



EPA Region 8 Drinking Water Unit Tech Tips

Sanitary Protection of Drinking Water Storage Tanks: # 24 Mesh Non-corrodible Screen

Finished Water Storage Sanitary Protection: EPA, State and industry guidances agree that living things down to the size of insects must be kept out of finished drinking water storage tanks. This public health protection is accomplished by using #24 mesh non-corrodible screen on storage tank vents, overflows and drains, and has been known to the drinking water industry and included in Ten State Standards since 1962.

Why do insects matter? Insects are vectors for disease because they carry protozoal, bacterial and viral pathogens on their hairs, mouthparts, vomitus, and feces. A #24 mesh eliminates the potential for increases in endemic diseases (low level of disease in a community) from insects by keeping them out of tanks.

Example – the house fly: Houseflies have been demonstrated to carry *Cryptosporidium*, *Giardia Lamblia*, typhoid, cholera, *E. coli* O157:H7, polio and other pathogens.



Flies inside an elevated tank

Cryptosporidium



A calf infected with Cryptosporidiosis can shed ~ 2 million oocysts.

At 0.00019 inches, a lot of *Cryptosporidium* can be carried by a fly that is 0.315 inches in diameter. Chlorine does not inactivate *Cryptosporidium*.

Salmonella



Birds and animals are also vectors for disease. *Salmonella* was the cause of outbreaks

from storage tanks at Gideon, Missouri (transported by birds) and Alamosa, Colorado (transported by birds and rodents).

#24 mesh will keep all insects out of storage tanks, including:



Black Widow:
0.5518 inches



House fly:
0.315 inches



Deer tick:
0.166 inch



Asian tiger, world's smallest mosquito:
0.078 inch

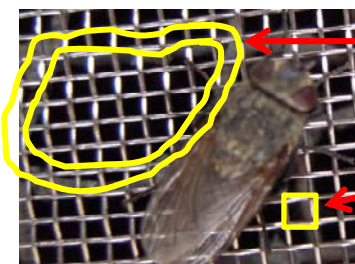


Noreeums (biting midges): 0.059 inch

Insects are capable of fitting through areas that are smaller than they are, and #24 mesh protects against this also.

How big is #24 mesh?

A #24 mesh screen commonly uses a wire diameter of 0.014 inches which produces an opening of 0.0277 inches.



This is the area created with a #4 mesh or 0.2023 inches for a wire diameter of 0.0475 – the fly can enter.

This is the area with a #24 mesh – the fly cannot enter.

Note: Ten State Standards lists a #4 screen for elevated tank vents due to an assumption in the 2003 revision that insects cannot fly to the top of an elevated tank. Experts in the science of insects have provided research that shows insects can easily fly to that height. Tank inspectors have found insects in elevated tanks, and confirmed this research.

Install #24 mesh non-corrodible screen to prevent insects from entering finished water storage tanks:

- Vents.** Protect elevated tanks from damage caused by extreme inhalation/exhalation events, frost buildup, etc. by using a vacuum-pressure release mechanism. See the Tech Tips on "Vacuum/Pressure Relief Mechanisms".
- Overflows.** Install mechanisms that temporarily give way in an overflow event (e.g., weighted swing valve). EPA still recommends a #24 when a duckbill or flapper valve is used as flapper valves can fail in the open position.
- Drains.** Make the screen removable for cleaning events.

Where can small quantities of #24 mesh (wire diameter 0.014 inches for an opening size of 0.0277 inches) be purchased?

-TWP <http://www.twpinc.com>

-Grainger <http://www.grainger.com>

Disclaimer : EPA does not endorse any products. The vendors listed above can provide small quantities of #24 mesh, this is provided as a convenience to PWSs (if you would like to be added to this list please contact Bob Clement at 303-312-6653). PWSs should use their established procedures and resources to find the best products and prices.