TRU-WELD

A Division of TFP Corporation

CAPACITOR DISCHARGE (CD)

Stud Welding Booklet

- CD Studs (Flanged)
- CD Studs (un-Flanged)
- CD Stud Welding Equipment
- CD Stud Welding Information
- Shipping Weights

460 Lake Road
Medina, Ohio 44256
www.truweldstudwelding.com

1-800-321-5588 Toll Free
330-725-7741
330-725-0161 Fax

TRU-WELD Stud Welding

Since 1959 Tru-Weld has been an industry leader of weld stud sales and manufacturing. TRU-WELD manufactures weld stud fasteners for a vast variety of applications. From the small everyday handheld tools, yard machinery, etc. to automobiles, aircrafts, bridges, ocean liners, steel structure buildings and military vehicles; weld studs are all around us in our everyday lives.

Stud Welding
Simply stated, the process of "Stud Welding" is the fusing of a threaded or non-threaded metal shaft or stud to a workpiece with a high power electrical detonation - yielding a stronger bond than if it were forged or traditionally welded.

Full Service Manufacturing With our full in-house manufacturing facility, Heat Treating and Finishing departments, Tru-Weld will design and manufacture a weld stud to suit your specific needs and application.

Service, Quality and Competitive Pricing The three vital steps that make the business world go around. We believe that with uncompromised service, high quality manufacturing and competitive pricing, TRU-WELD will continue to retain our current and gain new customers around the world. Please contact us to see if we can add you as another satisfied customer.

Experience Since 1928 TFP Corp. has been manufacturing Cold-Formed Fasteners. And now 49 years later - since 1959 Tru-Weld has maintained industry leadership in weld stud sales, manufacturing and equipment.

Our experienced Management and Staff is committed to provide the utmost in quality and service in every step of our production, while remaining competitive in the marketplace. It is our goal to meet our customer's needs more effectively than our competitors through a process of continuous quality improvement. Our long-standing relationship with our customers and suppliers is our key to continued success and growth. If we can be of any further assistance to you and your company, please do not hesitate to contact us.

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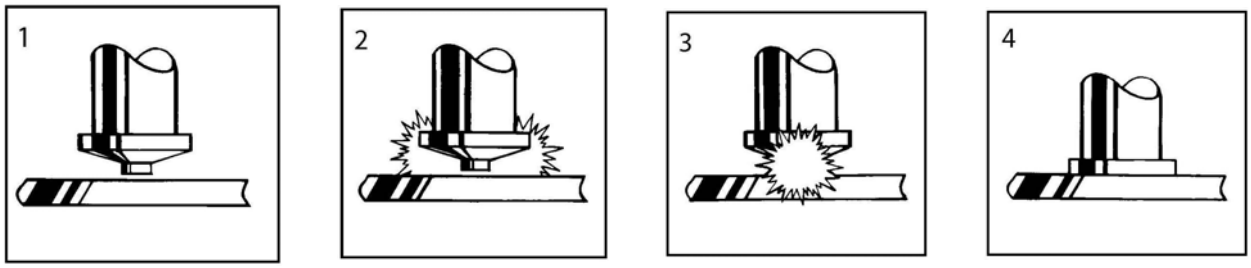
TRU-WELD Stud Welding

THE STUD WELDING PROCESS

Capacitor Discharge Stud Welding

Capacitor Discharge (CD) stud welding is generally used to weld smaller diameter fasteners to thin base metals. Since the entire weld cycle is completed in milliseconds, welds can be made without pronounced distortion, burn-through or reverse side discoloration. As long as one end of the fastener is designed for CD welding, CD studs can be manufactured in almost any shape.



Step 1 **Step 2** **Step 3** **Step 4**

1) The weld gun and stud is positioned against the work plate. No ferrule is needed.

2) Stored energy discharged through special weld "timing" tip and the stud starts downward.

3) The stud is forced downward into the pool of molten metal.

4) Metal solidifies and weld is completed in a split second.

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CD STUD WELDING MATERIAL CAPABILITIES

BASE MATERIAL	STUD MATERIAL			
	MILD STEEL; 1010 - 1030	STAINLESS STEEL 302/304/305	ALUMINUM 1100/5086/6061	BRASS 70-30/65-35
MILD STEEL: 1006-1030	EXCELLENT	EXCELLENT	NA	EXCELLENT
MEDIUM CARBON STEEL: 1030-1050	GOOD	GOOD	NA	GOOD
GALVANIZED SHEET DUCT OR DECKING	EXCELLENT	EXCELLENT	NA	NA
STRUCTURAL STEEL	EXCELLENT	EXCELLENT	NA	EXCELLENT
STAINLESS STEEL: 405,410,430, AND 300 SERIES (EXCL. 303)	EXCELLENT	EXCELLENT	NA	EXCELLENT
LEAD-FREE BRASS, ELECTROLYTIC COPPER, LEAD-FREE ROLLED COPPER	EXCELLENT	EXCELLENT	NA	EXCELLENT
MOST ALUMINUM ALLOYS OF THE 1000,3000,5000, AND 6000 SERIES 1	NA	NA	EXCELLENT	NA
DIE-CAST ZINC ALLOYS	GOOD	GOOD	EXCELLENT	GOOD

1) OTHER MATERIALS, SUCH AS 7000 SERIES ALUMINUM, TITANIUM ALLOYS, INCONEL, ETC. CAN BE WELDED UNDER SPECIFIED CONDITIONS.
2) GOOD – GENERALLY FULL STRENGTH RESULTS, DEPENDING ON THE COMBINATION OF STUD SIZE AND BASE METAL.

STANDARD LOAD CAPACITIES

STUD MATERIAL	STUD SIZE	MAX. FASTENING TORQUE (INCH/LBS,)	ULTIMATE TENSILE LOAD (LBS.)	MAX. SHEAR LOAD (LBS.)
LOW-CARBON COPPER FLASHED STEEL	6-32	6.0	500	375
	8-32	12.0	765	575
	10-24	14.0	960	720
	1/4-20	43.0	1,750	1,300
	5/16-18	72.0	2,900	2,200
	3/8-16	106.0	4,300	3,250
STAINLES STEEL: 304	6-32	10.0	790	590
	8-32	20.0	1,260	940
	10-24	23.0	1,530	1,150
	1/4-20	75.0	2,880	2,160
	5/16-18	126.0	3,750	5,350
	3/8-16	186.0	4,850	7,150
ALUMINUM ALLOY: 1100	6-32	2.5	200	125
	8-32	5.0	295	185
	10-24	6.5	380	235
	1/4-20	21.5	670	415
	5/16-18	36.0	1,125	695
	3/8-16	53.0	1,660	1,000
ALUMINUM ALLOY: 5086	6-32	3.5	375	235
	8-32	7.5	585	365
	10-24	10.0	735	460
	1/4-20	32.5	1,360	850
	5/16-18	54.5	2,300	1,400
	3/8-16	81.0	3,400	2,100
BRASS: 70-30, 65-35	6-32	8.0	600	390
	8-32	16.0	860	560
	10-24	18.5	1,040	680
	1/4-20	61.0	1,950	1,275
	5/16-18	102.0	3,280	2,140
	3/8-16	150.0	4,800	3,160

*MAXIMUM FASTENING TORQUE SHOULD DEVELOP FASTENER TENSION TO SLIGHTLY LESS THAN YIELD POINT.

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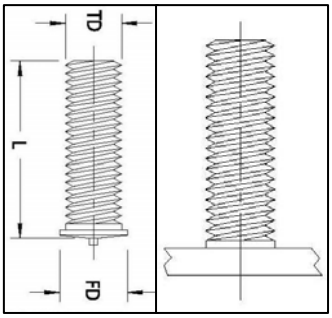

TYPE CD STUD

FULLY THREADED CAPACITOR DISCHARGE STUD – FLANGED
NO FERRULE NEEDED

WELD STUD SPECIFICATIONS			
TD Diameter and Thread Pitch	**L** Min. Length before weld	**TRU-WELD** Part Number	**FD** Flange Diameter
#4-40	.250	CDEC-004-541	.187
#6-32	.250	CDGC-004-541	.218
#8-32	.250	CDIC-004-541	.250
#10-32	.250	CDKF-004-541	.250
#10-24	.250	CDKC-004-541	.250
1/4-20	.375	CD04-006-541	.312
5/16-18	.500	CD05-008-541	.375
3/8-16	.500	CD06-008-541	.437
CD STUDS ARE AVAILABLE IN VARIOUS LENGTHS, DIAMETERS, AND MATERIALS (TOO MANY TO LIST HERE)			

PART NUMBERING CODES (CD STUDS)

PREFIX (IST FOUR DIGITS OR CHARACTERS)

CDEC = #4 CDKC= #10
CDGC = #6 CD04 = 1/4
CDIC = #8 CD05 = 5/16

SUFFIX (LAST THREE DIGITS)

FLANGE/NON-FLANGE (5 OR 6)
TIP/NO TIP (4 OR 0)
MATERIAL (1, 2, 3)
1 – MILD STEEL
2 – STAINLESS STEEL
3 - ALUMINUM

MATERIAL
MILD STEEL, STAINLESS STEEL, ALUMINUM, BRASS

PLATING
ALL MILD STEEL STUDS ARE COPPER PLATING (NICKEL PLATING AVAILABLE UPON REQUEST

ANNEALING
ALL STUDS ARE ANNEALED WHERE REQUIRED

ESTIMATED WEIGHTS OF THREADED CD STUDS IN POUNDS PER 1000 PIECES						
LENGTH	**#4-40**	**#6-32**	**#8-32**	**#10-24**	**1/4-20**	**5/16-18**
1/4	.69	1.00	1.39	1.79	3.08	4.90
3/8	.94	1.38	1.93	2.50	4.37	6.98
1/2	1.18	1.76	2.49	3.21	5.66	9.06
5/8	1.43	2.13	3.04	3.93	6.95	11.13
3/4	1.67	2.51	3.60	4.64	8.24	13.21
7/8	1.92	2.89	4.15	5.35	9.52	15.29
1	2.16	3.26	4.71	6.07	10.81	17.36
1-1/4	2.65	4.02	5.82	7.50	13.39	21.52
1-1/2	3.15	4.77	6.93	8.92	15.96	25.67
1-3/4	3.64	5.52	8.04	10.35	18.54	29.83

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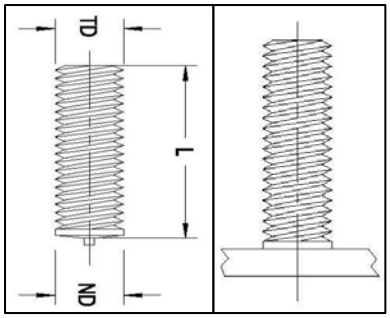

TYPE CD STUD

FULLY THREADED CAPACITOR DISCHARGE STUD – NON-FLANGED
NO FERRULE NEEDED

WELD STUD SPECIFICATIONS			
TD Diameter and Thread Pitch	**L** Min. Length before weld	**TRU-WELD** Part Number	**ND** Nominal Diameter
#4-40	.250	CDEC-004-641	.112
#6-32	.250	CDGC-004-641	.138
#8-32	.250	CDIC-004-641	.164
#10-32	.250	CDKF-004-641	.190
#10-24	.250	CDKC-004-641	.190
1/4-20	.375	CD04-006-641	.250
5/16-18	.500	CD05-008-641	.312
3/8-16	.500	CD06-008-641	.375
CD STUDS ARE AVAILABLE IN VARIOUS LENGTHS, DIAMETERS, AND MATERIALS (TOO MANY TO LIST HERE)			

PART NUMBERING CODES (CD STUDS)

PREFIX (IST FOUR DIGITS OR CHARACTERS)

CDEC = #4 CDKC= #10
CDGC = #6 CD04 = 1/4
CDIC = #8 CD05 = 5/16

SUFFIX (LAST THREE DIGITS)

FLANGE/NON-FLANGE (5 OR 6)
TIP/NO TIP (4 OR 0)
MATERIAL (1, 2, 3)
- 1 – MILD STEEL
- 2 – STAINLESS STEEL
- 3 - ALUMINUM

MATERIAL
MILD STEEL, STAINLESS STEEL, ALUMINUM, BRASS
PLATING
ALL MILD STEEL STUDS ARE COPPER PLATING (NICKEL PLATING AVAILABLE UPON REQUEST
ANNEALING
ALL STUDS ARE ANNEALED WHERE REQUIRED

ESTIMATED WEIGHTS OF THREADED CD STUDS IN POUNDS PER 1000 PIECES						
LENGTH	**#4-40**	**#6-32**	**#8-32**	**#10-24**	**1/4-20**	**5/16-18**
1/4	.69	1.00	1.39	1.79	3.08	4.90
3/8	.94	1.38	1.93	2.50	4.37	6.98
1/2	1.18	1.76	2.49	3.21	5.66	9.06
5/8	1.43	2.13	3.04	3.93	6.95	11.13
3/4	1.67	2.51	3.60	4.64	8.24	13.21
7/8	1.92	2.89	4.15	5.35	9.52	15.29
1	2.16	3.26	4.71	6.07	10.81	17.36
1-1/4	2.65	4.02	5.82	7.50	13.39	21.52
1-1/2	3.15	4.77	6.93	8.92	15.96	25.67
1-3/4	3.64	5.52	8.04	10.35	18.54	29.83

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Estimated Weights for Threaded CD Studs In Pounds Per 1000 Pieces

Length	4-40	6-32	8-32	10-24	1/4-20	5/16-18
1/4	.69	1.00	1.39	1.79	3.08	4.90
3/8	.94	1.38	1.93	2.50	4.37	6.98
1/2	1.18	1.76	2.49	3.21	5.66	9.06
5/8	1.43	2.13	3.04	3.93	6.95	11.13
3/4	1.67	2.51	3.60	4.64	8.24	13.21
7/8	1.92	2.89	4.15	5.35	9.52	15.29
1	2.16	3.26	4.71	6.07	10.81	17.36
1-1/4	2.65	4.02	5.82	7.50	13.39	21.51
1-1/2	3.15	4.77	6.93	8.92	15.96	25.67
1-3/4	3.64	5.52	8.04	10.35	18.54	29.83
2	4.13	6.27	9.15	11.78	21.12	33.98
2-1/4	4.62	7.03	10.26	13.21	23.69	38.14
2-1/2	5.11	7.78	11.37	14.63	26.27	42.29

Estimated Weights of No Thread CD Studs in Pounds Per 1000 Pieces

Length	3/32	1/8	5/32	3/16	1/4	5/16
1/4	.68	1.06	1.59	2.24	3.87	5.97
3/8	.92	1.50	2.27	3.21	5.61	8.68
1/2	1.16	1.93	2.94	4.19	7.35	11.39
5/8	1.40	2.37	3.62	5.16	9.09	14.11
3/4	1.64	2.80	4.30	6.14	10.84	16.82
7/8	1.88	3.24	4.98	7.12	12.56	19.53
1	2.12	3.67	5.65	8.09	14.32	22.25
1-1/4	2.60	4.54	7.01	10.04	17.81	27.67
1-1/2	3.08	5.41	8.36	11.99	21.69	33.10
1-3/4	3.56	6.28	9.72	13.95	24.78	38.52
2	4.04	7.15	11.07	15.90	28.25	43.95
2-1/4	4.52	8.02	12.43	17.85	31.75	49.37
2-1/2	5.00	8.89	13.78	19.80	35.23	54.80

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TRU-WELD EQUIPMENT

6400 N. Honeytown Road
Smithville, Ohio 44677

(330) 669-2773 Phone
(330) 669-2473 Fax

CAPACITOR DISCHARGE STUD WELDER

Model: TWE-250

Stud Welder Description

Incorporates the latest solid state technology into a compact and rugged CD Stud Welder. This system has the capacity to weld studs and pins (including cupped head pins) ranging from 14-guage through 1/4" full flanged stainless steel studs.

SPECS	TWE-250
SIZE	15-3/4" Length, 8" Width, 9" Height
WEIGHT	24 lbs.
WELD RANGE	14 gauge through 1/4" Stainless
DUTY CYCLE	30 studs per minute (including 1/4")
PRIMARY POWER	110 VAC @ 50/60Hz 10 Amp circuit or 220 VAC @50/60Hz 5 Amp circuit
CHARGE VOLTAGE	35-200 VDC

Operational and Safety Features

- **LED Voltage Meter**
- **Safety Shutdown**
- **Cooling Fan**
- **Front-Panel Informational LED's**
- **Dial-Down weld voltage control**

Made In the USA

FEATURES

- **Digital DC voltage readout on all models (allows for more accurate and repeatable weld settings).**
- **Cooling fan in all models for increased efficiency.**
- **Dial-down DC voltage setting (no need to turn off the unit when resetting to a lower voltage).**
- **Only 10 amp circuit requirement (unit fused @ 10 amps).**
- **33,000 micro farad capacitors charging to 200 VDC for greater power output @ lower DC voltage requirements.**
- **Terminal connections on the capacitors are over 5/8" in diameter for a good seat of the terminal buss bars to increase reliability.**
- **The terminal connections on the capacitors have 1/4-28 socket set screws inserted into each one. The socket set screw is used to make the connection to the buss bar. This eliminates damaging the threads in the aluminum connectors of the capacitor, ensuring a solid connection.**
- **Rigid internal construction connecting the entire internal unit to the front and rear panels minimizes the opportunity of the components coming loose during handling or operations.**
- **Sheet metal is powder-coated for greater durability, texture, and appearance.**
- **Stud Guns are ergonomically designed for better hand fit and comfort (reduces operator fatigue for increased weld repeatability).**
- **Stud Guns have a permanent internal spring with easy adjustment for various spring pressures allowing an increased opportunity to apply the correct spring pressure to the weld (no need for a variety of different springs for various applications).**
- **Stud Guns can be configured for "B" Collets, "CI" Collets, Euro Collets or standard tapered chucks.**
- **The TWE CD Unit weigh less than most other available models for ease or carrying.**

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CAPACITOR DISCHARGE STUD WELDER

Model: TWE-321

Stud Welder Description

Incorporates the latest solid state technology into a compact and rugged CD Stud Welder. This system has the capacity to weld studs and pins (including cupped head pins) ranging from 14-guage through 5/16" full flanged stainless steel studs.

SPECS	TWE-321
SIZE	18-3/4" Length, 8" Width, 9" Height
WEIGHT	29 lbs.
WELD RANGE	14 gauge through 5/16" Stainless
DUTY CYCLE	30 studs per minute (including 5/16")
PRIMARY POWER	110 VAC @ 50/60Hz 10 Amp circuit or 220 VAC @50/60Hz 5 Amp circuit
CHARGE VOLTAGE	35-200 VDC

Operational and Safety Features

- **LED Voltage Meter**
- **Safety Shutdown**
- **Cooling Fan**
- **Front-Panel Informational LED's**
- **Dial-Down weld voltage control**

Made In the USA

FEATURES

- **Digital DC voltage readout on all models (allows for more accurate and repeatable weld settings).**
- **Cooling fan in all models for increased efficiency.**
- **Dial-down DC voltage setting (no need to turn off the unit when resetting to a lower voltage).**
- **Only 10 amp circuit requirement (unit fused @ 10 amps).**
- **33,000 micro farad capacitors charging to 200 VDC for greater power output @ lower DC voltage requirements.**
- **Terminal connections on the capacitors are over 5/8" in diameter for a good seat of the terminal buss bars to increase reliability.**
- **The terminal connections on the capacitors have 1/4-28 socket set screws inserted into each one. The socket set screw is used to make the connection to the buss bar. This eliminates damaging the threads in the aluminum connectors of the capacitor, ensuring a solid connection.**
- **Rigid internal construction connecting the entire internal unit to the front and rear panels minimizes the opportunity of the components coming loose during handling or operations.**
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CAPACITOR DISCHARGE STUD WELDER

Model: TWE-375

Stud Welder Description

Incorporates the latest solid state technology into a compact and rugged CD Stud Welder. This system has the capacity to weld studs and pins (including cupped head pins) ranging from 14-guage through 3/8" full flanged stainless steel studs.

SPECS	TWE-375
SIZE	18-3/4" Length, 8" Width, 9" Height
WEIGHT	34 lbs.
WELD RANGE	14 gauge through 3/8" Stainless
DUTY CYCLE	30 studs per minute (including 3/8")
PRIMARY POWER	110 VAC @ 50/60Hz 10 Amp circuit or 220 VAC @50/60Hz 5 Amp circuit
CHARGE VOLTAGE	35-200 VDC

Operational and Safety Features

- **LED Voltage Meter**
- **Safety Shutdown**
- **Cooling Fan**
- **Front-Panel Informational LED's**
- **Dial-Down weld voltage control**

Made In the USA

FEATURES

- **Digital DC voltage readout on all models (allows for more accurate and repeatable weld settings).**
- **Cooling fan in all models for increased efficiency.**
- **Dial-down DC voltage setting (no need to turn off the unit when resetting to a lower voltage).**
- **Only 10 amp circuit requirement (unit fused @ 10 amps).**
- **33,000 micro farad capacitors charging to 200 VDC for greater power output @ lower DC voltage requirements.**
- **Terminal connections on the capacitors are over 5/8" in diameter for a good seat of the terminal buss bars to increase reliability.**
- **The terminal connections on the capacitors have 1/4-28 socket set screws inserted into each one. The socket set screw is used to make the connection to the buss bar. This eliminates damaging the threads in the aluminum connectors of the capacitor, ensuring a solid connection.**
- **Rigid internal construction connecting the entire internal unit to the front and rear panels minimizes the opportunity of the components coming loose during handling or operations.**
- **Sheet metal is powder-coated for greater durability, texture, and appearance.**
- **Stud Guns are ergonomically designed for better hand fit and comfort (reduces operator fatigue for increased weld repeatability).**
- **Stud Guns have a permanent internal spring with easy adjustment for various spring pressures allowing an increased opportunity to apply the correct spring pressure to the weld (no need for a variety of different springs for various applications).**
- **Stud Guns can be configured for "B" Collets, "CI" Collets, Euro Collets or standard tapered chucks.**
- **The TWE CD Unit weigh less than most other available models for ease or carrying.**

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