

## **UNDERGROUND DRAINAGE PIPING SYSTEM**

### **1.0 Scope**

1.1 This method statement details the method for installation and hydrostatic testing of underground drainage piping.

### **2.0 Material**

2.1 UPVC Pipes to EN1401-1 (Formerly BS 4660) with push-fit grooved joints.

### **3.0 Applicable Location**

East and West Podium – Basement level.

### **4.0 Method**

#### **4.1 Storage**

4.1.1 When off loading pipes shall be lowered to the ground either manually or with mechanical aid like crane depending on the quantity of the pipe and should not be dropped to the ground. Refer – Manufacturer's instruction for transport, handling and storage (Annexure – 1).

4.1.2 Pipes shall be given adequate support at all times and shall be stacked on a flat surface free from any sharp objects.

4.1.3 Timber supports of a least 3” wide shall be placed beneath the pipes with spacing not greater than 1.8 mtrs. Closer supports will be required for sizes below 160mm.

4.1.4 Pipes shall not be stored under direct sunlight to avoid ultra violet degradation.

4.1.5 Socketed pipes shall be stacked in layers with sockets placed at alternate ends of the stack and with the sockets protruding to avoid unstable stacks and the possibility of imparting a permanent set to the pipes.

4.1.6 Larger pipe sizes of thicker class shall always be placed at the bottom.

## 4.2 Preparation

- 4.2.1 The width of the trench at the crown of the pipe shall not be less than the outside diameter of pipe 300mm to allow proper compaction of side fill material.
- 4.2.2 The bedding shall consist of a free running granular material passing a 19mm sieve, but with a minimum of fine particles.
- 4.2.3 The thickness of the prepared bed shall be at least 100mm. It shall be well compacted and brought to an even surface so as to provide uniform support for the pipe.
- 4.2.4 Trenches shall be kept free of water by pumping the water out, if any.

## 4.3 Installation

- 4.3.1 Pipes are brought to the work place manually from the store to the hoist area and are shifted to the respective floors through the hoist.
- 4.3.2 Ensure that the mating areas of spigot and socket are thoroughly clean and square.
- 4.3.3 Set the rubber ring into groove.
- 4.3.4 Assess the full socket depth by simple measurement and mark spigot accordingly.
- 4.3.5 Apply lubricant to the spigot side and to the inside of the joint on rubber.
- 4.3.6 Accurate axial alignment of the spigot and socket prior to jointing is important, hand feed spigot into rubber joint until resistance from the inner sealing section is felt.
- 4.3.7 Complete the joint by applying leverage to the following socket and using a timber block to prevent damage.

**Important Notice**

If pipes are cut on site, make sure that the new spigots are cut square with a fine toothed saw and are chamfered to half pipe thickness with a coarse file before jointing.

- 4.3.7 All pipes and fittings delivered to site for the work should be stored in an approved manner to avoid deterioration due to accidental damage and atmospheric condition.
- 4.3.8 Before final erection, all pipes should be free of dust, scale rust or other form of corrosion.
- 4.3.9 All pipes will be laid to a uniform slope as indicated on the drawing on a prepared trench bed.
- 4.3.10 Before laying, all pipes and fittings should be checked for defects and jointing spaces cleaned properly.
- 4.3.11 Socketed pipes to be laid with sockets uphill. Scoop out compact bed locally at pipe sockets where socket pipes are used. Adjust pipes to line and level with the help of 1 mtr. Long spirit level and if required the surveyor's help can be obtained. Ensure pipe bottoms rest uniformly on the bedding.
- 4.3.12 To avoid possible damage or deformation of the pipe, its support by the ground in which it is laid should be made as uniform as possible and must be free from large stones, sharp edged flints or other hard objects.

**4.4 Back-Filling**

- 4.4.1 Before commencing to place any side fill material; any levelling pegs or temporary packing shall be removed.
- 4.4.2 Filling around the pipes shall be done with the same bedding material to a minimum height of 100mm and a maximum of 300mm and be thoroughly compacted.
- 4.4.3 Normal filling of trench shall then proceed in layers of 150mm with selected materials.

4.4.4 Plastic identification tape shall be installed during back filling operations. The tape shall be centered on the pipeline with lettering facing upwards.

## **5.0 Testing**

### **5.1 Air Testing**

**5.1.1** The length of drain or sewer to be tested including any connections should be effectively plugged.

**5.1.2** Air is pumped into the test length by suitable means (eg., hand pump) until a pressure of 100mm of water is indicated on a manometer connected to the system.

**5.1.3** A suitable time should be allowed for stabilization of air temperature.

**5.1.4** The air pressure should not fall below 75mm of water during a period of five minutes, without further pumping.

**5.1.5** In case of unsatisfactory air test, hydrostatic test is to be followed so that the leakage can be assessed and located.

**5.1.6** Testing will be inspected by main Contractor / Consultant to their satisfaction and document for correct test will be maintained by getting approval in test certificate by Consultant and Main Contractor.

### **5.2 Hydrostatic Testing**

**5.2.1** Water test is conducted to ensure and prove the tightness of the joints and ensure there are no leaks in the piping system.

**5.2.2** The water pressure test can be applied to the system in its entirety or in sections. All openings in the piping will be tightly closed by special cast iron pipe plugs or by another suitable means and the system filled with water to the point of overflow from the highest point. The plugs can be temporally opened to make sure that all air has been vented and that water has reached all parts of the system.

**5.2.3** No section of the pipe shall be tested to less than 1.5 meter head of water. In testing successive sections of piping, at least the upper 3 meters of the next proceeding section will the tested. Except the upper most 3 meters, the whole

system shall have been subjected to a height of less than 1.5 meter head of water.

- 5.2.4 The water shall be kept in the system or in the portion under test for at least 30 minutes before inspection starts. While the system is under pressure, a careful inspection shall be made on all pipes and joints. If any leaks in joints or evidence of defective pipe or fittings is revealed, the defective pipe / fitting should be immediately replaced with new joints and materials.
- 5.2.5 After the correction is made, the test pressure will be maintained for minimum 30 minutes and witnessed by QA/QC Engineer.
- 5.2.6 Testing will be inspected by main Contractor / Consultant to their satisfaction and document for correct test will be maintained by getting approval in test certificate by Consultant and Main Contractor.
- 5.2.7 Only after approval of testing back filling of trench will be allowed.

## **6.0 Records**

Prepare work inspection request (WIR) and have them signed by Consultant.

## **7.0 Attachments**

- 7.1 Test Format.

**ABOVE GROUND DRAINAGE PIPING****1.0 Scope:**

- 1.1 This method statement details the method for installation and hydrostatic testing of above ground drainage piping.

**2.0 Material:**

- 2.1 UPVC pipes to EN 1329 (Formerly BS 4514) and BS EN 1455 (Formerly BS 5255).
- 2.2 Types of joints
- |                           |   |                        |
|---------------------------|---|------------------------|
| a) For 1 ¼” dia to 2” dia | - | Solvent weld jointing. |
| b) For 3” dia & above     | - | Push fit jointing.     |

**3.0 Applicable locations:**

Towers, Podium & Villas.

**4.0 Method:****4.1 Storage.**

- 4.1.1 When off-loading, pipes shall be lowered to the ground either manually or with mechanical aid like crane depending on the quantity of the pipe and should not be dropped to the ground. Refer Manufacturer’s instruction for transport, handling and storage (Annexure – 1).
- 4.1.2 Pipes shall be given adequate support at all times and shall be stacked on a flat surface free from any sharp objects.
- 4.1.3 Timber support of at least 3” wide shall be placed beneath the pipes with spacing not greater than 1.8 mtrs. Closer supports will be required for sizes below 160mm.
- 4.1.4 Pipes shall not be stored under direct sunlight to avoid ultra violet degradation.
- 4.1.5 Socketed pipes shall be stacked in layers with sockets placed at alternate ends of the stack and with the sockets protruding to avoid unstable stacks and the possibility of importing a permanent set to the pipes.
- 4.1.6 Longer pipes of thicker class shall be kept at the bottom.

**4.2 Preparation:**

- 4.2.1 Drawings for installation are approved & co-ordinated with other services.
- 4.2.2 Location / Area ready for installation of piping.

**4.3 Installation:**

- 4.3.1 Pipes are brought to the work place manually from store to the hoist area and are shifted to the respective floors through the hoist.
- 4.3.2 Mark-up the pipe routing on the soffit of slab as per the setting-out.
- 4.3.3 Install anchor fasteners for support as per the approved support distances for different pipe sizes.
- 4.3.4 All supporting of pipes will be done as per specified spacing both horizontally and vertically. Supporting of both horizontal & vertical pipes shall be done in accordance with the approved details, drawings and specifications.
- 4.3.5 Pipes will be run to proper slope requirements as per the approved shop drawing.
- 4.3.6 Pipes & fittings will be joined by solvent weld jointing for pipe sizes 1 ¼” to 2”. Following steps, will be taken during the jointing.
  - 4.3.6.1 Pipes will be cut to square before assembly of fittings & all burrs to be rubbed-off.
  - 4.3.6.2 Cleaning fluid to be applied on both surfaces to be joined. The cleaning fluid will remove all dirt & soften the surface for the chemical solvent weld.
  - 4.3.6.3 Solvent cement will be applied evenly over mating surfaces of the both pipe & socket, and insert pipe into the socket with slight twisting action to full socket depth.
  - 4.3.6.4 Surplus cement of the joint will be removed by cloth.
  - 4.3.6.5 After jointing, it will be allowed for 3 minutes to get dried.
- 4.3.7 Clean-outs are provided to enable the maintenance in case of choking of drainage system at each change of direction.
- 4.3.7 Expansion couplings are provided at necessary locations as per manufacturer’s recommendations & shop drawing. Refer Anneuxre-I for Manufacturer’s recommendation to allow for the expansion.
- 4.3.8 All open-ended pipes to be plugged during installation phase.
- 4.3.9 Pipes & fittings will be joined by push fit method for the pipe sizes 3” to 6”. Following steps taken during installation.
  - 4.3.9.1 Ensure that the mating areas of spigot and socket are thoroughly clean and square.
  - 4.3.9.2 Set the rubber ring into groove.
  - 4.3.9.3 Assess the full socket depth by simple measurement and mark spigot accordingly.

- 4.3.9.4 Apply lubricant to the spigot side and to the side of the joint on rubber.
- 4.3.9.5 Accurate axial alignment of the spigot and prior to jointing is important, hand feed spigot into rubber joint until resistance from the inner sealing section is felt.
- 4.3.9.6 Complete the joint by applying leverage to the following socket and using a timber block to prevent damage.

**Important Notice:**

If pipes are cut on site, make sure that the new spigot are cut square with a fine toothed saw and are chamfered to half pipe thickness with a coarse file before jointing.

- 4.3.9.7 All pipes and fittings delivered to site for the work should be stored in an approved manner to avoid deterioration due to accident damage and atmospheric condition.
- 4.3.9.8 Before final erection, all pipes should be free of dust, scale rust or other form of corrosion.
- 4.3.9.9 All pipes will be laid to a uniform slope as indicated on the drawing.
- 4.3.9.10 Before laying, all pipes and fittings should be checked for defects and jointing spaces cleaned properly.
- 4.3.9.11 Socketed pipes to be laid with sockets uphill. Adjust pipes to line and level.

**5.0 Testing**

**5.1 Air Testing**

- 5.1.1** The length of drain or sewer to be tested including any connections should be effectively plugged.
- 5.1.2** Air is pumped into the test length by suitable means (eg., hand pump) until a pressure of 100mm of water is indicated on a manometer connected to the system.
- 5.1.3** A suitable time should be allowed for stabilization of air temperature.
- 5.1.4** The air pressure should not fall below 75mm of water during a period of five minutes, without further pumping.
- 5.1.5** In case of unsatisfactory air test, hydrostatic test is to be followed so that the leakage can be assessed and located.



**5.2 Hydrostatic Testing:**

- 5.2.1 Water test is conducted to ensure and prove the tightness of the joints and ensure there are no leaks in the piping system.
- 5.2.2 The water pressure test can be applied to the system in its entirety or in sections. All openings in the piping will be tightly closed by special cast iron pipe plugs or by another suitable means and the system filled with water to the point of overflow from the highest point. The plugs can be temporarily opened to make sure that all air has been vented and that water has reached all parts of the system.
- 5.2.3 No section of the pipe shall be tested to less than 1.5 meter head of water. In testing successive sections of piping, at least the upper 3 meters of the next proceeding section will be tested. Except the upper most 3 meters, the whole system shall have been subjected to a height of less than 1.5 meter head of water.
- 5.2.4 The water shall be kept in the system or in the portion under test for at least 30 minutes before inspection starts. While the system is under pressure, a careful inspection shall be made on all pipes and joints. If any leaks in joints or evidence of defective pipe or fittings are revealed, the defective pipe/fitting should be immediately replaced with new joints and materials.
- 5.2.5 After the correction is made the test pressure will be maintained for minimum 30 minutes.
- 5.2.6 Testing will be inspected by Main Contractor / Consultant to their satisfaction and document for correct test will be maintained by getting approval in test certificate by Consultant and Main Contractor.

**6.0 Acoustic Insulation**

- 6.1 Refer MS/P-017.

**7.0 Safety:**

- 7.1 During the installation & testing, all safety precautions shall be followed as per the established Project safety plan.

**8.0 Records :**

- 8.1 Work Inspection Request (WIR) duly signed by the Consultant.
- 8.2 Test certificates duly signed by the Consultant.

**9.0 Attachments :**

- 9.1 Test Format

## ACOUSTIC INSULATION OF DRAINAGE PIPES

### Scope

1.1 This method statement applies to installation of acoustic insulation for drainage piping.

### 2.0 Purpose

2.1 Purpose of this method statement is to outline the method of storage, handling and installation of acoustic lining for drainage piping.

### 3.0 Materials

3.1 Revac SGQ 50-25FF Metallic foil faced flexible polymer sheet laminated to quilted glass wool approximately 24mm thick, tested to ISO 140-3/95.

### 4.0 Method

#### 4.1 Receiving

4.1.1 When received at site, each pallet shall be checked for quantities, model numbers, physical damages, etc.

4.1.2 Receiving inspection shall be checked by Storekeeper, Engineer and QC Engineer, which shall be documented.

#### 4.2 Storage

4.2.1 All Revac pallets are stored in a covered store.

4.2.2 Storekeeper will be responsible for proper storage and maintenance of records, as required.

#### 4.3 Installation

4.3.1 The following areas of drainage pipes will be covered by acoustic lining.

4.3.1.1 High-level drain pipes in living areas/bed rooms, entrance foyers of apartments, lift lobbies, main lobby/reception areas, control room/offices, kitchens, bathrooms and any other occupied space.

4.3.2 Clean the drainage pipes prior to commencement of acoustic lining.

4.3.3 Wrap the pipes and fittings by Revac SGQ 50-25 FF sheets.

4.3.4 Revac SGQ 50-25 FF can cover either butt joint or overlap joint.

4.3.5 Aluminium foil tape should be used at maximum 250mm centers. All joints should also be covered with aluminium foil tape. Cut ends of glass fibre shall be enclosed by tape.

4.3.6 Vertical pipe lagging may require the acoustic barrier to be adhered to pipe to stop the material moving.

Note Refer attached manufacturer's instructions.

## 5.0 Inspection

5.1 Acoustic lining for drainage pipes shall be witnessed during false ceiling clearance inspections.

## 6.0 Safety

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

6.2 Only experienced and skilled insulators shall be engaged for carrying out this work.

6.3 The people involved in the insulation shall have PPE safety helmets, safety shoes, gloves, etc., as required.

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

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

## 7.0 References

7.1 Manufacturer's catalogue.

7.2 Approved submittal for acoustic lining for drainage piping. Ref. Submittal P-003.

7.3 Shop drawings.

## 8.0 Records

8.1 Work Inspection Request (WIR) duly signed by the Consultant.

## 9.0 Attachments

9.1 Manufacturer's instructions.

## **TESTING OF DRAINAGE STACKS**

1. After completing the installation, flush all the stacks thoroughly with clean water.
2. Identify the stacks by appropriate serial nos., mark the same on the drawings.
3. Take tennis/golf balls, mark the stack serial no. as on the drawing with paint/ permanent marker.
4. Arrange a net for collecting the balls in the respective tower manhole.
5. Drop the ball in the respective stack via water closet connected to the stack.
6. Flush water through the stacks, check ball nos. collected against the stack nos.
7. If any ball no. is missing, open the bottom of that particular stack and clear the debris.
8. Repeat the test for the particular stack which debris are cleared.
9. Record all the tests by WIR's.

## SUMP PUMPS

### **1.0**    Scope

1.1    This method statement applies to installation of sump pumps as per specification.

### **2.0**    Purpose

2.1    Purpose of this method statement is to outline the method of storage, handling and installation of sump pumps, valve package and controls.

### **3.0**    Material

3.1    Pump, guide rail, floats, cables, pedestal, stainless steel chain.

3.2    Valves (gate valves NRV, etc.) and piping accessories as per approved submittals shop drawings.

### **4.0**    Application Location

4.1    Podium Basement.

### **5.0**    Method

#### **5.1**    Receiving

5.1.1    When received at site, each pump, valves, grid rails, pedestals, stainless steel chain shall be checked for quantities model numbers, physical damages, etc., and notify supplier of any discrepancies for suitable rectification or replacement.

5.1.2    Valves shall be segregated as per sizes/models and stored on racks within a covered store.

5.1.3    Any items found damaged or not found suitable as per the project requirements shall be quarantined. Non-complaint material shall be clearly marked and stored separately to prevent any inadvertent use until returned to vendor.

#### **5.2**    Storage

5.2.1    Pump shall be stored on a flat surface in well ventilated storage area.

5.2.2    Inlet and outlet flange blanks shall not be removed until ready for connection to pipe work.

5.2.3    Manufacturer's instructions shall be strictly followed as applicable.

5.2.4    If the pumps are stored for longer periods the shaft shall be periodically rotated and lubricated, if required.

- 5.2.5 The stored pumps are to be inspected periodically for obvious conditions such as standing water, parts theft, excess dirt buildup or any other abnormal condition.
- 5.2.6 Storekeeper will be responsible for proper storage and maintenance of records, as required.

### **5.3 Preparation**

- 5.3.1 The sump pit designed to meet Dubai Municipality requirements shall be provided by Civil Contractor (NMX).
- 5.3.2 Examine the sump pits for suitability as per approved drawings/requirements.
- 5.3.3 Check and ensure that the shop drawings used are latest and approved for construction.
- 5.3.4 ETA will coordinate the locations and requirements as per approved shop drawings.
- 5.3.5 Check the piping support locations, cable entry floats are coordination in coordination with pump and piping layout and ensure they are not obstruction the space around pump.
- 5.3.6 Ensure easy access and sufficient clearance for servicing and maintenance i.e. for replacement of pump.
- 5.3.7 Ensure vertically of guide rails for easy removal of pump for maintenance.

### **5.4 Installation**

- 5.4.1 Provide proper ventilation before getting into the sump pit.
- 5.4.2 Mark the location of the pump guide rail, piping works in line with the shop drawings / requirement.
- 5.4.3 Drill the suitable size holes were applicable.
- 5.4.4 Shift the pumps and other associated accessories to the place of installations in safe manner use hand trolley / fork lift /crane as applicable / required as per site conditions.
- 5.4.5 Check and ensure free rotation of shaft.
- 5.4.6 Position the pump base on the area, which are already marked and drilled. After proper alignment fix the duct foot bend properly.
- 5.4.7 Fix guide rail and lifting chain properly.
- 5.4.8 Complete the piping and valve package installation as per approved drawings.
- 5.4.9 Install the electrical control panel and power connections as per approved drawings.

5.4.10 Provide grounding wiring as per approved shop drawing / manufacture recommendation.

5.4.11 Follow the manufacturer's instructions while installing the pump.

5.4.12 After completion of the installation, same shall be checked and certified by the manufacturer / authorised local representative.

## **6.0 Inspection**

6.1 After completion and pump installation and piping connections, the same shall be checked and certified by the pump manufacturer/authorised local representative.

6.2 Request for inspection shall be raised for consultant's inspection.

## **7.0 Safety**

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

7.2 Only experienced and skilled technicians shall be engaged for carrying out pump installation work.

7.3 The people involved in the installation shall use PPE such as safety helmets, safety shoes, harness, gloves, coverall, goggle, etc., as required.

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

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

## **8.0 References**

8.1 Manufacturer's instructions.

8.2 Approved sump pump submittal.

8.3 Approved shop drawings.

8.4 Specification Section.

## **9.0 Records**

9.1 Request for Inspection duly signed by the Consultant.

9.2 Pump installation checklist.

9.3 Installation certificate from manufacturer's authorised local representative.

## **10.0 Attachment**

10.1 Installation checklist.

## **TESTING & COMMISSIONING OF SUMP PUMPS**

### **1.0 Scope**

The scope of this Method Statement is to define the method of Start-up and Commissioning of Sump Pumps installed within the Burj Dubai – The Residences, in accordance with the Specification, manufacturer's instructions attached.

### **2.0 Material**

Refer to Appendix 1 – Schedule of Sump Pumps.

### **3.0 Test Equipment**

3.1 Digital Multimeter

3.2 Clamp Meter

#### Note

The calibration certificates of testing instruments shall be verified prior to usage and copies shall be included in the test reports.

### **4.0 Pre-commissioning checks prior to start-up**

#### **4.1 Mechanical**

4.1.1 Check and inspect the installation of Sump Pump is complete, verify the installation as per approved drawings.

4.1.2 Verify compliance to the attached manufacturer's installation instructions.

4.1.3 Obtain installation certification from manufacturer or their authorized representative.

4.1.4 Check and ensure adequate clearance available for service and maintenance of pumps and motors.

4.1.5 Check the installation is coordinated with other services.

4.1.6 Ensure the shipping bolts / chambers are removed.

4.1.7 Check all nuts, bolts, screws, fasteners etc., are fixed and tightened as required.

4.1.8 Check the alignment is completed as per manufacturer's instructions (where applicable).

4.1.9 Check and ensure the safety guards are in place and secure.



4.1.10 Rotate the pump manually and ensure free and smooth rotation.

4.1.11 Ensure the pumps are cleaned prior to start-up and all identification labels and tags are in place.

#### **4.2 Electrical**

4.2.1 Check all power cabling and control wiring is completed and dressed neatly.

4.2.2 Check the power isolator is fixed close to the pump motor for emergency stop and power isolation.

4.2.3 Check all terminations are completed and tightened as required.

4.2.4 Check the grounding connections are completed and tightened as required.

4.2.5 Ensure the overload protections are set correctly as per the pump motor load current.

4.2.6 Ensure all identification tags and labeling works are complete.

#### **5.0 Start-up and Testing**

5.1 Check the line voltage and phase rotation before energizing the power.

5.2 Switch ON the power and start the pump and check the rotation is in the correct direction.

5.3 Immediately on start-up, check for any abnormal noise and vibration. Rectify as / if required Consult manufacturer if required.

5.4 Observe for the correct operation of motor, pump and drive system.

5.5. Measure the current drawn (amperage) by the pump motor and record the same.

5.6 Record all pump and motor nameplate data in the commissioning format.

5.7 Ensure compliance to all manufacturer's commissioning instructions, as applicable.

#### **6.0 Safety**

6.1 Only experienced and skilled personnel shall be engaged for start-up and commissioning of Sump pumps.

6.2 Cable test reports shall be verified prior to energisation.

- 6.3 Warning signs and tapes shall be placed during start-up and commissioning as required.
- 6.4 All safety procedures shall be followed in accordance with the project health and safety plan.
- 6.5 Safety Officer shall check and ensure all safety precautions are followed.

## **7.0 Records**

- 7.1 Inspection request (for Witness of start-up and commissioning) duly signed by Consultants
- 7.2 Signed-off pre-commissioning checklists
- 7.3 Commissioning reports
- 7.4 Calibration certificates of testing instruments

## **8.0 References**

- 8.1 Specification
- 8.2 Manufacturer's start-up and commissioning instructions.
- 8.3 Approved Sump Pump submittals / drawings.
- 8.4 Approved shop drawings.

## **9.0 Attachments**

- 9.1 Appendix 1 – Schedule of Pumps
- 9.2 Pre-commissioning checklist
- 9.3 Manufacturer's instructions.

## Installation Check List of Sump Pump

S. No.	Activities / Items to be Inspected	Verification Sign of Engineer
1	Check the pumps to be used have approved material submittal.	
2	Ensure drawings used for installation are current and approved.	
3	Inspect pumps and control panel upon receipt at site as per approved submittals.	
4	Examine the sump pits for suitability as per approved drawings / requirements.	
5	Check the installation as per manufacturer's instructions and approved drawings.	
6	Check the piping connection to the pump completed satisfactorily and as per drawings.	
7	Ensure piping is supported properly and pipe weight is not transferred to pump.	
8	Installation to guide rails completed and supported as per manufacturer's instructions.	
9	Check the location of pumps as per approved drawings and ensure adequate space available for maintenance and removal of pumps.	
10	Check the control panel is installed as per approved drawings and all terminations are tight.	
11	Check the electrical power grounding and control wiring completed as per manufacturer's requirements/drawings.	
12	Ensure the piping to the sump pump is tested and verify the test reports prior to startup	

## Test Certificate for Sump Pump

S. No.	Activities / Items to be Inspected	Verification Sign of Engineer
1	Obtain pump manufacturers test curve prior to commencement	
2	Check Electrical connections properly made (Terminal covers fitted, level switches connected properly)	
3	Check overload setting correct and record setting on test sheets.	
4	Check fuse rating correct and record setting on test sheets.	
5	Check direction and speed of rotation are correct.	
6	Check and record pump and motor name plate details on test sheets.	
7	Check motor current on all phases and record result.	
8	Check valves and non return valves are fitted and area fully open.	
9	Record pump flow and head.	
10	Check auto change over to stand-by pump (if applicable).	

<b>S. No.</b>	<b>Activities / Items to be Inspected</b>	<b>Verification Sign of Engineer</b>
11	Check float switches located at correct location proper start-stop-high level indication.	
12	Check pumps can be removed and re-fixed without problem.	
13	Check guide bar, lifting chains are fixed properly and secured.	
14	Check for dry run protection.	
15	Check for proper operation of pumps.	