

7.5 Particulate filters

There are several types of particulate filters using different media to remove suspended matter from water in the range 0.5 to 50 µm, or greater. Particulate filters may be used to reduce turbidity and micro-organisms, or to remove specific inorganic particulates such as iron, aluminium or manganese compounds. Many particulate filters are incorporated into proprietary point-of-use devices to protect subsequent processes such as activated carbon filtration, reverse osmosis or UV disinfection.

Filters are made in several forms, for example discs, woven or resin-bonded cartridges and ceramic candles. Filtration is effected by pleated paper and felt, woven cartridge filters manufactured from viscose, polypropylene, fibrillated polypropylene, nylon or fibreglass, non-woven cartridges manufactured from resin-bonded polyester, and Kieselguhr ceramic.

Water passes through the filter and particles and micro-organisms may be retained depending on the pore size of the filter. Particle removal may be achieved by surface filtration or by retention within the filter material. Some of the cartridge and ceramic filters have graded pore sizes so that larger particles are retained on the surface while smaller particles penetrate the filter where they are retained. As the filter blocks the flow rate of water decreases and this is often the first sign that a filter needs replacing or cleaning. Replacement of a filter is usually recommended after a specific time or after a specific volume of water has been filtered and filtration period will depend on the quality of water being treated. A ceramic candle may additionally require periodic cleaning of the surface. Growth of bacteria on these filters and the possible contamination of the treated water are of concern. Some filters are impregnated with silver to prevent or inhibit the growth of bacteria.

The treatment capacity of these filters depends on the water quality, water pressure and the pressure drop across the filter, which in turn is dependent on pore size and porosity. An 18 cm ceramic candle operating under gravity may have an output of 20 litres per day whereas a 13 cm ceramic candle operating at 3 bar may have an output of 150 litres per hour. In hard water areas (greater than about 200 mg/l CaCO₃), calcium carbonate may precipitate and block the device. The manufacturer's advice on suitability should, therefore, be sought.