WINTERIZING

DATE	STATUS	APVD	AUTHD
11JUL05	Revised	JLS	RGP

1. GENERAL

1.1 Scope

a. This Standard Specification covers the general requirements for protection of equipment, piping, and instruments from ambient temperatures that could cause congealing or freezing of contents, interfere with operation, or cause damage to equipment.

b. Exceptions or variations shown in the UOP Project Specifications take precedence over requirements shown herein.

1.2 General Information

a. Process lines and associated equipment requiring protection against ambient temperatures that could cause congealing or freezing of contents, interfere with operation, or cause damage to equipment are shown on the UOP Piping and Instrument Diagrams (P&ID's).

b. Where protection is required, protection shall be based on maintaining piping or equipment contents above the minimum temperature as shown on the UOP P&ID's.

c. Protection shall be based on the use of steam or electrical heat tracing.

d. Protection shall be based on the winterizing temperature as defined in the Basic Engineering Design Questionnaire, Section 4.1, "Winterizing Temperature".

2. DESIGN

2.1 General

a. Protect vessels containing liquids that could congeal or freeze by heat tracing and insulating the nozzles, block valves, and drain piping in contact with the liquid.

b. Equipment containing liquids that could congeal or freeze shall have sufficient valved drains to ensure complete drainage upon shutdown.

2.2 Instruments

a. Use electrical heat tracing for pressure transmitters and differential pressure transmitters, including the connected piping.

b. Use electrical heat tracing for displacement type level instruments and gauge glasses, including the connected piping.

2.3 Pumps and Compressors

a. A water cooling system associated with a pump or a compressor shall have sufficient valved drains to ensure complete drainage upon shutdown.

b. Protect pumps in the same manner and to the same degree as the connected piping.

3. WINTERIZATION OF EQUIPMENT NOT SHOWN ON P&ID's

Provide protection of equipment, piping, and instruments not shown on UOP P&ID's as follows:

3.1 Basic Protection

a. Protect valved vents and drains in the same manner and to the same degree as the piping and equipment to which they are connected.

b. Protect piping entering and leaving the process area in the same manner and to the same degree as for the connected piping shown on the UOP P&ID's.

c. Outdoor instruments and impulse lines containing liquids subject to freezing, congealing, or high viscosity at winterizing temperature shall be heat traced and insulated in the same manner and to the same degree as for the connected piping and equipment shown on the UOP P&ID's.

d. Liquid level instruments, gauge glasses, and gauge columns containing material subject to freezing, congealing, or high viscosity at winterizing temperature shall be heat traced and insulated in the same manner and to the same degree as for the connected piping and equipment shown on the UOP P&ID's.

3.2 Winterizing Temperatures 32°F (0°C) and Below

When the winterizing temperature is 32ºF (0ºC) or below, provide winterization of water and instrument air lines as indicated in this section.

a. Underground Water Supply and Return Headers

(1) Headers shall be buried a minimum of 30 inches (750mm) below grade or 6 inches (150mm) below the frost line, whichever is greater.

(2) Block valves shall be operable from grade with the valve stem and packing permanently protected from contact with earth, rocks, etc. Provide a valve position indicator at grade.

(3) Where single service branch lines rise from below grade, the following arrangement shall be provided:

(a) Provide block valves in the supply and return risers just above grade.

(b) Provide a bypass, with a block valve, between the supply and return headers. Locate the bypass just under the risers' block valves. Heat trace and insulate the bypass.

The bypass shall be 3/4 inch for lines 3 inches and smaller, 1 inch for lines 4 to 8 inches, 1-1/2 inch for lines 10 to 20 inches, and 2 inches for lines larger than 20 inches.

(c) Provide a drain valve in the supply and return headers a minimum distance above the block valves, except that for 6 inch and larger size valves, provide a drain in the valve body above the valve seat. Heat trace and insulate the drain valve.

(d) Heat trace and insulate the risers from grade up to, and including, the block valves in the risers.

(4) Where a header for multiple services rises from below grade, protection shall be provided in the same manner as for overhead headers.

b. Overhead and at grade water supply and return headers.

(1) Provide a bypass, with a block valve, between and at the extreme end of the supply and return headers. Heat trace and insulate the bypass. The bypass shall be 3/4 inch for lines 3 inch and smaller, 1 inch for lines 4 to 8 inches, 1-1/2 inch for lines 10 to 20 inches, and 2 inches for lines larger than 20 inches.

(2) Provide a valve and drain to sewer at the end of water supply headers that do not have an associated return header. Heat trace and insulate the drain line and valve. The drain line and valve shall be 3/4 inch for lines 3 inch and smaller, 1 inch for lines 4 to 8 inches, 1-1/2 inch for lines 10 to 20 inches, and 2 inches for lines larger than 20 inches.

(3) Provide block valves at the high points of each branch line. Locate the valve in a horizontal position near the header. The section of line between the header and the block valve shall be of minimum length. The branch lines shall have sufficient valved drain points to ensure complete drainage upon shutdown. Alternately, branch lines may be treated as headers in Section 3.2b.(1) above.

(4) Heat trace and insulate the portion of the branch line between the block valve and the header. Heat trace and insulate the block valve.

(5) Heat trace and insulate valved vents and drains.

c. Instrument Air Lines

(1) Provide insulation and heat tracing of instrument air lines if the instrument air dew point is more than 5ºF (3ºC) above the winterizing temperature.

(2) Heat tracing shall maintain the instrument air temperature between 40ºF and 60ºF (6ºC and 15ºC).