



## How much do leaky toilets cost property managers? A case study.

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## Profile

The Leak Beeper was invented and patented by Steve Ghertner and Vince Luciani of Ghertner Automation. It was invented in response to a recurring problem that Steve's property management company, Ghertner Property Management, was having: high water bills due to leaking toilets. Steve and Vince, both Electrical Engineers, were convinced that the solution was rather simple: what was needed was a device that could gauge when water was re-filling a toilet's water tank due to a reason other than a deliberate flush.

The Leak Beeper has two parts. One part is a small sensor that hangs off the overflow tube inside the toilet tank. This sensor is used to determine when water is flowing through the overflow tube indicating a flush or water leakage.

The other part is a beeper-sized, battery-powered unit that hangs on the outside of the tank which is used to monitor the sensor, provide logic and timing, and annunciate an alarm using a flashing light, or a wireless signal.

Upon installation, the toilet is flushed so that the unit can establish the timing of a normal or intended water flow. The flush is detected by the probe as water flows through the refill tube. A microprocessor compares every flush length to the calibration value for that toilet. From this moment on, water flows that deviate from this calibrated time are flagged as suspected leaks.

## Subject

Falcon View is a 170-unit, garden-style, apartment complex in Madison, Tennessee. In the 12-months prior to the test, Falcon View consumed an average of 149,853 Cubic Feet of water per month and averaged water/sewer bills of \$11,378.

To more accurately determine potential savings, we tracked water consumption based on the number of days of usage each billing month and the number of apartments occupied. This method, common in the hospitality industry, is known as Per-Occupied Room or POR. Prior to the Leak Beeper installation, POR consumption was 15.61 Cubic Feet of water.

The occupancy rate remained relatively stable for the 12-months prior and post installation; 93% and 92%, respectively. They have a pool but no irrigation system.

## Test

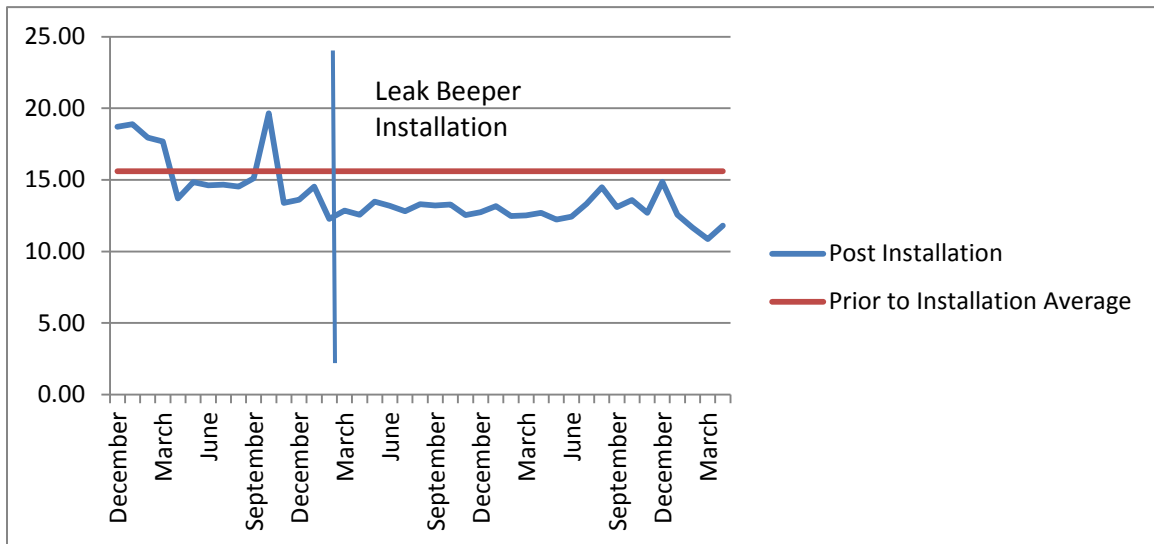
In February of 2010, Leak Beepers were installed on Falcon View's 340 toilets. The devices were checked by on-site maintenance personnel on a monthly basis. Once leaks were indicated, the toilets were repaired in a timely manner. The results were tracked over a two-year period post installation.

## Results

- General Consumption decreased by 18% to an average of 123,599 Cubic Feet per-month
- POR Consumption was reduced by 19% to an average of 12.88 Cubic Feet
- General Cost decreased by 20% to an average of to an average of \$91.98 per-month
- POR Cost decreased by 20% to an average of \$.94 per-occupied toilet per-month from \$1.19

- Monthly Water and Sewage bill decreased by an average of \$2,259 per month
  - Cumulative savings at the end of the period were \$55,964
- Payback period for the devices was 4.8 months
- First-year Return on Investment (ROI) was 97%
- Potential added value to the property, using a cap-rate of 10% is \$338,850

## Charted Consumption



## Conclusion

Our Case Study demonstrates that leaky toilets can present a significant financial burden to property managers and that the Leak Beeper can help solve the problem.

The study also shows that the Leak Beeper is an integral tool in solving many of the frustrating issues associated with keeping toilets in good working order. Since the Leak Beeper is constantly monitoring the toilet, issues that only show themselves intermittently can be effectively flagged and then addressed.

Prior to the installation, the toilets at Falcon View were regularly checked and maintained. Yet despite these efforts, water consumption was still 18% more than needed and resulted in significant, unnecessary costs. Our test proves that personal attention alone cannot catch all of the leaks that are occurring in a building.

In summary, over the past year, the Leak Beeper has shown itself to be a cost-effective tool in reducing overall expenses for property managers.

HOW MUCH DO LEAKY TOILETS COST PROPERTY MANAGERS? A CASE STUDY

Case Study Details

Month	Water Use Per-Occupied Toilet, Per-Day (Cubic Feet) (POR)				Water Cost Per-Occupied Toilet, Per-Day (\$) (POR)				General Bill	Avg. Monthly (RUD)**	Avg. Daily Annualized (RUD)**
	Avg. Prior to Install	Actual	Difference 12-month Avg. Prior to Install.	Difference Same Month Before Install	Avg. Prior to Install	Actual	Difference 12-month Avg. Prior to Install.	Difference Same Month Before Install			
December	15.61	18.70			\$1.19	\$1.42					
January	15.61	18.90			\$1.19	\$1.43					
February	15.61	17.94			\$1.19	\$1.36					
March	15.61	17.69			\$1.19	\$1.34					
April	15.61	13.71			\$1.19	\$1.04					
May	15.61	14.84			\$1.19	\$1.13					
June	15.61	14.63			\$1.19	\$1.11					
July	15.61	14.67			\$1.19	\$1.11					
August	15.61	14.53			\$1.19	\$1.10					
September	15.61	15.11			\$1.19	\$1.15					
October	15.61	19.66			\$1.19	\$1.49					
November	15.61	13.40			\$1.19	\$1.02					
December	15.61	13.61			\$1.19	\$1.03					
January	15.61	14.54			\$1.19	\$1.10					
February	15.61	12.27			\$1.19	\$0.93					
March	15.61	12.86	-18%	-27%	\$1.19	\$0.88	-26%	-34%	\$2,726	\$2,968	\$18,788
April	15.61	12.55	-20%	-8%	\$1.19	\$0.90	-24%	-13%	\$1,953	\$2,944	\$17,509
May	15.61	13.47	-14%	-9%	\$1.19	\$0.98	-18%	-13%	\$3,038	\$1,781	\$12,941
June	15.61	13.18	-16%	-10%	\$1.19	\$0.98	-17%	-12%	\$1,775	\$2,017	\$12,767
July	15.61	12.80	-18%	-13%	\$1.19	\$0.93	-22%	-17%	\$2,311	\$2,553	\$16,159
August	15.61	13.30	-15%	-8%	\$1.19	\$0.96	-19%	-13%	\$1,994	\$2,235	\$14,151
September	15.61	13.21	-15%	-13%	\$1.19	\$0.95	-20%	-17%	\$1,770	\$2,387	\$14,635
October	15.61	13.28	-15%	-32%	\$1.19	\$0.96	-19%	-36%	\$2,862	\$1,979	\$13,870
November	15.61	12.55	-20%	-6%	\$1.19	\$0.90	-24%	-11%	\$2,224	\$2,841	\$17,422
December	15.61	12.75	-18%	-6%	\$1.19	\$0.92	-23%	-11%	\$2,089	\$2,705	\$16,590
January	15.61	13.16	-16%	-9%	\$1.19	\$0.95	-20%	-14%	\$2,936	\$2,054	\$14,393
February	15.61	12.48	-20%	2%	\$1.19	\$0.91	-23%	-3%	\$3,343	\$2,461	\$17,245
March	15.61	12.52	-20%	-29%	\$1.19	\$0.90	-24%	-33%	\$2,543	\$2,785	\$17,628
April	15.61	12.70	-19%	-7%	\$1.19	\$0.96	-19%	-8%	\$1,704	\$2,320	\$14,230
May	15.61	12.22	-22%	-18%	\$1.19	\$0.93	-22%	-18%	\$2,867	\$2,359	\$15,961
June	15.61	12.43	-20%	-15%	\$1.19	\$0.97	-18%	-12%	\$2,283	\$1,974	\$13,116
July	15.61	13.32	-15%	-9%	\$1.19	\$1.00	-15%	-10%	\$1,433	\$1,812	\$11,336
August***	15.61	14.48	-7%	0%	\$1.19	\$1.08	-9%	-2%	\$307	\$1,066	\$6,458
September	15.61	13.10	-16%	-13%	\$1.19	\$0.99	-17%	-14%	\$1,838	\$1,913	\$12,289
October	15.61	13.59	-13%	-31%	\$1.19	\$1.02	-14%	-31%	\$1,980	\$1,472	\$9,964
November****	15.61	12.69	-19%	-5%	\$1.19	\$0.96	-19%	-6%	\$1,459	\$2,236	\$14,156
December	15.61	14.87	-5%	9%	\$1.19	\$1.06	-10%	3%	\$104	\$1,256	\$7,703
January	15.61	12.56	-20%	-14%	\$1.19	\$0.95	-20%	-14%	\$2,394	\$2,048	\$14,351
February	15.61	11.68	-25%	-5%	\$1.19	\$0.89	-25%	-4%	\$2,947	\$2,601	\$18,227
March	15.61	10.87	-30%	-16%	\$1.19	\$0.82	-30%	-7%	\$2,238	\$3,766	\$22,394
April	15.61	11.81	-24%	-6%	\$1.19	\$0.90	-24%	0%	\$2,600	\$2,628	\$17,784
Averages		12.88	-19%	-13%		\$0.94	-21%	-15%	\$2,304	\$2,368	\$15,329





## Installation Instructions

### Step 1

Remove toilet tank lid & hang Leak Beeper Alarm Unit on side or back of tank, so alarm light is visible.

### Step 2

Remove existing connector that attaches tank re-fill tube to overflow pipe, & install Leak Beeper S-Clip Probe in its place. Make sure that water level is at least 1/4 inch from bottom of Leak Beeper Probe. This may require lowering the Fill Valve Float.

### Step 3

Attach Leak Beeper's grounding clamp to the refill tube, about 1 inch from the probe.

### Step 4

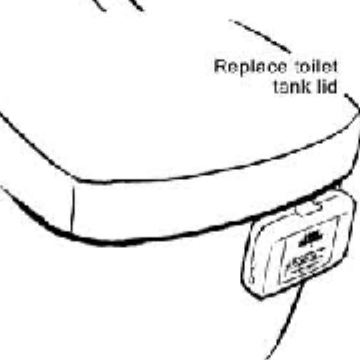
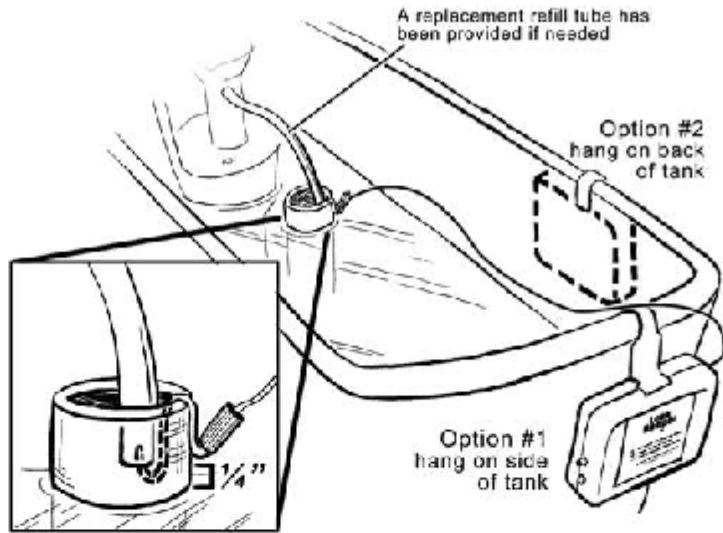
Connect the Probe Lead Plug into the Leak Beeper Alarm Unit. Make sure that the red and black wires are not twisted together. Replace Tank Lid.

### Step 5

Re-set the unit for calibration by pushing the indicator button briefly. Indicator light on the Leak Beeper will change from Red to Yellow, then to Green. The Green light will stay on to await the initial calibration flush.

### Step 6

Flush the toilet. Green light will blink while toilet is refilling. Blinking green light will stop after the toilet is refilled. The Leak Beeper is now monitoring your toilet for leaks.



#### Leak Indications:

**Blinking Red Light:** Indicates a "Short Leak", which is typically caused by a faulty flapper.

**Solution:** Replace flapper.

**Constant Red Light:** Indicates a "Long Leak" which is typically caused by a faulty fill-valve or flush-valve.

**Solution:** First replace the fill-valve. If leak indication persists, replace the flush-valve.

**Constant yellow light:** Indicates low batteries.

**Solution:** Replace Leak Beeper's 2 AAA batteries.

**Constant green light:** (when button is pushed) Indicates that the Leak Beeper and your toilet are functioning correctly.

In the unlikely event that both types of leaks occur at the same time, and that a low battery is detected, the indicator light will signal each occurrence concurrently, for 3 seconds each; a blinking red light, a solid red light and a constant yellow light.

**To clear out the leak indications and re-set the Leak Beeper for future detection, simply hold the indicator button down until the indicator light changes from Red to Yellow to Green. The Green light will stay on to await a new calibration flush.**