Procedures for Testing/Evaluating the LeakAlertor® 6000

BEFORE YOU GET STARTED!

There is a fundamental difference between the **TEST mode** written into the unit's firmware which is used by a consumer to confirm the unit's programming is functioning properly **and evaluating** the unit's performance against artificially simulated problems.

- TEST mode is a simple, three-minute function to demonstrate to the user the unit can detect the change in water height in the tank. This is further explained in the LeakAlertor 6000 User's Guide and on the website.

- Evaluating the unit is a process where the evaluator artificially simulates common toilet problems to confirm for themselves the unit can detect and alert a user to the specified problem.

The LeakAlertor 6000 uses a sophisticated set of algorithms to qualify, quantify and categorize common toilet problems. It can use these algorithms with a wide range of toilet manufacturers, toilet designs, flappers, flush valves, fill valves, and water pressure - **amounting to millions of variables** - yet still provide the user with a simple Green Light/ Red Light answer to the question, *"Is my toilet working properly?"*.

Evaluating the LeakAlertor is not as simple as "creating" toilet faults by holding the flush handle or fill valve down a few seconds then flushing. To adequately test the unit, you must correctly simulate the conditions the unit is designed to detect and alert.

- *The unit can tell the difference between a real problem and an incorrectly simulated one and will therefore ignore the simulated faults.*

Things to Know

- All steps during evaluation should be done with the toilet tank lid off so that you can observe what's happening inside the tank while also monitoring the unit.
- *The flush cycle starts* with the opening of the flush valve (flapper handle pushed down) and *ends when the fill valve shuts off*. It is normal for the LeakAlertor to continue blinking for a few moments after the fill valve shuts off.
- To reduce the number of false positives the unit "qualifies" problems before alerting for a leaking flapper or faulty fill-valve.

Please do not hesitate to contact us during your evaluation period if you have questions about the LeakAlertor, simulating toilet problems, or need additional information.

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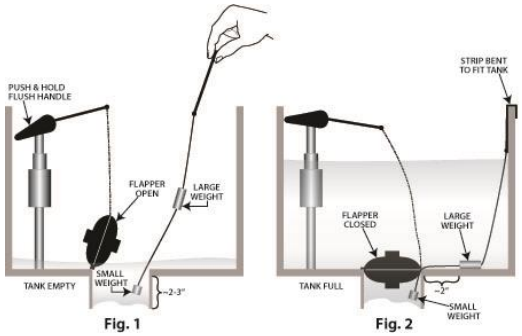
Simulating a Leaking Flapper

Set-up

- To correctly simulate a leaking flapper, you will need a leak simulator to place between the flapper and the flush valve.
  - Weights tied to several loops of fishing line will work, be sure to allow enough length that the weights can be tied off outside the toilet, so they are not drawn into the toilet bowl.
- Do not create a leak so excessive that the tank is unable to fill, and thereby mistakenly create a wide-open flapper.
- The key *is not the number of phantom flushes* but rather that *at least one* has occurred *between three successive* flushes.



Procedure

1) Flush the toilet, hold the flapper open long enough to allow the weight to go into the flush valve, then release the handle allowing the flapper to close and capturing the weight. Tie off the other end of the string to prevent the weight from being drawn *through* the flush valve on subsequent flushes. *(see Figs 1 & 2)*
   a. The **GREEN LED** will flash as there are no problems with the toilet
   b. The tank should begin to drain slowly through the leak you simulated, once enough water has leaked into the bowl the flush valve will actuate to refill the tank. **(Phantom Flush #1)**
2) Flush the toilet. (This is Qualifying Flush #1) The **GREEN LED** will flash.
   a. *Wait until at least one (1) Phantom Flush has been created.* **(Phantom Flush #2)**
3) Flush the toilet. (This is Qualifying Flush #2) The **GREEN LED** will flash.
   a. *Wait until at least one (1) Phantom Flush has been created.* **(Phantom Flush #3)**
4) Flush the toilet. (This is Qualifying Flush #3) The unit will begin to **BEEP,** and the **RED LED** will flash. The audible alert (the **BEEP)** will occur about 5 times, the **RED LED** will flash until the end of the flush cycle. The alerts terminate a few moments **after** the fill valve shuts off.
5) Flush the toilet again allow the flush cycle to complete. This confirms the alert will now occur during each subsequent flush **until the unit is reset**.
   a. Flush and hold the flapper open to carefully remove the leak simulator.
   b. Reset the unit to clear the flags (see the User's Guide or website for instructions on resetting the unit)
6) This concludes the simulation.

Simulating a Faulty Fill-Valve

Set-up

- Though there are several ways a fill-valve can operate incorrectly, there are two which waste water, and are therefore detected by the LeakAlertor.
  - Fill-valve continues to fill at the same rate as a concurrently leaking flapper (equilibrium)
  - Fill-valve continues to fill after the flush cycle is complete (runs into the overflow tube)
- Equilibrium is usually broken with the flapper leaks gradually increases, therefore causing more water to leak through the flush valve then is being added by the fill-valve. If the user does not replace the fill-valve during equilibrium, eventually the condition changes to and will then be detected as a leaking flapper.
- The unit periodically determines water height in the tank relative to the pre-established "nominal" water height at the end of a flush cycle. To simulate the normal delay between flushes, you must wait at least three minutes between each step of your simulation.

Procedure

1) RESET the unit (as instructed in the User's Guide or website) including the initial flush.
2) Flush the toilet (**GREEN LED** should flash, if not RESET the unit again)
   i. **Wait at least** three (3) minutes from when the **GREEN LED** **stops** flashing
   b. Press the fill-valve down, raising the water level in the tank until it spills into the overflow tube
      i. **Wait at least** three (3) minutes
3) Flush the toilet. (This is **Qualifying Flush #1**) The **GREEN LED** will flash.
   i. **Wait at least** three (3) minutes from when the **GREEN LED** **stops** flashing
   b. Press the fill-valve down, raising the water level in the tank until it spills into the overflow tube
      i. **Wait at least** three (3) minutes
4) Flush the toilet. (This is **Qualifying Flush #2**) The **GREEN LED** will flash.
   i. **Wait at least** three (3) minutes from when the **GREEN LED** **stops** flashing
   b. Press the fill-valve down, raising the water level in the tank until it spills into the overflow tube
      i. **Wait at least** three (3) minutes
7) Flush the toilet. (This is **Qualifying Flush #3**)
   - The unit will begin to **BEEP,** and the **RED LED** will flash.
   - The audible alert (the **BEEP)** will occur about 5 times, the **RED LED** will flash until the end of the flush cycle.
   - The alerts terminate a few moments **after** the fill valve shuts off.
8) Flush the toilet again allowing the flush cycle to complete. This confirms the alert will now occur during each subsequent flush **until the unit is reset**.
   a. Reset the unit to clear the flags
9) This concludes the simulation.

Simulating a Wide-Open Flapper (Flush Valve)

Set-up

- A wide-open flapper, aka running toilet, can waste between 2.5 and 5 gallons of water per minute (gpm)
- On average, that's over 200 gallons per hour
- There are at least seven (7) reasons why the flapper won't close…
- …and five (5) common reason why they will go undetected

Procedure

1) Flush the toilet (**GREEN LED** will flash)
    a. Hold the flush handle down to allow water to run through the flush valve until unit begins to alert
    b. **RED LED** will flash, and unit will **BEEP**
2) Once unit begins to alert, release the flush handle and allow water to fill the tank
3) When water covers the bottom of the red sensor wire the unit will stop the Wide-Open Flapper alert and return to normal operation
    a. There is no need to reset the unit for a Wide-Open Flapper alert
4) This concludes the simulation.