## METHOD STATEMENT

FOR

INSTRUMENT AIR PIPING AND TUBING SYSTEM INSTALLATION

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<td>Introduction of HSE instructions</td>
<td>10-Oct-04</td>
<td>MAA</td>
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<td>00</td>
<td>For initial issue and approval</td>
<td>15-Sep-03</td>
<td>K.J Rauf</td>
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1. OBJECTIVE

The objective of this method statement is to provide general guidelines for installation of Instrument Air Piping and Tubing System at project site.

2. SCOPE

Scope of this method statement covers the following activities.

- Material handling
- Procedure
- Precautions
- Inspection

3. REFERENCES

3.1 PROJECT DRAWINGS

- Instrument Air Piping and Tubing System Layout Drawings
- Installation Standards and specifications.
- Others.

3.2 PROJECT QUALITY PLAN (PQP)

- Project Quality plan for Instrument Air Piping and Tubing System

3.3 CODES AND STANDARDS

- Related latest Standard Codes and Specifications

4. ABBREVIATIONS/DEFINITIONS

PM  Project Manager
SM  Site Manager
CM  Construction Manager
I/C  Incharge
DE  Discipline Engineer
ITP  Inspection and Test Plan
E/I  Electrical & Instrumentation
PC  Plant Construction
QA&QC  Quality assurance & Quality Control
QCI  Quality Control Inspector
NEC  National Electrical Code
BS  British Standard
DIN  Din Standard
MS  Method Statement
AFC  Approved For Construction
PQP  Project Quality Plan
PPE  Personal Protection Equipment
HSE PLAN  Health Safety & Environment Plan.
5. RESPONSIBILITIES

• It is overall responsibility of PM/SM to organize resources to perform construction activities as per project specification, in compliance with quality, schedule & HSE requirements.

• It is the responsibility of CM that construction activities are executed according to the relevant project specifications, in compliance with quality, schedule & HSE requirements.

• DE will ensure that all the works are performed safely as per latest approved for construction (AFC) drawings & specifications.

• The relevant DE and Supervisor will ensure that all the piping work is conducted in accordance with this method statement and project specifications.

• The QA&QC Inspector will ensure that all work is executed according to PQP and that requirements of quality dossier are full filled.

• HSE and Construction activities shall be carried out with the close coordination of client.

6. PROCEDURES

6.1 RECEIPT AND STORAGE OF MATERIAL

• The material received from client shall be stored in the designated area of the warehouse.

• Arrangements shall be made, and maintained, to ensure protection against the effects of local weather and construction environment.

• During shifting of the material special care shall be taken to protect from any damage. Proper lifting and transporting equipment shall be used as required.

• All material shall be segregated accordingly to facilitate location of the items.

6.2 PROCEDURE

6.2.1 GENERAL

• Instrument piping and tubing shall be routed bearing in mind the following considerations, such that, where possible, they:

  a) Keep it short as much as possible consistent with good practice and accessibility.

  b) Do not obstruct access/ passages or emergency escape ways.

  c) It shall not restrict the accessibility or approach for maintenance/ removal of process equipment (e.g. pumps, motors, exchanger bundles, valves etc, etc.).
d) It shall be safe enough and not be subject to mechanical obstruction because of stepping on it.

e) Avoid areas where spillage is possible from overflowing of tanks/process cleaning/purging/condensate or drainage.

f) Keep safe distance with process piping and provided sufficient clearance from piping required lagging/insulation and cladding.

g) Slope back to tapping point (where possible) to allow for self-draining back into the process line. Pipes or tubes installed but not connected, shall have the ends closed in an approved fashion to prevent the entry of foreign material.

- Where instrument pipes/tubes run parallel to each other, stagger and offset the joints neatly.

- Horizontal runs of pipes and tubes shall have pipes/tubes vertically one above the other as far as possible and shall run with a minimum number of changes of direction with good practice and neat appearance.

- Compression fittings shall be installed in accordance with the pressure ratings, client's specifications and manufacturer's recommendations.

- Use a thread sealer on threads of screwed fittings as specified by the specification or otherwise as per standard practice.

- Keep the number of joints in tube/pipe-work as minimum as possible consisting with good practices.

- Avoid use of process piping/tubing or handrails as a support for instrument piping/tubing unless otherwise specified by drawings or specifications. Get client's advance approval where unavoidable and not indicated or not clear from the concerned documents.

- Piping and tubing runs shall be adequately supported and fixed at distances as outlined in the project specification.

6.2.2 AIR SUPPLY PIPING

- All piping material for main header and tee-off is to meet the type, size and quality specified and carefully inspected for conformity.

- Branch headers shall be installed with a self-drainage system having adequate drainage facilities or as specified in project drawings & specifications.

- Tube fittings shall be compatible with, or of the same material as, the tubing to which they are connected.

6.2.3 SIGNAL TUBING

- Tube fittings shall be compatible with or of the same material as the tubing to which they are connected.
The installation work is to be carried out as per typical construction drawings keeping sufficient slack to avoid strain on the connected instrument and to facilitate its dismantling for maintenance work.

All pneumatic signal tubing shall be cleaned by blowing through with filtered air before connecting instruments.

6.2.4 PROCESS IMPULSE TUBING / PIPING

All impulse tubing shall be self-drainage and in general run with recommended slope. The slope of the impulse pipe-work shall be down from the tapping point for liquids, steam and condensable and up from the tapping point for gas service unless special provisions are made for venting and draining.

Special attention shall be paid to the correct location of vents and drains to ensure they are at the highest or lowest points of the piping run.

Impulse lines shall be kept as short as possible consistent with good practice and accessibility.

Tube fittings shall be compatible with or of the same material grade as the tubing to which they are connected.

All the weld joints shall be properly welded & D.P.T shall be carried out after complete installation.

All the type of jointing shall be tested after completion for requisite pressure according to the specifications or otherwise to the standard practice.

6.2.5 INSPECTION

Quality inspection plan (QIP) specific to project requirements shall be made and inspection activities are recorded on the formats as given in para related documents or client supplied formats might be used.

6.3 PRECAUTIONS

No one shall be allowed to interfere with or work on, or work in the immediate vicinity of, any existing electrical installations or equipment without a valid permit to work. This applies to both temporary and permanent pressurized pneumatic/hydraulic installations/ instrument and equipment.

Where it would be required to work in the vicinity of pressurized pneumatic/hydraulic equipment all necessary precautions to avoid accident shall be taken to avoid any leakage.

Installation, modification or work shall only be carried out under full time supervision by a competent qualified instrument technician.

The electrical supply to powered hand tools shall not exceed 24 volts. Where this is not possible, due to the type of tool being used, the approval of the
• Electrical lighting for use in confined spaces shall not exceed 24 volts. Powered hand tools used in confined spaces shall be air operated. Where this is not possible, all such tools shall be equipped with a dead-man’s switch.

• All works on electrical equipment shall be in accordance with Client’s Representative Lock Out/Tag Out procedure.

• The temporary electrical network installed for job would be protected by ELCBs (Earth Leak Circuit Breakers) to avoid any accidental contact.

• All E&I equipment in stores, should be safe guarded from fire by placing suitable fire extinguishers.

• All panels shall be kept lock in order to avoid theft of small components present in the panels.

• Proper rigging shall be ensured during lifting of panels/switch gears.

• Suitable fire extinguishers shall be provided in electrical/instrument panel rooms. Preferably CO₂.

• Panel rooms shall be kept lock and entry should be prohibited for unauthorized persons.

• Unfilled excavated trenches must be provided with warning lights during night.

• Tube fitters/ tubers shall wear gloves.

• Properly protected ladder shall be used while fixing brackets/supports.

• Piping or tubing scrap shall be removed on daily basis from work site.

• Do not operate tags shall be placed on valves of inst. air supply where necessary.

• Hazard data sheet for mercury & air pressure shall be provided in instrument lab.

• A work permit system shall be established prior to testing/ checking/ pressurizing/ energizing of instrument air piping/ tubing and supplies.

6.4 SCAFFOLDING

• Scaffolding shall not be disturbed or altered by any unauthorized persons where alterations are required authorized scaffolders would be contacted who shall carry out the work under competent supervision.

• Where materials are to be positioned on scaffolding it shall be ensured that the scaffolding is not overloaded.
• A prominent “DO NOT USE” sign shall be clearly displayed for incomplete/unsafe scaffolding.

• Before use, scaffolding shall be inspected by an authorized scaffold inspector/coordinator who shall put a green tag in a prominent position at the base of all ladder access points.

• Scaffold shall be inspected at weekly intervals by scaffold inspector/coordinator who shall sign and date the “ScafTag” after each inspection.

• A scaffold register shall be kept by the scaffolding inspector/coordinator containing the following information.
  
  • Date of first & subsequent weekly inspections.
  
  • Individual identifications of all scaffolds, which shall be, cross-referred to the scafTag identity number.
  
  • Clear name and signature of the authorized scaffold inspector against each separate scaffold inspected.
  
  • If there is any doubt about the security of any anchorage, suspension points or ties for a scaffold, e.g., strength of existing buildings/structures, or these under construction, the Client’s representative shall be consulted before proceeding with erection.

• All scaffolds shall be provided with suitable access and where ladders are used for this purpose. They shall be of an adequate length and properly secured by lashing or fixing to prevent displacement.

7. TOOLS AND EQUIPMENTS

• Correct type, size and weight of tool shall be used for each job.

• Hammers - Right kind of hammer shall be selected for the job. Eye protection shall be worn when hammering.

• Cutters shall be kept sharp.

• Spanners and wrenches - Right type and size shall be used. Extension on spanners and wrenches shall not be used unless the wrenches are designed for such use. A pipe wrench shall not be used as a hammer. A wrench (except slugging wrenches) shall not be hammered to tighten a bolt.

• Hacksaws - Correct type of blade shall be selected to suit the material to be cut. The blade should be set in a hacksaw frame so that the teeth are pointing in the forward direction and sufficient tension shall be applied to ensure the blade is maintained rigid.

• Power Tools - All portable power tools shall be stored in clean dry conditions. Power tools shall not be left lying around the job site where they may be damaged.
• Rotating tools shall be switched off and held until rotation has completely stopped before they are set down. Tools shall be disconnected before changing bits, blades, cutters, or wheels.
• All portable power tools shall be equipped with properly functioning "dead-man switches".
• Grinding Machine - Care shall always be taken to ensure that the grinding wheel is free from defect before mounting.
• The proper size and type of wheel shall be fitted to the tool so that the maximum permissible periphery speed of the wheel does not exceed the maximum speed displayed on the machine. No grinding machine shall be used unless the maximum speed is clearly marked on the case. All wheels shall be fitted with adequate guards.

8. HSE INSTRUCTIONS

During the installation all measures shall be adopted to ensure safe working.
• Client site management system shall be implemented
• Prior to start of job, an HSE (DESCon) person shall deliver the specific HSE instruction to the concerned personnel.
• All personnel involved will use necessary PPE as required.
• The workers will be made aware of HSE requirements related to this activity through daily, weekly and monthly toolbox and HSE talks.
• HSE notice board will be installed.
• All equipment will be inspected by HSE (DESCon) prior to use.
• Access and good housekeeping should be maintained.
• Fire extinguisher should be available in all working areas.
• All activities at height should be provided with suitable working platform. Platform should be free from combustibles/flammables.
• When working on height, proper fall protection measure shall be taken.
• All access ladders and scaffoldings shall be secured and tagged before use.
• Welding sets should be checked and maintained regularly for wear and tear.
• Waste Management should be strictly followed to keep the job site neat and clean.

9. ATTACHMENTS

Nil