Method Statement – Installation of Chilled Water Pipes and Testing

1.0 Scope:

1.1 This method statement applies to installation, pressure testing, insulation and cladding of chilled water piping including valves and accessories, as per specification

2.0 Purpose:

2.1 Purpose of this method statement is to outline the method of storage, handling, fabrication, installation, pressure testing, insulation and cladding of chilled water piping including valves and accessories.

3.0 Material:

3.1 Pipes:

Seamless, Black steel, SCH 40, Grade 'B'

3.2 Fittings:

Up to 50 mm dia. MI fittings with threaded ends

65 mm dia. and above – Steel Butt Welding Type / Grooved Coupling Joint Type

3.3 Valves:

Up to 50 mm: Thread Ends

65 mm and above: Flanged Ends

3.4 Accessories:

Pressure gauges, thermometer, test points, air vents, water meters, etc.

3.5 Fiber Glass insulation, adhesives.

3.6 Aluminum cladding as applicable.

3.7 Supports as per approved schedule attached:

Clevis hangers, G.I. angles/channels, threaded rods, anchor fasteners etc.

4.0 Method:

4.1 Storage:

4.1.1 All material while unloading shall not be dropped, but slowly lowered to the ground.

4.1.2 Pipes shall be stacked on a flat surface with adequate supports.

4.1.3 End caps of pipes shall be in place until removed for installation.

4.1.4 While stacking, it shall be ensured that pipes of bigger sizes are placed below and smaller sizes on top.

4.1.5 All pipes shall be covered and shall not be exposed to direct sunlight.

4.1.6 All other items such as valves, fittings, gauges, etc. shall be kept on racks within site stores and shall be segregated as per size, model, type etc. for easy retrieval.

4.1.7 Fiber Glass insulation shall be stored in manufacturer's packing and shall not be exposed direct sun light.

4.1.8 Insulation material shall be segregated as per size, thickness for easy retrieval.

4.1.9 The adhesive material shall be stored in a covered and ventilated storage area.

4.1.10 Aluminum sheets shall be placed on wooden supports and factory packing shall retained till sheets are taken for fabrication.

4.1.11 All supporting materials shall be stored in a covered storage area, segregated according to size, type, model, etc. for easy retrieval.

4.1.12 Manufacturers instructions for storage shall be followed for applicable items.

4.1.13 Any items found damaged or not suitable as per project requirements shall be removed from site. If required to store temporarily, they shall be clearly marked and stored separately to prevent any advertent use.

4.2 Preparation:

4.2.1 Check and ensure all drawings used for installation are latest and approved for construction.

4.2.2 Mark the pipe routing and support locations on the ceiling as per approved drawings.

4.2.3 Check the co-ordination of piping layout with other services and reflected ceiling and decide pipe route with minimum bends/offsets.

4.2.4 Check and ensure sufficient clearance around pipe for applying insulation/cladding as applicable.

4.2.5 Check the access and clear space around valves, vent points, drain point's locations for maintenance and servicing.

4.2.6 Fabricate the structural supports from G.I. angles / channels as per support schedule as required.

4.2.7 Clean and apply primer / red oxide on all ERW black pipes, prior to installation.

4.3 Installation:

Note: Prior to start installations are sample installations to be made and offered for Consultant Inspections.

Piping:

4.3.1 Drill the holes in the slab / shaft for fixing supports.

4.3.2 Fix the anchors and threaded rods with clevis hangers / structural supports as applicable. Threaded rod length shall be sufficient to allow for leveling of piping.

4.3.3 Cut the pipes accurately to measurements determined at site. Ensure cut ends are square and free dents.

4.3.4 Prepare the pipe ends according to the type of joints i.e., threaded joints, welded joints / grooved coupling joints.

4.3.5 The end preparation shall be done at site work shop.

4.3.6 Threading and grooving as applicable shall be done as per fitting / coupling manufacturers recommendations.

4.3.7 End preparations for welded joints shall be done as per approved welding procedure.

4.3.8 After the end preparation clean the pipe ends and ensure no material and dust is left inside.

4.3.9 Depending on site conditions, assemble the piping into manageable lengths on the floor. Using threaded, welded/grooved coupled jointing as applicable.

4.3.10 Qualified and approved welders shall be engaged for welding works.

4.3.11 Install the pipe spools at heights as per approved drawings in a neat and tidy manner.

4.3.12 Insert the approved hard insulating material of suitable thickness between the pipe and support.

4.3.13 Align and level the piping as per approved drawings.

4.3.14 Install the G.I. flat strip type U-clamp for vertical pipes / G.I. rod type U-clamp for horizontal pipes as per approved schedule of supports.

4.3.15 Sleeves of suitable sizes shall be provided at wall crossings.

4.3.16 Expansion couplers / bellows shall be installed at locations where piping crosses building expansion joints.

4.3.17 Hole saw cutter shall be used to cut the holes in the pipe work for fixing branch connections.

4.3.18 Make provisions for installing drain and air vent points as per approved drawings.

4.3.19 Install the valves as per approved drawings.

4.3.20 Install the piping connections with valves and accessories wherever equipments are installed.

4.3.21 For AHUs and FCUs, not installed, complete the bypass connection as per approved drawing.

4.3.22 Fix the blind plugs / temporary valves on all drain, air vent, pressure gauge, thermometer and test points tapings as applicable.

4.3.23 Check and ensure proper supporting is provided as per approved drawings.

4.3.24 Make temporary tapping provisions at multiple points for easy and quick filling and draining of pressure testing water.

4.3.25 Ensure all joints are properly tightened.

4.4 Pressure Testing:

4.4.1 The chilled water piping shall be tested to 12 Bar according to the system working pressure.

4.4.2 The piping may be tested in sections or in total, depending on site requirements.

4.4.3 Estimate the piping volume and make arrangement for required quantity of clean water.

4.4.4 Arrange for temporary piping / hose pipe connections for filling and draining the water.

4.4.5 Fix the temporary valves at air vent / drain points and approved and calibrated pressure gauges.

4.4.6 Fill the piping system with clean water.

4.4.7 During initial filling, employ sufficient man power to monitor the entire length of the piping system for possible leakages.

4.4.8 If leakages are observed, arrest the leakages immediately. If leakages are major, isolate the leaking portion with nearest isolating valve and / or stop the water filling.

4.4.9 Rectify the leakages and again fill the water.

4.4.10 Ensure no leakages throughout the entire piping system.

4.4.11 Observe for the leakages and pressurize the system using hydraulic test pump.

4.4.12 During pressurization observe the joints and entire piping system for leakages.

4.4.13 Pressurize the system till pressure on the pressure gauge at lowest part of the system indicates the 12 bar pressure of the system under testing.

4.4.14 During hot ambient conditions system pressure may raise due to increase in the ambient temperature. Ensure under no circumstances the system is pressurized above 12 bar pressure.

4.4.15 Observe the pressure gauge readings for 2 hours and ensure that there are no leakages.

4.4.16 Raise the "Request for Inspection" for witnessing the hydraulic pressure testing by consultant.

4.4.17 Proceed with insulation only after satisfactory completion of hydrostatic pressure testing.

4.5 Insulation:

4.5.1 The pipe surface shall be thoroughly cleaned to remove dust, traces of

Oil, grease etc. All welded joints are painted with primer.

4.5.2 The insulation pipe section of suitable thickness, as per approved drawings/submittals may be used.

4.5.3 When insulation is done after pressure testing following procedure shall be followed.

4.5.4 Apply adhesive on inner surface and longitudinal slit as recommended by manufacturer.

4.5.5 Apply the adhesive on the surface of the pipe to be insulated, as recommended by manufacturer.

4.5.6 Fix firmly the insulation on the pipe surface and hand press the insulation to remove any air locks. Join the longitudinal beam shall be joined properly by hand pressing.

4.5.7 Fix the Aluminum Foil self adhesive tape over the longitudinal seam.

4.5.8 Continue the same procedure for successive lengths. Adhesive shall be applied on the circumstantial joint properly. Seal the circumferential joint by fixing self adhesive tape.

4.5.9 Complete the insulation as described earlier in point No.4.5.6 to 4.5.9.

5.0 Cladding:

5.1 All external and plant room chilled water piping shall be cladded as per approved drawings and submittals.

5.2 Aluminum sheets of approved type, quality and thickness are cut as required and rolled in the rolling machine to give cylindrical profile and to form the longitudinal and circumferential groove.

5.3 Slip the rolled aluminum profile on to the insulated pipe. Care shall be taken to ensure no damage to insulation.

5.4 Match the longitudinal grooves of the rolled profile and join by GI/Aluminum pop rivets/Stainless steel screws as applicable.

5.5 The screw /rivets sizes shall be optimum.

5.6 Fix the successive cladding, and match the circumferential groove of previous cladding and fix screws/rivets.

5.7 All longitudinal and circumferential joints are properly sealed using clear sealant.

5.8 The valves, strainer NRV, flexible joints, pumps etc. are cladded by demountable boxes to allow maintenance access.

5.9 Care shall be taken to ensure, the cladding surface is free from abrasion, scratches, dirt etc.

5.10 Cladding shall be firmly fixed on the pipe.

5.11 The locations susceptible for damages shall be cladded with Stainless steel sheets as per approved submittals.

5.12 Raise the "Request for Inspection" for the inspection by consultant and obtain approval.

6.0 Inspection:

6.1 Welders Certificate to be submitted for Consultant approval.

6.2 Inspection requests shall be raised for Consultant for inspection at various stages as required.

6.3 Sample installations to be offered for Consultant Inspection.

6.4 Inspection shall be carried out as per installation checklists submitted vide Inspection and Test Plan

7.0 Safety:

7.1 All safety precautions shall be followed as per established project safety plan and procedure.

7.2 Warning signs shall be displayed while carrying out pressure testing.

7.3 Only experienced and skilled technicians shall be engaged for carrying out installation and testing work.

7.4 The people involved in the installation shall use PPE such as safety helmets, safety shoes, hornets, gloves etc. as required.

7.5 Safety officer shall check and ensure that all safety precautions are followed.

7.6 Safety officer shall check and ensure that all scaffolding and ladders used at site are having duly signed tags.