Section 4.5 Corrosion Protection for Piping

All of your regulated piping that is in contact with the ground and routinely contains fuel must be protected from corrosion. This also applies to ancillary equipment such as flexible connectors, swing joints, and other equipment.

You can protect this piping and ancillary equipment from corrosion in several ways. It may be:

- made of a non-corrodible material (such as fiberglass or flexible plastic)
- made of steel and coated and cathodically protected
- made of steel and cathodically protected
- isolated from contacting the earth by being inside some form of secondary containment that is made of a non-corrodible material

Any metal joints, flex connectors, and any other components of the piping that are in contact with the ground must be protected from corrosion.

All cathodic protection systems require periodic testing and maintenance.

Keep all paperwork related to your corrosion-protected piping and ancillary equipment (examples include paperwork related to installation, cathodic protection, and repair).

To determine requirements and BMPs for corrosion protection of your piping, do the following:

1. Identify the type(s) of piping for each UST system. If you know what type of piping you have, check the appropriate boxes in the table on the next page. If you do not know, look through the material below the table to see how you can identify your piping, then check the appropriate boxes in the table on the next page.

   Note: A piping run sometimes may consist of different types of piping. Make sure that you select ALL types of piping associated with each UST.

2. For each type of piping you check, go to the section of the Workbook listed in the right column of the table. Read the requirements and best management practices and fill out the appropriate checklist(s).

What type(s) of piping do you have that are in contact with the ground and routinely contain regulated substances?					Go to these sections for information
UST Number:	**1**	**2**	**3**	**4**	
Fiberglass Reinforced Plastic (FRP) Piping					Section 4.5.1
Flexible Plastic Piping					Section 4.5.1
Coated and Cathodically Protected Steel Piping					Section 4.5.2
Metal Piping Sleeved within Non-corrodible Piping					Section 4.5.3

Note: If your piping type is not listed above, contact the DEC UST Program to determine what requirements apply to your system.

Metal piping with no additional corrosion protection is not in compliance with the regulations and needs to be replaced. If you have this type of piping, contact the DEC UST Program for guidance.

If you know the type(s) of piping you have, skip the description information below and proceed to the sections as instructed in the table above. Otherwise, take the following steps to figure out what is at your facility:

- Look under your dispenser and in the sump on top of your tank to see if you can identify the piping. Note that some piping may have metal flexible connectors in these areas. These connectors are only at the ends of the piping and do not make up the entire piping run.
- Look through your old records and permit to see if they match any of the names in the descriptions.
- Contact the contractor who installed your piping.

Piping Type Descriptions

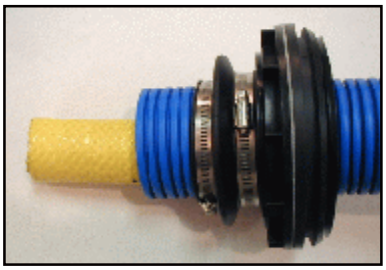
Fiberglass Reinforced Plastic (FRP) Piping - This piping is made of fiberglass reinforced plastic. It is a rigid piping (it is not flexible). Examples of FRP piping makers include Ameron and Smith Fiberglass Products Inc. This piping type also may have metal flexible connectors associated with it. If **all** components associated with a FRP piping run that are in contact with the soil are made of FRP, then the piping run is made of non corrodible material, and no further monitoring or recordkeeping for corrosion protection is required.


Sample FRP Piping

Flexible Plastic Piping - This type of piping is made of plastic that is flexible. Examples of flexible piping brand names include: Poly-Tech, EnviroFlex, GeoFlex, Perma-Flexx, Omniflex, Pisces, and Co-Flex™. This piping type may also have metal connectors associated with it.

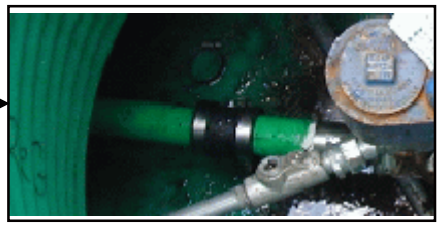
Sample Flexible Piping

Sample Flexible Piping



Sample Flexible Piping

Sample Flexible Piping in a Sump



Close-up of Flexible Piping in a Sump

Coated and Cathodically Protected Steel Piping - This is steel piping that has <u>both</u> an external coating and cathodic protection. <u>If you are not sure whether you have a cathodic protection system, see the "Determining If You Have Cathodic Protection" section below.</u>

Other Cathodically Protected Metal Piping - This is metal piping without an external coating that has a cathodic protection system. Typically, this type of piping was originally installed as bare metal and had cathodic protection installed at some later date. <u>If you are not sure whether you have a cathodic protection system, the information in the following section, "determining if you have cathodic protection," may help you.</u>

<u>Determining If You Have Cathodic Protection</u> - There are two types of cathodic protection systems commonly used to protect your metal piping from corrosion - impressed current cathodic protection (ICCP) systems and sacrificial (galvanic) anodes.

ICCP system - If you have an ICCP system, you will have an electrical rectifier (a device for converting alternating current into direct current) located somewhere at your facility. Sample pictures of rectifiers are provided in section 4.4.

If you have an ICCP system, your rectifier must operate continuously.

If you have an ICCP system, you must monitor and test the system as described in subchapter 4.6.

Sacrificial (galvanic) anode system - It is more difficult to tell if you have this type of cathodic protection system because the anodes are buried and attached to the piping. You cannot see them and there is no rectifier. Look at any installation paperwork you have or contact the contractor who installed the piping or cathodic protection system to try to determine if you have a sacrificial (galvanic) anode system.

If your piping is protected from corrosion by use of sacrificial (galvanic) anodes, you must monitor and test the system as described in subchapter 4.6.

4.5.1 FRP Piping and Flexible Plastic Piping

FRP Piping and **Flexible Plastic Piping** are made of non-corrodible materials and both meet the corrosion protection requirements without additional equipment or operation and maintenance.

Requirements for FRP Piping and Flexible Plastic Piping

FRP piping and flexible piping are not commonly joined together in one piping run, and in those rare cases when they are connected, the connection is typically made inside a sump, which must be monitored for releases (see section 4.8.4). There should not be any metal piping components (such as turbine pump heads and metal flexible connectors) associated with these types of piping that are in contact with the ground. But if any metallic components are in contact with the ground, they must be protected from corrosion by one of the following:

- Effectively isolating the metal connector from direct contact with the ground.
- Cathodically protecting metal components in contact with the ground. If you cathodically protect the metal component, you must meet the cathodic protection requirements in section 4.6.

4.5.2 Coated and Cathodically Protected Steel Piping

Coated and cathodically protected steel piping is usually (but not always) equipped with sacrificial (galvanic) anodes. All buried steel piping must be protected from corrosion. Make sure that metal piping components such as pump heads and flexible connectors are either effectively isolated from the soil or are cathodically protected.

Requirements for Coated and Cathodically Protected Steel Piping

The coating must be on the outside of the piping and must be made of a suitable dielectric material (a material that isolates the piping from the surrounding soil and does not conduct electricity).

If you have galvanic anodes, you must comply with specific testing and record keeping requirements for this type of cathodic protection. Descriptions of cathodic protection, requirements, and BMPs for cathodic protection are in section 4.6.

4.5.3 Other Cathodically Protected Metal Piping

Metal piping that is not coated with a dielectric material but is protected from corrosion is usually equipped with an impressed current system. All buried metal piping in contact with soil must be cathodically protected, or isolated by non-corrodible sleeves. Make sure that metal piping components such as pump heads, flexible connectors, and swing joints are either effectively isolated from the soil or are cathodically protected.

Requirements for Cathodically Protected Metal Piping

If you have an impressed current system, you must comply with specific testing and recordkeeping requirements for that type of cathodic protection. A description of cathodic protection, as well as requirements and BMPs for cathodic protection systems, are in section 4.6.

Keep records of your cathodic protection installation. These records may be useful in determining whether your piping is in compliance with the corrosion protection requirements.