

# STUD WELDING PRODUCTS, INC.

## Procedures for Stud Welding 3/4" Shear Connectors Through Metal Deck

In order to achieve good results in any shear connector weld-thru deck job, it is imperative the following procedures be followed.

### 1. Top Flange of Beam

The top flange of all beams to be welded should be free of paint, excessive rust or mill scale, dirt, moisture and all other foreign materials these materials are contaminants to any welding process, especially stud welding due to the short duration of the weld cycle. Do not stud weld to galvanized beams.

### 2. Fit-Up Between Beam Flange and Deck

When installing the material deck and tacking it in place, it is important that the decking be held as tight as possible to the beam flange. A gap between the deck and flange will cause an inconsistent arch length and also allow the molten metal to escape the weld area, thereby resulting in inconsistent welds.

### 3. Deck Placement

Whenever flashing is used as a closure on spandrel beams, care should be taken to butt the deck to the flashing as opposed to lapping. In most cases, the flashing is made of hot dipped galvanized sheet without controls on the amount of zinc. Most deck manufacturers limit the deck coating to 1-1/4 oz/sq ft. The welding of studs should be avoided at lapped points due to the lack of proper nesting, resulting in gaps between the sheets. If it is necessary to weld in a lapped area, it is recommended that a portion of the top sheet be removed, especially in the case of hot dipped galvanized decking.

### 4. Deck Conditions Prior to Welding

Prior to welding, the deck surface should be swept to remove all dirt, sand, or other foreign materials that has accumulated during construction. The deck must be dry. Under wet conditions, it may be necessary to heat or blow dry each stud location in order to remove moisture from between the deck and beam flange.

### 5. Structural Ground

It is always recommended that the welding ground be attached to a spot on a beam that has been ground clean. Poor or inadequate ground connections can result in loss of weld current and therefore, effect the weld quality.

### 6. Power Requirement for Operating Power Source

Consult either the manufacturer or manual for the recommended fusing, primary wire size and primary wire length for the power source to be used. Inadequate primary power or incorrect wire size or length can contribute to a reduction in weld current when some rectifier type power sources are used. Inadequate power or fusing can also hamper the starting and output current for a motor generator.

### 7. Welding Current

It is essential to have the correct weld current for this application, normally between 1,500 and 1,900 amps. When excessive cable lengths are used the result will be a reduction in weld currents. This can contribute to weld inconsistency or even weld failure. Always use 4/0 cables in the welding circuit. The amount of cable totally depends upon the power source being used. It may be necessary in some cases to parallel cable when long runs are needed.

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## 8. Weld Settings

Exact weld settings cannot be given because no two jobs are the same. Actual settings will depend upon job site conditions, deck thickness, type of deck used, amount of galvanizing and ambient temperature. Listed below are approximate settings, minimum and maximum. Most jobs will fall within these settings. Light gauge, lightly galvanized or phosphotized/painted black iron deck of single thickness should fall close to the minimum setting. Double thickness and heavily galvanized deck will be close to the maximum setting.

Weld Time	0.8 to 1.6 sec (48-96 cycles)
Weld Current	1,500-1,900 amps DC
Lift	1/8"
Plunge	1/4 " - 1/2"
Polarity	Straight
ferrule	WTD

## 9. Gun Set-Up

Gun lift should be measured with a stud and ferrule in place and the gun compressed to weld, but on an isolated piece of material, such as piece of wood. The controlled plunge jet (brass screw) should be removed from the stud gun.

### *Accessories:*

Legs B-0109-18 18" Long

Footpiece B-0021 Foot Extension Assembly

Grip B-0060-1

Chuck Ch-075

Weld current should be checked by using a time current monitor. It should be monitored periodically due to cable heating which can cause a reduction in weld current. **NOTE: The above settings are for 3/4" diameter shear connectors only.**

## 10. Testing of Weld Studs

All pre-productions and productions testing should be done in accordance with American Welding Society Structural Welding Code D1.1. (in severe cold weather conditions, the testing should be done before the stud is cold but yet not while it is hot, preferable when the stud is warm to the touch. Reference: Weld Test Procedure Report.

## 11. Visual Inspection

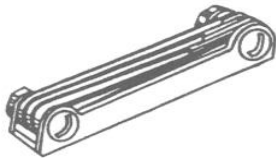
Visual inspection should be allowed and should show a full 360 degree weld fillet, not necessarily the same fillet height around the circumference of the stud. And undercut at the weld interface will be cause for rejection. If the fillet is something less than 360 degree, the stud should be tested by hammer blow or bending with a pipe to 15 degrees. The bending method is preferred. If a failure does not occur, the weld should be considered good and left in the bent condition. If the weld fails, the studs should be replaced.

## 8. General Information

- A) Keep ferrules dry; wet ferruled cannot be used
- B) Keep stud dry; rusty studs cause welding problems and premature chuck failure
- C) Do not weld when the temperature of the base material is below 0 degrees F per AWS D1.1, Section 7.5.4  
“ Welding shall not be done when the base metal temperature is below 0 degrees F (-18 Degrees C) or when the surface is wet and exposed to falling rain or snow. When the temperature of the base metal is below 32 degrees F (0 degrees C) one additional stud in each 100 studs welded shall be tested by methods specified in 7.7.1.3 and 7.7.1.4, except that the angle of testing shall be approximately 15 degrees. This is in addition to the first two studs tested for each start of a new production period or change in set-up.
- D) Do not attempt to weld through more than 2 thickness of galvanized decking
- E) Do not weld where water is present on the weld surface.
- F) Do not weld through dirt, sand or other foreign material.
- G) Beam flanges should be free of paint, rust and any other foreign material.
- H) If welding thru deck, deck must be tight against beam flange.
- I) Weld studs in the center of beam flange whenever possible to eliminate arc blow.
- J) Hod gun perpendicular to base material.
- K) Test weld set-up at the start of each day and every half hour.
- L) Do Not weld to galvanized beams.

## Gun Set-up

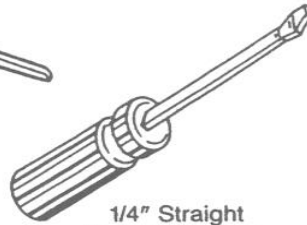
### TOOLS REQUIRED



Allen Wrench  
Set



Chuck  
Ejector Key



1/4" Straight  
Blade Screwdriver

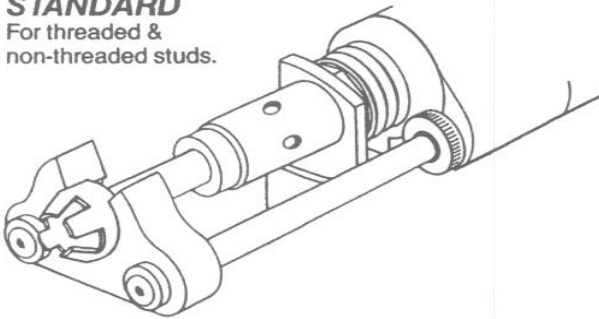


Small  
Adjustable Wrench

### SET-UPS

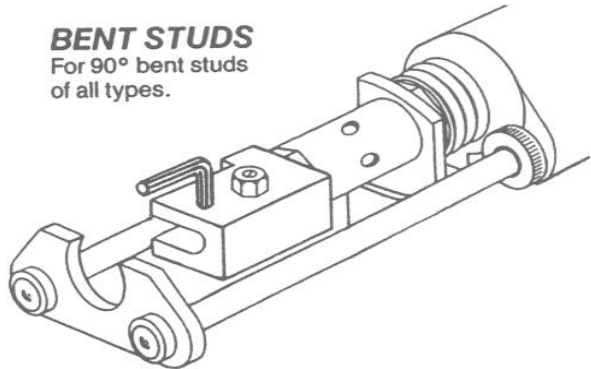
#### **STANDARD**

For threaded &  
non-threaded studs.



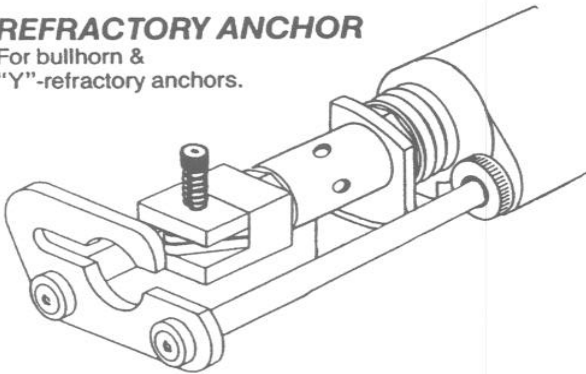
#### **BENT STUDS**

For 90° bent studs  
of all types.



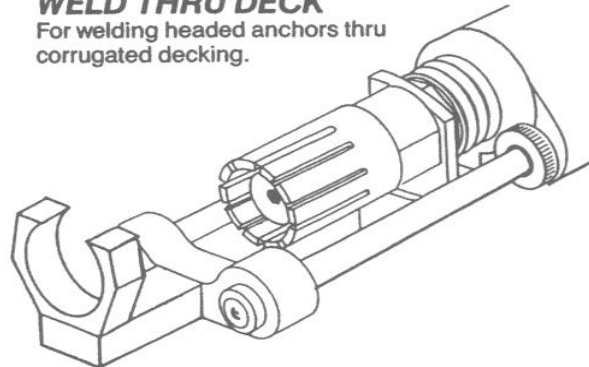
#### **REFRACTORY ANCHOR**

For bullhorn &  
"Y"-refractory anchors.



#### **WELD THRU DECK**

For welding headed anchors thru  
corrugated decking.



STUD WELDING PRODUCTS 1-800-252-1919

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APPROXIMATE STUD WELD SETTING FOR MILD AND STAINLESS  
STEEL STUDS TO MILD AND STAINLESS BASE MATERIALS.

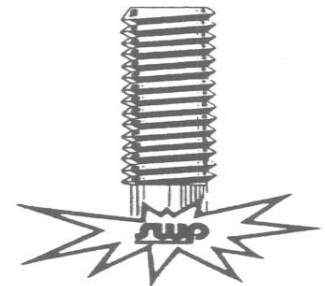
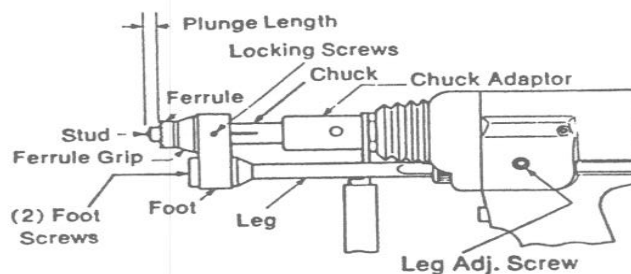
DIA- METER	DOWN HAND			OVERHEAD			VERTICAL			INSIDE ANGLE		
	WELD AMPS	SEC. TIME	CYCLE TIME	WELD AMP	SEC. TIME	CYCLE TIME	WELD AMPS	SEC. TIME	CYCLE TIME	WELD AMPS	SEC. TIME	CYCLE TIME
1/4	450	.18	11	450	.17	11	450	.17	11	490	.19	12
5/16	500	.25	15	500	.25	15	500	.25	15			
3/8	550	.33	20	550	.33	20	600	.33	20	660	.39	23
7/16	675	.41	25	675	.41	25	750	.33	20			
1/2	800	.55	33	800	.55	33	875	.47	28	900	.52	32
5/8	1200	.66	40	1200	.66	40	1275	.60	36	1320	.66	40
3/4	1500	.85	53	1500	.85	53	1700	.73	50	1750	.80	55
7/8	1700	1.05	63	1700	1.05	63	NOT RECOMMENDED			NOT RECOMMENDED		
1	1900	1.42	85	2050	1.20	72	NOT RECOMMENDED			NOT RECOMMENDED		

### STUD STICK OUT PAST FERRULE (PLUNGE LENGTH)

DOWNHAND, OVERHEAD, VERTICAL DIAMETER		INSIDE ANGLE DIAMETER	
STICKOUT		STICKOUT	
1/4-1/2		1/4	
5/8-3/4		1/4-3/8	
7/8-1			

SETTINGS ARE APPROXIMATE AND WILL VARY SLIGHTLY DUE TO SIZE AND LENGTH OF WELD  
CABLE, INCOMING POWER SUPPLIED AND CONDITION OR THICKNESS OF BASE MATERIAL.

**THRU-DECK 3/4**  
AMPS = 1600 - 2000  
TIME = .08 - 1.4  
STICK OUT = 3/8 - 1/2  
SETTING WILL VARY DEPENDING ON  
GAUGE OF DECK AND AMOUNT OF CABLE



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Check us out on the Internet [www.studweldprod.com](http://www.studweldprod.com) or email [info@studweldprod.com](mailto:info@studweldprod.com)

#### Downey, CA

9459 Washburn Rd.  
Downey, CA 90242  
Phone- 800.252.1919  
Fax- 562.862.3022

#### Hayward, CA

2391 American Ave.  
Hayward, CA 94545  
Phone- 510.782.7883  
Fax- 510.782.7918

#### Renton, WA

927 Thomas Ave SW  
Renton WA 98057  
Phone- 425.656.9787  
Fax- 425.656.9786

#### Phoenix, AZ

3535 East Wier Ave., Ste. #4  
Phoenix, AZ 85040  
Phone- 602.305.9350  
Fax- 602.305.4890