Tru-Fit Products • Tru-Weld

Quality weld studs, stud welding equipment and fasteners since 1928

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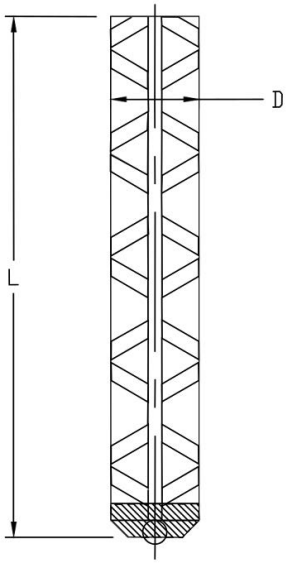
Tru-Weld's patented SWR (Stud Weldable Rebar) A706 anchors are fully stud weldable with standard stud welding equipment and accessories.



Benefits of Stud Welding:

*Full penetration welds

*Faster production than traditional welding

*Bridge and building construction

*Automatic machine controlled welds

SWR A706 Applications:

*Precast concrete grade crossings

*Concrete connections where ductility is key

*Thread, bent and straight bar stud uses

*Seismic management

*Bridge and Building construction

Tru-Weld Part #	Size	Ferrule Part #	Chuck Part #	Foot Part #	Grip Part #
SWR08-194-11	1/2 X 12-1/8	FER10-P flat welding FER10-PV vertical welding	CSW-050	B-2C	GC-062
SWR08-290-11	1/2 X 18-1/8				
SWR08-386-11	1/2 X 24-1/8				
SWR08-482-11	1/2 X 30-1/8				
SWR08-578-11	1/2 X 36-1/8				
SWR08-770-11	1/2 X 48-1/8				
SWR10-291-11	5/8 X 18-3/16	FER12-P flat welding FER12-PV vertical welding	CSW-062	B-2C	GC-075
SWR10-387-11	5/8 X 24-3/16				
SWR10-483-11	5/8 X 30-3/16				
SWR10-579-11	5/8 X 36-3/16				
SWR10-771-11	5/8 X 48-3/16				
SWR12-291-11	3/4 X 18-3/16	FER14-P flat welding FER14-PV vertical welding	CSW-075	B-3C	GC-087
SWR12-387-11	3/4 X 24-3/16				
SWR12-483-11	3/4 X 30-3/16				
SWR12-579-11	3/4 X 36-3/16				
SWR12-771-11	3/4 X 48-3/16				

A706/A706M-22

Bar Designation	Nominal Weight, lb/ft [Nominal Mass, kg/m]	Diameter, in. [mm]	Cross-Sectional Area in.^{2} [mm^2]	Perimeter, in. [mm]
		Nominal Dimensions [A]		
4 [13]	0.668 [0.994]	0.500 [12.7]	0.20 [129]	1.571 [39.9]
5 [16]	1.043 [1.552]	0.625 [15.9]	0.31 [199]	1.963 [49.9]
6 [19]	1.502 [2.235]	0.750 [19.1]	0.44 [284]	2.356 [59.8]

[A] The nominal dimensions of a deformed bar are equivalent to those of a plain round bar having the same weight [mass] per foot [metre] as the deformed bar

Tensile Requirements	
	Grade 60 [420]
Tensile Strength, min, psi [MPa]	80,000 [550][A]
Yield Strength, min, psi [MPa]	60,000 [420]
Yield Strength, max, psi [MPa]	78,000 [540]
Elongation in 8 in. [200 mm], min %	
Bar Designation Nos. 4, 5, 6 [13, 16, 19]	14
[A] Tensile strength shall not be less than 1.25 times the actual yield strength.	

The Tru-Weld SWR A706 meets all the requirements of:

*ASTM A706 -Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement-Grade 60 deformed concrete reinforcement.

*ACI 318- Earthquake-Resistant Structures

*Seismic Design Requirements for Ductile Steel Reinforcing Elements

*Stud-weldable in accordance with the requirements AWS D1.1/ D1.1 M Structural Welding Code-Steel Clause 9 Stud Welding and/or AWS D1.4/ D1.4 M

Physical and Embedment Properties of SWR A706 Weld Studs

Below are physical properties of SWR A706 Weld Studs per A706/A706M-22 Grade 60. Using formulas in ACI 318-19 (Table 25.4.2.3) development length for deformed bars in tension can be calculated. Below are embedment length requirements to develop the full bar strength capacity. Free edge distance and an-chor spacing should be observed in regard to achieving full capacity. In actual practice, Tru-Weld applica- tions should include a factor of safety. Embedment length can be reduced based upon factors given in ACI 318-19 Section 25.4. **The user of these Tru-Weld studs will make this determination.**

Dia.	A_s	ASTM	A_sF_y Yield Lbs. (Min)	A_sF_u Tensile Lbs. (Min.)
1/2	0.20	4 [13]	12,000	16,000
5/8	0.31	5 [16]	18,600	24,800
3/4	0.44	6 [19]	26,400	35,200
A_s Nominal Area				
F_y Yield--60,000 PSI Min				
F_u Tensile--80,000 PSI Min				

Per A706/A706M-22 Grade 60 6.2 The chemical composition as shown by heat analysis shall be limited by the following:

Element max, %

Carbon 0.30 %

Manganese 1.50 %

Phosphorus 0.035 %

Sulfur 0.050 %

Per ACI 318-19:25.4.2.1 Development length ℓ_d for deformed bars and deformed wires in tension shall be the greater of (a) and (b):

(a) Length calculated in accordance with 25.4.2.3 or 25.4.2.5 using the application modification factors of 25.4.2.4

(b) 12 in. min. (per ACI)

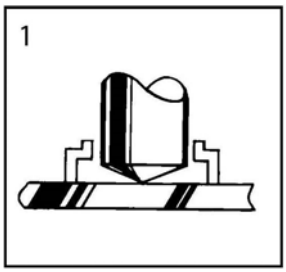
Normal Weight Concrete Compressive Strength, f'c (psi)	Minimum Embedment Length for Full Anchor Capacity Development, After Welding (inches)		
	Bar Diameter, db		
	0.5	0.625	0.75
3000	21.91	27.39	32.86
4000	18.98	23.72	28.46
5000	16.97	21.21	25.46

Light Weight Concrete Compressive Strength, f'c (psi)	Minimum Embedment Length for Full Anchor Capacity Development, A. er Welding (inches)		
	Bar Diameter, db		
	0.5	0.625	0.75
3000	29.21	36.52	43.82
4000	25.30	31.63	37.95
5000	22.63	28.28	33.94

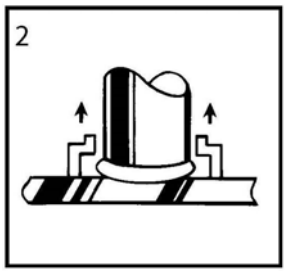
In house parameters provided acceptable results in welding application and testing. The parameters may need modification with respect to application or field conditions. Please refer to AWS requirements for further information.

		Downhand Welding				
Dia., in. [mm]	Area in^2 [mm^2]	ASTM	Amp	Sec	Lift	Plunge
0.500 [12.7]	0.20 [129]	4 [13]	900	0.67	0.125	0.312
0.625 [15.9]	0.31 [199]	5 [16]	1200	0.71	0.1875	0.375
0.750 [19.1]	0.44 [284]	6 [19]	1700	0.98	0.1875	0.375

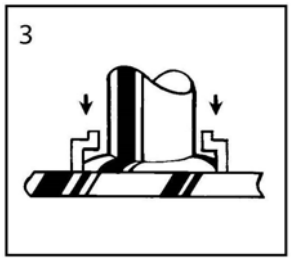
Stud Welding - Step by Step



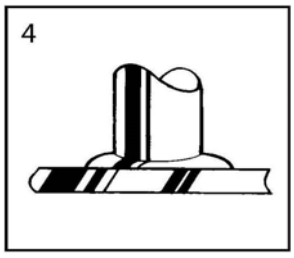
The weld gun is positioned over the base material and the main gun spring is partially compressed. Hold gun perpendicular to work surface and hold ferrule firmly against the surface.



The trigger is pressed and the stud lifts off the base, drawing an arc. The arc melts the end of the weld stud and the base material below. The arc shield (ferrule) concentrates the heat below the weld stud and contains the molten metal within the weld zone. Do not move weld gun during weld.



The main spring plunges the weld stud down into the molten pool of metal in the base material. The cycle is completed in less than a second and the resulting weld bond develops the full strength of the fastener in the weld zone. Allow metal to cool and withdraw gun from the stud, pulling the gun straight up off of the stud.



The weld gun is withdrawn from the weld stud leaving and the ferrule. The ferrule is broken away and discarded. Visually inspect weld.

Note - when determining finished length required for the particular application, keep in mind the reduction in length (burn-off) from stud welding operations. TRU-WELD stud lengths are always given before weld.