

SERVICES IN BUILDINGS



SERVICES



**WATER
SUPPLY**



**SANITARY/
DRAINAGE
SYSTEM**



**GAS
SUPPLY**



**ELECTRICITY
SYSTEM**



TELEPHONE



HVAC



**FIRE
PROTECTION**



INTERNET

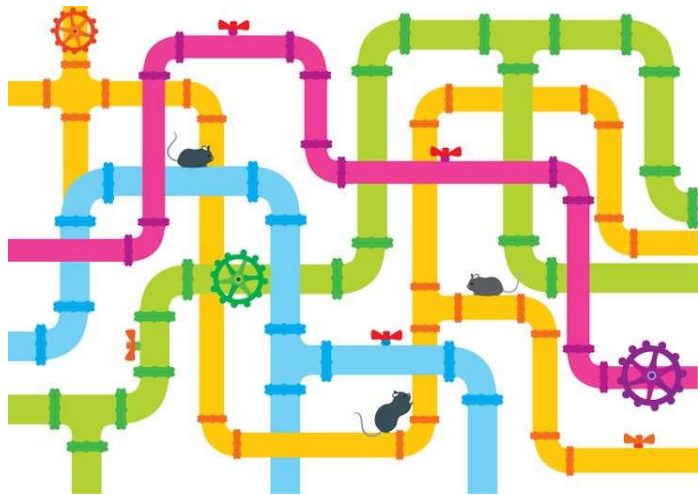


CCTV

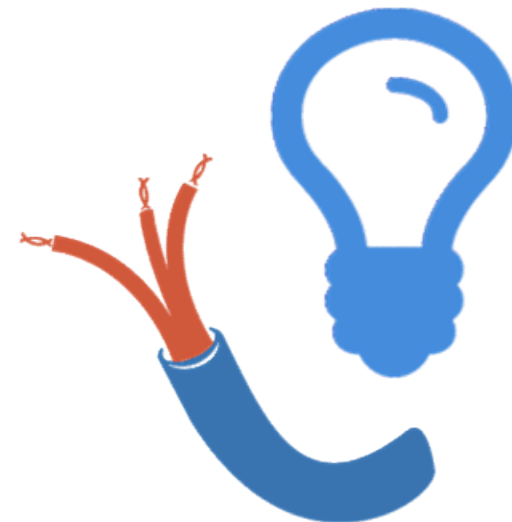
SERVICE GROUPS

Services system consists of arrangement of pipes or wires with in or on to surface of building
These can be broadly classified into two groups

THOSE WHICH
REQUIRE PIPES



THOSE WHICH
REQUIRE WIRES



TYPES OF PIPES



There are different types of pipes used based upon the material of pipe:

Lead – plumbing is derived from Latin word plumbum used for lead, it was used for plumbing as it was malleable, but due to its ill effects on health it was discontinued.

Copper – used commonly for Air Conditioning but can be also used for water supply under high pressure. This is an expensive type of pipe.

Stainless steel – used for water supply

Cast Iron (CI) (BS 78, BS 437 and BS 4622) – was used as sewer (internal)

Concrete – was used as sewer (external)

TYPES OF PIPES



There are different types of pipes used based upon the material of pipe:

Pitch fiber (BS 2760) – was used as sewer (external)

Asbestos cement (AC) – used for water supply as well as industrial waste water effluent pipes

Galvanized iron (GI) – used for water supply

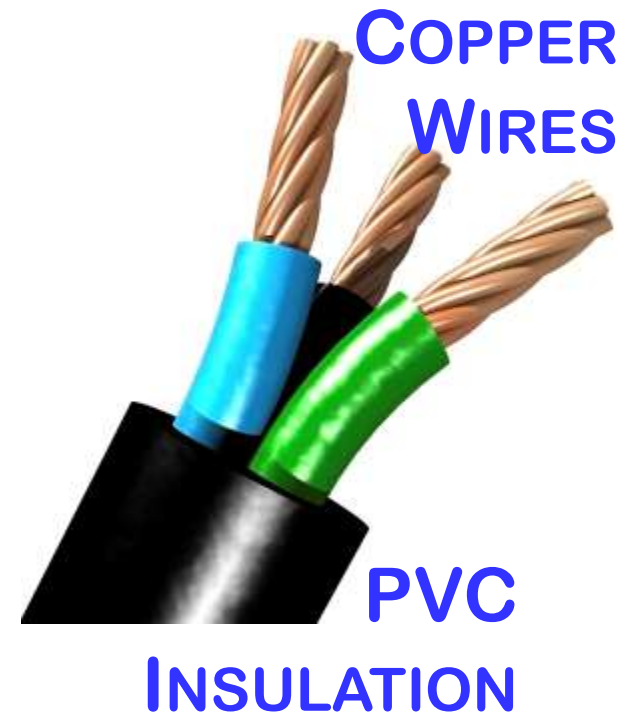
Polymer type / PVC (BS 3506 ,4660) – nowadays used for water supply, sewers, electrification conduits, gas supply etc.

MATERIALS USED IN WIRES

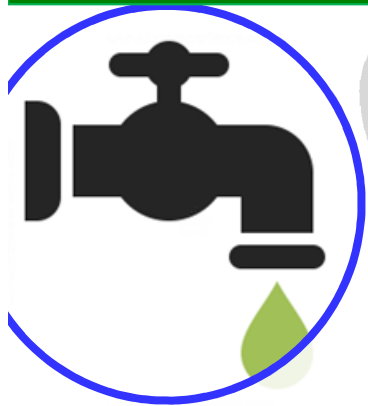
Wired material is known as conductor through which electricity can flow easily and the conductor covering material is called insulator

Copper – Copper is the most common material for conductor.

PVC – PVC is the most suitable material as insulator.



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WATER SUPPLY SYSTEM

Water supply system is divided into two types:

1.

Cold Water System

Cold water system provides water for the following purposes:

- Drinking purpose
- Cooking purpose
- Sanitary purpose
- Washing purpose
- Gardening

2.

Hot Water System

Hot water system provide hot water for:

- Bathing
- Washing

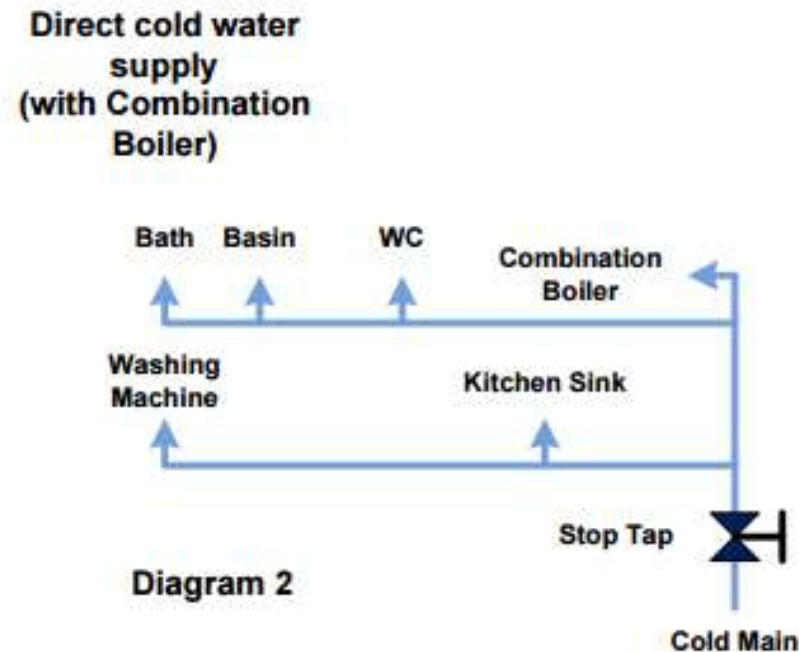
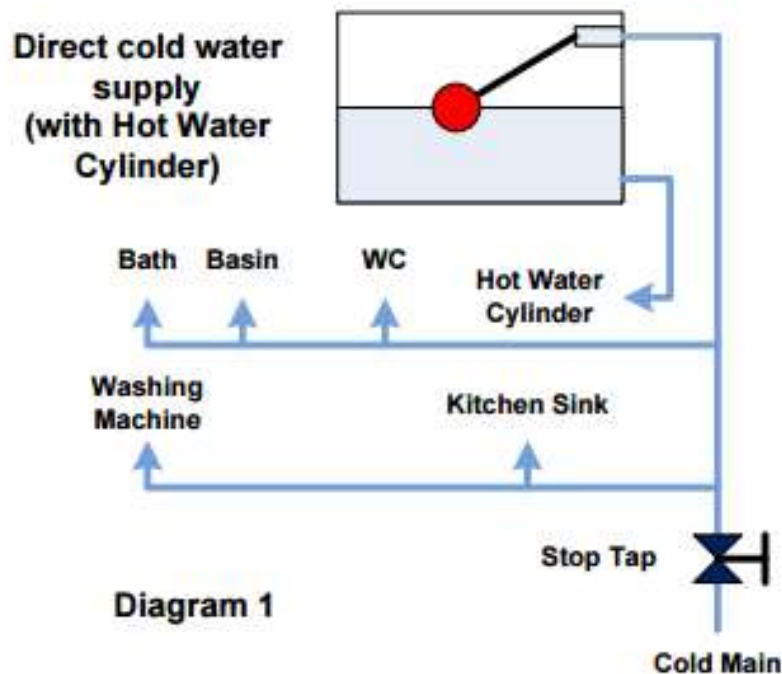
Source of heat are following:

- Boiler/ geysers
- Electrical heat
- Instant Geyser

TYPES OF COLD WATER SUPPLY SYSTEM

There are two types of cold water supply system:

1. Direct Supply: When there is no storage used.
2. Indirect Supply: When a storage tank is used.



TYPES OF COLD WATER SUPPLY SYSTEM

There are two types of cold water supply system:

1. Different valves are used like
2.
 1. Stop valve
(connects or isolate the W/S from main service)
 2. Drain valve
(connects or isolate the inter W/S system of building)

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Sewerage SYSTEM



Sewerage system is provided for two purposes:

- Drainage water used for washing & sanitary purposes
- Rain water disposal

In sanitary system different appliances are used like:

Soil pipes for water closets, soil pipes start from the soil appliance and ends in the gutter

Waste pipes contains waste water from sink and wash basin and the pipes are called floor pipes

TYPES OF Sewerage SYSTEM

There are three types of drainage system:

- Combined system
- Totally separate system
- Partially separate system

Sewage – Waste water and matter flowing in drains is called Sewage.

Drain – Sewage Pipe containing sewage is called drain when it is in the owner boundary.

Sewer – Beyond the house limits it is connected with a large pipe provided by WASA (Water & Sanitation Authority) called Sewer.

MANHOLES

For inspection & cleaning chambers are provided at:

- Junctions
- Change in direction
- Change in grade



When depth is more than 900 mm Inspection & cleaning chamber is called Man hole

SANITARY FITTING & FIXTURES



Sanitary fixture – A receptacle or device that is either permanently or temporarily connected to the water distribution system of the premises and demands a supply of water and discharge system.

Sanitary fitting – It is of two types:

- **Supply fitting** – A fitting that controls the volume and/or directional flow of water and is either attached to or accessible from a fixture, or is used with an open or atmospheric discharge.
- **Waste fitting** – A combination of components that conveys the sanitary waste from the outlet of a fixture to the connection to the sanitary drainage system.

SANITARY FITTING & FIXTURES

Fitting

- Wash hand bars
- Water closet
- Bidet
- Sinks

Fixtures

- Traps
- Bends



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GAS SYSTEM



Gas system provides natural gas to gas appliances like

- Geysers
- Cooking ranges
- Gas burners

Gas becomes highly explosive when mixed with air so gas system must be free from leakage.

Temperature change may lead to condensation in main pipe so a slight slope is provide to avoid accumulation of water That may block the pipe

A gas meter & control knobs are provided to regulate the supply of natural gas.

GAS SYSTEM



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ELECTRICITY SYSTEM



Electrical system is required for several purposes like

- Lighting
- Heating
- Other electrical appliances

Types of Electrical System:

- AC 240 Volts
- AC 110 Volts
- DC Electrical Supply System (Specialized Uses)

ELECTRICITY SYSTEM



Electrical system is divided in a series of circuits like

- Light circuit
- Heating circuit
- Power circuit

The whole system must be earthed by connecting the electrical system special conductor & pass into ground . For high rise building a lightning conductor is also provided.

Circuits are isolated by mean of electric fuse or circuit breakers.

Switches are provided to control the supply

TYPES OF ELECTRIC WIRING



Electrical wiring is provided either on

- Wooden battens (old system)
- PVC pipes
- Metal tubes (conduit)

PVC pipes & metal tube can either be provided on the wall surfaces or in groves made before plastering.

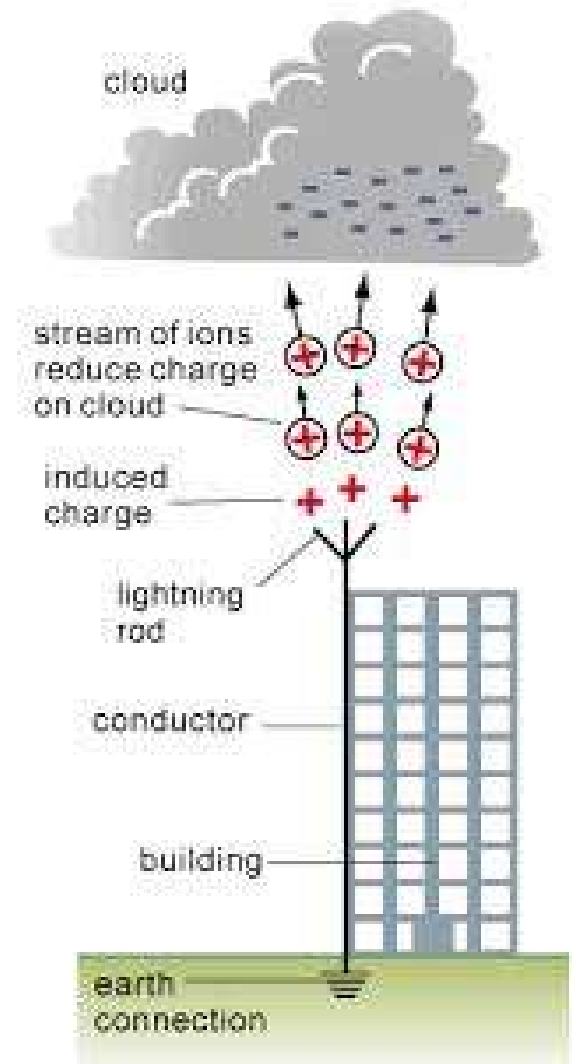
In residential buildings concealed system is common & esthetically good.

In industrial buildings metal tubes/wire racks are provided on surface.

LIGHTNING CONDUCTOR

Lightning conductor is a metal rod or metallic object mounted on top of an elevated structure, such as a building, a ship, or even a tree, electrically bonded using a wire or electrical conductor to interface with ground or "earth" through an electrode, engineered to protect the structure in the event of lightning strike.

If lightning hits the structure, it will preferentially strike the rod and be conducted to ground through the wire, instead of passing through the structure, where it could start a fire or cause electrocution.



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TELEPHONE SYSTEM

- Operated at a relatively low voltage
- Its wiring should be separated from electrical supply system.
- Double pair cables are used



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Fire Fighting SYSTEM



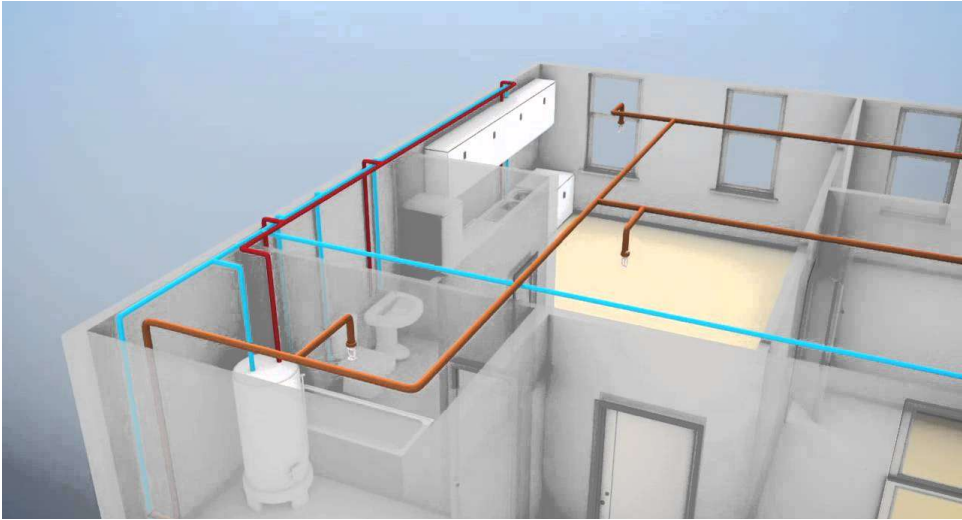
Fire protection system may be of two types:

1. Fire extinguishing equipment
2. Fire sprinkler system

Fire extinguisher is a portable device that discharges a jet of water, foam, gas, or other material to extinguish a fire.
Types: Water & Foam, Carbon dioxide, Dry Chemical, Wet Chemical, Clean Agent, Dry Powder, Water Mist etc.

A fire sprinkler system is an active fire protection method, consisting of a water supply system, providing adequate pressure and flowrate to a water distribution piping system, onto which fire sprinklers are connected.

Fire Fighting SYSTEM



OTHER SERVICES



Heating, Ventilating, and Air Conditioning (HVAC) equipment perform heating and/or cooling for residential, commercial or industrial buildings. The HVAC system may also be responsible for providing fresh outdoor air to dilute interior airborne contaminants such as odors from occupants, volatile organic compounds (VOC's) emitted from interior furnishings, chemicals used for cleaning, etc. A properly designed system will provide a comfortable indoor environment year round when properly maintained.

Internet System is an internet connection to house via cable through local internet provider or via telephone line through telephone network operator (PTCL) or via wifi through wifi internet service provider (Wateen/PTCL EVO).

CCTV is part of the security system where cameras are installed at different locations to check the suspicious activities. These cameras are connected to a central record and monitoring system via cables or wireless techniques.

TABLE 3-1
Size of Gutters^a

Diameter of gutter (in.) ($\frac{1}{16}$ in. slope)	Maximum Rainfall (in. per hr)				
	2	3	4	5	6
3	340	226	170	136	113
4	720	480	360	288	240
5	1,250	834	625	500	416
6	1,920	1,160	960	768	640
7	2,760	1,840	1,380	1,100	918
8	3,980	2,655	1,990	1,590	1,325
10	7,200	4,800	3,600	2,880	2,400

Diameter of gutter (in.) $\frac{1}{8}$ in. slope	Maximum Rainfall (in. per hr)				
	2	3	4	5	6
3	480	320	240	192	160
4	1,020	681	510	408	340
5	1,760	1,172	880	704	587
6	2,720	1,815	1,360	1,085	905
7	3,900	2,600	1,950	1,560	1,300
8	5,600	3,740	2,800	2,240	1,870
10	10,200	6,800	5,100	4,080	3,400

Diameter of gutter (in.) ¼ in. slope	Maximum Rainfall (in. per hr)				
	2	3	4	5	6
3	680	454	340	272	226
4	1,440	960	720	576	480
5	2,500	1,668	1,250	1,000	834
6	3,840	2,560	1,920	1,536	1,280
7	5,520	3,680	2,760	2,205	1,840
8	7,960	5,310	3,980	3,180	2,655
10	14,400	9,600	7,200	5,750	4,800

Diameter of gutter (in.) ½ in. slope	Maximum Rainfall (in. per hr)				
	2	3	4	5	6
3	960	640	480	384	320
4	2,040	1,360	1,020	816	680
5	3,540	2,360	1,770	1,415	1,180
6	5,540	3,695	2,770	2,220	1,850
7	7,800	5,200	3,900	3,120	2,600
8	11,200	7,480	5,600	4,480	3,730
10	20,000	13,330	10,000	8,000	6,660

^aCourtesy of IAPMO (International Association of Plumbing and Mechanical Officials)

THANKS

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GRAZIE

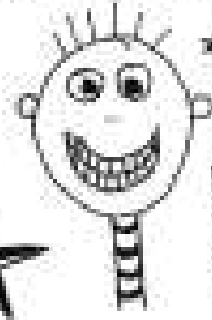
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