

Method Statement for Installation & Testing of Chilled Water Pipes & Accessories

This chilled water piping installation method of statement is prepared in order to outline the activities and the methods used for the **installation of chilled water pipes and accessories**.

Carry out all project site installation activities in accordance with the contract details and in full compliance to the Contract Specifications and documents.

All work within the rights-of-way of the standards and specifications will be done in compliance with requirements issued by authorities.

Tools & Equipment Required For CHW Piping Works

Before starting the chilled water piping installation below mentioned tools shall be arranged and necessary measures will be taken for the safety of the equipment. Relevant entities which might require protection include any such works in the vicinity of the area of work or on the service access or discharge path. The construction team will ensure that any such requirements are documented.

- Welding Machine
- Cutting Equipment's (oxygen, acetylene cylinders and cutting torch etc.)
- Threading Machine
- Scaffolding
- Lifting arrangement
- Tool Box
- Measuring Tape
- Spirit level
- Plumb Bob
- Steel Hammer
- Electric Drilling machine
- Hole Saw Cutter

Storage of Pipes & Accessories

- During delivery of materials all Chilled Water Piping material while unloading shall not be dropped, but slowly lowered to the ground.

- For pipes, wooden supports shall be placed beneath at equal distance.
- Pipes shall be stacked on a flat surface with adequate supports.
- End caps of pipes shall be in place until removed for installation.
- 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.

Pre Requirements

- Check and ensure all drawings used for installation are latest and approved for construction.
- Mark the pipe routing and support locations as per approved drawings, and check the co-ordination of piping layout with other services and decide pipe route with minimum bends/offsets.
- Check and ensure sufficient clearance around pipe for applying insulation / cladding as applicable.
- Clean and apply primer / red oxide on all seamless black steel pipes before installing.

Installation of Chilled Water Pipes

Cutting and Preparation of Pipes

1. Cut the pipes accurately to measurements determined at site, and prepare the pipe ends according to the type of joints i.e. Threaded joints, welded joints etc.
2. Threading shall be done as per fittings / coupling manufacturer's recommendations.
3. End preparations for welded joints shall be done as per approved welding procedure.
4. After the end preparation clean the pipe ends and ensure no material and dust is left inside.
5. Qualified and approved welders with certificates shall be engaged for welding works.

Piping Supports Installation

1. Marking out and installation of supports will require operatives to work at height. Any platforms which are to be used are to be safe and fit to purpose. Mobile scaffolds will be used in areas where work will be below 5 meters. Any work over 5 meters will require

- a fixed scaffold. All scaffolds are to be inspected by certified safety officer.
2. All chilled water pipes support & spacing between supports shall be as per the specification & manufacturer recommendation instruction.
 3. Drill the holes in ceiling/wall for fixing supports, fix the anchors and threaded rods with clevis hangers /structural supports as applicable.
 4. Threaded rod length shall be sufficient to allow for leveling of piping in future.

Chilled Water Pipes Installation – Horizontal

1. Install the pipe sections at heights as per approved drawing in a neat and tidy manner.
2. Prior to lifting any pipes into place either manually or with mechanical lifting aids: the area is to be secure to prevent unauthorized entry.
3. For small diameter pipes; the pipes can be lifted manually. Install pipes loosely into support brackets and align properly before connection to an adjacent pipe or fitting. Supervisor to ensure adequate numbers of personnel are assigned to manually lift pipe and that correct manual handling techniques are used.
4. Larger pipes are to be lifted into pipe supports using 2 Genie lifts or Chain blocks. The 2 Genie lifts or Chain blocks are to be used in tandem to ensure that the pipe is lifted as level as possible and load is shared equally by both. The pipe shall be secured to the genie lifts using rope.
5. Lift the pipe to the desired height and fit the supports on the pipe then secure it. Pipes up to but not including 65mm will be threaded, and above and including 65mm will be grooved for Victaulic clamps.
6. Insert the rubber inserts between the pipe and support.
7. Sleeves of suitable sizes shall be provided at wall crossings/openings.
8. Expansion couplers shall be installed at location where piping crosses building expansion joints.
9. Once pipe system or section has been properly jointed the pipe supports can be tightened onto the pipe.
10. Install the valves in locations as per approved drawings.

11. Install the piping connections with valves and accessories wherever equipment's are installed as per approved drawings and technical specification.
12. Fix the blind plugs / temporary valves on all drain, air vent, pressure gauge, thermometer and test point's trappings etc. as per approved drawings.
13. Check and ensure proper supporting is provided as per approved drawings.
14. While installation is going on of the pipe work, the insulation will be fitted to the pipe work. But all fittings and joints will be left exposed until the pressure testing and inspection is completed and approved.
15. Raise the inspection for chilled water piping installation to consultant. Obtain sign off for hydraulic pressure testing after the test is witnessed.

Installation of Pipe work in Riser Shaft

1. Riser shaft openings are to be secured to prevent unauthorized access and all persons working within riser shall wear appropriate fall protection PPE.
2. A contractor certified scaffold provider will erect a scaffold within the mechanical services riser. This scaffold shall be subject to inspection and sign off by competent scaffolder and recorded in scaffold register. The scaffold shall be designed in such a way to allow chilled water pipe (CHWP) room to be fitted.
3. Using a dead weight plumb line, determine the position of the pipe supports and mark the concrete accordingly. Refer to the approved shop drawings or manufacturers recommendations regarding vertical spacing.
4. Drill the holes in the shaft for fixing supports.
5. Provide pipe anchors and channel support in position ensuring that all fixings are secure. Locate anchors and guides at equal distances on each side of expansion devices.
6. Determine the position of the lifting points to be used and marked out the concrete accordingly. Fix anchor bolts rated to exceed 100kg and fit temporary lifting supports capable of lifting the full load of CHWP section within the riser. Max load of CHWP section is 100kg. Hang 1ton chain blocks from the support. Ensure chain block is in good working condition and has adequate length of chain to reach pipe work below.

7. Position the pipe directly below the lifting position. Secure canvas strap around the pipe. Ensure the canvas strap is double wrapped and choked; this will prevent the strap from slipping. Attach to the chain block using shackles and ensure the pipe is free from any obstruction.
8. Persons above to start pulling on the chain block. When reaching the correct elevation/position provide U strap clamps or diamond riser clamps with rubber support insert at each floor level.
9. Lifting equipment to be removed when pipe work fully secured in riser.
10. Pipes within the riser shall be connected using Victaulic fittings.
11. Tighten all clamps to ensure that all fixings of support are secure.
12. Install temporary end caps to any pipe work prior to leaving the workplace each day.

Chilled Water Pipe Jointing Methods

Ensure that the materials used as approved by consultant. Threaded, Grooved & Welded jointing method will be used to join the pipe as per consultant specification.

Threaded Joint Method

1. For Threading Joint, ensure that the floor area where the threading machine is to be located is protected with GI drip tray and PVC or polythene sheet, it is also advisable to keep some oil absorbent type material sand etc. in the work area in the event of any spill.
2. When pipes have been threaded they should be placed upright in a container to allow the excess oil to drain before they are moved to the workplace. Any spillage oil will soak into floor very quickly and is impossible to remove all care should be taken to avoid the contamination of any surface.
3. Measure and mark the length of pipe as per drawing. Cut the pipe to the measured length, ensuring that the ends are cut square & chamfered as required and all burrs are removed from the pipe.
4. Measure and mark the length of threaded required on pipe with allowances for fittings. Place roller cutter of machine on mark and switch machine on. When the pipe is turning, apply turn the roller cutter handle ensuring that this operation is not carried out too quickly which will avoid damaging the pipe.
5. Before threading use pipe reamer to remove internal burr from pipe. Then bring down the die stock and close the dies into

threading position, switch on machine ensuring it is running the correct direction. When threading is completed open diestock and retract from pipe.

6. Remove pipe from threading machine and place in pipe vice. Clean thread with rag to remove any excess cutting oil.

Grooved Joint Method

1. Pipes 65mm and above will be grooved where they are to be installed in concealed, exposed and accessible positions.
2. For grooved joint, use the correct grooving machine for rolled grooves as supplied by the manufacturer.
3. Prepare the groove as to accommodate couplings and check the groove is properly formed.
4. Care to be taken to gasket shall not be damaged while jointing.

Welded Joint Method

1. Where the space is extremely congested and groove joint is not possible or practical welding will be used to join the piping.
2. Construct welded joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to Part 1 Quality assurance article.
3. Measure the length of pipe required due allowance for any pipe fittings to be used. Cut pipes to measure length ensuring that the ends are cut square.
4. The prepared ends to be welded, pipe-to-pipe or pipe to fitting shall be aligned using water level or spirit level and ensuring that the spacing between the abutting ends is enough to give good root penetration.
5. The surfaces to be welded shall be smooth, uniform and free from laminations, tears, scale, slag, grease paint and other deleterious materials that might adversely affect the welding.
6. The alignment of abutting ends shall minimize any offset between surface caused by dimensional variations and will equally distribute around circumference of the pipe any such offset.
7. Hammering of the pipe to obtain proper line will be kept to a minimum.
8. The two prepared ends shall be tack welded together on four positions at 90 degree. After tacking the alignment shall be checked to confirm the integrity of the alignment has been preserved.

9. All slag or foreign matter shall be removed from each pass of welding, including the repair of any visible defects, such as cracks, cavities etc. prior to commencing the succeeding passes. The removal of any such impurities will be by using electrical grinder.
10. On completion of welding process the welders designated identification mark will be placed adjacent to the weld.
11. The weld shall be visually inspected to check for inadequate penetration excessive undercutting, burn through and to ensure the weld is free from cracks.
12. All welds to be wire brushed and painted with red oxide paint when welds are completed.

Pressure Testing of CHW Piping System

- The chilled water piping shall be tested according to the system working pressure (i.e. 1.5 times the working pressure) and/or PN ratings of the pipes, pipe fitting and valves used in the piping.
- The piping may be tested in sections or in total, depending on site requirements and as per consultant advice.
- Estimate the piping volume and make arrangement for required quality of clean water.
- Arrange for temporary piping / hose pipe connections for filling and draining the water.
- Fix the temporary valves at air vent / drain point and pressure gauges.
- Fill the piping system with clean water through a temporary pump and obtain the test pressure if no leakage is observed.
- If leakages are observed, arrest the leakage immediately. If leakages are major, isolate the leaking portion with nearest isolating valve and / or stop the water filling.
- Rectify the leakages and again fill with water until no leakages throughout the entire piping system is observed.
- After no leakage is observed pressurize the system using hydraulic test pump up to full pressure.
- During pressurization observe the joints and entire piping system for leakages.
- Observe the pressure gauges readings for 4 hours and ensure there is no drop in gauge pressure. System pressure to be 1.5 times than the actual working pressure.