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SPECIFICATION FOR STEAM JACKETING OF PIPING

(PROJECT STANDARDS AND SPECIFICATIONS)

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SCOPE

This Project Standard and Specification covers the requirements for the design and installation of steam jacketing piping shown on P&ID and Utilities Flow Diagram. However, the jacketing piping to be supplied with the Vendor's proprietary for standardization equipment is excluded in general.

DESIGN REQUIREMENTS

1. The external pressure load acting on inner pipe shall be reviewed in accordance with ASME Section VIII Div 1 UG-28.
2. The discontinuity stress (local stress) of connecting part with inner and outer pipe shall be reviewed by stress engineer.
3. The buckling stress and the distance of spacers shall be calculated for each size and each temperature.
4. The type of jacketed pipe, such as full-jacket or semi-jacket, shall be considered for flexibility analysis of the jacketed piping system.

STEAM JACKETING SYSTEM

General

The steam jacketing system consists of:

- The steam supply piping to the jackets
- The individual steam jacket circuits
- The steam traps for draining condensate from the jackets
- The condensate discharge system

Steam and Condensate

The steam supply to jacketing piping shall be taken from a steam subheader/main header and condensate from steam trap shall be returned to a condensate subheader/main header.

All take-offs from the steam header shall be taken from the top. The steam supply line to jacketing system and steam/condensate line from jacketing system shall an isolation block valve located near nozzle of jacketing pipe as shown on the attached drawing Figure 1.

Jacketed Circuits-Construction of Pipe Sections

1. A steam jacketed pipe consists of a product line which passes through the center of a larger diameter steam line. The nominal sizes (in inches) of the inner-pipe x outer-pipe are shown on attached drawing Figure 2.
2. The jacket pipe is welded to the back of the end flange (reducing flange) of each jacket section and the inner-pipe is welded into the reducing flange, as shown on Figure 4.
3. Clearance guides to support the inner-pipe on long spans shall be made as shown on Figure 2.
4. The steam inlet and outlet jacket tappings (3/4" ~ 1 ½") to be in accordance with the attached drawing Figure 2.
5. For jacket ends the distance from flange facing to centerline of tapping shall be short as possible, leaving enough space t\for withdrawal of bolts.
6. Typical construction details of jacketed piping components are shown on Figure 4-6.
7. Breakout flanges shall be designed at proper spacing considering piping stress by thermal expansion, installation, test etc. The proper spacing shall be decided by piping stress analysis of each jacketing line.

Jacketed Circuits-Layout and Connections

1. A steam jacket circuit is formed by a number of jacket sections (pipe, fitting or valves) which are connected in series by jump-overs. Each steam jacket circuit has its own valved steam supply and condensate drain to steam trap. Each jacketed pipe spool shall have at least two flanged connections on the jacket, one for steam supply and one for steam or condensate discharge. The connections shall be located as close as possible to the flanged spool ends. The connection for steam supply shall have wear (impingement) plates welded to the inner pipe.
2. In principle, the steam inlet pipe must be connected to the uppermost jacket tapping of a circuit.
3. The length of steam jacket circuit covered by one steam supply connection shall not exceed 30 m and if the length is over than 30 m other steam supply piping shall be designed to supply steam to jacket circuit. See the attached drawing Figure 2 and 3.
4. Although each circuit shall be arranged so that the flow of condensate is generally downwards, a small vertical rise due to lay-out is permitted, provided a drain point with steam trap at lowest point of circuit is installed.

The maximum accumulated vertical pipe rise per circuit, however, shall be 1.5 meters.

5. The lay-out of piping and equipment must be such as to reduce potential congealing points to a minimum. Dead-ended and non-circulating piping shall be avoided.
6. If required during operation that certain part(s) of process piping will be shut off from the rest of the system for any reason, the steam jacket circuit of that (those) particular part(s) shall be separable from the rest of the jacketed circuit too, without obstructing service of other parts.

Steam Trap

1. Each steam jacket circuit shall be provided with its own steam trap located near steam/condensate outlet nozzle of steam jacketing piping.
2. Each trap shall have a block valve upstream and downstream of trap. Steam traps shall be flanged type with an integral strainer and check valve. Test valves shall be considered upstream steam trap. See the attached drawing Figure 1.
3. At the end of any circuit the steam/condensate is drained at the lowest tapping.
4. Steam trap shall be installed in horizontal or vertical position in accordance with manufacturer's recommendation.
5. The drain line from each circuit to the steam trap shall be short and downward for gravity drainage wherever possible.

CLEANING AND TESTING

1. The steam traps are to be disconnected during this procedure.
2. All welding seams of inner pipe shall be disclosed so that radiography test can be performed and leakage of inner pipe during hydrostatic test can be checked.
3. After cleaning all systems have to be pressurized with steam and checked for leakage and proper functioning of steam traps.
4. Test pressure for inner-pipe and jacket pipe is shown on line requirement of isometric drawing.

INSULATION

Steam supply lines, steam manifolds, condensate manifolds and condensate return lines shall be insulated. Steam traps must be left uninsulated.