

# Chapter 9

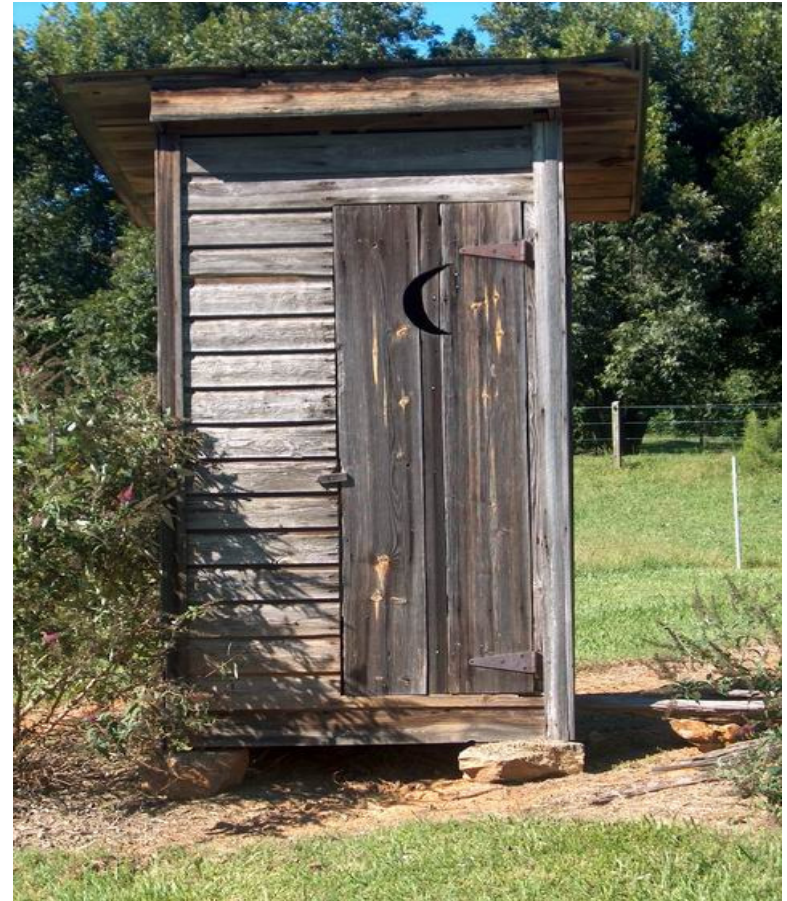
## Traps & Interceptors



**Indian Plumbing Association**

# Before

The average plumbing system in the 1800's looked like this until the late





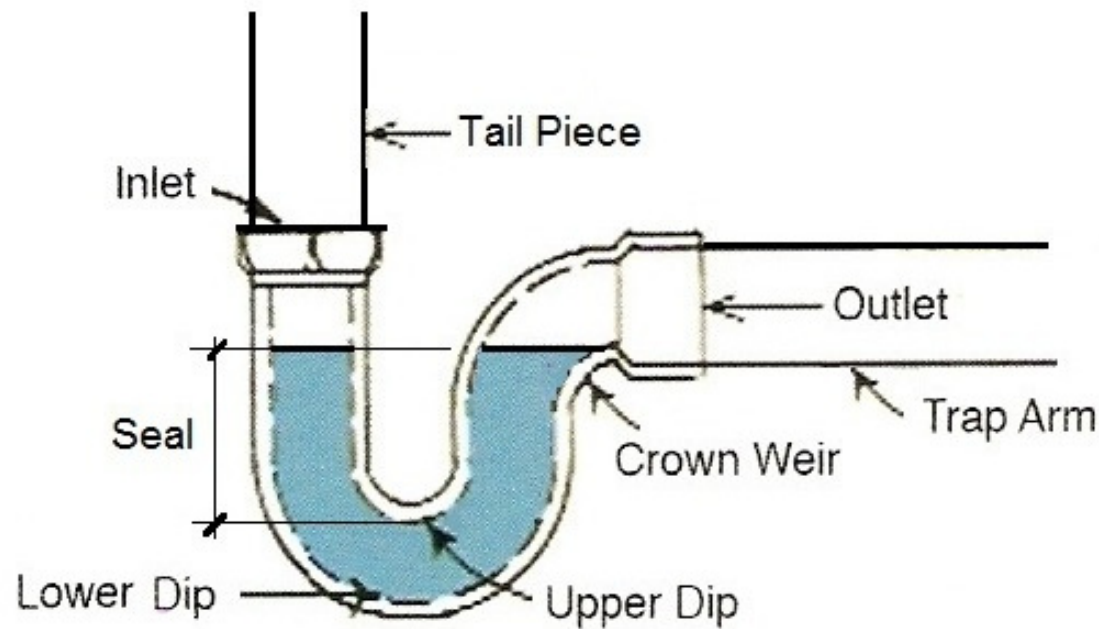
# After

Now they look like this

What brought about the change?

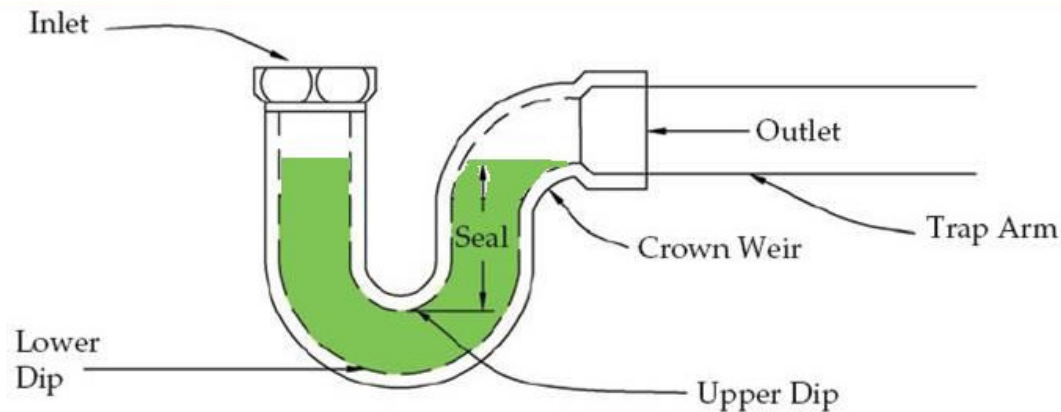


Requirements for the installation of traps on each plumbing fixtures to prevent sewer gas or vermin from entering the structure.

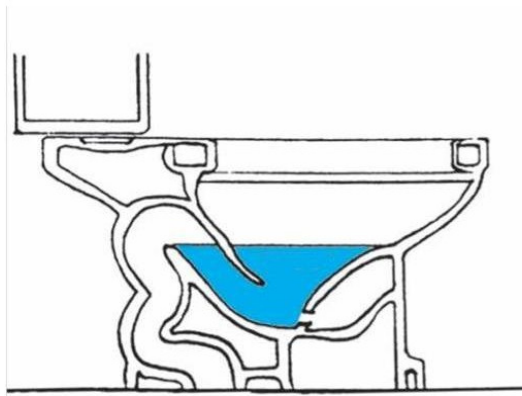


# Trap – Definition

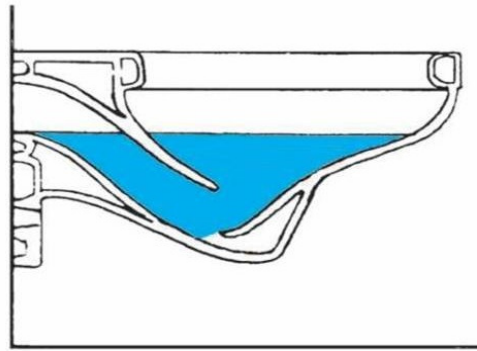
- A fitting or device so designed and constructed as to provide, when properly vented, a liquid seal which will prevent the back passage of air
- The trap thus prevents sewer gas or vermin from entering the structure



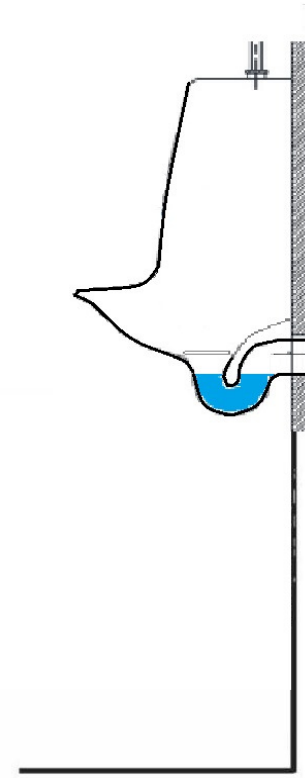
# Water Closet and Urinal Integral Traps



Floor-Mounted Water Closet



Wall-Hung Water Closet



Wall-Hung Urinal

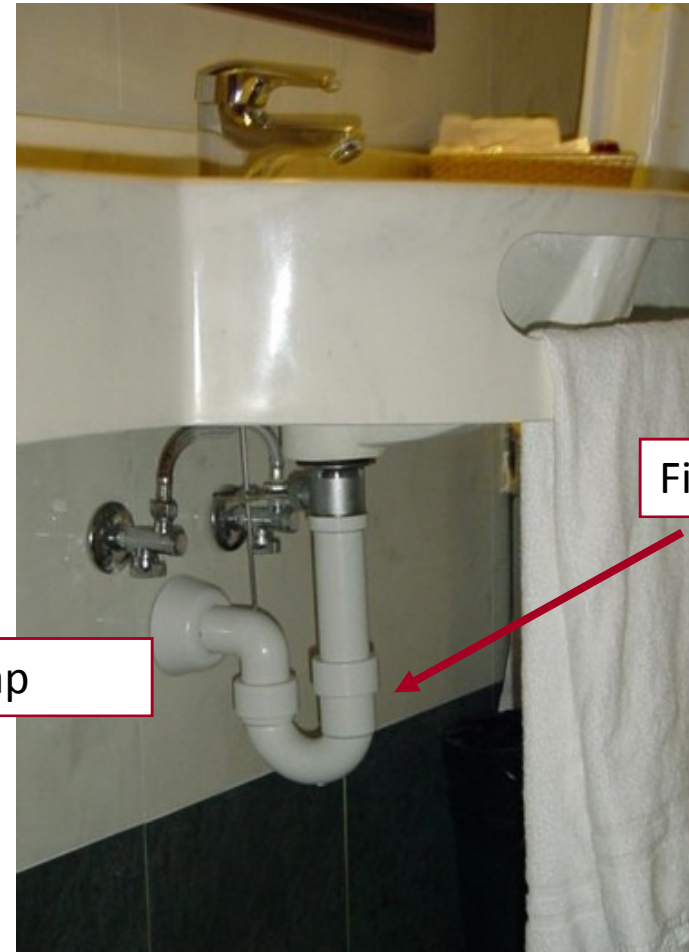
# Traps Required

Each plumbing fixture, except fixtures with an integral trap, shall be provided with an approved type water seal trap





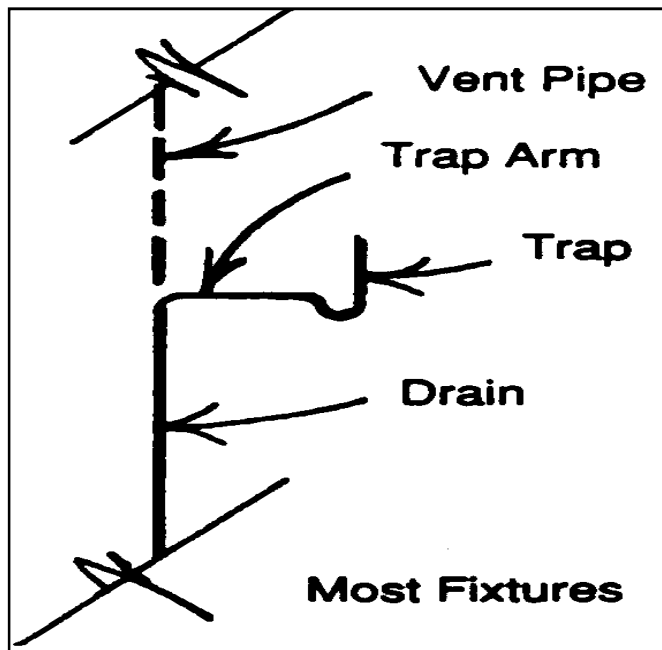
# Installed Traps



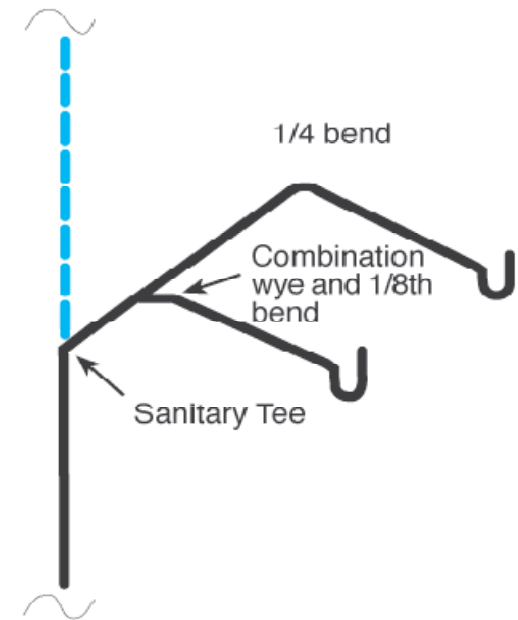
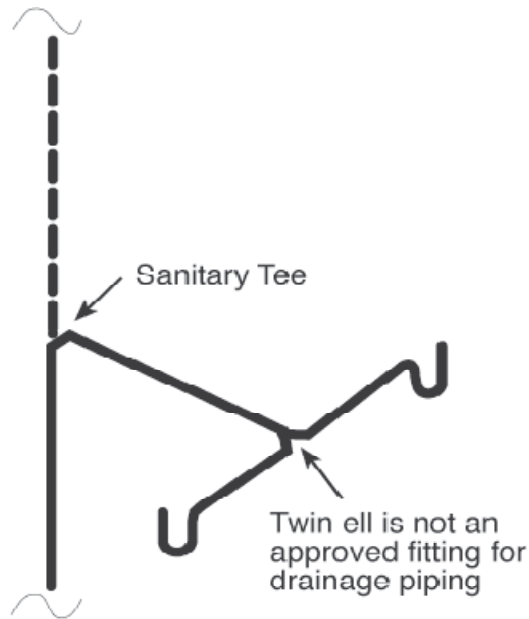


# One Trap on Trap Arm

Not more than 1 trap shall be permitted on a trap arm



# Two Traps on One Trap Arm - Prohibited



# Two Traps on One Trap Arm - Prohibited



# One Trap on a Three Compartment Sink

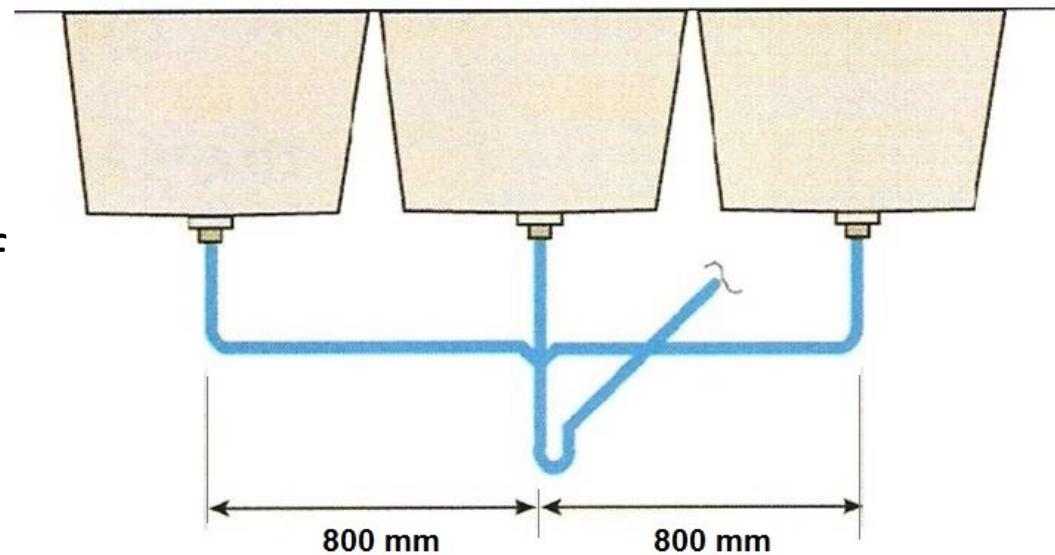
- Not more than 3 single compartment sinks of same depth
- Not more than 800 mm apart





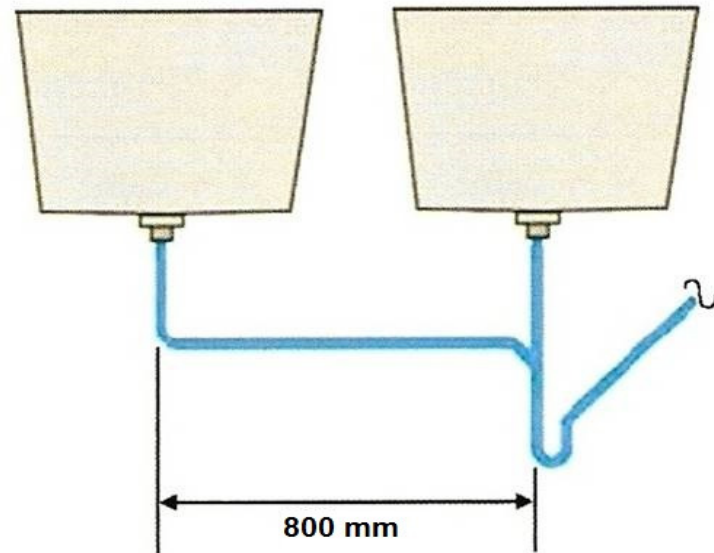
# Three Compartment Sink on One Trap

Trap should always be on the center compartment to minimize the length of the exposed fouling area



# Two Fixtures on One Trap

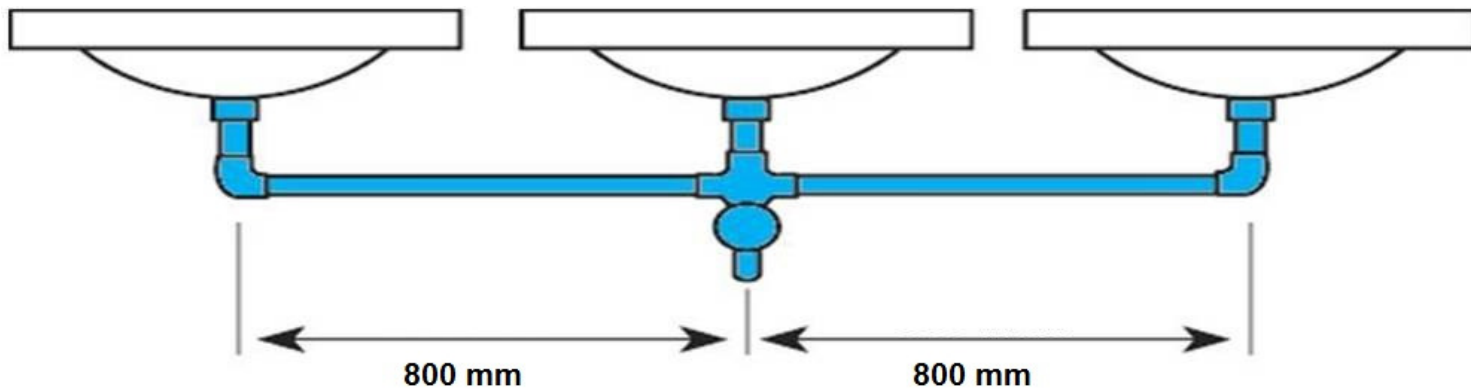
Prohibited if over 800 mm center to center or if overflow rim not at same level



# One Trap

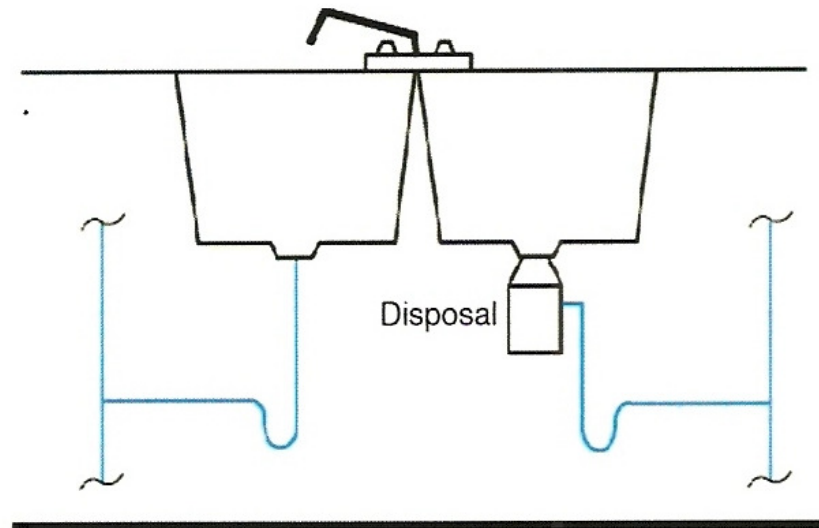
## Serving a Set of Washbasins

- Washbasins immediately adjacent
- Not more than 800 mm apart
- Trap centrally located



# Food Disposal Sink

- No food waste disposal unit will be installed with sink served by a single trap.
- Each food waste disposal unit must be connected to a separate trap

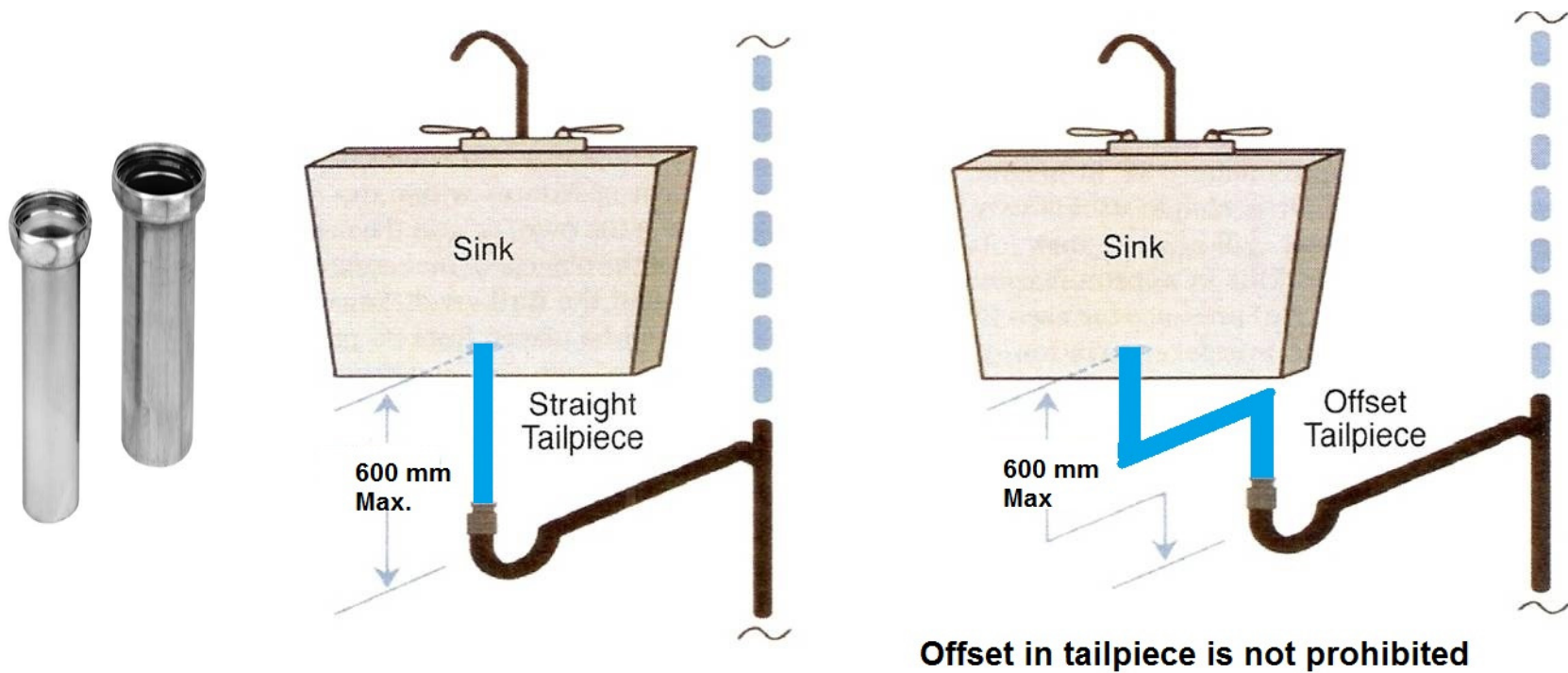




# Trap Tailpiece

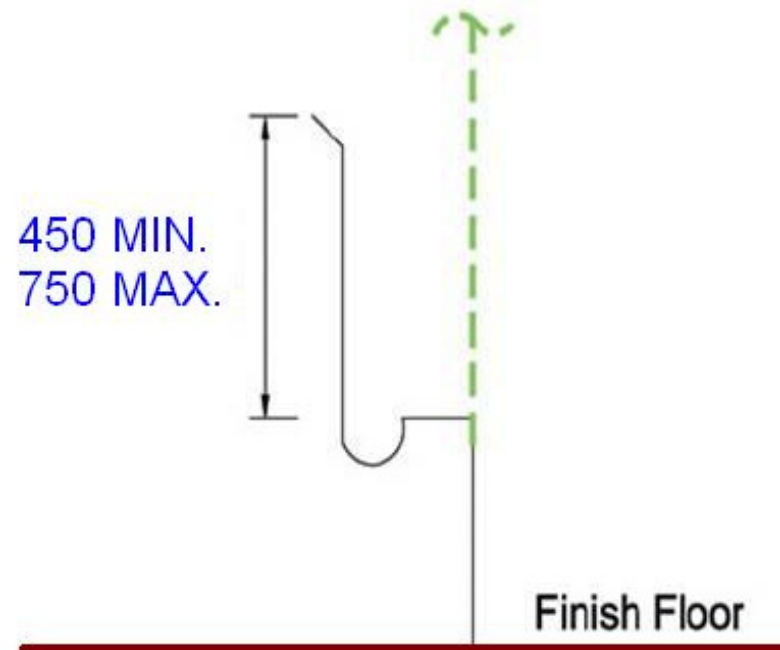
- The vertical distance between a fixture outlet and the trap weir must be as short as practicable, but the tailpiece from any fixture cannot exceed 600 mm in length.
- This distance requirement also applies to tail pieces in combination waste and vent systems.

# Maximum length of a tailpiece



# Clothes Washer

- Standpipes for clothes washers are an exception to the 600 mm requirement, as the standpipe is considered to be a receptor rather than a tailpiece.
- Washing machine standpipes must extend not more than 750 mm nor less than 450 mm above their trap.



# Traps Protected by Vent

Each fixture trap shall be protected from back siphonage and back pressure by means of a vent pipe





# Traps Protected by Vent Pipes

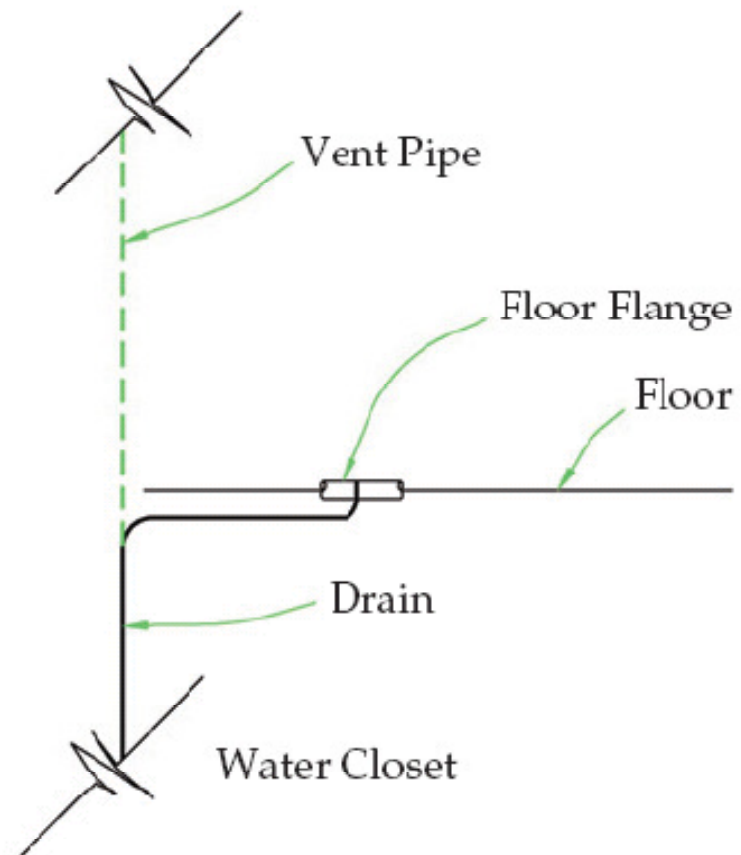
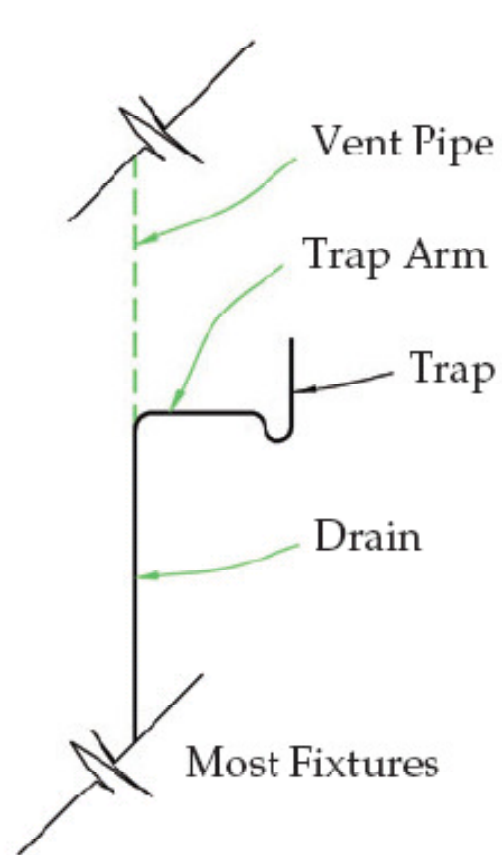
- The operation of a trap is based upon a simple hydraulic phenomenon that equal atmospheric pressure must be maintained on both sides of the trap.
- When a trap is filled to the trap seal, the atmospheric pressure at the fixture side is equal to the atmospheric pressure at the fixture drain outlet.

# Traps Protected by Vent Pipes

- The fixture-fitting vent is of such a size as to equalize the pressure on the outlet side of the trap.
- A pressure variation of plus or minus 1 kg/cm<sup>2</sup> is sufficient to cause a trap to lose its seal.
- A positive pressure will cause the trap to blow its contents into the fixture, and a negative pressure will siphon the trap seal into its drain.

# Traps Protected by Vent Pipes

- Based upon the simple fact that atmospheric pressure of 1.0 bar (10 m of water column) will lift a column of water with a cross-sectional area of 1 cm<sup>2</sup> approximately 10.0 m in height.
- Using this information, it is simple to discover 0.1 kg will support a column of 1 m high.
- An atmospheric pressure variation of 0.02 bar (200 mm of water column) on either side of the trap seal would be sufficient to completely remove the water from a trap with a 50 mm trap seal.

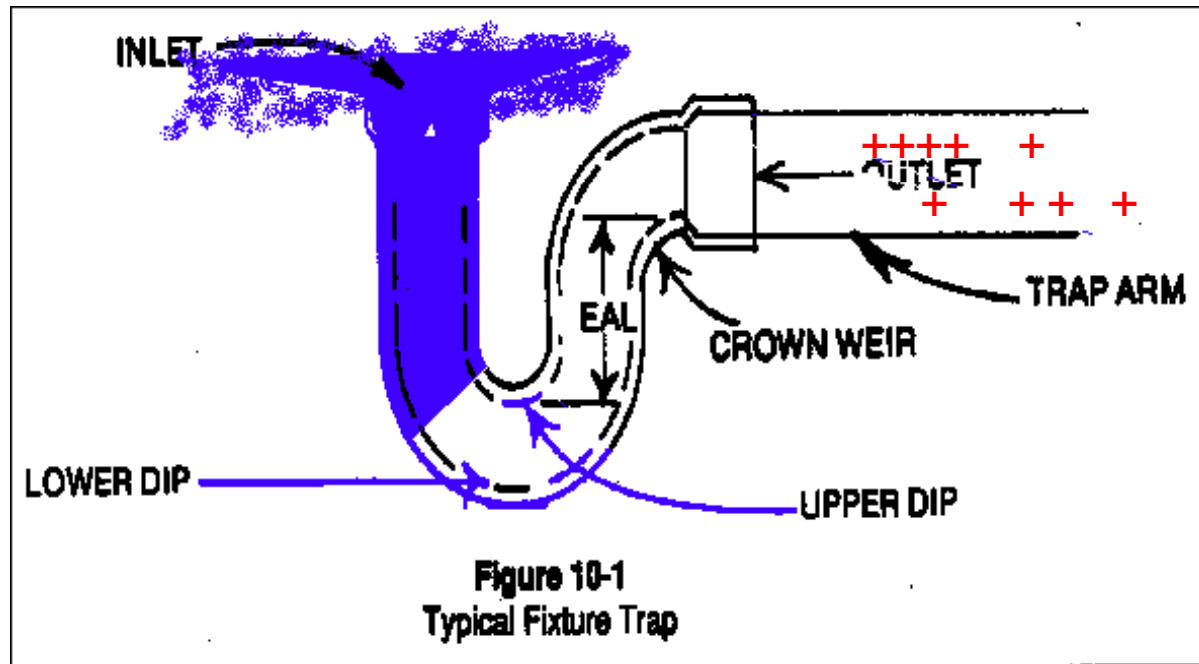




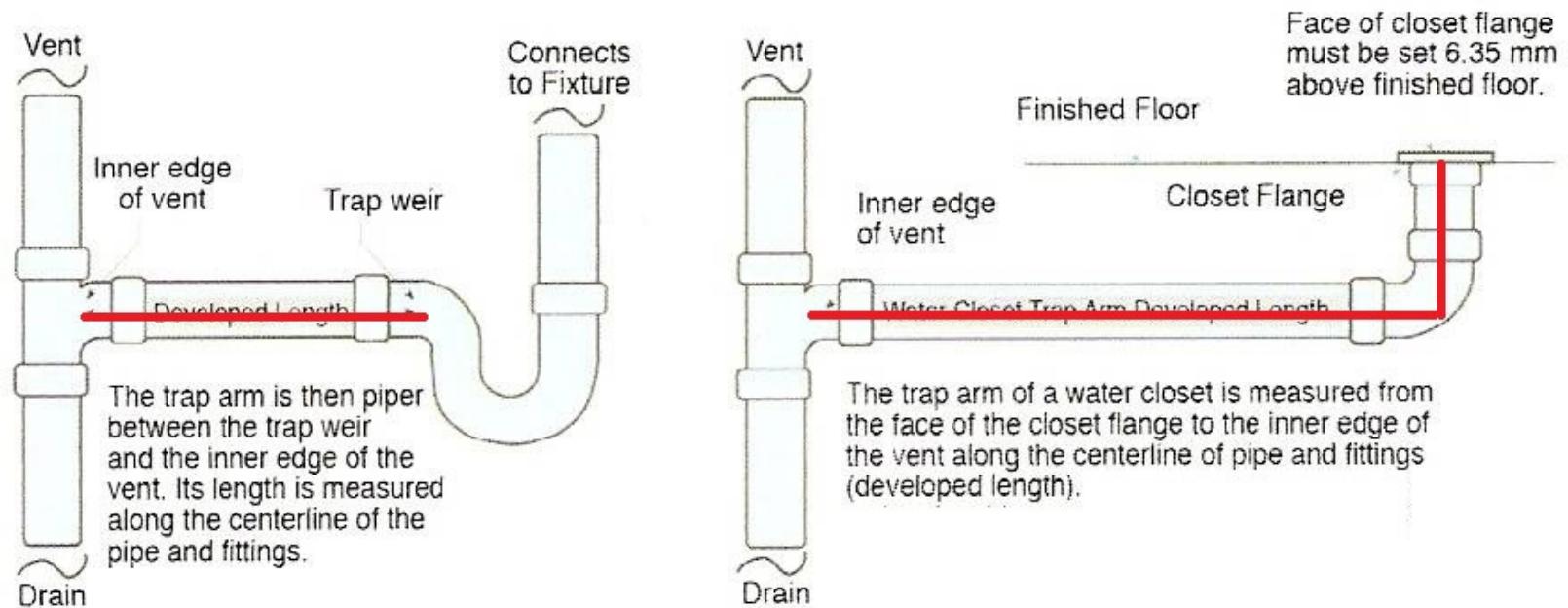
# Atmospheric Pressure

+ 0.02 bar (200 mm of water column) Pressure removes seal

Surges  
back and  
forth

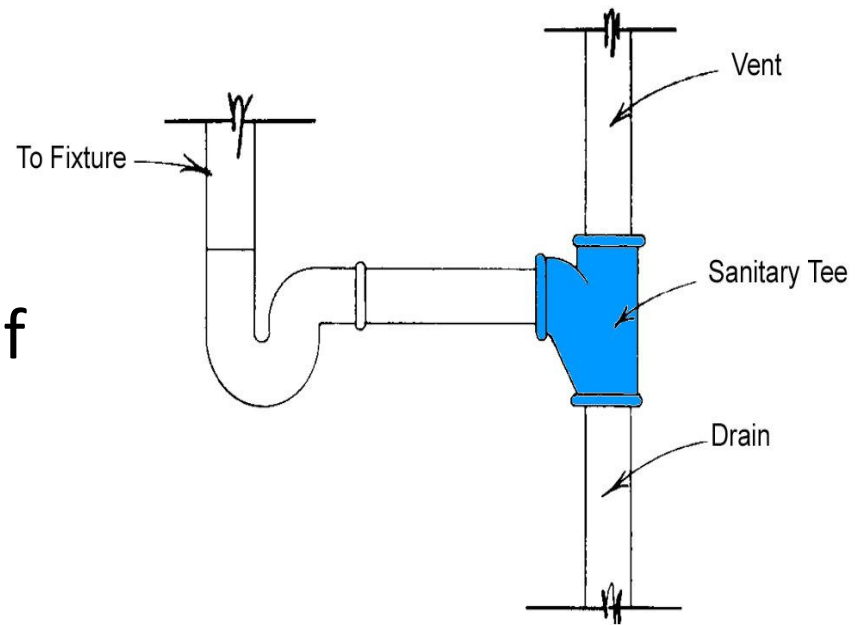


# Developed Length of Trap Arm



# Trap protected by a vent

Each fixture trap must have a protecting vent located so that the developed length of the trap arm from the trap weir to the inner edge of the vent will be within the distance never less than two times the diameter of the trap arm.



# Trap Arm - Developed Length

- Developed length - Not less than 2 x the diameter of trap arm

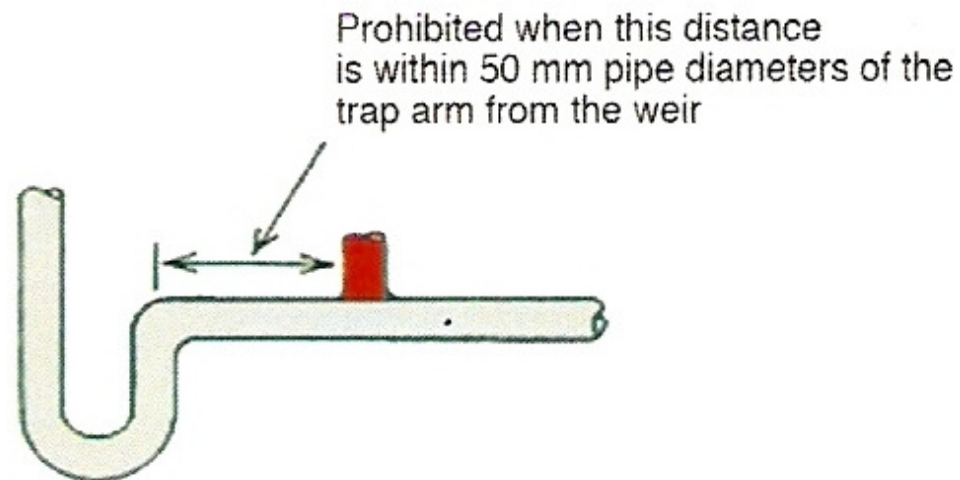
Horizontal Lengths of Trap Arms  
(Except for water closets and similar fixtures)\*

Trap Arm Pipe Diameter	Distance Trap to Vent Minimum	Length Maximum
32 mm	64 mm	750 mm
40 mm	80 mm	1,050 mm
50 mm	100 mm	1,500 mm
80 mm	160 mm	1,800 mm
100 mm	200 mm	3,000 mm
Exceeding 100 mm	2x Diameter	3,000 mm

Maintain slope of 1:50 (2 percent)

# Minimum Trap Arm Distance

Not less than 2x the diameter of the pipe





# Traps

- Each trap shall be self cleansing
- Made of ABS, cast brass, cast-iron, PP, PVC, or other approved materials



**A drawn brass tubing trap**, not less than 17 B&S gauge (1.1 mm thick), may be used only in exposed and readily accessible areas, except not used for urinals.

- Each trap will have the manufacturer's name stamped legibly into the metal of the trap, and each tubing trap must have the gauge of the tubing in addition to the manufacturer's name.
- Every trap must have a smooth and uniform interior waterway.

# Traps – Slip Joints

- Slip joints are limited on each trap arm to one slip joint after the P-trap.
- This would include the slip joint on a trap arm extension.
- A trap arm could have a listed trap adapter (metal or plastic) at the connection to the waste piping, a slip joint extension, and a p-trap with a slip joint on the water seal.



# Trap Size

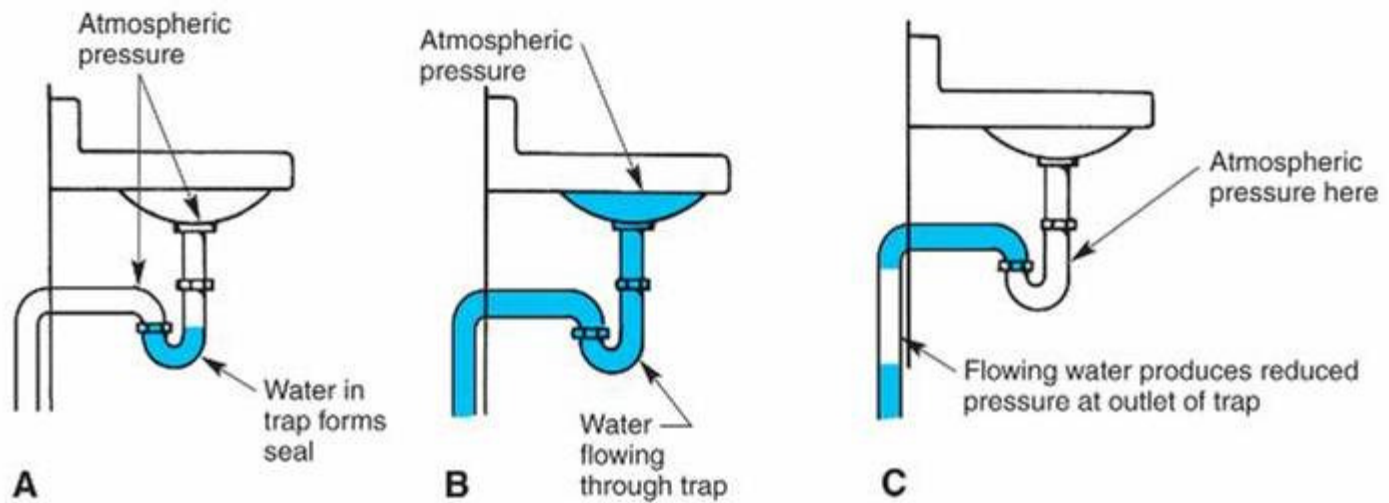
- The size (nominal diameter) of a trap for a given fixture shall be sufficient to drain the fixture rapidly, but in no case less than nor more than one pipe size larger than given in Table of UIPC-I.
- The trap shall be the same size as the trap arm to which it is connected.

# Prohibited Traps

- No form of trap that depends for its seal upon the action of movable parts shall be used.
  - No trap that has concealed interior partitions, except those of plastic, glass, or similar corrosion-resisting material, shall be used. "S" traps and crown-vented traps shall be prohibited.
  - No fixture shall be double trapped.
  - Drum and bottle traps shall be installed only when permitted by the Authority Having Jurisdiction for special conditions.
  - No trap shall be installed without a vent, except as otherwise provided in this code.

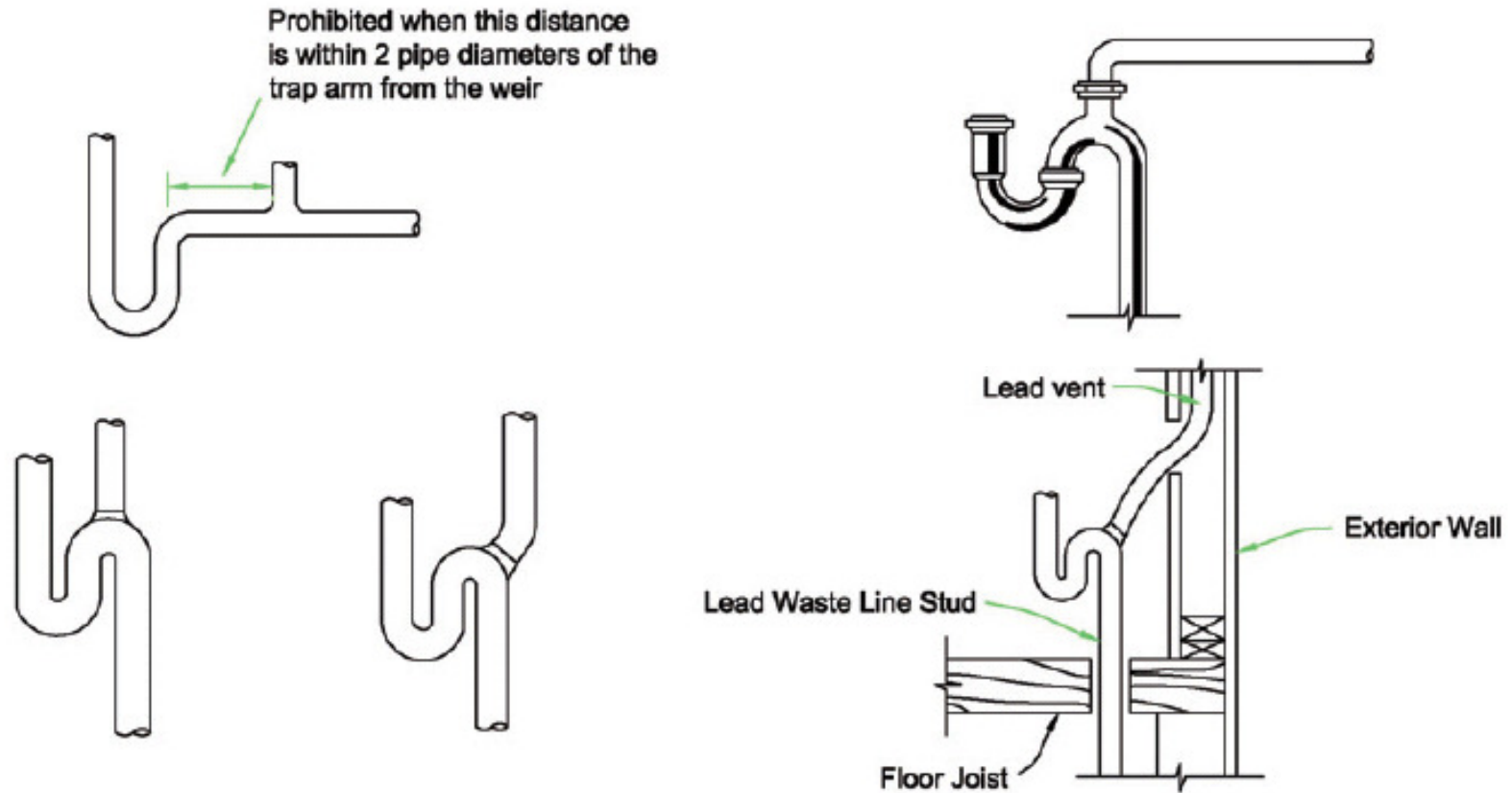


# Prohibited traps



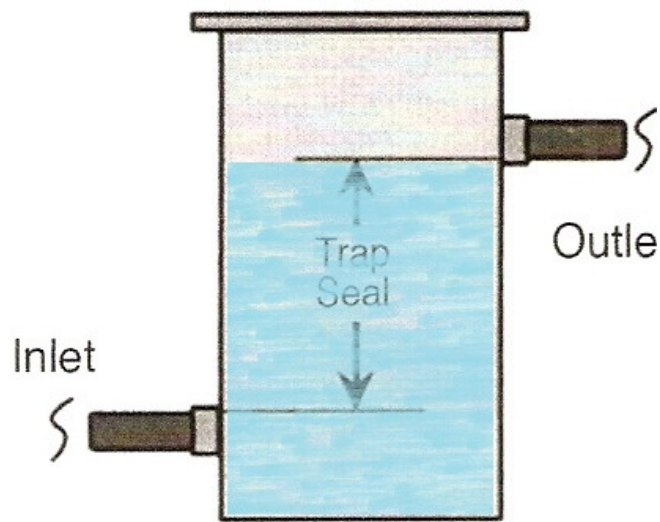
# Prohibited Traps

## Crown Vented Traps

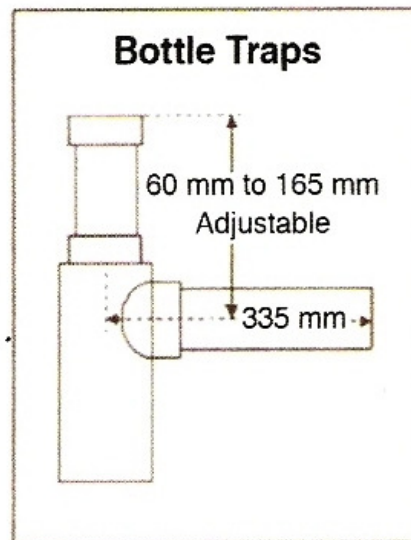


# Drum Trap & Bottle Trap

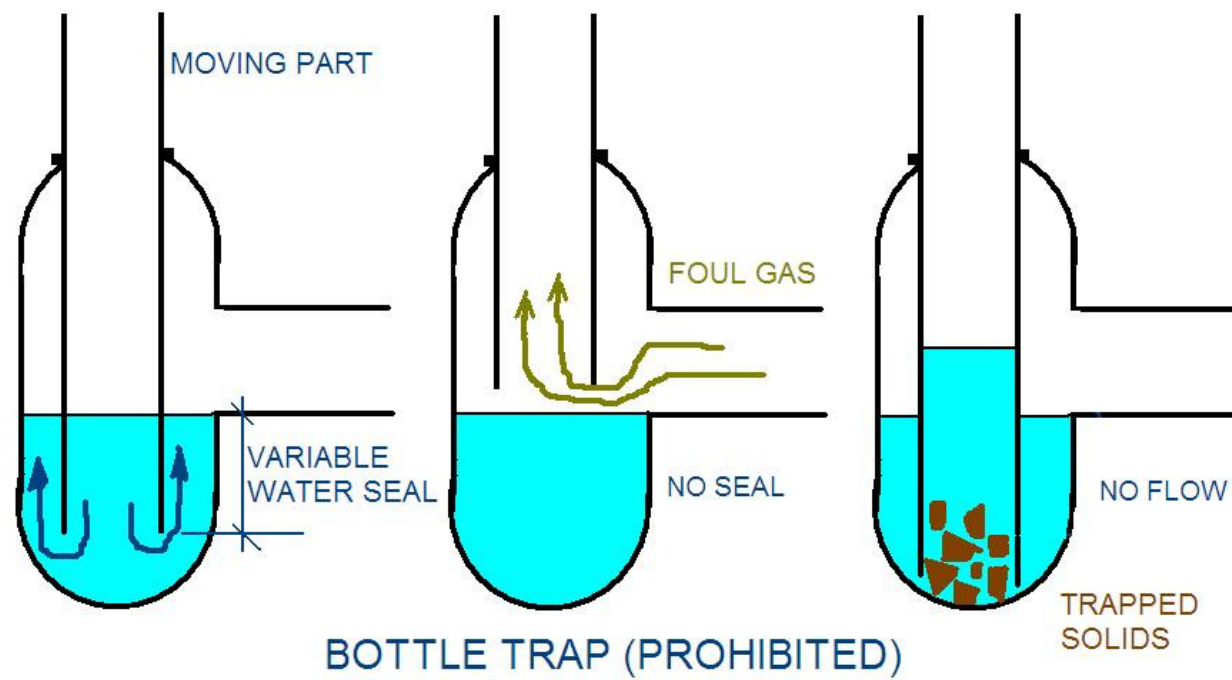
Prohibited, unless approved by AHJ



Drum Trap



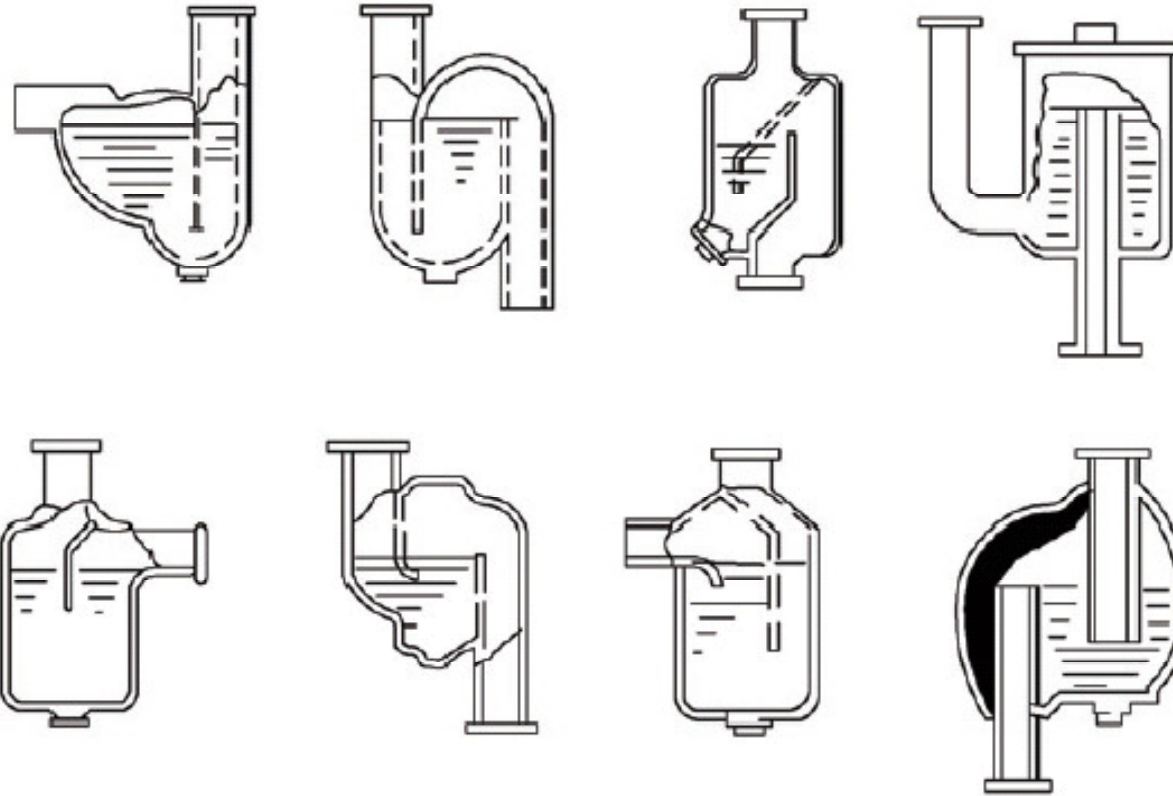
Bottle Trap



# Trap Partitions

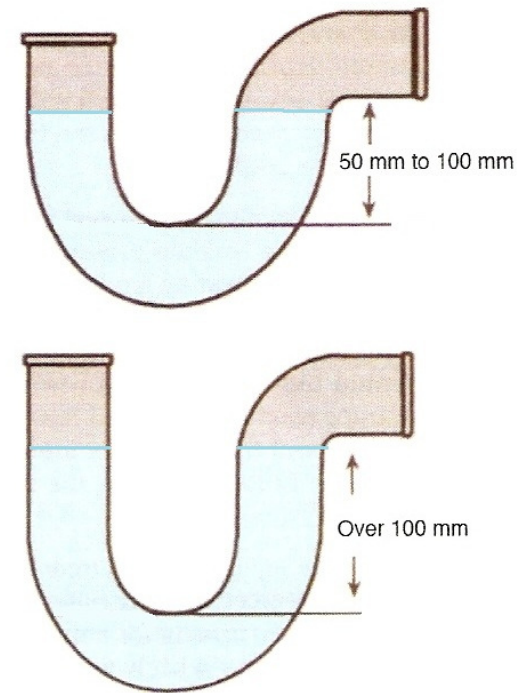
Internal Partition Traps are Prohibited

Unless Made of corrosion resistant materials and be non-removable



# Trap Seals

- Each fixture trap shall have a liquid seal of not less than 50 mm (Standard Trap) and not more than 100 mm (deep Seal Trap), except where a deeper seal is found necessary by the Authority Having Jurisdiction.
- Traps shall be set true with respect to their liquid seals.





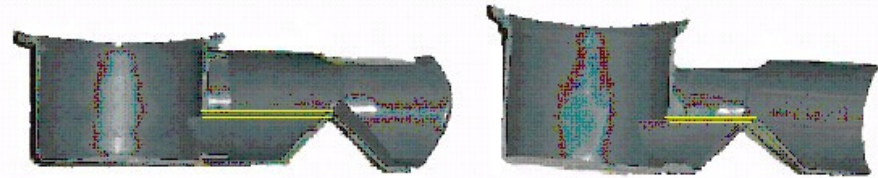
# Floor Drain Traps

- Constructed to allow it to be readily cleaned
- Equipped with an approved backwater valve when subject to reverse flow
- Drain inlet located at all times in full view

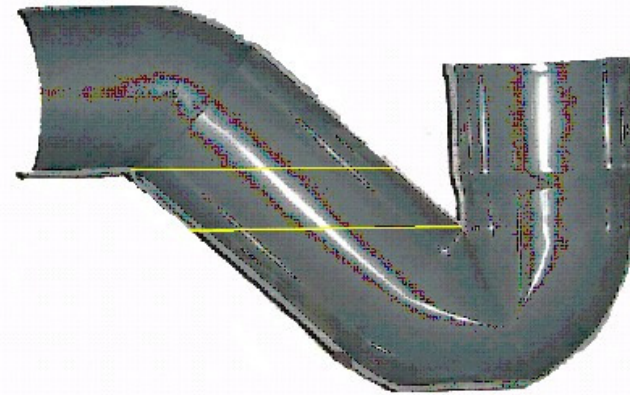


# Floor Drain Traps

Min. Trap Seal 50 mm

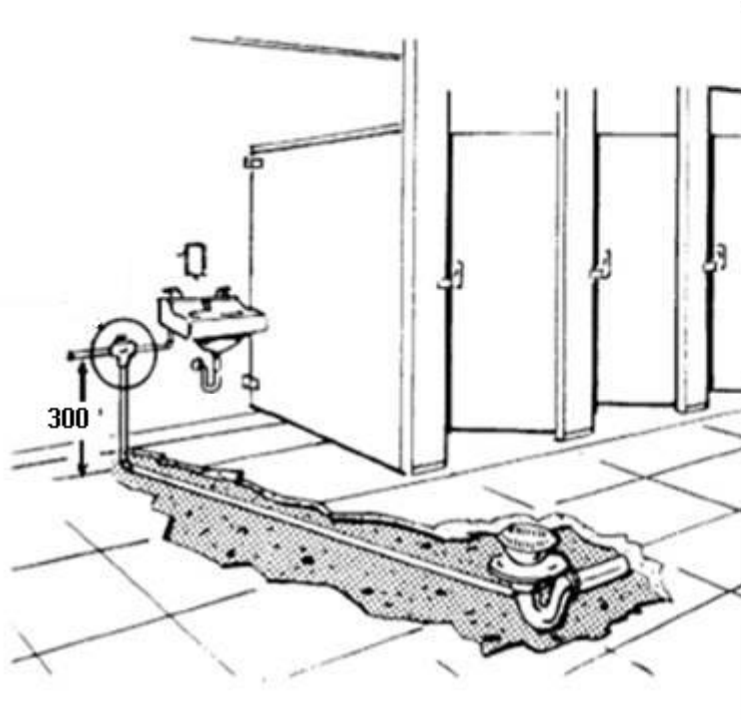


Nahni Traps with inadequate trap seal



P trap with adequate trap seal

# Typical Installations



**Restrooms**



**Laundry rooms**

# Traps: Summary

- A liquid seal of not less than 50 mm.
- A smooth and uniform interior waterway.
- Self cleansing type
- ABS, cast brass, cast-iron, PP, PVC, or other approved materials
- No internal moving parts to make the trap seal.
- Trap partitions of corrosion resistant materials and non-removable.
- Slip joints limited on each trap arm to one slip joint after the P-trap.
- Manufacturer's name legible

# Trap Seal Protection.

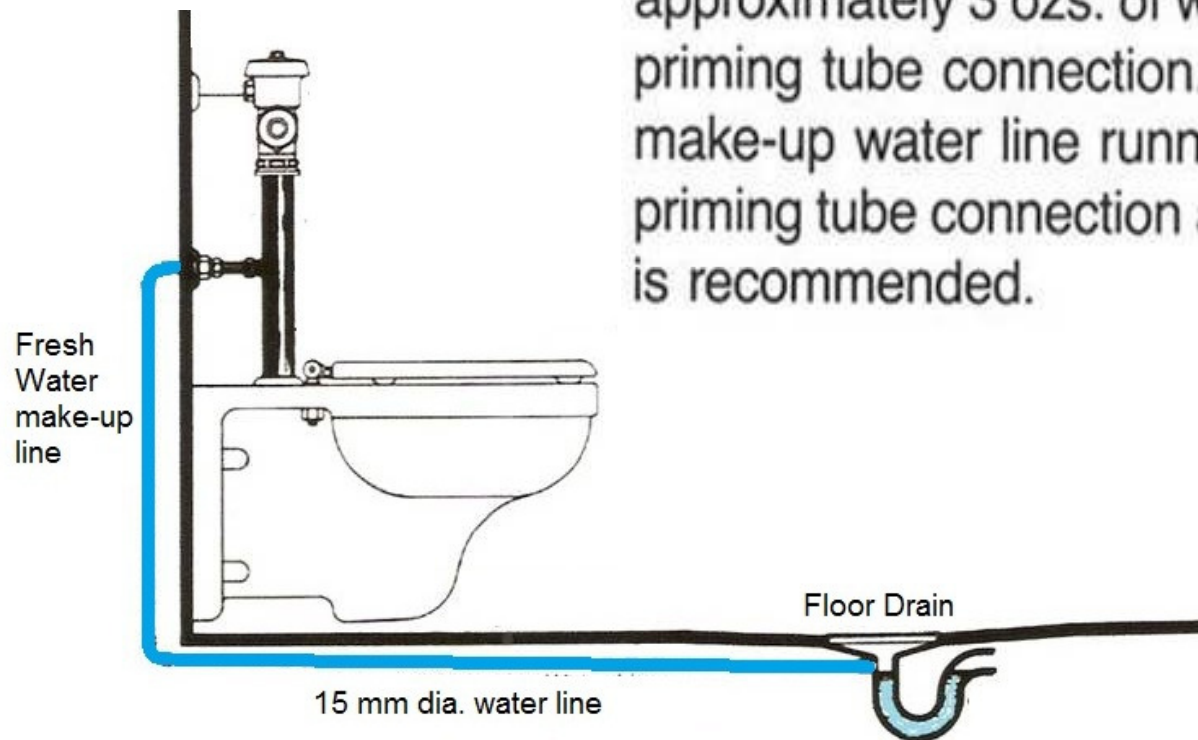
- Floor drain or similar traps directly connected to the drainage system and subject to infrequent use shall be protected with a trap seal primer.
- There are three basic ways in which traps lose their water seal. They are:
  - Siphonage.
  - Backpressure.
  - Evaporation.
- The first two have been addressed many times in UIPC-I but evaporation has not been discussed prior to this point.

# Trap Seal Protection

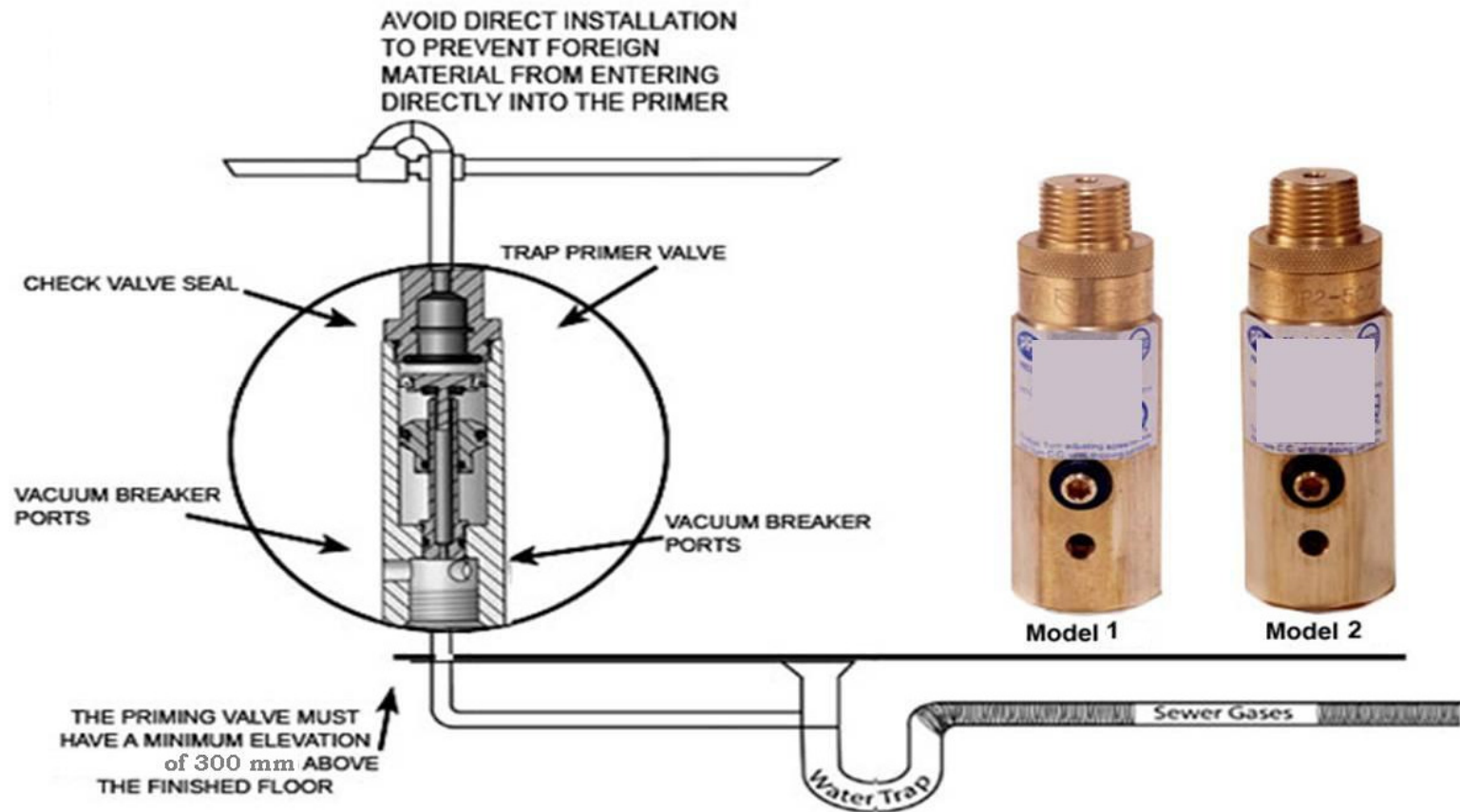
- Floor drain or similar traps directly connected to the drainage system and subject to infrequent use shall be protected with a trap seal primer, except where not deemed necessary for safety or sanitation by the Authority Having Jurisdiction.
- Trap seal primers shall be accessible for maintenance.



The **Flush Valve Primer** replaces the standard flush valve connection providing a fresh water prime to replenish the floor drain trap seal. Each time the flush valve operates, approximately 3 ozs. of water flows through the priming tube connection. A 12 OD copper make-up water line running between the priming tube connection and the floor drain trap is recommended.



# Trap Seal Primer



# Sink and Washbasin Trap Primer





# Interceptor

- A device designed and installed to separate and retain deleterious, hazardous, and undesirable matter
- Protects system from substances which may be harmful
- Properly treat wastes before entering system

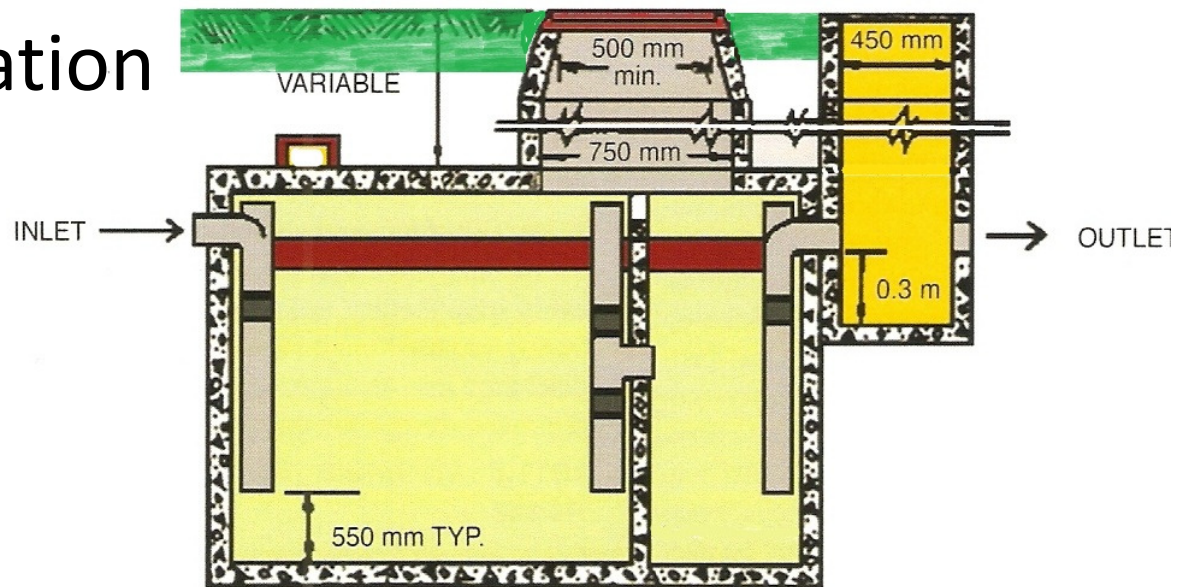


Their function is to prevent liquid wastes containing grease, flammables, sand, solids, acid or alkaline substances, and other such ingredients from entering public or private sewage disposal systems until the liquid wastes have been properly treated.

At the same time, normal sewage or liquid wastes must be permitted to discharge by gravity into the drainage and sewage systems.

The three principal methods of treating these wastes are:

1. Floatation
2. Sedimentation
3. Neutralization





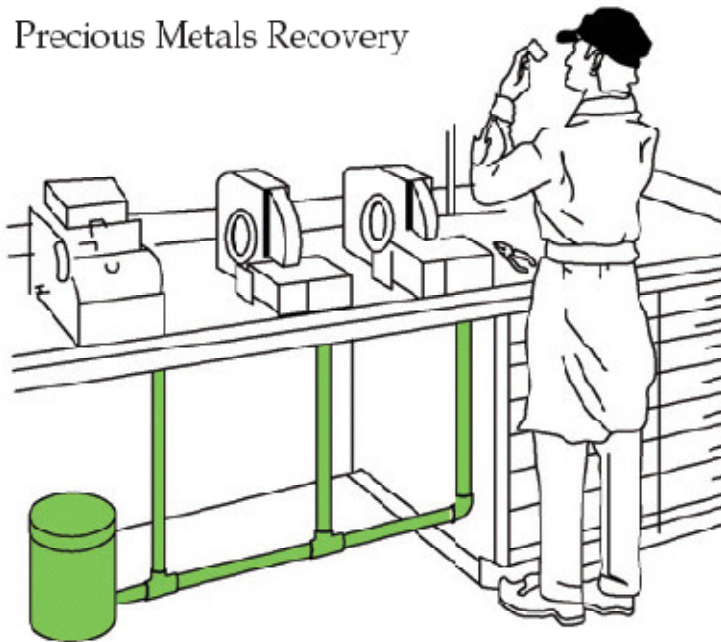
# Relief Vent.

- Interceptors (clarifiers) shall be so designed that they will not become air-bound if closed covers are used.
- Each interceptor (clarifier) shall be properly vented.



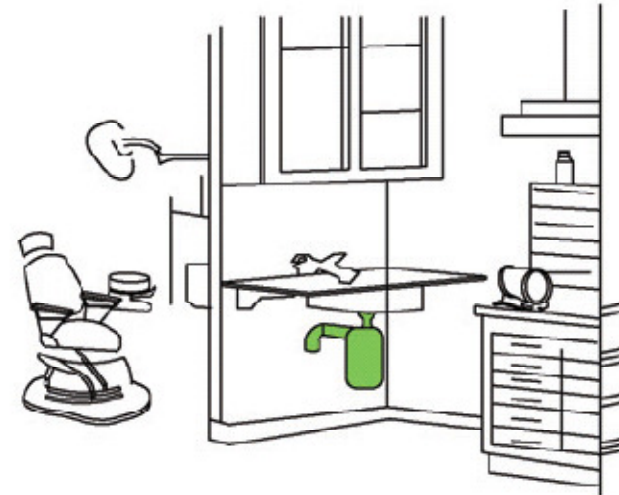
# Solids Interceptor

Precious Metals Recovery

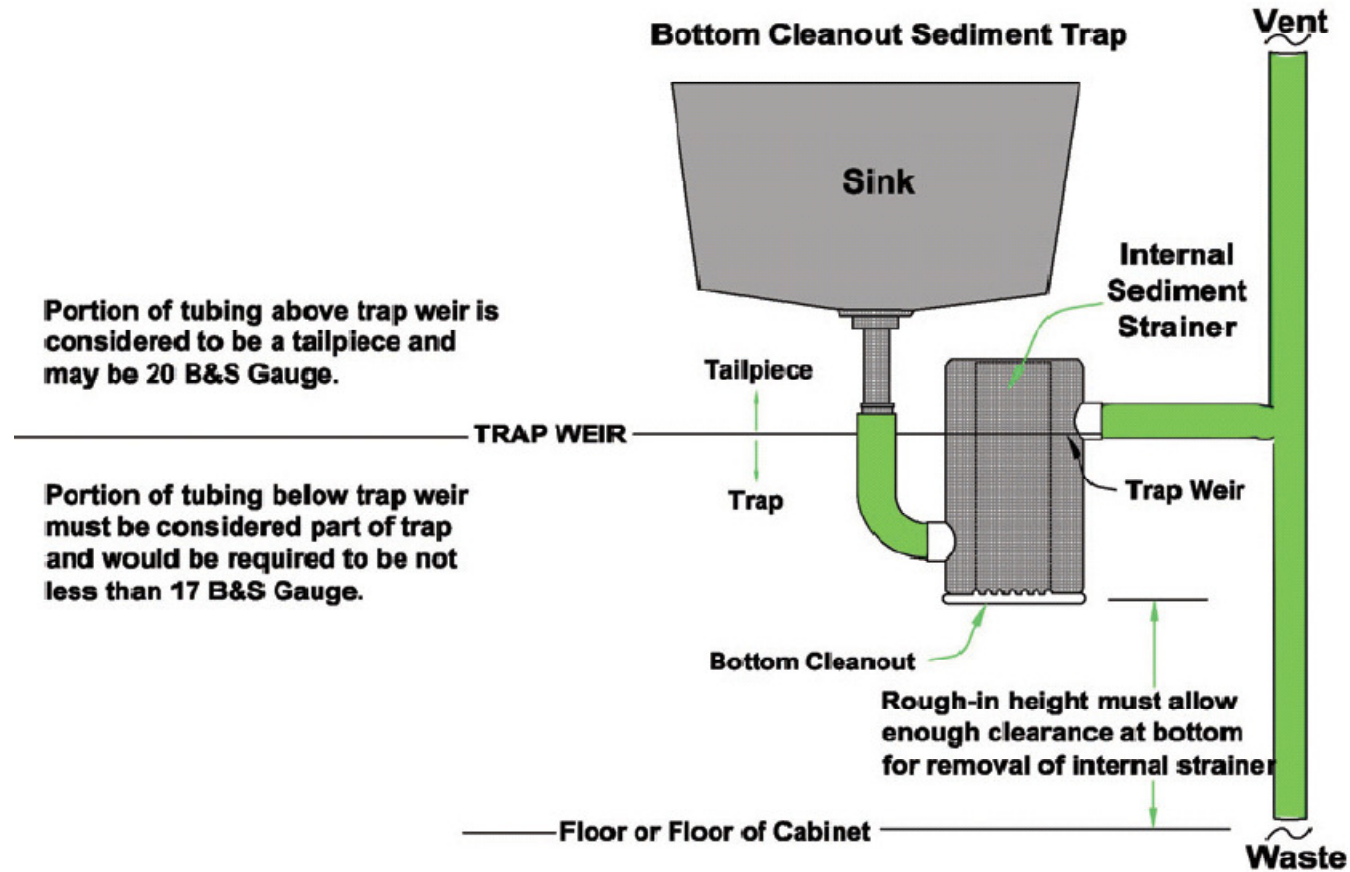


Installed above floor

Dental Laboratory – Plaster and Denture Grindings Recovery

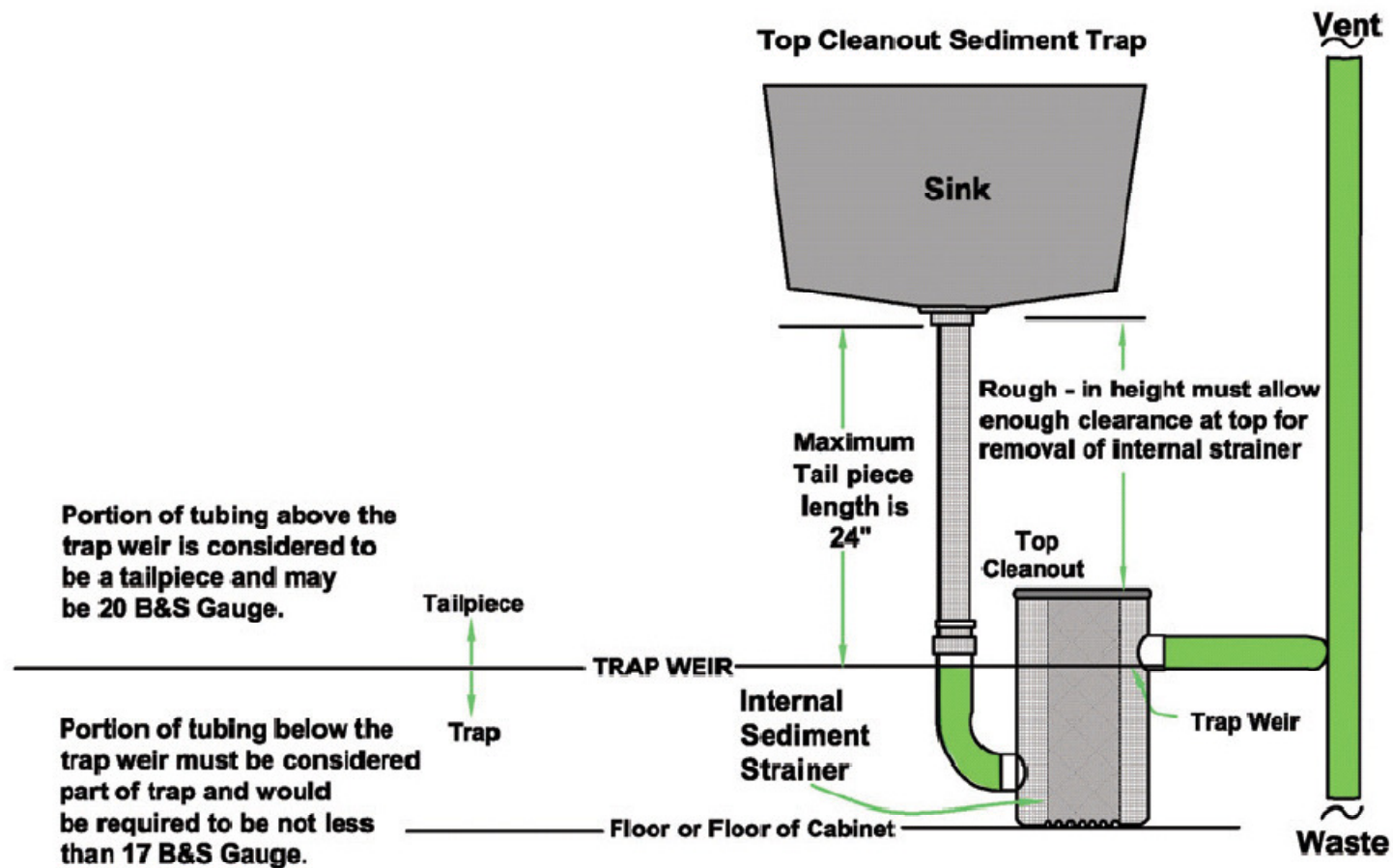


Installed under fixture



**Figure 10-26 (a)**

Typical Installation for Bottom Cleanout Sediment Trap or Solids Interceptor



**Figure 10-26 (b)**  
Typical Installation for Top Cleanout Sediment Trap or Solids Interceptor



# Thank you

## Any Questions?

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