

Air Filtration - Total Cost of Ownership

Leading University Reduces Air Filter Costs by 33% and Achieves Targets for Airflow and Air Quality

Company Profile:

An internationally prominent research university and medical center: one of the top Universities in the country in health care research and medical education.

The Situation:

The southern University operates hundreds of air handlers on campuses, hospitals and research centers throughout the state. Filters were purchased on an annual bid basis. The University bought the lowest cost filter per unit, but total operating costs were extremely high. When filters were downgraded as a potential remedy, they required even more frequent changing than previously. Average pressure drops were over 3" wg. causing energy costs to rise and delivered airflow to drop.

The final filters used were manufactured from a coarse fiber material, which further compromised efficiency. No service or technical assistance was offered to help the University achieve its goals regarding air quality, airflow, and cost management.

The Action:

The Camfil Farr Branch in Alabama conducted a comprehensive Life Cycle Costing (LCC) analysis using a widely-respected, proprietary software that has been in use, industry-wide, for more than 15 years. The analysis calculated the Total Cost of Ownership for the existing product combination - Airguard DP® Max pleated filter with Vari-Pak® final filter, and also a recommended alternative.

The LCC software performed calculations factoring-in four cost components: filter cost, filter change-outs, HVAC-related energy, and filter disposal. The software also identified the optimum point on the pressure drop curve at which changing the filters would result in both lowest energy use and continued proper airflow to the facility.



The Result:

Camfil Farr proposed eliminating the prefilters. They were inefficient, had very short service life, and quickly showed exceptionally high pressure drop of over 1.8" w.g. The LCC showed the Hi-Flo® ES MERV 14 pocket filter (with no prefilter) would be significantly more effective than the University's multi-stage configuration.

After testing the single-stage Hi-Flo ES solution in their system, the University identified a \$500 thousand savings annually in total filters costs. Additionally, the annual energy costs for the entire system would decrease by more than \$1 million dollars. For the first time, the AHUs were able to deliver the expected airflow of 500 fpm.



“The single-stage, longer lasting Hi-Flo ES saved \$1.5 million in annual filter and energy costs.”

The Proof:

In stark contrast with electrostatically charged-coarse fiber medias, the Hi-Flo ES fine fiber media performs at its rated efficiency throughout its service life. Its controlled media spacing, (or “tapered pocket design”) creates and maintains a substantially lower pressure drop, with less energy consumption, than any pocket filter. The Hi-Flo ES filter also provides the longest life and the highest dust holding capacity.

The Hi-Flo ES proved the actual delivered filter efficiency originally specified by the University would be at the level expected – which was not achievable with the previous filter configuration. The 500 fpm airflow that the AHUs were designed for was being delivered for the first time.

In Situ Test Bank:

70 Airguard DP Max pleated prefilters and 70 Airguard Vari-Pak final filters were tested against 70 Camfil Farr Hi-Flo-ES MERV 14s final filters without a prefilter.

The Airguard prefilters required changing every two months due to the filters collapsing and pressure drop prematurely reaching 1.8" wg. The Vari-Pak final filters were at 1.2" wg after seven months, for a combined drop of 3" wg. The combined clean pressure drop for the Airguard filters was 1.3" wg. The Camfil Farr Hi-Flo-ES was .31" wg. at the time of installation and after seven months in service, it only reached .39" wg.

Airflow was also a major concern. The airflow through the two-stage Airguard bank dropped to 194 fpm due to high pressure drop. The Camfil Farr bank delivered the required 500 fpm airflow.

Cost Breakdown:

TCO Elements	Airguard (1)	Camfil Farr (2)	
Energy Cost	31837 USD	12782 USD	
Filter Cost	6040 USD	5460 USD	
Labor Cost	1890 USD	420 USD	
Waste Cost	350 USD	140 USD	
CO ² Impact	601719.12 lb	241570.40 lb	
Landfill Impact	23.31 yd ³	3.40 yd ³	
Total Cost of Ownership (TCO)	40117 USD	18802 USD	
Performance Satisfaction Terms			