

OVERVIEW

Stud welding meets a broad variety of fabrication and construction requirements. It is fast, easy and strong and provides a lower installed cost when compared to other fabrication methods.

PROCESS DESCRIPTION

The stud welding process is similar to the stick welding process; however, unlike the stick welding process, stud welding is automated and can be performed by operators not trained in the welding field.

The operator loads a stud and a ceramic shield into the welding tool. (The ceramic shield serves to contain the molten pool of steel during the welding process.) The operator places the stud tip against the work piece and presses the trigger. The power supply then operates the internal mechanism in the weld tool (often called a gun). The tool creates a lifting action which is analogous to striking the arc in stick welding. The power supply provides the necessary weld current to sufficiently melt the stud and the base material. The power supply maintains this arc for the appropriate duration (typically less than one second) and then plunges the stud into the molten pool of steel created by the arc. The ceramic shield (ferrule) molds the molten pool of steel until the steel cools and then the ceramic shield is broken and discarded. This automatic process means that the welding of fasteners is extremely fast. In a time where labor costs are a significant factor - if not the significant factor- in a job, any labor

savings is appreciated by the fabrication shop.

STUD WELDING CONSTRUCTION APPLICATIONS

Because the weld produced by the stud welding process offers high structural integrity, excellent productivity and many other benefits, it is used extensively in a wide range of construction applications, including:

Bridges: The shear stud is welded onto a bare I-beam used in steel bridge construction. When the concrete is poured the shear stud interlocks the steel and concrete together.



Bridge Girder with 7/8 Shear Studs

Deformed bar anchor: Deformed Bar Anchors (DBA) are used to provide anchorage with surrounding concrete. Unlike conventional deformed bar (re-bar) DBA's are weldable using the stud weld process. This means anchorage can be welded quickly and reliably into a wide variety of spaces and surfaces.



Welded Deformed Bar Anchor

Embed Plates: Studs are welded to the back of a plate and are embedded into material. This can be concrete in tilt up wall construction or it could be earth in a retaining wall application.



Embed plates

Through Deck (Thru Deck): In multi-story steel building construction, shear studs are welded through the steel decking. This joins the shear stud, steel deck and I-beam together. Once the concrete is poured, it too is interlocked to the steel structure by the shear stud. This is commonly referred to as composite beam construction. This approach can allow for smaller beam webs and/or greater spans between beams. This can add up to significant cost savings for the steel erector.



Shear Stud Welded Through Deck

Threaded Studs: Threaded studs also have their place in construction and fabrication. They are used in window retention (Rock & Roll Hall of Fame) and drop ceiling applications and wire way routings as well as many other applications.

STUD WELDING EQUIPMENT

The stud welding equipment is composed of a few key pieces:

- 1) Power Supply to generate the weld energy
- 2) The weld tool (gun) which is used to automatically strike the welding arc and hold the fastener during the welding process
- 3) The proper accessories that are suited to the particular welding application



- 4) Cables that run between the power source and the weld tool. The cables can become a critical component if they are undersized or if a user attempts to put too much cable onto a power supply that cannot handle the cable load.

While these components do not appear complex, like any system, they require the proper maintenance and care to ensure maximum job uptime.

MAKING THE DECISION

To determine whether stud welding is the optimum metal fastening method for your requirements, analyze your specifications and consider such factors as productivity, quality, aesthetics and engineering assistance. If appearance is important, compare stud welding's one-sided fastening process with two-sided processes. When comparing welding times between processes, be sure to compare the steps involved in one process versus another to reach an accurate assessment of productivity rates.

If you have selected the stud welding process, consider the following qualifications when choosing a stud-welding partner.

PRODUCT DESIGN AND ENGINEERING

Is the manufacturer an innovator, offering solutions for promoting efficiencies and solving problems in your process? Do they offer accessible on-staff technical support? How responsive are they?

EQUIPMENT

Does the supplier manufacture stud welding equipment, guns and studs meeting various size and power requirements? Do they offer a complete package, including power supplies, stud welding guns, studs and accessories? Can they recommend the optimal equipment and/or complete package for your unique application? Do they assist you in determining the optimum equipment, fasteners and accessories?

EASE OF EQUIPMENT USE

Is the equipment easy to use? Does it offer advanced technology, such as digital features included on the equipment to help you increase your efficiency, flexibility and reliability and ease of set up for your operators?

VALUE ADDED SERVICES

Does the manufacturer provide additional process capabilities? Do they offer such value-added services as component reduction, secondary process elimination, waste minimization and quality improvement to help you minimize costs and maximize your productivity?



Shear Stud thru deck and Bluearc Stud Gun

SUPPORT

Does the manufacturer provide training? Do they have maintenance programs in place, including routine maintenance and emergency/break-down service? How quickly will they respond to your inquiries? Are they consistently available when you need them?

EXPERIENCE

How long has the manufacturer been in the stud welding industry? Do they offer the expertise to help you fulfill your unique metal fabrication requirements? Does the manufacturer have any active members in the American Welding Society and the SEAA?

BLUEARC STUD WELDING

Bluearc manufactures shear studs, deformed bars and threaded studs in a wide variety of sizes. Bluearc also offers arc equipment along with all the proper accessories to get your job done right and quickly.

When compared with...	Stud welding offers...	
Boring/Drilling/Tapping	<ul style="list-style-type: none">• Faster process• No through-hole preparation• Less installed cost	<ul style="list-style-type: none">• No reverse side marking• Resistance to leaks and vibration
Conventional Bolting	<ul style="list-style-type: none">• Faster process• No two-sided access required• No visible head• Assembly without requiring two hands	<ul style="list-style-type: none">• No through-hole preparation• Less installed cost• No reverse side marking• Resistance to leaks and vibration
Hand Welding	<ul style="list-style-type: none">• Less training• Faster process• Less installed cost• Works equally well on thick or thin material	<ul style="list-style-type: none">• No reverse side marking• Ability to join after surface is painted• Resistance to leaks and vibration

For more information or to discuss your construction fastening requirements with one of our experts, contact Bluearc today.



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