



HARTFIEL®
AUTOMATION

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A Hartfiel Automation Company

DUST COLLECTION

Solutions

MAC® PULSE VALVES

High Performance. Long Life.

The MAC Pulse Valve series was developed to replace current diaphragm style technology and create a more robust and reliable valve solution in industrial applications. MAC Pulse Valves are ideal to replace existing diaphragm technology in applications such as reverse jet bag houses and dust collectors, pneumatic conveying and bulk material handling.

The MAC Pulse Valve utilizes the MAC 46 Lifting series' balanced pilot technology to ensure fast, repeatable pulses. It also utilizes bonded spool technology in the main valve for superior reliability beyond existing diaphragm technology. A checked accumulator and a main spool with memory spring are used to ensure a shift back to the home position, for times when air supply may not be adequate. A line of adapter plates has also been released to replace existing diaphragm pulse valves with a direct drop-in, without disturbing existing plumbing.

MAC Pulse Valve are currently available in four sizes.



THE CURRENT ENVIRONMENT

The problem with diaphragm valves.

High Energy Consumption

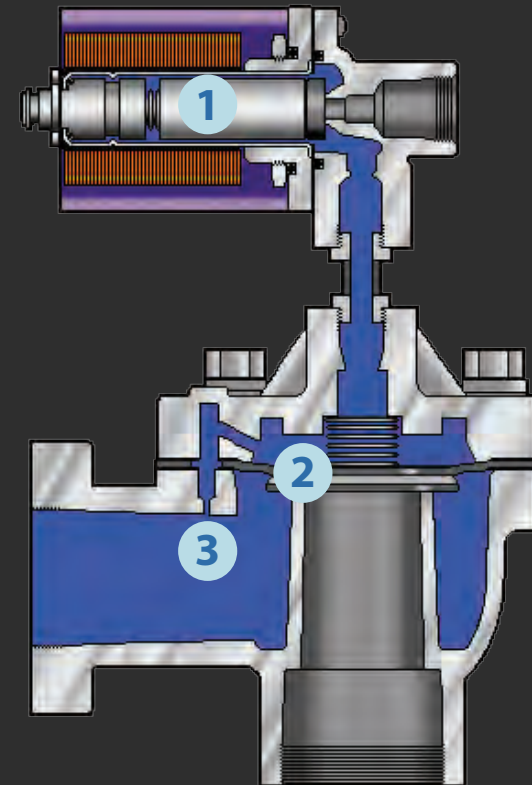
Dust collector systems are one of the largest consumers of air and energy in a factory environment. Energy savings for replacing diaphragm valves with a spool valve can be 20 - 30%.

Low Cycle Rate

Diaphragm valves are rated at 1 million cycles, resulting in more frequent downtimes and higher labor costs compared to the 10 million cycle rate of a MAC® spool-type valve.

High Cost of Ownership

Many leaks in diaphragm valves occur after only a short time and are not easily detected. These leaks are caused by tears on the diaphragm. As a result, air compressors work much harder to supply the same air pressure, causing higher electricity usage. When diaphragm valves tear, they can cause negative performance in other air valves on the manifold.



- 1 Contaminated Air** Passes Through Unbalanced Solenoid
- 2 Diaphragm Ruptures** (Air Leaks)
- 3 Small Fixed Orifice** (Blocked By Contaminants)
- 4 No Manual Override**

THE MAC® PULSE VALVE ADVANTAGE

The benefits of spool type valves.

The MAC® Pulse Valve series is designed to be a direct drop-in replacement for existing pulse technology. The MAC® solution utilizes a long life, bonded-spool design, instead of the traditional diaphragm style. MAC® also uses a balanced pilot valve that isolates the solenoid from airline contamination. Available with integral solenoid pilot as well as bleed pilot configurations.

Maintenance

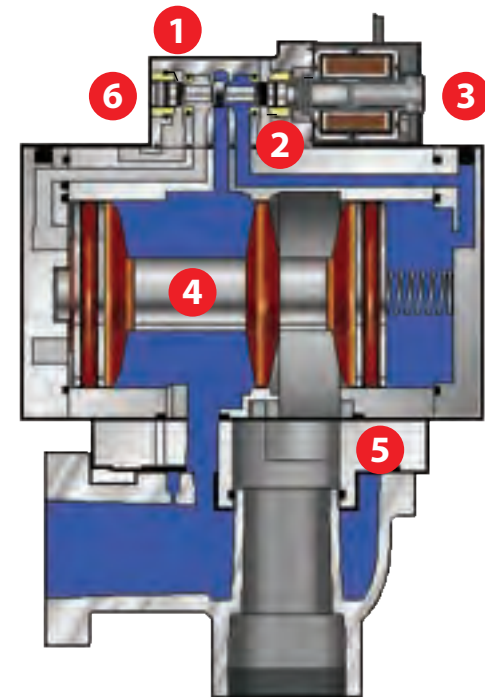
Lower cost of ownership through reduction in downtime due to high reliability. When necessary, maintenance is simplified with available spool kits.

Return on Investment

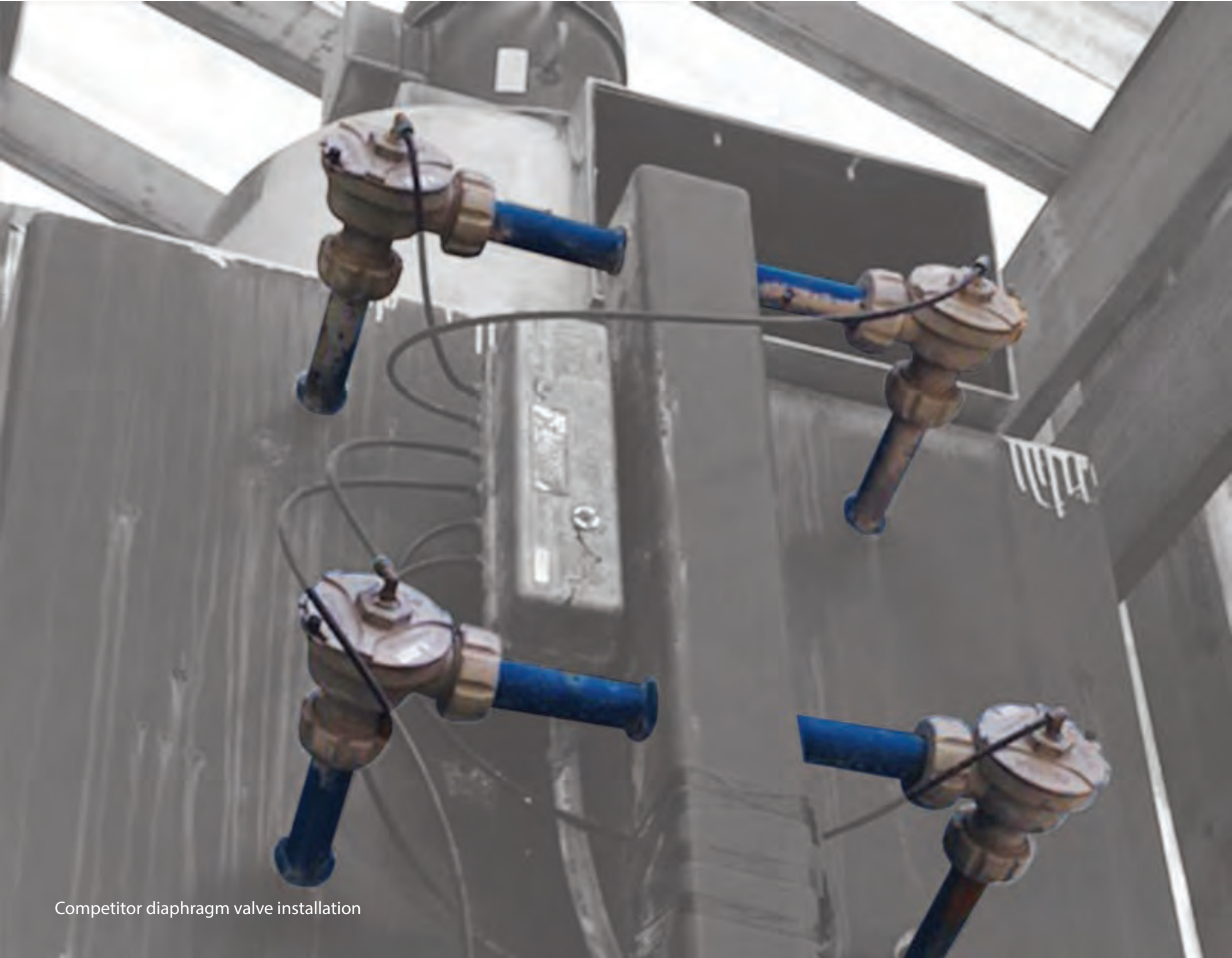
MAC® spool valves do not leak or experience blowouts. ROI is very short due to significant energy savings, extended bag life, greatly reduced replacement costs, reduction in downtime and labor savings.

Harsh Environment Compatible

An aluminum die-cast body, nitrile seals and an environmentally protected solenoid are standard features. Viton® seals are also available for extreme temperature environments and chemical resistance.



- 1 4-Way Pilot** (Maximized Shifting Forces)
- 2 D-Seal Technology Isolates Solenoid** (Longer Life)
- 3 Lifting Solenoid** (Consistent Response)
- 4 Dynamic Bonded Rubber Spool** (Balanced, Wiping Action.)
- 5 Adapter Plate** (Drop-in Replacement to Existing Base)
- 6 Manual Override**



Competitor diaphragm valve installation

BEFORE

Image of dust collection system filters using competitor diaphragm pulse valves .



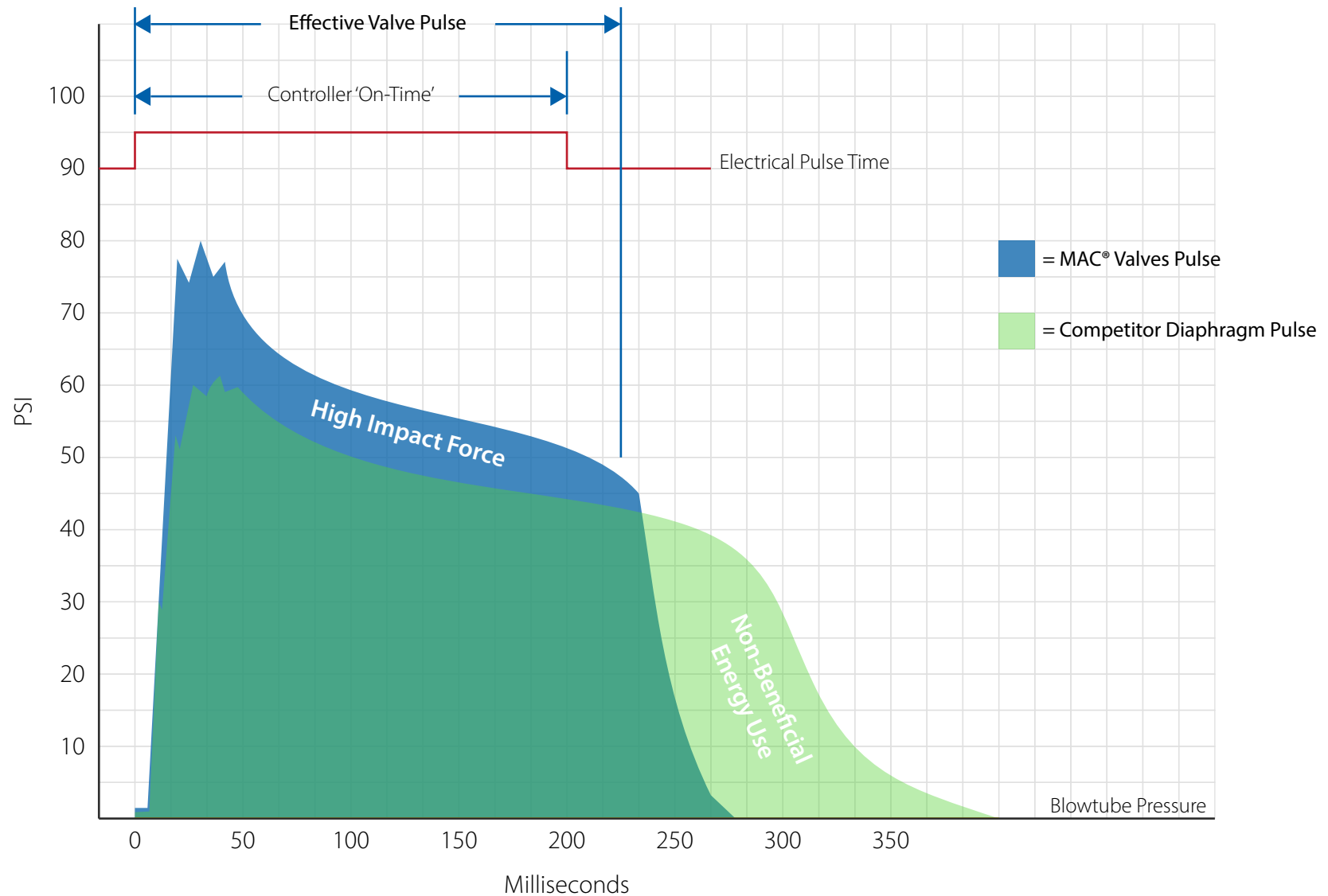
AFTER

The valve for the far left filter was replaced with a MAC® Pulse Valve. This image shows the results after just 2 cycles.



PULSE VALVE PERFORMANCE CURVE

MAC Valves = More "Cleaning Energy"





MAC PV06 spool valve installation

CASE STUDY

: Concrete Production

PROBLEM

A concrete production facility could not run all of their equipment simultaneously because their dust collection system was unable to handle the amount of dust produced. This caused added time in prepping material for shipment, resulting in shipping delays and increased employee overtime.

ANALYSIS

The current diaphragm valves utilized by the customer in their dust collection system were leaving excessive amounts of dust and material on the systems filters.

SOLUTION

The diaphragm valves were removed and replaced with MAC® Pulse Valves.

BENEFIT

The customer is now able to run all equipment simultaneously, resulting in reduced employee overtime and the ability to meet customer deadlines. Clean-up time has been greatly reduced. Old material has been purged from the system, allowing the system to operate at a higher efficiency.



CASE STUDY : Bakery

PROBLEM

A production bakery facility was changing filters in their dust collection system every 2 to 3 weeks due to accumulation of product.

ANALYSIS

The customer's dust collection system was utilizing diaphragm valves to clean their filters. These valves were grossly under-performing.

SOLUTION

The diaphragm valve under-performing the most was removed and replaced with MAC® Pulse Valve. After manually cycling the MAC® spool valve twice, the filter was rechecked and appeared to be brand new.

BENEFIT

Customer will realize cost reductions from a decrease in time spent changing filters and total number of filters used in a fiscal year.

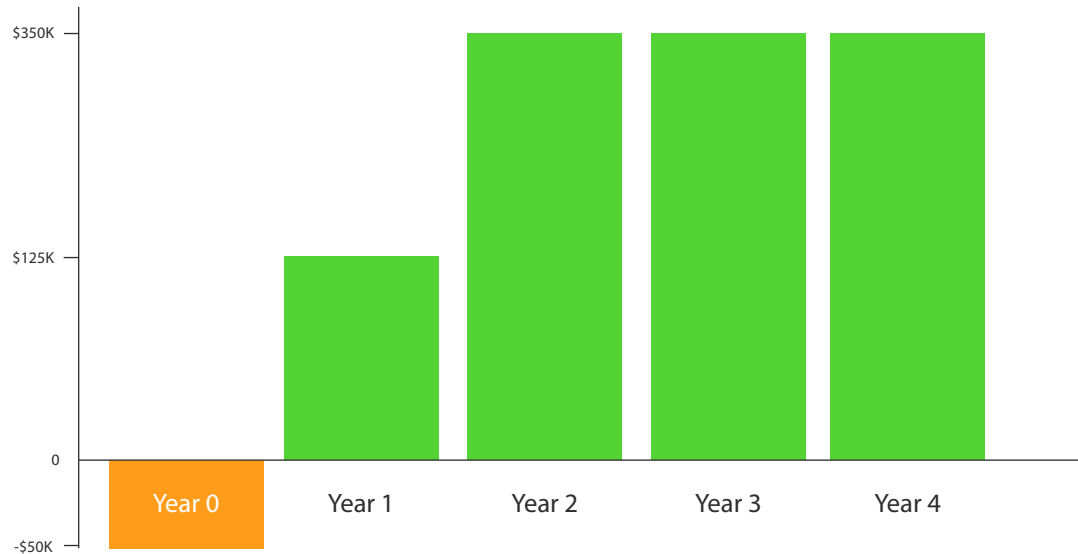
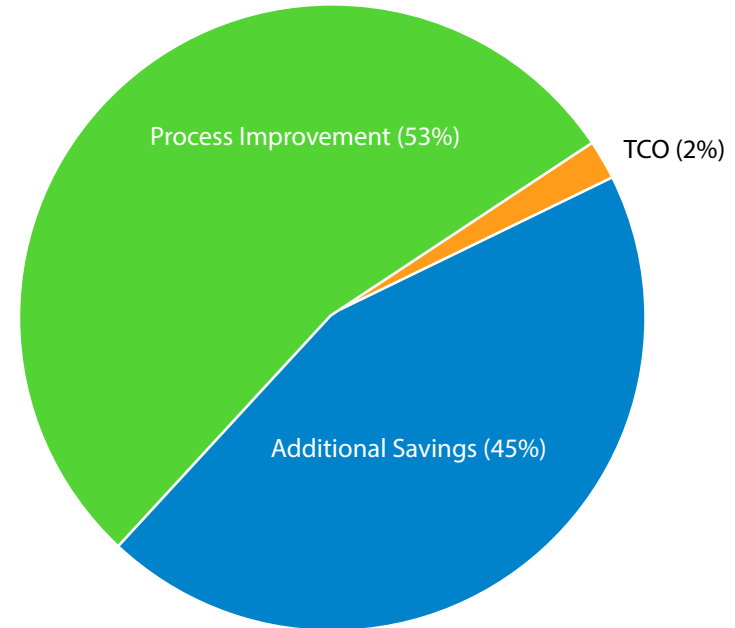


Return on your investment.

ANNUAL PROFIT IMPACT

Total Cost of Ownership	\$5,666.67
Process Improvement	\$183,820.00
	\$157,088.72
Total	\$346,575.39
Investment	(\$265,000.00)

ROI **0.76 years**



This is a sample CPR report prepared for a potential MAC® Pulse Valve customer

Savings Summary

PROCESS IMPROVEMENT

Downtime Reduction

Weekly unscheduled downtime caused by dust collector	\$161,920.00
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Scrap Improvement Savings

Reduced scrap due to failure of dust collector. $12,500 \text{ lbs/hr} \times 24 \times 365 = 109,500,000 \text{ lbs}$	\$21,900.00
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ADDITIONAL SAVINGS

Lowered Cost of Carrying Inventory

50% of total on shelf for competitor vs. 20% of total on shelf for MAC	\$125.00
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Energy Savings Per Year

Catastrophic Failure \$207.36 cost per day x 6 days before changing = \$1,244.16 per occurrence (24x/yr)	\$29,859.84
(Estimated cost of air leakage/day)*(number of days of leakage)*(number of valves leaking at a time) = difference between spool and diaphragm <i>Existing: 600ccpm x 30 valves. Proposed: 50ccpm x 30 valves</i>	\$55,103.88

Alternative Cost Avoidance

EPA Cost reduction	\$0.00
Equipment Rental? (crane....)	\$0.00
Reduced Labor due to checking for leaks: (number of instances)*(length in hours)*(fully burdened labor rate) = (2 people * 3 times per week)*(4 hrs)*(\$60.00)	\$72,000.00
Production Loss	\$0.00

Miscellaneous Savings

Safety Costs????	\$0.00
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Summary: 7 Key Advantages

of MAC® Pulse Valves
in Dust Collection Environments

1

Energy Savings

Powerful pulse action extends time needed between pulses ... lowering energy costs.

2

Access

Access to valves in the system is difficult. The spool valve's long life reduces lost labor due to long repairs.

3

Downtime

When a dust collection system fails, plant operations come to a halt. Spool valves reduce downtime.

4

Product

Insufficient pulses cause excess waste to build up in the system and can cause a reduction in waste removal resulting in product contamination.

5

Maintenance Costs

Diaphragm valves cause daily maintenance issues and increased labor costs. Spool valves allow for better use of labor throughout the plant.

6

Filter Bag Life

Cleaner filters resulting from stronger pulses increase overall filter life, reducing costs.

7

Ease of Use

Only the MAC solenoid pilot offers a manual override to test the pulse valve.



Currently available in 4 size options

MAC® Pulse Valve PV03 Series

PIPE SIZE
¾" and 1"

FLOW
24 Cv



SPOOL KITS

Nitrile K-PV001
Viton® K-PV001-05

BASE ADAPTERS*

M-PV001-01 - ASCO® / Flexclean® ¾"
M-PV002-01 - Goyen ¾"
M-PV003-01 - ASCO 1"
M-PV004-01 - Turbo 1"
M-PV005-01 - Goyen 1"
M-PV009-01 - ASCO ¾" External

**Additional configurations available upon request*

MAC® Pulse Valve PV06 Series

PIPE SIZE
1½"

FLOW
53.2 Cv



SPOOL KITS

Nitrile K-PV002
Viton® K-PV002-05

BASE ADAPTERS*

M-PV006-01 - 1 1/2" Goyen
M-PV007-01 - 1 1/2" ASCO
M-PV008-01 - 1 1/2" Norgren
M-PV010-01 - 1 1/2" Turbo D-Series
M-PV011-01 - 1 1/2" Turbo F-Series

**Additional configurations available upon request*

MAC® Pulse Valve PV09 Series

PIPE SIZE
2 & 2½"

FLOW
100 Cv



SPOOL KITS

Viton® S-PV003-05

BASE ADAPTERS*

K-PV003-05 Viton (includes seals and spring)
N-PV001-01 Solenoid Adapter Plate
N-PV001-02 Remote Bleed Adapter Plate
N-PV002-02 PV09 Check Stem Kit

**Additional configurations available upon request*

MAC® Pulse Valve PV12 Series

PIPE SIZE
2½" & 3"

FLOW
175 Cv



SPOOL KITS

Viton® K-PV035-05

Hartfiel Automation Territory

HQ – MINNEAPOLIS, MN

Serving MN, ND, SD
6533 Flying Cloud Drive
Suite 100
Eden Prairie, MN 55344
PH 952.974.2500

DES MOINES, IA

Serving IA, NE
3215 99th Street
Urbandale, IA 50322
PH 515.309.0670

ATLANTA, GA

Serving GA
1400 Northbrook Pkwy
Suite 350
Suwanee, GA 30024
PH 678.221.2703

RICHMOND, VA

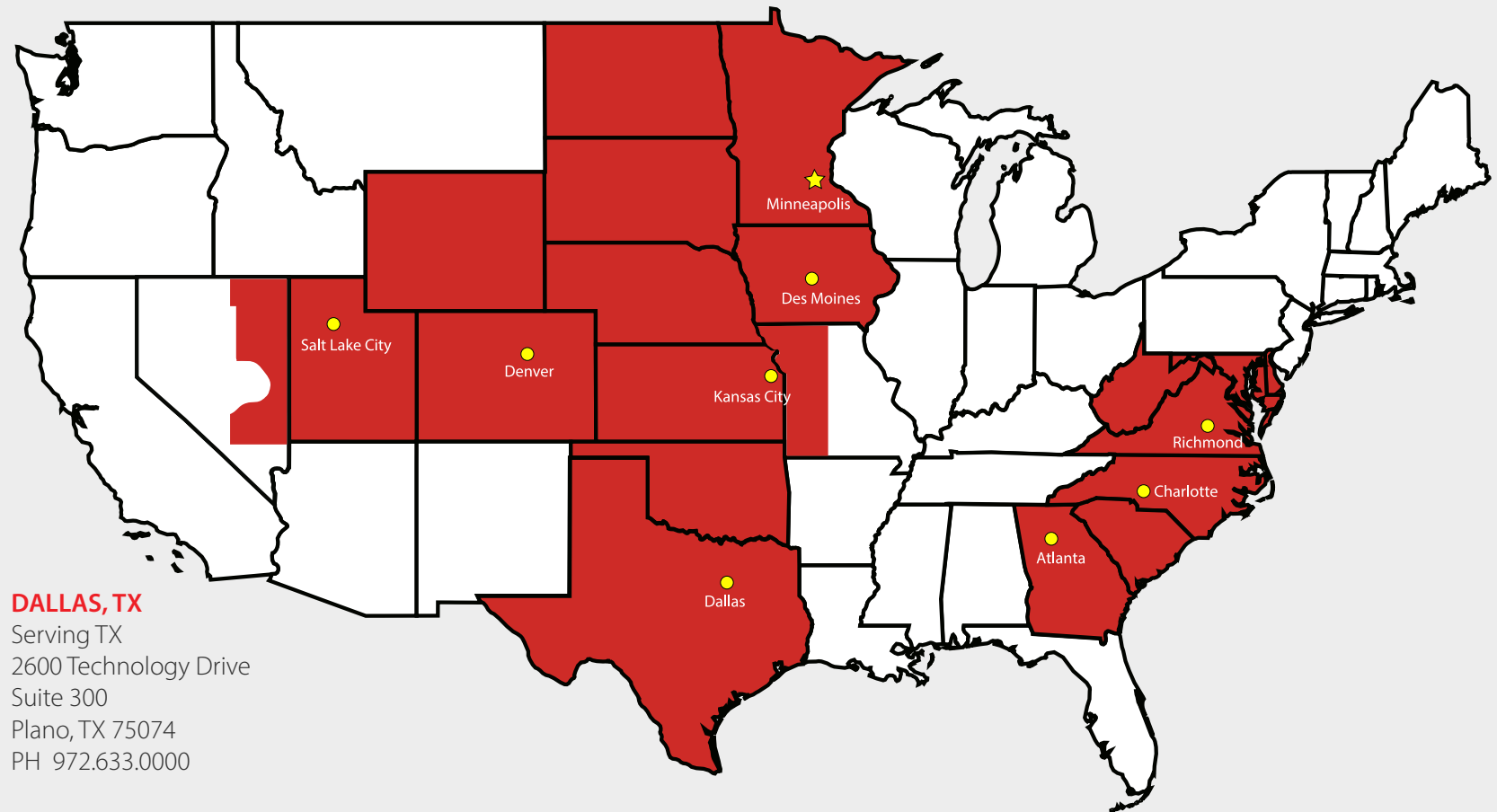
Serving VA, DE, MD WV
11501 North Lakeridge Pkwy
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Ashland, VA 23005
PH 540.898.4511

DENVER, CO

Serving CO
5045 Robb Street
Suite 600
Wheat Ridge, CO 80033
PH 303-431-3600

KANSAS CITY, KS

Serving KS, OK, West MO
8017 Flint Street
Lenexa, KS 66214
PH 913.894.6545



DALLAS, TX

Serving TX
2600 Technology Drive
Suite 300
Plano, TX 75074
PH 972.633.0000

CHARLOTTE, NC

Serving NC, SC
7148 Weddington Rd
Suite 130
Concord, NC 28027
PH 704.788.1240

SALT LAKE CITY, UT

Serving UT, WY, East NV
8675 South 700 West
Sandy, UT 84070
PH 801.567.1188



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