

# JOB ROLE –PLUMBER (GENERAL II)

Sector – Plumbing  
(Qualification Pack Code: PSC/Q0110)



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# UNIT 05: REPAIR OF LEAKAGES IN BASIC FITTINGS AND FIXTURES

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# Session Objectives

The student will be able to:

- Perform the plumbing repairing, cause of damage and procedure for repairing the pipeline,
- Describe the types and replacement of repair,
- Perform the site management,
- Demonstrate the repair of fixtures, stopcock and water supply fitting ,
- Describe the term cistern, water closet , toilet tank and tap & faucet,
- Illustrate the types of pipes and their methods of repair,
- Prepare the plan and schedule of routine maintenance, repairs and modifications.

# Introduction

- A water leak can cause a major disturbance in the plumbing system. Leaks from water pipes, plumbing fixtures and fittings are a sizeable source of water wastage in our homes. Sometimes, considerable water leakages from the system may cause problems related to pressure moulding and significant water losses. Thus, as soon as a leak is found, its repair becomes an absolute necessity.



# Sources of Leakage

## Water supply line leaks

- Sometimes, there are leaks in the water supply line coming to home from the meter. These are often difficult to detect because the supply pipe is usually buried at least 3 feet below the ground.
- If you think you have found the leak and can get to it, you could try to fix the problem.



# Leaks due to pipe corrosion

- Pipe corrosion is a process that results in a reduction of thickness of the wall of a metal pipe, caused by electrolysis (chemical breakdown by electric current), junk, or acidity of water.
- Use a piece of wood as a resonator to recognise and amplify the sound of the leak.



# Remedies

**Galvanised pipes:** After locating the leak, cut and replace the corroded pipe.

**Step 1.** Close the water at the nearest valve below the leak, and drain the pipe.

**Step 2.** When the fittings on both sides of the leak are not readily available, cut out the leaking section. One plumber should hold the pipe with a wrench to prevent its turning in the adjoining fitting, while another plumber cuts a thread on it.

**Step 3.** Replace the cut-out section with a desired coupling, a pipe section of the given length, and a similar union.



**Copper pipes:** Copper pipe resists corrosion, except when attacked by acids.

**Step 1.** Close the water at the nearest valve below the leak, and drain the pipe.

**Step 2.** Replace it with either soldered or compression joints.

The following can be done to reduce corrosion.

**Use of di-electric unions:** These are fixed in the hot and cold water take-offs from the tank and it reduces the galvanic corrosion of water tanks.

**Use of magnesium rods:** These are also used in a few geysers, such as the gas operated type, to save against rust and corrosion. Maximum life of the rods is 1½ years; then they must be changed.

## Leaks in valves

- All valves should be checked regularly for leaks. Most leaks are from washers or bonnets.



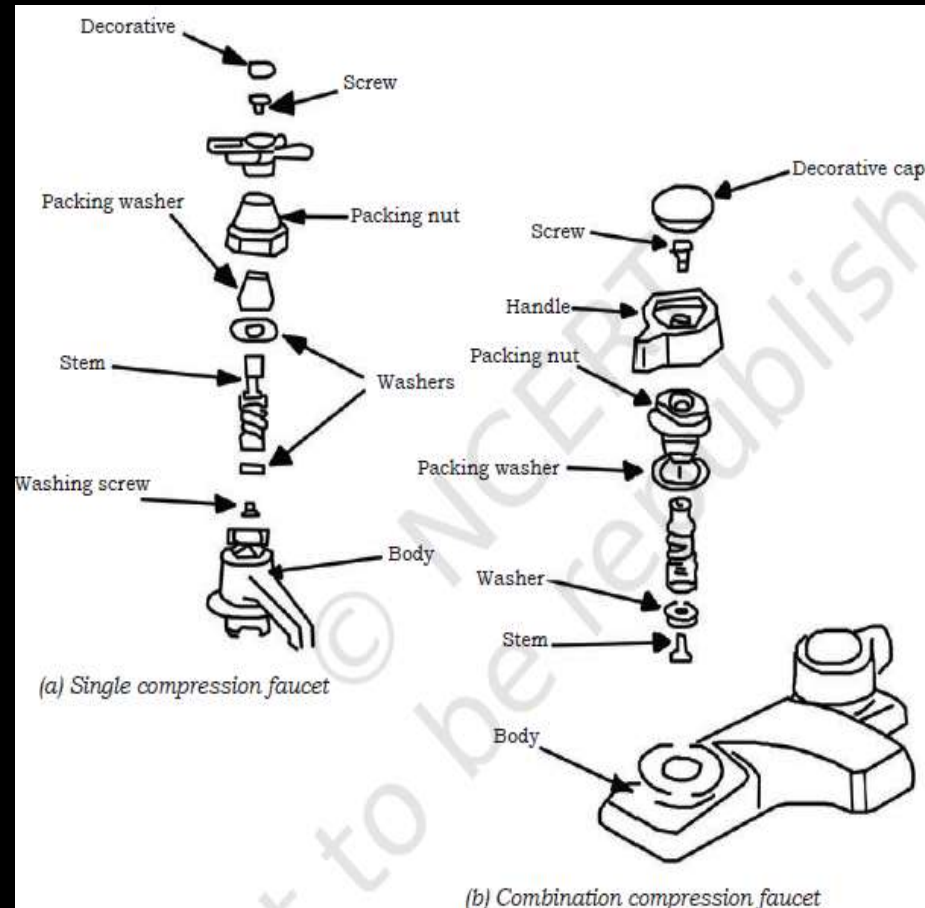
## Leaks in faucets

- A faucet is a device that allows you to turn the flow of water on and off.



# Compression faucets

- These faucets have separate hot and cold water handles and their action requires you to tighten the handle down to turn the water flow off.
- While repairing compression (or washer) faucets, first check the valve seat. If it is chipped or rough, reface it with a refacing tool or replace it.



# Following procedures to repair single compression faucets:

## Leak at the stem and the packing nut and washer

**Step 1.** Turn the water supply off at the shut off valve, and remove the cap, screw and handle.

**Step 2.** Remove the packing nut with a wrench, the old packing material and the washer.

**Step 3.** Place a new washer onto the stem's lower end, and reassemble all parts in order.

**Step 4.** Turn the water supply on and check for leaks and proper operation.

## Leak at the spout

**Step 1.** Turn the water supply off at the shut-off valve. Remove the cap, screw and handle.

**Step 2.** Remove the packing nut with a wrench; then remove the stem from the body.

**Step 3.** Remove the screw and washer from the bottom of the stem.

**Step 4.** Place a new washer onto the bottom of the stem.

**Step 5.** Check the valve seat inside the body. If it is chipped or rough, reface the seat with a refacing tool. If the seat is even, place the stem into the body. Replace if needed.

**Step 6.** Reassemble all the parts in the proper order.

**Step 7.** Turn the water supply on and check for leaks and proper operation.

## Leak at the base of the body

- Step 1.** Turn the water supply off at the shut-off valve.  
Remove the cap, screw and handle.
- Step 2.** Remove the packing nut with a wrench.
- Step 3.** Remove the worn washer from the packing nut.
- Step 4.** Slide a new washer into the packing nut for a snug fit.
- Step 5.** Reassemble the parts in the proper order.
- Step 6.** Turn the water supply on and check for leaks and proper operation.

# Non-compression faucet repairs

**Ball faucets:** Commonly used in kitchen sinks, these washer less faucets can be identified by their single handle that regulates a special plastic or metal ball inside the faucet body.

**Step 1.** Remove the handle by loosening the set screw.

**Step 2.** Remove the cap and pull out the ball with the cam assembly.

**Step 3.** Use needle nose pliers to remove the two rubber valve seats and springs.

**Step 4.** Replace the rubber seats and/or the selector ball.

**Step 5.** Reassemble the faucet, ensuring that the slot in the ball aligns with the metal protection on the housing. Check for leaks.

**Metal cartridge faucets:** Such faucets look quite identical to a compression washer faucet. Leaks in these faucets are usually caused by two O-rings in the faucet body. Replacing the O-rings should eliminate the leaks.

**Step 1.** Remove the screw and push a screwdriver down the hole to keep the stem in place while removing the handle and cover.

**Step 2.** Unscrew the retaining nut and remove the spout. The body of the faucet is exposed to get to the O-rings.

**Step 3.** Replace the O-rings.

**Step 4.** Reassemble the faucet and check for leaks.



# Causes

1. Worn out or defective washer.
2. Accumulation of grit, dust, or other foreign matter.
3. Defective stopcock seat.
4. The gland nut is loose.
5. The packing in the stuffing box is defective.
6. The packing in the stuffing box is dry.
7. The spindle is bent.
8. The spindle thread is worn out.

# Repairs

- First, we have to find exactly where the stop valve or tap is leaking.

**(i) Compression nuts:** If water is leaking from one of the two compression nuts, then tighten the nuts and this should stop the leakage. Grip the body of the tap with water pump pliers and then tighten the nut by turning it clockwise, using a spanner.



Parts of a stop tap or a valve



Opening of a compression nut

**(ii) Gland nut:** If the leak is on the gland nut, first try tightening the gland nut with a spanner. This may stop the water from leaking.

The gland nut can be removed and repacked without the water being isolated.



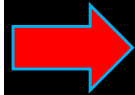
Tightening of a gland nut



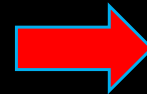
Removing bits from a gland nut

# REPLACING STOP TAP WASHER

**(a) Opening of a large nut**



**(b) Separating body of a tap**

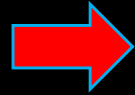


**(c) Checking the washer**

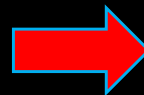


Conti...

**(d) Removing the washer**



**(e) Replacing the rubber washer**

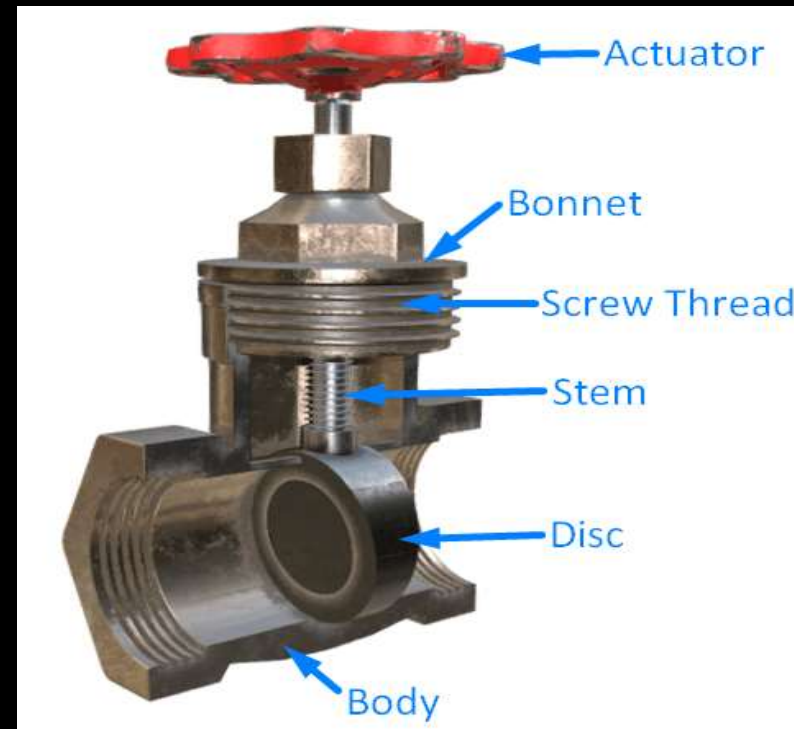


**(f) Applying tape**



# Water Supply Fitting — Gate Valve

- Gate valve is one of the most common valves used in the main supply lines of a water supply system and pump-lines.



## Defects

1. Water flows from around the stuffing box screw.
2. The valve is hard to turn on or turn off.
3. The spindle rotates continuously and the gate valve does not close.
4. These are used when there is a high chance of leakage in the joints.

## Causes

1. The gland nut is loose.
2. The packing in the gland nut is defective.
3. The spindle is bent.
4. The spindle thread is worn out.

# Repair

1. Tighten the dry gland nut.
2. Renew the defective packaging with asbestos hemp and water pump grease.
3. Replace the bent spindle with a fresh one.
4. Replace the worn-out spindle.





# Cistern

**Repair of cistern:** As you know, water is stored in the cistern, and if there is leakage in the cistern, the following steps should be followed for repairing:

- (i) Inspect the toilet:** If water is not flushing, it means the flush is defective.
- (ii) Repair the handle:** Sometimes, in the toilet cistern, the flush handle is loose and not connected to the other part. It may be due to a worn out connector.
- (iii) Replace the toilet siphon:** If the toilet cistern flush handle is intact and working properly, the problem is likely to lie with the flush diaphragm, which is at the base of the toilet siphon.

## Water Closets

- Most water closets are made of vitreous China, which might crack if exposed to extremely hot water. A plunger will normally handle simple toilet clogs.



## Toilets Tanks

- It is a general complaint that water continues to leak into the closet bowl of the toilet tank. It may be due to failure of mechanism of toilet tanks.



# Taps and Faucets

## Washerless Taps and Faucets

- These can be either the single handle or two handle type. In these, the control of water flow is done by a replaceable cartridge or arrangement of seals that allows water flow when the holes or ports are lined up in a proper configuration.

## Sink

- Sink bowls come in many different materials. Although enamelled cast iron remains an attractive and durable product, nowadays bowls are available in stainless steel, and other solid surface materials for their added durability and stain resistance.

# Washbasin

- In our homes, washbasins and kitchen sinks get choked due to some obstruction from waste material or dirt. As a result, water can not flow smoothly.
- Thus, many small tools like plunger, auger, force cup and wire are used for clearing the obstruction.

## Use of tools for removing clogs



## Noises in the Plumbing System

- In an old plumbing system, different types of noise may be created due to some defect. These could include whistling, chattering or hammering. Noises can be checked with proper intervention.

## Odours in the Plumbing System

- A well-designed and correctly installed plumbing system gives out no odour. In an incorrectly installed system, there is a possibility for odours to result from defects in the system, particularly if the fit is not properly vented.

# Different types of pipes and methods of repair

Material		Cast Iron
Burst	Action	Repair
Joint failure	Enclose joint Two couplers	Special joint clamp Two couplers and new section
Brittle failure	Remove section/joint Enclose failure	Two couplers and new section Repair collar or clamp
Corrosion	Remove section/joint Rehabilitation	Two couplers and new section Slipping, etc. Repair collar or clamp
Material		Ductile Iron
Joint failure	Enclose joint Remove section/joint	Special joint clamp Two couplers and new section
Extensive pinholing	Rehabilitation technique Remove section/joint	Slipping, etc. Two couplers and new section
Ductile failure	Remove section/joint Enclose burst	Two couplers and new section Repair collar or clamp
Localized pinholing	Enclose burst	

Material		Steel
Extensive pinholing	Rehabilitation technique Remove section/joint	Slip lining, etc. Two couplers and new section
Joint failure	Remove section/joint Enclose joint	Two couplers and new section Special joint clamp
Isolated pinholing	Enclose burst	Patch and weld Repair collar or clamp
Material		Prestressed Concrete
Surface softening	Remove complete length/ joint or cracking	Two couplers and new pipe section
Joint failure	Remove complete length/ joint Enclose joint	Two couplers and new pipe section Special joint clamp
Material		Polythylene/P.V.C
Fast crack propagation	Remove damaged section	Two couplers and new section
Brittle failure	Remove damaged section Enclose burst	Two couplers and new section Repair collar or clamp
Joint failure	Cut out joint	Two couplers and new section

# Prepare the plan and schedule of routine maintenance, repairs and modifications

1. As per the manufacturer's recommendation, check the need for repair, or replacement requirement of plumbing items.
2. Read the existing warranties and service agreements made by the user prior to start maintenance or repair work.
3. Prepare the estimate cost of the work to be done and collect a quotation if required.
4. Collect the written approval of the work to be carried out by the concerned person.
5. Detailed information of the site must be collected and check the requirement of access to the site.
6. Identify and select the labour, tools and machinery required for activities.



7. Qualification and skill experience of manpower should be properly checked.
8. Availability of labour should be scheduled as per need.
9. Availability of tools and equipment, machinery should be ensured as per work.
10. Prior approval from the concerned department should be taken so that there is no further disturbance during work.
11. Plan appropriate time for installation so that minimum disturbance of operation occurs.
12. Detailed information of weather should be collected so that contingency planning can be done.
13. Mention in detail about the schedules, jobs to be carried out in work order, etc.
14. Submit the bill and final report of execution of work to the customer.

# Summary

- A plumber must also have knowledge of the various plumbing repairing, types of repairs, repair and fixtures, faucet, tap, water supply system, stop valve and different types of pipes and methods etc., where these should be used while carrying out the tasks.
- Proper fittings also help in checking leakage in the plumbing lines.

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