

## **Method Statement for Installation of Chilled Water Piping System**

This method statement covers on site installation of pre-fabricated and site fabricated mild steel pipework including supports, expansion and anchor points for chilled water system.

This procedure is to define the method used to ensure that the Chilled Water Pipework System installation is as per project requirements.

System comprises all pipes, tubes, valves, fittings, reducers, expanders, nipples, vents, bleed off, expansion and contraction devices, hangers, brackets, anchors, supports, sleeves, plates and all accessories.

By following this method statement you shall ensure that components connected thereto as an **integrated pipework system**, installation final connections and workmanship, is correct and acceptable. Also you shall make sure that all the work conforms to the contract documents and General Specifications. Materials required to submit and reviewed the Client.

In addition to piping works, this procedure will ensure that the pipe insulation to all supply and return mains, headers, branches, risers, drips, run-outs, pump suction and discharge, pipework, fittings, flanges, valves, expansion and movement devices and flexible connections etc.

### **Pre Requirements before installation**

- All materials and documentation relevant to a particular section of works will be checked by the Construction Department prior to the commencement of work ensuring that these are of the correct type as reviewed by the Client.
- Before commencement of any construction works, pre-inspections will be carried out on all materials prior to them leaving the storage area. Invite the client or consultant to attend the material receiving inspections as per their discretion.
- Prior to the commencement of any construction works, areas and access will be inspected to confirm that they are in a suitable condition for safe construction works to commence.

### **Chilled Water Piping System Installation Method**

Mechanical Supervisor will instruct tradesmen regarding the execution of the works and will distribute all necessary approved construction status drawings of the latest revision.

The supervisor will also check that tools and equipment available are in compliance with the contract requirements.

- Verify sleeves to be fixed at the required locations and are of the same material.

- By means of string and chalk lines the actual pipe layout will be identified, so as to allow for the installation of pipe supports, anchors, and guides.
- Pipes will be free from burrs, rust, scale and other defects and will be thoroughly cleaned and painted with 2 primer coats before erection and closing up
- Supports for chilled water piping will be fixed in place by an approved construction method to suit the elevation of piping as indicated on the approved construction drawings.
- Hanger rod sizes will be in accordance with the requirements of the specification. The spacing of supports for steel pipework will be in accordance with Contract Specifications.
- Supports will be arranged as near as possible to pipe joints and any change in direction. Additional supports will be added within 300mm of any branch lines. Heavy in-line equipment will be supported independently.
- Vertical rising pipework will be supported at the base or as indicated on the approved construction drawing.
- Pipework will be installed so as to allow sufficient space for expansion or contraction and thermal insulation. During installation open ends of pipes will be protected by plastic caps, which will only be removed when the adjoining section is installed.

Coordinated chilled water piping installations will generally run parallel to the alignment of the adjacent building surface's, and as close to the construction as possible, or in certain cases, slope towards a drain point. All high points within pressure pipes will be vented by means of automatic air vents.

Drain outlets will be provided at all low points of the system, and means of air venting at all high points of the system.

Chilled water piping over service passages for plant operators, will be installed to a minimum height of 2meters from finished floor.

Pipework will rest freely on supports and carefully aligned prior to final connection to each other, or any other pertaining equipment as listed in the scope of works.

Where possible all pipes of straight runs will be lined up with facilities for pipes to be rotated for welding joints –bottom welding will be excluded as far as is possible.

Pipework connections to final equipment will be made by the designated flexible connection where required.

All branch connections will be factory fabricated, if site fabrication is necessary it will be of the same standard. Sample of material will be submitted for approval prior to any production work starts.

All tees will be of the same size as the pipes connected to them, bushed outlets will only be used if the required outlet size is not of standard manufacture.

Reductions will be made by means of straight through reducing sockets, reductions on bends by bushes will not be used.

Valves and other in line equipment will be installed where indicated on the approved construction drawings, installation will be in accordance with the manufacturer's recommendations and will be consistent with the flow direction of fluids.

Flexible connection, anchors, guides expansion joints and loops will be installed where indicated on approved construction drawings.

When installing universal and swing type expansion joints the axial movement of the building structure shall be taken into consideration at the time of installation.

All chilled water piping system will be provided with adequate removable sections to assist cleaning and for ease of maintenance operations, just the equipment connections.

### **Chilled Water Piping Jointing Requirements**

- Screwed pipe work and joints up to and including 50mm mild steel pipe
- Pipe ends will be threaded by the use of an appropriate threading machine.
- The machine die head will be suitable to cut tapered type threads.
- Threads will be cut to the correct thread length.
- After the suitable thread has been cut, burrs, surplus oil and swarf will be removed prior to the selected fitting being screwed in place.
- Threads will be applied with threaded joint compound of the approved type.
- By means of an appropriate pipe wrench, the selected fitting will be screwed onto the pipe thread to the correct tightness required without causing any damage to the pipe/fitting.

### **Flanged Jointing Procedure**

Fixing of flanges to pipe ends will be either screwed or welded type.

The type selected for a specific application will be as per approved details and in compliance with the specification requirements.

Gaskets will conform to ANSIB 16.21 and ASTM D200.

Follow below steps:

1. Clean both flange faces to be joined.
2. Hold gasket in correct position on clean flange face until flanges meet.

3. Using only undamaged rust free bolts, nuts and washers, lubricate bolt threads and all mating surfaces using an automotive grade of oil or grease.
4. Tighten bolts in the sequence as recommended by the manufacturer until full torque is achieved.
5. Prior to any pressure testing taking place check, and if necessary re-tighten bolts.

### **Procedure of Mechanical Joints**

- The mechanical joint consists of a split coupling housing and an insertable rubber gasket.
- To accept the mechanical joint the pipe ends must be grooved. Grooves will be achieved with the use of an appropriate grooving machine.
- Pipe grooving and joint will be installed in accordance with the manufacturer's recommendations.
- Prior to any prefabricated pipework being released from the pipe fabrication shop for installation on site, the shop manager or his representative will complete the "material release note for prefabricated pipework" so as to ensure compliance with the specification requirements.

### **HEALTH SAFETY AND ENVIRONMENTAL REQUIREMENTS**

During the installation of chilled water piping system following shall be considered.

A- Work on height

B- Tools

C- Welding

D- Handling equipment

E- Pressure test

#### **A- Work on height**

1. Mobil scaffold & Ladders
2. Stand or erect towers on firm base or level ground
3. Brakes on castors are always using
4. Secure the tower to the structure if necessary by ties
5. Tower inspections will be doing regularly by competent persons (Safety Officers)
6. Louisville wooden step ladders type are allow to use
7. Unsound ladders never use
8. Lean sideways from ladders is forbidden
9. Ties to be fitted all the time with right length
10. Regular inspections will be done.

**B- Tools**

1. Right tools for the job always using
2. Correct size of hand tools will be used for the size of the job
3. Defected tools will be rejected immediately
4. Only earthed tools will be allowed to used
5. Damaged tools are not allow to use before repairing
6. All electric staff must be in good shape
7. The power tools will be inspected by competent persons

**C- Welding**

In order to ensure that all welding takes place in safe manner, the following will be considered:

1. Welders
2. The welding Equipment
3. Working location
4. Working instructions

**C-1 Welder**

1. The welders to be trained and certified
2. The welder must be healthy
3. The welder must be trained for safe work i.e, toolbox talk etc.

**C-2 Equipment**

On construction site, arc welding is usually carried out with direct current (DC), supplied from diesel driven generator. Welding leads and welding return cables are frequently dragged over rough surface, their insulation should therefore be suitable for resisting fear and wear.

1. The cables and couplings should be examined frequently for defects.
2. The part of the cable which connected to the electrode holder should be as flexible as possible
3. The welding return should be firmly connected to the metal by constructed clamp
4. Electrode holder should be fully insulated
5. Electrode holder is essentially a pair of spring loaded jaws
6. The electrode holder must be made from good quality material

**C-3 Working location**

1. Arrange good ventilation in case of welding enclosed resets
2. Insulated materials will be used in case of wet floor

**C-4 Working instructions**

1. Fire extinguisher required with welding all the time
2. Screens to be used when necessary, available all the time

3. Avoid welding near flammable materials
4. Checking area before leaving is strongly required
5. Monitoring of the area for gasses will be done

#### **D- Handling Equipment**

1. Personal protective equipment (safety shoes- gloves) will be available and used
2. Lifting to height from the floor will be done in two stages
3. Heavy load will be lifted by sufficient people or using suitable lifting equipment
4. Obscured load should be never handled manually

#### **Mechanical handling**

##### **Chain Blocks**

1. Swivelling hooks are only the type of hooks allowed to use
2. In case of chain damage, the chain will be replaced immediately
3. The chain links must be in good shape
4. Safety latches to be fitted all the time and working correctly
5. Defective slings will be reject immediately
6. Recognized slings only to be use
7. Welding or flame cutting to be keeping away from slings

##### **E- Pressure test**

1. Calibrated pressure gauges to be used.
2. Only water will be used for pressure test
3. Testing area will be secured and only limited access to be given to related persons only
4. "DANGER HIGH PRESSURE" warning signs to be displayed
5. Pressure pumps and valves to be in good condition
6. Free defects connections are only allowed to use.