

METROPOLITAN UTILITIES DISTRICT	Construction Standard	No: 8.3.3
	Trace Wire, Anode and Test Lead Attachment Methods For Steel, Ductile Iron And Cast Iron Water Mains	Page: 1 of 7
Prepared by: D.J. Satterfield		<u>Supersedes:</u> 1-31-10
Approved by: Jeff Schovanec		Effective: 7-2-20

Scope: The following procedures cover the various approved methods of attaching anode leads, test leads, and trace wire to steel, ductile iron and cast iron water mains. Other methods may be considered for use with prior approval from the M.U.D. Engineering Department.

* **CADWELD PLUS WELDING SYSTEM (DUCTILE IRON OR STEEL PIPE)**

* The CADWELD PLUS welding system replaces the conventional method of using starting material and a flint gun to ignite welding material. This is accomplished by using pre-sealed, drop-in welding material crucible cup packages which are placed into existing molds and using the CADWELD PLUS Control Unit to discharge current into a pre-installed crucible cup ignitor strip.

- * 1. Clean a 2" to 3" square on top of the steel or ductile iron pipe, as in Fig 1, using an angle grinder and file down to bare shiny metal. Remove 1 1/2" of insulation from the connector wire end. Slide a copper sleeve on to the connector wire end and crimp it. Cut off the remaining wire or bend the end of the connector wire over the sleeve. See Fig 2. Tug on the sleeve to ensure it is tight.

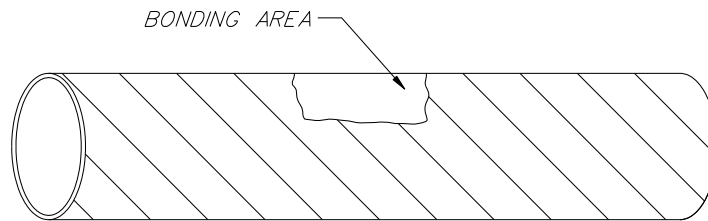


FIG 1

**

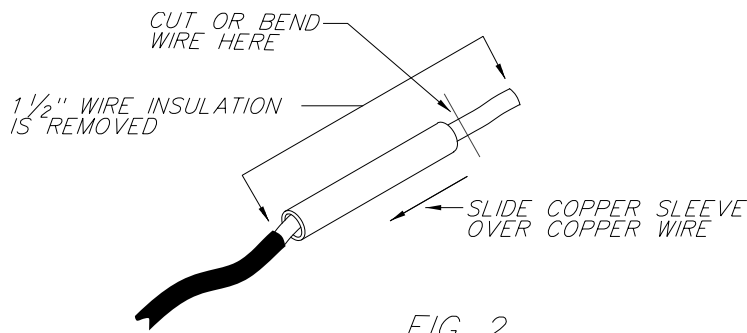


FIG 2

- * 2. Clean and wipe bonding area using a clean rag and heat the area until the moisture evaporates from the pipe. Heat to dry the mold also.

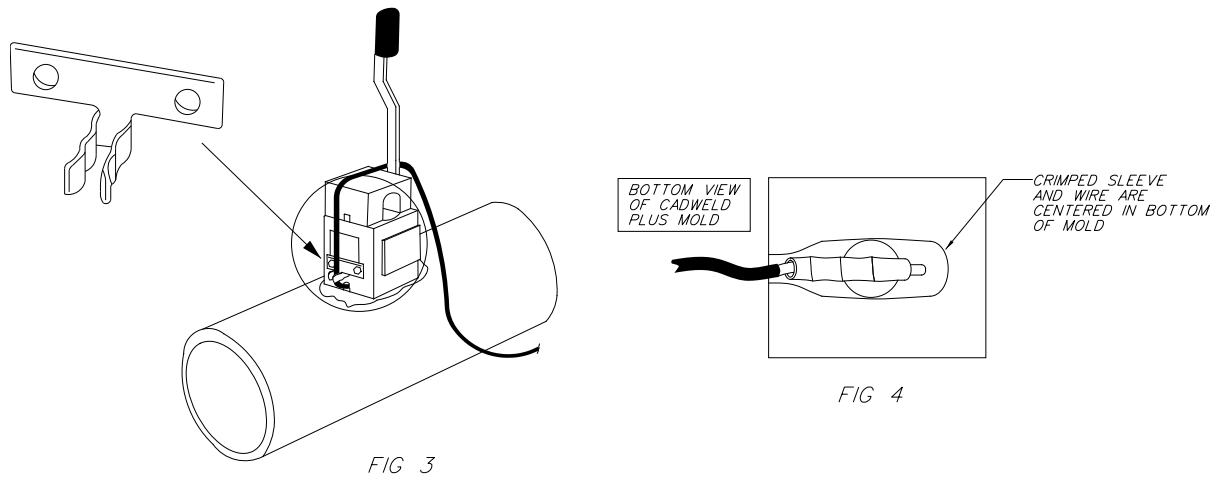
* Revised Text

** Revised Drawing



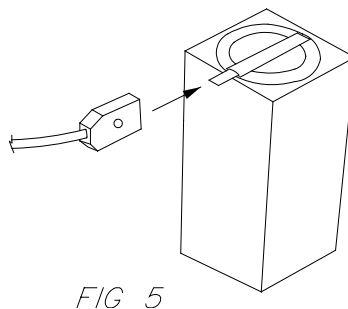
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- * 3. Place the CADWELD PLUS Cup into the mold. The ignition strip and termination clip should be positioned perpendicular to the opening in the mold cover to minimize exposure to the reaction. (NOTE: Ensure that the CADWELD PLUS Cup and mold are specific to the pipe being welded to.)
- * 4. On the bottom of the mold, center the copper sleeve and connector wire in the bonding area parallel to the pipe.
- * 5. Place the mold over the connector wire and hold firmly in an upright position. See Fig 3. The clip on the side of the mold may be used to hold the wire in place. Fig 4 shows the bottom view of the mold centered over the connector wire end.



- * 6. **Warning:** Always wear protective eyewear and gloves during operation. Be sure OPERATE switch is not being pressed during insertion of ignition strip into Control Unit termination clip.

Connect the Control Unit termination clip to the CADWELD PLUS cup ignition strip. See Fig 5. Push the Control Unit termination clip onto the CADWELD PLUS cup ignition strip until the end of the termination clip is flush with the black line on the ignition strip. Make sure ignition strip is fully seated inside termination clip. A slight “snap” should be felt.

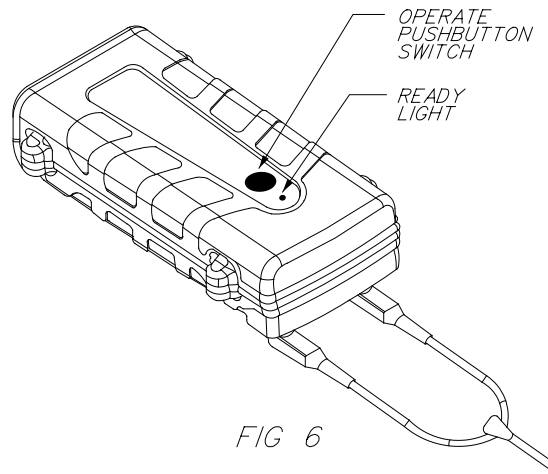


- * Revised Text
- *** New Drawing



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- * 7. Press the OPERATE pushbutton switch and hold down with constant pressure. The READY light flashes 5 to 7 times as the Control Unit charges. *Note: If the READY light flashes 12 times or more, the batteries must be replaced.* Once the unit is fully charged, the READY light becomes steady. Initiation of the reaction occurs one second after the READY light is on steady. Maintain constant pressure on the OPERATE switch until the reaction has been initiated. Letting go of the switch before reaction initiation will result in an internal discharge without ignition of the welding material. See Fig 6.
- ** 8. Allow 30 seconds for the completion of the reaction and the solidification of the molten metal. Remove used Control Unit ignition strip from Control Unit termination clip.



- ** 9. Remove the mold and clean the slag from the inside and bottom of the mold. Check the connection by tugging on the connector wire.
- * 10. Once a successful connection is made, cover the bonding area and connection with a bitumastic coating or apply primer and cold wrap according to Construction Standard [8.5.2](#).

- * Revised Text
 ** Added Text
 *** New Drawing



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* **ATTACHING ANODES TO CAST IRON OR DUCTILE IRON PIPE USING THE CATHODI-CLAMP®**

Materials:

- Cathodi-Clamp®
- 32# anode
- Wire connector

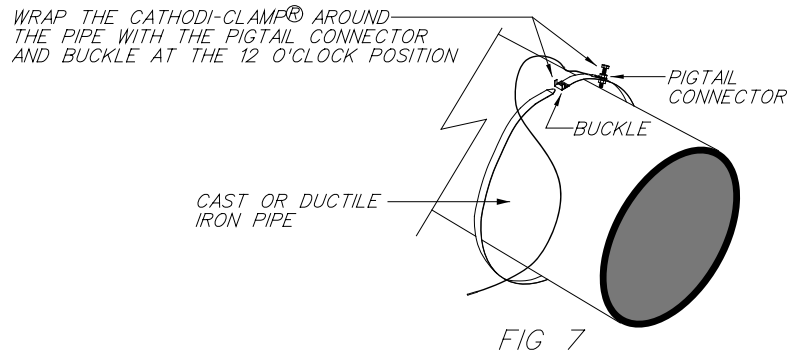
Tools:

- Wire brush
- Socket or wrench
- Continuity tester

Note: For cast iron or ductile iron mains larger than 18", contact the Corrosion Engineer.

Installation of Cathodi-Clamp®

- * 1. Clean around the pipe surface with a wire brush to remove rust scale and dirt, so the band will lay flat against the pipe. For ductile iron pipe, remove the factory coating and file to smooth the surface where the pigtail connector bolt will contact the pipe surface.
2. Wrap the band around the pipe with wire pigtail and connector bolt at the 12 o'clock position. See Fig 7.

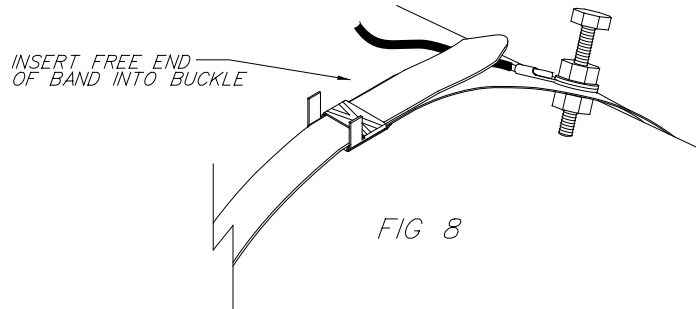


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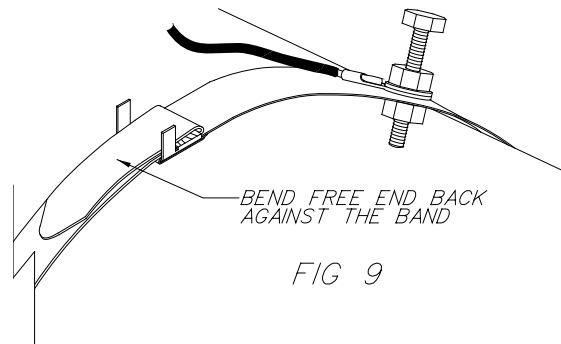


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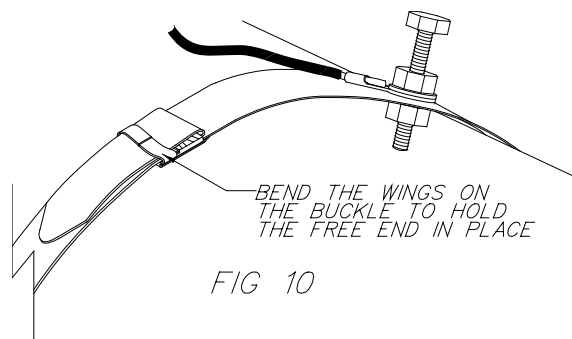
3. Insert the free end of band into buckle, as shown in Fig 8, making sure band is resting flat against pipe surface.



4. Pull on free end to place band in slight tension around pipe.
5. Bend free end back against inside edge of buckle to hold band securely to pipe. See Fig 9.

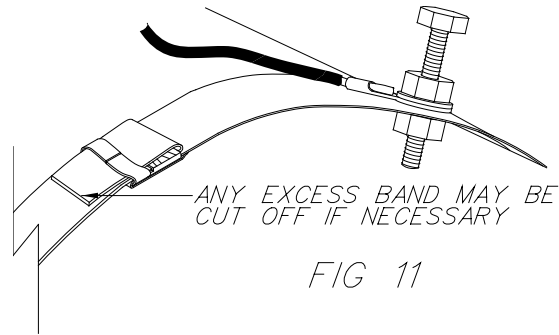


6. Lightly strike fastener "wings" of buckle with mallet or hammer holding free end in place as shown in Fig 10.

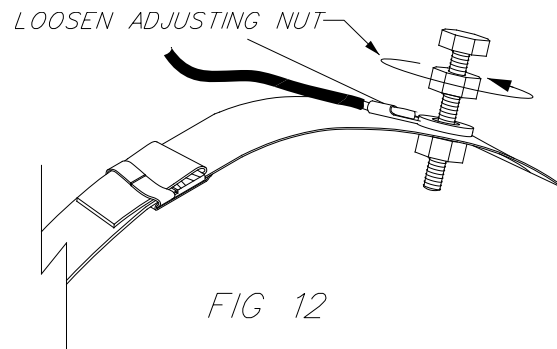


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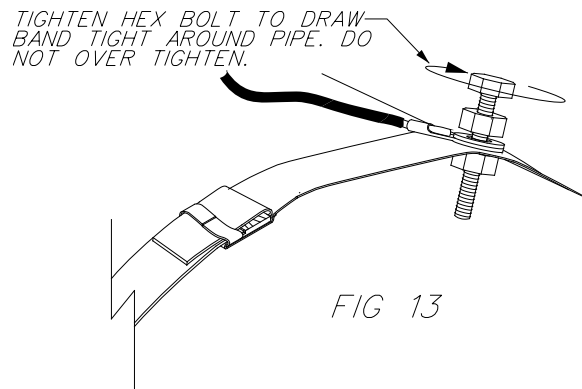
- Excess length of free end of band may be cut with snips (Fig 11) or may remain in place.



- Loosen the adjusting nut on the top of the band. See Fig 12.

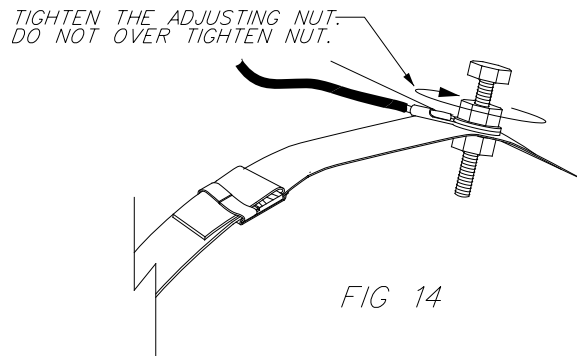


- Using socket or wrench, hand tighten the hex cap bolt to draw the band tight around the pipe. See Fig 13.

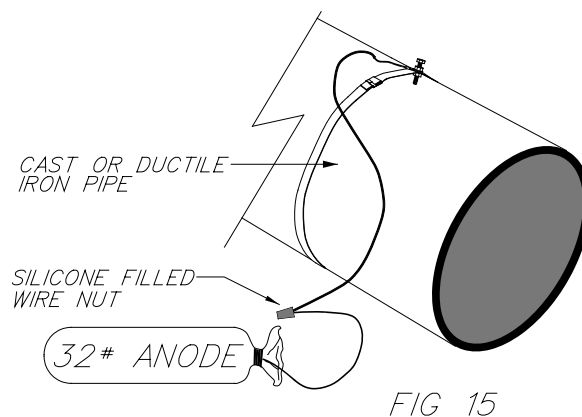


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- Hand-tighten the adjusting nut on the top of the band – do not over-tighten the bolt or nut. See Fig 14.



- Verify continuity with continuity tester, one end attached to copper end of wire pigtail, the other end contacting the pipe. *Note: If there is no continuity, make sure that pipe surface at contact is clean; tighten hex bolt cap 1/4 turn at a time until continuity is established.*
- Place a 32# anode in the ditch; remove 1" of insulation from the end of anode wire, exposing the copper.
- Hold anode wire end and Cathodi-Clamp® pigtail end together with ends even.
- Screw on connector, pushing wires firmly through the pie shaped cap. No copper wire should be left exposed outside of the connector cap. See Fig 15.



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