



V2-S2&S3&S4-6
ATTACHMENT-6 WATER SUPPLY AND
SANITARY WORKS

WATER SUPPLY & SANITARY WORKS

1. SCOPE

- 1.1 This specification covers the general requirements for supplying and laying of water supply pipe line with necessary fittings and fixtures for buildings/structures tapping off from potable water supply distribution system, supplying and laying sewage pipe line with disposal works including provision of all fittings and fixtures of sanitary works and such other related items of work forming a part of the job, which may be required to be carried out though not specifically mentioned above. The work under this specification will consist of furnishing of all tools, plants, labour, materials, and any and everything necessary for satisfactorily carrying out the work.

2. APPLICABLE CODES

- 2.1 The following standards and codes are made a part of this specification. All standards, codes of practice referred to herein will be **the latest version on the date of contract** made by the Bidder.

1. IS.458 : Concrete Pipes (with and without reinforcement).
2. IS.554 : Dimensions for pipe threads where pressure tight joints are required on the threads.
3. IS.651 : Salt glazed stoneware pipes and fittings.
4. IS.774 : Flushing Cisterns for water closets and urinals (valveless siphonic type)
5. IS.775 : Cast iron brackets and supports for wash basins and sinks.
6. IS.781 : Sand-cast brass screw-down bib taps and stop taps for water services.
7. IS.783 : Code of practice for laying of concrete pipes.
8. IS.1068 : Electroplated coatings of nickel and chromium on iron and steel.
9. IS.1239 : Mild steel tubes (Part I) and mild steel



tubulars and other wrought steel pipe fittings (Part II).

10. IS.1536 : Centrifugally cast (spun) iron pressure pipes for water, gas and sewage.
11. IS.1626 : Asbestos cement building pipes, gutters and fittings (spigot and socket types).
12. IS.1703 : Ball valves (horizontal plunger type) including floats for water supply purposes.
13. IS.1726 : Cast iron manhole covers and frames.
14. IS.1726 : Sand cast iron spigot and socket soil, waste and ventilating pipes, fittings and accessories.
15. IS.1742 : Code of practice for buildings drainage.
16. IS.2326 : Automatic flushing cisterns for urinals.
17. IS.2470 : Code of practice for design and construction of septic tanks.
18. IS.2556 : Vitreous sanitary appliances (Part I to Part XV)
19. IS.2963 : Non-ferrous waster fittings for wash basins and sinks.
20. IS.3311 : Waste plug and its accessories for sinks and wash basins.
21. IS.5329 : Code of practice for sanitary pipe work above ground for buildings.
22. IS.5434 : Non-ferrous alloy bottle traps for marine use.

3. DRAWINGS

- 3.1 BIDDER will submit to OWNER/ENGINEER for his approval, detailed working drawings showing layout of water supply and sanitary works with necessary fittings and fixtures before the actual construction is undertaken.

4. SANITARY INSTALLATION

- 4.1 The work will be carried out complying in all respects with any specific requirements of the local body in whose jurisdiction the work is situated, and as approved by the Owner/ Engineer.

- 4.2 Any damage caused to the building, or to installations therein, either due to negligence on the part of the BIDDER, or due to actual requirements of the work, will be made good and the building or the installation will be restored to its original condition by the BIDDER
- 4.3 All sanitary and plumbing work will be carried out by licensed plumbers.
- 4.4 On completion of the work, the site will be cleaned and disposed of all debris as directed by the Engineer.
- 4.5 All sanitary appliances including sanitary fittings, fixtures, toilet requisites will be of size, and design as specified in the item of work and as per sample approved by the Engineer.
- 4.6 All sanitary fittings and fixtures will be acceptable to the Owner/Engineer any variations, they will satisfy the permissible tolerances in dimensions/slope/ contour as specified in relevant IS codes/ standards.
- 4.7 All colour glazed porcelain fixtures, such as wash basin, sink drain board, water closet pan, urinal, 'P' trap etc. will have hard durable glazed finish. They will be free from cracks, indentations, or other glazing defects. No chipped porcelain fixtures will be used. Joints between PVC & RCC pipes will be made perfectly air and watertight by caulking with neat cement mortar.
- 4.8 **Indian Type Water Closet** (Orissa Pattern)
- This will be the long pan pattern made of colour glazed earthenware, colour glazed vitreous china or of colour glazed fire clay. The general requirements will conform to IS.2556 (Parts III and X). Each pan will have an integral flushing rim of suitable type. It will also have an inlet or supply horn for connecting the flush pipe. The flushing rim and inlet will be of the self draining type. It will have a weephole at the flushing inlet to the pan. The flushing inlet will be in the front, unless otherwise specified or ordered by the Engineer. The inside of the bottom of pan will have sufficient slope from the front towards the outlet

and the surface will be uniform and smooth enable easy and quick disposal while flushing. The exterior surface will be unglazed and sufficiently rough or grooved at right angles to the axis of the outlet. Pans will be provided with a trap 'P' or 'S' type with a minimum 50 mm water seal and 50 mm diameter vent horn. Pan will be laid at the correct location and level over a bed of lime concrete using brick aggregates (1 part lime mortar to 2 parts brick bats with lime mortar of 1 part lime to 2 parts of sand) or cement-sand admixture as specified in the drawings.

4.9 **European Type Water Closet** (W.C)

Water closets will be either of colour glazed earthenware, colour glazed vitreous china or colour glazed fire clay as specified and will be of "Siphonic Wash down type" conforming to IS.2556 (Part VIII). The closets will be of one piece construction with approved plastic/bakelite seat and cover. Each water closet will have 4 fixing holes having a minimum diameter of 6.5 mm for fixing to wall and will have an integral flushing rim of suitable type. It will also have an inlet of supply horn for connecting the flush pipe. The flushing rim and inlet will be of the self-draining type. The water closet will have a weephole at the flushing inlet. Each water closet will have an integral trap with either "S" or "P" outlet with at least 50 mm water seal. The water closets will have an anti siphonage 50 mm dia. vent horn on the outlet side of the trap. The inside surface of water closets and traps will be uniform and smooth in order to ensure smooth flush. The serrated part of the outlet will not be glazed externally. The water closet when sealed at the bottom of the trap in line with the back plate, will be capable of holding not less than 10 litres of water between the normal water level and the highest possible water level of the water closet installed.

4.10 **Urinals**

Urinals will be of the bowl pattern, either flat back or angle back type lipped in front. They will be of colour glazed earthenware, colour glazed vitreous china or colour glazed fire clay, and of size as specified conforming to IS.2556 (Part VI). The urinals will be of one piece construction. Each urinal

will be provided with not less than two fixings holes of a minimum dia. of 6.5 mm on each side. Each urinal will have an integral flushing box rim of suitable type and inlet or supply horn for connecting the flush pipe. The flushing rim and inlet will be of the self-draining type. It will have a weephole at the flushing inlet of the urinal. At the bottom of the urinal, an outlet horn for connecting to an outlet pipe will be provided. The exterior of the outlet horn will not be glazed and the surface will be provided with grooves at right angles to the axis of the outlet to facilitate fixing to the outlet pipe. The inside surface of the urinal will be uniform and smooth throughout to ensure efficient flushing. The bottom of pan will have sufficient slope from the front, towards the outlet such that there is efficient draining of the urinal. The waste fittings will be chromium plated.

4.11 **Wash Basins**

- a) Wash basins will be of coloured glazed earthenware, coloured glazed vitreous china or coloured glazed fire clay as specified and conforming to IS.2556

<u>Type</u>	<u>Size</u>
Flat Back	630 x 450 mm
Flat Back	550 x 400 mm

- b) Wash basins will be of one piece construction, including a combined overflow. All internal angles will be designed so as to facilitate cleaning. Each basin will have a rim sloping inside towards the bowl on all sides except sides on contact with the walls and will have skirting at the back. Basins will be provided with single or double tap holes as specified. The tap holes will be square. A suitable tap hole button will be supplied if one tap hole is not required in installation. Each basin will have a circular waste hole to which the interior of basin will drain. The waste hole will be either rebated or bevelled internally with diameter of 65 mm at top and a depth of 10 mm to suit a waste plug having 64 mm diameter. Each basin will be provided with a non-ferrous 32 mm waste fittings. Stud slots to receive the brackets on the underside of the wash basins will be suitable for a bracket with stud not exceeding 13 mm diameter, 5 mm high and

305 mm from the back of basin to the centre of the stud. The stud slots will be of depth sufficient to take 5 mm stud. Every basin will have an integral soap holder recess or recesses which will fully drain into the bowl. The position of the chain stay-hole will not be lower than the overflow slot. A slot type of overflow having an area of not less than 5 sq.cm. will be provided and will be so designed as to facilitate cleaning of the overflow. The specifications for waste plug, chain and stay will be the same as given for sinks.

- (c) All the waste fittings will be chromium plated. Bottle trap will conform to IS. 5434. The chromium plating will be of service grade No. 2 conforming to IS.1068.

4.12 **Sinks**

- a) The sinks will be of colour glazed earthenware, colour glazed vitreous china or colour glazed fire clay as specified conforming to IS.2556 (Part V) and will be of the following sizes :

450 x 300 x 150 mm
600 x 450 x 200 mm

- b) They will be of one piece construction, including a combined overflow. The floor of the sink will gently slope towards the outlet. The outlet will in all cases be suitable for waste fittings having flange of 64 mm diameter and the waste hole will have a minimum diameter of 65 mm at the bottom to suit the waste fittings. The waste hole will be either rebated or bevelled having a depth of 10 mm. Each sink will be provided with a non-ferrous 40 mm dia. waste fitting. The sink will have overflow of the weir type and the inverts will be 30 mm below the top edge. Each sink will be provided with a waste plug, of suitable dia. chain and stay. The plug will be of rubber or other equally suitable material and will be water tight when fitted. Plug chains will be of brass wire chromium plated. It will have an overall length from the collar to the stay of not less than 300 mm. There will be a triangular or D shackle at each end, one of which will be brazed to the plug and the other securely fixed to the stay. The 150 mm long shank of the waste will be threaded conforming to the requirements of

IS.2556 for sinks only. The waste fittings and plug fittings will be chromium plated. The chromium plating will be of service grade No.2 conforming to IS.1068.

4.13 **Flushing Cisterns**

The flushing cisterns will be of PVC, automatic or manually operated, high level or low level, as specified. For water closets and urinals high level cistern is intended to operate with minimum height of 125 cm and a low level cistern a maximum height of 30 cm between the top of the pan and the underside of the cistern. The W.C. pan will be connected to the cistern by 40mm (O.D) high density Polythene flush pipe with holder clamp and brass coupling.

4.14 **Mirror Frames:**

Mirror frame where specified will be of fibre glass of approved shape, size, colour and make. Mirror will be of superior glass with edges rounded off or levelled as specified. It will be free from flaws, specks or bubble and its thickness will not be less than 5.0 mm. The glass for the mirror will be uniformly silver plated at the back and will be free from silvering defects. Silvering will have a protective uniform covering of red lead paint.

4.15 **Toilet Shelf**

Glass shelf unit will consist of an assembly of glass shelf, anodized aluminium/CP brass guardrail and supporting brackets. The shelf will be of glass of best quality with edges rounded off and will be free from flaws, specks, bubbles and of thickness not less than 5.0 mm. The shelf will have guardrail, resting on rubber washers on glass plate. Ceramics shelf will be of shape, size and design as specified in the drawings/approved by Engineer.

4.16 **Towel Rail**

Towel rail will be of CP brass/anodized aluminium with two brackets of same material, diameter and length as specified.

4.17 **Toilet Paper Holder**

Toilet paper holder will be of CP brass, PVC with CP brass brackets or ceramic of approved make and design.

4.18 **Soap Container**

Soap container will be of C.P. brass, PVC with CP brass brackets of approved make and design.

4.19 **CP Flush Valves for EWC**

The CP flush valve for EWC will be of "Jaquar" brand of Jaquar & Co. 'ACCO' brand of Asia Continental Metalware Fabric or equivalent quality.

4.20 **CP Flush Valve for Urinals**

CP flush valve for urinal will be of "Jaquar" brand of Jaquar & Co., 'ACCO' brand of Asian Continental Metalware Fabric or of equivalent quality.

4.21 **Gully Trap**

Each gully trap will have one C.I. grating 150 mm x 150 mm and one water tight precast R.C. cover 300 x 300 x 40 mm thick with 1:1 1/2:3 mix concrete (one cement: one and half sand: 3 stone chips 20 mm down) including neat cement finish.

4.22 **Fibre Glass Sink**

Fibre glass sink where specified will be of heavy duty (4 ply) of approved manufacturer, shape and size. The pipes and other appurtenances will be of the description mentioned for the glazed vitreous sinks.

4.23 **Stainless Steel Sink**

It will be of required shape and size, with or without drain board as provided in the schedule item. Sinks will be made from stainless steel sheets of approved make and quality and properly polished. Thickness of the sheet will be 1 mm or more as per the requirement.

4.24 **Plastic Seats & Covers for Water Closets**

These will conform to IS : 2548 (Part 1&2) and will be either of thermoset or of thermoplastic quality.

Thermo-set Seats and Covers are moulded from phenolic plastics (Type A) or Urea Formaldehyde (Type B) Thermo plastic Seats and Covers are also of Type A, moulded from Polystyrene or Type B, moulded from Polypropene.

Underside of the seats may be either flat or recessed and colour will be as agreed. Table Dimensions of the seats and covers will be as per Table-I of the Code (both Part 1&2). Hinging device may be either of the following materials:

- i) Bronze or Brass with Nickel Chromium Plating.
- ii) Mild Steel with Nickel Chromium Plating
- iii) Aluminium alloy with anodic coating
- iv) Suitable plastic with reinforcement.

5. **Polyethylene and UPVC Pipes**

High Density Polyethylene Pipe

These are used for potable water supplies, sewage and industrial effluents and will conform to IS :4984 - 1987. High density polyethylene (HDPE) used for the manufacture of pipes will conform to designation HDPE 52 PB of IS: 7328 - 1992.

The pipes will be classified by pressure ratings (working pressure) at 27 degree 'C' as follows:

Class of pipe	Working pressure
Class - 1	2.0 kg/cm ² (0.2 Mpa)
Class - 2	2.5 kg/cm ² (0.25 Mpa)
Class - 3	4.0 kg/cm ² (0.4 Mpa)
Class - 4	6.0 kg/cm ² (0.6 Mpa)
Class - 5	10.0 kg/cm ² (1.0Mpa)

The outside diameter of the pipe and their wall thickness will be as given in the table of IS:4984 - 1987.

Each pipe will be clearly and indelibly marked at intervals of not more than 5 metres in colour and also may be marked with, BIS mark. The marking will show manufacturer's name or trade mark. Marking in colour will be as follows :

Colour

Class - I	Orange
Class - 2	Red
Class - 3	Blue
Class - 4	Green
Class - 5	Yellow

5.1 **PVC Pipes for Potable Water Supplies**

The plain as well as socket end pipes, made of unplasticized polyvinyl chloride, are used for potable water supplies and not suitable for use in suction and

delivery lines of agricultural pumps and casing pipes in tube-well. These will conform to IS : 4985 - 1988. The pipes other than those meant for plumbing will be classified by pressure ratings (working pressure) at 27 degree 'C' as follows:

Class of pipe	Working pressure
Class - 1	2.5 kg/cm ² (0.25 Mpa)
Class - 2	4.0 kg/cm ² (0.4 Mpa)
Class - 3	6.0 kg/cm ² (0.6 Mpa)
Class - 4	10.0 kg/cm ² (1.0 Mpa)

The outside diameter of the pipe and Wall thickness will be as per IS : 4985
 The nominal outside diameter of plain end pipes plumbing works will be 20,25,32,40& 50mm. Each pipe will be clearly and indelibly marked at intervals of not more than 3 metres in colour and will also be marked with the standard mark.. The marking will show Manufacturer's name or trade mark, outside diameter, class of pipe and pressure rating, batch number word "Plumbing" in the case of plumbing pipes.

Marking in Colour except plumbing pipes which will be marked in Pink will be as follows:

Class - 1	Red
Class - 2	Blue
Class - 3	Green
Class - 4	Yellow

5.2 **Fittings for Polyethylene /Un plasticized PVC Pipes**

Unless otherwise specified, fittings will be injection moulded and/or fabricated type and will conform to IS: 7834 (Part 1 to 8) - 1987, IS : 8008 (Part 1 to 7) 1976 & IS : 8360 (Part 1 to 3) - 1977.

6. **STOP COCK AND BIB COCK**

6.1 A bibcock (bibtap) is a draw off tap with a horizontal inlet and free outlet and stopcock (stop tap) is a valve with a suitable means of connections for insertion in a pipe line for controlling or stopping the flow. They will be of specified



size and will be of the screw down type. The closing device should work by means of a disc carrying a renewable non-metallic washer, which shuts against water pressure on a seating at right angles to the axis of the threaded spindle which operates it. The handle will be either crutch or butterfly type securely fixed to the spindle. The cocks will open in anti-clockwise direction. When the bib cocks and stop cocks are required to be chromium plated, the chromium plating will be of service Grade No. 2 conforming to IS.1068. In finish and appearance, the plated articles will be free from plating defects such as blisters, pits, roughness and will not be stained or discoloured.

- 6.2 These fittings will be of brass heavy class, chromium plated (C.P) and of approved manufacture and pattern with screwed or flanged ends as specified. The fittings will in all respects comply with the requirements of IS.781. The standard size of brass fittings will be designated by the nominal bore of the pipe to which the fittings are attached. A sample of each kind of fitting will be got approved from the Engineer and all supplies made according to the approved samples.
- 6.3 All cast fittings will be sound and free from laps, blow holes and fittings, both internal and external surfaces will be clean, smooth and free from sand etc. Burning, plugging stopping or patching of the casting will not be permitted. The bodies, bonnets, spindles and other parts will be truly machined and when assembled the parts will be axial, parallel and cylindrical with surfaces smoothly finished. The area of the waterway of the fittings will not be less than the area of the nominal bore.
- 6.4 The fittings will be fully examined and cleared of all foreign matter before being fixed. The fittings will be fitted in the pipe line in a workmanlike manner. The joints between fittings and pipes will be made leak- proof. The joints and fittings will be leak proof when subjected to a pressure test specified by the Engineer and the defective fittings and joints will be replaced or redone.

7. MANHOLES

- 7.1 Manholes of types and sizes as specified will be constructed in the sewer line at such places and to such levels and dimensions as shown in the

- drawings or as directed by the Engineer. The size specified indicate the inside dimensions of the manhole.
- 7.2 Excavation and backfilling will be as per respective specifications.
- 7.3 Manhole will be built on a bed of cement concrete 1:4:8 (1 cement : 4 sand : 8 graded stone aggregate of 40 mm nominal size). The thickness of the bed concrete will be 23 cm unless otherwise specified or directed by the Engineer. In bad ground special foundation as suitable will be provided.
- 7.4 Brick work will be with first class country bricks in cement mortar 1:4 (1 cement : 4 sand). The external joints of the brick masonry will be finished smooth. The joints of the pipes with the masonry will be made perfectly leak-proof.
- 7.5 The brick walls of manholes will be plastered inside with 13 mm thick cement plaster 1:2 (1 cement : 2 sand) finished smooth with a floating coat of neat cement.
- 7.6 Channels and benching will be in cement concrete 1:2:4 (1 cement : 2 sand : 4 graded stone aggregate).
- 7.7 The depth of channels and benching will be as indicated in the table given below :

Size of drain mm	Top of channel at the centre above bed concrete mm	Depth of benching at side wall above bed concrete mm
100	150	200
150	200	300
200	250	350
250	300	400
300	350	450
350	400	500
400	450	550
450	500	600

- 7.8 All manholes deeper than 0.8 m will be provided with staggered M.S. rungs as specified in drawings. Rungs will be painted with coal tar, the portion embedded in cement concrete block being painted with thick cement slurry before fixing.

- 7.9 C.I. manhole covers and frames will conform to IS 1726. The covers and frames will be neatly cast and they will be free from air and sand holes and from cold shuts. They will be neatly dressed and carefully trimmed. All casting will be free from voids whether due to shrinkage or other causes. Cover will have a raised chequered design on the top surface to provide an adequate non-slip grip. The cover will be capable of easy opening and closing and it will be correctly fitted in the frame. The cover will be gas tight and water tight. The cover will be coated with black bituminous composition. It will not flow when exposed to a temperature of 63°C and will not be brittle as to chip off at temperature of 0°C.
- 7.10 The frame of the manhole cover will be firmly embedded to correct alignment and levels in plain cement concrete 1:2:4 (1 cement : 2 sand : 4 graded stone aggregate) on top of the brick masonry. After completion of the work, manhole covers will be smeared with thick grease.
- 7.11 Manhole cover and frame will conform to "Medium Duty", 500 mm internal diameter and will weigh not less than 116 kg. (weight of cover 58 kg. and weight of frame 58 kg.).
- 7.12 The depth of the manholes will be reckoned from top level of C.I cover to the invert level of channel. The depth will be measured correct to centimetres.
- 7.13 Inspection chambers will be constructed similar to manholes as detailed in working drawings.
- 7.14 Sewers of unequal sectional area will not be jointed at the same invert level in a manhole. The invert of the smaller sewer at its junction with main will be at least 2/3 the diameter of the main, above the invert of the main. The branch sewer should deliver sewage in the manhole in the direction of main flow and the junction must be made with care so that flow in the main is not impeded. No drains from house fittings e.g. gully trap or soil pipe etc. to manhole will normally exceed a length of 6 meters unless it is unavoidable.

8. **DROP CONNECTION**

- 8.1 In cases where branch sewer enters the manholes of main pipe sewer at a higher level than the main sewer, a drop connection should be provided.

Pipes and specials conforming to IS 1729 will be of the same size as the branch pipe sewer.

- 8.2 For 150 mm and 250 mm main line, if the difference in level between the water line (peak flow level) and the invert level of branch line is less than 600 mm a drop connection may be provided within the manhole by giving a suitable ramp. If the difference in level is more than 600 mm the drop should be provided externally.
- 8.3 The excavation will be done for the drop connection at the place where the branch line meets the manhole. The excavation will be carried up to the bed concrete of the manholes and to the full width of the branch line. Excavation and backfilling will be done as per respective specifications.
- 8.4 At the end of branch sewer line C.I. tee will be fixed to the line which will be extended through the wall of manhole by a horizontal piece of C.I. pipe to form an inspection or cleaning eye. The C.I. drop pipe will be connected to the tee at the top and to the C.I. bend at the bottom. The bend will be extended through the wall of the manhole by a piece of pipe which will discharge into the channel. Necessary channel will be made with cement concrete of grade M15 and finished smooth to connect the main channel. The joint between C.I. pipe and fittings will be lead caulked. The joint between C.I. tee and S.W. branch line will be made with cement mortar 1:1 (1 cement : 1 fine sand). The exposed portion of the drop connection will be encased around with minimum 150 mm. thick concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) and cured. For encasing the concrete around the drop connection, necessary centering and shuttering will be provided. The holes made in the walls of the manhole will be made good with brick work in cement mortar 1:4 (1 cement : 4 coarse sand) and plastered with cement mortar 1:2 (1 cement : 2 fine sand) on the inside of the manhole wall. The excavated earth will be back filled in the trench in level with the original ground level. Drop connection will be measured in numbers.

9. **ROAD GULLY CHAMBERS**



- 9.1 The chamber will be of brick masonry/RCC and will have a C.I. grating with frame fixed in 150 mm thick cement concrete of grade M15 at the top. The size of the chamber will be taken as clear internal dimensions of the C.I. frame. The chamber will have a S.W. connection pipe, the length of which between road gully chamber and the point of discharge to drain or to open ground will be measured separately. The chamber will be built at the locations indicated in drawings.
- 9.2 Bed concrete, brick work, plastering, RCC work, excavation, backfilling, etc. will be as per details given on the drawing and in compliance with the requirements laid down in the specifications for the respective items.
- 9.3 The gully grating cover will be hinged to the frame to facilitate its opening for cleaning and repairs. The weight of grating will be 75 kg. minimum.
- 9.4 After completion of the work, the exposed surfaces of the grating and the frame will be painted with a thick coat of coal tar.

10. WATER SUPPLY PIPES

Chlorinated polyvinyl chloride (CPVC) pipes having thermal stability for hot and cold water supply including all CPVC plain and brass threading conforming to relevant IS code.

All exposed pipes shall be installed with PVC saddles screwed on 25 mm thick wooden blocks securely fixed on walls at suitable intervals, not exceeding 1 m. Pipe wherever installed in wall chasing shall be fixed as in the case of galvanized steel pipes.

11. WATER TANKS

All tanks for storage of water shall be as indicated in the drawings / Schedule of Items and shall be completely watertight and properly covered with dust, light and mosquito proof cover approved type as shown on drawings or as described in the bill of quantities. They shall be fitted with a ball valve of the inlet pipe. A mosquito proof overflow pipe shall be fixed to the tank with the pipe invert about 25 mm above the top of water line. Approved type of stop valve shall be provided for every outlet pipe. All outlet and inlet pipes shall be fixed as shown in the drawings. Inside surface of galvanized steel tanks shall be painted with anti-corrosive drinking water paints as indicated in the Schedule of Items.

All water storage tank have facility of Automatic and manual control of water level in the tank with auto-manual start stop of water pump

All storage tanks, water supply fittings and pipes before being put into commission shall be disinfected with liquid chlorine by the Bidder at his own cost.

12. SANITARY & PLUMBING FITTINGS



All sanitary fittings and plumbing fixtures shall be of the best quality and make, and shall be subject to Owner's approval. All water supply fittings in toilets, kitchen etc viz., Bib cocks, pillar cocks, P-traps, towel rail, shower rose, gratings etc., shall be of best quality chromium plated brass of approved make.

All water supply pipes for internal plumbing of buildings shall be of Chlorinated polyvinyl chloride (CPVC) pipes having thermal stability for hot and cold water supply including all CPVC plain and brass threading confirming to relevant IS code.