

Ultra-Flow Baghouse Dust Collector Life Cycle Analysis

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:

- A. **90% reduced dust emissions from the collector.**
- B. **Increase bag life from 18-36 months to 60-84 months**
- C. **Lower power consumption by 20-40%, smaller blower and motor HP.**
- D. **Lower operating cost by 40-80%**
- E. **No upward "can" velocity.**

[See page 2 for a typical life cost example]

Example:

Ultra-Flow Model 84VS-8, 20000 SCFM @ 18:1 filter ratio, compared to any commonly available dust collector.

Cost to purchase and service for conventional collector:

Dust emissions	66 x10 ⁻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 x10 ⁻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
1 st year	\$69,883.00	\$61,248.00
2 nd year	\$13,033.00	\$5,023.00
3 rd year	\$13,033.00	\$6,940.00
4 th year	\$7,038.00	\$5,023.00
5 th year	\$13,033.00	\$5,023.00
6 th year	\$13,033.00	\$6,940.00
7 th year	\$7,038.00	\$5,023.00
8 th year	\$13,033.00	\$5,023.00
9 th year	\$13,033.00	\$6,940.00
10 th year	\$7,038.00	\$5,023.00
Total cost	\$169,195.00	\$112,206.00

Operating Cost Savings over 10 years = \$56,989.00 re-invested in other plant operations!!!!

When modest inflation is factored in, **the savings are \$71,237.00**

It is a Return On Investment of 63.5%

NO RISK

1. This technology is proven over 25+ years.
2. If it wouldn't work, the client would not pay the invoice. Payment terms are 30 days (O.A.C).