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Sacrificial Anodes - Underground Ferrous Piping

Policy and Procedure No.: **P-05-26** May 2005(Revised January 2011)

Purpose

Establish a policy for the installation of sacrificial anodes to avoid the deterioration of underground ferrous piping.

Background

Corrosion is caused when the properties in a material (*ferrous piping*) deteriorate due to reactions with its environment; damage is caused due to the weakening of steel due to oxidation. Protection of all buried ferrous piping for either gas or potable water is therefore required to avoid such corrosion.

What is a "Sacrificial Anode"?

*An anode attached to a metal object, such as a metal pipe, serves to inhibit the object's corrosion. The anode is electrolytically decomposed while the object remains free of damage.
A galvanic anode, also known as a *sacrificial anode*, is used to protect metal from galvanic corrosion, by the use of a metal electrode which is itself consumed instead in an anodic oxidation reaction. This technique is also known as *cathodic protection*.

*(The American Heritage Dictionary)

Application

Each system of buried ferrous piping used for either potable water or gas supply shall have a protective coating of an approved type, machine applied, and conforming to recognized standards. Field wrapping shall provide equivalent protection and is restricted to those short sections and fittings necessarily stripped for threading.

Installation Method

All buried ferrous piping shall be provided with cathodic protection installed in accordance with Table-A of this section and the following requirements:

1. Galvanic anodes for cathodic protection of ferrous piping shall be buried not less than 3-ft below grade and below the bottom of the pipe to be protected. They shall not be less than 4-ft horizontally from any buried metallic pipe. Before back filling, the anode shall be flooded with a minimum of five gallons of water.
   When connected to the pipe being protected, less than 6-in above grade, the anode shall be connected with a thermite weld.
   Connections 6-in or more above grade may be made by the use o f a listed mechanical clamp.
2. Gas supply piping shall be isolated at the connection of the utility or private tap from the water main and at each building foundation line adjacent to the full-way shutoff valve.
3. Gas supply piping shall be isolated adjacent to each foundation line or at the appliance when located outside the building and from the serving gas supplier's service equipment.
4. Approved isolation fittings shall be located a minimum of 6-in above grade, except that fitting at the water tap.
5. Any piping laid in the same trench with pipe requiring cathodic protection shall be separated laterally a minimum of 12-in from the protected pipe, and piping installed diagonally above pipe requiring cathodic protection shall be separated vertically a minimum of 6-in.

A typical installation method is illustrated on the following page; other methods may also be used.

Inspections

After the anode bag has been installed and the trenching is exposed, an underground gas test inspection is required. The building inspector will check for the appropriate anode bag size, minimum installation distances and burial depth.

TABLE – A: ANODE SELECTION CHART

	PIPE SIZE					
ANODE SIZE	**½"**	**¾" & 1"**	**1-¼" & 1-½"**	**2"**	**3"**	**4"**
1-lbs. Anode	50'	----	----	----	----	----
3-lbs. Anode	150'	100'	50'	50'	----	----
9-lbs. Anode	500'	200'	200'	150'	100'	100'
17-lbs. Anode	----	500'	350'	300'	250'	150'
32-lbs. Anode	----	----	500'	500'	450'	350'
Allowable length (in feet) of coated and wrapped buried ferrous gas or water pipe for each size anode.