

# Installing Jumper Wires

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## Summary of Changes

This document was reviewed and no changes are required at this time.

## Overview

This standard describes the method for installing jumper wires across proposed pipe cuts or flange separations in steel piping to prevent electrical sparking and ignition of gaseous atmospheres.

## Audience

This standard is intended for FortisBC (Gas) Operation Supervisors, Operation Managers and personnel when undertaking work on existing piping systems.

## Contents

Safety .....	1
Temporary and Permanent Piping Section Removal .....	2
Procedure .....	2

## Safety

Prior to starting any work ensure Safe Site Work Planning (SSWP) is completed with reference to the use of the jumpers and the reasons why.

Wear all applicable Personal Protective Equipment (P.P.E.) - hard hats, safety glasses, Canadian Standards Association (CSA) approved work boots, reflective Fire Resistant (F.R.) bibs and jackets as well as any other identified safety gear.

If gas is leaking, or if work on an insulating fitting increases the likelihood of leaks, take the following precautions:

- Leave existing test or bond wires as they are if they are shorted (connected).
- If the test or bond wires on opposite sides of the insulating fitting are open (not connected), short (connect) them before separating a flange or making a pipe cut.
- If it is necessary to extend a test wire, attach an extension wire using an approved electrical connector. Do not simply twist the wires together because this will not make a reliable connection.
- Exercise caution to prevent breaking test or jumper wires.

In some circumstances, it may be necessary to request that Corrosion Control switch off the applicable rectifiers if the line has impressed current cathodic protection.

### DANGER:

- Do not allow broken or disconnected test wires to accidentally touch each other, the main, or any metallic conduit pipe in a gaseous atmosphere. Apply electrical tape to any cut or exposed ends.
- Do not remove bonding or jumper wires or separate test wires in a gaseous atmosphere.

## Temporary and Permanent Piping Section Removal

The temporary removal of a section of steel piping requires leaving the jumper wires in place until the operation is complete.

When removing a section of steel piping permanently, it may be necessary to install a permanent bond wire to replace the piping that was carrying impressed current. Contact Corrosion Control personnel to determine if this is necessary.

## Procedure

- Refer to **CRL# 1397** Excavating, **CRL# 1220** Locating Buried Gas Piping, **CRL# 1783** Excavating Safety and **CRL# 1385** Working Outdoors with Escaping Gas prior to any work.
1. Prepare the jumper wire.
    - Cut the wire long enough, ensuring adequate slack, to span the proposed cut, flange separation, or piping section.
      - Use AWG #6 – 7 strand, CSA C22.2 No. 38, RWU 90, crosslink PE coated copper conductor for jumper wires. FortisBC (Natural Gas) approved part number 380-5400. Heavier copper conductor with similar properties is also acceptable.
    - Attach approved clamps to the jumper wire or bare the jumper wire ends for cadwelding to the pipe.
      - Examples of approved clamps are shown in Figures 1 and 2. F-clamps, c-clamps and magnets specially designed for attachment to pipe or fittings are also acceptable.

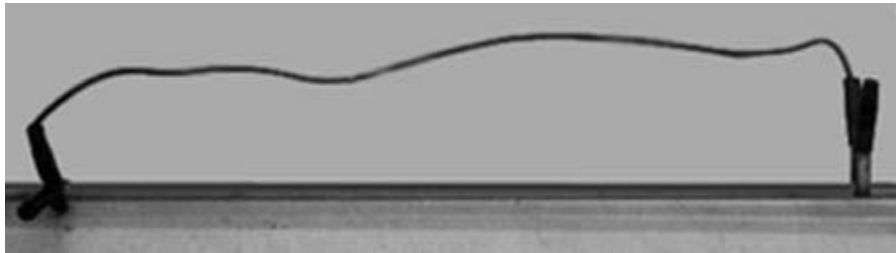
### Caution:

Refer to **CRL #1262** *Thermite Welding (Cadwelding)* to ensure that the pipe wall is thick enough to allow cadwelding on the pipe.

2. Attach the jumper wire.
  - Remove the coating from the pipe and clamp the jumper wire to the pipe, making solid contact or cadweld the wire ends to the pipe sections.
  - Whether using clamps or cadwelding, the pipe surface needs to be prepared by removing all oxides to ensure acceptable electrical continuity.
3. Cut the pipe, separate the flanges and/or remove the piping section with the jumpers in position.
4. Remove the jumper wire after completing the work.

- If the work order requires a permanent bond, leave the cadwelded wire in position on the pipe.
  - Ensure no leaks are present when removing the jumper wire.
5. Prepare the wire to pipe connections for wrapping.
    - See **CRL #1324** *Wrapping Wire-to-Pipe Connections*
  6. Wrap the pipe.
    - **CRL #1436** *Protective Coatings for Buried Steel Piping Systems*

**Figure 1: Clamp-On Jumper Wire (Spring Type) for 21 and 26 mm Pipe**



**Figure 2: Clamp-On Jumper Wire (Chain Type) for 42 mm and Larger Pipe**

