5.16 Chapter 16: PLUMBING - INDOOR WORK

5.16.1 Water Supply (General)

General Requirements: All water supply installation work shall be carried out through skilled plumbers. It is most important that a wholesome water supply provided for drinking and culinary purposes shall not be liable to contamination from any less satisfactory water. There shall, therefore, be no cross connection whatsoever between a pipe or fitting for conveying or containing wholesome water and a pipe or fitting for conveying or containing impure water or water liable to contamination or of uncertain quality of water which has been used for any purpose.

No piping shall be laid or fixed so as to pass into, through or adjoining any sewer, scour outlet or drain or any manhole connected therewith nor through any ash-pit or manure-pit or any material of such nature that would be likely to cause undue deterioration of the pipe. Where the laying of any pipe through fouled soil or pervious material is unavoidable, the piping shall be properly protected from contact with such soil or material by being carried through an exterior cast iron tube or by some other suitable means. Any piping or fitting laid or fixed, which does not comply with the above requirements, shall be removed and re-laid in conformity with the above requirements.

All pipe work shall be so laid or fixed, and maintained as to be and to remain completely watertight, thereby avoiding waste of water, damage to property and the risk of contamination of the water conveyed. Due attention shall be given to the maximum rate of discharge, protection against damage and corrosion, protection from frost, and to avoidance of airlocks, noise transmission and unsightly arrangement.

To reduce frictional losses, piping shall be as smooth as possible inside. Methods of jointing shall be such as to avoid internal roughness and projection at the joints, whether of the jointing materials or otherwise. Change in diameter and in direction shall preferably be gradual rather than abrupt to avoid undue loss of head. No bend or curve in piping shall be made so as to materially diminish or alter the cross-section.

Underground piping shall be laid at such a depth that it is unlikely to be damaged by frost or traffic loads and vibrations. It shall not be laid in ground liable to subsidence, but where such ground cannot be avoided; special precautions shall be taken to avoid damage to the piping. Where piping has to be laid across recently disturbed ground, the ground shall be thoroughly consolidated so as to provide a continuous and even support. Where the service pipe is of diameter less than 50 mm, the stop valves shall be of the screw-down type and shall have loose washer plates to act as non-return valves. Other stop valves in the service line may be of the gate type.

5.16.2 Pipe works

- *Providing and fixing G.I. pipes including G.I. fittings & clamps & repair walls (internal works)*

PI0001	*15mm*
PI0002	*20mm*
PI0003	*25mm*

PI0004 32mm

PI0005 40mm

PI0006 50mm

- *Providing and fixing H.D.P.E pipes, PN 10, including fittings and repairing walls etc. complete*

PI0010 20mm

PI0011 25mm

PI0012 32mm

PI0013 40mm

PI0114 50mm

- *Providing and fixing 3-layer PP-R (Polypropylene Random Copolymer) PN-16 pipes, SDR 7.4 UV Stabilized and anti microbial fusion welded, having thermal stability for hot and cold water supply including all PP-R plain and brass Threaded Polypropylene random fittings including fixing pipe with clamps at 1.0m spacing. This includes testing of joints, cutting chases and making good the wall complete as per direction of Engineer-in- Charge.*

PI0290 16mm

PI0291 20mm

PI0292 25mm

PI0293 32mm

PI0294 40mm

PI0295 50mm

- *Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes - class 1 (SDR11), having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge. Internal work - Exposed on wall*

PI0300 15 mm

PI0301 20 mm

PI0302 25 mm

PI0303 32 mm

PI0304 40 mm

PI0305 50 mm

- *Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes - class 1 (SDR11), having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge. Concealed work, including cutting chases and making good the walls etc.*

PI0315 15 mm

PI0316 20 mm

PI0317 25 mm

PI0318 32 mm

For internal work, the pipes and fittings shall run on the surface of the walls or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern holder bat clamps, keeping the pipes about 1.5 cm clear of the wall. When it is found necessary to conceal the pipes, chasing may be adopted or pipes fixed in the ducts or recess etc., provided there is sufficient space to work on the pipes with the usual tools. The pipes shall not ordinarily be buried in walls or solid floors. Where unavoidable, pipes may be buried for short distances provided adequate protection is given against damage and where so required joints are not buried. Where directed by the Engineer, a M.S. tube sleeve shall be fixed at a place where the pipe is passing through a wall or floor for reception of the pipe and to allow freedom for expansion and contraction and other movements. In case the pipe is embedded in walls or floors it should be painted with anticorrosive bitumastic paint of approved quality. The pipe shall not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors the pipes shall be laid in layer of sand filling as done under concrete floors.

Cutting and Threading: Where the pipes have to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bore is offered. The end of the pipes shall then be carefully threaded with pipe dies and taps in such a manner as not to result in slackness of joints when the two pieces are screwed together. The taps and dies shall be used only for straightening screw threads which have become bent or damaged and shall not be used for turning of the threads so as to make them slack as the later procedure may not result in a water tight joint. The screw threads of pipes and fittings shall be protected from damage until they are fitted.

Jointing: The pipes shall be cleaned and cleared of all foreign matter before being laid. In jointing the pipes, the inside of the socket and the screwed end of pipes shall be oiled and rubbed with a white lead and a few turns of spun yarn wrapped round the screwed end of the pipe. The end shall then be screwed in the socket, tee etc, with pipe wrench. Care shall be taken that all pipes and fittings are kept at all times free from dust and dirt during fixing. Burr from joint shall be removed after screwing. After laying, the open ends of the pipes shall be temporarily plugged to prevent access of water, soil or any other foreign matter.

All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern holder bat clamps of required shape and size as to fit tightly on the pipes when tightened with screw bolts. The clamps shall be embedded in brickwork in cement mortar 1:3 (1 cement: 3 coarse sand), and shall be spaced at regular intervals in straight lengths as shown in table 5.16.1.

Table 5.16.1 INTERVALS IN STRAIGHT LENGTH

Diameter of pipe (mm)	Horizontal length (m)	Vertical length (m)
15	2.0	2.5

20	2.5	3.0
25	2.5	3.0
32	2.5	3.0
40	3.0	3.5
50	3.0	3.5

The clamps shall be fixed at shorter lengths near the fittings as directed by the Engineer. The pipes shall be tested as follows.

Testing the joints: After laying and jointing the pipes and fittings shall be inspected under working conditions of pressure and flow. Any joint found leaking shall be redone and all leaking pipes removed and replaced without extra cost.

The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 kg/cm^2 (60 metres of head of water). The pipes shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off taps and stopcocks shall then be closed and hydraulic pressure shall be applied gradually. Pressure gauge must be accurate and preferably should have been recalibrated before the test. The test pump having been stopped the test pressure should be maintained without loss for at least half an hour. The pipes and fittings shall be tested in section as the work of laying proceeds, keeping the joints exposed for inspection during the testing.

Measurements: The lengths shall be measured in running metre correct to 10 mm for the finished work, which shall include G.I. pipe and G.I. fittings such as bends, tees, elbows, reducers, crosses, plugs, sockets, nipples and nuts, but exclude brass or gun metal taps (cocks), valves, lead connection pipes and shower rose. All pipes and fittings shall be classified according to their diameters, method of jointing and fixing substance, quality and finish. In case of fittings of an equal bore the pipe shall be described as including all cuttings and waste. In case of fittings of unequal bore, the largest bore shall be measured. Pipes laid in trenches (or without supports) shall be measured separately.

Rate: The rate shall include the cost of labour and material involved in all the operations described above. The rate shall include the cost of cutting holes in walls and floors and making good the same. It shall not include painting of pipes and providing sleeves.

5.16.3 Storage Tank

- *Providing and fixing storage tank of M.S. sheet welded all round, including. 40mm G.I scour pipe, 25mm G.I overflow pipe, 15mm ball valve, pads for inlet and outlet pipes, red lead primer & two coats of bitumastic paint*

PI0020 *270 litre capacity of 2mm steel sheet*

PI0021 *810 litre capacity of 2.8mm steel sheet*

PI0022 *1620 litre capacity of 3.15mm steel sheet*

The tanks shall be made from best quality M.S sheet of thickness specified above. The sheets shall be welded to form a tank as per standard welding practice.

The tanks shall have net capacity as specified. The various sizes of tanks with their net capacities are given below.

Table 5.16.2 VARIOUS SIZES OF STORAGE TANKS WITH NET CAPACITIES

Net capacity of tank	Size of tank
270 liters	90 x 60 x 60 cm
810 liters	120 x 90 x 90 cm
1620 liters	120 x 120 x 120 cm

Fittings: Each tank shall be provided with 40 mm dia G.I scour pipe, which shall terminate into a socket and a plug, 25 mm G.I over flow pipe with fittings and brass mosquito proof coupling conforming to the municipal design and approved by the Engineer and ball valve with copper or plastic float of specified size and pressure. The ball valve shall be securely fixed to the tank independent of the inlet pipe and set in such a position that body of the ball valve does not submerge when the tank is full up to waterline. Each tank shall be provided with 40 cm dia standard mosquito proof C.I hinged cover weighing 8.15 kg and frame weighing 6.80 kg with locking arrangements.

Hoisting: The hoisting of tanks into position as directed by the Engineer shall be carried so that no part of the tank or structure is damaged in the operation. The tank shall be installed in position truly level and secure to concrete members with necessary bolts and nuts.

Painting: A priming coat of red lead shall be applied both internally and externally. On the inside, two coats of bitumastic paint shall be applied and on the exterior two coats of paint of approved make and tint shall be applied.

Measurements: Water storage tanks shall be counted in numbers for complete job.

Rate: The rate shall include the cost of materials and labour involved in all the operations described above except the cost of external painting.

- *Providing and fixing plastic tank with accessories complete*

PI0030 *300 litre capacity*

PI0031 *500 litre capacity*

PI0032 *1000 litre capacity*

PI0033 *2000 litre capacity*

PI0034 *3000 litre capacity*

Fittings: Each tank shall be provided with 40 mm dia G.I scour pipe, which shall terminate into a socket and a plug, 25 mm G.I over flow pipe with fittings and brass mosquito proof coupling conforming to the municipal design and approved by the Engineer and ball valve with copper or plastic float of specified size and pressure. The ball valve shall be securely fixed to the tank independent of the inlet pipe and set in such a position that body of the ball valve cannot become submerged when the tank is full up to waterline.

Hoisting: The hoisting of tanks into position as directed by the Engineer shall be carried so that no part of the tank or structure is damaged in the operation. The tank shall be installed in position truly level and secure to concrete members with necessary bolts and nuts.

Measurements: Water storage tanks shall be counted in numbers for complete job.

Rate: The rate shall include the cost of materials and labour involved in all the operations described above.

5.16.4 Sanitation (General)

General Requirements for Installation: The work shall be carried out, complying in all respects with the requirements of relevant byelaws of the local body in whose jurisdiction the work is situated. Any damage caused to the building or to electric, sanitary water supply or other installations etc therein either due to negligence on the part of the contractor, or due to actual requirements of the work, shall be made good and the building or the installation shall be restored to its original condition by the contractor. Nothing extra shall be paid for it except where otherwise specified.

In all the above operations the damaged portion shall be cut in regular geometric shape and cleaned before making good the same. All exposed G.I., C.I. or lead pipes and fittings shall be painted with approved quality of paint and shade as specified.

5.16.5 Pans & Cisterns

- *Providing and fixing Indian-type vitreous china w.c squatting pan, including 100 mm. P or S trap, 10 litres vitreous china cistern & fittings, repair walls complete.*

PI0041 *580mm, white Orissa-model*

- *Providing and fixing Indian-type vitreous china w.c squatting pan, including 100 mm. P or S trap, 10 litres PVC cistern & fittings, repair walls complete.*

PI0042 *580mm, white Orissa-model*

Flushing Cistern: The cistern shall be fixed on C.I. cantilever brackets, which shall be firmly embedded in the wall in cement concrete (1:2:4) block 100 x 75 x 150 mm. The cistern shall be provided with 20mm nominal bore overflow pipe. The outlet or flush pipe from the cistern shall be connected to the pan by means of cement or putty joint. The flush pipe shall be fixed to wall by using holder bat clamps of required shape and size so as to fit tightly on the pipes when tightened with screwed bolts. The clamps shall be embedded in brickwork in cement mortar 1:3 (1 cement: 3 sand). The connection between the cistern and the closet shall be made by means of 40 mm flush bend with an inlet connection as specified.

Painting: The cistern, brackets, overflow and flush pipe etc. shall be painted with two or more coats of paint of approved shade and quality.

Squatting pan: The pan shall be sunk into the floor and embedded in a cushion of average 15 cm thick cement concrete 1:5:10 (1 cement: 5 fine sand: 10 graded brick ballast 40 mm nominal size). The concrete shall be left 115 mm below the top level of the pan so as to allow flooring and its bed concrete. The pan shall be provided with a 100 mm 'P' or 'S' type trap with an approximately 50mm seal and 50 mm dia. vent horn, where required by the Engineer. The joint between the pan and the trap shall be made leak proof with cement mortar 1:1 (1 cement: 1 sand). Cost of concrete shall be paid separately.

Measurements: Measurement shall be counted in numbers for complete job.

Rate: The rate shall include the cost of materials and labour involved in all the operations described above.

- *Providing and fixing European-type vitreous china w.c pedestal including seat and lid with c.p brass hinges, 15 litres white vitreous china low level cistern with flush pipe, fittings, brackets, repairing walls complete.*

PI0050 *White, with plastic seat & lid*

- *Providing & fixing European-type vitreous china w.c One piece Toilet with seat cover, repairing walls complete*

PI0051 *White, with plastic seat & lid*

W.C. pan with white plastic seat and lid.

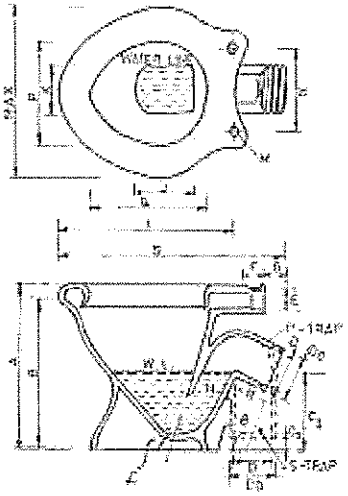
Seat and Cover: The seat shall be fixed to pan by means of two 8 mm diameter corrosion resistant hinge bolts with a minimum length of shank of 65 mm and threaded to within 25 mm of the head. Each bolt shall be provided with two suitably shaped washers of rubber or other similar materials for adjusting the level of the seat while fixing it to the closet. In addition, one non-ferrous or stainless steel 8mm washer shall be provided with each bolt. The maximum external diameter of the washer fixed on the underside of the pan shall not be greater than 25mm. One arm of the hinge in each bolt shall be fixed to the underside of seat by three Nos. 20mm long, 6 gauge wood screws. The other arm of the hinge shall be fixed to the underside of the cover, flush with the surface by means of three 10mm long 6 gauge wood screws.

Water closet: The closet shall be fixed to the floor by means of 75 mm long 6.5 mm diameter counter sunk bolts and nuts embedded in floor concrete.

The low level cistern shall be fixed as per specifications given above for Indian type W.C.

Measurements: The squatting pan shall be measured in numbers.

Rates: The rate shall include the cost of the materials and labour involved in all the operations described above.



NOT TO SCALE
ALL DIMENSIONS ARE INMM

WASH DOWN (EUROPEAN)

Figure 5.16.1 Water closet

Table 5.16.3 DIMENSION OF WATER CLOSET

	A	B	C_1	C_2	D	D_0	E	F	G

S - trap	390	350		20	80	110	55	30	45
P – trap	390	350	185	20	80	110	55	30	45

	J	H	K	L	M	N	O	P
S - trap	150	Not < 50 water surface	150	430	13	165	175	240
P – trap	150	< 50 cu. cm	150	430	13	165	175	240

	Q	R	S	α	θ	T
S - trap	230	40	630	90^0 to 135^0	-	75
P – trap	230	40	630	90^0 to 135^0	104^0	75

5.16.6 Urinals

- Providing and fixing white vitreous china flat back, lipped front urinal basin 430x260x350mm including all fittings, painting and repairing walls complete

PI0065 One bowl-5 litres C.I. cistern

The installation shall consist of lipped urinal (single or range) automatic flushing cistern, G.I flush and waste pipes. The size of the flushing pipe shall be 15mm.

Urinals shall be fixed in position by using wooden plugs and screws. It shall be at a height of 65 cm from the standing level to the top of the lip of the urinal, unless otherwise directed by the Engineer. The plugs shall be fixed in the cement mortar 1:3. After the plugs are fixed the mortar shall be cured until it is set. Each urinal shall be connected to 32mm dia waste pipe, which shall discharge into the channel or a floor trap. The connection between the urinal and the flush or waste pipe shall be made by means of putty or white lead mixed with chopped hemp.

Measurement: Urinals shall be measured in numbers.

Rate: The rate shall include the cost of all materials and labour involved in all the operations described above.

5.16.7 Bath Tub

PI0075 Providing and fixing Porcelain, white enamelled Bath Tub with fittings and accessories complete - CP mixer, 40mm C.P brass waste, 32mm C.P brass over flow, rubber plug, 40mm C.P trap etc.

PI0076 Providing and fixing Fibreglass Bath Tub white with fittings and accessories complete - CP mixer, 40mm C.P brass waste, 32mm C.P brass over flow, rubber plug, 40mm C.P trap etc.

PI0077 Providing and fixing PVC P-Trap, heavy duty, for bath-tub complete

The installation shall consist of an assembly of the bath-tub, pillar taps, chain with stay plug and waste arrangements. The tub shall be connected to a waste pipe and anti-siphon stack unless it discharges into a floor trap or in a channel.

Measurement: The item shall be measured in numbers.

Rate: The rate shall include the cost of all materials and labour involved in all the operations described above.

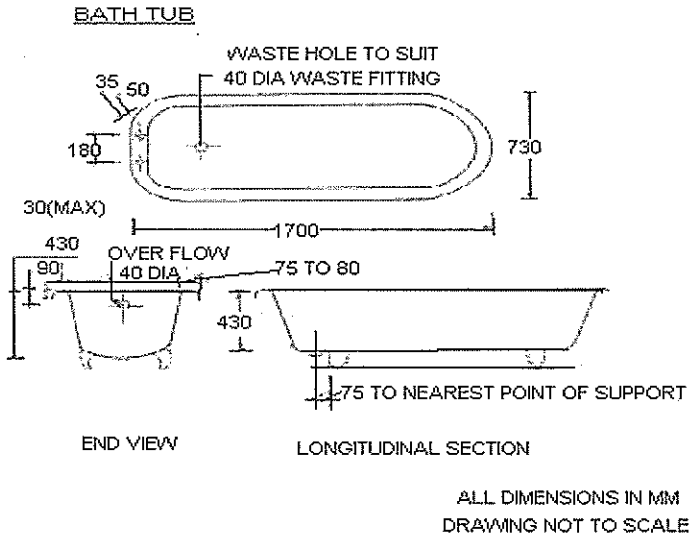


Figure 5.16.2 Details of a bathtub

5.16.8 Wash Basin

- *Providing and fixing white vitreous china wash basin, including C.I brackets, 15mm C.P. brass pillar taps, c.p. chain & rubber plug, 32mm p.v.c. waste, 32mm dia. trap & union, repair walls*

PI0085 *Flat back wash basin 630x450mm with a pair of 15mm c.p. brass pillar taps*

PI0086 *Flat back wash basin 630x450mm with single 15mm c.p. brass pillar tap.*

PI0087 *Flat back wash basin 550x400mm with a pair of 15mm c.p. brass pillar taps*

PI0088 *Flat back wash basin 550x400mm with single 15mm c.p. brass pillar tap*

- *Providing and fixing white vitreous china angle back wash basin 400x400mm including brackets, 15mm c.p. brass pillar taps, c.p. brass chain & rubber plug, 32mm c.p. brass waste (waste coupling), 32mm dia c.p. brass trap and G.I. union and repair walls*

PI0095 *With single 15 mm c.p. brass pillar tap*

PI0096 *With a pair of 15 mm c.p. brass pillar taps*

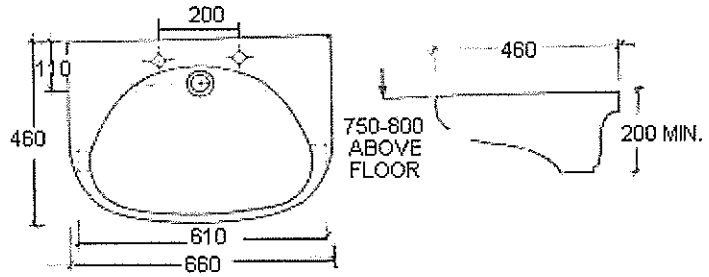
The wash basin shall be provided with one or two taps as mentioned in the item. The front edge of the wash basin from the floor level shall be 80 cm.

Fixing: The basin shall be supported on a pair of R.S. or C.I. cantilever brackets embedded in concrete (1:2:4) block of 100 x 75 x 150 mm size. The brackets shall be fixed in position before dado work is done. The wall plaster on the rear shall be cut so that overhang of the top edge of the basin can rest on it. After fixing the basin, the plaster shall be made good and surface finished to match with existing one. The union shall be connected to 32 mm dia waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to gully trap or direct into the gully trap on the ground floor; and shall be connected to waste pipe stack through a floor trap on upper floors. The C.P. brass trap and union shall not be provided when the waste pipe is discharged through a floor trap or a surface drain leading to a floor trap. Where so specified C.P. brass trap and union shall be paid for separately. Where so specified a G.I. puff 20 mm terminating with perforated brass cap screwed on it on the outside of the wall or connected to the anti-syphon stack, will be provided.

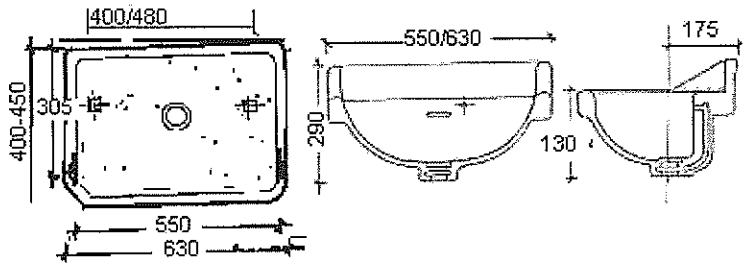
Measurement: Wash basin with specified fittings shall be measured in numbers.

WASH BASINS

SURGEONS BASIN



FLAT BACK TYPE WITH TWO TAPS



FLAT BACK TYPE WITH ONE TAP

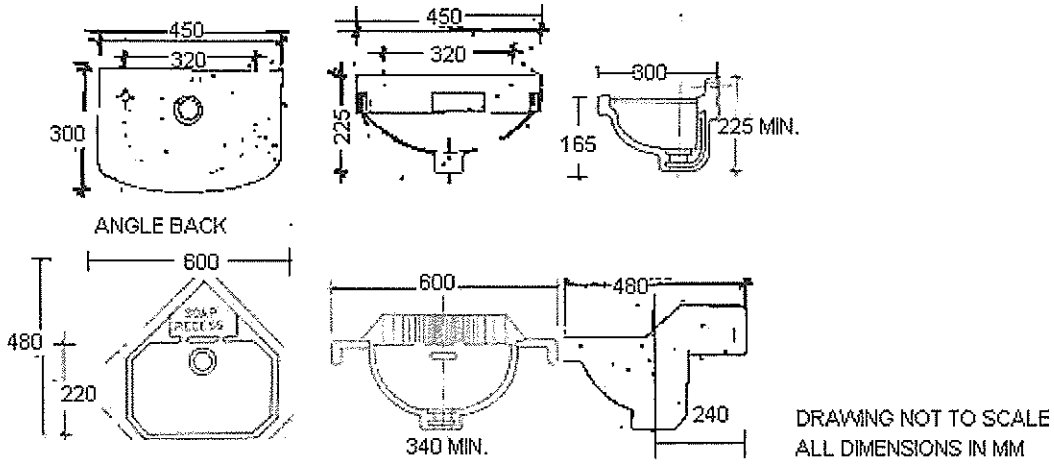


Figure 5.16.3 Types of wash basin

PI0115 Providing & fixing pedestals for basins, white vitreous china, recessed back for pipes and necessary fittings

White vitreous china pedestal for wash basins, where specified, shall be provided. The quality of the pedestal shall be exactly the same as that of the wash basin with which it is to be installed. It shall be completely recessed at the back to accommodate supply and waste pipes and fittings. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from the floor to top of the rim of basin 75 to 80 cm.

Measurement: The pedestal shall be measured in numbers.

Rate: The rate includes the cost of all materials and labour involved in all the operations described above.

PI0105 Providing and fixing c.p. flush valve, 32mm with 40mm outlet

PI0106 Providing and fixing c.p. concealed flush valve, 32mm with 40mm outlet

PI0107 Providing and fixing c.p. flush bend, long

PI0108 Providing and fixing c.p. flush valve elbow

Measurement: The fitting shall be measured in numbers.

Rate: The rate includes the cost of all materials and labour involved in all the operations.

5.16.9 Kitchen Sinks

- *Providing and fixing Kitchen Sinks including all connections and fittings*

PI0120 White glazed vitreous china 600 x 450 x 250 mm including accessories and repairs to walls etc.

PI0121 Stainless steel, 450 x 400 x 150 mm, single bowl

PI0122 Stainless steel, 580 x 480 x 175 mm, single bowl

PI0123 Stainless steel, 940 x 460 x 160 mm, single bowl & drain-board

PI0124 Stainless steel, 1080 x 520 x 175 mm, single bowl & drain-board

PI0125 Stainless steel, 1150 x 515 x 175 mm, single bowl & drain-board

PI0126 Stainless steel, 1740 x 520 x 200 mm, single bowl & double drain-board

PI0127 *Stainless steel, 940 x 460 x 160 mm, double bowl*

PI0128 *Stainless steel, 1150 x 520 x 160 mm, single bowl*

PI0129 *Stainless steel, 1740 x 520 x 200 mm, double bowl & single drain-board*

PI0130 *Stainless steel, 1740 x 520 x 200 mm, double bowl & double drain-board*

The installation shall consist of assembling the sink, the brackets, trap, unions and waste pipe.

Fixing: The sink shall be supported on C.I. or R.S. brackets embedded in cement concrete 1:2:4 block of size 100 x 75 x 150 mm. Brackets shall be fixed in position before dado work is done. The C.P. brass (or P.V.C) union shall be connected to 40 mm nominal bore G.I. or P.V.C. waste pipe which shall be suitably bent towards the wall and shall discharge into a floor trap.

Measurement: The sinks shall be measured in numbers.

Rate: The rate shall include all the specials mentioned in the description of the item and the labour involved in the operation but will not include the cost of waste pipe which shall be payed separately.

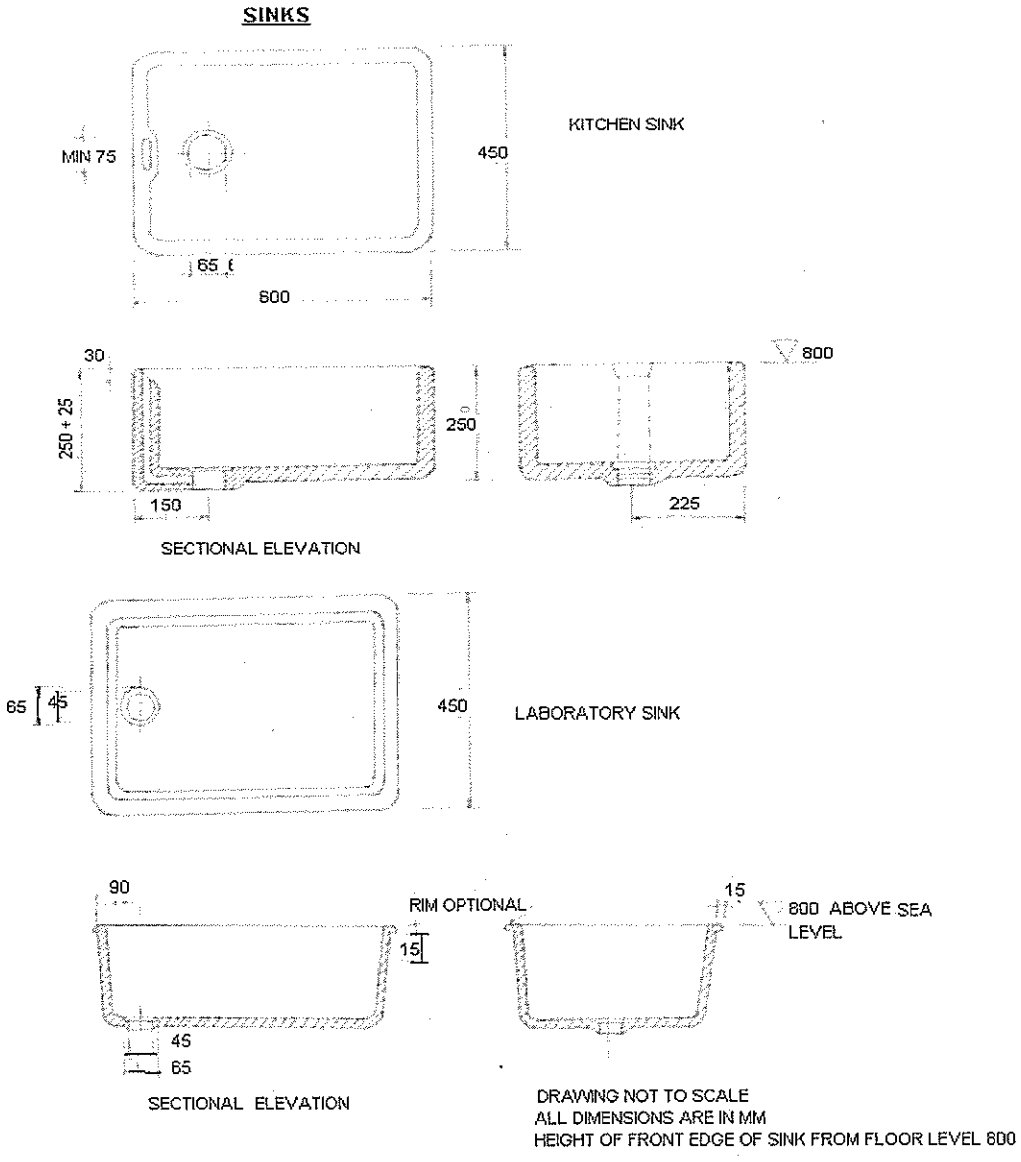


Figure 5.16.4 Kitchen sink

PI0140 Providing and fixing stainless steel drain-board, 610 x 460 mm with all necessary fittings

PI0141 Providing and fixing c.p. brass chain & rubber plug for basin and sink

Fixing: The board shall be of the size specified. One end of the board shall rest on sink and the other end shall be supported on C.I. (or R.S.) bracket embedded in cement concrete (1:2:4) block 100 x 75 x 150 mm. The bracket shall be of cantilever type or wall fixed type as for the sink.

Measurement: The sinks shall be measured in numbers.

Rate: The rate shall include the cost of all materials and labour involved in all operation for the items.

5.16.10 Waste Pipes

PI0150 Providing and fixing 32mm dia p.v.c. waste

PI0151 Providing and fixing 32mm c.p. brass waste (waste coupling)

PI0152 Providing and fixing 40mm c.p. brass waste (waste coupling)

Measurement: The items shall be measured in numbers.

Rate: The rate shall include cost of materials and the labour involved in the operation.

5.16.11 Water Heaters

- *Providing and fixing electric water heater including necessary fittings*

PI0160 10 litres

PI0161 15 litres

PI0162 25 litres

PI0163 35 litres

PI0164 50 litres

PI0165 70 litres

PI0166 100 litres

The water heaters shall be fixed on C.I cantilever brackets, which shall be embedded in the wall in cement concrete 1:2:4. The other fitting as specified shall be provided as per the directives of the Engineer. The brackets shall be painted with synthetic red lead primer or as directed by the Engineer.

Measurement: The water heater shall be measured in numbers.

Rate: The rate shall include the cost of all materials and labour involved in all operation for the items.

5.16.12 Bathroom Fittings

- *Providing and fixing C.P. Brass shower fittings*

PI0175 Shower with revolving joint, 15mm,

PI0176 Adjustable shower, with locking key, 15mm

PI0177 Shower arm, standard 15mm

PI0178 Shower arm, heavy duty 15mm

PI0179 Flexible shower tube & shower

- *Providing and fixing c.p. brass stop cock*

PI0185 15mm, standard, c.p knob

PI0186 20mm, standard, c.p knob

PI0187 20 mm heavy-duty, c.p knob

PI0188 15mm, concealed, c.p knob

PI0189 15mm, angle, c.p knob

- *Providing and fixing c.p. brass pillar-cock*

PI0195 15mm, standard, c.p knob

PI0196 15mm, swan neck, c.p knob

- *Providing and fixing c.p. brass bibcock*

PI0205 15mm, standard vertical, c.p knob

PI0206 15mm, inclined, c.p. knob

PI0207 15mm, long nose, c.p. knob

PI0208 15mm, long body, c.p. knob

- *Providing and fixing c.p. brass mixers, 15mm*

PI0215 For basin, Single – hole, casted spout

PI0216 For basin, close hole

PI0217 For basin, elbow action, surgical

PI0218 For basin, elbow action, surgical with shower

PI0219 For sink, with spout J-pipe

PI0220 For sink, with casted spout swinging

PI0221 For sink, with swivel spout

PI0222 For wall, non – telephonic type

PI0223 For wall, telephonic type with crutch and telephonic shower

PI0224 For wall, telephonic type without crutch, and with telephonic shower

PI0225 For wall, telephonic type with crutch, and without telephonic shower

PI0226 For wall, telephonic type with C.P bend and flanges

PI0227 For wall, with telephonic shower arrangement with 115 mm long bend pipe for overhead shower connection

PI0228 Three hole mixer without pop - up

PI0229 Three hole mixer with pop - up

PI0230 For bath, with exposed adjustable legs with telephonic shower arrangement with crutch

PI0231 For shower, three in one, with bend flexible tube, and shower & hook

- *Providing and fixing Wall Spouts*

PI0240 c.p., standard, 15mm

PI0241 With diverter, for use with single lever mixers

Only Government approved brands of fittings shall be used. The fittings of the type specified in the item shall be fully examined and cleared of all the foreign matters before being fixed. The fitting shall be fitted in the pipelines in workmen like manner. The joints between fittings and pipe shall be leak proof when pressure tested. The defective fittings and joints shall be replaced or redone.

Measurement: The items shall be measured in numbers.

Rate: The rate shall include all labour and materials involved in the work.

5.16.13 Bathroom Accessories

PI0250 Providing and fixing 600x450mm bevelled edge mirror (superior glass) including 4mm A.C sheet base fixed to wooden cleats with C.P brass screws and washers

The mirror shall be mounted on 4 mm thick plain asbestos sheet ground and shall be fixed in position by means of 4 C.P. brass screws and C.P. brass washers, over rubber washers and wooden plugs firmly embedded in walls. C.P. brass clamps with C.P. brass screws may be an alternative method of fixing, where so directed. Unless specified otherwise the longer side shall be fixed horizontally.

Measurement: Mirror shall be measured in numbers.

Rate: Rate shall include the cost of all the materials and labour involved in all the operations described above.

PI0251 Providing and fixing 450x120mm glass shelf, including. c.p. brass brackets fixed to wooden cleats

Measurement: The glass shelf shall be measured in numbers.

Rate: The rate shall include all labour and materials involved in the work.

PI0252 Providing and fixing c.p. towel rail 750 x 20mm with c.p brass brackets fixed to wooden cleats

PI0253 Providing and fixing c.p. towel rail 600 x 20mm with c.p brass brackets fixed to wooden cleat

PI0254 Providing and fixing c.p. towel rail 450 x 20mm with c.p brass brackets fixed to wooden cleats

PI0255 Providing and fixing c.p. towel ring

The towel rail shall be of the type as specified. The thickness of the rail shall be of 1.25mm. Chromium plating shall be of grade B type. The brackets shall be fixed by means of C.P. brass screws to wooden plugs firmly embedded in the wall.

Measurement: The towel rails shall be measured in numbers.

Rate: Rate shall include the cost of all the materials and labour involved in all the operations described above.

- *Providing and fixing toilet paper holder*

PI0260 C.P. brass

PI0261 Recessed ceramic, 200 x 100 mm, coloured,

PI0262 Recessed ceramic, 200 x 100 mm, white

PI0263 Recessed ceramic, roll-type, 150 x 150 mm

The toilet paper holder shall be of the type as specified and size and design as approved by the Engineer. It shall be fixed in position by means of screws and rawl plugs embedded in the wall. In case of C.P. brass toilet paper holder C.P. brass screws shall be used for fixing the holder to the rawl plugs.

Measurement: Holder shall be measured in numbers.

Rate: Rate shall include the cost of all the materials and labour involved in all the operations described above.

PI0270 Providing and fixing Liquid soap container, c.p, including. c.p. brass lid & brackets, wooden cleats, c.p. brass screws

It shall be fixed in position by means of screws and rawl plugs embedded in the wall.

Measurement: Holder shall be measured in numbers.

Rate: Rate shall include the cost of all the materials and labour involved in all the operations described above.

- *Providing and fixing soap dish*

PI0275 Including brackets, wooden cleats, c.p. brass screws

PI0276 Recessed, ceramic, 150x150 mm

PI0277 Recessed, ceramic, 200x100 mm

- *Providing and fixing c.p. coat hook*

PI0285 Single

PI0286 Double

The item shall be of the type as specified and size and design as approved by the Engineer. It shall be fixed in position by means of screws and rawl plugs embedded in the wall. In case of C.P. brass, C.P. brass screws shall be used for fixing the holder to the rawl plugs.

Measurement: Measurement shall be taken in numbers.

Rate: Rate shall include the cost of all the materials and labour involved in all the operations described above.