STEAM TRACING DESIGN GUIDELINES

V.1.1 INTRODUCTION

Steam tracing is one of many ways to preheat, add heat and prevent heat loss from piping systems and their components. Some other ways are:

- ☛ Jacketed piping
- ☛ Hot water and oil tracing
- ☛ Dowtherm tracing

Jacketed piping systems are used primarily to maintain a constant high temperature. Due to its high cost of construction, jacketed systems are seldom used except where temperature control is critical. Hot water and oil must be pumped at a high velocity to maintain a desired temperature, and must have a separate return header as does Dowtherm. Hot water, oil or dowtherm are also an additional system which add to the cost of a plant.

Steam tracing is most often selected because:

- ☛ There is generally available a surplus of low and/or medium pressure steam.
- ☛ Steam has a high latent heat and heat-transfer-coefficient.
- ☛ Steam condenses at a constant temperature.
- ☛ Steam flows to end-point without the aid of pumps (when designed correctly).
- ☛ A small amount of return piping is needed due to existing condensate headers.

V.1.2 USES

Freeze Protection (winterizing)

- ☛ Adding sufficient heat to above-grade piping systems and equipment which are exposed to ambient temperatures below the freezing point of their media prevents freezing.

Maintaining A Desired Temperature

- ☛ The viscosity of some liquids becomes higher as their temperatures become lower causing more difficult and costly pumping and leading to down-time for cleaning.
- ☛ Condensation may occur in some gases if the ambient temperature falls below the dewpoint which is harmful and expensive in such systems as:

-Natural Gas where control valves freeze up and burners malfunction.

-Compressor Suction Lines where compressors can be damaged.

V.1.3 MATERIAL

Steam tracing material is normally as follows:

-Use the material specified for steam piping from the steam header (through the distribution manifold, if applicable) to and including the tracer block valve.

-Use 1/4” through 7/8” O.D. copper or stainless steel tubing (depending on the design conditions) from the block valve to the steam trap. Though sizes may vary with different applications, 3/8” and 1/2” O.D. are the most often used. Tube fittings and adapters are normally flareless compression type or 37 degree flared type.

-Use the material specified for condensate piping from the steam trap (through the collection manifold, if applicable) to the condensate header or end-point (drain or grade).

V.1.4 DESIGN GUIDELINES

1. Steam piping should be run within 12” of the line or equipment being traced to minimize exposed tubing.

2. Spiral tracing should be limited to vertical piping using multiple tracers on horizontal lines which require more heat.

3. Tracers should be designed so that the flow is always down. ***Avoid pockets! !*** Where vertical flow is unavoidable, steam pressure should be a minimum of 25 PSIG for every 10’ of rise.

4. Tracers should be a maximum of 100' long and continuous from the supply to the collection manifold or endpoint. For lines over 100’ long, provide another tracer and overlap the two 3 inches to avoid cold spots.

5. Tracers should have no branch tees except as indicated in *Section V.3.*

6. Provide each tracer with a separate strainer and steam trap.

7. Manifolds can be horizontal or vertical depending upon the design conditions.

8. Tracers should be attached to the pipe at 8” to 10” maximum intervals with stainless steel wire. Wire tension should be sufficient to hold the tracer secure and flush against the pipe.

9. Some piping materials, such as lined pipe, might require spacer blocks to avoid “hot spots”.

10. Tracer loops with unions are necessary:

- ☛ when joining tubing lengths.
- ☛ at all break flanges and unions.
- ☛ at all flanged valves.

11. Tracer discharge lines should be as short as possible since long discharge lines can freeze even with a fully functioning steam trap.