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Cross filter offers compact solution for final effluent improvement

Water companies face increasing pressure from the Environment Agency to improve the quality of final effluent from sewage treatment works in line with EU legislation. The failure to meet strict consents for the quality of effluent returned to watercourses can result in the imposition of financial penalties.

Often, final effluent quality can only be improved by the introduction of additional or tertiary treatment equipment, for which various sand filters have been traditionally used. However, all sand filters are inherently bulky and often expensive, requiring a lot of space and copious amounts of water for backwashing. This may not be a problem on the large treatment works serving towns and cities, but consent issues also affect hundreds of small sites in rural areas, where there is rarely much space available for new equipment and low flow volumes restrict the potential for backwashing. On such sites, a Cross automatic backwashing mechanical filter can provide an attractive alternative solution.

A recent application in rural Dorset is a typical example. Here, a new Environment Agency solids consent figure of 45 milligrams/litre was proving difficult to achieve under



A portable rig is used for accurate on-site filter



A typical final effluent filter package for a rural sewage treatment plant.

fluctuating ambient conditions. Cross Manufacturing's first suggestion was to carry out an on-site test, using their portable filtration rig. This enabled filtration samples to be taken from the final effluent using a range of Cross filter micron ratings, which can be quickly selected by simply swapping filter coils. Subsequent laboratory analysis confirmed the most appropriate filter rating for the application – 50 microns in this case.

With this information, an automatic backwashing filter package could be designed to accurately and economically suit the maximum

operating demands of the works. The 4 litres/second filter package built for this project is small enough to be housed in a corner of an existing building, although weatherproof housings can be supplied for external locations.

The Cross package draws from the site's existing effluent sump and pumps the filtered effluent directly into the watercourse. Filtered water is used for automatic backwashing, which is triggered by an adjustable differential pressure switch with set time lapse back-up. Backwashing does not interrupt forward flow through the filter and uses only minimal quantities of water, which are re-introduced to the works' secondary treatment area. Requiring only a 12V d.c. power supply, the Cross filter can be supplied with a transformer or, in remote locations, can be battery operated, with optional solar and/or wind powered battery charging.

Background notes for editors

Cross filtration technology

The technology at the centre of each Cross filter is a stainless steel spiral coil with raised nodes on the surface which produce a precise filtration gap. Known as the "Zero Gravity" coil, the design traps any particles above the required size, which is selectable from seven interchangeable micron ratings: 12, 25, 50, 75, 125, 200 and 400.

The trapped particles are washed away quickly and thoroughly by backwashing, reversing the flow across the coil, forcing it to open slightly and completely flushing any debris out of the system. Unlike a conventional coil, the patented "Zero Gravity" coil opens evenly along its length during the backwash process, resulting in complete and thorough cleaning with the minimum use of liquid.



The photo shows a close-up of a Cross "Zero Gravity" coil during an on-site test. Trapped particles can be seen prevented from passing through the filtration gap, in this case rated at 50 microns.

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