



NATIONAL PETROCHEMICAL COMPANY  
STANDARDS

ENGINEERING STANDARD  
FOR  
STEAM TRACING

NPCS-ES-PI-03

REVISION : 0

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CONTENTS

- 1 SCOPE
- 2 DEFINITIONS
- 3 DESIGN BASIS
- 4 STANDARDS AND CODES
- 5 MATERIALS
- 6 INSTALLATION DETAILS

TABLE - 1

ATTACHMENTS

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1 SCOPE

- 1.1 This standard covers the minimum requirements for the detailed engineering design, material and installation for steam tracing of piping system and equipment for process reasons or for winterization.

2 DEFINITIONS

- 2.1 "Severe Climate" is defined as a climate for which the winter design dry bulb temperature is -20°F or below.
- 2.2 "Moderate Climate" is that where the design dry bulb temperature is above -20°F.

3 DESIGN BASIS

- 3.1 Steam heat tracing shall be designed to maintain the traced piping and equipment at/or above the specified heat tracing objective temperature when ambient temperature is at the specified winterizing temperature.
- 3.2 The minimum number of parallel steam tracers, and tracers size for various traced line shall be as shown in Table 1.
- 3.3 Tracer requirements in Table 1 have been calculated on the basis of insulation thickness based on tracing steam temperature. In case where process temperature requires greater thickness of insulation, number of tracers can be reduced accordingly.
- 3.4 Insulation thickness shall be in accordance with NPCS-ES-TP-02, based on tracing steam temperature or process temperature, whichever is higher.

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- 3.5 Where multiple tracers are required for long runs of larger pipe, the number of tracers can be reduced by one or more of the alternatives method listed below.
- 3.5.1 Using larger size tubing.
- 3.5.2 Using 1/2" or larger size Steel pipe.
- 3.5.3 Using heat transfer cement with tubing sizes shown.

4 STANDARDS AND CODES

|               |                                              |
|---------------|----------------------------------------------|
| NPCS-ES-PI-01 | Piping System Design.                        |
| NPCS-ES-PI-02 | Piping Material Specification.               |
| NPCS-CS-PI-02 | Piping Fabrication & Erection.               |
| NPCS-SD-PI-39 | Steam Tracing Details.                       |
| NPCS-ES-TP-02 | External Insulation (Hot).                   |
| ANSI B 31.3   | Chemical Plant and Petroleum Refinery Piping |



5 MATERIALS

5.1 TRACER MATERIAL

It shall be selected from the materials described below.

5.1.1 Soft annealed seamless (ASTM A-179 or equal) Steel tubing.

5.1.2 Soft annealed seamless Copper tubing as per ASTM B 68 (to be used up to 204°C).

5.1.3 Soft annealed welded S.S. tubing as per ASTM A 269 TP 304.

5.2 Minimum wall thickness shall be as follows:

| SIZE IN INCHES | WALL THICKNESS IN mm (INCHES) |              |                 |
|----------------|-------------------------------|--------------|-----------------|
|                | CARBON STEEL                  | COPPER       | STAINLESS STEEL |
| 3/8            | 0.89 (0.035)                  | 0.82 (0.032) | 0.7112 (0.028)  |
| 1/2            | 1.24 (0.049)                  | 0.89 (0.035) | 0.89 (0.035)    |

Note a) Wall thickness shall be reviewed for pressure in excess of 8.6 bar.

b) Tubing shall not be used for pressure in excess of 12.1 bar.

5.3 Tube fitting shall be compressed type designed for steam service. Material used shall be Carbon Steel, Brass and Stainless Steel for Carbon Steel, Copper and S.S. respectively.

5.4 All fittings shall be in straight runs of tubing only and not in loops, etc., and be insulated separately.

5.5 Steel pipe schedule 80 shall be used for branches from manifolds to tracers, for interconnecting lines between two parts of a tracer which are not adjacent, and from tracer through trap to condensate header.

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