Standard Specification for Plumbing & Sanitary Works

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Standard Specification for Plumbing & Sanitary Works

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1 PURPOSE
The purpose of this standard is to define specifications to be followed for plumbing, sanitary works and Drainage.

2 SCOPE
The work covered by this specification includes supply of approved quality sanitary ware, accessories, their installation and commissioning the scheme as directed.

3 CODES AND STANDARDS
IS:1172:1993 - Code of basic requirements for water supply drainage and sanitation.
Part16:1979 - Laying of water & sewer lines including appurtenant items
IS:1239 - Mild Steel Tubes and Mild Steel Tubulars and other wrought steel pipe fittings.
IS:1536:2001 - Centrifugally cast (Spun) iron pressure pipes for water gas & sewage.
IS:2470:1985 - Code of Practice for installation of septic tank :
IS:1537:1976 - Vertically cast iron pressure pipes for water, gas and sewage.
IS:3989:1984 - Centrifugally cast (spun) iron spigot & socket soil waste and ventilating pipes, fittings and accessories.
IS:1729:2002 - Cast iron/ Ductile iron Drainage pipes and pipe fittings for over ground Non- pressure pipeline socket and spigot series
IS:1626:1994 – Specifications for Asbestos cement building pipes, gutters and fittings
IS:458:2003 - Specification for Concrete pipes (with and without reinforcement)
IS:784:2001 - Prestressed concrete pipes (including fittings)
IS:5219 - Specification for cast copper alloys traps:
IS:771 - Specification for Glazed fire-clay sanitary appliance.
Part 1:1979 - Part 1- General requirements
IS:774:2004 - Flushing cistern for water closets & urinals (Other than plastic Cistern)- Specification

4 TECHNICAL REQUIREMENTS

4.1 MATERIALS

4.1.1 Sanitary fixtures

All sanitary ware shall be glazed earthware of fireclay as specified in the material schedule & shall be of best quality manufactured by approved manufacturer, and shall be finally approved by the Owner / Consultants prior to installation. The approved samples shall be kept at site till the final installation of the sanitary ware.

The materials shall be free from any wrap, cracks, blemishes, blisters, uneven glazing, shall be smooth and free from crazing & deformations.

4.1.2 Pipes

Galvanised iron pipes and specials shall be of class "C" heavy type, first quality and shall conform to IS 1239. All pipes and fittings shall be approved by the Owner / Consultants prior to installation.

Cast Iron soil waste pipes & specials shall be of approved quality and shall conform to IS 1729. These pipes shall be used for soil waste, vents and anti-siphonage.

Asbestos cement pipes and specials shall be approved make and shall conform to IS1626. These pipes shall be used wherever they are exposed and non-vertically.

4.1.3 Plain Cement Concrete

Plain cement concrete used for sanitary installations shall consist of following mixes. The mixing of concrete shall generally be done by mixers unless otherwise permitted by the Owner / Consultants. The concrete when hand mixed shall be done on a clean platform and not be mixed earlier than 20 minutes before it is placed in position. The water used for mixing shall be clean potable water, and the water cement ratio shall generally not exceed 0.6.
Sr. No. | Mix | Cement | Qty of clean course sand | Qty of graded clean stone aggregate | Max. size of aggregate (mm) \\
--- | --- | --- | --- | --- | --- \\
1. | 1:4:8 | 1 | 4 | 8 | 20 to 37 \\
2. | 1:3:6 | 1 | 3 | 6 | 20 to 37 \\
3. | 1:2:4 (M15) | 1 | 2 | 4 | 20 to 25 \\

The contractor shall provide necessary formwork. Concrete when laid shall thoroughly be compacted by standard methods. The 24 hours when the concrete work is not suspended. Minor defects shall be rectified after removal and the exposed surfaces shall be rendered smooth.

4.1.4 Brick Work

The bricks shall be clean and best available in the area. The bricks shall neither be overburnt nor underburnt. The size of brick shall be 75 x 115 x 225 with tolerances of 1.5mm in depth, 3mm in width & 6mm in length. The bricks when immersed in water for 24 hours shall not absorb more than 20% of its weight of water.

The cement mortar shall consist of one bag of cement mixed with 6 parts of clean coarse sieved sand, as specified. Wherever required, scaffolding shall be provided. The joints on the surfaces to be plastered shall be raked for a depth of 12mm prior to application of plaster. The brickwork shall not be raised more than 900 cm. in a day. Brickwork shall be cured for at least 7 days.

4.1.5 Cement Plaster

The cement mortar shall be prepared from one bag of cement to four parts of clean washed sand and shall be applied uniformly over brick surface. The average thickness of plaster on brickwork shall be limited to 20mm. The concrete surface shall have 12mm average thick plaster. The surfaces of concrete shall be roughened prior to application of plaster. The plaster so applied shall be rendered smooth by a neat coat of thick cement slurry, which shall be trowelled smooth. The plaster shall be cured for at least seven days.

4.1.6 Reinforced Cement Concrete

The concrete shall be done as specified under Plain Cement Concrete, however the maximum size of aggregate shall be limited to 20mm. The concrete pad shall be vibrated by mechanical means. The contractor shall also provide reinforcement wherever required to a maximum of 85 kg / Cu. m. of concrete. The contractor shall also provide formwork wherever required. The exposed surfaces shall be rendered smooth wherever plaster is not called out.

4.2 SANITARY FIXTURES

4.2.1 European Water Closet (Ordinary or Syphomic Type)

The European Water Closet shall consist of:

a) Approved washdown closet in white glazed or coloured earthenware with integral "P" or "S" trap as specified.

b) Rubber joints for inlet connection.

c) Black or any other colour of solid plastic seat and cover with chromium-plated hinges and rubber buffers as specified.
d) Low level flushing cistern of 15 litres capacity Fordham or equivalent make, porcelain enamelled with all fittings and accessories with 32mm flush chromium plated flush bend.

e) Porcelain enamelled supporting brackets for cistern.

f) 15mm p.v.c. connector and 15mm C.P brass stop cock easy clean type.

g) Standard toilet paper roll holder of approved type shall be provided, and this shall be surface mounted type fixed with C.P. counter sunk brass screws.

h) All the necessary work required for satisfactory working.

4.2.2 Indian Water Closet

The Indian Water Closet shall consist of:

a) Best Indian make Water Closet pan of 630mm (i.e. 25") size with "P" or "S" trap in white glazed earthenware.

b) Low level flushing cistern of 15 litres capacity ‘Fordham’ or equivalent make, porcelain enamelled with all fittings and accessories with 32 mm flush chromium plates flush bend.

c) 32mm C.I. flush pipe of appropriate length with necessary brass and wiped soldered joints bend to proper shape & fixed in position in chasses and the chasses shall then be fixed smooth to match.

d) The brickbat lime or cement concrete required to be filled around the entire space of the W.C. pan properly rammed and consolidated without damaging the pan.

e) C.I. soil waste pipe bend with cleaning cap extending upto Gulley Trap Chamber beyond the "P" trap.

f) The work shall include all the primary works such as cutting, excavating pits in ground floor for fixing closet pan and similar other work necessary for satisfactory working of the closet.

4.2.3 Wash Basin

This shall be the best available type of wash basin of approved Manufacturer and shall consist of the following approved accessories:

a) Wash basins of size as specified in the material schedule and shall be in vitreous Chinaware with or without antisplash rim with tap holes, overflow split.

b) Supporting Cast Iron Brackets with premier & 20r more finishing coats.

c) 12mm chromium plated tap with appropriate marks for cold or hot water.

d) 32 mm chromium plated brass waste coupling with rubber plug and chain.

e) 12mm p.v.c. connector with wiped joints & 15mm chromium plated brass stop cock.

f) All the accessories wherever necessary shall be painted in 2 coats or more with approved enamel paint.

g) The wash basin shall have glazed chinaware pedestal whenever so specified in the material schedule.

h) All the necessary work that will be necessary for its satisfactory working.

4.2.4 Urinals

These shall be of the approved make and shall consist of the following:

a) Vitreous Chinaware urinal stall of 11p type as specified in the material schedule.

b) 5 litre capacity C.I automatic flushing cistern with all accessories.
c) 32mm Chromium plated brass waste coupling.
d) 12 mm dia C.P. brass, flush pipe.
e) Suitable supporting arrangement using Rawl plugs with C.P. brass screws used for fixing the urinal.
f) All other necessary work for satisfactory working.

4.2.5 **Shower Rose**
This shall be of Chromium plated brass and approximately 125mm in diameter with C.P. brass arm of appropriate length and wall flange etc., wherever necessary.

4.2.6 **Mirror**
The mirrors shall be of size specified in the material schedule with or without bevelled edges. The mirrors glass shall be free from all defects & shall give clean undisturbed image at any distance & angle. This shall normally be of "Hindustan Pilkington" or approved equal. The mirror shall be mounted on Asbestos sheets or 6mm plywood with brass counter sunk screws with washers and detachable G.P.caps.

4.2.7 **Soap Dispenser**
This shall be either clear glass or chinaware type or as specified in the material schedule and shall be of approved type. This shall include all the necessary accessories such as fixing bracket with easy rotatory moment of the dispenser. Chromium plated brass screwed-in-type of cap with a central orifice.

4.2.8 **Stop Cocks & Bib Taps**
These shall be chromium plated brass heavy quality of "EGO" type or equivalent, and shall be easy type with capston head. The size shall be as specified in the Bill of Quantities.

4.3 **SANITARY FITTINGS**

4.3.1 **P.V.C Connectors**
These shall be of specified size, of appropriate length with brass unions and wiped solder joint, shall be bent to correct shape without any distortions, and work shall include all the operations, such as fixing, as necessary for satisfactory working of the same.

4.3.2 **Towel Rails**
The towel rails shall be of chromium plate brass tube with a pair of C.P. brackets. Material shall be of approved type and the size shall be as indicated in the Bill of Quantities or drawing. The towel rails shall be fixed to wall by Rawl plugs and C.P. brass counter sunk screws.

4.3.3 **Peet Valve**
The peet valves shall be of gunmetal heavy type of approved quality and shall have hand wheels. The work shall include testing & making good leakages.

4.3.4 **Marble Partitions / Kota Stone Partitions**
These shall be of the sizes specified in the relevant drawings or Bill of Quantities and shall be machine cut and polished from both the sides with rounded edges. This shall be fixed in the brickwork with appropriate groove made good to match after fixing.

4.3.5 **Nahani Traps or Deep Seal Traps**
These traps shall be of Cast Iron Type of outlets of required sizes. The work shall include fixing the trap in P.C.C. 1:2:4, and shall be provided with Chromium plated brass hinged type heavy grating on the top. The deep seal traps shall have generally 50mm water seal.
4.3.6 **Half-Round Channels for surface Drains**

These shall be of best Indian make glazed chinaware and of specified size. They shall be bedded on 75mm thick concrete or cement mortars in the floor and shall be laid to slope. The joints shall be finished in white or coloured cement to match.

4.3.7 **Automatic Ball Float Valves**

These shall be best Indian make and available for high pressure quality. The connecting rod from valve to copper float shall be brass and shall withstand high pressure encountered on it. The float shall be of high pressure encountered on it. The float shall be of copper unless otherwise specified. This shall be soldered and brazed to render it leakproof. The material shall be approved by the Owner / Consultants prior to installation.

4.3.8 **Measurements**

All the above items shall be measured, paid on number basis. Rates of these items shall include providing and fixing with all necessary materials and labour cost as per specifications.

4.4 **MISCELLANEOUS FIXTURES**

All miscellaneous fixtures such as robe hooks, soap trays, shelves, tumbler and tooth brush holder shall be as specified and work shall cover supply & fixing of the same with approved methods.

4.4.1 **Manholes**

These shall be constructed as per the following specifications

a) The maximum distance between manholes shall be 30 meter unless specially permitted otherwise. In addition, at every change of alignment gradient or diameter there shall be a manhole or inspection chamber. The distance between manhole or inspection chamber and gully chamber shall not exceed 6 metres unless desired otherwise. Manhole shall be constructed so as to be watertight under test. The bending at the sides shall be carried out in such a manner as to provide no lodgement for any splashings in case of accidental flashing of the chamber. The channel or drain at the bottom of chamber shall be plastered with 1:2 cement, sand mortar and finished smooth to the grade. The channels and drains shall be shaped and laid to provide smooth flow.

b) Connecting to existing sewer line shall be through a manhole.

c) Manholes shall be provided with standard C.I. covers. The covers shall be close fittings so as to prevent gases from coming out. Suitable heavy duty covers shall be used where necessary as decided by the MMCI/HPCL Engineer in charge.

4.4.2 **Inspection Chambers**

a) Necessary Excavation, refilling for the construction of the chamber.

b) Bed concrete PCC 1:3:6, 150mm thick with 150mm offsets on all sides beyond the Brickwall.

c) Brick Masonry 230 thick all round upto maximum depth of 1.20 metres in cement mortar 1:6.

d) 20mm thick plaster in cement mortar 1:4 on inside (with water proofing compound) and outside and other exposed surfaces of the chamber, plaster shall be rendered smooth by cement floating of 2mm thick, finish smooth by trowell.

e) Cast Iron heavy duty Manhole cover and frame suitable to the size of the chamber. The cover shall be painted in 2 coats of bitumastic anti-corrosive paint. Cover shall be close fitting so as to prevent gases form coming out.
f) Concrete screed benching to suit the pipe size and the benching shall be finished smooth for easy flow.

h) All necessary work required for satisfactory working of the same.

i) PCC 1:3:6 coping, 100mm thick on the top of the chamber to house the C.I. cover frame. (Dimensions to suit the brickwork).

4.4.3 Valve Chambers

Valve Chambers shall be of the inside clear size as required and the construction shall be similar to that for Inspection Chambers except for benching for the drainpipes. AMS locking arrangement shall be provided in addition to the Cast Iron Cover.

4.4.4 Gully Trap Chambers

The Gully Trap Chambers shall consist of brick masonry chambers suitable for the specified size of the Gully Traps. The traps shall be glazed stoneware of approved make.

Construction of Gully Trap Chambers shall consist of the following:

a) Excavation and refilling after construction of chamber.

b) 1:3:6 PCC bed concrete required for embedding the Trap.

c) 230mm thick Brick Masonry in C.M. 1:6.

d) 20mm thick W.P plaster from inside and smooth from outside in C.M. 1:6 trowell smooth by cement floating on all surfaces.

e) PCC 1:3:6 coping 100mm thick for having cast iron cover frame. (Dimensions shall suit the brickwork).

f) Cast iron frame and cover size fixed in coping & painted in 3 coats of anti-corrosive bitumastic paint.

g) All the work necessary for satisfactory working of the same.

4.4.5 Cast Iron Covers

The Cast Iron cover for manholes, Inspection Chambers, Valve Chambers, Gully Traps, Pits shall be of the size & duty as specified in the Material Schedule. The Cast Iron cover shall conform to IS 1726. The rate shall include painting with three coats of anti-corrosive bitumastic paint.

4.4.6 G.I. Pipe Work

The galvanised pipework shall include cutting to required lengths, threading, jointing, fixing, testing, and commissioning the water lines. Any leakages found during testing, or after commissioning the lines shall be removed and replaced. The pipes when fixed to walls shall be fixed with wooden packing and G.I. clamps and screws. They shall be kept at least 12mm away from the walls. The piping as done shall be tested for water pressure of 10Kg / Sqm, maintained for 12 hours. The measurement of the pipings shall be done along the longitudinal axis of the pipeline. The rate of the pipeline shall include the following items:

a) Providing pipe & specials other materials as required.

b) Cutting to required lengths, threading, jointing, fixing, testing & commissioning the line as required.

c) Including all Tees, Bends, elbows, reducers, flanges Couplings, Unions and all other accessories.

d) Providing wooden battens, clamps, screws, rubber insertions, bushes etc.
4.4.7 Cast Iron Pipe Work

The soil waste, vent and anti-siphonage pipes & specials shall be of approved quality & make and as specified above. When underground pipes shall be kept on firm soil & trenches it shall be backfilled carefully to avoid damages to pipes, when exposed vertically, they shall be fixed by means of wooden packing and M.S. clamps. The rate of measurement shall include the following:

a) Measurement shall be based on the actual longitudinal length.
b) Provision of specials and all other materials required for installation.
c) Cutting to required lengths, jointing with spun yarn and lead caulking, testing & removal of leakages.
d) Any auxiliary works such as making openings, holes in walls, floors and making good the same to match.
e) The pipe when exposed shall be fixed to walls by 50mm thick wooden packing, M.S. clamps and screws.

Note: In case of underground pipes, excavation and back filling shall be measured separately.

4.4.8 Asbestos Cement Pipe Work

The work shall be similar to that described above. However, the jointing shall be done in C.M. 1:2 or as specified, in places of lead caulking. The measurement shall be on the basis of actual longitudinal length including specials and the rate shall include all the items of work described above. In case of Asbestos cement pipes, portions of the pipe lengths which are likely to be damaged by movement of persons, materials, and or vehicles shall be in equivalent cast iron unless otherwise specified length of such portion, shall, however, be limited to one straight length of the C.I. pipe or two meters, whichever is more.

4.4.9 Stoneware Pipework

Glazed stoneware pipe shall be as per I.S. Specifications made by the approved manufacturer, absolutely smooth finished from inside, well burnt and non-porous. The contractor shall get the sample of pipe approved before purchasing. The line shall be laid in the required gradient, socket facing upstream direction, and joints filled up with dry cement mortar of 1:1 proportion, and caulked well inside and edges outside the socket splayed off well at 45 deg.c. The spigot end shall be inserted into the socket to the full length. No change in directions shall be allowed by partial insertion of the spigot. The joints shall be well watered and kept moist by wet gunny bags for at least a week's period.

4.5 INSTALLATION OF PIPE

4.5.1 Licensed Plumbers

The work which required to be carried out under the provision of these specifications shall only be executed by the licensed plumber or by a person whose qualification has been approved by the MMCI/HPCL Engineer in charge.

4.5.2 Excavation

Excavation shall be done in accordance with Technical specifications.

4.5.3 Concreting

Concreting shall be done in accordance with Technical specification.
4.5.4 Laying of Pipes

The pipes shall be laid with the sockets facing upstream and shall rest on solid and even foundations for the full length of the barrel. Socket holes be formed in the foundation sufficiently deep to allow sufficient space for the pipe jointer to work right around the pipes and as short as is practicable to accommodate the socket in the proper position and allow the joint to be made.

Where pipes are not bedded on concrete, the trench shall be left slightly high and carefully bottomed up as pipe laying proceeds so that the pipe barrels rest on firm and undisturbed ground. If the excavation has been carried too low, packing done shall be in concrete.

All vertical pipe shafts, soil pipes or ventilation pipes shall be strongly supported at the foot upon a bed of concrete and firmly attached to the walls. It shall fixed at least 5 cms. clear of the finished surface of the wall by means of suitable clamps of approved type.

Each separate pipe shall be individually set for line and for level using one of the standard procedure as approved by the MMCI/HPCL Engineer in charge.

4.5.5 Jointing of Pipes

The spigot and socket joints of cast iron pipes shall be fitted with jute or yarn mixed with linseed oil and cement slurry, and then the entire joint shall be covered by cement all round to ensure complete leak proof joint.

Screwed wrought iron or steel piping shall be jointed with screwed and socketed joints, using screwed fittings of wrought iron, steel or malleable cast iron. Care shall be taken to remove any burr from the ends of pipes after screwing.

A joint compound may be used according to the manufacturer's instructions together with a grummet of a few strands of fine yarn, but compounds containing red lead shall not be used. Any threads exposed after jointing shall be painted or in case of underground piping, thickly coated with bituminous or other suitable composition to prevent corrosion.

The joint in lead pipe shall be made as wiped solder joints. The minimum and the maximum length of the wiped solder joints shall be 8 mm and 9 cm respectively. The solders shall consist of two parts of Portland cement and one part of clean sharp sand.

All pipes shall be fixed 25 mm clear off the wall with M.S Holder bat clamps or as approved by the MMCI/HPCL Engineer in charge. Where any water closet pan or earthenware trap connected to such pan is to be jointed with a cast iron pipe, the joint between the stoneware spigot and the cast iron socket shall always be of a flexible (non-rigid) nature, such joints shall be made with a mixture of bitumen and chopped asbestos fibre (nut dust).

4.5.6 R.C.C PIPE

4.5.6.1 Materials

For pipe materials, the following specifications shall apply:

RCC Pipes & Collars IS:458
Laying of Pipes IS:783.

For cement sand, mortar, water etc. the specifications laid down for concrete works shall apply.

All pipes must be new and perfectly sound, free from cracks, cylindrical, straight, and of standard nominal diameter and length with even texture. Each pipe shall have one collar with it.
The contractor shall submit manufacturer's test certificate whenever demanded by MMCI/HPCL Engineer in charge or his authorised representative. Spun yarn for pipe joints shall be of best quality. It shall be free from dust etc.

4.5.6.2 Transportation and Stacking

The transportation of materials to the work site and stacking shall be done in a manner to cause minimum inconvenience to the traffic and other construction works. The pipe shall be protected during handling against impact, shocks and free fall to avoid cracks and damage.

The contractor shall be fully responsible for the safety and security of materials transported and stacked in the field.

4.5.6.3 Lowering and Laying of Pipes

General

The laying and jointing of pipes shall conform to IS:783. The trench shall be checked for proper level, gradient and alignment before lowering the pipes.

Lowering

The pipes shall be lowered cautiously to prevent disturbance of the bed and sides of the trench. The heavy pipes shall be lowered by means of proper shear legs, chain pulley blocks or as directed by MMCI/HPCL Engineer in charge. Great care should be taken to prevent sand etc. from entering the pipes.

Laying

Laying of pipes shall proceed up grade of slopes. The error of grade shall not be rectified by packing up earth underneath the pipes. If required, concrete shall be used for packing.

The ends of the pipes shall be kept closed to keep dirt, mud and foreign materials, out. Adequate provision shall be made to prevent floating of pipe in the event of flooding of trenches.

The body of the pipe for its entire length shall rest on an even bed in the trench and places shall be excavated to receive the collar for the purpose of jointing.

4.5.6.4 Jointing of Pipes

A few skeins of spun yarn soaked in neat cement shall be inserted in the groove at the end of the pipe and the two adjoining pipes butted against each other. Collar shall be slipped over the joint covering equally both the pipes. Spun yarn soaked in neat cement shall be passed round the pipes and inserted in the joint by means of caulking tools from both ends of the collar. More skeins of yarn shall be added & well rammed home. The object of the yarn is to centre the two ends of the pipes within the collar and to prevent pipes becoming loose.

Cement mortar 1:2(1 cement :2 sand) shall be slightly moistened and must on no account be soft or sloppy and shall be carefully inserted by hard into the joint. The mortar shall then be punched and caulked into the joint and more cement mortar added until the space of the joint has been filled completely with tightly caulked mortar. The joint shall be finished off neatly outside the collar on both side at an angle of 45 Deg.

Any surplus mortar projecting inside the joint is to be removed and to guard against any such projections, sack or gunny bags shall be drawn past each joint after completion.

4.5.6.5 Curing

The cement mortar joints shall be cured at least for seven days.
4.5.6 Testing

All joints in the pipes shall be tested to a head of 1.5 metres of water above the top of the highest pipe.

4.5.7 Testing of pipes

All tests shall be conducted by the contractor at his own expense in the presence of the MMCI/HPCL Engineer in charge and as guided by the MMCI/HPCL Engineer in charge.

4.5.7.1 Testing for water supply system

When the service is complete, it shall be slowly and carefully charged with water, allowing all air to escape and avoiding all shock or water hammer. The services shall then be inspected under working conditions of pressure.

When all draw of points are closed, the service pipe shall be absolutely water tight. All piping, fittings and appliances will be checked over for satisfactory support, and protection from damage and corrosion. Because of the possibility of damage in transit, cisterns shall be retested for water tightness on arrival at the site, before fixing.

4.5.7.2 Testing for Sewer System

Comprehensive tests of all appliances shall be made by simulating conditions of use before the final approval. Over flow shall also be examined for obstruction.

4.5.7.3 Smoke Test

All soil pipes, waste pipes, vent pipes and rain water drain pipes and all other pipes which are above ground shall be gas-tight. To ensure gas-tightness, smoke test shall be conducted. The smoke can be produced by burning oily waste or tar paper or similar material in the combustion chamber of smoke machine.

4.5.7.4 Water Test

The drains pipes shall be subject to test pressure of at least 1.5 M head of water at the highest point of the section under test. The tolerance figure of two litres per centimeter of diameter per kilometer (or one gallon per inch of diameter per mile) shall be allowed during a period of ten minutes. The test shall be carried out by suitably plugging the low end of the drain and the ends of connections if any and then filling the system with water.

4.5.7.5 Sterilization

All building water supply system before connected to the street main shall be thoroughly and efficiently disinfected by the contractor under the supervision of MMCI/HPCL Engineer in charge and as guided by the MMCI/HPCL Engineer in charge. The system shall be first flushed out with water and a does of 50 parts of chlorine to one Million parts of water. If ordinary powder is used, the proportions shall be 150 grams to 1000 litres of water.

4.6 SEPTIC TANK & EFFLUENT DISPOSAL

4.6.1 Septic tank

Septic tank shall consist of the tank itself with inlet and outlets therefrom complete with all necessary earthwork and backfilling. The details of septic tank shall be as shown on drawings. This item shall also include ventilating pipe of at least 100 mm dia whose top shall be provided with a suitable mosquito proof wiremesh and cowl. Ventilating pipe shall extend to a height of about 2 metres when the septic tank is at least 15 metres away from the nearest building and at least 2 metres above the building when it is located closer than 15 metres. Ventilating pipes can be connected to the normal soil ventilating system of the building where allowed.
4.6.2 Effluent Disposal

The effluent from the septic tank shall be disposed by allowing it into an open channel or a body of water if the concerned authority approves or into a soak pit for absorption by soil or shall be allowed to be absorbed by soil through open jointed SW pipes laid in a trench filled with broken bricks.

4.6.3 Soak Pit

The soak pit shall be complete as shown on drawing. It shall consist of a 900 mm dia pit 1000 mm in depth below the invert level of the inlet pipe. The pit shall be lined with stone, brick or concrete blocks set in cement mortar (1:6) and filled with brick bats. Inlet pipe shall be taken down to a depth of 900 mm from the top as an anti-mosquito measure.

4.6.4 Open joined SW Pipe/dispersion trenches

Minimum dia. of the SW pipes shall be 150 mm nominal. The trench for laying the pipes shall be minimum 600 x 600 mm. The joints of the pipes shall be left unsealed. The entire length of the pipe within the trench shall be buried in a 250 mm layer gravel or crushed stone of uniform size. On top of gravel/crushed stone layer 150 mm bed of well graded coarse aggregate shall be laid. Ordinary soil will be used for filling the top of trench.

4.6.5 Commissioning septic tank

After the septic tank has been proved watertight and the sewage system is checked the tank shall be filled with water to its outlet level before the sewage is let into the tank. It shall be seeded with well digested sludge obtained from septic tank or sludge digestion tank. In the absence of digested sludge a small quantity of decaying organic matter such as digested cow-dung may be introduced.

4.6.6 Testing Septic Tank

The septic tank shall be tested for watertightness. It shall be filled up with water and allowed to soak for 24 hrs. Then, it shall be topped up and allowed to stand again for 24 hrs and loss of level recorded. The fall shall not be more than 15 mm.

4.7 MEASUREMENTS & RATES

In addition to the normal Scope of Work (i.e. supply of materials and labour including auxiliary works), and the various items of works specified in the preceding paragraph, the rates shall include the following:

a) Excavation shall be measured in cubic meters, wherever it is so specifically mentioned and not included in items of work described under the preceding paragraphs.

b) Rate of plain cement concrete shall include providing all the materials, mixing, laying, compacting, necessary formwork, curing and finishing.

c) Rates of RCC above shall include provision of all materials, mixing, laying, compacting, necessary formwork, curing and reinforcement as specified above.

d) Brickwork shall be measured in cubic meters wherever so specified in schedule of materials and if not included in the items of work mentioned in the preceding paragraph. Rate shall include raking of joints for plaster also.

e) Plaster shall be measured in square meters wherever so specified in the schedule of materials and if not included in the lieu of work, mentioned in preceding paragraphs. The rates shall include curing, scaffolding.
f) The installation of sanitary units such as European or Indian type W.C. wash basins mentioned under the sanitary fixtures shall be measured on individual Number Basis, and shall include all the various items of work mentioned under the relevant paragraph.

g) Manhole & Inspection Chambers, Gully Trap Chambers shall be measured on Individual Number Basis for various depths, and Rates shall include all the various operations described above.

h) Rates are included for giving satisfactory testing for the function of the system.

i) Back-filling or making surfaces good after testing is over shall be covered in rate.

j) Connection with the existing drain, including cutting hole in manhole, jointing and making it good after joint is done, shall also be covered in rates.