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CONTRACTOR TIPS

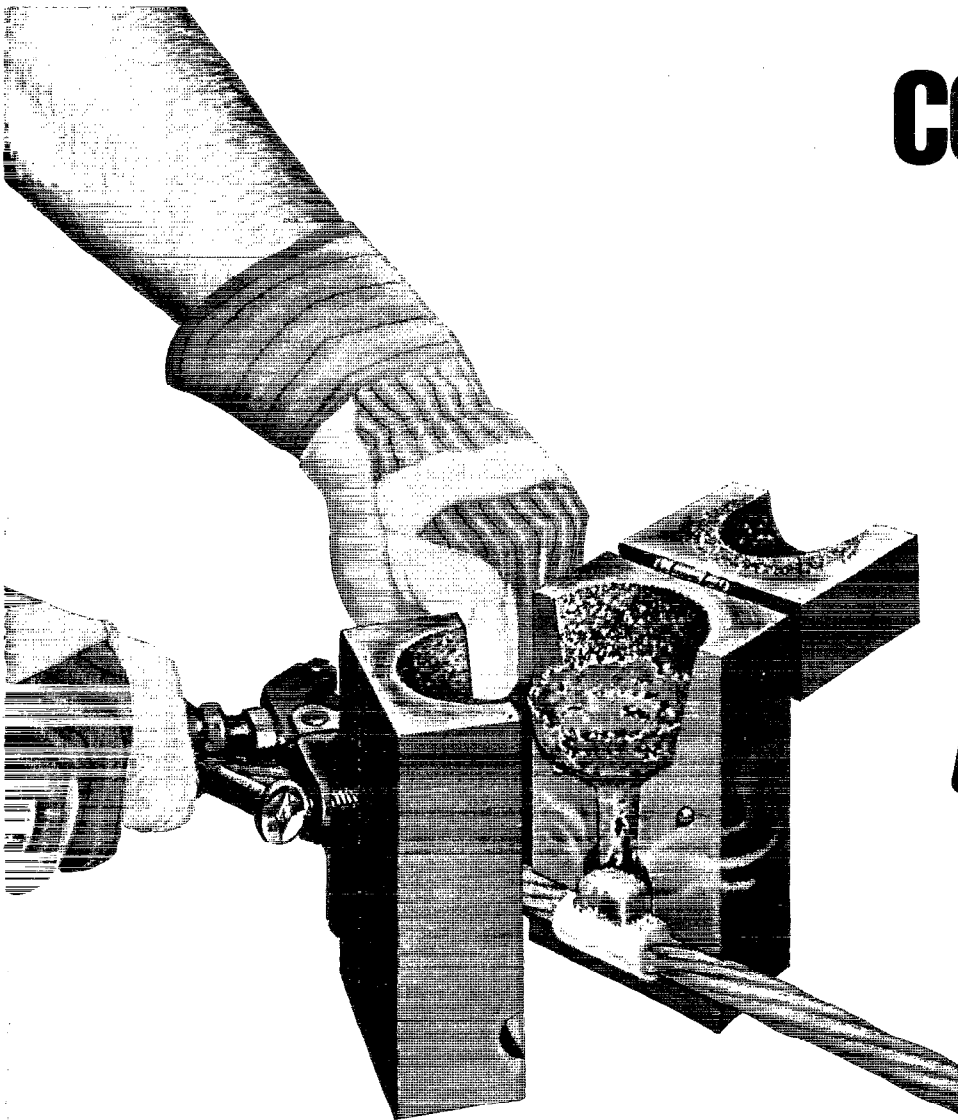
For

The

Use Of

CADWELD[®]

Products



CONTRACTOR TIPS

FOR THE USE OF CADWELD PRODUCTS.

CADWELD has the answers to all of your grounding needs.

This pamphlet contains a list of time-saving tips for contractors using CADWELD products. Actually, making a CADWELD connection is often easier and less expensive than using crimp or bolted connections.

We have one or more answers to almost any requirement. To use this guide, just look up the question you have in the Table of Contents or the Index.

CHECK LIST

| | |
|---|---------------|
| Every job needs: | |
| Mold(s) (with instruction sheets) | Flint ignitor |
| Weld metal* | Wire brush |
| Handle clamps | Torch |
| *If weld metal box is opened, check to be sure disks are still there. | |
| In Addition, | |
| some molds need: | |
| Packing for rebar molds | |
| CADWELD Mold Sealer for some molds | |
| Mold cleaning tool | |
| Cable clamps, surface clamps, ground rod support clamps, etc. | |

TABLE OF CONTENTS

CONNECTION SIMPLIFICATION

- Sleeves and shim Question 1, page 1
- Fewer molds for the job Q2, p2

TIPS FOR MAKING CONNECTIONS

- Wet or muddy conductors Q3, p4
- Holes in the connection Q4, p4
- Pin holes in the connection Q5, p4
- Heating mold with torch Q6, p4
- Heating mold without a torch Q7, p5
- Cable "burned up" Q8, p5
- Leakage of weld metal Q9, p6
- Mold leakage Q10, p6
- Clamp adjustment Q11, p7
- Connections to steel Q12, p7
- Steel surface clamps Q13, p8
- No flint ignitor Q14, p9
- Ground rod driving sleeves Q15, p9
- Ground rod splices Q16, p10
- Mold life Q17, p11
- Lugs Q18, p11
- Small tap wires Q19, p11
- Solid conductor Q20, p11

- Starting the reaction Q21, p12
- Flint ignitors Q22, p12
- Combining weld metal Q23, p12
- Welding to copper surface Q24, p13
- Connection of large conductors Q25, p13
- Indoor connections Q26, p14

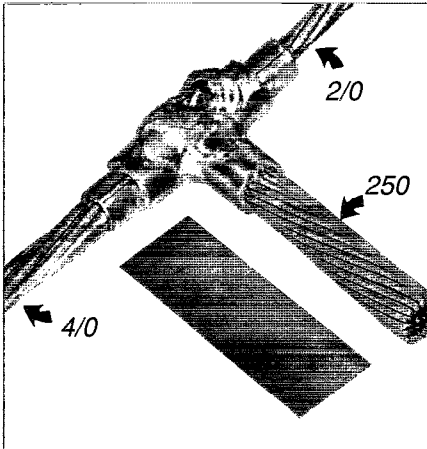
GENERAL INFORMATION

- Price key Q27, p15
- Wear plates Q28, p15
- Split crucible Q29, p15
- Heavy duty Q30, p16
- Weld metal alloys Q31, p16
- Weld metal sizes Q32, p17
- Power conductor Q33, p17
- Ground rod connections Q34, p17
- Reinforcing bar connections Q35, p18
- Connection variations Q36, p18
- Different manufacturers materials Q37, p19

- INDEX p20

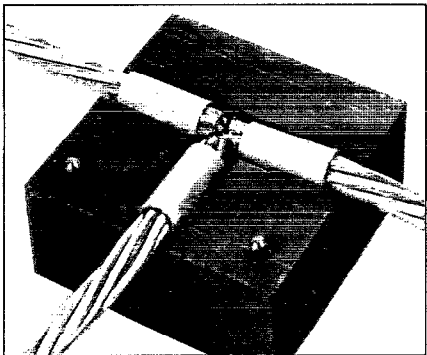
CONNECTION SIMPLIFICATION

QUESTION 1: I have lots of 4/0 molds in my stock but now I have a small job using 2/0. Can I shim the smaller cable to fit the mold?



WRAP SLEEVES

ANSWER 1: Sure - you can often shim one or two cable sizes to fit a larger mold. Use a wrap sleeve, CADWELD P/N B140A. Wrap the shim around each cable to build it up to a 4/0 size. Then use the 4/0 molds to make the connection. We recommend that you keep a package of wrap sleeves handy.



ADAPTOR SLEEVES

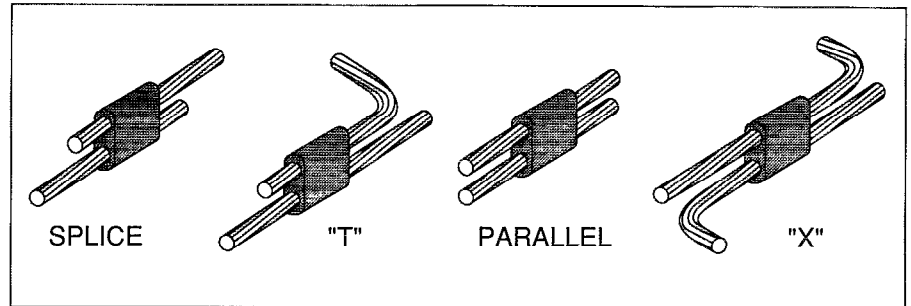
ANSWER 2: Use an adaptor sleeve which is sized for specific cables to buildup the 2/0 to fit the 4/0. Select sleeve P/N B1332Q for this example. Adaptor sleeves cost more but they take less time.

ADAPTOR SLEEVE SELECTION GUIDE

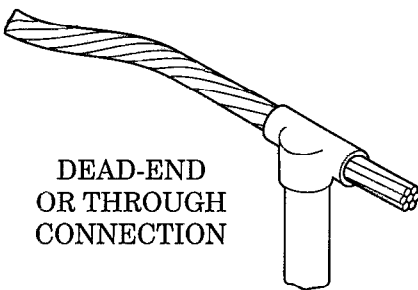
| CABLE SIZE | | USE SLEEVE PART NO. | USE IN MOLD FOR |
|----------------------|----------|------------------------|--------------------|
| CONCENTRIC STRAND | SOLID | | |
| ----- | #6 | B133-1L | #4 |
| #6 | ----- | B112 | #2 |
| #4 | #3 or #4 | B133-1V | #2 |
| #3 or #4 | #2 | B133-1Y | #1 |
| #2 | #1 | B133-2C | 1/0 |
| #1 | 1/0 | B133-2G | 2/0 |
| 1/0 or #1 | 2/0 | B133-2L | 3/0 |
| 2/0 or 3/0 | 3/0 | B133-2Q | 4/0 |

QUESTION 2: CADWELD makes so many different molds. Isn't there an easier way?

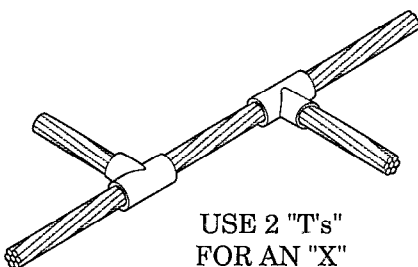
ANSWER 1: Use **Type PT** molds on conductor sizes up to about 4/0. This one type mold can be used to make splices, tees, and "X's", in addition to parallels.



ANSWER 2: When a splice is required, several different molds can be used. For instance, the splice can be made using the same mold as another connection like a **Type TA** or **GT**. Just center the ends of the cable to be spliced under the tap hole of the mold. Or, use the **Type TA** mold as above but with a short length of cable (about 3 inches) in the tap cable hole. Be careful to center the cable ends for the splice in the center of the mold!



ANSWER 3: For ground rods, use **Type GT** thru cable connections. When the cable dead-ends at the ground rod, just let it extend past the rod 2" (through the mold) when making the connection.

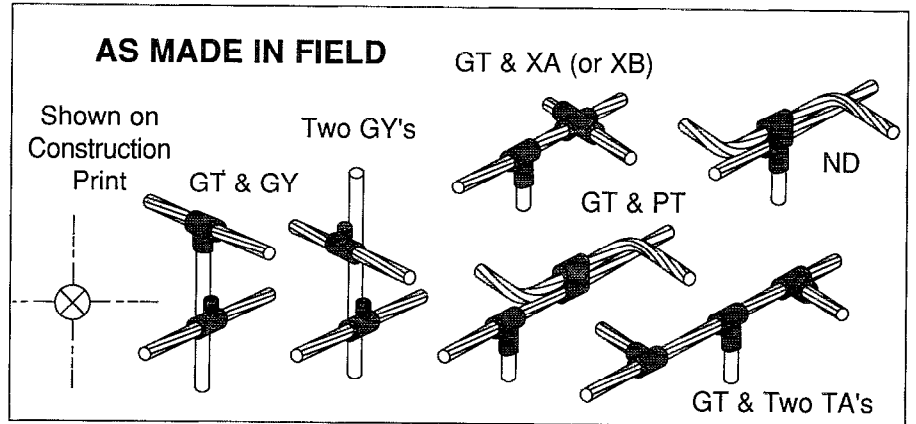
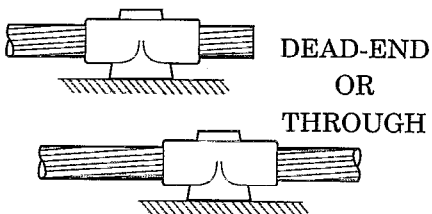
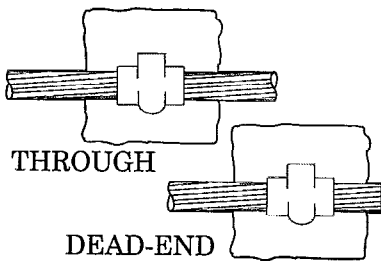
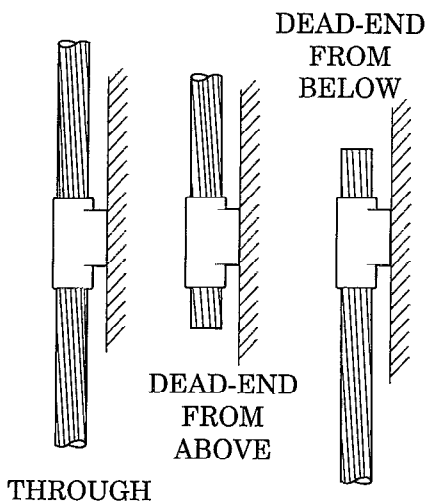


ANSWER 4: When a lot of "T's" and a few "X's" are required on a job, use two "T's" about 2" (min.) apart to make the "X".

ANSWER 5: When several cables are shown on the print to be connected to the same ground rod, use your **Type GT** mold to connect a through cable (or two cables from opposite directions) to the top of the rod. Then use your **Type TA** mold to connect the other cables to the first cable. Electrically, this is equal to that shown on the print.

GROUND ROD CONNECTIONS

When the construction print shows several cables to a ground rod, several methods can be utilized to achieve the required electrical path.



ANSWER 6: When making connections of vertical cable to a vertical steel surface, a **Type VV** mold can be used for a through cable, a dead-end cable from above or a dead end cable from below.

ANSWER 7: When making connections of horizontal cable to a vertical steel surface, a **Type VG** or **VT** mold can be used for a through cable or a dead-end cable.

ANSWER 8: When making connections of horizontal cable to a horizontal steel surface, a **Type HC** or **HT** mold can be used for a through cable or a dead end cable.

TIPS FOR MAKING CONNECTIONS

QUESTION 3: How do I clean the conductors when they are wet and muddy?

ANSWER: When the conductor is wet and muddy, *first* heat the conductor with a torch to dry all the moisture. Wiping the conductor with a cloth while heating helps to remove the mud. *Second*, rap the conductor to knock out as much dirt as possible. *Finally*, wire brush the conductor across the ends and back the sides about 2 inches.

QUESTION 4: Sometimes, I get the holes in the riser even after I have been using the mold and it is hot. What can I do?

ANSWER 1: Holes in the riser can be caused by contamination on the cables or the surface if welding to steel. If there is oil or other substance which burns, a black material can usually be seen in the holes and around the weld. Moisture can also cause holes in the finished connection. See question 9 for further discussion.

ANSWER 2: Holes in the riser can also be caused by excessive galvanizing when welding to a galvanized surface. If this occurs, remove a little more galvanizing at the area of the weld before making the next weld. This can be done with a file or a scraper.

QUESTION 5: I can make good looking CADWELD connections most of the time. But, the first one I make each morning doesn't look as good - it has small pin holes in the riser. What's wrong?

ANSWER: Heat the mold (to above the boiling point of water) before using it each day. It only takes a couple of minutes using a hand-held propane torch. The graphite absorbs moisture from the atmosphere overnight. Making the first connection without heating the mold causes the moisture to turn to steam, some of which becomes entrapped in the weld metal.

QUESTION 6: But I do heat the mold and still have the holes on the first connection. I know there is moisture in the mold because I can see the moisture come out as I am heating the mold. And I heat the mold until it is nice and warm. What's wrong?

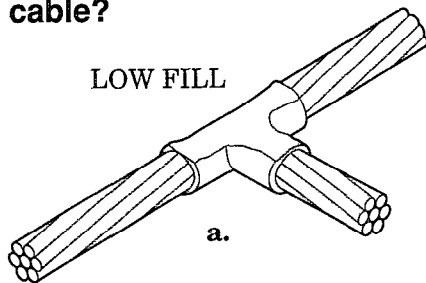
ANSWER: The moisture you are seeing coming out of the mold is actually moisture from the torch flame condensing on the cold mold (the product of combustion is water). You are therefore adding moisture to the mold as you begin heating it. This can't be prevented. It is therefore necessary to heat the mold to a high enough temperature to drive all the moisture out. It is hot enough when a drop of water sizzles on the mold. Having the mold good and hot gives another benefit too. If there is moisture on the conductors, a hot mold will dry some of the moisture as the welding preparation takes place.

QUESTION 7: I don't always have a torch with me. How else can I heat the mold?

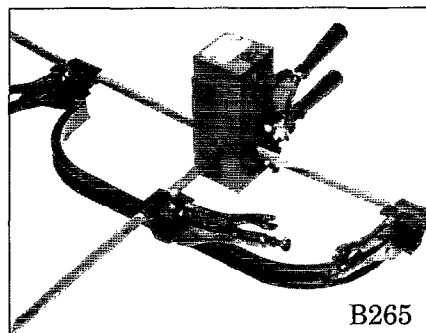
ANSWER: One way, which must be used with extreme caution and only when no other method is available, is to make a dummy connection using scrap conductors. Do not attempt this if the mold is very wet since the weld will sputter and spew excessive hot materials. If the mold is horizontally split, a wet mold can cause a high riser which can lock in the crucible. In this case, use only half the required weld metal to make the dummy connection. Any unused weld metal may be disposed by mixing it with earth.

QUESTION 8: The other day when I opened the mold, the cable was "burned up". Was the "shot" (weld metal) too hot causing it to burn up the cable?

ANSWER: What you experienced was not the cable being "burned up". When a CADWELD Connection is being made, the molten metal from the reaction melts the cable under the tap holes. Before the Weld Metal and the cable it melted solidifies, if any of the following happens, a void is found when the mold is opened:

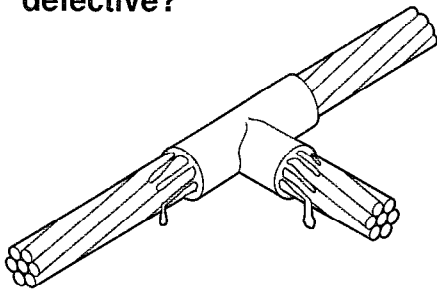


a. If molten metal leaks from the mold, not enough material remains in the mold to fill the weld cavity. A new mold may be necessary to eliminate the leakage.



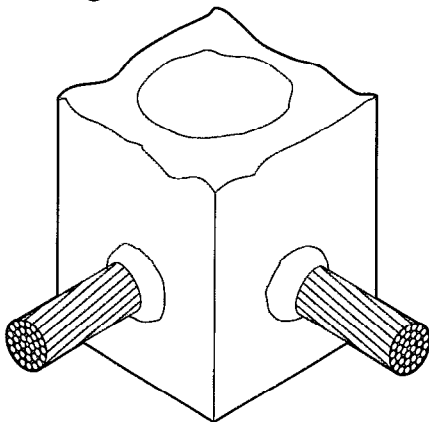
b. If a connection is being made to a through (uncut) cable, again the weld metal melts through all the strands. If there is tension on the cable, even slight tension, the cable is pulled apart. This creates a larger void than can be filled with the Weld Metal. Use cable clamp **B265** to hold the cables.

QUESTION 9: I get some molten metal leaking out of the mold around the cable strands, especially on 4/0 7 strand cable. Is my mold defective?



ANSWER: This is a common occurrence, especially after the mold has been used 15 to 20 times and the opening in the mold for the cable becomes worn. After the mold has been locked on the cables, apply a ring of CADWELD Mold Sealer around the cable where it enters the mold. Don't force it into the mold! If it gets in the weld cavity, the molten metal will cause it to burn and give off gases which can cause an improper weld or spattering of molten weld metal.

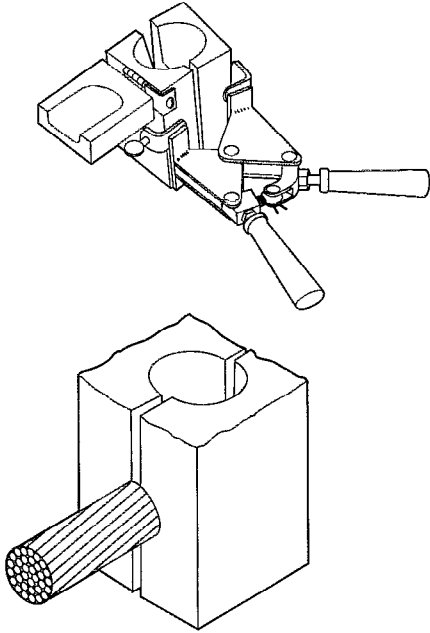
QUESTION 10: The weld metal leaks around the cable strands, especially when I use 4/0 seven strand cable. Can I pack mud around the mold to stop the leakage?



ANSWER: NO! Mud or anything else containing water or lots of oil should never be used. CADWELD Mold Sealer packed around the conductors AFTER the mold handles have been closed and locked will usually stop the leakage. However, after the mold wears and the cable opening becomes enlarged, the difference between the mold opening and the cable diameter may be too great for the sealer to do its job. The answer then is a new mold.

When applying the sealer, never allow it to be forced into the weld cavity. It will cause poor welds. See QUESTION 9.

QUESTION 11: My mold doesn't close tight enough even though the handles lock. What can I do?



QUESTION 12: I try to make a connection to a steel surface but it doesn't "stick" to the steel or, if it does, a light rap with a hammer knocks it off. Is there a problem with the weld metal?

ANSWER: The first thing to check is the adjustment of the handles, especially if the handles are new. Just in front of the grips is the adjustment linkage. Remove the key and pin. Then turn the linkage out to tighten the locking action. Test the locking action and then replace the pin and key.

ANSWER: Check the conductors at the mold cable opening to make sure that you are using the correct mold for the cable. Too large a cable will hold the mold open.

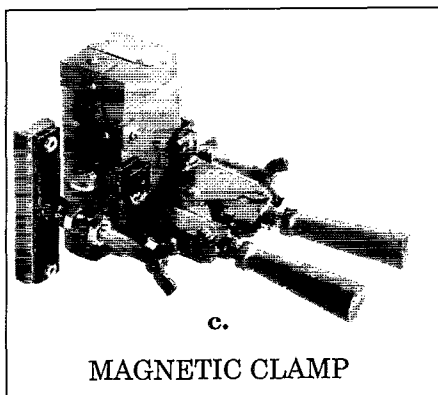
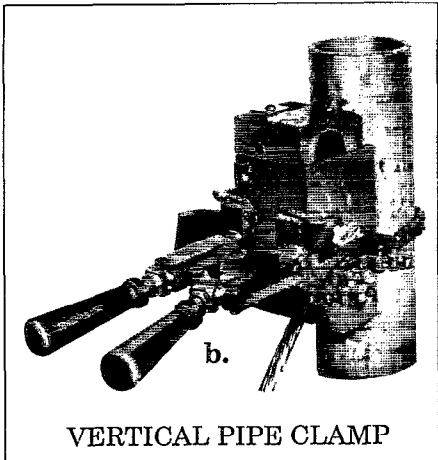
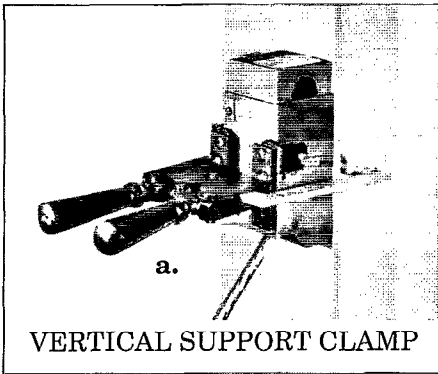
ANSWER: Check the mold parting line. Make sure some foreign object isn't caught in the parting line.

ANSWER: There is no problem with the weld metal. The lack of "stick" to the steel is caused by one of the following:

a. The steel surface is not properly prepared. A file, rasp or grinder using an ERICO approved wheel must be used to clean the steel surface to "bright metal". Brushing the surface is not sufficient. If the surface is heavily galvanized, the galvanizing at the area of the weld must be removed.

b. The cable may not be positioned properly in the mold. When the cable dead-ends at the connection, the cable end must be positioned as shown on the instructions supplied with each mold. Often, this means not to push the cable all the way into the mold. Positioning the cable end too far in the mold may restrict the flow of the molten weld metal resulting in an improper connection.

QUESTION 13: When welding to a steel surface, is there an easy way to hold the mold tight to the surface?



ANSWER: While there is no one solution, CADWELD offers several clamps for different situations;

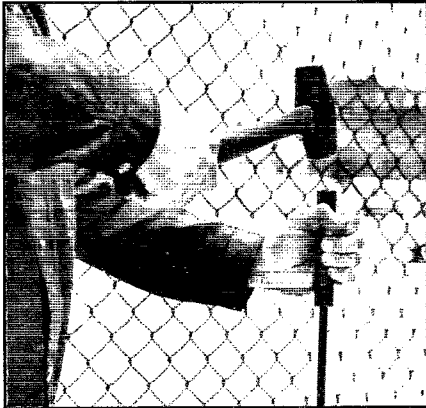
a. When welding to a “H” shaped steel column, the CADWELD Vertical Support Clamp is available. The part numbers are **B-134** for the **L-160** handle (fits 3” or “C” Price Key molds) and the **B-135** for the **L-159** handle (fits 4” or “D” Price Key molds). The clamp is easily attached to your existing CADWELD E-Z Change Handle Clamp.

b. If welding to a vertical pipe, such as a fence post, the CADWELD Pipe Clamp works well. It is a single unit incorporating both the pipe clamp and the handle clamp. Part numbers for the different mold sizes and applications are as follows:

| CLAMP PART NO | FITS MOLD PRICE KEYS | FOR THE FOLLOWING CONNECTION TYPES | PIPE |
|---------------|----------------------|------------------------------------|------------|
| B159-V | D & F | VS, VF, VB, & VV | VERTICAL |
| B160-V | C & R | VS, VF, VB, & VV | VERTICAL |
| B159-VT | D & F | VT | VERTICAL |
| B160-VT | C & R | VT | VERTICAL |
| B159-H | D & F | HA, HS, HC, & HT | HORIZONTAL |
| B160-H | C & R | HA, HS, HC, & HT | HORIZONTAL |

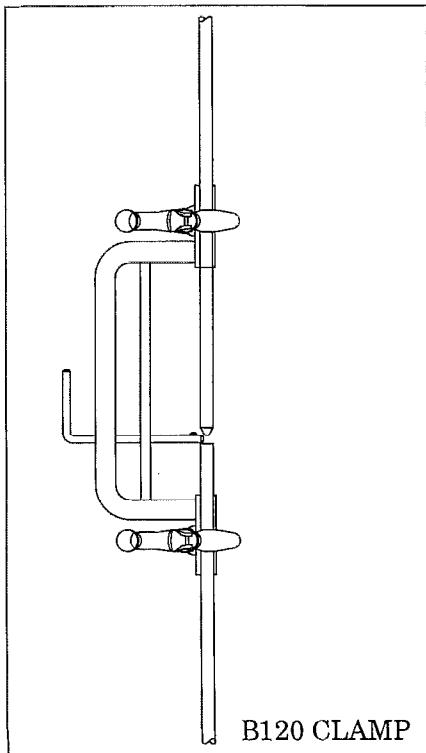
c. For large flat surfaces, or large diameter steel tanks, the CADWELD Magnetic Clamp is the answer when using vertically split molds. It is a combination Handle Clamp and Magnetic Clamp, part number **B396** for “C” & “R” Price Key molds and **B159M** for “D” & “F” Price Key molds.

QUESTION 14: Every time I drive a ground rod, I have to cut off the top of the rod before my mold will fit on. How can I save time on this connection?



GROUND ROD DRIVE SLEEVE

QUESTION 15: When making Type GB ground rod splices, I have a hard time positioning the mold correctly on the rods. Any suggestions?



ANSWER: Use a driving sleeve. If using a threaded rod, use the screw coupling and drive stud when driving the rod. For a plain rod, either steel or copper-clad, use the CADWELD driving sleeve as listed below.

GROUND ROD DRIVING SLEEVES *

| GROUND ROD SIZE | PART NO. |
|--------------------------|----------|
| 1/2" COPPERCLAD OR STEEL | B137-14 |
| 5/8" COPPERCLAD | B137-16 |
| 5/8" STEEL | B137-31 |
| 3/4" COPPERCLAD | B137-18 |
| 3/4" STEEL | B137-33 |
| 1" COPPERCLAD | B137-22 |
| 1" STEEL | B137-37 |

* FOR PLAIN (NOT THREADED) RODS ONLY

ANSWER: Use the CADWELD **B120** clamp. This clamp not only supports the rod but also properly positions and supports the mold.

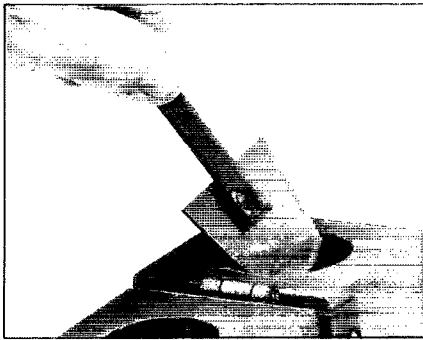
This clamp is required for all ground rod splice connections.

QUESTION 16: The CADWELD catalog states that the average mold life is 50 connections. I can't get anywhere near that many. What can I do to improve mold life?

ANSWER: Mold life will vary to some extent with the type of connection being made. But, 50 connections, or more, is not unusual for a mold. Some of the reasons for shorter mold life are:

a. Cleaning the mold with a wire brush. The mold is made of graphite which is a soft material. The wire brush quickly erodes the graphite resulting in short mold life.

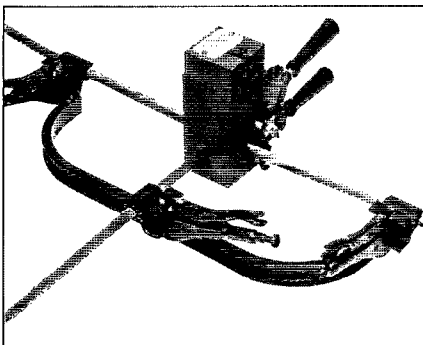
b. The mold should be cleaned after each connection with a soft cloth, *natural* bristle brush, crumpled newspaper, or a clean rag. Only the loose material must be removed. The mold should never be "scrubbed".



MOLD CLEANING TOOL

c. For horizontally split molds (such as **Type TA**), the CADWELD mold cleaning tool (P/N **B136A** for molds using Weld Metal #65 & smaller, **B136B** for molds using Weld Metal #90 and larger) works quite well without damaging the graphite.

When using horizontally split molds, the tap hole must also be checked when cleaning the mold. If slag remains in the tap hole, push it out with the handle of the mold cleaning tool or with a rod.



B265 CABLE CLAMP

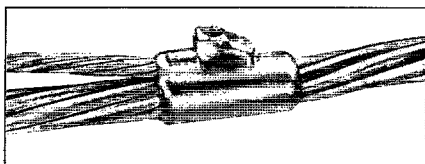
d. The conductors must be aligned before the mold is clamped on. Any misalignment will cause the mold to act as a clamp causing excessive wear and chipping. The cable clamp, P/N **B265**, helps in aligning the cables.

QUESTION 17: I like the CADWELD lugs and the pricing is certainly low enough but I sometimes can't wait for lugs to be ordered. Can I make my own?

ANSWER: Yes, if you are using the CADWELD **Type LA** connections. Standard electrolytic copper bus bar can be used. You will not, however, have the tinned surface we provide. If you are using the **Type GL** lug connections, you must purchase the specially formed lugs.

QUESTION 18: I often have to make taps of small wire from large runs. For instance, a #6 tap from a 2/0 run. The **Type TA** requires that I use a sleeve on the #6. Is this necessary?

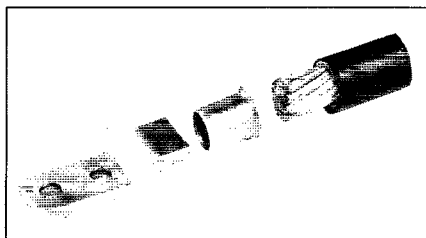
ANSWER: If you use a **Type TA** connection; yes, it is necessary. An easier way is to use a **Type PC** connection in which the #6 is parallel to the 2/0. This gives you two advantages. One, no sleeve is required. Two, a vertically split mold is used rather than a horizontally split mold. This means that the mold is easier to clean after each connection.



PC CONNECTION

QUESTION 19: I have a fine strand cable. It is too large to fit in the mold for that size conductor. What to do?

ANSWER: Ropelay cable (either welding cable or class G or H ropelay) is larger in diameter than concentric strand cable (7, 19, 37 etc. strand). A different mold is required. Also, sleeves must be used on the cable ends. The sleeves both hold the strands together and give mechanical protection to the strands after the weld is made. A phone call to CADWELD can give you the proper mold and sleeve numbers to order.

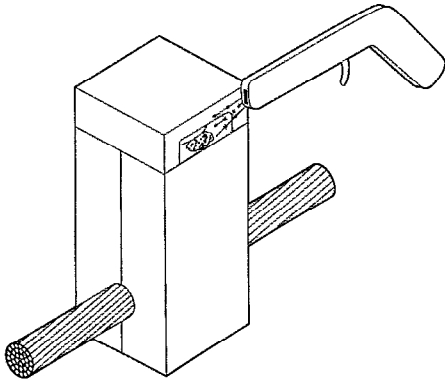


CABLE SLEEVE

QUESTION 20: The last job I was on used a #2 solid conductor. The mold I ordered out of the catalog was too big, even though I ordered it for #2. Why?

ANSWER: #2 solid is smaller in diameter than #2 stranded you ordered from the catalog. A different mold part number must be ordered. Contact your local rep or CADWELD for help.

QUESTION 21: I lost my flint ignitor. What else can I use to start the CADWELD reaction?



QUESTION 22: My flint ignitors do not last very long. The end of the ignitor gets burned and fouled. How can I avoid this problem?

QUESTION 23: I don't always have the correct size weld metal required for the mold that I'm using. Anything that I can do to get the job done?

ANSWER: My first suggestion is to contact your local CADWELD distributor to buy another one. The flint ignitor is the only recommended method to start the reaction.

However, emergencies do happen and other methods must be tried. Attempts to start the reaction with a torch have been tried. The reaction is difficult to impossible to start with a torch. The force of the flame keeps blowing out the reaction as fast as the torch flame tries to start it. One possible way is to place a match head on the starting material **ON THE LIP OF THE MOLD** (not in the crucible on top of the welding material). The torch starts the match which then starts the starting material reaction.

NEVER USE A MATCH or other hand held flame. It probably will not start the reaction but if it does, **YOU WILL BE BURNED!**

ANSWER: First, make sure you place a small amount of starting material on the lip of the mold under the cover opening with the remaining starting material over the weld metal in the mold crucible. The spark is aimed at this starting material on the lip to begin the reaction.

Second, stand to the side with the end of the flint ignitor just back from the cover opening when you start the reaction. Now, the end of the flint ignitor is protected from the flame of the CADWELD reaction and should last much longer.

If the end of the flint ignitor becomes fouled, it can be cleaned by soaking it overnite in household ammonia.

ANSWER: Yes, but with caution. The weld metal size is the approximate weight of the welding material in grams. Thus, two **#45** weld metals can be combined to make a **#90**. However, be careful that the starting material does not get mixed between the two layers of weld metal. It should be added only over the top.

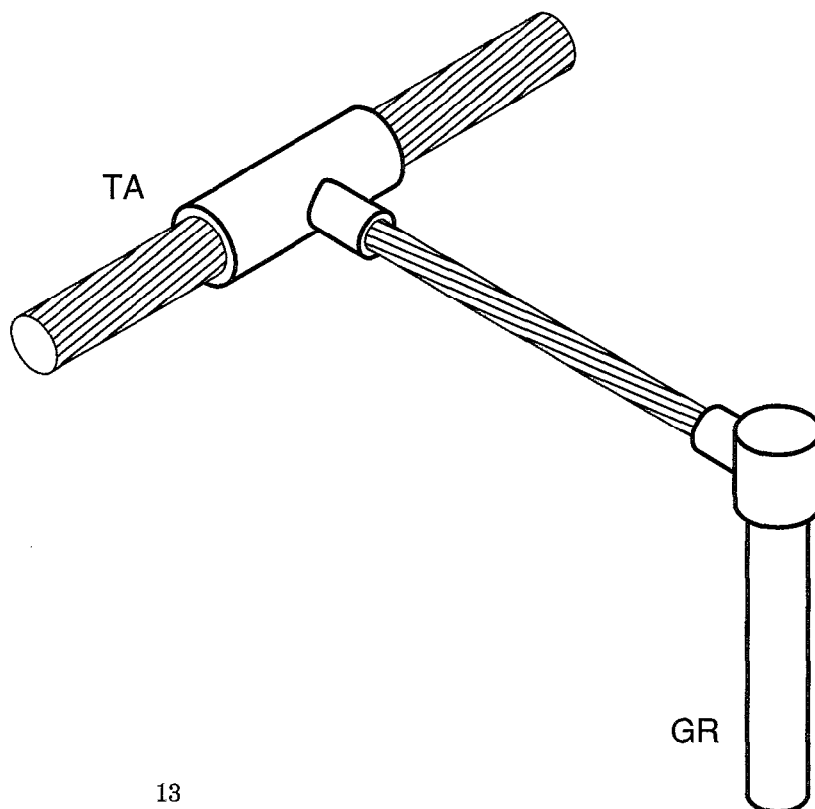
If a **#90** is required and you only have a **#200**, you can use slightly less than half of the **#200**. But, you must dump out the rest of the **#200** to get to the starting material. It probably is easier and it is a lot less expensive to go to your local distributor and get the correct weld metal size.

QUESTION 24: Rather than buying another mold, I tried to use my Type VS mold to weld a cable to a copper plate. The finished weld looked good but when I gave it the old hammer test, it came right off. There was almost no weld to the copper plate. Yet, when I follow the same procedure when welding to a steel surface, I can't knock off the weld. Why?

ANSWER: The mold you used was designed and tested for welding to a steel surface. A copper surface is harder to weld to and takes a different mold which in most cases takes a larger size weld metal than to steel. Whenever possible, when welding to copper, weld to the edge. Molds for these welds are shown in Sections 4 and 5 of the CADWELD catalog A-1A.

QUESTION 25: My job calls for a 500 kcmil conductor to be welded to a $\frac{5}{8}$ " copper clad ground rod. Because the conductor is so large, it is difficult to properly position it over the ground rod. Is there an easier way?

ANSWER: The easiest way is to make two connections. First, make a TA (TAC3Q2Q) to the 500 using a short length of 4/0 conductor. Then, make a GT (GTC162Q) of the 4/0 to the ground rod. The installed cost will usually be less than trying to weld the 500 directly to the rod. And, electrically, the procedure is just as good.



QUESTION 26: I have many jobs that require CADWELD connections to be made inside, near sensitive electronic equipment, or outdoors in confined spaces. What can I do to make these connections and not have to worry about smoke created by the welding process?

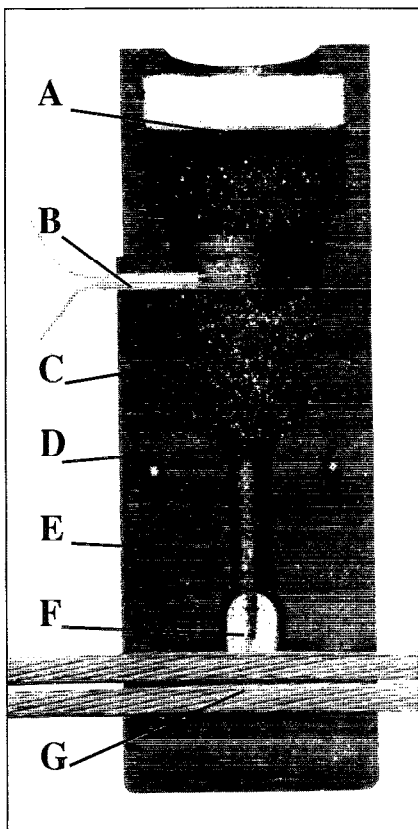
ANSWER: To deal with such situations, ERICO has developed its CADWELD EXOLON® low-emission welding process. The EXOLON system produces the same permanent, high-reliability welded bonds as the standard CADWELD process, but without the smoke usually associated with the exothermic welding process.

The low-emission EXOLON system is ideal for exothermic welding in tunnels, vaults, and trenches; and it can be used inside computer rooms, telecommunications centers, and other electronic facilities where installers have been reluctant to make CADWELD connections before. That means that exothermic welding can now be used just about anywhere, indoors or out.

The metallurgy is exactly the same as that of the conventional CADWELD connection system, which means the EXOLON process still provides a superior connection when compared to compression or bolted connections.

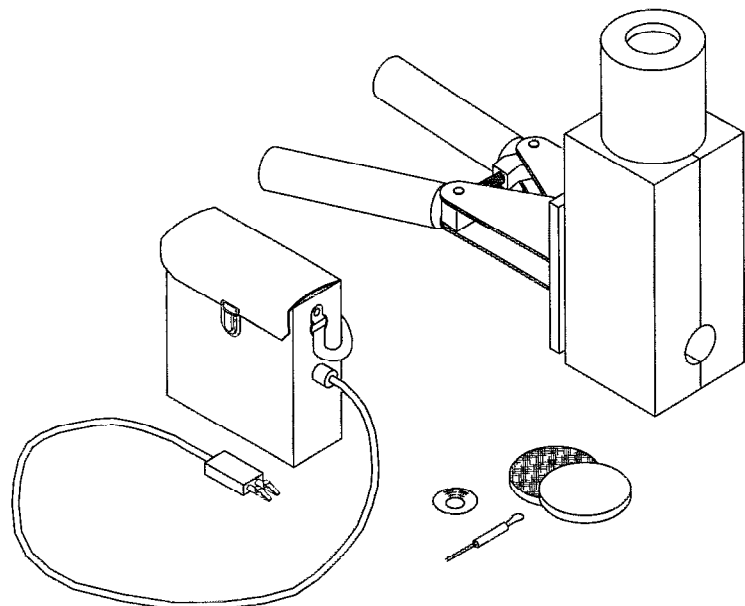
What's different from the standard CADWELD process is that the EXOLON system uses a unique high-temperature dual filter on top of the mold. These filters trap virtually all the smoke created by the welding process, while allowing heated air to escape. In addition, the easy-to-use, battery starting system does away with flint ignitors and open flames.

Any connection listed in the catalog A-1A and other catalogs can be supplied using the EXOLON process.



CADWELD EXOLON

- A. two-piece filter
- B. ignitor
- C. welding material
- D. steel disk
- E. tap hole
- F. weld cavity
- G. two bare copper conductors



GENERAL INFORMATION

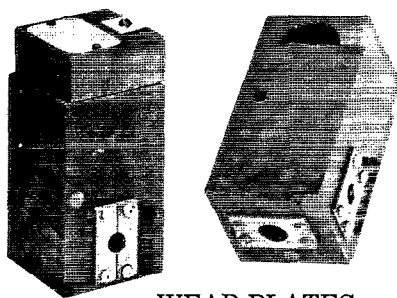
QUESTION 27: I keep hearing the words “price key” in reference to molds. What are they talking about?

ANSWER: We have standardized our mold sizes. We have given each of these standard sizes a letter which we call a price key. For example, the most common molds used for grounding are Price Key “C”.

We have also used this Price Key to simplify pricing. Rather than individually price each and every mold, we establish an average price for all molds of the same Price Key. In most cases, the third letter of the mold part number is the Price Key. eg. **TAC2Q2Q** AND **GTC162Q** are both Price Key “C”.

QUESTION 28: I’ve seen some CADWELD molds with copper plates around the cable openings. What are these for?

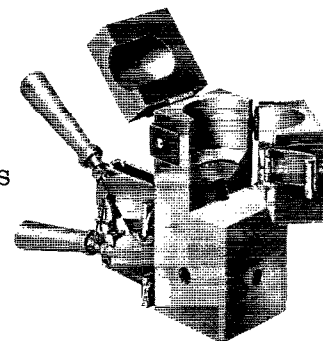
ANSWER: These are called wear plates. They are available on most of our molds. Their purpose is to support the cable at the metal plate rather than on the soft graphite. This increases the mold life. We have had some contractors tell us the mold life is increased 3 to 4 times. Other say 2 times. You must still treat the mold with kindness to get long mold life. Wear Plates are available for most CADWELD molds with cable openings from 1/0 thru 500 kcmil and ground rods 1/2" thru 1". The wear plates can be ordered by adding a “W” suffix to the mold part number. eg. **TAC2Q2Q-W**. Molds with wear plates are not carried in stock so delivery will be longer.



WEAR PLATES

QUESTION 29: Some of the Type TA molds I get have an extra hinge on the crucible section. Opening this helps in cleaning the mold. What is this called and how do I order it?

ANSWER: This is called a “split crucible” feature and is available on most horizontally split molds. To order, add a “L” suffix to the mold part number. eg. **TAC2Q2Q-L**. Molds with split crucibles are not carried in stock so delivery will be longer.



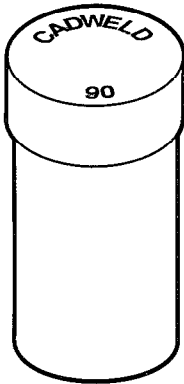
QUESTION 30: I've noticed in your catalog a separate listing for "Heavy Duty" CADWELD Connections. Why Heavy Duty?

ANSWER: Heavy Duty was originally developed by CADWELD after World War II when copper was still scarce and the power companies were reclaiming old cotton and tar insulated cable. After burning off the insulation (before EPA restrictions), they found it difficult to properly clean the copper prior to making a connection. We found that by making a connection with two to three times larger size Weld Metal than normally used, we could burn thru the "dirt" and make a good connection. Since then, we have modified the Weld Metal size increased to about 2/3 larger than Standard. When field conditions are unusually bad, CADWELD Heavy Duty connections provide an answer.

QUESTION 31: I've noticed different color caps on CADWELD Weld Metals. Do these mean anything or are they just to dress up the tubes?

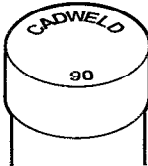
ANSWER: The different color caps on CADWELD Weld Metals do have a meaning. We have proven that one type or alloy of weld material is not suitable for all applications. To prevent inferior connections, we have developed the following different types:

COLOR
CODED
CAPS

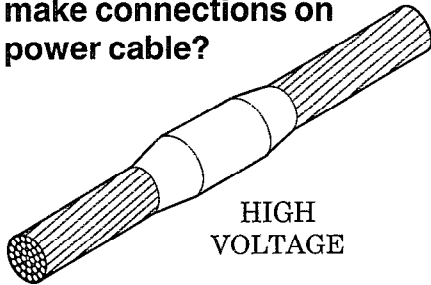


- a. The standard Weld Metal that you normally use will have a clear (or natural) cap. This is used for almost all your grounding connections.
- b. When welding to a cast iron or ductile iron surface, the CADWELD **XF-19** Alloy is used. These have orange caps.
- c. When making a grounding connection to a load bearing rail, the CADWELD **F-80** Alloy is required. These have yellow caps.
- d. On all Cathodic Protection jobs, the CADWELD **F-33** alloy is utilized. **F-33** alloy have green caps. The use of **F-33** weld metal is absolutely necessary on the connections to pipe lines.
- e. White caps are used for CADWELD LS and CADWELD EXOLON weld metal which does not contain starting material. These newer CADWELD products use electric start.

QUESTION 32: I lost the label in the weld metal box. How can I tell what size weld metals I have?



QUESTION 33: Can CADWELD be used to make connections on power cable?



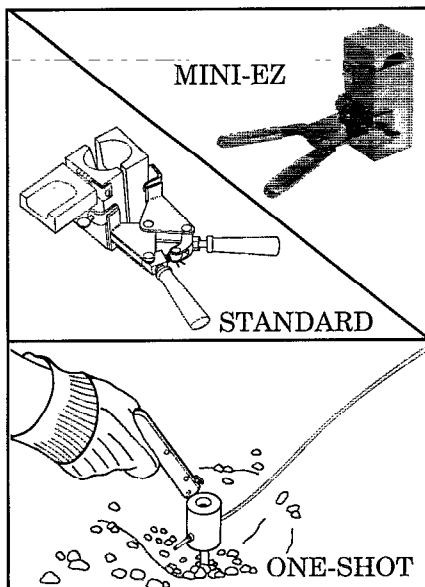
ANSWER: The weld metal size is embossed on each cap of the individual weld metal containers.

ANSWER: Yes! CADWELD Connections were designed for grounding applications, the most severe duty required. Thus they will have outstanding performance when used in power cable applications. CADWELD connections are used for splices, parallel taps and lug connections and are often more economical than all but the cheapest crimp connection.

CAUTION --- CADWELD connections cannot be used on cables under high tensile loads.

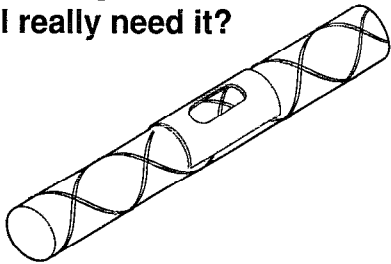
CADWELD also has a special line of high voltage connections incorporating a smooth or streamlined design. This eliminates “corona points” and aids in taping. They have been used for voltages as high as 138kV and conductor sizes up to 3000 kcmil.

QUESTION 34: The CADWELD catalog lists the standard connections of a cable to a ground rod, a MINI-EZ series, and the ONE-SHOT® connections. I’m confused as to which one I should use.

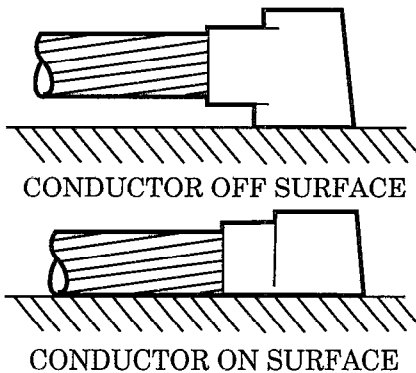


ANSWER: Several factors enter into the choice. But, no matter which style is used, you can expect the same high quality CADWELD connection you are used to. When connecting small wire (say #4 to #10 AWG) to ground rods, the ONE-SHOT and MINI styles are less expensive and easier to use than the standard CADWELD. For example, a GT connection of #6 to a 5/8" ground rod can be made with a ONE-SHOT at a 14 to 18% savings as compared to the standard CADWELD. The MINI mold style can save up to 56%. However, as the conductor size increases, the savings disappear. An advantage of the ONE-SHOT is where only a few connections are to be made at a particular location, the required number of ONE-SHOT's can be taken along with a flint igniter. When finished, nothing has to be carried back and restocked except the flint igniter.

QUESTION 35: On connections to reinforcing bars (rebar), a listing for “packing” is noted in the catalog. What is this and do I really need it?



QUESTION 36: The CADWELD catalog, in several instances, lists two types of connections for what appears to be the same connection. What is the difference and which should I use?



a.

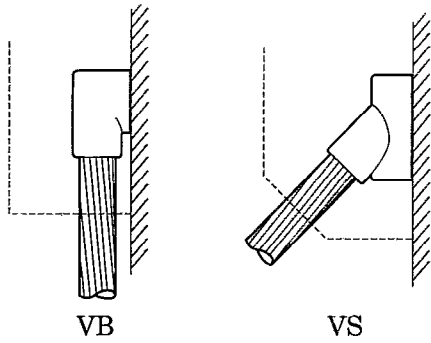
ANSWER: YES! it is necessary. The packing listed is a material that is placed around or over the rebar to prevent the molten metal from leaking around the rebar deformations. In some cases, it is a copper shim that is wrapped around the bar and in other cases, it is a ceramic batting material that either wraps around or is placed over the rebar, depending on the connection being made. The instructions enclosed with the mold must be consulted for proper usage of the packing material. Do not substitute any other material for the proper packing. Not only will it probably not work but it may cause a dangerous situation.

ANSWER: Lets look at each of these separately.

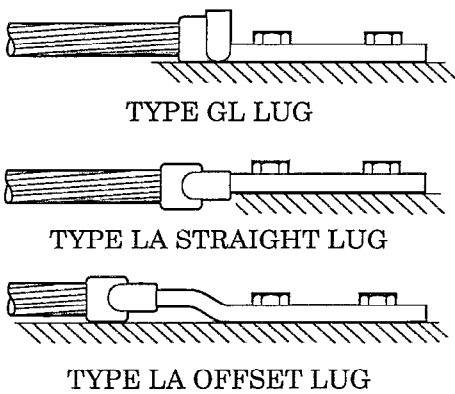
a. **Types HA and HS, Types HC and HT, and Types VG and VT.** The difference in these is that one type makes the weld with the cable **on** the surface of the steel and the other with the cable **off** the surface. For small conductors, the “on the surface” style is recommended in most cases since the mold is less prone to damage as compared to the “off the surface” mold. But, for conductors 1/0 and larger, the “off the surface” style has the advantage of not having an “open area” around the conductors next to the surface which can leak molten metal unless packed with mold sealer. However, with the “off the surface” style, the mold must be removed from the finished weld more cautiously to prevent the small area of graphite between the mold and the surface from breaking.

b. Comparing the **Type HA** to the **HB**, the **HA** is for steel surfaces and the **HB** is for cast iron or ductile iron surfaces. Each is designed differently and takes a different weld metal alloy. They should never be mixed.

c. Comparing the **VS** to the **VS Range** and the **HA** to the **HA Range**, the “range” mold is used when connections must be made to more than one pipe size and those sizes fall with the range that the mold fits. Since the mold is made to fit several sizes, care must be exercised when positioning the mold to prevent leakage. When the connection is to be made to only one size pipe, it is better to order the mold for that particular pipe size.



d. Comparing the **Type VS** to the **Type VB**, the **VS** mold is stronger and will normally have a longer life than the **VB** mold because of the greater mass of graphite around the cable hole. However, some users like the **VB** better because the cable can be “trained” to present a neater look. But, because of the smaller section of mold between the cable and the surface, care must be exercised when using the **VB** mold to prevent this small section from breaking.



e. Comparing the two types of lug termination molds available, **Types GL** and **LA**, the **Type GL** is usually more economical. The weld metal in most cases is smaller and the lug price is usually less. When comparing the shapes of the two types, it can be seen that the **LA** has two styles of lugs, a straight lug and an offset lug. When bolting to the edge of a surface or another lug, the straight lug can be used. But, when bolting further in from the edge, the weld will interfere with the bolting surface. Then the offset style must be used. The **Type GL** can be used in either situation.

f. Comparing the **Type XA** to **Type XB**, it is noted that the **XA** requires the tap (usually the smaller) cable to be cut. When using the **XB**, the cables are just lapped and do not require cutting and positioning in the mold. The **XB** mold usually costs more and a larger size weld metal is required, but the extra material cost is easily offset by savings in labor.

Also note that when welding a small cable (like a #6) to another cable, the #6 requires sleeves. It must be cut to put on the sleeves. Therefore, the **Type XA** mold is the proper choice for this situation.

QUESTION 37: The CADWELD literature states that materials from different manufacturers should not be mixed. But, CADWELD’s competitor states otherwise. Who is correct?

ANSWER: CADWELD is correct! For example, CADWELD molds are tested only with CADWELD weld metal. There is a great difference between CADWELD weld metal and the competitors. Therefore we cannot guarantee what will result in using their weld metal in CADWELD molds. And, to whom do you go for service when you have problems? Also, look at the different kinds of weld metal we have for specialized CADWELD applications (See QUESTION 30). We have developed these to provide you with an optimum connection for all your applications.

INDEX

| ISSUE | QUESTION |
|-------------------------|---------------|
| Adaptor sleeves | 1 |
| Adjusting handles | 11 |
| Alloys, weld metal | 30 |
| Bright metal | 12 |
| Brushing | 12 |
| Cable-to-steel | 35 |
| Cable, | |
| Clamp | 8, 16 |
| Melted | 8 |
| Positioning the | 12 |
| Tension | 8 |
| Caps, color | 31 |
| Cast iron | 31 |
| Cathodic | 31 |
| Clamp, | |
| Cable | 8, 16 |
| Ground rod support | 15 |
| Handle | 13 |
| Magnetic | 13 |
| Pipe | 13 |
| Surface | 13 |
| Cleaning, | |
| Conductors | 3 |
| Flint ignitor | 22 |
| Mold | 16, 29 |
| Steel surface | 12 |
| Tool | 16 |
| Clear caps | 31 |
| Closing mold | 11 |
| Color caps | 31 |
| Combining weld metal | 23 |
| Compatability | 35 |
| Connection selection | 2, 36 |
| Connections, | |
| Cable-to-cable | 2, 18, 28, 34 |
| Cable-to-ground rod | 2, 32 |
| Cable-to-lug | 17, 34 |
| Cable-to-steel | 2, 36 |
| Ground rod splice | 15 |
| Indoor | 26 |
| Large conductors | 25 |
| Tee | 2, 18, 29 |
| "X" | 36 |
| Contaminates | 4 |
| Crucible, split | 29 |
| Different manufacturers | 37 |

| ISSUE | QUESTION |
|--------------------------|------------|
| Disposal of weld metal | 17, 23 |
| CADWELD Mold Sealer | 9, 10 |
| F33 alloy | 31 |
| F80 alloy | 31 |
| File | 4, 12 |
| Flint ignitor | 21, 22, 34 |
| GB, Type | 15 |
| GL, Type | 17, 36 |
| GT, Type | 2, 34 |
| Galvanized steel | 4, 12 |
| Green caps | 31 |
| Grinding | 12 |
| Ground rod, | |
| Clamp | 15 |
| Connection | 2, 15, 34 |
| Drive sleeve | 14 |
| Driving tool | 14 |
| Plain | 14 |
| Splice | 15 |
| Threaded | 14 |
| HA range | 36 |
| HA, Type | 36 |
| HB, Type | 36 |
| HC, Type | 2, 36 |
| HS, Type | 36 |
| HT, Type | 2, 36 |
| Handle, | |
| Adjustment | 8, 11 |
| Clamp | 13 |
| Mold | 13, 34 |
| Heating molds | 5, 6, 7 |
| Heavy duty | 30 |
| High voltage connections | 33 |
| Holes in weld | 4, 5, 6 |
| Key, price | 27 |
| L mold suffix | 28 |
| LA, Type | 17, 36 |
| Leakage, weld metal | 8, 9, 10 |
| Life of mold | 16, 28 |
| Lug connection | 17, 34 |
| Lugs | 17 |
| Magnetic clamp | 13 |
| Manufacturers, different | 37 |
| Matches | 21 |
| Mini-EZ molds | 34 |
| Moisture | 4, 5, 6 |

INDEX (Cont.)

| ISSUE | QUESTION | ISSUE | QUESTION |
|-----------------------------------|-----------|---------------------------------|-------------|
| Mold cleaning | | Split crucibles | 29 |
| Cleaning | 16, 29 | Starting material | 21, 22, 23 |
| Cleaning tool | 16 | Starting the reaction | 21 |
| Life | 16, 28 | Steel, | |
| Packing | 9 | Cable to | 36 |
| Sealer | 9 | Galvanized | 4, 12 |
| Closing | 11 | Stick to | 12 |
| Parting line | 11 | Surface clamp | 13 |
| Leakage | 9, 10 | Stick, to steel | 12 |
| Muddy conductors | 3 | Surface clamp | 13 |
| Oil contamination | 4 | Surface preparation | 12 |
| One-Shot® connections | 34 | TA, Type | 2, 18, 29 |
| Orange caps | 31 | Tap hole | 16 |
| PC, Type | 18 | Tee connection | 2, 18, 29 |
| PT, Type | 2 | Tension on cable | 8 |
| Packing, mold | | Torch | 5, 6, 7, 21 |
| Mold | 9, 10 | Uncut cable | 8 |
| Rebar | 35 | VB, Type | 36 |
| Part number, weld metal | 23, 31 | VG, Type | 2, 36 |
| Pinholes | 4, 5, 6 | VS range | 36 |
| Pipe clamp | 13 | VS, Type | 36 |
| Plates, wear | 28 | VT, Type | 2, 36 |
| Porosity | 4, 5, 6 | VV, Type | 2 |
| Positioning cable | 12 | Voids | 8 |
| Power conductor | | W mold suffix | 28 |
| Conductor | 33 | Water (moisture) | 4, 5, 6 |
| Connections | 33 | Wear plates | 28 |
| Price key | 24 | Weld metal | |
| Propane torch | 5, 6, 7 | Combining | 23 |
| Range, pipe sizes | 36 | Disposal | 7, 23 |
| Rasp | 12 | Leakage | 8, 9, 10 |
| Rebar packing | 35 | Mixing | 37 |
| Riser, holes in | 4, 5, 6 | Size | 23 |
| Ropelay stranding | 19 | Spattering | 9 |
| Sealer, mold | 9, 10 | Weld metal caps, | |
| Shim | 1 | Color | 31 |
| Simplification | 1, 2 | Size | 23 |
| Size, weld metal | 23 | Welding cable | 19 |
| Sleeve, | | Wet conductor | 3, 4 |
| Conductor | 1, 18, 19 | White caps | 31 |
| Ground rod driving | 14 | Wire brush | 16 |
| Adaptor | 1 | Wrap sleeves | 1 |
| Wrap | 1 | X connection | 36 |
| Small wire | 18 | XA, Type | 36 |
| Solid conductor | 20 | XB, Type | 36 |
| Spice, ground rod | 15 | XF19 alloy | 31 |
| | | Yellow caps | 31 |

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