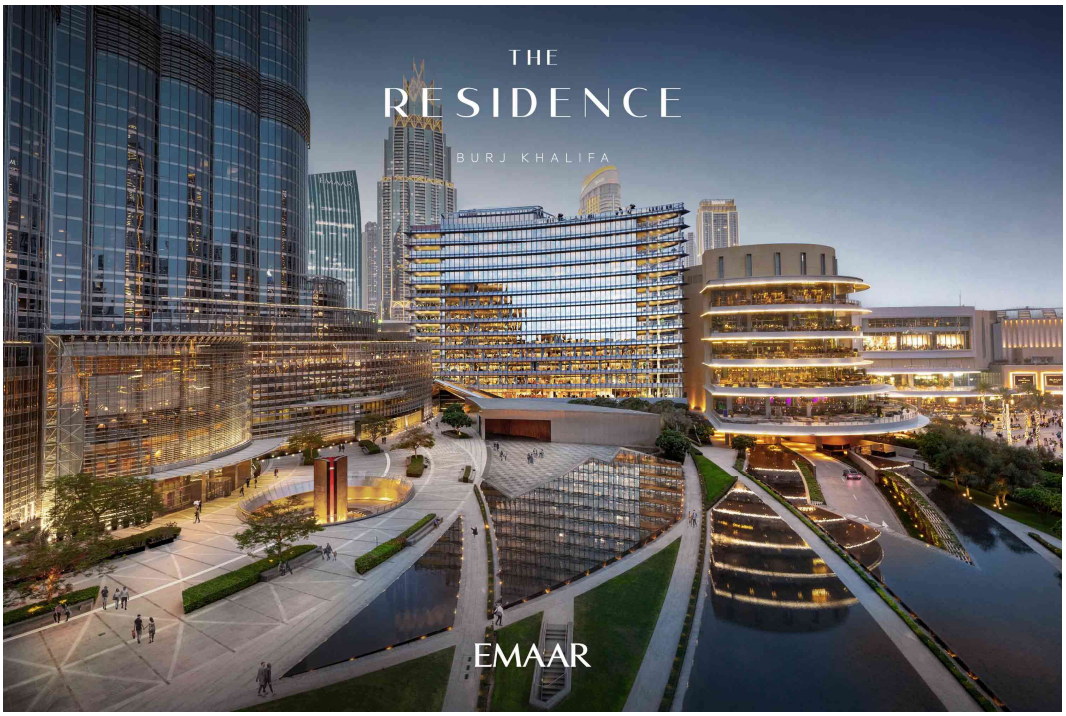
METHOD STATEMENT

FOR

INSTALLATION OF CHILLED WATER PIPING



BURJ DUBAI – THE RESIDENCES

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Rev.	Description	Date	Prepared By	Reviewed By	Approved By	Approved By
2	Revised as per Consultant Comments	04.07.04				
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			ETA M&E	ETA M&E	NMX	MACE

1.0 Scope :

1.1 This method statement applied to installation, pressure testing, joint insulation of chilled water piping including and accessories.

2.0 Purpose :

2.1 Purpose of this method statement is to outline the method of storage, handling, fabrication, installation, pressure testing, joint insulation and water piping including fittings.

3.0 Material :

3.1 Pipes

ERW, black steel, SCH 40, Grade 'B'

3.2 Fittings

Fabricated MI fittings, grooved ends.

3.3 Supporting Materials

Fabricated MS structured supports. (Sketch enclosed)

4.0 Method :

4.1 Storage :

4.1.1 All material while unloading shall not be dropped, but slowly lowered to the ground with the help of mobile / tower crane.

4.1.2 For pipes, wooden supports shall be placed beneath at equal distance. If stored on the floor.

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

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

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

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

4.1.7 Insulation material shall be segregated as per size, thickness for easy retrieval, stores out of direct heat.

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

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 in the trench as per approved drawings.

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

4.2.4 Check and ensure sufficient clearance around pipe for applying joint insulation.

4.2.5 Fabricate the structural supports from MS angle / channels .

4.3 **Installation :**

4.3.1 Lift pipe with the help of mobile / tower crane and rope / chain and kept on 40 Ft. trailer.

4.3.2 Shift drive trailer to the site.

4.3.3 Lift pipe with the help of tower crane rope / chain.

4.3.4 Unload at required position on the support and adjust the pipe.

4.3.5 Drill the holes in trench wall for fixing supports.

4.3.6 Fix supports, as per sketch attached.

4.3.7 Lay full length of 12m long as it fits to the requirement.

4.3.8 For the shorter lengths requirement, measure the length as per site condition.

4.3.9 Mark short length requirement on the pipe, remove the insulation locally, cut the pipe with the help of gas cutting set, 200mm longer than required then machine cut end of pipe to extract length.

4.3.10 Short pieces to be jointed by grooved ends will be square cut with mechanical cutter.

4.3.11 Prepare the pipe ends according to the type of joints ie. welded joint / grooved joints.

4.3.12 The end preparation shall be done at site workshop.

4.3.13 Welding / grooving as applicable shall be done as per fitting / coupling manufactures recommendations. Refer attached copy of relevant pages of Victaulic catalogue for groove preparation.

4.3.14 Shorter lengths of pipe that can be handled by machine (upto 2 Mtr) may be grooved joint or welded joint. Larger length pipes shall have one welded joint either side.

4.3.15 End preparations for welded joints shall be done as per approved welding procedure. Method Statement M-017.

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

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

4.3.18 Qualified and approved welders shall be engaged for welding works. Current certificates provided with M/S-M-017.

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

4.3.20 Align and level the piping as per approved drawings.

a. Pipes to be kept on the levelled (with the help of water column tubes) supports.
b. Bring the pipe ends touching to each other.
c. Check the alignment with the help of sprite level / set square at the four opposite point on the pipe periphery.
d. Adjust the alignment with help of slight knocking of hammer on the pipe.
e. Repeat above procedure till sprit level / sequence give ±15% deflection.

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

4.3.22 Fix the blind plugs / temporary valves on all drain, air vent.

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

4.3.24 Ensure all joints are properly tightened.

4.3.25 Raise the "Work Inspection Request (WIR)" of piping installation by NMX QA/QC and consultant. Obtain clearance for hydraulic pressure testing.

4.4 Pressure Testing :

4.1 The chilled water piping shall be tested according to the system working pressure and PN ratings of the pipes, pipe fitting and valves used in the piping. Test pressure as follows :

Floor piping test pressure : 15 Bar
Risers (Low & High) and trench piping : 20 Bar

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

4.3 Estimate the piping volume and make arrangement for required quality of clean water.

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

4.5 Fix the temporary valves at air vent / drain points and approved and pressure gauges.(Calibration Certificates provided).

4.6 Fill the piping system with clean water.

4.7 Warning signs will be displayed while carrying out pressure testing, barriers to be erected to exclude other workers.

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

4.9 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 / drain down completely where tests are partial and no values are installed.

4.10 Rectify the leakages and again fill the water.

4.11 Ensure no leakages throughout the entire piping system.

4.12 Observe for the leakages and pressurise the system using hydraulic test pump.

4.13 During pressurisation observe the joints and entire piping system for leakages.

4.14 Pressurise the system till pressure on the pressure gauge at lowest part of the system indicates pressure.

4.15 Observe the pressure gauges readings for 8 hours and ensure there is no drop in gauge pressure.

4.16 Raise the "WIR" for witnessing the hydraulic pressure testing by NMX QA/QC and consultant.

4.17 Obtain proceed with clearance for insulation only after satisfactory pressure testing.

4.5 Joint Insulation

Field joint insulation procedure

Field joint insulation shall be applied after the preinsulated pipes are installed and joined, either by welding or mechanically with mechanical couplings, and pressure-tested per the project's specifications. If the preinsulated piping system is supplied with leak detection / location system, please refer to the leak detection installation procedure prior to insulating the joints. Field insulation application at joints shall be as follows:

4.51. Joint Preparation

Ensure that the joint was tested and leak-free. Clean the surface of the pipe joint and remove any foreign material around the joint to be insulated. Make sure the joint is clean and dry. Apply by brush, red-oxide primer to the welded area and any scratched or damaged area.

4.5.2 Installation of G.I. sheet metal mould

4.5.3 Place the galvanized sheet metal mould/roll-up around the joint area. Ensure that the length of the mould is centered and equally distributed at each of the adjoining jacket pipe ends.

4.5.4 Locate the pouring hole and position on top of the joint.

4.5.5 Fasten the mould tightly with plastic straps or wires at three locations to ensure tightness between the jacket and the mould.

4.5.6 To ensure a complete closure of the G.I. sheet metal mould, apply 4mm Dia rivets every 2" distance along the G.I. overlapping ends.

4.5.7 Seal both of the mould ends utilizing two wraps of mastic, duct or gray tape of 2" width.

4.5.8 Pouring of PU foam chemicals

After the sheet metal mould is securely placed on the field joint to be insulated, weigh the required amount of chemicals, Polyol & Isocyanate (ISO), in separate cups. Please note that Polyol has a distinctive smell, with a pale-to-dark yellow color; ISO is colored black. Both chemicals should not be exposed to air-moisture or heat for long hours. Make sure the chemicals containers are closed tightly after usage.

First, pour the Polyol (weighed in a cup) into the mixing cup/bucket. When ready to mix, pour the ISO (weighted in a cup) into the mixing cup/bucket with Polyol and using electric drill with mixer blade attached, mix the two chemicals for 20 seconds. Make sure the chemicals are thoroughly mixed. When the color of the mixture changes (from dark to pale yellow) or when the mixture is starting to rise, pour immediately (as quickly as possible) the mixture through the pouring hole of the mould. Allow few minutes for the foam to rise, then, plug the pouring hole to refrain rising foam from coming out of the hole.

4.5.9 Polyol and Isocyanate has to be kept in closed container until it is finally poured in the mixing bucket.

4.5.10 Heat shrinkable sleeve will only be applied to the ends of the HDPE mould for sealing.

4.5.11 Remove any excess foam at the mould seams and pouring hole. Clean the surface of the sheet metal mould. Remove the plastic straps/wires.

4.5.12 Cut the shrink sleeve to the required length. Remove the plastic backing of the shrink sleeve and place one end of the shrink sleeve on top of the mould and wrap around the joint allowing some overlap at the top of the joint (about 50mm for smaller pipe sizes to 150mm for larger pipe sizes). Ensure that the width of the shrink sleeve is centered with the joint to be sealed, completely covering the entire length of the mould.

4.5.13 The shrink sleeve should be loose when in place. This will compensate for the shrinkage of the material when heated.

4.5.14 Using the torch, pre-heat slightly the inner adhesive part of the closure patch. Position the closure patch so that the patch is centered on the overlap along the full width of the shrink sleeve.

4.5.15 With the torch, heat up the closure patch evenly. Do not overheat the closure patch and with a gloved-hand, smoothen and tap lightly the closure patch to ensure good bonding.

4.5.16 Start shrinking the sleeve from one end or from the middle and apply heat circumferentially with the torch in brush-stroke motion until the shrink sleeve is fully bonded on the joint. Do not overheat!

4.5.17 The sealing of the joint is completed when the melted adhesive is coming out from the edges of the sleeves.

5.0 Inspection

5.1 "WIR" by NMX QA/QC and Consultant shall be raised for piping installation, pressure testing, joint insulation and signed by Roberts & Partners.

5.2 Inspection shall be carried out as per installation checklist during installation, testing and insulation stages by ETA QA/QC Dept.

5.3 The entire installation work shall be supervised by the supervisors/engineers.

6.0 Safety

6.1 Hot work permit will be obtained prior to the commencement of any hot works.

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

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

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

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

6.6 Safety office shall check and ensure that all safety precautions are followed.

6.7 Safety office shall check and ensure chat all scaffolding and ladders used at site are having duly signed tags.

6.8 Fire extinguishers will be provided near to the hot work areas.

6.9 Welder screen for Arc Welding will be erected to protect against arc eye of other persons.

6.10 Necessary precautions shall be taken for fumes which are flammable, toxic and dangerous to humans.

7.0 References

7.1 "WIR" duly signed by ETA/NMX QA/QC and consultant for

i) Piping Installation
ii) Pressure Testing
iii) Insulation

8.0 Non Destructive Testing

See Method Statement M-018 (shall be submitted by specialist)