

ULTRA-FLOW™

LC SERIES - BAG HOUSE DUST COLLECTOR

QAM's advanced technology drastically improves dust collectors filtration efficiency. The results are more power, a significant reduction in energy consumption, less down time, and a major increase of bag filter life. Up to 27 times more efficient and filters lasting three times longer.

Unmatched Filter Efficiency: 99% to 1 Micron

Maintenance and Operating Costs Reduced

Designed for Low Pressure Drop: 1-2" W.C.

30-50% Less Electricity Needed

Small Footprint with Unmatched Performance

Advanced Filter Cleaning System

ULTRA-FLOW™ Dust Collectors by QAM

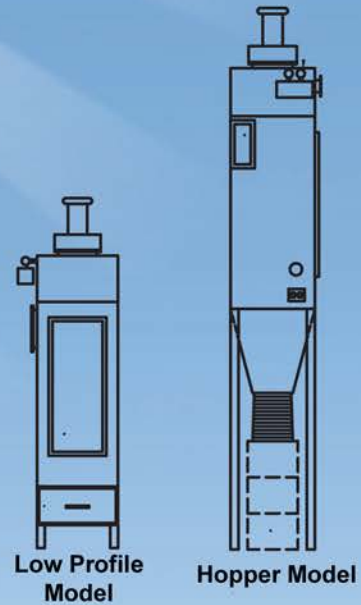
Design, Engineer, Manufacture

Custom Filtration for Any Job

Expert Air Solutions

PERFORMANCE GUARANTEE

Pressure drop under 4 inches W.C. across filter elements and dust penetration will not exceed 0.002 grains per cubic foot converted to standard conditions 70F and 14.7 psia. It will meet EPA, OSHA, Department of Environment and Ministry of Labour standards now and in the future.



QAM: Quality Air Management
240 Camille Crescent
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Manufacturing Standards :



Environment
Canada



ULTRA-FLOW™

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Ultra-Flow™ by QAM, is in its 6th Generation of Advanced Dust & Fume Collection Technology, Proven Since 1979

Energy Cost Savings & Triple the Cleaning Power
Increased Filter Life & Reduced Dust Emissions by 95%

Advanced Pulse Jet Technology
No Venturi, Uses Less Compressed Air & Half the Filter Bags

Re-Circulate Filtered Air Back to the Work Area
Little Maintenance Required & Easy to Service

Optimize Air Quality

Clean Air of Dust, Fumes & Particles
No Leaks, Puffing, or Upward Can Velocity
Lasts Longer, Less Bag Filter Changes

High Volume - Low Velocity

Max Filtration Efficiency: 99% to 1 Micron
Operates at 18-24:1 Filter Ratio
Low Pressure Drop @ 1.5-2.5 WC

Pollution Control

Maintains the Safest Work Environment
Small Footprint Installs Outside / Inside
Unrivaled Performance and Durability

Ideal for Carpentry, Steel, Machining, Industrial & Manufacturing

COMPARE DUST COLLECTORS

1440CFM Model

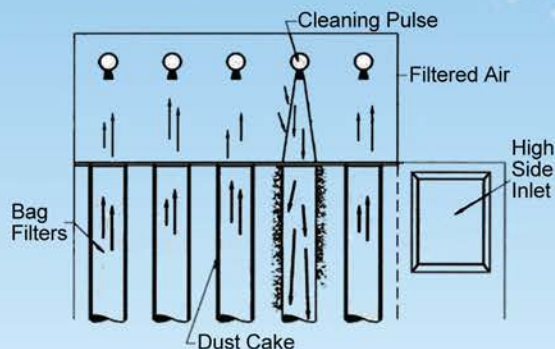
Purchase Price
Dust Emissions
Foot Print
Height
Weight
Blower / Motor
Number of Bags
Filter Life
Air Consumption
Pressure Drop

LC18

\$7000
 10×10^{-5} Grains/ft³
27"x39"
76"
1150 lbs
2.35 BHP
18
3-6 Years
0.98 SCFM
1.5-2.5" W.C.

Competition

\$8000-9500
 800×10^{-5} Grains/ft³
54"x54"
141"
2276 lbs
4.07 BHP
36
1-3 Years
5.42 SCFM
4-8" W.C.



Inside Look of Ultra-Flow Cleaning Dirty Air Debris and Fumes Drawn Up Through the Bag Filters for Maximum Indoor Air Quality

SPECIFICATIONS

Model	CFM	W x D x H	Weight
LC6	500	21" x 21" x 76"	480lbs
LC9	720	21" x 27" x 76"	590lbs
LC12	960	27" x 27" x 76"	850lbs
LC18	1440	39" x 27" x 76"	1150lbs
LC30	2400	39" x 39" x 76"	1900lbs
LC30-8	4800	39" x 39" x 127"	2700lbs

Styles

Hopper & Drum, Low-Profile Dust Tray, Top-Mounted Blower

Options

Outlet Silencer: Sound Reduction -10dba
Magnehelic Gauge
Automatic Cleaning with Timer Controller
96" Long Bags and/or PTFE Filter Coatings
Explosion Vent; 20:1 Ratio
Supersonic Nozzles
Perforated Baffle for Tricky & Abrasive Dust



Danger



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Save \$70,000 in Cost of Operation

ULTRA-FLOW is the most advanced dust collector technology:

- 90% Reduced emissions from the dust collector. Virtually 95-99% efficient
- 20-40% Lower power consumption; smaller blower and motor HP
- 40-80% Lower operating and maintenance cost
- 3-5 times increase in filter bag life
- No upward “can” velocity to plug the collector with dust



Typical Example of Economics:

Ultra-Flow™ baghouse model handling 20,000 SCFM @ 18:1 filter ratio, compared to any commonly available dust collector.

Cost to purchase and service for conventional collector:

Dust emissions	66 x 10 ⁻⁴ gr/cu.ft.
Initial purchase price, c/w 40 HP blower	\$62,845.00
Replace 256 bags @ \$15.92 each	\$4075.00
Labor at \$35 per hour at 10 bags per hour	\$896.00
Replace 10% cages \$40.00 each	\$1024.00

Cost to purchase and service for Ultra-Flow:

Dust emissions	4 x 10 ⁻⁴ gr/cu.ft. (90% less)
Initial purchase price, c/w 25 HP blower	\$56,225.00
Replace 84 bags @ \$15.92	\$1329.00
Replace 10% cages @ \$35.00 (no venturi)	\$294.00
Labor at 10 bags per hour	\$ 294.00

Power Consumption: (based on 8 hours per day & 5 days per week operation)

Conventional collector = 25.5 kW x 8 hours x 250 days = 51,000 kWh per year @ \$7038.00

Ultra-Flow collector = 18.2 kW x 8 x 250 = 36,400 kWh per year @ \$5023.00

Power saving is 46%.

10 Year Operating Cost Analysis:

	Conventional Collector	Ultra-Flow Collector		Conventional Collector	Ultra-Flow Collector
1 st year	\$69,883	\$61,248	7 th year	\$7,038	\$5,023
2 nd year	\$13,033	\$5,023	8 th year	\$13,033	\$5,023
3 rd year	\$13,033	\$6,940	9 th year	\$13,033	\$6,940
4 th year	\$7,038	\$5,023	10 th year	<u>\$7,038</u>	<u>\$5,023</u>
5 th year	\$13,033	\$5,023			
6 th year	\$13,033	\$6,940	Total cost	\$169,195	\$112,206

Operating Cost Savings over 10 years = \$56,989, factor modest inflation and the savings are \$71,237.

Return On Investment of 63.5%., which can be re-invested in other plant operations!!!!

See next page for WHY & HOW.

Why and How Ultra-Flow Achieves This:

Ultra-Flow's latest Advanced Technology design gives the user more performance at an affordable price. Typically pressure drop will decrease by at least 35%, translating into a reduced power consumption of 30-50%. The low velocity, high volume approach to the pulse-jet allows for 100% of the bag to be cleaned (conventional designs clean as little as 10-20% of the media. As result there is longer bag life and cleaning frequency will be cut in half.

The high, side inlet prevents dust hang-up and re-entrainment on to the bags.

Limitations of Contemporary Dust Collector Designs

A) Media Blinding

As the jet enters the bag through the venturi, it has velocities that drive dust from the bag which is in cleaning mode to an adjoining bag in filtering mode. As the bag cleaning continues the media is partially plugged until as little as 5% of the media is effective. The pressure drop increases and the dust holding capacity between cleanings drops to as little as 5% of the original. This means the bag must be cleaned up to 20 times more often to maintain equilibrium. In an attempt to compensate for this serious design flaw, the approach has been to lower the filter ratio. This has had limited success, in that the bags last longer since it gives the cleaning system more bag area to plug before the cleaning frequency and pressure drop increases enough to indicate a bag change. A collector at 3:1 filter ratio, compared to a conventional design at 6:1 filter ratio, assuming the same cleaning system jet velocity and flow, will last nearly twice as long, but the cleaning frequency will be nearly the same. The dust penetration through the bag on a limestone dust will be in the 0.0100 to 0.080 grains per cu. ft. range. It must be understood that for the above to be valid, the dust must have densities of over 20 lb./cu.ft..

B) Can velocity

Can velocity is defined as the vertical velocity component as the process air enters the bag section from the inlet. You determine cross-sectional area of the bottom of the collector housing and subtract the cross-sectional area of the bags. Most existing collectors use bottom (hopper) inlets. Typically operating at a 6:1 filter ratio with 8 foot long bags, the can velocity is 275 to 300 ft per minute. If the bag is lengthened say from 8 feet to 12 feet, the filter ratio drops to 4:1 but the can velocity remains unchanged. On dusts with a significant component of dust below three microns and densities under 50 lb per cu.ft, this can velocity range impedes dust from falling into the hopper.

The QAM Solution:

- 1) Use a gentle, although powerful high volume low velocity cleaning pulse-jet.
- 2) No venturi in the bag cage.
- 3) New specially designed bags and cages for high-ratio operation. Only half of the number bags are used, compared to conventional designs.
- 4) More spacing between bags to prevent all dust penetration and ensure dust drops to the hopper.
- 5) Position the pulse pipes at the critical distance to ensure maximum induction of secondary air and pulse-jet growth.
- 6) Set the pulse controller, according to instructions supplied by QAM, for optimal operation and much lower operating cost.

The Result:

- I. 90% reduced dust emissions from the collector.
- II. Increase bag life typically to 84 months (compared to only 18 months).
- III. Lower power consumption by 20-40%, due to smaller blower and motor horsepower.
- IV. Lower operating cost by 40-80%.
- V. No upward "can" velocity.

Filter Ratio (or air-to-cloth); A Gross Engineering Mistake (as a governing specification in cylindrical bag pulse jet dust collectors)

The History of Reverse Jet and Pulse Jet Design and Development must be reviewed to determine proper selection of collectors.

The first pulse jet collector was developed by Pulverizing Machinery of Summit New Jersey in the early 60's, to collect dust from their Pulverizers. They had tried to use the Blow-ring design but they could not handle the dust (powder) loads as their grinder Pulverizers became bigger. The typical load to the collectors from the Pulverizers were between 150 and 300 grains per cubic foot. The collector design was based on the same blow-ring filtering velocities at these loads. The cages were based on available designs from shipping pulverizer shafts. The pulse valves selected were diaphragm valves that were the fastest and the lowest cost valve available. This valve happened to be a ¾ inch diaphragm pilot operated valve. They decided to use several valves in a collector and pulse them with an electronic timer. It was found the hole sizes and venturi formed an air ejector design that had the same jet velocity that the blow-ring collector was using. But the big breakthrough came with the realization that the dust was ejected from the bag during the first 4 or 5 milliseconds of the valve opening. The valves were operated as fast as the mechanical design allowed. The operation was completed in less than 0.10 seconds. It became apparent that the frequency of cleaning was a function of the load to the collector. For instance, for loadings of 300 grains, the collectors would operate at a filtering velocity of between 7 and 9 ft per minute. At material handling facilities such as quarries, the collector would run at velocities of 14 to 16 feet per minute. The typical pressure drop in these collector designs were about 3.5 inches WC pressure for the high loads and 2.0 inches WC for the lower dust loads. The typical compressed air usage, on the high loads, were 1 to 2 SCFM per 1000 CFM of filtered air. For loads under 10 grains per cubic foot, the air usage was 0.2 to 0.8 SCFM per 1000 CFM of filtered air.

Determining the filter velocity (then referred to as filter ratio) became a rather complicated procedure. The ratio presumably was determined by dust load, fineness of the dust, temperature of process gas stream, and other factors.

The hopper inlet was a carry over design from both the blow-ring collector and the previous mechanical shaker collectors.

By 1969, there were over 10,000 collectors in operation. Almost all of them were installed on process exhaust from Pulverizers or in foundries. Pulverizing Machinery changed their name to Mikropul and licensed FlexKleen to also build and Market collectors. The collectors for MikroPul had 4 ½ inch diameter bags 72 inch long and the FlexKleen units had 5 inch bags 102 inches long. Bag life was 3-5 years on Pulverizer applications and over eight years on low loading applications.

Engineering Disaster 1971

In 1971, the patent was challenged and the Pulverizing Machinery patent was declared invalid. The market changed radically because Air Pollution Control Regulations also became effective at the same time. Many new suppliers entered the market. In order to compete, Mikropul changed their design. They went from 6 foot to 10 foot bags. They increased their pulse pipe holes by the same ratio. The whole industry followed and copied the new design for hole size and venturi throat diameter. At the time, Mikropul had 40,000 ventures in stock and kept the same venturi sizes. This increased the jet velocity of the cleaning jet by 66 per cent.

This was when the dust collector market was growing at a 20% annual rate. With the new designs:

- (1) pressure drop increased to 4 ½ to 6 ½ inches WC
- (2) Compressed air consumption increased by over 50% for similar applications.
- (3) Bag life was reduced by over 50%.
- (4) In reaction to these problems the filter ratios were reduced to between 4 & 6 on almost all applications.

Reasons for Disaster

What happened was no one at that time realized what might have been a rather obvious truth, that the velocity with which the dust is ejected from the bag during cleaning is proportional to the velocity of the cleaning jet. At the new velocities, dust is driven toward adjacent rows of bags in the filter mode. Depending on the dust density, the dust will be driven through the adjoining cake into the clean side of the bags. The cake becomes more dense and the pressure drop increases until the process stabilizes which takes 16-100 hours. Even after the equilibrium, the dust still penetrates and bag wear is high. With low filter ratios it takes longer for the bag to wear out and require longer times between replacements.

Today's Conditions

This disastrous design continues to be employed by most of the pulse jet collector suppliers in the world.

New Advanced Technology eliminates design flaws; allows for High Ratio Operation

Twenty-four years ago a new technology was developed, a new pulse jet collector that basically changed the cleaning system design. The key to this design was to change the jet velocity to a fraction of the existing designs. New Technology eliminated the penetration of dusts from the row of cleaning bags to the adjoining row in a filtering mode.

This allowed pulse jet collectors to operate at:

- (1) **lower pressure drops (1 - 3 inches WC),**
- (2) **lower compressed air consumption for cleaning (50 - 75% less)**
- (3) **3 to 4 times longer bag life**
- (4) **filter ratios of over 14:1 on any application**
- (5) **decrease dust penetration by up to 90%.**

There have been several suppliers building and selling these New Technology collectors since 1982. In fact the patents have now expired. **There are over 4000 installations worldwide.**

WHY IS THIS NEW TECHNOLOGY NOT ACCEPTED BY ALL THE MAJOR SUPPLIERS?

- 1) If you produced 40,000 collectors after the development of the new technology was published over 20 years ago, you might be subject to legal action for poor judgment and causing the public to be overcharged for their dust collection.
- 2) They do not have the engineering expertise to build these new technology collectors.
- 3) People using the old obsolete technology control over 90% of the market world-wide.
- 4) The suppliers of valves and filter elements would have their markets cut in half.
- 5) Air compressor sales and service for pulse jet collectors would be cut by 60%

MODIFYING EXISTING COLLECTORS WITH ALMOST NO RISK TO THE PURCHASER.

We can supply new bags, pulse pipes and bag plugs to alter performance to high technology low pressure drop, reduced air consumption, lower penetration (immediately noticeable) and long bag life (it takes some time to verify that but it should be obvious from the other indications). The modifications take only a few hours and if a customer is not satisfied, he can return pipes and cages for credit and re-install the old components.

If this was not an absolute certainty customers would not pay for the equipment.

Testimonial from Mei-West

November 1, 2012

Quality Air Management
240 Camille Crescent
Waterloo, On N2K 3B7

Subject: Ultra-Flow model 60VS-8 and 72VS-8 bag house dust collectors

To whom it concerns,

Since Spring 2011, we have been setting up a new grass seed processing plant. These plants produce a lot of very fine dust. To create a dust free environment in a temperature controlled building we started looking for a filter system that is compact enough to fit inside the building without wasting too much valuable space.

We were quoted different systems by a number of dust collector suppliers. Yours impressed me the most from its unique and seemly very advanced technical standard. However, the tipping point is that the two collectors were small enough to fit inside our building, which is what we wanted. All the others were far too large and would have had to go outside. Also, the motor horsepower was only 20 and 30 HP. The others were around 50 HP or more. All the so-called experts told me that I was being fooled, because these smaller dust collectors could never do the job. I always like a challenge and to be the innovator and ignored these warnings. We've run these bag houses for a while now and they are running amazingly well and at only 1 – 3.5 inch pressure drop. You recommended that we reduce the cleaning frequency even more and run the collectors at around 2 inch pressure drop, to save even more on operating cost and reduce wear and tear on the filter bags. I'm impressed and delighted.

No one else seemed to match your technical expertise and that assures us of success in our application of these dust collectors.

Yours Truly,



Heinz Nolting
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