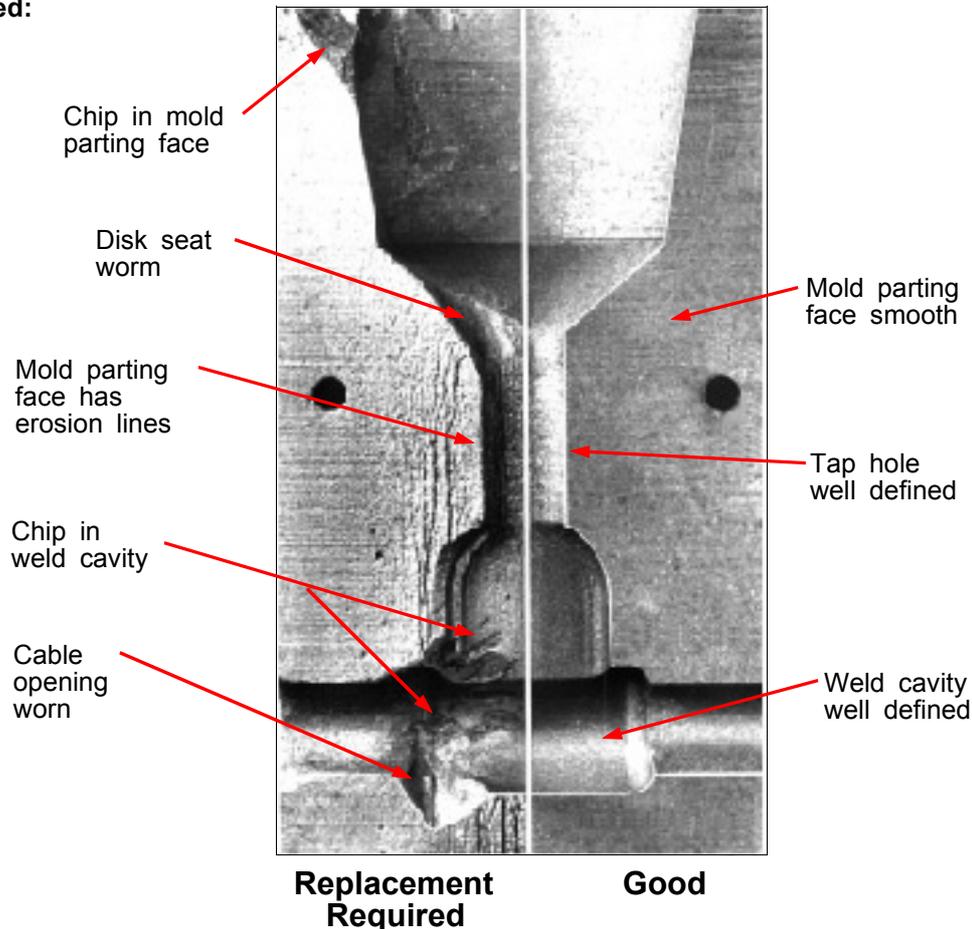


### INSPECTION

#### **A. WELD MOLD INSPECTION**

The mold is designed to last for an average of 50 connections. This will vary according to the care taken during the installation process.

**Inspect the mold regularly. Check the following items to determine if a mold should be replaced:**



#### **Cable opening**

- The conductor should fit snugly. a loose fit will cause leakage.
- The opening should not be chipped or worn.

#### **Weld cavity**

- The cavity should be well defined.
- There should be no chips or gouges.

#### **Tap Hole**

- The tap hole should be well defined.

#### **Disk Seat**

- The disk should not be worn or chipped; the disk must sit securely in place.

#### **Mold Parting Face**

- The parting face should not be chipped.
- The parting face should always be cleaned properly. Use a clean cloth or newspaper and wipe clean. Using a wire brush to clean the mold will cause wearing and will prematurely destroy the mold.

### INSPECTION of WELD Connections General Indicators.

Proper inspection of a EXOWELD connection relies on the judgment of the field personnel. Look closely at the size, color, surface finish, and porosity of the connection.

Following the guidelines below will assist in making meaningful inspections. Photographs of good, acceptable, and reject connections appear on pages that follow.

#### **SIZE**

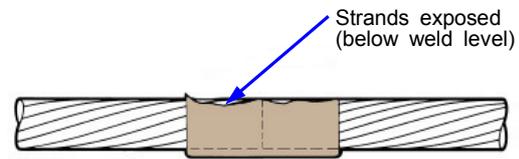
1. No portion of the conductor within the confines of the weld should be exposed.
2. Maximum depression under the riser on horizontal connections (after the slag has been removed) should be no lower than the top of the conductor.

A low fill indicates;

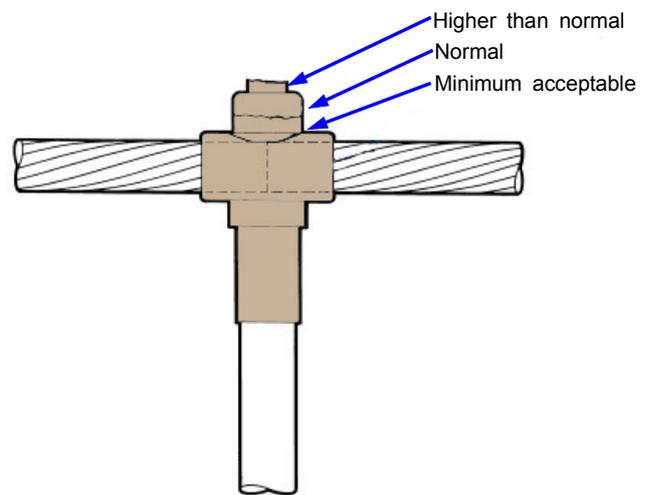
- Not enough weld metal was used.
- Excessive leakage of molten metal.
- Improper positioning of the conductor inside the mold.
- Movement of conductor.

Excessive high fill (tall riser) indicates;

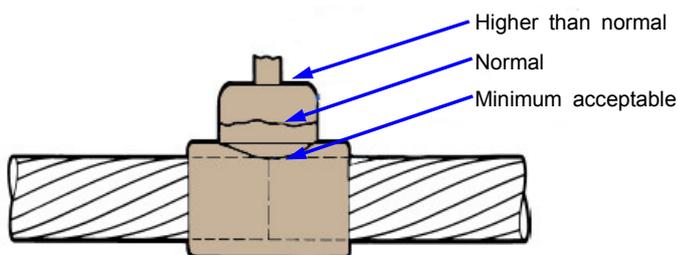
- Too large weld metal size was used (connection is still acceptable).
- Apparent volume increase due to contaminants in conductor or mold.



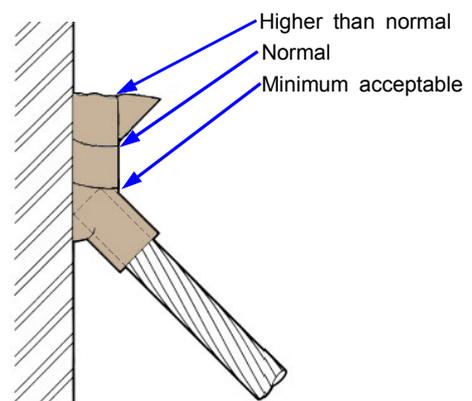
**Unacceptable**



**Type HGT**



**Type H**



**Type ADVS**

### **COLOUR**

The colour of a WELD connection is best seen after a light wire brushing of the connection. It should normally be gold to bronze in colour. Occasionally, it may be silvery at the top. This silver colour indicates "tin sweat" of the surface, a normal condition. A EXOWELD connection to cast iron or galvanized surfaces is often silvery due to alloying of the metals.

### **SURFACE FINISH**

The surface of a EXOWELD connection should be reasonably smooth and free of major slag deposits. If slag deposits cover more than 20 % of the connection surface, or if any cable strands are exposed after slag has been removed, the connection must be rejected.

### **POROSITY**

The connection should be essentially free from porosity. Excessive porosity is normally the result of contaminants (water, oil, dirt, etc.) in the conductor and/or mold. A few small pinholes may be present on the surface of the riser. The depth of a pinhole must never extend beyond the center of the conductor. To check the depth, probe the pinhole with a 1/32-in. -diameter wire (paper clip). Reject the connection if the depth of the pinhole extends beyond the center of the conductor.

### **PHOTOGRAPHIC GUIDES**

Like all electrical connections, a visual inspection is no guarantee of performance. Crimped or bolted connections cannot be inspected visually, but EXOWELD connections can be visually inspected and provide an indication of the quality of the weld. Visual inspection is recommended as a minimum practice.

Use the photographs shown on the following pages as a guide to visual inspection. EXOWELD connections are normally rated as good, acceptable or reject.

A **good connection** is a normal weld with only minor surface imperfections.

An **acceptable connection** is a less than normal weld, but a good performing weld. Imperfections indicate that 1) a new mold is required, 2) a change in procedure is necessary, or 3) the proper mold conductor and/or weld metal should be used.

A **reject connection** shows inadequate fill or an extra high riser due to 1) use of incorrect procedure, 2) use of incorrect equipment and/or equipment worn beyond its useful life, or 3) use of incorrect material.

### Photograph Guides for Inspection of welded connections



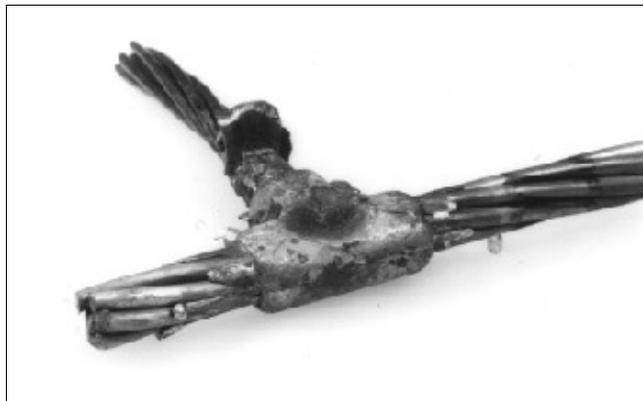
#### **Good**

A solid weld with only minor surface imperfections.



#### **Acceptable**

Fill is lower than normal, but still sufficient.



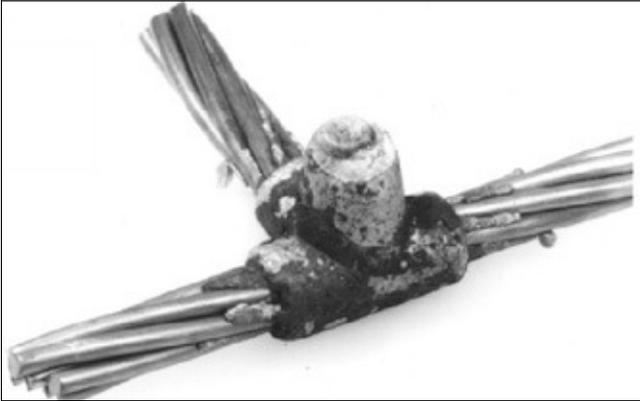
#### **Acceptable**

A worn or incorrect mold was used, allowing leakage around conductor. The fill in this connection is sufficient to allow it as acceptable. Attention to mold is required prior to making next connection.



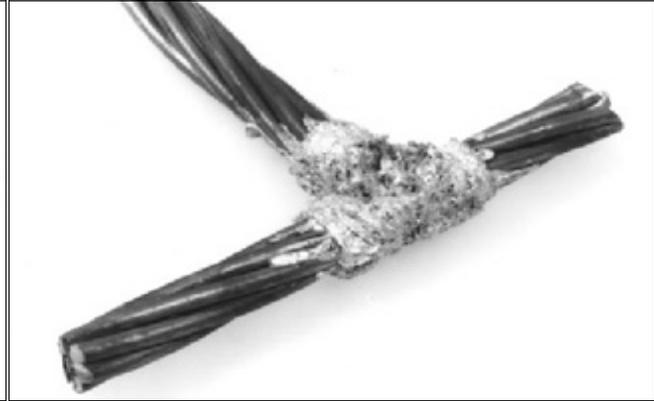
#### **Acceptable**

The presence of water/moisture in conductor strands or mold indicates that one or both were not properly dried. Although the riser is porous, the weld is solid. The degree of porosity is not sufficient to reject this connection.



**Reject**

Extreme amounts of slag on surface are caused by weld material leaking past disk or complete lack of disk. Inspect the condition of mold disk seat and check disk positioning prior to making the next connection.



**Reject**

Excessive water in cable strands and/or mold. Cable and mold must be dried by heating.



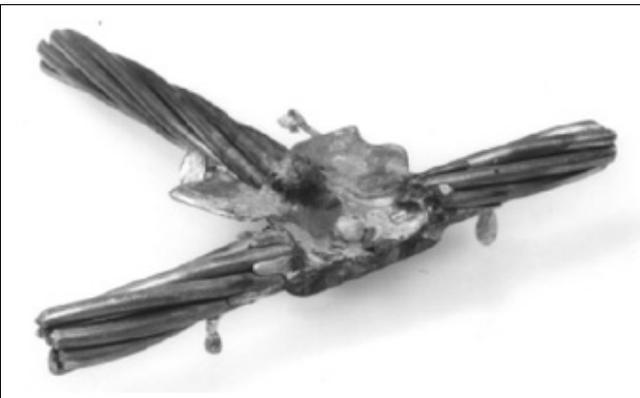
**Reject**

Light carbon traces on cable and connection are evidence of oil on cable strands. Oily cables must be cleaned with safety solvent.



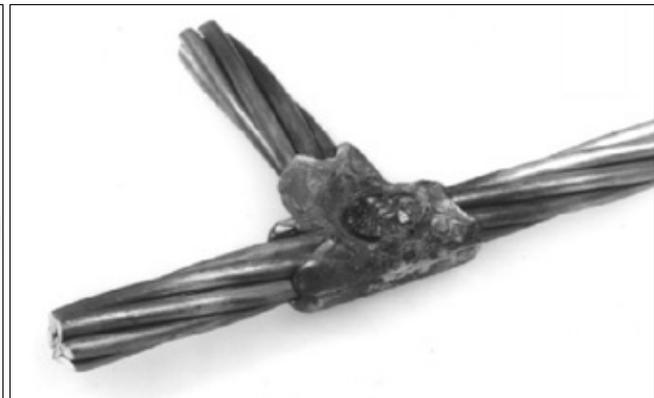
**Reject**

Heavy carbon coating on cable and connection is evidence of large amounts of oil or grease on cable. Cable must be cleaned with safety solvent.



**Reject**

Fill too low. Weld cavity was not filled over cable strands. "Fins" indicate that the mold was not closed tightly due to incorrect mold, incorrectly adjusted handle clamp, or presence of foreign material in mold parting line. Before making the next connection, check the mold for each of the above.



**Reject**

Fill too low. Weld cavity was not filled over cable strands. Absence of leakage indicates that weld metal size was incorrect (too small) or thru conductor moved.

### Field Situation Guide

Most field difficulties can be overcome by checking the following problems.

#### P 1. THE MOLD DOES NOT CLOSE TIGHTLY

Check for :

- a. Adjust the handle clamps
- b. Cables not positioned correctly or bent.
- c. Dirt or slag in mold parting line.
- d. Correct cable size.

NOTE : Use "C" clamp if necessary.

#### P 2. THE CONNECTION COVERED WITH EXCESSIVE SLAG

Check for:

- a. Weld material leaking past the disk, caused by:
  - 1) Chipped graphite at tap hole.
  - 2) Disk moved when weld material was placed into position.
  - 3) Disk not properly seated.
  - 4) Disk was not installed.

NOTE : A small amount of slag on the surface is not abnormal.

#### P 3. MOLTEN METAL "SPITS" OUT OF THE CRUCIBLE WHEN MAKING A CONNECTION

Remedy:

- a. See P 4 below.

#### P 4. THE CONNECTION IS POROUS

Check for :

- a. Presence of moisture either in conductor or mold.

Remedy:

- 1) Dry the conductor by wiping and heating.
- 2) Heat mold with torch (to above 100 deg C) or by igniting weld metal in mold without any conductors, taking care to prevent burns from the hot metal running out of the mold.

NOTE: Do not use the second method of heating if the mold has wear plates.

- b. Other contaminations (Oil, insulation, etc.) present in conductors.

Remedy:

- 1) Use a safety solvent to wash the conductor, then dry it.
- 2) If insulation is present between strands, remove it.

- c. Mold packing material in weld cavity of mold

Remedy:

- 1) Always apply mold packing material to conductor after mold is closed.

#### P 5. THE CONDUCTORS DO NOT WELD

Check for:

- a. Conductors were not properly cleaned and dried.

Remedy:

- 1) Remove oxides with a wire brush. If heavily oxidized re-cut conductor end and use HEAVY DUTY molds.
- 2) Dry conductors with a torch.

- b. Conductors not properly positioned in the mold.

Remedy:

- 1) Check for proper gap or butting as required (see the mold tag and read the instructions packaged with mold).
- 2) Check to be sure gap is centered under tap hole.

NOTE: In some cases, the run (thru) conductor must be cut and gapped. Follow instructions for same or use HEAVY DUTY molds.

### P 6. THE WELD METAL LEAKS AROUND THE CONDUCTOR

Remedy:

- a. Use packing material around the conductor after the mold is closed.
- b. Use molds with wear plates (which also act as chill plates).
- c. Check for the proper mold. Mold must be sized for the cable being welded.
- d. If the mold is excessively worn, replace with a new mold.

### P 7. THE CONNECTION HAS "FINS", METAL IS LOST

Check for:

- a. Mold not completely closed.
- b. Mold worn beyond useful life and needs replacement.

### P 8. THE CABLES PULL OUT OF THE MOLD DURING WELDING

Remedy:

- a. Use a clamp or other means to prevent movement of conductors when welding.

### P 9. INSUFFICIENT FILL METAL TO COVER CONDUCTORS

Check for:

- a. Use of proper weld metal size (see mold tag)
- b. Too large a gap between conductors (see positioning instructions).
- c. Mold leakage.

Remedy:

- 1) see P 6
- 2) see P 7
- 3) see P 8
- d. Conductor movement.

### P 10. THE RISER TOO HIGH

Check for:

- a. Use of proper weld metal size (see mold tag).
- b. Moisture in mold or conductor.

Remedy:

- 1) see P 4.

### P 11. THE MOLD WEARS OUT QUICKLY

(Mold should produce an average of 50 connections).

Remedy:

- a. Use cable clamp for hard-drawn copper.
- b. Clean the mold with a soft brush, clean cloth, or newspaper, DO NOT USE A WIRE BRUSH.
- c. Use care in removing the mold from a finished connection to prevent chipping of mold.