[INCH-POUND]
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COMMERCIAL ITEM DESCRIPTION

STUD WELDING SYSTEMS, INTEGRAL POWER SOURCE AND CONTROL UNIT, MANUAL

The General Services Administration has authorized the use of this commercial item description for all federal agencies.

1. SCOPE. This commercial item description (CID) covers electric arc and capacitor discharge stud welding systems with integral direct current power source, controller, and stud gun. The stud welding systems are intended for manual welding use in operations that require the rapid, reliable, and economic attachment of stud fasteners or bolts to a plate or panel.

2. CLASSIFICATION. The stud welding systems shall be of the following types and sizes. The type and size to be furnished shall be as specified (see 7.2(b)).

Type I - Capacitor discharge (CD)

Size 1 - 12 gauge through 1/4-inch
Size 2 - 12 gauge through 5/16-inch
Size 3 - 1/8-inch through 3/8-inch

Type II - Electric arc

Size 4 - 10 gauge through 1/2-inch
Size 5 - 10 gauge through 5/8-inch
Size 6 - 10 gauge through 3/4-inch
Size 7 - 10 gauge through 7/8-inch
Size 8 - 5/16-inch through 1-inch
Size 9 - 10 gauge through 1-1/4-inch

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any other data which may improve this document should be sent to: Defense Supply Center Richmond (DSCR), ATTN: DSCR-VBD, 8000 Jefferson Davis Highway, Richmond, VA 23297-5610.

AMSC N/A FSC 3431

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

3. SALIENT CHARACTERISTICS

3.1 General requirements. The system shall be new and one of the manufacturer's current models capable of operation in accordance with the requirements herein. All parts subject to wear, breakage, or distortion shall be accessible for adjustments, replacement, and repair.

3.2 Components. The stud welding shall include, as a minimum, the following components:

3.2.1 Power source and controller (PSC).

3.2.1.1 Type I, stud welder. The PSC for type I stud welding systems shall contain the capacitor bank and controls for power on/off, capacitance range, and charging voltage. The PSC shall possess jacks for the attachment of welding cables. The systems shall be initial contact, drawn arc, or initial gap systems as specified (see 7.2(c)). The PSC shall automatically discharge after the power switch is placed in the "off" position and shall have a protective device to prevent the capacitor voltage from being applied to the stud gun until the gun is properly seated on the workpiece.

3.2.1.2 Type II, stud welder. The II stud welding systems shall operate on the standard electric drawn arc principle. The PSC shall contain the transformer-rectifier and controls for power on/off, welding current, and timing. The PSC shall possess connectors for the attachment of welding cables. When specified (see 7.2(d)), the systems shall be capable of reverse polarity welding.

3.2.2 Stud welding gun. The stud welding gun shall be constructed of nonconductive, high-impact material and shall be capable of withstanding the rigorous handling normally encountered in construction environments. The gun shall be of the pistol type with a finger-actuated switch that initiates the welding process.

3.2.2.1 Stud welding gun adjustements. Type I and type II stud welding guns shall be equipped with adjustable support legs and stud chucks as specified (see 7.2(e)) to accommodate desired stud lengths and diameters. Type II systems shall be equipped with stud gun feet and arc shield ferrule grips as specified (see 7.2(f)).

3.2.2.2 Dual-gun system. When specified (see 7.2(g)), type II stud welders shall have a dual-gun system.

3.2.3 Welding cables. The stud welder shall possess a welding cable assembly to provide a means for conducting welding current and transmitting control signals from the welding gun to the controller. A means shall be provided to securely clamp the ground lead(s) to the workpiece. Cable lengths shall be provided as specified (see 7.2(h)).

3.2.4 Inert gas shielding equipment. If required, the type II stud welding system shall be equipped with gas shielding accessories as specified (see 7.2(i)).

3.2.5 Portability. Type I stud welding systems shall be manually portable. Type II systems shall be manually portable, or the base shall be equipped with wheels or with lifting eye(s) as specified (see 7.2(j)).

3.2.6 Electrical system. The electrical system shall conform to the American National Standards Institute/National Fire Protection Association (ANSI/NFPA) 79, "Machinery, Industrial, Electrical Standard For". Unless otherwise specified (see 7.2(k)), type II stud welding systems shall operate from a dual 230/460-volt, 3-phase, 60-hertz circuit and shall be wired for the voltage. Type I systems shall operate from a 120-volt, single-phase, 60-hertz circuit. Type II electrical systems shall provide current output regulation and thermal overload protection as specified (see 7.2(l)).

3.2.7 Optional accessories. Optional accessories shall be furnished as specified (see 7.2(m)).

3.3 Performance. Unless otherwise specified (see 7.2(n)), the stud welding system shall meet the performance requirements in sections 3.2.1 and 3.2.2 when tested in accordance with sections 5.3 through 5.3.3 herein.

3.3.1 Visual weld inspection. For the type I process, the fillet formed at the base of the stud shall appear full and even. The weld shall not form a large crater with excessive metal expulsion or possess a very shiny appearance. For the type II process, the fillet shall appear full, even, and shiny all around the stud. The fillet shall not possess a very shiny, low profile extending beyond the outside of the ferrule, nor shall it possess a small, uneven, or dull appearance with fingers of metal extending through the vents of the ferrule.

3.3.2 Weld strength. A perpendicular force with sufficient magnitude to bend the stud shall not cause failure or cracking in the weld. Failure can occur in the stud or the workpiece.

3.4 Machine dimensions and weight. If required, the maximum dimensions (length, width, and height) and machine weight shall not exceed the restrictions specified (7.2(o)).

3.5 Safety and health requirements. The machine shall be designed and manufactured in accordance with ANSI/National Electrical Manufacturers Association (ANSI/NEMA) EW1, "Welding, Electric Arc, Power Sources", and ANSI/American Welding Society (ANSI/AWS) C5.4, "Stud Welding, Recommended Practices For". The manufacturer shall ensure that the stud welding system and all equipment and accessories supplied with the system shall be in compliance with ANSI/AWS Z49.1, "Safety In Welding And Cutting", and Occupational Safety and Health Administration (OSHA) 29 CFR PART 1910, "Occupational Safety and Health Standards for General Industry". If a conflict arises between the ANSI and OSHA standards, the OSHA standards shall apply. Covers, guards, or other safety devices shall be provided for all parts of the system that present safety hazards. The manufacturer shall ensure that the system is intended for manual use. A type II system having a power source with an open circuit voltage that is not in accordance with NEMA EW1 section 5.3.1 shall not be provided as a manual system. Should this situation occur, it shall be cause for rejection of the system.