

DRAINAGE

Sanitary Fixtures

Washbasins

- Materials: Vitreous china clay, fire clay, stainless steel or porcelain channeled sheet steel.
- Types: Wall mounted, floor mounted or tabletop: under counter & countertop
- Fixing height above FFL: 760 to 800mm.
- Different sizes: 36 x 28 cms, 40 x 40 cms, 45 x 30 cms, 45 x 33 cms, 40 x 38 cms, 44 x 40 cms, 44 x 40 cms, 50 x 40 cms, 50 x 40 cms, 64 x 47 cms, 68 x 52 cms,
- Famous brand names: Cera, Hindustan, Jaguar, Kohler,
- Minimum space: 900 x 900

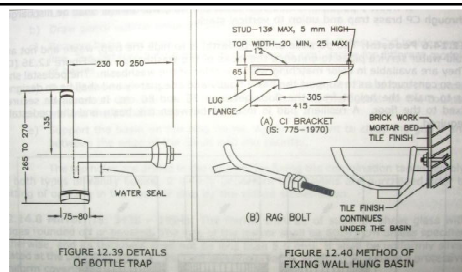
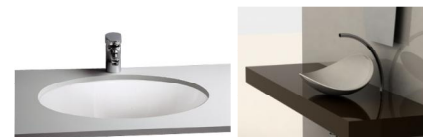
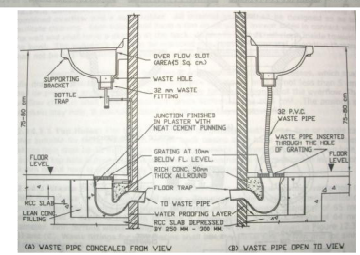


FIGURE 12.39 DETAILS OF BOTTLE TRAP

FIGURE 12.40 METHOD OF FIXING WALL HUNG BASIN



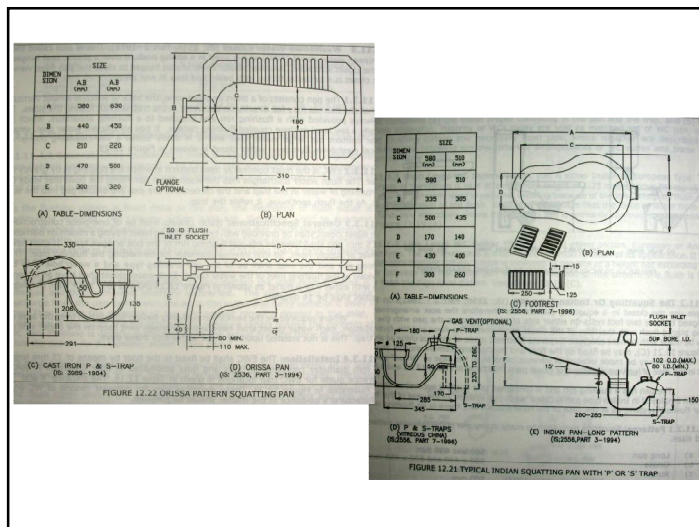
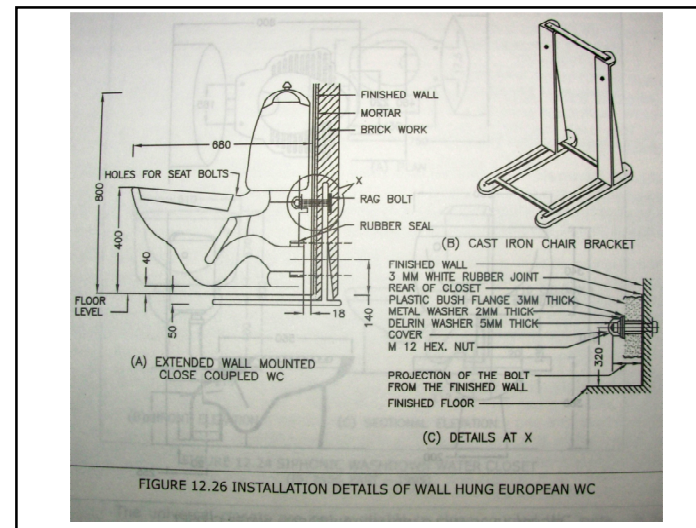
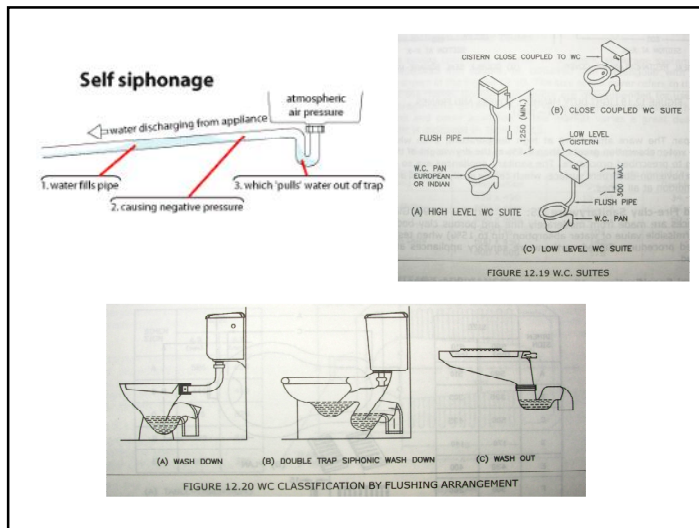
(a) WASTE PIPE CONCEALED FROM VIEW

(b) WASTE PIPE OPEN TO VIEW

Water closets

- Used to collect & convey human waste in very hygienic manner.
- Water closet produces less noise while flushing.
- Type of use:
 - Pedestal: Above floor mounted, Wall mounted
 - Squatting: Anglo India & in- floor mounted.
- Types:
 - Siphoning trapped system
 - Non-siphoning trapped system
 - Valve-closet system
 - Washout & wash down
- Flushing cistern: 5 ltr to 15 ltr, refilling in max. 2 mins.,
- 32mm dia pipe for flushing, 100mm dia for discharge of sewage.
- Minimum space: 900 x 1200






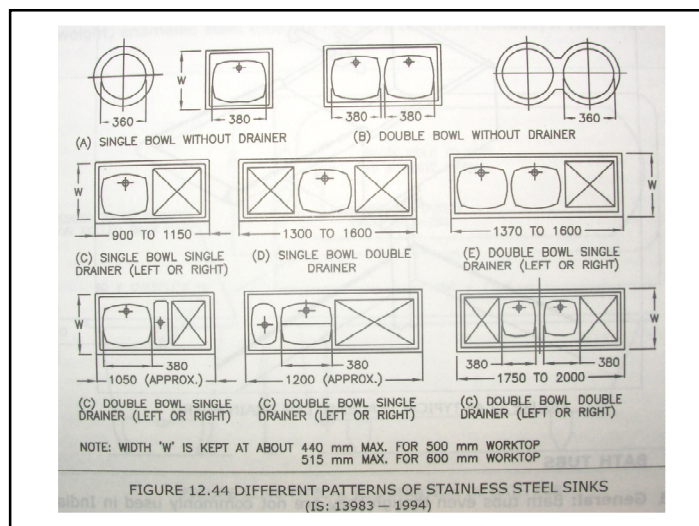
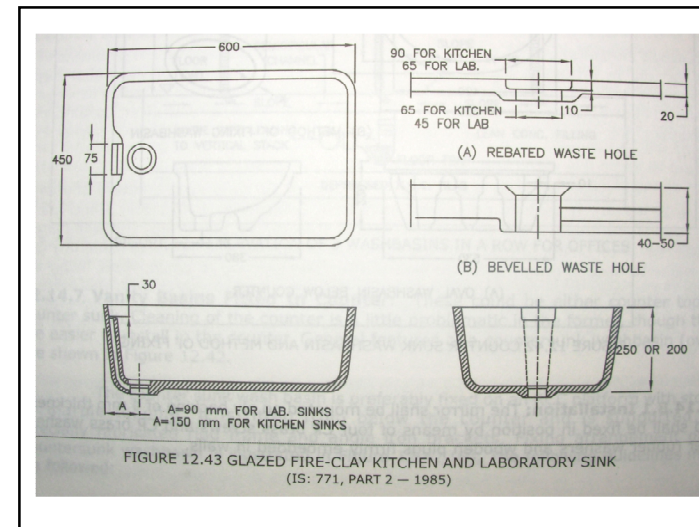
Shower

- Body washing with running water
- Place shall be **well ventilated** to reduce condensation
- Minimum space: 900 x 1200
- Shower tray: 750 x 750 with slip resistant base, Made up of glazed fire clay or glass reinforced polyester
- Chrome plated shower with hot & cold connection
- Floor slope: 2%
- Discharge pipe: 40-50mm



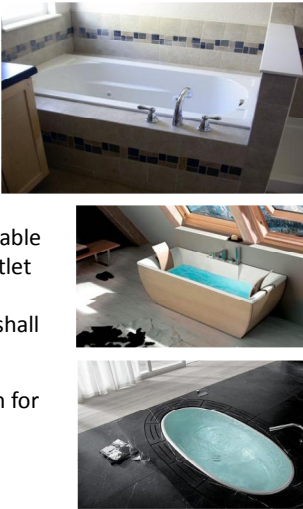

Sink

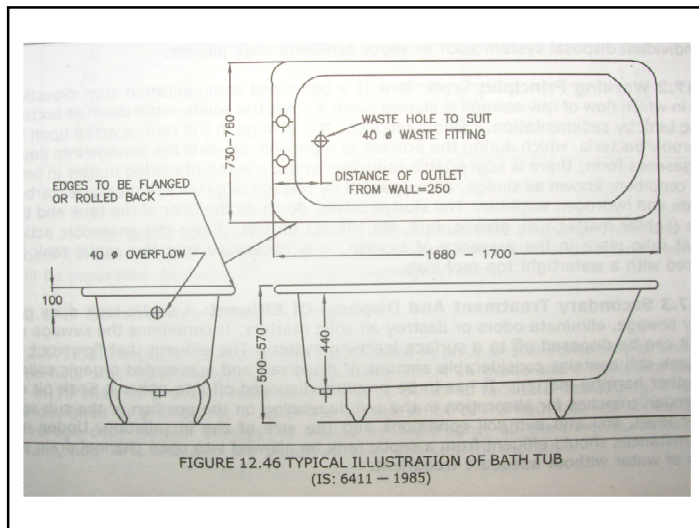
- Generally made up of stainless steel or glazed fire-clay
- Type of use:
 - Cantilevered
 - Fitted in counter
- Single of double bowels & single of double drains.
- Common sizes: 1000 x 600, 1200 x 600, 1600 x 600, 1800 x 600, 2400 x 600 and 2800 x 600
- Depth of sink varies from 200 to 300

Bath tubs

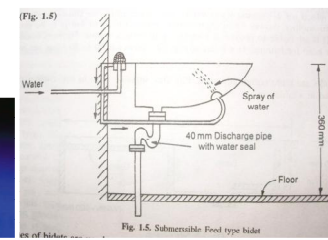
- General Dimensions:
 - Length: 1450 to 1850 mm
 - Width : 700 to 725 mm
 - Height : 480 to 540 mm
- Custom shapes & sizes are available
- Flat bottom sloping towards outlet
- Discharge pipe: 40 mm
- Gap between bath tub & walls shall be sealed properly to prevent seepage of water
- General accessories: 2 tap, each for hot & cold water; spray type shower head with flexible pipe





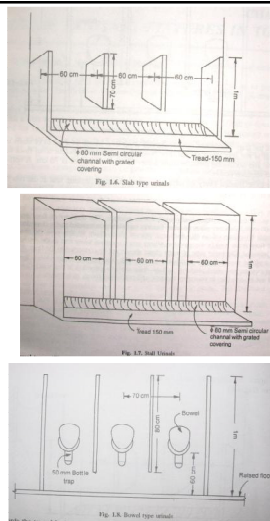
Bidets

- Used to wash perineals & foot.
- Types:
 - Over rim water feed
 - Submersible water feed
- Both are either pedestal or wall mounted
- Water supplied by ascending spray



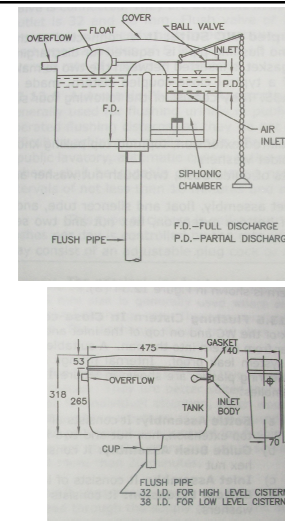
Urinals

- Types:
 - Slab type
 - Stall type
 - Bowl type
 - Trough type
- Channel shall be smooth and laid in slope towards trap.
- Max length of channel- 2.4 m (4 stalls)
- Width of each stall - 60 cm
- Height of bowl - 60 cm from FFL
- c/c distance between two stall - 70 cm
- Bottle trap or U trap for each bowl
- Flushing after each 20 mins by automatic flushing unit- 3.5 litre/stall
- Dia of discharge pipe: 65- 80 mm



Flushing Cisterns

- Storage tank to discharge water to flush out the sanitary appliance
- Types as per use:
 - Single flush
 - Dual flush
- Types as per material:
 - CI
 - Plastic
 - Vitreous china
- Types as per height
- Types as per mechanism
 - Manual
 - Automatic
- Dia of discharge pipe- 38mm



Connection to Sanitary Fixtures

Sanitary Fixture	Dia of trap pipe & discharge pipe in mm	Max. length of unvented pipe in m
Water closet	100	6
Wash Basin	40	2.5
Sink		
- Domestic	40	2.5
- Commercial	50	2.5
Shower (single)	40 or 50	2.5
Shower (Multiple)	50	2.5
Urinal (Bowl type)	50 or 65	2.5
Urinal (Stall, Trough)	65 or 80	2.5
Floor Waste Gully		
- Without fixture connection	50	2.5
- With fixture connection	Up to 100	2.5
Washing machine	50	2.5
Bath tub	40	2.5
Bidet	40	2.5

Slopes of pipes

Dia of discharge pipe in mm	Max. slope to be provided
40	1/40
50	1/40
65	1/40
80	1/60
100	1/60
125	1/80
150	1/80

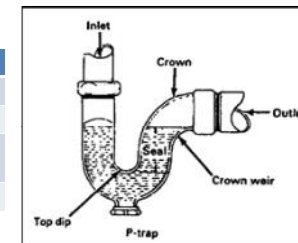
TRAPS

- Fittings or part of appliance to retain water seal so as to prevent passage of foul air into the building.
- Fitted in waste or soil appliances
- General features:
 - Fitted to appliance as an integrated manner
 - Always be of a self cleansing pattern
 - Conveniently accessible & provided with cleansing eye
 - Maintain an efficient water seal under all conditions of flow.

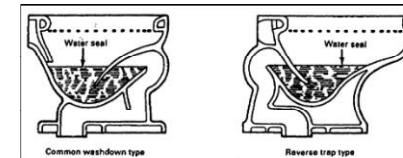
Water seal

- Water seals

Appliance	Water seal in mm
Water closet	50
Floor trap	50
Other fixtures directly connected to stack	40
Rural WC	20



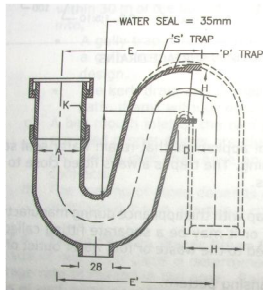
- Seal may be broken due to
 - Siphonage
 - Air compression
 - Momentum
 - Evaporation



CLASSIFICATION OF TRAPS ACCORDING TO SHAPE

P- & S- Traps

- For washbasins, bath tubs & other appliances: Brass + copper (56% or more)
- For WC: Viterous china, cast iron or UPVC
- Nominal sizes: 32, 40 & 50mm and 100mm
- Water seal: 25 to 75mm
- Internal threaded or external threaded
- S- trap for floor mounting, P- wall mounting

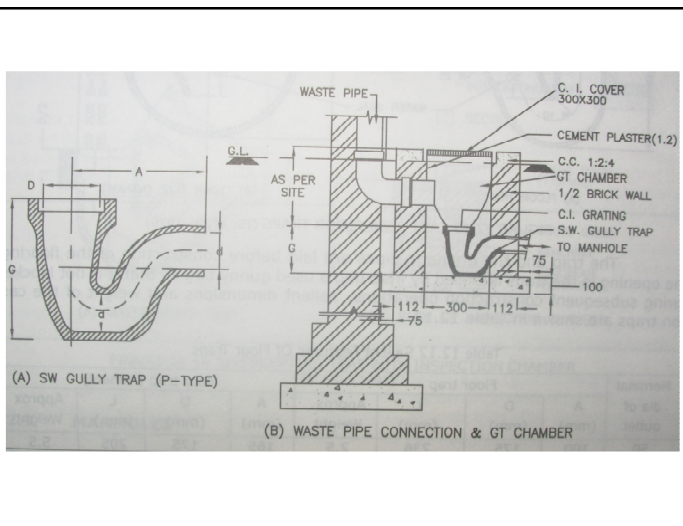
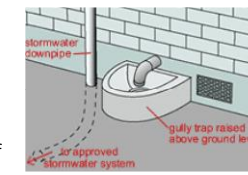


ITEM		32	40	50
INTERNAL DIA.	A	30	38	48
P-TRAP	E	100	110	130
S-TRAP	E'	95	110	130
DIA OF RECESS IN OUTLET, MIN.	H	38	41	52
INTERNAL THREAD ON INLET	K	33	42	52

CLASSIFICATION OF TRAPS ACCORDING TO USE

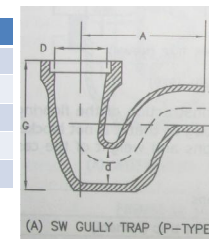
Gully Trap

- Connects waste water of building with main drain
- Deep seal trap, provided on the external face of bathroom & kitchen wall
- Min water seal – 50 mm
- Also prevent ingress of insects, rodents etc. from sewer line into waste line
- Material: Hard burnt stoneware (SW) thoroughly salt glaze inside & outside.
- CI grating is provided on top to trap rubbish



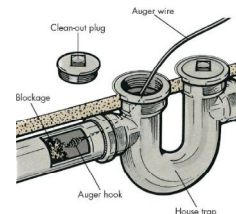
- GT is housed in a masonry chamber finished with neat cement punning
- Salient dimensions of square mouth GT

Size (Dxd)	D	d	G	A
100x100	100	100	330	305
125x100	125	100	345	265
150x100	150	100	346	330
180x100	180	100	380	320
180x150	180	150	520	405

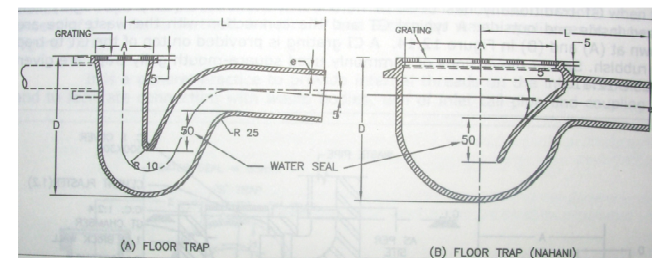


Floor Trap or Nahani Trap

- Provided in floor to collect used spilled over the floor.
- Material: Cast iron or UPVC
- Removable grating on the top
- Min water seal – 50 mm
- All traps & drain pipes are laid before casting of floor and kept close by inserting a gunny bag in the opening.



Nominal dia of outlet	Floor trap				Nahani trap			
	A	D	L	Approx weight	A	D	L	Approx weight
50	100	175	236	2.5	165	175	205	5.5
75	100	225	275	4.8	165	225	215	6.5
100	200	296	330	7.5	-	-	-	-



Intercepting Trap

- Provided in manhole at junction of house sewer & street sewer to prevent entry of foul gases.
- Material: Glazed stoneware
- Opening on top: cleaning eye for rodding to clear the blockage
- Water seal of 100mm

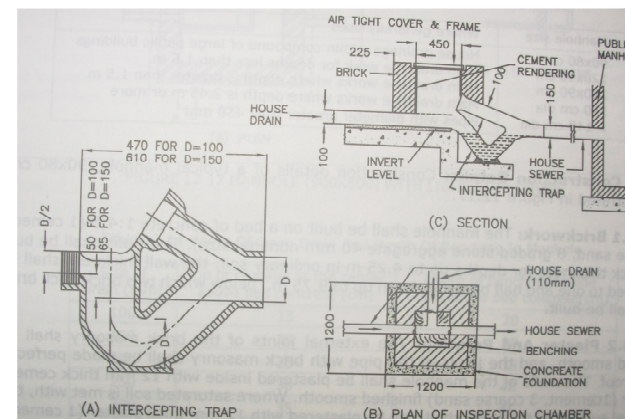
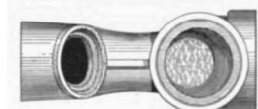
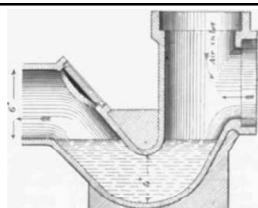
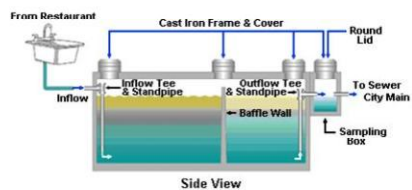


FIGURE 12.16 INTERCEPTING TRAP WITH INSPECTION CHAMBER (IS: 651-1992)

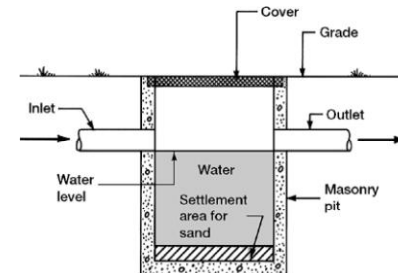
Grease Trap

- Trap used for collection & removal of greasy contents skimming on the surface.
- Provided in liquid waste from kitchens or food processing units.



Sand Trap

- For arresting the sand or silt carried by the liquid waste through sedimentation or deposition.
- It prevents damage to sewer caused by erosion of pipe or reduction in capacity by deposition.



DRAINAGE INTO A PUBLIC SEWER

Where public sewerage is available following information is particularly necessary:-

- The position of the public sewer or sewers in relation to the proposed building.
- The invert level of the public sewer.
- The system on which the public sewers are provided.
- The materials of construction.
- Whether an intercepting trap is required by the authority.
- Where manholes are constructed under roads.

CONSIDERATION OF DRAINAGE DESIGN

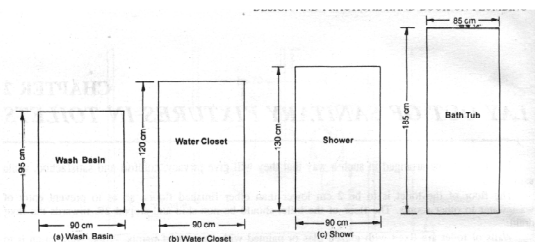
- Wastewater through kitchen sink, washbasin, tub and urinal are connected by GI pipes to floor trap.
- Wastewater from bath goes directly from the flooring to the nahani trap.
- Sewage from WC, which is connected to S-trap, goes through floor while P-trap goes in the rear wall.
- Floor trap is connected to waste water vertical pipe and to inspection chamber directly on the ground.
- Inspection chambers are provided near every gully trap or WC connection and at every 30 m or at every turn
- To facilitate the easy flow-away of water, a gradient of slope in ratio of 60:1 should be employed. For a 15 cm pipe the gradient should be 100:1

Sanitary Fixtures Layout in Toilets

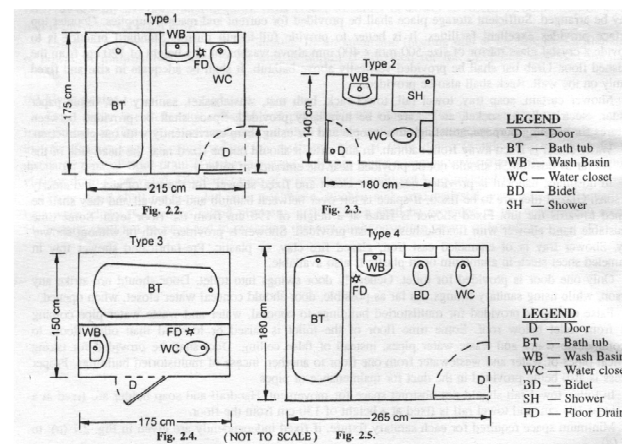
General

- Provide privacy & comfort for user
- Flooring: 2 cm lower than other floor; non skid and sloped 2% towards floor drain
- Walls: Glazed tiles or painted with water proof paint
- Proper ventilation to reduce odour & humidity, 6 air changes/hour, Min 1/20th of floor area for openings
- General items: Mirror (120 cm FFL), Grab bar, shower curtain, soap tray (105 cm FFL), towel rail (130 cm FFL), towel rack, bath mat, waste basket, sanitary bin, tissue paper holder, electric socket, storage space etc..
- Provision of counter in toilet is better
- Adequate space between fixtures for accessibility & cleaning

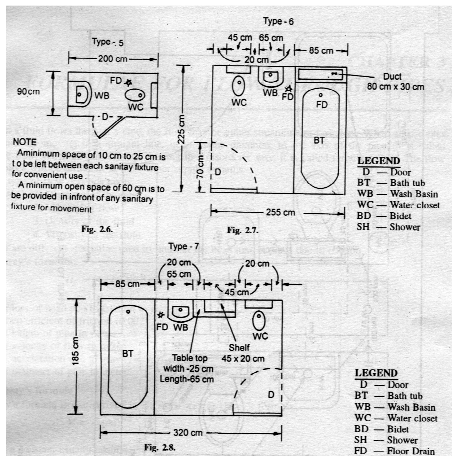
- WC
 - Fixed away from bath tub, if possible. Shall not be towards head side of bath tub
 - Shall not be provided near entrance of toilet
 - Door shall conceal WC while opening, if possible.
- Door shall open inside toilet
- Minimum Space required for each sanitary fixture



General Arrangements



General Arrangements



Water & Waste water Layout

