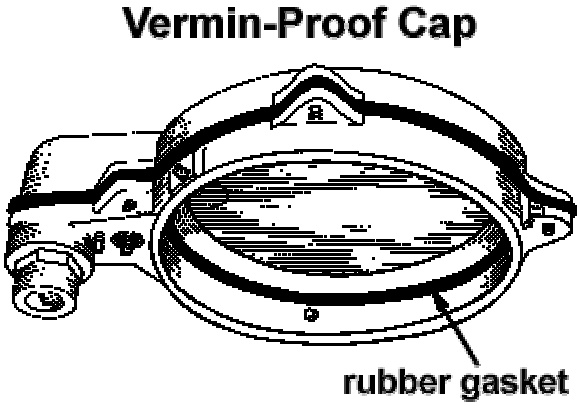
PENNSTATE
College of Agricultural Sciences
Cooperative Extension

Sanitary Well Caps

Bryan Swistock, Extension Associate
William E. Sharpe, Professor of Forest Hydrology
Paul D. Robillard, Associate Professor of Agricultural Engineering

What is a sanitary well cap?

A "sanitary" well cap (sometimes referred to as a "vermin-proof" well cap) attaches to the top of the well casing much like a standard well cap. The cap provides an airtight rubber gasket seal to prevent insects, small mammals or surface water from entering the well. Most sanitary well caps also include a small, screened vent to allow for air exchange.



Original illustration provided by the Wisconsin Department of Natural Resources

Photo of a sanitary well cap

Are sanitary well caps required in Pennsylvania?

Unlike most states, Pennsylvania does not have statewide construction standards for private water wells. In the absence of state regulations, professional well drillers usually install a less expensive standard well cap. While local ordinances in parts of the state require some well-construction practices, only Chester County currently requires a sanitary well cap on new or existing wells drilled or repaired after March 9, 2001. Thus, nearly all existing wells in Pennsylvania have a standard well cap.

What are the benefits of a sanitary well cap?

Bacterial contamination is a common problem that occurs in about half of the private water wells in Pennsylvania. Drinking water is typically tested for "coliform bacteria,"

which includes a large number of different species of bacteria, some of which can cause illnesses or diseases. For this reason, all drinking-water supplies should be free of coliform bacteria. See Penn State Extension fact sheet F-132, entitled "Treating Coliform Bacteria in Drinking Water," for more information on coliform bacteria.

Bacterial contamination of ground water wells can occur from both above and below the surface. Pollution of entire ground water aquifers affecting many wells may occur from failing septic systems or animal wastes. Similarly, individual wells may be contaminated from the surface if contamination sources are near the wellhead. Surface contamination of individual wells is usually caused by surface water flowing along the well casing and/or from a loose fitting or absent well cap that allows insects, animals or surface water to directly enter the well.

A sanitary well cap prevents insects, small mammals or other surface contaminants from entering the top of the well and contaminating the well with coliform bacteria. A recent study by the U.S. Geological Survey of 78 wells in Pennsylvania with standard well caps found obvious evidence of insects in nearly half of the wells. Insects were found inside the well cap, on the wiring or plumbing, or inside the casing. Water samples from these wells determined that 62% contained coliform bacteria. Another study by the Wisconsin Department of Natural Resources demonstrated that insects could be a source of coliform bacteria in wells (Wisconsin DNR 1993).

Can a sanitary well cap eliminate bacterial contamination of wells?

A recently completed study by Penn State University (Swistock et al. 2003) documented the effect of installing a sanitary well cap on existing water wells. Sixteen private wells that contained coliform bacteria were disinfected with chlorine and fitted with a sanitary well cap. Of these 16 wells, seven did not have coliform bacteria when they were retested one month after installation of the sanitary well cap. The sanitary well caps were most successful in eliminating bacteria from wells that previously contained small numbers of bacteria (< 3 colonies per 100 mL of water), compared to those that had more gross contamination.

This Penn State study also looked at bacterial contamination in new wells that were constructed with a sanitary well cap and a grout seal—a cement-like substance injected around the well casing to prevent surface water contamination. Only 29% of these new wells contained coliform bacteria. This suggests that proper well-construction practices, including the installation of a sanitary well cap, can reduce but not completely eliminate bacterial contamination. Wells drilled into ground water aquifers that are contaminated by animal wastes, septic systems or surface water can contain coliform bacteria regardless of well-construction practices.

Should you install a sanitary well cap on your well?

A sanitary well cap is recommended for all existing and new water wells. Even if your well is currently bacteria-free, a sanitary well cap will help insure that it does not become contaminated in the future by insects or other contaminants around the well head. If your well tests positive for coliform bacteria, a sanitary well cap may help to

solve the problem, especially if your well contains small numbers of bacteria. In this case, you should first remove any obvious insects or nests and disinfect your well with chlorine to kill all existing bacteria. The homeowner can disinfect easily by using a chlorine solution. Consult Penn State Extension fact sheet F-140, entitled "Shock Chlorination of Wells and Springs," to learn more about this process. Sanitary well caps are generally available for $40 to $50 from local well drillers. They can be installed by the homeowner or by a professional well driller. In the recent Penn State study, the average cost per well for both disinfection and installation of a sanitary well cap by a professional well driller was $100.

For more information

Swistock, B.R., W.E. Sharpe and P.D. Robillard. 2003. The Influence of Well Construction on Bacterial Contamination. Final Report to The Center for Rural Pennsylvania for completion of Cooperative Agreement Number 2002-8.

Swistock, B.R., W.E. Sharpe and P.D. Robillard. 2001. F-132, Treating Coliform Bacteria in Drinking Water, Penn State Extension Fact Sheet. 4 p.

Swistock, B.R., W.E. Sharpe and P.D. Robillard. 2001. F-140, Shock Chlorination of Wells and Springs, Penn State Extension Fact Sheet. 2 p.

Wisconsin Department of Natural Resources, Bureau of Water Supply. 1993. Earwigs in your well. Madison, Wisconsin. Publication WS-029 93, 1 p.

The fact sheets listed above, along with other publications related to water wells, are available from the following sources:

- Online at http://www.sfr.cas.psu.edu/water
- Your local county Cooperative Extension office
- Email: brs@psu.edu
- Phone: Bryan Swistock, 814-863-0194

Penn State College of Agricultural Sciences research, extension, and resident education programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

Issued in furtherance of Cooperative Extension Work, Acts of Congress May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture and the Pennsylvania Legislature. T. R. Alter, Director of Cooperative Extension, The Pennsylvania State University.

This publication is available in alternative media on request.