CASE **STUDY**
Food Processing

DAIRY PROCESSING FACILITY

DUAL 9 AIR FILTER. HIGHER PERFORMANCE, EXTENDED LIFE (3-4 TIMES LONGER), LOWER TOTAL COST & INCREASED CONTAMINANT COLLECTION

COMPANY PROFILE
Top five North American food processor providing a wide range of quality cheese, dairy, baked goods and beverage products for over 100 years.

THE SITUATION
A series of air handling units filtered air from a high contaminant zone in a particularly challenging production area. Plant personnel conducted a filter options analysis and after an evaluation period, Camfil's Aeropleat® III MERV 8 panel filter was chosen for its optimum balance between performance and cost. The evaluation determined that the Aeropleat III changeout schedule should be set at one-month intervals.

With continuous improvement a plant priority, the processing facility welcomed the option recommended by the Camfil local representative to evaluate a newly-introduced air filter, the Camfil Dual 9 MERV 9 panel filter. Produced with a dual-layered gradient density media, the Dual 9 captures larger particles in the media top layers, while smaller, finer particles are captured and held deep within the media body. The challenge was to determine if the dual properties would work together in high contaminant load situations common to this application, and if so, would the higher filter cost outweigh the higher performance.

THE ACTION
The air handling units being evaluated were divided into two groups, both groups with equal airflow and dirt load. One group operated with the current Aeropleat III filter, and the second group operated with the new Dual 9. Weekly pressure drop readings were recorded. After one month, the Aeropleat III filters were replaced per normal procedures. The filters were weighed and an average was calculated. The average weight of the used Aeropleat III filters was compared to the average weight of new, unused Aeropleat III filters to determine the amount of dirt captured during the first month. In parallel, and for four months thereafter, Dual 9 filters were removed, weighed and compared to new, unused filters to determine monthly dirt levels captured. The data was then compiled and reviewed.

THE RESULT
After month one, the current Aeropleat III filter captured an average of 40 grams of dirt, compared to the Dual 9 that captured 137 grams. In the months following, month two averaged 212 grams collected by the Dual 9; month three, 407 grams collected; and the fourth and final month totaled 535 grams captured. A new, unused Dual 9 on average weighs 532 grams which means the filter held more than its weight in dirt.

"The minimal pressure drop measured was impressive. After four months under heavy dirt loading conditions, the Dual 9 still had plenty of filter life left."

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THE PROOF

Dual 9 ROI

When the analysis was completed, the Camfil 30/30® Dual 9 was cost justified:

- Reduced filter changeouts from 12 times per year to four.
- Lowered dirty filters shipped annually to landfills from 4,200 to 1,400.
- Increased the average monthly amount of dirt captured from 40 grams per filter to 127 grams per filter.
- Lessened strain on final filters and coils by capturing more dirt with prefilters.
- Lowered the annual total cost of ownership from $42,000 to $26,600.

The Hidden Costs

An overlooked side benefit to longer lasting air filters is the potential to reduce industrial accidents. Air handling units on the rooftops of industrial facilities can present a challenge to perform maintenance on. Some units may be located near the roof's edge which require fall protection procedures to be followed. Other units are only accessible by using ladders or lifts. Many industrial facilities, particularly food and beverage plants, use ammonia refrigerant which often requires a network of piping that must be crossed, usually multiple times. Transporting new filters to the units and disposing of the old filters is not always a simple task.

Filters requiring monthly or quarterly changes means workers will face additional challenges based on the calendar. Northern and midwestern workers face the winter snow, ice and freezing temperatures. Summer presents difficulties for workers, particularly in the Southwest deserts. Rooftop equipment produces heat which adds to the dangers. With longer lasting air filters, you can make the calendar work to your advantage and lessen the possibility of accidents.

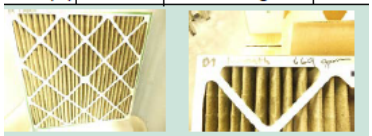
1 Month

ASHRAE 52.2-2017

Test Report:	180924_817		
Time:	7:15:20	Date:	18/09/24

Test Data	Test Results	Rated Values	
AirFlow (cfm)	2001.2	2001.2	
Nominal Vel (fpm)	500	500	
Initial ΔP (inWG)	0.31	0.30	
MERV		9	@2001cf
E_1 (0.3-1.0µm), (%)	17	n/a	
E_2 (1.0-3.0µm), (%)	42	≥ 35	
E_3 (3.0-10µm), (%)	69	≥ 75	
Final DP, (inWG)	N/A	1.0	
Arrestance, (%)	N/A	90	
DHC, (g)	N/A		

Temp, (F)	75	Test Aerosol	KCL
RH, (%)	59	Loading Dust	



1 mo service, wt = 669 gms

ONE MONTH IN SERVICE:

Total dirty filter weight:	669 grams
Avg new filter weight:	532 grams
Dirt captured:	137 grams
Pressure drop ΔP:	0 .00 w.g.

2 Months

ASHRAE 52.2-2017

Test Report:	180924_816		
Time:	6:43:33	Date:	18/09/24

Test Data	Test Results	Rated Values	
AirFlow (cfm)	2001.2	2001.2	
Nominal Vel (fpm)	500	500	
Initial ΔP (inWG)	0.40	0.30	
MERV		9	@2001c
E_1 (0.3-1.0µm), (%)	17	n/a	
E_2 (1.0-3.0µm), (%)	48	≥ 35	
E_3 (3.0-10µm), (%)	75	≥ 75	
Final DP, (inWG)	N/A	1.0	
Arrestance, (%)	N/A	90	
DHC, (g)	N/A		

Temp, (F)	76	Test Aerosol	KCL
RH, (%)	55	Loading Dust	

2 mos service, wt = 744 gms

TWO MONTHS IN SERVICE:

Total dirty filter weight:	744 grams
Avg new filter weight:	532 grams
Dirt captured:	212 grams
Pressure drop ΔP:	+.09" w.g.

3 Months

ASHRAE 52.2-2017

Test Report:	180921_812		
Time:	1:21:47	Date:	18/09/21

Test Data	Test Results	Rated Values	
AirFlow (cfm)	2001.2	2001.2	
Nominal Vel (fpm)	500	500	
Initial ΔP (inWG)	0.55	0.30	
MERV		9	@2001cf
E_1 (0.3-1.0µm), (%)	21	n/a	
E_2 (1.0-3.0µm), (%)	60	≥ 35	
E_3 (3.0-10µm), (%)	84	≥ 75	
Final DP, (inWG)	N/A	1.0	
Arrestance, (%)	N/A	90	
DHC, (g)	N/A		

Temp, (F)	75	Test Aerosol	KCL
RH, (%)	59	Loading Dust	

3 mos service, wt = 939 gms

THREE MONTHS IN SERVICE:

Total dirty filter weight:	939 grams
Avg new filter weight:	532 grams
Dirt captured:	407 grams
Pressure drop ΔP:	+.24" w.g.

4 Months

ASHRAE 52.2-2017

Test Report:	180921_813		
Time:	1:53:19	Date:	18/09/21

Test Data	Test Results	Rated Values	
AirFlow (cfm)	2001.2	2001.2	
Nominal Vel (fpm)	500	500	
Initial ΔP (inWG)	0.86	0.30	
MERV		9	@2001c
E_1 (0.3-1.0µm), (%)	28	n/a	
E_2 (1.0-3.0µm), (%)	70	≥ 35	
E_3 (3.0-10µm), (%)	74	≥ 75	
Final DP, (inWG)	N/A	1.0	
Arrestance, (%)	N/A	90	
DHC, (g)	N/A		

Temp, (F)	74	Test Aerosol	KCL
RH, (%)	59	Loading Dust	

4 mos service, 1067 gms

FOUR MONTHS IN SERVICE:

Total dirty filter weight:	1067 grams
Avg new filter weight:	532 grams
Dirt captured:	535 grams
Pressure drop ΔP:	+.55" w.g.