APPLICATION
Onshore, Marine and Concrete Structures

THERMITE WELD DATA
Thermite welding is a simple, inexpensive and efficient method of attaching a copper conductor cable to steel or cast iron.

It is particularly useful for connecting cathodic protection cables to pipelines including test leads, negative and bonding cables.

The welding process uses a high temperature reaction charge of powdered copper oxide and aluminium which when ignited produces aluminium oxide and super heated copper.
The thermOweld® Process

The thermOweld® cathodic connection process is a simple, efficient method of welding copper to copper or copper to steel. One advantage is that no outside power is required when using the thermOweld® exothermic process. The thermOweld® process uses high temperature reaction of powdered copper oxide and aluminum. The reaction takes place in a semi-permanent graphite mold. These molds should last for approximately fifty or more welds if proper care is given. The reaction takes place very rapidly, therefore the total amount of heat applied to the conductors or surfaces is considerably less than that of brazing or soldering. This is important to remember when welding to insulated cable or thin wall pipe.

This system is very field friendly, since it is light and portable and requires no outside power source. It requires very little time or skill to obtain an efficient, maintenance free connection when using the thermOweld® process.

For more information visit our website at www.thermOweld.com

The thermOweld® process has been used to weld materials other than copper for electrical purposes. Materials welded include:

- Stainless Steel
- Copper Weld®
- Nickel
- Galvanized Steel
- Silicon Bronze
- Copper Clad Steel
- Columbium
- Plain Steel
- Everdur®
- Kama
- Steel Rail
- Cor-Ten®
- Brass
- Bronze
- Niobium
- Chromax
- Cast Iron
- Monel

When welding to galvanized steel it is recommended to reprofile exposed bare steel.

The thermOweld® connection is a molecular weld. The weld has the same melting point as copper. This factor along with the increased cross sectional area of the connection and the following insure:

1. thermOweld® connections will not be affected by a high current surge. Tests have shown that the electrical conductor will melt before the thermOweld® connection when subjected to high short circuit current. Consult IEEE Standard 837.
2. thermOweld® connections will not loosen or corrode at the point of weld. There are no contact surfaces or mechanical pressures involved. A thermOweld® connection becomes an integral part of the conductor.
3. thermOweld® connections have a current-carrying capacity equal to or greater than that of the conductors.
thermOweld® Weld Metal is packaged in moisture-resistant plastic cartridges that have tight-fitting caps. These cartridges and the necessary steel discs are then packaged in boxes that are shrink-wrapped. This insures the weld metal arriving in good condition, always dry, and ready for a positive ignition every time.

thermOweld® Weld Metal comes in four types: one for welding copper to copper or copper to steel, copper to rail, copper to cast iron and one for welding copper to steel for cathodic protection. The size and weight (in grams) of the cartridge are marked on each individual cartridge.

thermOweld® Weld Metal is available to be shipped via ground, air or ocean freight.
DATASHEET 4.3.2

CS-32 TYPE MOLDS
Horizontal Cable to Horizontal Steel Surface

CS-32 Type Molds are for connecting copper cable to horizontal steel surfaces. When welding to steel pipe, each mold fits a wide range of pipe sizes. When welding to pipe, the cable runs parallel to the pipe. For welding to ductile iron pipe, see note below.

<table>
<thead>
<tr>
<th>CABLE SIZE</th>
<th>SURFACE</th>
<th>MOLD #</th>
<th>INSERT</th>
<th>WELD TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>#6 Solid</td>
<td>Flat 1/4&quot; &amp; Larger pipe</td>
<td>M-100</td>
<td>2</td>
<td>15CP</td>
</tr>
<tr>
<td>#6 Str</td>
<td>Flat 1/4&quot; &amp; Larger pipe</td>
<td>M-101</td>
<td>3</td>
<td>15CP</td>
</tr>
<tr>
<td>#4 Solid</td>
<td>Flat 3/8&quot; &amp; Larger pipe</td>
<td>M-102</td>
<td>2</td>
<td>15CP</td>
</tr>
<tr>
<td>#4 Str</td>
<td>Flat 3/8&quot; &amp; Larger pipe</td>
<td>M-103</td>
<td>3</td>
<td>15CP</td>
</tr>
<tr>
<td>#4 Solid</td>
<td>Flat 5/16&quot; &amp; Larger pipe</td>
<td>M-104</td>
<td>2</td>
<td>15CP</td>
</tr>
<tr>
<td>#4 Str</td>
<td>Flat 5/16&quot; &amp; Larger pipe</td>
<td>M-105</td>
<td>3</td>
<td>15CP</td>
</tr>
<tr>
<td>#2 Solid</td>
<td>Flat 3/16&quot; &amp; Larger pipe</td>
<td>M-106</td>
<td>2</td>
<td>15CP</td>
</tr>
<tr>
<td>#2 Str</td>
<td>Flat 3/16&quot; &amp; Larger pipe</td>
<td>M-107</td>
<td>3</td>
<td>15CP</td>
</tr>
<tr>
<td>#1 Str</td>
<td>Flat 1/8&quot; &amp; Larger pipe</td>
<td>M-108</td>
<td>2</td>
<td>40CP</td>
</tr>
<tr>
<td>#1 Str</td>
<td>Flat 1/8&quot; &amp; Larger pipe</td>
<td>M-109</td>
<td>3</td>
<td>40CP</td>
</tr>
<tr>
<td>1/8 Str</td>
<td>1/8&quot; &amp; Larger pipe</td>
<td>M-110</td>
<td>3</td>
<td>40CP</td>
</tr>
<tr>
<td>2 x 1/8 Str</td>
<td>1/8&quot; &amp; Larger pipe</td>
<td>M-111</td>
<td>3</td>
<td>40CP</td>
</tr>
</tbody>
</table>

- For sizes not listed, contact thermoweld®.
- ThermoMold® is a registered trademark of Thermoweld Ltd.
- For wire size #4 to #10 solid, order (x) 38-0200-00 sleeves per weld.
- Required Tools:
  - 38-0200-00 - 38-0200-00 - 10" x 12" x 2" - *For use with thermoweld®.

CATHODIC HANDY PACKS

Each Cathodic Handy Pack contains:
- Flat to 4" & Larger Pipe: 3/4" to 3 1/2" & Larger Pipe
- 10 x 12" x 2" Mold Cleaner
- 10 x 12" x 2" Mold Cleaner
- 10 x 12" x 2" Mold Cleaner

Welding to Ductile Iron Pipe: When welding to ductile iron pipe, use cold metal and molds designated for cast iron.
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THERMITE WELD EQUIPMENT

The Contractor's First Choice

CS-33

CS-33 Type Molds are for connecting copper cable to horizontal cast iron surfaces. When welding to cast iron pipe, each mold fits a specified pipe size. When welding to pipe, the cable runs parallel to the pipe. For welding to ductile iron pipe, see note below.

<table>
<thead>
<tr>
<th>CABLE SIZE</th>
<th>SURFACE</th>
<th>MOLD #</th>
<th>PIECES</th>
<th>WELD METAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>86 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-158</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>84 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-157</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>82 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-159</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>80 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-160</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>76 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-161</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>72 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-163</td>
<td>650</td>
<td></td>
</tr>
</tbody>
</table>

For sizes not listed, contact thermoweld®.
- Sold complete with frame. If not required, specify MOLD NUMBER followed by suffix "G".
- For wire size #1 to #10 solid, order (1) 38-0020-00 sleeve per weld.
- Welding To Horizontal Pipe: To weld to 4" to 24" horizontal pipe, add pipe size to mold number. To weld #1 or cable to 6" horizontal pipe, the mold number would be M-163-6. To weld to pipe 30" and larger, use flat surface mold.
- Required Tools: 38-0020-00 - Flange Igniter
- Other recommended accessories:
  - 38-3922-00 - Mold Cleaning Brush (pg 18)
  - 38-0313-00 - Cable Cleaning Brush (pg 18)
  - 38-0001-00 - Resp (pg 18)
  - Welding To Ductile Iron Pipe: When welding to ductile iron pipe, use weld metal and molds designated for cast iron.

CS-35

CS-35 Type Molds are for connecting copper cable to horizontal cast iron surfaces. When welding to cast iron pipe, each mold fits a specific pipe size. When welding to pipe, the cable runs parallel to the pipe. For welding to ductile iron pipe, see note below.

<table>
<thead>
<tr>
<th>CABLE SIZE</th>
<th>SURFACE</th>
<th>MOLD #</th>
<th>PIECES</th>
<th>WELD METAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>86 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-5316</td>
<td>325</td>
<td></td>
</tr>
<tr>
<td>84 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-5335</td>
<td>325</td>
<td></td>
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<tr>
<td>82 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-5350</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>80 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-5351</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>76 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-5353</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>72 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-5540</td>
<td>650</td>
<td></td>
</tr>
<tr>
<td>70 Solid</td>
<td>Flat (30&quot; &amp; larger pipe)</td>
<td>M-5542</td>
<td>650</td>
<td></td>
</tr>
</tbody>
</table>

For sizes not listed, contact thermoweld®.
- Sold complete with frame. If not required, specify MOLD NUMBER followed by suffix "G".
- For wire size #1 to #10 solid, order (2) 38-0020-00 sleeves per weld.
- Welding To Horizontal Pipe: To weld to 4" to 24" horizontal pipe, add pipe size to mold number. To weld #1 or cable to 6" horizontal pipe, the mold number would be M-5542-6. To weld to pipe 30" and larger, use flat surface mold.
- Required Tools: 38-0020-00 - Flange Igniter
- Other recommended accessories:
  - 38-3922-00 - Mold Cleaning Brush (pg 18)
  - 38-0313-00 - Cable Cleaning Brush (pg 18)
  - 38-0001-00 - Resp (pg 18)
  - Welding To Ductile Iron Pipe: When welding to ductile iron pipe, use weld metal and molds designated for cast iron.

DO NOT use Type CS-33 or CS-35 molds on Soil Pipe (ASTM A74-82). A test weld should be made on a section of the pipe being used to determine the possibility of detrimental metallurgical effects.
THERMITE WELD EQUIPMENT

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ACCESSORIES

38-0304-00 – 8" File
38-0305-00 – Wire Brush
38-0306-00 – Card Cloth Brush
38-0307-00 – Crimping Tool
38-0308-00 – 6" Screwdriver
38-0309-00 – Flint Ignitor
38-3922-00 – Mold Cleaning Brush

38-0101-00 RASP
This tempered steel, curved rasp is recommended for removing rust and mill scale from steel and cast iron surfaces. The blade is replaceable. Specify part # 38-0101-01.
Not recommended for use on galvanized surfaces.

38-0904-00 Flint Ignitor Extension
The 38-0904-00 Flint Ignitor Extension allows the installer to stand 36" from the mold. Flint Ignitor not included.

38-0309-00 Flint Ignitor
The 38-0309-00 Flint Ignitor is used to ignite the starting powder. Each mold that is sold with a frame has a Flint Ignitor included. Replacement flints are available upon request. Part #38-0309-01.

PACKING MATERIAL
Packing material is used to prevent the molten weld metal from leaking out of the mold. When cable opening becomes worn from heavy use, the packing material may be used to prolong mold use. It is also used around 7 strand cable to prevent leaking. Packing material comes in a 1 lb or a 5 lb package.
Note: This packing material to be used on outside of mold only. If packing gets into weld cavity, gassy welds will result.