Developed in 1988, **CADWELD EXOLON** is a significant advance in welded electrical connections. The metallurgy is the same as the standard CADWELD connection approved by over 70% of electric utilities in the USA — but the virtual elimination of visible smoke plus a unique electric starting system makes this improved process easier and more convenient than ever before.

Most connections listed in this catalog can be ordered in the CADWELD EXOLON configuration. Ordering information is shown below.

HOW TO ORDER CADWELD EXOLON

1. To order CADWELD EXOLON products, just specify molds and weld metal from the catalog and add an “XL” prefix.

Example: TAC2Q2Q becomes XLTAC2Q2Q, and 150 becomes XL150.

2. If the weld metal shown in the catalog shows more than one tube required such as 2-#200, you must specify #XL400 to get the correct size filters.

Example: XLTAD-4L3Q: XL400

3. The following molds require a price key change:

- "C" price key molds using 2-#150 weld metals change to XLD price key.
- "E" price key molds using 2-#150 weld metals change to XLJ price key.
- "H" price key molds using 2-#150 weld metals, contact ERICO.
- "M" price key molds using 2-#150 weld metals change to XLV price key.
- "R" price key molds using 2-#150 weld metals change to XLF price key.
- "T" price key molds, ALL change to XLP price key.

Example: TAC3Q3Q using 2-#150 weld metals change to XLTAD3Q3Q using #XL300 weld metal

4. Filters and ignitors are included with the weld metal. XL filters and ignitors are not sold separately.

5. The ignitor can be used only once and then must be discarded. Filters will last as specified in the instructions supplied with each mold.

6. A Relia-Start electric starter, part number XLB971A1 (battery, charger, carrying case and connecting cable), is required for XL weld metal. There is no starting material in the XL weld metal tube. Batteries operate about 200 starts before recharging from 120 VAC is required. The charger, all electrical connections and instructions are included in the battery case.

7. Baffle with cover is required for larger molds. Estimated life of the baffle is 500 welds.

XLB972A1 Baffle is required for molds using XL200 and XL250 weld metals.

XLB973A1 Baffle is required for molds using XL300 to XL750 weld metals.

8. For EZ Change Handles, add XL prefix. (Flint ignitor not included.)

9. Welding Tray, part number XLB974B2, is used under the mold to protect cables and equipment from hot materials.

OTHER INFORMATION

Certain tools may be required for various connections.

If required, these tools are listed on the same page as the connection and in Section A.

- Some tools listed in Section A can save you a lot of time.
- Also refer to A9E, Contractor Tips, to make your job easier, and learn about labor saving ideas.

Prices for standard products are shown in Price List G285P

For other CADWELD literature, videos and software, See Section C.

For all your connection needs — we're only a phone call away.
Phone: 800-677-9089 Fax: 800-677-8131

or call your local CADWELD distributor, agent, or CADWELD Regional Sales Manager

REQUIRED TOOLS SUMMARY:

Required tools are listed with each mold. For your reference, handle clamps and/or frame are summarized below.

MOLD	REQUIRED
A*	Includes frame with handle
C, Q & R	Requires L160
D, F & Z	Requires L159
E*	Includes frame but also requires L160
J*	Includes frame but also requires L159
K*, M* & V*	Includes frame with handles

* To order mold only – without handles or frame – add suffix "M" to mold part number.

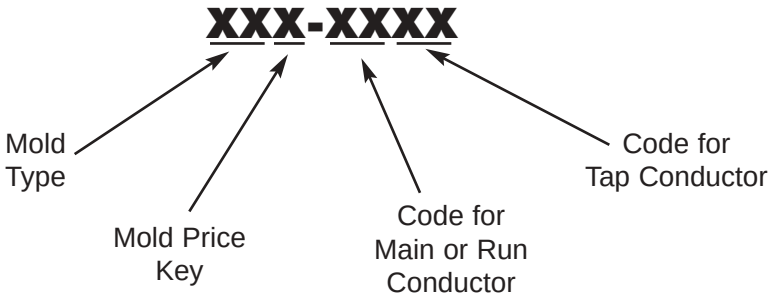
GROUNDING CONNECTION SPECIFICATION

All grounding connections of copper to copper and copper to steel conductors of #8 and larger sized conductors shall be CADWELD exothermic welded connections. Conductors spliced with a CADWELD exothermic welded connection shall be considered as a continuous conductor, as stated in the notes accompanying NEC 250-50, 250-64, 250-68, 250-70 and IEEE Std 80 – 1986.

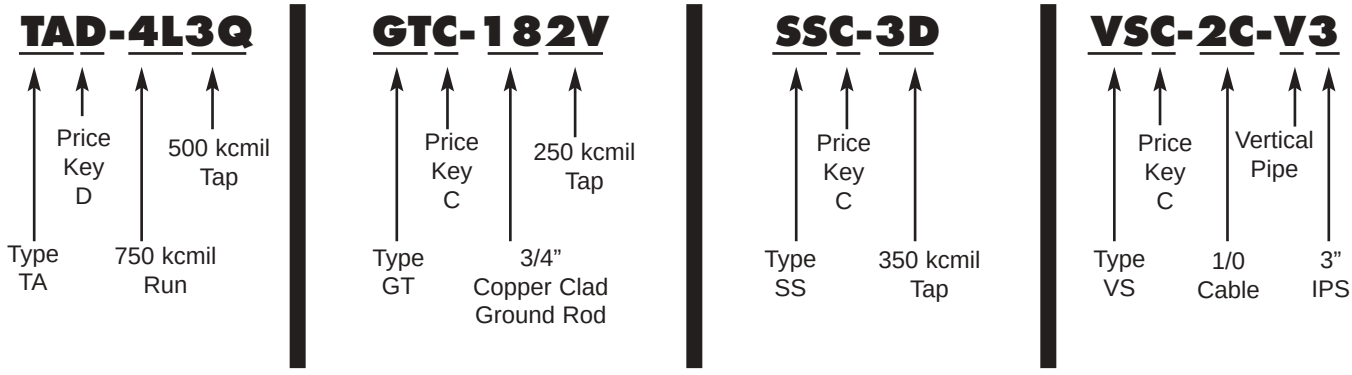
All grounding connections to equipment shall use bolted lugs. When the conductor is #8 and larger, the lug shall be joined to the conductor by the CADWELD process, otherwise use listed compression lugs which meet IEEE Std 837 – 1989.

THE CADWELD MOLD NUMBERING SYSTEM

The CADWELD Mold Part Number gives, in code, the complete information about the mold – Type of connection, mold price key, and conductor size(s)

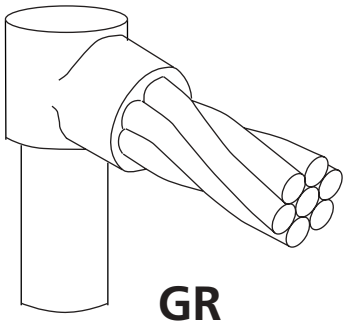


EXAMPLES



Conductor codes are listed in Section B

CABLE TO GROUND ROD GR



GR

CABLE TO GROUND ROD

- Single cable to top of ground rod. Concentric strand copper cable unless otherwise noted. For copper clad, galvanized, stainless clad or stainless steel ground rods.
- **Bold letter** in mold part number is the price key.

REQUIRED TOOLS

Handle Clamps **L160** *for **C** Price Key Molds*
Clamps are included with T and P Price Key Molds

Flint Ignitor **T320** *(Included with handle clamp or frame but also available separately)*

SUGGESTED TOOLS

Cable Cleaning Brush	T313 or T314
Slag Removal Spade	B136A or B136B
Mold Cleaning Brush	T394
File	T329
Cable Clamp	B265
Torch Head	T111

ACCESSORIES

See Section A

GROUND ROD SIZE	CABLE SIZE	MOLD PART NUMBER			WELD METAL
		Steel	Copper Clad Plain (unthreaded)	Copper Clad Sectional (with 9/16" threads)	
1/2"	6	GR**T**-14C1H	GR**T**-14A1H	GR**T**-14B1H	25
	6 SOL	GR**T**-14C1G	GR**T**-14A1G	GR**T**-14B1G	25
	4	GR**T**-14C1L	GR**T**-14A1L	GR**T**-14B1L	25
	4 SOL	GR**T**-14C1K	GR**T**-14A1K	GR**T**-14B1K	25
	2 SOL	GR**T**-14C1T	GR**T**-14A1T	GR**T**-14B1T	32
	2	GR**T**-14C1V	GR**T**-14A1V	GR**T**-14B1V	32

		Steel or Copper Clad Sectional (with 9/16" threads)	Copper Clad Plain (unthreaded)	Copper Clad Sectional (with 1/2" threads)	
1/2"	1	GR**C**-141Y	GR**C**-151Y	GR**C**-131Y	65
	1/0	GR**C**-142C	GR**C**-152C	GR**C**-132C	90
	1/0 SOL	GR**C**-142B	GR**C**-152B	GR**C**-132B	90
	2/0	GR**C**-142G	GR**C**-152G	GR**C**-132G	90
	3/0	GR**C**-142L	GR**C**-152L	GR**C**-132L	90
	4/0	GR**C**-142Q	GR**C**-152Q	GR**C**-132Q	90
	250	GR**C**-142V	GR**C**-152V	GR**C**-132V	90
	300	GR**C**-143A	GR**C**-153A	GR**C**-133A	90

Ph: 1-800-677-9089
www.erico.com

GROUND ROD SIZE	CABLE SIZE	MOLD PART NUMBER		WELD METAL
		Copper Clad Plain (unthreaded)	Steel or Copper Clad Sectional (threaded)	
5/8"	6	GR**T**-161H	GR**T**-311H	32
	6 SOL	GR**T**-161G	GR**T**-311G	32
	4	GR**T**-161L	GR**T**-311L	32
	4 SOL	GR**T**-161K	GR**T**-311K	32

		Copper Clad Sectional (threaded) or Plain	Steel	
5/8"	2 SOL	GR**C**-161T	GR**C**-311T	65
	2	GR**C**-161V	GR**C**-311V	65
	1	GR**C**-161Y	GR**C**-311Y	65
	1/0	GR**C**-162C	GR**C**-312C	90
	1/0 SOL	GR**C**-162B	GR**C**-312B	90
	2/0	GR**C**-162G	GR**C**-312G	90
	3/0	GR**C**-162L	GR**C**-312L	90
	4/0	GR**C**-162Q	GR**C**-312Q	90
	250	GR**C**-162V	GR**C**-312V	90
	300	GR**C**-163A	GR**C**-313A	115
	350	GR**C**-163D	GR**C**-313D	115
	500	GR**C**-163Q	GR**C**-313Q	150

		Copper Clad Plain (unthreaded)	Steel or Copper Clad Sectional (threaded)	
3/4"	6	GR**T**-181H	GR**T**-331H	32
	6SOL	GR**T**-181G	GR**T**-331G	32
	4	GR**P**-181L	GR**P**-331L	45
	4 SOL	GR**P**-181K	GR**P**-331K	45

		Copper Clad Sectional (threaded) or Plain	Steel	
3/4"	2 SOL	GR**C**-181T	GR**C**-331T	90
	2	GR**C**-181V	GR**C**-331V	90
	1	GR**C**-181Y	GR**C**-331Y	90
	1/0	GR**C**-182C	GR**C**-332C	90
	1/0 SOL	GR**C**-182B	GR**C**-332B	90
	2/0	GR**C**-182G	GR**C**-332G	90
	3/0	GR**C**-182L	GR**C**-332L	90
	4/0	GR**C**-182Q	GR**C**-332Q	90
	250	GR**C**-182V	GR**C**-332V	90
	300	GR**C**-183A	GR**C**-333A	115
	350	GR**C**-183D	GR**C**-333D	115
	500	GR**C**-183Q	GR**C**-333Q	150
1"		CONTACT ERICO FOR ORDERING INFORMATION		

GROUNDING SYSTEM – CONDUCTORS AND CONNECTORS

The grounding conductor size is based on the maximum magnitude and duration of available fault current, and on the type of connections being used in the grounding system.

IEEE Std. 80-2000, Guide for Safety in Substation Grounding, the accepted industry standard, uses a fusing formula as the basis for selecting minimum conductor size to avoid fusing (melting) under fault conditions.

This formula can be simplified to the following:

$$A = K \cdot I\sqrt{S}$$

Where: A = Conductor size in circular mils
K = Constant from the following table
I = RMS fault current in amperes
S = Fault time in seconds

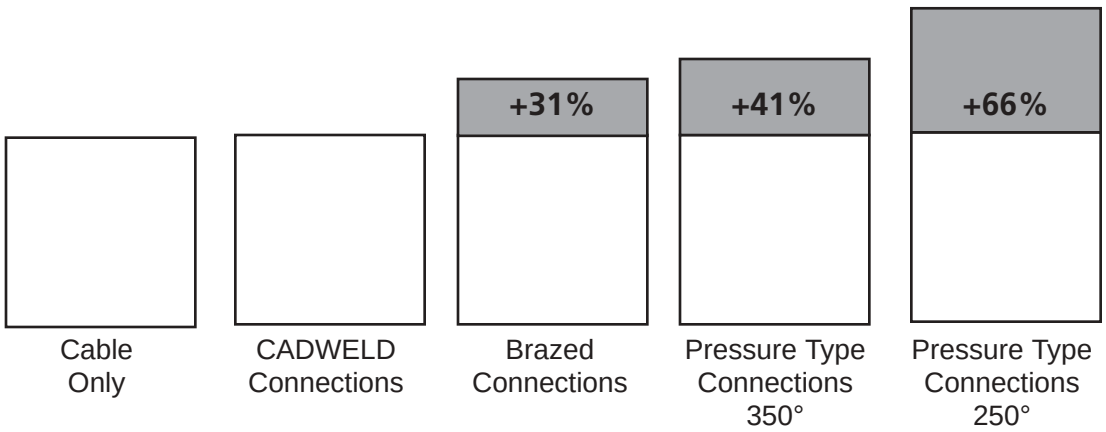
Based on the standard ambient temperature of 40°C.

MAX TEMP	CONSTANT K FOR ABOVE FORMULA		
	COPPER S.D.	COPPERWELD DSA 40%	COPPERWELD DSA 30%
1083 C	7.01	10.46	12.04
450 C	9.18	13.74	15.87
350 C	10.10	15.13	17.46
250 C	11.65	17.47	20.17

The temperatures listed above for each material are specified in IEEE Std. 80-2000 to be used for different types of connecting means;

Pressure type connectors	250° to 350°C*
Brazed connections	450°C
Exothermic welded connections	1083°C

*except those which have been tested to and passed the requirements of IEEE Std. 837-1989.



EXAMPLE – 25,000 Ampere, 2 second fault:

CONNECTION TYPE	CONDUCTOR SIZE
CADWELD	.246 kcmil – use 250 kcmil
Brazed	.322 kcmil – use 350 kcmil
Pressure Type (at 350 C)	.357 kcmil – use 350 kcmil
Pressure Type (at 250 C)	.408 kcmil – use 400 kcmil

BARE CLASS A, B, AND C CONCENTRIC STRANDED CONDUCTOR

Based on A.S.T.M. Standard Specifications.

Size in Circular mils	Size A.W.G.	Conductor Dia. In.	NUMBER OF WIRES 7	19	37	61	91	CADWELD Cable code
1,000,000		1.152			.1644*	.1280	.1048	4Y
800,000		1.031			.1470*	.1145	.0938	4Q
750,000		.998			.1424*	.1109	.0908	4L
700,000		.964			.1375*	.1071	.0877	4G
600,000		.893			.1273	.0992	.0812	3X
500,000		.813		.1622*	.1162	.0905		3Q
400,000		.728		.1451	.1040	.0810		3H
350,000		.681		.1357	.0973	.0757		3D
300,000		.630		.1257	.0900	.0701		3A
250,000		.575		.1147	.0822	.0640		2V
211,600	4/0	.528	.1739	.1055	.0756			2Q
167,800	3/0	.470	.1548	.0940	.0673			2L
133,100	2/0	.419	.1379	.0837	.0600			2G
105,500	1/0	.373	.1228	.0745	.0534			2C
83,690	1	.332	.1093	.0664	.0476			1Y
66,370	2	.292	.0974	.0591				1V
52,630	3	.260	.0867	.0526				1Q
41,740	4	.232	.0772	.0469				1L
26,240	6	.184	.0612	.0372				1H
16,510	8	.146	.0486	.0295				1E
10,380	10	.116	.0385	.0234				1B
6,530	12	.0915	.0305	.0185				
4,110	14	.0726	.0242	.0147				

*Class AA

Ph: 1-800-677-9089
www.erico.com

BARE SOLID COPPER WIRE

Based on A.S.T.M. Standard Specifications

Size A.W.G.	Cross Sectional Area Circular Mils	Wire Dia. In.	CADWELD Cable code
4/0	211,600	.4600	2P
3/0	167,800	.4096	2K
2/0	133,100	.3648	2F
1/0	105,500	.3249	2B
1	83,690	.2893	1X
2	66,370	.2576	1T
3	52,630	.2294	1P
4	41,740	.2043	1K
6	26,250	.1620	1G
8	16,510	.1285	1D
10	10,380	.1019	1A
12	6,530	.0808	
14	4,110	.0064	

DSA COPPERWELD CONDUCTOR

Cable Stranding	Nominal Diameter	kcmil	Equivalent Copper Size*	CADWELD Cable code
7/#10	.306	72.7	3AWG	9A
7/#8	.385	115.6	1	9B
7/#7	.433	145.7	1/0	9C
7/#6	.486	183.8	2/0	9D
7/#5	.546	231.7	3/0	9E
19/#9	.572	248.8	3/0	9F
7/#4	.613	292.2	4/0	9L
19/#8	.642	313.7	4/0	9G
19/#7	.721	395.5	250 Kcmil	9H
37/#9	.801	484.4	300	7W
19/#6	.810	498.8	350	9J
37/#8	.899	610.9	400	7V
19/#5	.910	628.9	450	9K
37/#7	1.01	770.3	500	9M

*Approximate based on Fusing Current calculations and tests by Copperweld Co.

GROUND RODS

Nominal Size	Material	Type	Thread Size	Body Dia.	CADWELD Ground Rod Code
1/2"	Copperclad	Sectional	9/16"	.505	14
	Steel*	Plain		.500	14
	Copperclad	Plain		.475	15
	Copperclad	Sectional	1/2"	.447	13
5/8"	Copperclad	Sectional	5/8"	.563	16
	Steel*	Plain		.625	31
	Copperclad	Plain		.563	16
3/4"	Copperclad	Sectional	3/4"	.682	18
	Steel*	Plain		.750	33
	Copperclad	Plain		.682	18
1"	Copperclad	Sectional	1"	.914	22
	Steel*	Plain		1.00	37
	Copperclad	Plain		.914	22

* Plain steel, stainless steel, stainless clad rods or galvanized steel.

RECTANGULAR COPPER BUSBAR

Thickness Inches	Width Inches	Circular Mil Size	Weight Lbs. per Foot	CADWELD Bus Bar Code
1/8	1	159,200	.484	CE
	1-1/2	238,700	.726	CG
	2	318,300	.969	CH
3/16	1	238,700	.727	DE
	2	477,500	1.45	DH
1/4	1	318,300	.969	EE
	1-1/2	477,500	1.45	EG
	2	636,600	1.94	EH
	3	954,900	2.91	EK
	4	1,273,000	3.88	EM
3/8	1	477,500	1.45	GE
	1-1/2	716,200	2.18	GG
	2	954,900	2.91	GH
	3	1,432,000	4.36	GK
	4	1,910,000	5.81	GM
1/2	2	1,273,000	3.88	JH
	3	1,910,000	5.81	JK
	4	2,546,000	7.75	JM

USEFUL CONVERSIONS

Area

Square Inches x 1273 = kcmil
Square Millimeters x 1.974 = kcmil
kcmil x 0.5067 = Square Millimeters

Density

Copper: 0.323lb/in^3
Steel: 0.283lb/in^3

REINFORCING BARS

Rebar Sizes	NOMINAL DIMENSIONS Dia. Inches	Cross-Sectional Area - Sq. Inches	Equivalent Copper Sizes*	CADWELD Rebar Code
3	.375	.11	9AWG	51
4	.500	.20	7	52
5	.625	.31	5	53
6	.750	.44	3	54
7	.875	.60	2	55
8	1.000	.79	1	56
9	1.128	1.00	1/0	57
10	1.270	1.27	2/0	58
11	1.410	1.56	3/0	59
14	1.693	2.25	250 kcmil	60
18	2.257	4.00	450	61

* Based on 8% IACS, rounded to the next higher commercial copper size.

Ph: 1-800-677-9089
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STANDARD STEEL WIRE GAGE

(WASHBURN MOEN GAGE) SOLID

Gage No.	Dia. Inches	Gage No.	Dia. Inches
7/0	.490	6	.1920
6/0	.4615	7	.1770
5/0	.4305	8	.1620
4/0	.3938	9	.1483
3/0	.3625	10	.1350
2/0	.3310	11	.1205
1/0	.3065	12	.1055
1	.2830	13	.0915
2	.2625	14	.0800
3	.2437	15	.0720
4	.2253	16	.0625
5	.2070	17	.0540

STEEL PIPE SIZES

STANDARD WEIGHT (SCHEDULE 40) ASTM A53-90-B ANSI/ASME B36.10M-1985

Nominal Size In	O.D. Inches	Wall Thickness Inches	CADWELD Mold Code
1	1.315	.133	1
1-1/4	1.660	.140	1.25
1-1/2	1.900	.145	1.50
2	2.375	.154	2
2-1/2	2.875	.203	2.50
3	3.500	.216	3
3-1/2	4.000	.226	3.50
4	4.500	.237	4
5	5.563	.258	5
6	6.625	.280	6
8	8.625	.322	8
10	10.750	.365	10

CAST IRON PIPE – CLASS A THRU D

AWWA Specification 1908, ASA A21.2 Class 100-250.

Nominal Size (Inches)	Actual O.D. (Inches)
4	4.80 to 5.00
6	6.90 to 7.10
8	9.05 to 9.30
10	11.10 to 11.40
12	13.20 to 13.50
14	15.30 to 15.70
16	17.40 to 17.80
18	19.50 to 19.90
20	21.60 to 22.1
24	25.80 to 26.30
30	31.70 to 32.70
36	38.00 to 39.20
42	44.20 to 45.60
48	50.50 to 52.00
54	56.70 to 58.40
60	62.80 to 64.80
72	75.30 to 76.90
84	87.50 to 88.50

Other standard sections used for fence posts

Section	CADWELD Mold Code
1-1/2" square	PS15
2" square	PS20
2-1/2" square	PS25
3" square	PS30*
1.875 x 1.625 x .133 “H”	PH1
2.25 x 1.95 x .143 “H”	PH2

* For D or F mold price only