



The Guide to Plumbing

Plumbing refers to either drainage or sanitary pipework, which are built in accordance with the architect drawings. Design plans should include a location of sanitary fittings, drainage runs, hot and cold water pipes, a gas supply pipe, water storage cylinder, electrical units, harvesting system, UFH, etc. Please note that the following guidance is the introduction into the subject. Refer to Building Regulations, Approved Document H, which covers drainage and waste disposal and British Standard BS EN 12056:2.

Sanitary system consists of horizontal branches, vertical stacks, drains, sewer. It should be done in such a way to allow for the unobstructed flow of waste from an appliance to the underground drainage. To do this, it is necessary to choose the proper size and type of pipes and gutters. In order to do so, we have to know the expected rate of discharge and the slope (minimum gradient 18) of the pipes. By determining the occupant's load base on the proposed area, we can establish the required number of plumbing fixtures.

On the market, there is a wide range of residential plumbing pipes like for instance:

- Copper pipes which are durable and not prone to leaks. These pipes are heat resistant, do not pollute drinking water and can be recycled. Usually comes in various sizes depending on the type of use
- Galvanised steel is not used in residential projects anymore, but was widely used before and houses built 1930-1980s

might have this type of pipes. Galvanised pipes are heavy and coated with zinc what might cause rusting. Might cause discolouration of water and reduced water pressure. Corrosion of pipes might occur over the time.

- PVC pipes are light and easy to work with. Do not rust or corrode, are durable. Perfect for high water pressure. Used in sink, toilet, bath, vent stacks etc. Can carry only cold water.
- CPVC pipes contains chlorine but are more flexible than PVC pipes and can be used for both hot and cold water supply. CPVC should be insulated to avoid freezing
- PEX pipes are very heat resistant so can be used for both cold and hot water. PEX pipes can be used in various connections
- Stainless steel pipes are strong and corrosion-resistant but more expensive than copper piping.

- Other popular materials for pipes are polyethylene PE HPDE, ABS, PP acoustic soil etc.

Each type of the fitting is jointed in a different way. For instance, pipes can have a ring seal for push-fit joints or can be solvent-weld jointed. Water test or smoke test can be done to check the air tightness.

All points of discharge should be fitted with a water seal trap. Trap prevents foul air from the system to enter the building. There are minimum trap sizes and seal depths for the various appliances. Traps should be fitted directly after appliance, below the outlet and should be fully accessible and removable. Traps are available in various options like low-level bath, shower trap, anti-siphon bottle trap, S o P tubular traps.

Branch discharge pipes discharge to stack or other branch pipe. Often appliance can discharge to a gully. If the appliance is on the ground level, pipe might discharge directly to a drain or a gully. The crossflow into other branch pipe and any bends should be avoided. Pipes serving a single appliance should have at least the same diameter as the appliance trap. Junctions on branch pipes should be done with a proper sweep. It is necessary to avoid cross-flow which occurs when two branches are installed opposite each other. The no connection zone and a parallel junction underneath is required.

There are also branch ventilating pipes formed by combining two or more vent pipes. If a branch pipe exceeds these limits, it should be connected via a branch ventilated pipe to external air or a ven-

Table 1 Minimum trap sizes and seal depths

Appliance	Diameter of trap (mm)	Depth of seal (mm of water or equivalent)
Washbasin ¹ Bidet	32	75
Bath ² Shower ²	40	50
Food waste disposal unit Urinal bowl Sink Washing machine ² Dishwashing machine ²	40	75
WC pan – outlet <80mm	75	50
WC pan – outlet >80mm	100	50

¹ The depth of seal may be reduced to 50mm only with flush grated wastes without plugs on spray tap basins.

² Where these appliances discharge directly to a gully the depth of seal may be reduced to not less than 38mm.

³ Traps used on appliances with flat bottom (trailing waste discharge) and discharging to a gully with a grating may have a reduced water seal of not less than 38mm.

Extract from The Building Regulations 2010, Approved Document H

PUSHFIT SYSTEM PIPE	SOLVENT WELD SYSTEM PIPE	FOUL UNDERGROUND DRAINAGE
 Soil Pipe 3 m Black (SP400)	 Plain Ended Olive Grey Pipe (SS300)	 320mm Chamber Base 2 Inlet (ETP369A)
 Soil Pipe 92.5deg Triple Socket Access Branch Black (SP413)	 92.5deg Triple Socket Branch Olive Grey - Boss 50 mm (SS310)	
 Soil Pipe Vent Terminal Black (SU219)	 Vent Terminal (SU219)	 Universal Drain Adaptor (ETP333UNI)



tilating stack, or an air admittance valve should be used.

Branch pipes connect to a main stack which leads to a drain. They should have the same diam-

eter or bigger than the appliance trap. Branch is any piping fixture other than main, riser or stack. Discharge stacks are the vertical connecting pipes that leads to the central stack. All stack discharge

to a drain. Stacks should have the adequate diameter to allow for the positive pressure. The internal diameter of the stack should be not less than that of the largest trap or branch discharge pipe.

To prevent water seals in the traps from being lost by pressures which can develop in the system, discharge stacks should be ventilated. In the connection of the ground floor appliances stub stacks can be used. The vertical drop to the drain must not exceed 1.5m from a WC and 2.5m from a waste appliance.

Drains receive the discharge from soil, waste and sanitary system and it conveys it to the sewer.

Vent stack is a vertical piping to which connections are made from the discharge side of traps and through which gases, odour is removed. Branch vent is connecting one or more individual vents with a vent stack.

Pipes sizes should not exceed the dimensions for diameter against pipe length. At the head of

Table 3 Minimum diameters for discharge stacks

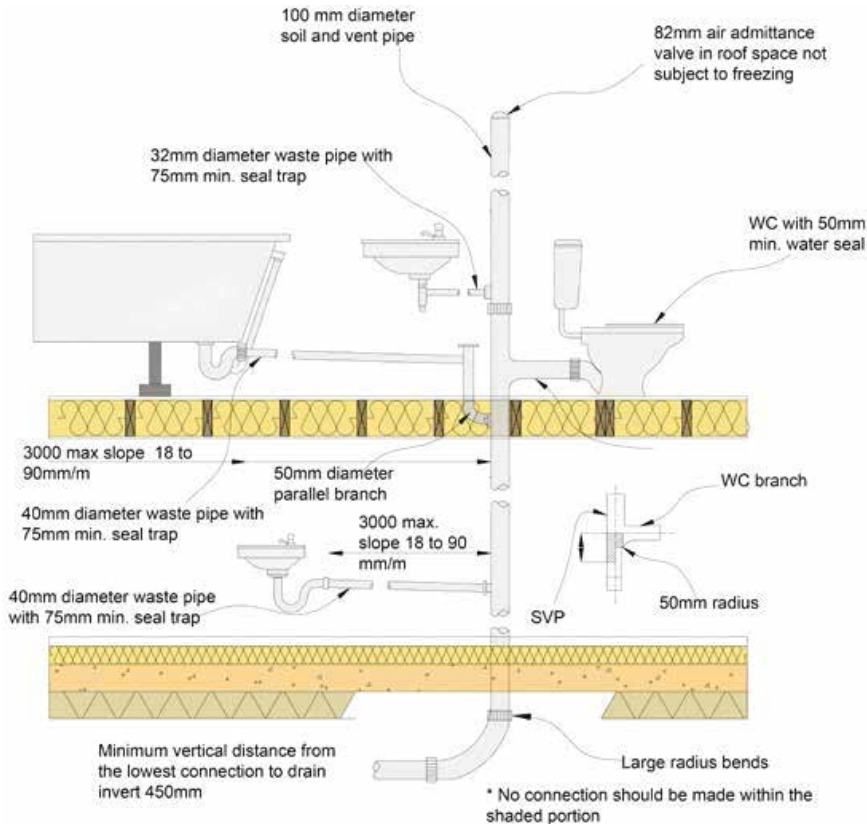
Stack size (mm)	Max. capacity (litres/sec)
50*	1.2
65*	2.1
75†	3.4
90	5.3
100	7.2

Notes:

* No WCs.

† Not more than 1 WC with outlet size <80mm.

(Illustration source: LABC Warranty Chapter9: Building Services, Figure 6)



Single stack system: air admittance valves

underground drains, ventilation is to be provided, either by a soil pipe or a separate ventilation pipe. Air admittance valves provide ventilation of the drainage system to prevent the loss of water seals in traps. Valves should be positioned in such a way to comply with Building Regs and to avoid freezing. The drainage system should also be ventilated adequately. If the connecting drain is fitted with intercepting traps, air admittance valves should not be used.

There should be access to allow for repairs. This can be done by providing rodding points in discharge stacks. Rodding points in stacks should be above the spillover level of appliances.

Over tightening connections of tubes, pipes and fixtures might lead to cracks and water leaks. Never apply too much force on a pipe as the excessive pressure might destroy the fitting and cause leakage. Same applies to over tightening of the plastic fittings on toilet or faucet supply tubes.

- Wrapping around threads should be done three times and clockwise, what ensures that the tape will not unwind and properly tighten the fitting.
- Cross-flow should be prevented. The

branch pipe should not lead to the stack in a way that will cause a cross-flow into any other pipe.

- Positive pressure has to be eliminated by the correct slopes, pipes size. If the system will have a positive pressure water will leak into the building. Drain-waste-vent systems with adequately sloped pipes will ensure the neutral air pressure. If slope can not be achieved, a pump might be required.
- Shut off the main water pipe before commencing any plumbing works to avoid flooding. In the next step, attach the new valve or faucet. The stop valve is where the water supply can be shut. Usually, there is an external and internal stop.
- Have knowledge of various types fittings and their application. Never mix up parts like wyes, tees, elbows. Avoid misconnections.
- Ensure copper pipes are dry before sweating to avoid leaking from the joint.
- Insulate pipes in the outside areas to avoid freezing, which will lead to splits and leaks.

Plumbing does not seem to be difficult, but getting it done requires the adequate knowledge on fixtures and basic rules. Always use qualified plumber or heating engineer. The Chartered Institute of Plumbing and Heating Engineering (CIPHE) set standards for plumbing and heating engineering industry and has a list of professional plumbing and heating engineers here www.ciphe.org.uk/find-a-plumber.

