

Air Filtration - No Prefilter Required

Food Production Facility Replaces Two Filters with One, Gains Higher Performance, Longer Life, and Improved Air Flow

Company Profile:

Leading manufacturer of a popular line of snack foods, located in the Midwest.

The Situation:

The snack food producer had twin rooftop air handling units (AHUs) serving its packaging area. Three filter types were changed twice per year. Despite this effort, filtration performance was inadequate, and particulate was noted downstream of the filters. The air volume delivered to the plant was less than optimum, particularly during the summer months. The AHUs each had three stages of filtration. Stages one and two were upstream of the coil; the final filters in stage three were downstream of the coil.

Stage one used 4" MERV 8 pleated filters, stage two had MERV 11 bag filters, and stage three consisted of MERV 14 filter bags. Each of the low-cost filter types relied on short-lived electrostatic charge to achieve the desired MERV rating on the day of installation. During service, the charge dissipated and efficiency dropped precipitously as the filters transitioned from electrostatic to mechanical operation resulting in the coarse fibers capturing far less dirt and air resistance rising quickly. Stage one and two initial differential pressure was alarming measured at 0.41" water gauge. Stage three had noticeable bag damage. Acrossed all three stages, little dirt accumulated on the face of the filters and by-pass was significant.

Poor filter performance, high filter change-out costs, and disappointing air flow measurements led management to seek alternatives.

The Action:

After being invited to review the situation and offer solutions, Camfil recommended to replace the two highly-charged synthetic filters in stages one and two, with single-stage MERV 11 high-capacity fine fiber bag filters. The food company decided to test the single-stage proposal using products from two different manufacturers.



The Result:

Camfil Farr's 10-pocket Hi-Flo® ES, designed to operate without a prefilter, was tested against Koch Filter's Multi-Sak™ 10-pocket bag filter for a period of 9½ months. The single-stage test proved the Hi-Flo ES maintains a significantly lower average differential pressure drop when compared to Koch's bag filter and compared to the food company's original multi-stage configuration.

Since the Hi-Flo ES could remain in service for one year (at least twice as long) operating at a lower average differential pressure drop, the total savings calculated in energy, disposal, labor, and product costs was a conservative \$418 per unit.



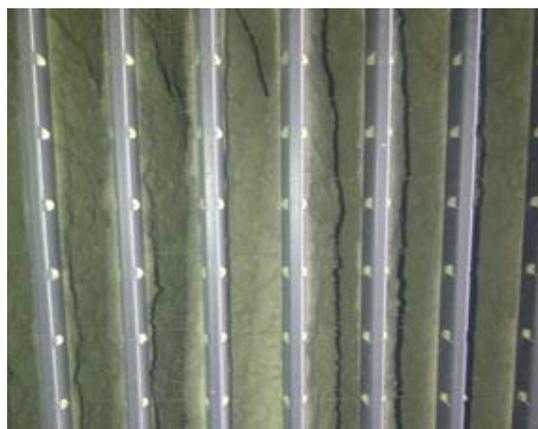
“The Hi-Flo ES lasting twice as long and not requiring a prefilter saved 25% in annual costs.”

The Proof:

The trial proved that single-stage filtration using the Camfil Hi-Flo ES MERV 11 bag could replace the current two-stage filter solution. The cost savings and improved airflow realized by the manufacturer after upgrading to the single-stage Hi-Flo ES were significant. There was also a dramatic difference in the amount of dirt captured since bypass was eliminated. Correspondingly, the plenum and coils directly behind the Hi-Flo ES product accumulated far less dirt.

To complete the project, the recommended solution for stage three was to install a MERV 14 Hi-Flo ES bag as a final filter. The overall solution would then be to use the MERV 11 Hi-Flo ES bags as the prefilter (remaining in service one year) and MERV 14 Hi-Flo ES bags as the final filter (remaining in service up to two years.) It was recommended that both air handling units supplying the packaging area be outfitted with this solution.

**Camfil Farr Hi-Flo ES
MERV 11**



Large amount of collected dirt present

**Koch Filter Multi-Sak
MERV 11**



Small amount of collected dirt present

Single-Stage Filter Test Koch Filters Multi-Sak - vs - Camfil Hi-Flo ES					
Unit	Product Installed	Initial pressure drop - May 6th, 2011	Intermediate reading - June 8th, 2011	Intermediate reading - July 8th, 2011	Final reading - February 16, 2012
9501	Merv 11, Camfil Farr Hi Flo ES. Microglass fiber, non-charged high capacity media	0.12	0.18	0.11	0.19
9502	Merv 11 Koch Multi Sak-S synthetic charged media	0.14	0.25	0.24	0.27

Total Cost of Ownership Comparison Koch Filters with a Prefilter - vs - Camfil without a Prefilter											
System Configuration						Operational Cost					
Filter Style & Description	Size	Filter Count	Product Cost	Filter Life (hrs)	Filter Changes per year	Annual Product Cost	Average DP	Energy Cost based on avg dp	Labor Cost for filter changeouts	Disposal Cost @\$2.00	Annual Cost per Unit
Koch 4" Merv 8 pleat	24x24x4	9	\$8.00	4,380	2	\$144.00	.25" w.g.	\$702.00	\$120.00	\$60.00	
Koch Merv 11 MultiSak-S bag	24x24x21/10	9	\$35.00	4,380	2	\$630.00	.21" w.g.				
						\$774.00	.46" w.g.				\$1,656.00
Merv 11 HiFlo ES bag	24x24x22/10	9	\$75.00	8,760	1	\$675.00	.31" w.g.	\$473.00	\$60.00	\$30.00	\$1,238.00
Total Operational Cost Difference:											\$418.00

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