mechatronics engineer and then qualified as a mechanical engineer. This puts him and his team in a position to project, implement and control complete systems as well as to support them with service and maintenance. Pipeline and boiler construction belong to this process, which explains why multiple welding studs need to be welded on. To enable this, two Soyer hand tools are employed - the BMS-8N for capacitor discharge for stud sizes of up to M8 and the BMK-16i with SRM technology for stud sizes of up to M16. The devices can be used in the workshop and if required, also on the construction site. Managing Director Tobias Huber explains: "Capacitor discharge welding is extremely fast, only takes a fraction of a second and has the added advantage that no annealing colours occur on the reverse side of the sheet. The surfaces are extremely clean after welding and without splashes. Thanks to the SRM process, we can weld larger diameters of up to M16 with a very stable weld seam."

The company has ten employees, most of whom are welders. The capacitor discharge process is easy to learn, all you need to do is enter the stud diameter in the device. That's why, according to Huber, semi-skilled workers are also employed. The SRM process is somewhat more demanding and the operation of the device more complex. "On the welding machine, you can set several parameters, from the welding time to the welding current up to lift time etc., that's why we have welding specialists to do the job," says Tobias Huber.

Not the cheapest but with huge advantages

Both stud welding processes are applied for example in

Edelstahl Huber

Tobias Huber has been won over by the SRM stud welding process, the reduction in working time quickly compensates for the purchase price.

sheet metal housings or system components which need to be equipped with threaded studs. Since all systems are manufactured individually, only hand tools are used. "We do not have fully or partially automated welding processes", says Huber. In order to achieve close tolerances, especially with rows of studs or to be able to maintain flange connections, you can avail of the welding templates. These consist of two millimetre thick metal sheets, into which holes for guiding the welding gun have been lasered. "Otherwise the alignment of the weld studs would often be quite tricky," says Tobias Huber. As a rule, tolerances in the five-tenths range are required.

Even though stud welding is in general a higher-priced acquisition according to Tobias Huber the enormous amount of time saved, together with the very high welding quality are the decisive factors. In the past, screws or rivets were used for the connections and accordingly holes needed to be drilled. "Of course screws, rivets or normal studs are a lot cheaper but you can't weigh up the welding process against other connection techniques. In many respects a rivet or screw connection cannot be compared to a welded stud." He recommends capacitor discharge to those who only occasionally need to weld a stud with a normal diameter. The process does not require any shielding gas and is therefore also well suited for use on construction sites. Besides this Soyer now offers a battery-operated stud welder. According to Huber, only those who have to weld particularly large studs need avail of the SRM technology.

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