

Standard Specification for Tracer Materials

The tracer in a steam tracing system must be as flexible as possible for ease of installation and conformance to the shape and layout of the process pipes and equipment being heated and must act as a leakproof carrier of the heating media. Whenever possible it is recommended that semi-rigid tubing be used rather than rigid pipe for tracing because considerably less force is exerted as a result of differential expansion between the tracing element and the process pipe or equipment. Therefore, the tracer can be held closer to the surface of the heated pipe or equipment to provide a higher heat transfer rate. Additionally, tubing systems can be installed in about half the time required for a piping system when long length coils are used due to the elimination of the many welded joints required to make up a rigid carbon steel pipe tracer for a complex process piping system. A semi-rigid tube tracing system will require a minimum number of joints, which can be made up by using compression fittings.

Steam tracers shall be selected to fulfill the thermal and installation requirements. These requirements are determined by the process pipe material, temperature of the process pipe and tracer, pressure of the heating media as well as the environment in which the tracer will operate. The tracer shall be a metal close to the potential of the process pipe so as to minimize galvanic corrosion. Recommendations are as follows:

- a) Copper tubing tracers shall be soft annealed grade 122 and meet ASTM Standard Specifications B68, B75, B88, B251 and B280. Minimum wall thickness shall be as follows:
 - 3/8" O.D. x 0.032" wall (10mm O.D. x 1 mm wall)
 - 1/2" O.D. x 0.035" wall (12mm O.D. x 1 mm wall)
 - 3/4" O.D. x 0.049" wall (20mm O.D. x 1.2 mm wall)
- b) Copper tubing shall be used if the saturated steam pressure or the item being traced does not exceed 400°F (204°C) and there is no corrosion or other deterrent for using copper.
- c) Stainless steel tubing tracers shall be type 316 seamless cold drawn and fully annealed with a maximum Rockwell hardness of RB90 and meet ASTM Standard Specifications A269, A213, A249 and, A450. Minimum wall thickness shall be as follows:
 - 3/8" O.D. x 0.032" wall (10mm O.D. x 1 mm wall)
 - 1/2" O.D. x 0.035" wall (12mm O.D. x 1 mm wall)
 - 3/4" O.D. x 0.049" wall (20mm O.D. x 1.2 mm wall)



- d) Stainless steel tubing shall be used if the saturated steam pressure or the item being traced has a maximum temperature above 400°F (204°C) and there is no corrosion or other deterrent for using stainless steel.
- e) Carbon steel cylindrical tracers are not recommended for steam tracing circuits. During shutdown periods, the combination of air and moisture on or in the tracers causes rapid rusting.
- f) Since the tracer tube is a primary component of the steam tracing system, the tubing shall be thoroughly inspected prior to use to see that it conforms to the specification, is of the correct diameter and thickness and is not out of round.

The pressure design and temperature ratings are of utmost importance in a tracing system. ANSI/ASME B31.3 Code addresses these requirements for process piping by including ASTM Standard Specifications that must be met under the Code.

The Table below provides information on the allowable pressure rating (psi) for typical tubing tracers used at temperatures up to 400°F (204°C). Stainless steel tubing tracers may be used at temperatures much higher than those shown in the table.

TABLE FOR WORKING PRESSURE (PSI) @ 400°F (204°C)

Tube O.D. Inches	Tube Wall Thickness (Inches)									
	316 Welded Stainless Steel			TP 316 Seamless Stainless Steel			#122 Seamless Copper			
	0.035	0.049	0.065	0.035	0.049	0.065	0.030	0.032	0.035	0.049
1/4	4340	6163	8597	4967	7252	10117	534			
3/8	2778	3941	5397	3224	4637	6351	---	378	407	624
1/2	2176	3112	3933	20409	3489	4628	---	---	302	358
3/4	1424	1781	---	1666	2096	3188	---	---	---	292

- Calculations Based On ANSI/ASME B31.3 Code.
- No Allowance Made For Corrosion Or Erosion
- Calculations Based On Minimum Wall And Maximum O.D. Allowable Under ASTM A269 Specifications For Stainless Steel Tubing
- Calculations Based On Minimum Wall And Maximum O.D. Allowable Under ASTM B75 Specifications For Copper

