

OurwaterQuality

Science of clear water: ultrafiltration

Ultrafiltration is a type of membrane filtration in which hydrostatic pressure forces a liquid against a semi-permeable membrane. Suspended solids and solutes of high molecular weight are retained, while water and low-molecular-weight solutes pass through the membrane. Ultrafiltration is not fundamentally different from reverse osmosis and other types of membrane filtration and it is classified by the sizes of molecules it will retain. Ultrafiltration typically consists of pressure vessels containing long, spaghetti-like, membranous tubes with pore spaces ranging from 0.01-0.03 microns. The hollow fibers mechanically screen impurities, which are concentrated on the inside wall of the membrane and are effectively removed with periodic flushing or power washing.

Ultrafiltration membranes are classified according to NMWCO (nominal molecular weight cutoffs) in sizes of at least 10,000 daltons. Whereas the pore size of ultrafiltration and other membrane technologies is usually measured in microns, RO membranes have a nominal molecular weight cutoff of less than or equal to 1,000 daltons. In

addition to its ability to remove sand, silt, clay and algae, ultrafiltration physically removes microbiological contaminants from water supplies. The sizes of some select contaminants in water (per EPA), which are removed by ultrafiltration, are as follows: *Giardia* (8-12 microns), *Cryptosporidium* (4-6 microns), bacteria such as *E. coli* and *Salmonella* (0.2 to 4 microns) and viruses (0.004 to 0.1 microns). Some municipal systems are supplementing their water-treatment technologies with ultrafiltration because of its ability to remove the spores *Giardia* and *Cryptosporidium*, which have become chlorine-resistant and pose a significant threat to public health.

Chemical-free ultrafiltration is a "greener" technology than reverse osmosis because of its high efficiency (95-98 percent); only a small amount of source (inlet) water is used to flush the membrane. Ultrafiltration has low operating and maintenance expenses (membrane life may be as long as five years) and its application ranges over a much wider range of inlet water temperatures and water pressures than RO. System controls are electronic

(to monitor flow volumes and control membrane flushing). Operation of the system is based on water pressure. Ultrafiltration will continue during a power failure so long as water is being fed to the system. Spikes of contaminants in the inlet water do not affect the quality of the permeate water. Ultrafiltration does not remove dissolved minerals or affect pH, so its product (permeate) water will not become more aggressive to copper pipe and fittings than the inlet water.

For domestic wells, and particularly those with high turbidity (cloudiness caused by suspended particles) as well as microbiological issues, it is an efficient, water-conserving addition to a series of purification stages. Ultrafiltration will not remove dissolved salts or soften water, and it should not be mistaken as a substitute for reverse osmosis. But in some applications, ultrafiltration might be an effective pre-treatment for reverse osmosis and other purification techniques. Reverse osmosis is more effective than ultrafiltration in removing some contaminants but it does come with a price. Reverse-osmosis membranes may become fouled with turbidity and



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scale (hardness), their output is low (holding tank is required), and there is a significant amount of concentrate water lost to the drain. Well owners with recurring microbiological problems should seriously consider ultrafiltration technology.

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Building permits

SANTA FE COUNTY building permits issued from mid-August to late September included the following:

James Wright, 169 Avenida Ponderosa. \$166,000.

David Mulligen, 57 Craftsman Rd. \$300,000.

Richard Valerio, 119 Los Pinos Rd. \$200,000.

Patricia Racette, 19 Vuelta Chamisa. \$900,000.

Rancho Viejo de Santa Fe, 136 Rancho Viejo Blvd. \$97,500.

Lucas Fresquez, State Road 2868. \$295,000.

Chris Cordes, 16 Valle Vista Grande. \$600,000.

Chien Lee, 54 La Pradera. \$250,000.

Armando Jurado, 41 Camino Colores. \$100,000.

Troya Homes LLC, 32 Meadow Hills. \$98,000.

Joseph Holifield, 39 Arroyo Privido. \$250,000.

Building permits issued by the **CITY OF SANTA FE** in August and September included the following:

Robert Freeman, 1404 North Point. \$302,254.

Jorge & Kate Ching, 117 Coronado Ln. \$391,000.

Mary and Bruce Black, 804 Viejo Rastro. \$500,000.

Vernon Herrera, 120 Valle Sereno. \$410,000.

Lawrence Boyd, 704 Calle Beatrice. \$192,550.

— 713 Calle Beatrice. \$152,220.

— 717 Calle Beatrice. \$151,709.

Centex Homes, 4237 Parque de Villa. \$202,272.

— 4265 Parque de Villa. \$118,176.

— 3017 Primo Colores St. \$92,162.

— 4004 Sandia Vista Ct. \$218,682.

— 4232 Entrada Sonata. \$218,682.

— 4240 Entrada Sonata. \$218,682.

— 4260 Entrada Sonata. \$118,176.

— Also 9 attached homes at 4310, 4328, and 4332 Santo

Domingo St., priced \$129,232 to \$169,544.

Richard & Michelle Babcock, 116 N. El Rancho Rd. \$367,303.

Homewise Inc., 7602 Mesa del Oro Ln. \$132,571.

— 7609 Mesa del Oro Ln. \$132,571.

— 7610 Mesa del Oro Ln. \$113,588.

— 7613 Mesa del Oro Ln. \$113,588.

— 4503 Contenta Ridge. \$127,606.