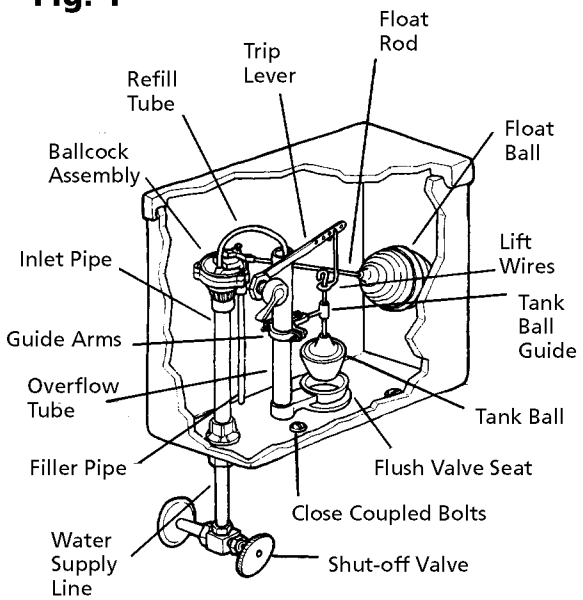
HOW-TO BOOKLET #3010
FLUSH TANKS

TOOL & MATERIAL CHECKLIST

- ❑ Flush Tank Parts
- ❑ Pliers
- ❑ Adjustable Wrench
- ❑ Phillips/Standard Slot Screwdrivers

Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in the Basics Listed Above.

Fig. 1



The parts of a typical toilet and flush tank with a diaphragm-type ballcock assembly

The flush tank is exactly what the name implies: a tank to flush water. Don't be concerned about putting your hands into the tank water to make repairs. However, there may be some mineral deposits in the tank, so when the repair work is finished, you should be sure to wash your hands.

Water goes into the tank via the diaphragm-type ballcock assembly (**Fig. 1**). This unit has a water valve that is opened and closed by a float arm-or by water pressure on some of the new water saving ballcocks (**Fig. 2**) that are now available.

When you flush the toilet, the handle, handle lift arm, and lift wire, raise the tank ball or flapper (**Fig. 3**). The water flows out of this opening into the toilet bowl and flushes it. The float ball rides the water level down in the tank and turns on the water valve in the ballcock.

After the flush, the weight of the tank ball or flapper drops it back into the bowl opening, sealing the opening. The tank fills with fresh water. When the water reaches a predetermined height, the float then shuts off the water valve in the ballcock assembly.

By matching the tank's parts with the illustrations in this booklet, you can solve almost any problem that the tank develops. The symptoms are noted here, along with repair procedures.

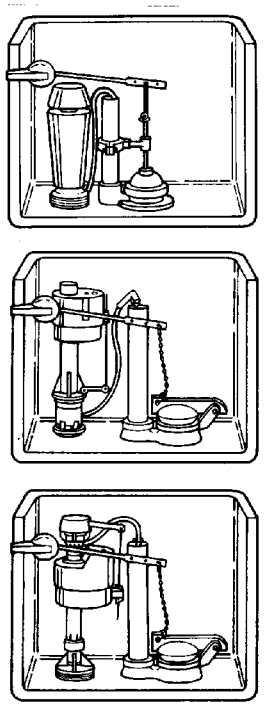
TANK IS FULL OF WATER BUT TANK WON'T FLUSH

Lift the top and check the handle lift arm, the lift wire (sometimes a chain), and the tank ball. Is the assembly connected throughout? Reach down in the tank and lift up on the tank ball or flapper. The toilet should flush. If not, the blockage is in the opening between the bottom of the tank and the bowl, or it is in the curved connection between the tank and the bowl.

First, unbend a wire coat hanger, lift the tank ball or flapper, in the bottom of the tank, and try running the wire down through the passage between the bottom of the tank and the opening into the toilet bowl. You may be able to dislodge any blockage at this point. If not, read on:

1. Turn off the water supply to the tank. A shutoff valve usually is under the tank at about 4" above the floor. It looks like a faucet. If not, turn off the water at the main water service entrance to the house.
2. Bail out all water possible from the tank. You can pour it into the toilet.
3. Disconnect the water supply line to the ballcock by unscrewing a nut holding the water supply line and ballcock at the bottom (outside) of the tank (**Fig. 4**). You will need an adjustable wrench to turn the nut and pliers to hold the ballcock from turning. Put a bucket under the connection to catch the remaining water in the flush tank.
4. Remove the tank bolts that hold the tank to the back of the toilet bowl. Be careful. Too much force on the wrench can crack the china parts. Once cracked, the parts must be replaced; they are worthless.
5. Lift off the tank and check the passage between the bottom of the tank and the top of the toilet. Remove any debris. Then reassemble the toilet in reverse order as described above.

Fig. 2



Common types of ballcock assemblies

If the handle/tank ball linkage is the problem of no flush, you can quickly find it by simply tracing the parts from the handle to the tank ball. The most common troubles are:

- A broken chain between the lift wire and lift arm.
- A corroded handle that won't raise the lift arm. Change the arm with an adjustable wrench.
- A corroded and broken lift wire from the tank ball the armor chain. Install a new wire; it screws into the top of the tank ball.
- A misaligned guide through which the lift wire is threaded. Loosen the guide clamp with a screwdriver and turn it with your fingers back into alignment.

TANK WON'T FILL

If the water is not turned off, this trouble may then be traced to a faulty ballcock water valve or a stuck float assembly inside the flush tank.

But, first, is the water turned on? A curious little boy or girl may have turned off the supply valve.

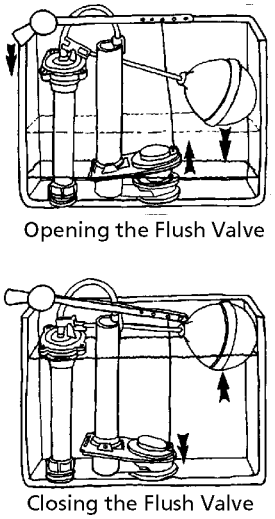
Second, try jiggling the float/arm. Corrosion could be causing it to stick just enough to prevent the ballcock water valve from opening.

If jiggling corrects the problem, turn off the water, disassemble the float/arm at the ballcock assembly, and clean the parts with fine (0000) steel wool. Don't remove any metal; just buff it shiny bright.

Third, if corrosion isn't the problem, the ballcock assembly is malfunctioning and should be replaced.

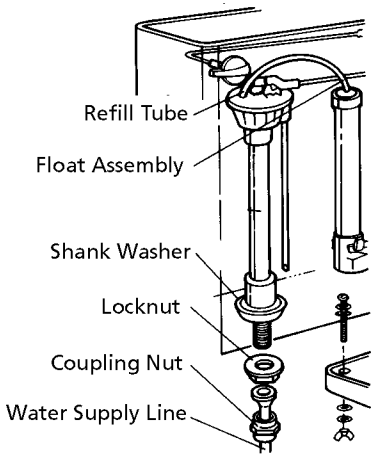
To do this, turn off the water supply and sponge out excess water. Remove the refill tube from the old ballcock (**Fig. 4**). Screw the coupling and ballcock locknut. Lift the entire ballcock and float assembly from the tank. Clean the tank bottom where the ballcock shank washer seats.

Fig. 3



Flapper assembly toilet operation

Fig. 4



Typical diaphragm-type ballcock

When replacing the ballcock it is suggested that you use one of the new types of water savers (**Fig.5**). To install:

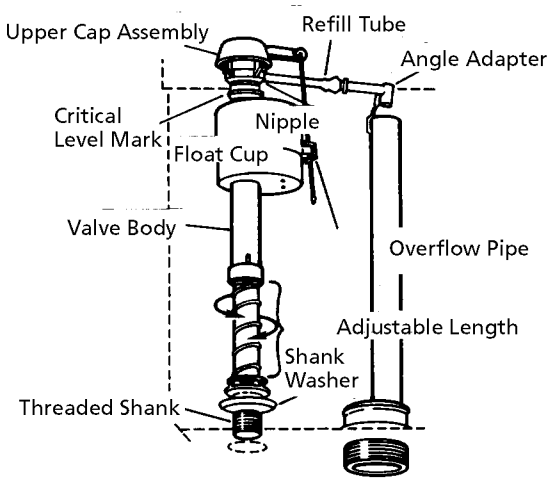
1. Adjust the height of the valve body to fit the tank by turning the threaded shank in and out of the valve body. Position the valve in the water supply hole.
2. Tighten the locknut and attach the water supply tube to the threaded valve shank. Then tighten the coupling nut.
3. Attach the refill tube to the valve and overflow pipe.
4. Turn on the water supply and set the desired water level with the adjustment clip on the float cup. The tank is ready to operate.

NOISY TOILETS

A common cause of loud toilet noises or even leaks is a faulty ballcock washer. To replace it, remove the two thumbscrews on top of the ballcock assembly

Fig. 5

Installation of water saver-type ballcock



that hold the float arm assembly in place. Lift the float arm out of the tank and pull the valve plunger up and out of the ballcock.

Inside the plunger area are the ballcock washers (**Fig. 6**). If they are worn or damaged, replace them with exact duplicates. If the ballcock still leaks, replace the entire assembly.

SPLASHING SOUNDS INSIDE TANK

Remove the tank top and flush the toilet. Is water from the bowl refill tube discharging into the tank? If so, reposition the refill tube so it spouts into the top of the overflow tube. Do not let the end of the tube reach below the tank water level–that would make it siphon tank water away, causing constant slow running of water.

A faulty toilet inlet valve is rare, but can cause splashing. If the valve is at fault, you should be able to see it leaking as the tank refills. Either replace the entire valve assembly or repair the toilet inlet valve. For either job, the water supply to the toilet must be turned off.

LOW WATER IN TANK

One of two problems may exist:

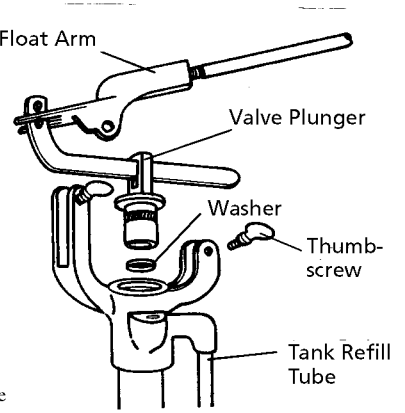
- The float is mis-set. Try bending the float rod up with your fingers. If the float rod doesn't have an adjustment screw on top of the ballcock assembly. Make the bend gentle; don't kink the rod.

  If there is an adjustment screw, try turning the screw down (clockwise) to move the arm upward.

  The water level in the tank should be about 1/2" to 3/4" below the top of the overflow tube.
- The float ball is damaged or water logged causing low water. Also, a damaged float can cause the toilet to run constantly because the float never gets high enough in the tank to turn off the inlet valve in the ballcock. The end of the float rod is threaded like a machine bolt. Just unscrew the float ball and replace it with a new one.
- If the flapper is faulty, it should be replaced. Turn off the water supply and flush. Remove the chain or wires from the trap lever. (If replacing a tank ball with a flapper assembly, remove and discard the ball, lift wires, and guide arm.) Remove the old flapper by sliding it up and off the overflow tube.

Install the new flapper by sliding it down over the overflow tube until the ring touches the tank bottom. Then adjust the flapper ball so it centers on the valve opening (**Fig. 7**). Adjust the lift chain length as needed. The valve opening on brass flush valves should be cleaned with emery cloth or steel wool to remove corrosion and ensure that the flapper ball seals properly.

Fig. 6



To stop ballcock leaks, remove the plunger from the ballcock and replace defective washers.

HIGH WATER IN TANK

There are two solutions:

- If there is a float rod adjustment screw atop the ballcock, turn the screw.
- Gently bend the float rod downward with your fingers to lower the water.

TOILET RUNS CONSTANTLY

Suspicion: a faulty tank ball. The ball is worn out and letting water bypass it into the toilet. Or, the seat in which the tank ball fits is corroded or pitted, letting water into the toilet bowl. The leak drops the float ball in the tank and opens the inlet valve in the ballcock assembly.

- If the tank ball is shot, replace it. The rod is threaded; just unscrew the rod or ball to remove the ball. Reverse the procedure for a new ball.
- If the seat is corroded, turn off the water at a supply valve, raise the tank ball, and buff the seat with fine (0000) steel wool. Don't remove metal with this abrasive. Just remove the corrosion.

If you find that the ball/seat is okay, look for trouble at the inlet valve of the ballcock assembly. The washers may be worn enough so water bypasses them. Washer replacement is described above.

Also look for trouble at the float. Try bending the float rod up or down just a tad. Sometimes the float is just enough out of kilter to keep the inlet valve slightly open. A tiny adjustment is all that's needed.

POOR FLUSHING ACTION

The problem is not enough water in the flush tank. Try adjusting the float rod upward with either the adjustment screw on the ballcock or by gently bending the float arm upward. Bend it gently.

FLUSH TANK LEAKS

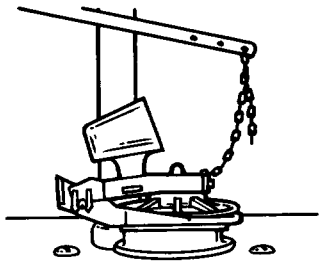
Generally, leaks can be stopped by just tightening connections with a wrench.

CAUTION: Flush tanks and toilet bowls are easily cracked. Take it easy with wrenches; if a little pressure from the wrench won't stop the leak, replace the washer or gasket at the connection.

If the flush tank is cracked, replace it immediately. **Do not** attempt to repair it because the repair can't be trusted to permanently solve the problem. The tank may start leaking again-when you're on vacation or away from home and can't turn off the water.

Fig. 7

Installation of a new flapper



Leaks at the Ballcock Connection. Tighten the nut at the bottom of the tank both inside and outside the tank. This is where the water supply line enters the tank. Usually, the base of the ballcock has a tapered rubber fitting. When the bottom outside nut is tightened, the fitting is drawn into the hole in the tank with a wedging action, sealing the opening. You will also have to loosen the nut at the base of the ballcock inside the tank. When you've tightened the outside nut, tighten the inside nut accordingly.

Leaks at the Close Coupled Bolts. These bolts hold the tank to the toilet. To tighten them use a standard slot screwdriver from inside the tank and a wrench from the outside. Because the bolts have rubber washers, **do not** apply too much pressure. If tightening doesn't stop the leak, turn off the water supply, remove the tank, reinstall new washers, and then reassemble the unit.

Leaks at the Tank Ball Seat. The overflow tube and tank ball seat are usually one single unit. This unit is held to the tank with a nut from under the tank. You will not be able to reach this nut unless you remove the tank from the bowl. But before you do this, try turning the tank ball seat clockwise with your fingers. A tiny turn might be all that's needed to stop the leak. If not, turn off the water, and disassemble the flush tank.

Tighten the nut holding the seat with a pipe or spud wrench–again not too tightly or you'll crack the tank. If you can't replace it, then replace the entire unit with a new assembly. The cost is not prohibitive.

Tank Condensation. Because the tank contains cold water, moisture may condense on to it from warm air. Constant dripping can mildew tiles and rugs and corrode metal parts on the outside of the tank. Such condensation is usually easy to cure with a waterproof insulation lining. Buy one at a plumbing supply store, or make one from 1/2" foam rubber or plastic. To install the lining, turn off the water and completely dry the inside of the tank. Apply a liberal coating of rubber cement or silicone glue to the sides of the tank, press the foam in place, and let it dry for 24 hours before refilling the tank. Make sure that the foam pad doesn't interfere with the tank's moving parts.

If the water entering the tank is below (50 degrees F), you may have to install a tempering valve that mixes hot water with cold to raise the tank's water temperature. This can be a difficult job because of the need of a water heater hookup, and is best undertaken by a professional plumber.