TECHNICAL NOTE 13-01 (Preliminary)
WATER RESTRAINT SYSTEM (WRS)

Installation Modifications for Cold Weather Environments

First release: December 7, 2001

Introduction

The WRS is a new system and has not been fully tested in a cold weather environment where long term winter temperatures can be at or below freezing (32 F). There are a few proposed installations in locations where the average low temperature in some months may be at 32 F or below during special conditions. For installations in these locations, there may be days when the temperatures may fall below the 32 F and the low temperature may affect WRS operation. In these locations special precautions are installed to prevent damage to the WRS system.

Requirements

1. Nozzle installations mounted where exposure to low temperatures and high wind chill conditions can occur must be specially protected. Water allowed to freeze in the barrel can impede WRS operation and might damage the nozzle under prolonged freezing conditions. Nozzles exposed to this type environment must have the nozzle drip-valve removed so that water will drain from the cannon barrel.

1. The water remaining in the three-inch piping that connects the water tank and pump to the cannon may freeze under prolonged periods where the air temperature and/or the wind-chill temperature are below freezing. Freezing can interfere with WRS operation and might damage WRS water pipe and/or associated welds. The three-inch water piping under these conditions should have heat tape applied and compatible wrapped insulation applied over as much of the pipe length as possible. The institution should provide GFCI electrical service to support the heat-tape installation.

1. Water control valves located at the water tank and at the cannon subassembly might freeze under severe weather conditions. The heat tape applied to the 3-inch water pipe should be extended as good as possible to cross the upper and lower Bermad valves and the associated Danfoss pilot valves.

1. The WRS water tank normally holds 300 gallons of water. This large mass of water is unlikely to freeze unless the air temperature is below 32 F for many days. Therefore, the water tank will not need a heater unless a particular site is known to have a history of long term freezing conditions.

1. The chemical tank contains a blended OC composition that contains anti-freeze compounds such as alcohol and propylene glycol. Factory tests have shown that the chemical additive has only a slightly higher viscosity at 32F, therefore the chemical injection at 32F will be the same or only be slightly less than certified. Therefore, no special freezing protection is required for the chemical tank or the chemical delivery line at this time.

Procedures

1. When applicable, remove the nozzle valve with associated air tubing. Replace the air tubing with plugs to seal the air supply lines. Store the nozzle valve and the air tubing in the WRS Power Control Cabinet.

1. Prepare the 3 inch water piping and install insulation as follows:

   A. Clean welds by removing scale, slag and loose materials.

   A. Wipe piping to remove dirt and oils.

   A. Apply one brush coat of “rust encapsulating” primer paint.

   A. Spiral-wrap heat tape around 3-inch water pipe using manufacturer’s recommended turn spacing. Begin near pump and lower Bermad (near the electrical outlet) and proceed up to the cannon (upper) Bermad.

   B. Extend the heat-tape run as good as possible at the upper Bermad to include a figure-8 wrap around each Bermad valve and a spiral-wrap around all pilot-valve plumbing.

   A. Apply insulated tape and cover tape in accordance with manufacturer’s recommendations.