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Caption:

A typical Cross filter installation for a HVAC application.

Ref: (Cross/2009.193.Fb)



Caption:

Cross Forced Sedimentation filter units in the plant room at Lunar House.

Office block HVAC performance restored with Cross filtration retrofit

Cross 'Zero Gravity' filter technology has a proven track record for maintaining HVAC circuits in as-new condition throughout years of operation. Benefits include the maintenance of energy efficiency and the virtual elimination of expensive, fouling-induced equipment breakdowns and blockages. These benefits, combined with a low long-term cost of ownership, have enabled Cross filters to be specified as critical elements in the design of office block HVAC circuits throughout the company's twenty-five year history.

In recent times, however, it has been noticed by Cross that budget restraints on new builds have sometimes resulted in the elimination of filtration plant from the original plans. Whilst this has reduced the initial capital cost, it has also left the HVAC circuits and equipment vulnerable to the threat of fouling. Expensive dosing regimes can be introduced to try to minimise these problems, but they represent on-going and increasing expenditure and do not always sit easily with contemporary views on environmental awareness and responsibilities.

As a result, Cross is now increasingly being asked to investigate the retrofitting of its filtration equipment into existing HVAC systems, in some cases as an alternative to the huge expense of replacing and refurbishing the majority of the plant. Fortunately, the compact equipment footprint facilitated by the Cross 'Zero Gravity' filtration technology means that space for the retrofitted plant can usually be found without difficulty in existing plant rooms. Once installed, the Cross equipment immediately begins to clean up the fouled circuits by permanently removing the harmful sediments. After a short period of time efficiency is restored and the threat of damage to equipment is greatly reduced.

Whilst much of this activity is now taking place in the UK, the beginning of the trend for Cross can be traced back to a large office complex in the USA, where the service pipework was displaying serious symptoms of fouling, including reduced flow rates, increased maintenance and impaired performance from pumps, chillers and heat exchangers.

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The building's property management service company was contemplating a major replacement and refurbishment programme before the benefits of Cross filters were presented to them. It was explained that retrofitting Cross filtration systems on existing circuits would remove the build-up of sludge and sediment and improve the performance of the systems. Subsequent preservation of the water in a clean condition would prevent the performance from declining in the future, reducing maintenance, breakdowns and repairs.

The results, as described by the service company's chief engineer, have been spectacular:

"The installation of Cross filters on our two cooling tower circuits has greatly improved our water quality. Also, the flow rates in both circuits has increased by almost 30% without affecting the delta-t across the plate heat exchangers or the cooling tower itself. The cooling tower ponds have never been cleaner."

"The Cross filter system is also working well on the closed loop side of the condenser system. The filters are working efficiently, reliably, and always backwashing to their original clean differential. Reduced maintenance has given my staff more time to devote to other matters."

In the UK, Lunar House, a twenty storey office complex in central Croydon, has seen the completion of a fifteen month refurbishment project, performed by Haden Young and Carillion Building, that included the renewal of all of the electrical services, heating and air conditioning plant.

Cross filtration systems were specified by building consultants Brian Warwicker Partnership for installation on the building's primary and secondary chilled water, condenser water and constant temperature heating water circuits. The Cross Forced Sedimentation filtration systems specified cause sediment that is either trapped in new pipework or has built up in existing plant to collect in a specially designed sump, from where it is pumped for filtration. The system has the proven advantage of filtering out the sediment at a greatly increased concentration than would be found in the pipework itself, thus reducing the size of the filtration equipment required as well as optimising filtration efficiency.

The four Cross systems installed at Lunar House utilise filters which use a separate water supply for backwashing to ensure that any water treatment regime in the pipework cannot become diluted. Backwashing is automatically triggered by measuring the increased pressure drop across the filter elements caused by the built up of debris, backed up by a programmable timer and manual override. The filters at Lunar House are equipped with 125 micron coils, which have proved to be a successful rating for the long term preservation of building service plant efficiency.

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By keeping the building service pipework and equipment in clean condition, the Cross filtration system has maintained the efficiency of the plant and therefore reduced the additional energy costs incurred when overcoming the effects of fouled up pipework.

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Background notes for editors

Central to Cross filtration technology is an ingeniously designed 'Zero Gravity' stainless steel coil with raised nodes on the surface which define a precise filter rating. The coil is manufactured using techniques that Cross has developed through its activities in the aerospace industry, where the company is recognised as a market leader in turbine heat sealing technologies. Manufactured in seven ratings between 10 and 400 microns, the 'Zero Gravity' coil is designed to open very slightly and evenly along its entire length when the liquid flow across it is reversed during backwashing, ensuring that the build-up of particles is completely washed away.

Cross filter systems are tailored to suit any size of duty by simply adding enough 'Zero Gravity' coils to match the required flow capacity. Coils are fitted in a specially designed stainless steel housings that create a cyclonic flow path for the water passing through, helping to keep suspended solids away from the surface of the coils and therefore extending the length of time before a backwash is required. The coil housings are backwashed individually in sequence and therefore forward flow is always maintained, removing the costly requirement for a redundant standby filter and simplifying the overall installation.

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