Instrument Connecting Piping

INDEX

Th s nstruct on Sect on covers the nsta at on and ma ntenance of nstrument connect ng p p ng for a app cat ons other than the measurement of draft or very ow pressures n add t on, these nstruct ons cover p p ng connect ons at the pressure source for pressure and eve nstruments

For connect ng p p ng for f/b L ne Tr⁄nsm tters, see nstruct on Sect on G18 3

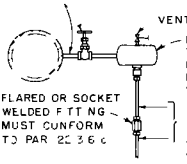
For the nsta at on of n pp es, va ves, and reservo rs at the Pr mary E ement for f u d d fferent a pressure nstrument, see nstruct on Sect on G23 1

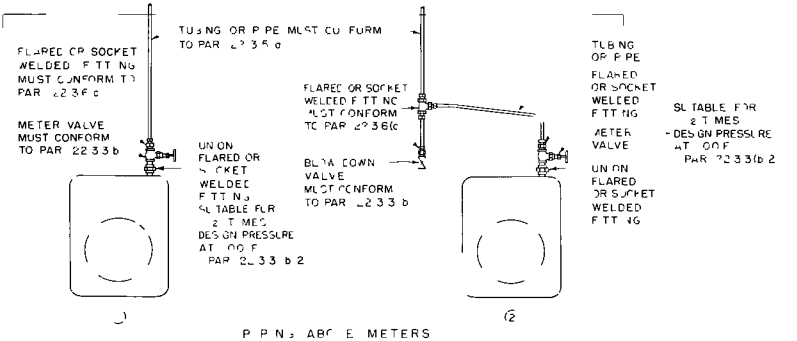
For pneumatic contro connect ng tub ng, see nstruct on Sect on G18 2

For a r f ow connect ng p p ng to a Ba ey Bo er Meter, see nstruct on Sect on M61 1

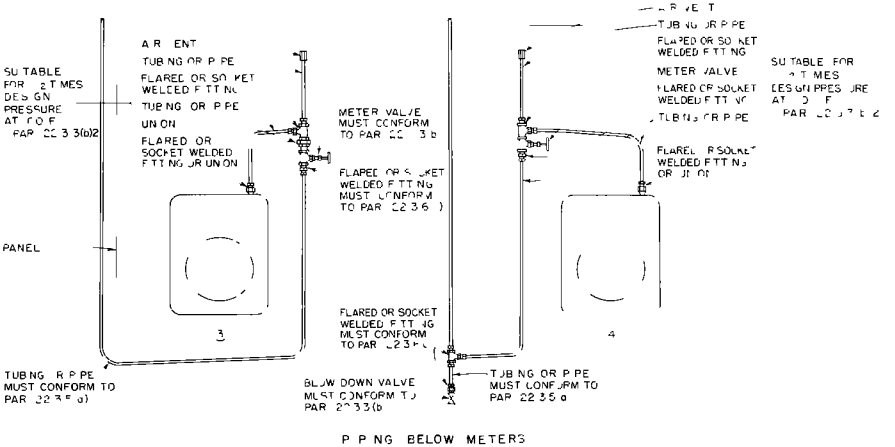
NOTE REFERENCES ARE TO NUMBERED PARAGRAPHS N THE AMER CAN NAT CNAL STANDARD CODE FOR PRESSURE P P NG ANS B3 0 96")

SHUT OFF VALVES AND N PPLES MUST BE OF SAM PRESS RE AND TEMPERATURE STANDARD AS MA N L NE PAR 2232 a)





P P NG ABO E METERS



P P NG BELOW METERS

FIGURE 1 Connecting Piping Recommendations in accordance with Code for Pressure Piping" for Steam and Water Applications

SELECTION OF MATERIALS

When selecting material for connecting lines between the Primary Element or other pressure source and the instrument, consider the following

1 Kind of fluid being measured

2 Operating temperature and pressure of fluid

3 Possibility of corrosive atmosphere

4 Distance between Primary Element or pressure source and instrument

Recommendations below are based on Paragraph 122 of the "American National Standard Code for Pressure Piping (ANSI B31 1 0 1967) Figures 1 and 2 illustrate the minimum requirements specified by this paragraph of the Code

Selection Chart Recommendations

Pressure and temperature conditions shown in the Selection Chart (Figure 2) refer to the pressure and actual metal temperature in the instrument lines Allowance should be made for temperature increase during blow down, although the Code recognizes that the metal temperature in the lines during blow down may be considerably less than main line temperature, and permits rating the piping in superheated steam service at saturation temperature rather than at the higher actual flowing temperature in the main line

For best instrument response, 1/2 inch O D tubing or piping is recommended as a minimum size However, in some applications, it is desirable to use 3/8-inch O D tubing for final connections at the instrument, but these lines should not exceed ten feet per line in length (see Figure 18)

NOTE Sizes listed are based on a maximum run of 100 feet for each connecting line For each 50 feet or run longer than 100 feet use tubing or piping 1 8 inch larger in size Always use the weight of tubing or piping noted in Figure 2 or in the recommendations below

Selection Based on Measured Fluid

For steam, water, and most other liquids within the limitations of temperature and pressure noted in Figure 2, use copper tubing and steel flared fittings (do not use copper tubing for services with flammable fluids in the piping system) For conditions too severe for either copper or steel tubing, use Schedule 80 steel pipe with socket welded fittings Use either 1,2 inch or 5,8 inch O D steel tubing and flared fittings for temperature and pressure conditions which do not fall within the limitations for copper tubing in Figure 2 Use steel tubing for gas and oil service

For air or gas measurement with Type CC, CA, CH, DC DA, or DH Fluid Meters, use 3,8 inch, Schedule 40 iron or steel pipe with screwed fittings, for Type CG and DG Meters, use 1-inch, Schedule 40 iron or steel pipe with screwed fittings for piping runs up to 25 feet, for longer runs, use larger size pipe

For brine measurement, use 3 8 inch wrought pipe with screwed fittings

For black liquor measurement, use 3 4-inch wrought pipe with screwed fittings

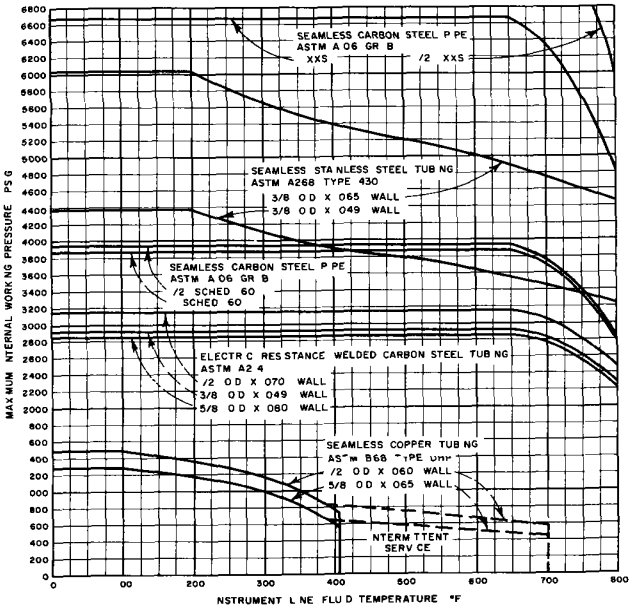
Instrument and Blowdown Valves

Instrument or meter valves are shut off valves installed immediately ahead of the instrument connections as shown in Figure 1 For instrument designed for service pressure up to 800 psig, use 3 8 inch forged steel screwed instrument valves For Type CG or DG Fluid Meters, use 1 inch valves as specified in Figure 7 For instruments designed for service pressures greater than 800 psig, use instrument valves consistent with the size and type of connecting piping required Where an adjacent meter piping arrangement is used (Figure 18), use 1/4-inch instrument valves

Valves that come in contact with black liquor or brine should be iron For materials for use with other corrosive liquids consult Bailey Meter Company

For pressure instruments, use 3 8 inch forged steel screwed valves for instrument valve and 3 8 inch forged steel for blowdown valves (Figure 11)

For Fluid and Differential Pressure Meters designed for pressures greater than 800 psig that include manifold piping with either square ends for welding or 1 2 inch back welded forged steel unions, use 1 2 inch forged steel valves with ends equipped with either welding sockets or 1 2 inch NPT threads



NOTES

1 The curve representing the rating of the tubing selected must lie above the intersection of lines representing the actual expected maximum sustained temperature and pressure

2 Tubing materials, dimensions, and specifications are those of tubing stocked by Bailey Meter Company In some cases, larger sizes are recommended Several commercial pipe sizes have been shown for convenience

3 If other materials or sizes or wall thicknesses are used, allowable working pressures must be calculated as provided for in the code

4 Temperatures are instrument line fluid temperatures In steam service, tubing preceding blowdown valves shall be suitable for saturated steam temperature at the design main line pressure

5 Copper tubing may be used in dead end steam or water service up to design pressures and temperatures shown by the dotted curves provided that the temperature within the lines for continuous service does not exceed 406F

6 Pressure and/or temperature may exceed the normal design conditions occasionally provided the pressure does not exceed the allowable value for the temperature involved by more than

(1) 15% during 10% of the operating period
(2) 20% during 1% of the operating period

7 The recommended minimum wall thickness for socket welded tubing is 065

8 Tubing wall thicknesses are not calculated to provide additional thickness that may be required for mechanical strength Tubing should be continuously supported in conduit, trays or channels

FIGURE 2 Selection Chart for Instrument Connecting Piping Based on Code for Pressure Piping (ANSI B31 1.0 1967)

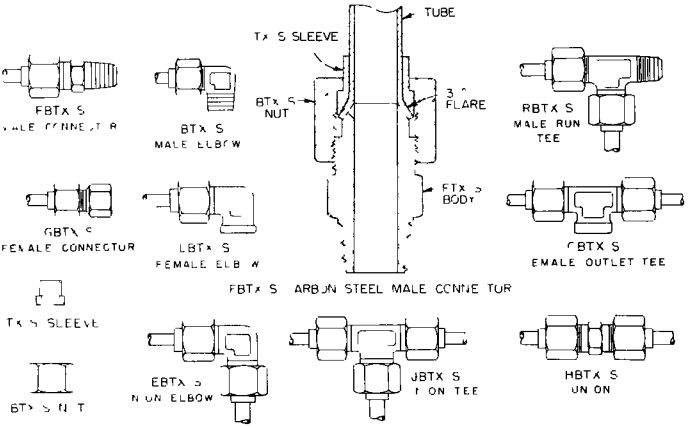


FIGURE 3 Typical Steel Flared Fittings

Blowdown valves at or near the instrument should be of the gradual-opening type and for steam service, should be suitable for saturated steam temperature corresponding to actual line pressure For other than steam service valves should be suitable for actual main line pressure and temperature

When blowdown valves are used valves at the instrument, as well as any intervening fittings and tubing between such valves and the meter, must be suitable for 1 1 2 times the design pressure at 100F

Flared Fittings

Figure 2 indicates that carbon steel flared fittings are suitable for pressures up to 2000 psig at a temperature of 900F Several forms of steel flared fittings are shown in Figure 3 For proper installation of flared fittings, see 'Flaring Copper or Steel Tubing page 18

INSTALLATION FOR FLUID AND DIFFERENTIAL PRESSURE METERS

Before installing connecting piping, refer to Figures 4 thru 7 to determine the best type of installation for the application desired note the general and specific remarks covering each individual arrangement

An alternate method (providing test connections) of making final connections is shown in Figure 18 For various types of high and low pressure connections see Figure 8

General

1 Connecting piping or tubing must slope at least one inch per foot and be properly supported throughout its entire length Pockets formed by incorrect sloping or supporting will cause faulty operation of the Meter (refer to 'Supporting Connection Lines", page 17)

2 Connect K1 (upstream Primary Element connection) to high pressure (H) side of Meter

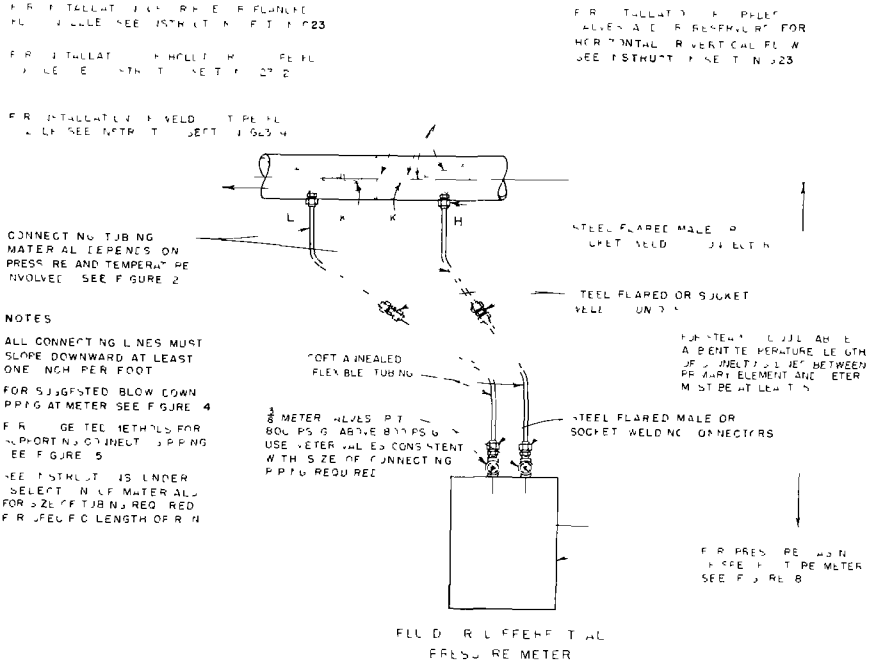


FIGURE 4 Installation of Connecting Lines with Primary Element above Meter

3 Connect K2 (downstream Primary Element connection) to low pressure (L) side of Meter Refer to Instruction Section G23 1 for details regarding connections at horizontal and vertical pipe lines

4 Run connecting lines close together to maintain equal temperature, making sure that neither comes in contact with hot steam pipes

5 Tubing and piping must be absolutely tight Use full lengths of tubing with as few unions or fittings as possible

Steam, Water, and Non corrosive Liquids

The arrangement of connecting piping for steam, water, or other non corrosive liquid, regardless of operating pressure and temperature is basically the same Differences involve only the connections at the Primary Element and the piping material

When the Meter is below the Primary Element (Figure 4), run connecting piping directly between Meter and Element (whether flow at the Element is horizontal or vertical) Where the Meter is located above the Primary Element (Figure 5), observe the following precautions

1 Arrange tubing with drop legs below the Primary Element (Figure 5) with lowest point of drop leg about five feet below axial center of pipe line

2 Install vertical risers with air vents at top of vertical runs of tubing to Meter to discharge accumulations of air

3 Slope tubing from risers downward to Meter

4 Make certain that line pressure is able to support a water column from Primary Element to Meter at any rate of flow

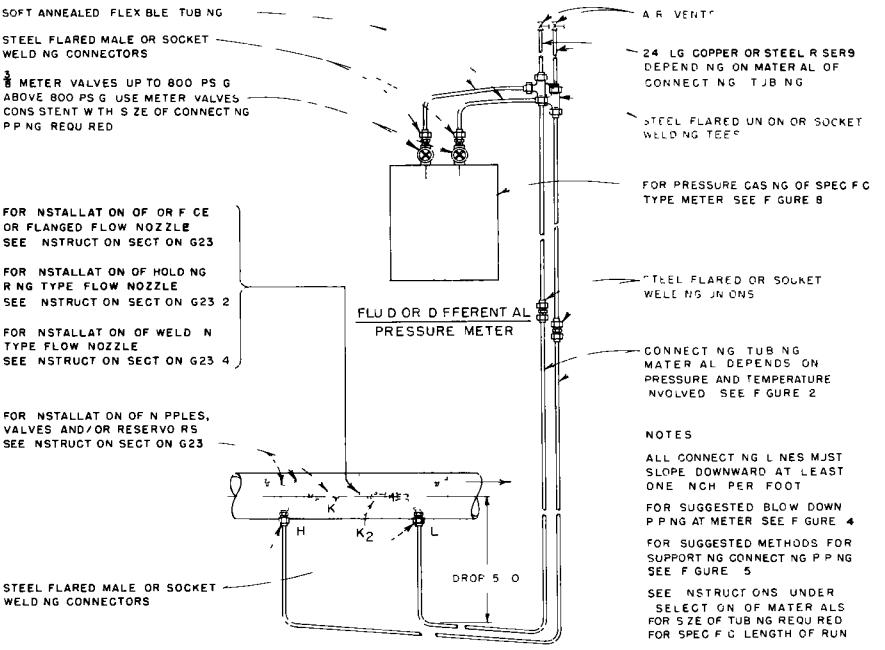


FIGURE 5 - Installation of Connecting Lines with Primary Element below Meter

Oil, Chemicals, or Other Corrosive Liquids

Installation of connecting piping for oil, brine, chemicals, and other corrosive liquids is similar to that for non corrosive liquids except that separating chambers should be installed in the pipe lines These chambers separate the line liquid from the clean water in the instrument Where special arrangements of separating chambers are required, a drawing of the specific installation will be included

Gas, Air, or Non-Condensable Vapors

Figure 7 shows connecting piping for gas, air, or non condensable vapors The Meter is usually installed above the Primary Element If the Meter must be located below the Primary Element, piping from the Element to the vertical drop should slope downward toward the Primary Element

When the gas contains moisture, dirt, or other foreign matter, install traps or settling chambers (Figure 9) in the piping so that such material may be collected and blown down periodically Arrange all nipples and valves at the Primary Element so that moisture, condensation, or tarry accumulations will drain back into the gas main Make arrangements for cleaning and draining accumulations of scale or tarry substances which might collect on the inside of the pipe at the orifice location If the effective area of the connecting piping is reduced by large accumulations, the Meter will become sluggish and inaccurate

Low Pressure Steam

In applications where steam pressure is less than 25 psig, the connecting tubing arrangement is the same as that shown in Figures 4 and 5 except in special applications when the Primary

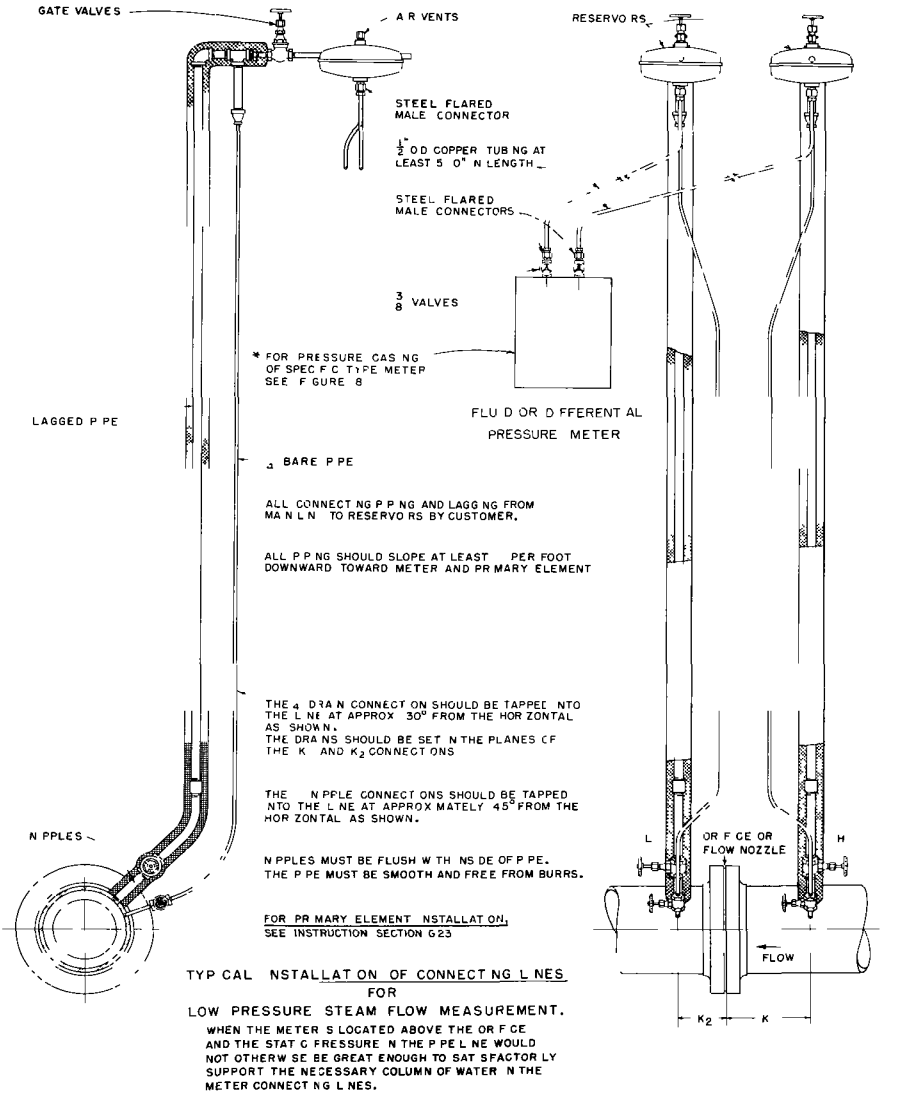


FIGURE 6 Installation for Low Pressure Steam Flow (under 25 psig) with Meter Above Primary Element where Static Pressure in Line Would Not Otherwise Support Required Water Column

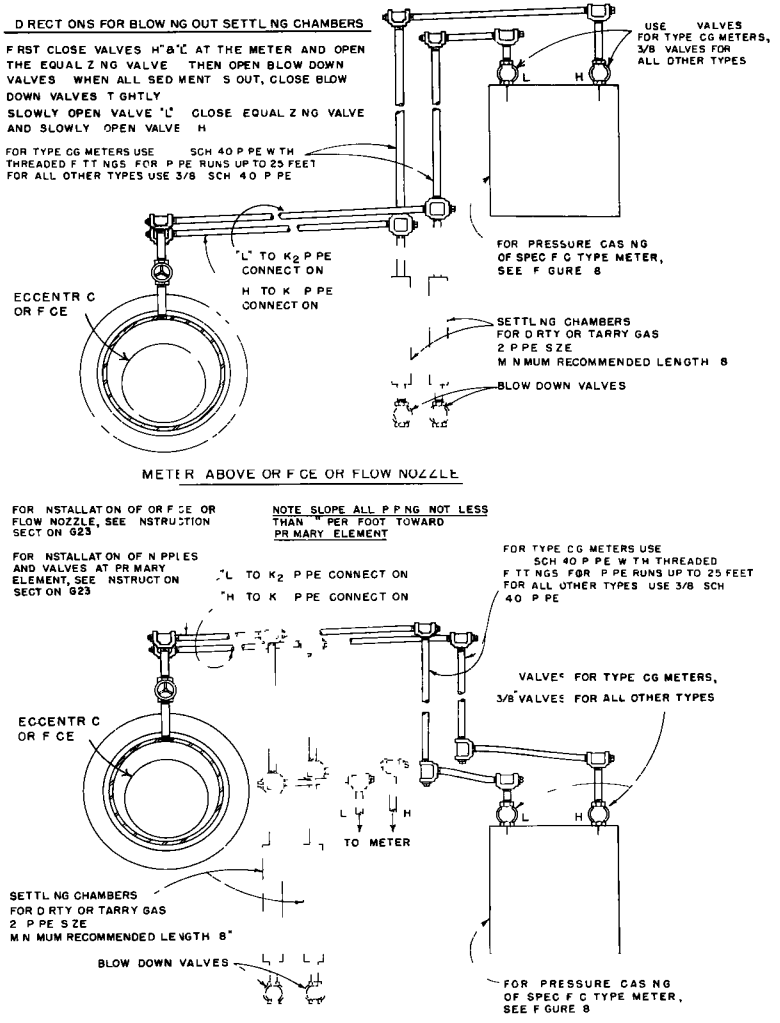


FIGURE 7 Installation of Connecting Lines for Gas or Air Flow Measurement

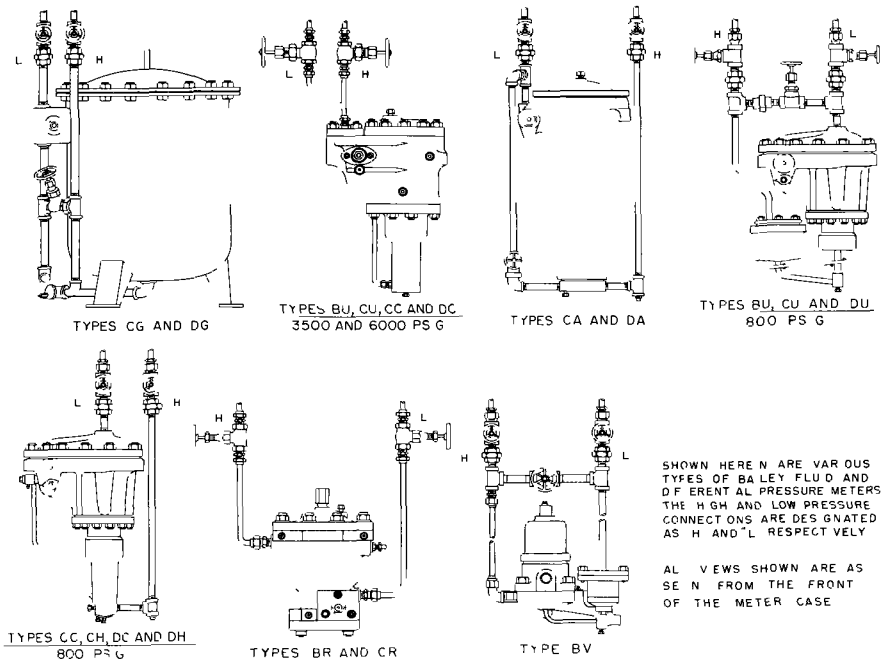


FIGURE 8 Various Meter Types showing High and Low Pressure Connections

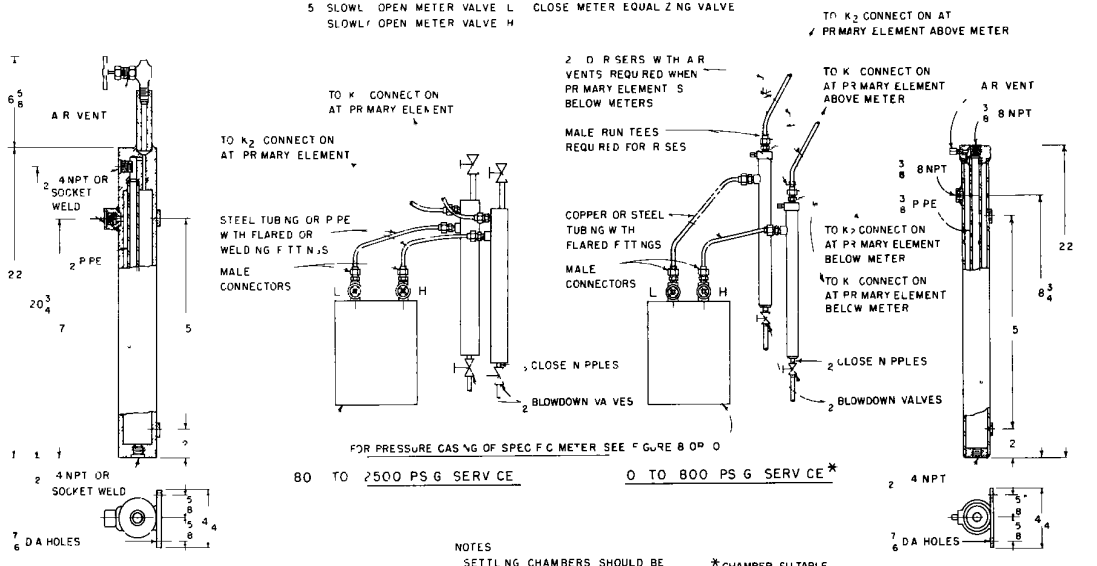
Element is below the Meter and the pressure in the system cannot support a water column equal to the vertical distance between the pipe line and Meter (Figure 6)

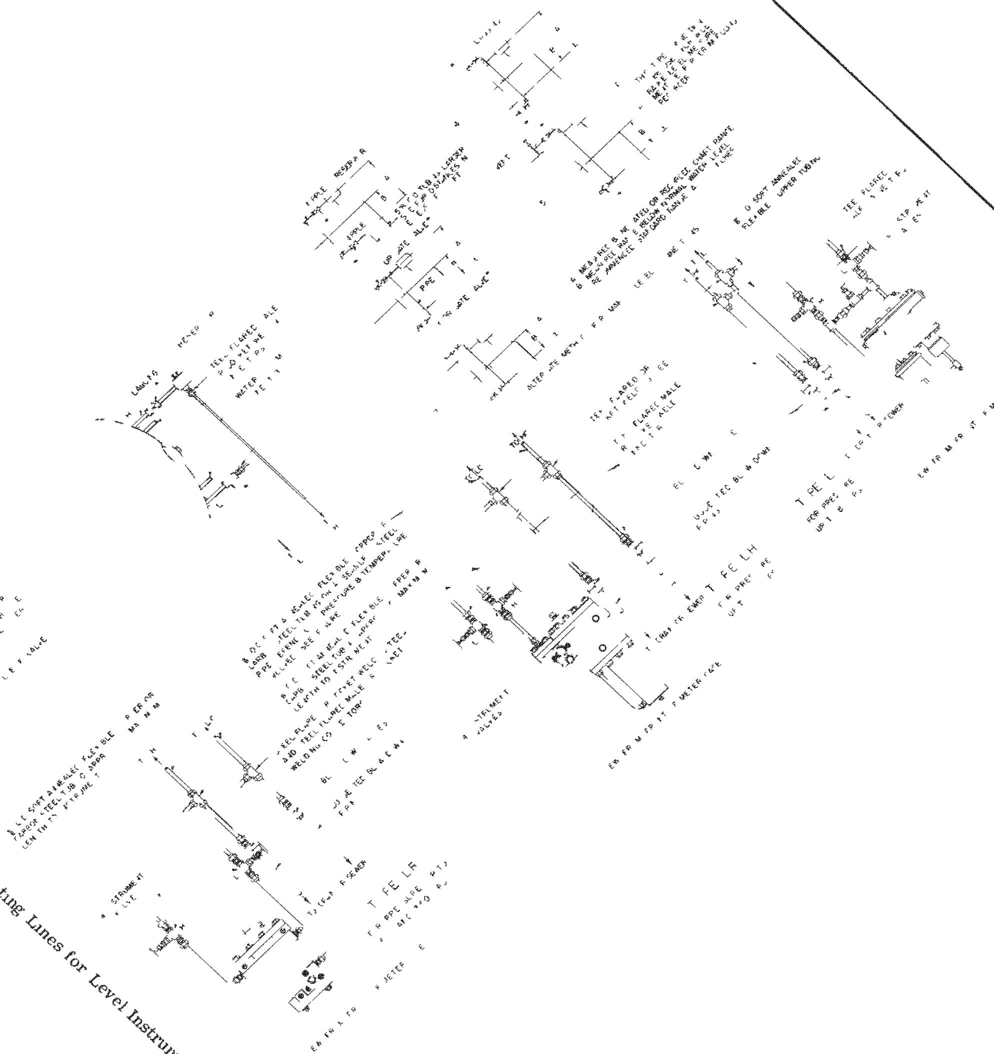
Settling Chambers

Refer to Figure 9 If the steam or liquid being measured carries considerable sediment which might collect in the connecting tubing and pressure casing, install settling chambers close to Meter or at a low point in the connecting lines Sediment that has accumulated in the bottom of the settling chamber can be blown down as often as necessary When blowing down the chambers, refer to Figure 9 and observe the precautions under "Blowdown Piping , page 17

If the nature of the fluid being measured is such that gases form in the piping and accumulate under the Fluid Meter bell, place a magnesium rod in each settling chamber to correct the conditions Insert rods thru blowdown connection in bottom of chamber A screen (soldered across the inlet end of the nipple or pipe connected to the chamber) will keep the rod from clogging the blowdown connection Note that piping from meter to reservoir must be at least five feet

FIGURE 9 - Installation of Settling Chambers





tion of Connecting Lines for Level Instruments

INSTALLATION FOR LEVEL INSTRUMENTS

Figure 10 shows typical piping installations for level instruments Several piping arrangements at the drum are shown, differing in the elevations of effective upper and lower instrument connections with respect to connections actually provided in the drum View 1 is the simplest arrangement with piping arranged horizontally at the two drum connections and should be used where possible, however, if the distance between connections exceeds the desired range span, differential pressures beyond the instrument range may result Therefore, it may be necessary to install an external circulating pipe and tee off instrument connections (see views 2 and 3) at effective elevations corresponding to instrument range limits For calibration data to apply make installation with effective connection elevations as noted on Specification Sheet or calibration table included in this instruction book

General (Refer to Figure 12)

1 Connecting piping or tubing must slope at least one inch per foot and be properly supported throughout its entire length Pockets formed by incorrect sloping or supporting will cause faulty operation of the Meter (see Supporting Connecting Lines page 17)

2 Connect high connection (HC) to high pressure (H) side of Meter

3 Connect low connection (LC) to low pressure (L) side of Meter Refer to Instruction Section G23 1 for details regarding connections at horizontal and vertical pipe lines

4 When a Class 13H Compensator is included in a Type LH Recorder or Indicator, run connecting piping to helix coil from HC connecting piping (see Figure 11)

5 Run connecting lines close together to maintain equal temperature, making sure that neither comes in contact with hot steam pipes

6 Tubing and piping must be absolutely tight

Boiler Drum Connections

Connections into the boiler drum correspond to the highest and lowest drum levels to be measured (at least 30 inches apart) The usual range is 15 to +15 inches with zero inches of water representing normal water level and the connections made 15 inches above and below that level

The drum connections (Figure 10) should be level and made in the drum head or in the side of the drum near the end (the same end as connec

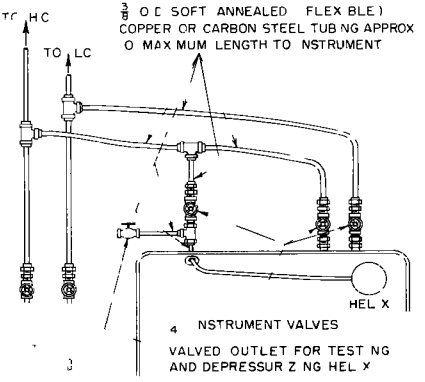


FIGURE 11 Installation of Connecting Piping for Class 13H Compensator

tions for water column) Locate connections so openings into drum are not subject to direct interference from circulating or generating tubes In necessary, protect openings with baffles

Use a reservoir at the high connection (HC) to provide a constant water head on the high pressure side of the instrument

Connections in Tanks, Heaters, Etc

Connections into tanks, heaters hot wells, or other vessels are similar to those made to boiler drums (see Figure 10) The connections should cover complete level range with the low connection (LC) several inches above the bottom of the vessel to prevent sediment and impurities from entering the piping

If steam is present in the tank, install a reservoir at the high connection (HC) to provide a constant water head If the vessel does not contain steam, some means must be provided for maintaining a constant water head on the high connection One method is to use a slight feed supply in which water is introduced slowly into high connection Further details are available upon request

For special installations (i e where air bubbler or sight feed systems etc are required), specific drawings covering the application will be provided

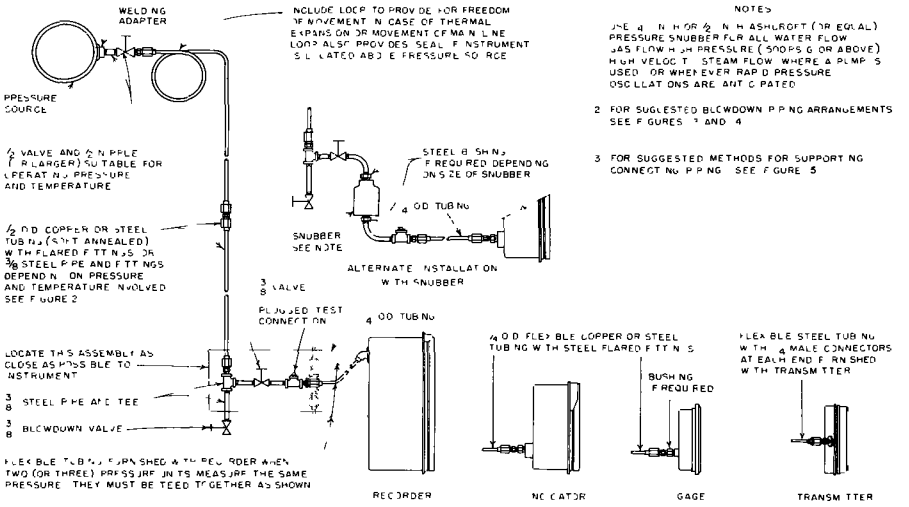


FIGURE 12 Installation of Connecting Lines for Pressure Instruments

INSTALLATION FOR PRESSURE INSTRUMENTS

General (Refer to Figure 12)

1 For connection at pressure source, use 1/2 inch (or larger) steel nipple (size in accordance with "Code for Pressure Piping") followed by Globe type shutoff valve; both nipple and valve must be suitable for operating pressure and temperature at the pressure source

2 Install valve so that it closes against the pressure from the pressure source

3 To make connections from instrument to pressure source, use either 1/2 inch O.D copper or steel tubing with steel flared fittings or 3/8 inch instrument shut off valve followed by a 3 8 inch nipple and tee in the piping near the instrument

4 A short length of flexible capillary tubing is provided with each Pressure Recorder and Transmitter The outlet end of the tubing has a fitting with 1/4 inch male pipe threads Connect the fitting to the 3/8 inch tee, using a 1/4x3/8 inch bushing

5 In the case of a Pressure Indicator or Gage, no capillary tubing is furnished Use a short length of 1/4-inch O D tubing with flared fittings from the 3/8 inch pipe tee to the instrument to provide a flexible connection at the instrument

6 Include a short drop leg in the piping at the pressure source when the pressure source is located below the instrument piping

7 Tubing or piping must be absolutely tight Use full lengths of tubing with as few unions as possible

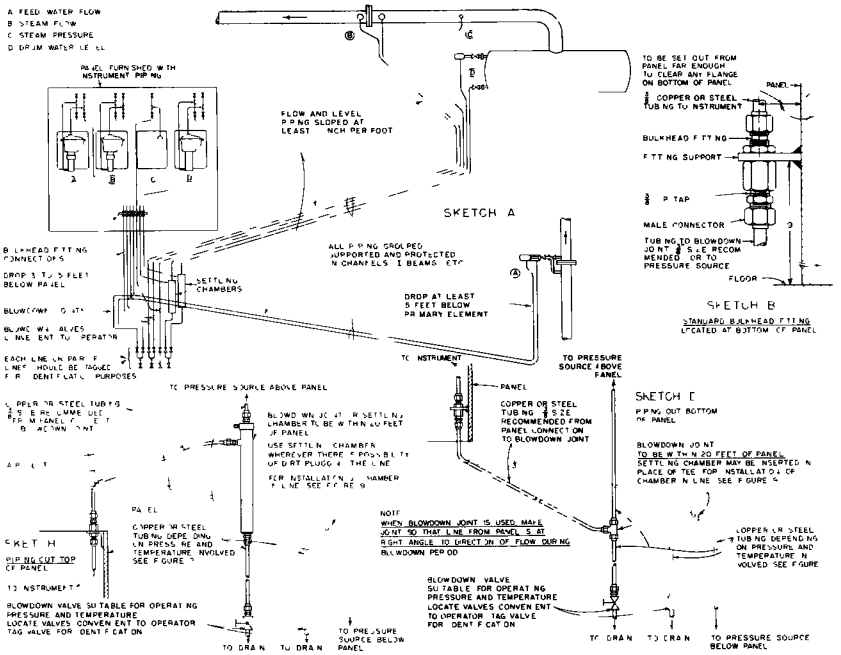


FIGURE 13 Typical Bailey Instrument Panel Arrangements

PIPING TO BAILEY INSTRUMENT PANELS

A typical Bailey Instrument Panel piping installation is shown schematically in Figure 13 Sketch A The panel piping uses bulkhead type fittings with 3/8 inch NPT outlets (see Figure 13, Sketch B) for connecting pipe outside the panel Meter connections are made as shown in Sketch A

Routine blow down of instrument piping should be made from some point outside the panel Connect blowdown lines and joints within 20 feet of the panel as shown in Figure 14 and Sketches C and D of Figure 13 Use 3/8 inch O D tubing from blowdown joints to the panel Make blowdown joint connections so that piping from instrument (or panel) is at a right angle to the direction of flow during blowdown procedures If settling chambers are used in pipe lines, they should be included in place of blow down joints (see Figure 9 for installation of settling chambers) Make certain that piping from the joints to the pressure source and blowdown valves are suitable for the highest pressure and temperature encountered and are of a suitable size for the distance between the pressure source and the instrument (see "Selection of Materials' page 3)

Observe the following when making pipe runs to the panel

1 Piping out top of panel (see Figure 13, Sketch C)

a When the pressure source is located above the panel, run piping directly to pressure source, no drop leg is required

b When the pressure source is located below the panel, provide an air vent close to the panel connection at the high point in the line run piping down to at least 5 feet below pressure source then back up to the source

2 Piping out bottom of panel (see Figure 13, Sketch D)

a When the pressure source is located above the panel, run piping down 3 to 5 feet before going up to pressure source, this provides sufficient drop leg

b When pressure source is located below the panel, run piping down to at least 5 feet below pressure source then back up to source

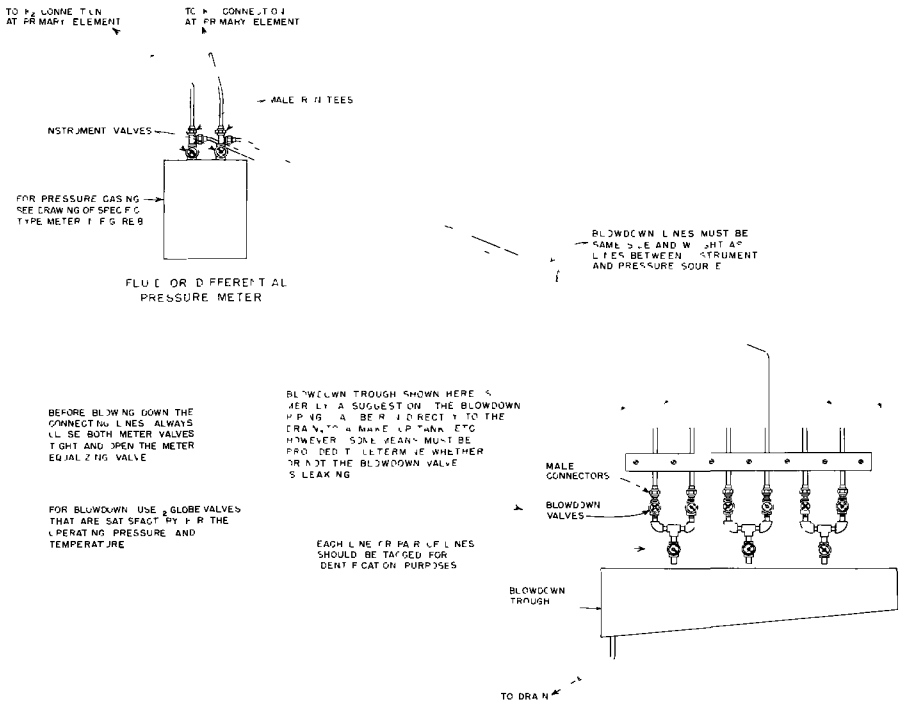


FIGURE 14 - Suggested Arrangement for Instrument Connecting Line Blowdown Piping

BLOWDOWN PIPING

Typical blowdown piping arrangements are shown in Figures 13 and 14

General

1. Blowdown piping and valves must be the same as used in instrument connecting lines and suitable for the highest pressure and temperature that may be encountered

2 If no blowdown piping is furnished, the instrument valves must meet the same specifi cations as noted here for blowdown valves

3 If blowdown piping is provided, the instru ment valve need only be suitable for 1 1 2 times the design pressure at 100F

4 Tag each valve or set of valves for ease of identification

5 See applicable instruction sections for frequency of blow down

Blowdown Procedure

1 Close instrument valves For Fluid and Differential Pressure Meters and Level Record ers or Indicators open instrument equalizing valve

2 For instruments without separate blow down piping

a Crack unions or fittings below instru ment valves and bleed off pressure in instrument casing,

b Disconnect connecting lines from in strument at unions or fittings on instrument manifold or connecting piping.

c Swing connecting lines away so blow down is not directed toward instrument casing

3 Slowly open one blowdown (or instrument) valve Allow sufficient time for line to clear, then close valve Repeat for other valve (pres sure instruments have only one valve)

4 If instrument measures steam allow suf ficient time for steam to condense in connecting lines before placing instrument in service

5 (Reconnect lines on instrument without blowdown piping) Place instrument in service in accordance with procedure outlined in appli cable Instruction Section

SUPPORTING CONNECTING LINES

Instrument connecting lines must be supported and adequately protected to prevent sagging and accidental damage Figure 15 shows various methods of supporting connecting piping When planning connecting piping runs, consider the following

1 Piping runs should be arranged for ease of maintenance

2 Tag lines every 30 to 40 feet for easy identification

3 Run piping in protected areas (such as in channels, I beams, against walls or ceiling, thru pipe sections, etc)

4 Protect horizontal runs near floor with steel sheeting or kickplates

5 Support piping thru which hot liquid or steam will be blown so that it may expand and contract without buckling One method is to run piping thru short sections of larger pipe, clamped tight by the supporting device

6 Run connecting lines in group fashion as they approach an instrument panel board (see Sketch L of Figure 15) Run different types of piping, such as instrument, draft, and control lines in separate groups or tiers If two lines are required for one instrument, run lines ad jacent to each other

Protect Against Vibration

The following suggestions may be helpful to eliminate vibration which could cause piping failure

1 Support tubing with wooden clamps (see Sketch C of Figure 15)

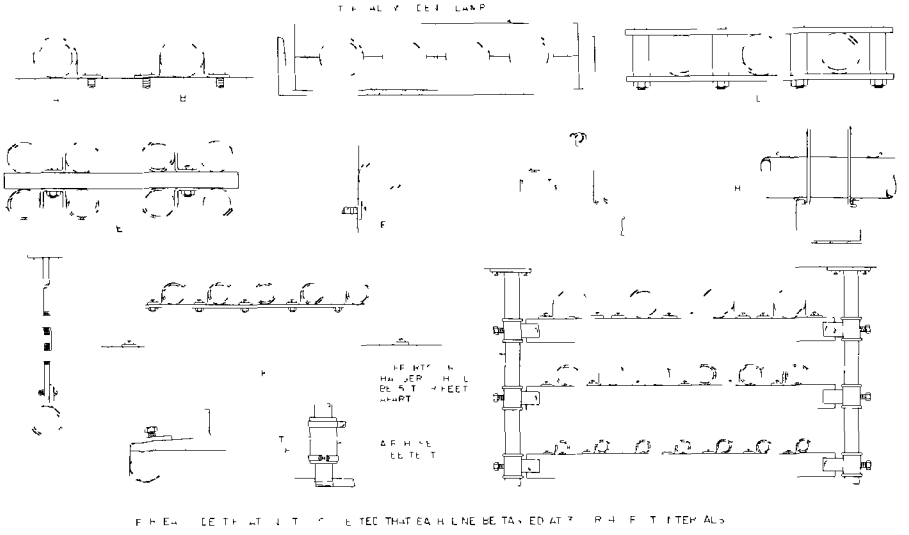


FIGURE 15 Suggested Methods for Supporting Instrument Piping

2 Insert a small piece of 1 8 inch thick rubber (gasket material) between each tube clamp and tubing at all points affected by vibration

3 Make two or three loops (in a horizontal plane) in the tubing at or near the pressure source connection.

4 For low pressure (draft or control) connecting lines, insert a 12 to 18 inch length of air hose in the line at the pressure source connection, (see Sketch N of Figure 15) Rubber covered woven steel tubing, in which a small rod has been inserted, might also be used for this purpose

5 Set up a periodic inspection procedure for checking all joints for leakage

FLARING COPPER OR STEEL TUBING

Flare with approved flaring tools To make a good joint, square off the end of the tubing and file away all cutter or hacksaw marks Remove all filings, chips, burrs, and grit from inside tubing by blowing compressed air thru tube Also remove any burrs on outside edges Make certain that the flare conforms to the requirements of the fitting used for coupling the tube If flaring tools have been properly used, the flare diameter will be correct

When the tube is flared too short (Figure 16, Sketch A), the full clamping area of the fitting is not utilized and the flare may be squeezed thin due to the small area of the tube that is clamped

Tubes flared too long (Figure 16, Sketch C), will stick and jam on threads when assembling and are likely to seat against the bottom of the fitting rather than on the tapered seat

For correct flare length (Figure 16, Sketch B), and diameter, the outside corner of the flare should extend beyond the maximum inside diameter or toe of the sleeve or tube nut, but not beyond the outside diameter of the sleeve or tube nut

The flare angle of the tube should be directly related to the flare angle of the fitting An incomplete flare cannot be depended upon to draw

down properly on the fitting seat since the sleeve tends to climb up on the flare, leaving very little grip on the tube after the fitting is assembled Therefore, complete all flares to the proper angle

The flare must be square and concentric with the tube and fitting sleeve to seat properly *Flares may be out of square and eccentric be* cause the tube has not been cut off square a id the flare has been unevenly formed in the flar ing tool. Such flares cannot be corrected and should be cut away and reflared

Inspect the flare for surface markings If marks are present, the flare should be cut away and the tube reflared

Before flaring, be sure that the sleeve and or tube nut has been placed on the tubing

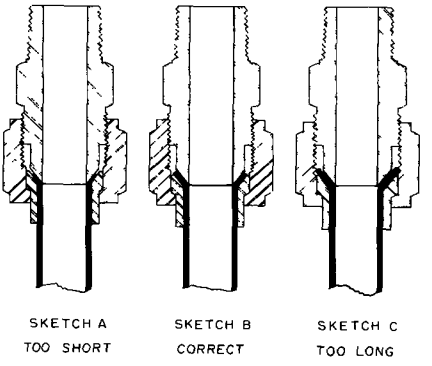


FIGURE 16 Tubing Flares

TESTING FOR LEAKAGE

To test for leakage, follow the steps outlined below:

1 Tighten connecting piping, fittings, and valve assemblies

2. Disconnect piping from instrume it

3 Blow down piping under line pressure to make certain it is clear (see Blowdown Pip ing" Page 17) Then close instrument valve H and L and allow piping to fill

4 Check for leakage at piping and fitting joints with a soapsuds solution

5 Repair any leaks

6. Make necessary reconnections at instru ment Return instrument to service as outlined in applicable Instruction Section

PROTECTION FROM FREEZING

For installations where cold temperatures may be encountered, connecting lines should be protected to prevent fluid in the lines from freezing One of the methods recommended be low should be used when excessively cold temperatures exist

Electric Heating Cable

For dependability the electric heating cable method is preferred to either of the two alter nate methods below Install the heating cable *as follows (refer to Figure 17)*

1. Wrap instrument lines with a 1 8 inch (minimum) thick layer of asbestos insulation before applying heating cable

2 Then, wrap cable around or lay it paral lel to the lines and completely insulate the en tire group

3 Support cable with straps or asbestos tape

4 Weather proof insulation with aluminum foil or other suitable material

The heating cable must be able to withstand any temperature that may be encountered (such as the high temperature in Steam Flow Meter connecting lines during blowdown procedures) For insulated pipes approximately 0 24 watts is required per square foot of pipe area for each degree F difference between the desired temperature and ambient temperature On the basis of a 60F temperature difference, a 400 watt cable will be suitable for heating 27 8 square feet of pipe surface, or approximately 200 feet of 1 2 inch O D tubing (or two 1 2 inch O. D lines side by side 100 feet long) The length of cable required for an installation,

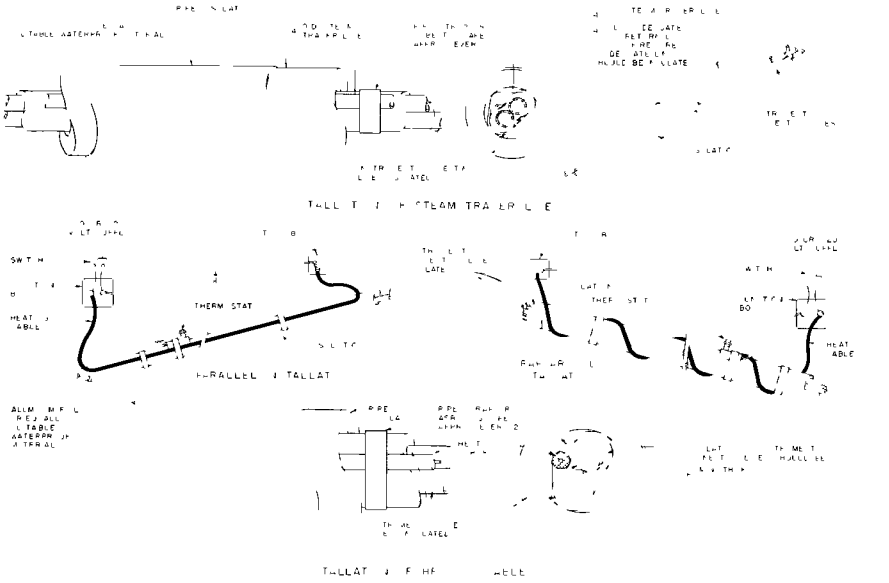


FIGURE 17 Suggested Methods for Protecting Instrument Connecting Lines from Freezing

then, depends on the watts per foot of the cable used and the method of installation (cable laid parallel, wrapped around, etc)

A thermostat is recommended to protect the cable from overheating and to alleviate manual operation Place the thermostat directly against the pipes being heated and at a location where the temperature is most representative Use a simple pipe strap of asbestos tape to hold the thermostat is place Refer to applicable manufacturer instructions for additional precautions and recommendations regarding the heating cable

Steam Tracing

Steam tracing (see Figure 17) may be used by running 1/4 inch O D copper tubing (through which low pressure saturated steam may flow) parallel to and against the lines to be heated Note that the instrument lines are insulated before the tracing line is installed and that both steam and instrument lines are completely insulated and weather proofed with aluminum foil or other equally suitable material In plants where condensate cannot be wasted, it will be necessary to provide a 1/4 inch return line back to some common header to return the condensate to a condenser or deaerator

Thermostatically controlled valves may be used to turn the steam on and off as required or this action may be a manual operation In the latter case, however, there is danger that turning on the steam might be overlooked until after the lines have frozen There is also the possibility that condensate trapped at some low point in the steam tracing line may freeze, making it impossible to thaw out the frozen instrument lines with the steam tracer line

Warm Air

Wherever possible, the lines should be run inside a duct thru which warm air may be circulated This is only practical where several lines are included in the same duct

ADJACENT METER P P NG

THE P P NG ARRANGEMENTS SHOWN BELOW LLUSTRATE AN ALTERNATE METHOD OF CONNECT NG THE METER TO THE PR MARY ELEMENT OR OTHER PRESSURE SOURCE THE VALVE BLOCKS PROV DE TEST CONNECT ONS TO WH CH CAL BRAT NG EQU PMENT CAN BE ATTACHED A THOU D SCONNECT NG THE P P NG AT THE METER D STANCE BETWEEN TEE CONNECT ONS TO PR MARY ELEMENT AND THE F NAL CONNECT ONS AT THE PRESSURE CAS NG SHOULD NOT EXCEED ABOUT TEN FEET WHEN US NG TH S ARRANGEMENT
CONNECT NG P P NG MUST SLOPE AT LEAST NCH PER FOOT

MATER AL AND S ZE FOR ALL TUB NG OR P P NG AND F TT NGS MUST CONFORM TO LATEST REV S ON OF CODE FOR PRESSURE P P NG ANSI B3 0 SEE F G 2

ADJACENT METER P P NG TEMS AVA LABLE FROM BA LEY METER CO AS STANDARD PACKAGE OF ACCESSOR ES W TH EXCEPT ON OF 4 NSTRUMENT VALVES MATER AL NCLUDES 20 FEET OF $\frac{3}{8}$ O D COPPER STEEL OR STA NLESS STEEL TUB NG DEPEND NG ON PRESSURE NVOLVED

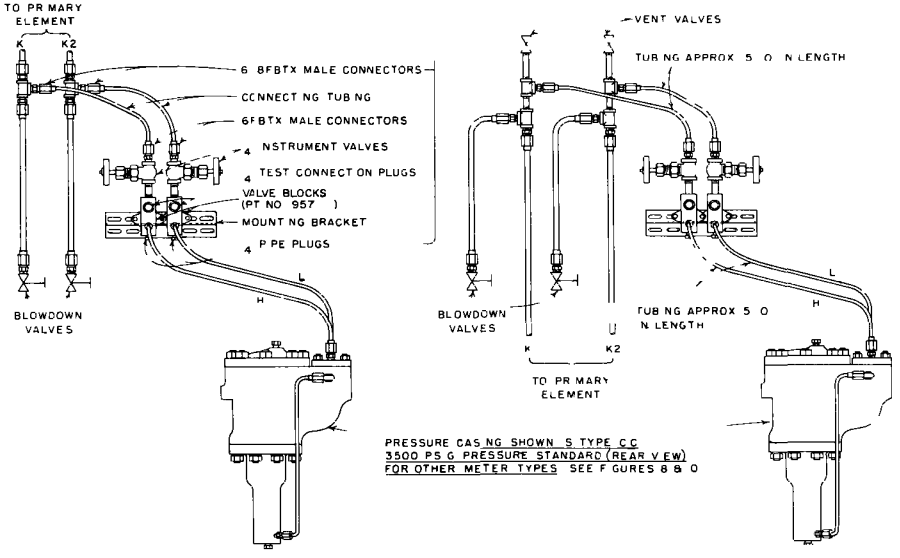


FIGURE 18 - Adjacent Meter Piping Arrangement

Product Warranty

Bailey Meter Company warrants the products manufactured by t to be free from defects in material and work manship and will repair or replace, at its option, free of charge, f o b its factory, such part or parts which prove defective within one year from date of shipment In respect to any products which are not an integral part of a product manufactured by the Company, the warranty given by the manufacturer thereof shall apply

Shipping Damage

We strongly recommend that you inspect and test your instrument as soon as you receive it If the instrument is damaged or operates improperly, notify the carrier for inspection of the shipment The carrier's claim agent will prepare a report of damage, a copy of which should be forwarded to your nearest Bailey District Office (see back cover for location) The District Office will then tell you how to have the instrument repaired or replaced

Service

The Bailey Meter Company is vitally concerned that your Bailey instrument provides continued, fine performance This instruction manual is designed to fully describe the correct installation, operation, and maintenance of your instrument under recommended conditions If the need arises factory trained Service Engineers are on call for prompt, in plant maintenance Telephone or wire your nearby Bailey District Office to make arrangements for this service

Replacement Parts and Supplies

Complete parts drawings and recommended spare parts list information are included in this instruction manual When replacement parts or supplies are required for maintenance of your Bailey instrument, contact your nearest Bailey District Office (see back cover for location) Always specify complete data on the instrument nameplate on your inquiry or order for parts Common parts are available for shipment within 48 hours on a speed order basis

BA LEY METER COMPANY
HEADQUARTERS

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