

## *Standard Features :*

- Differential Pressure gauge to determine when the cartridge should be replaced
- Filtration efficiency is 99.95% of oil and water aerosols down to 0.1 microns and oil carryover of 0.5 ppmw
- Element life up to 10 years virtually eliminating filter maintenance
- Complete turndown capability
- Pressure drop of 0.5 psi "wet" can save thousands of dollars in air compressor operating costs
- Maximum 2 psi  $\Delta P$  during element life when free of solids
- Permanent installation eliminates the need for bypass valving
- No filter elements to stock or maintain

## *Application :*

A well designed compressed air or gas system requires that sufficient filtration be used. Filtering the compressed air is recommended to remove oil and water aerosols that could impair proper dryer performance.



The Flair Mist Eliminator Filter offers excellent capability for high quality filtration. The Mist Eliminator Filter will coalesce and remove as much as 99.95% of all aerosols. The design of the filter element offers unique advantages to the user including up to a ten year life. This extended life eliminates the regular element change out schedule required with cartridge type coalescing filters. This reduction in maintenance will save on the expenses of replacement cartridges, labor and unit shut down, and filter piping elements. The unique element design offers complete turndown capability with more flexibility for the operator than with typical coalescing filters.

One of the greatest advantages of the Mist Eliminator Filter is that it operates at an extremely low pressure drop, typically 0.5 psi "wet". This lower pressure drop will save thousand of dollars per year in compressor operating costs - when compared to the higher pressure drop required with the typical coalescing type prefilter.

The Mist Eliminator Filter is offered by Flair - the industry's leader in compressed air and gas drying and purification systems.

# *Benefits of the Mist Eliminator*

## **Saves Significant Operating Costs**

The Mist Eliminator Critical Service Filter saves significant operating cost. A typical coalescing cartridge filter requires 6 PSI pressure loss for operation. The compressor system must operate against this wasted flow restriction in order to deliver air downstream. Each 1 PSI of pressure loss equates to 0.5% of compressor horsepower for a 1,000 SCFM compressed air system. Over the time the Mist Eliminator filter is operating you can save 3% more energy than a standard coalescing filter for an approximate cost savings of \$5,400 per year. Using the equation for a compressor requirement reduction of 0.5% per 1 psig of pressure drop or 3% over the average of 6 psig pressure drop with typical coalescing filters (based on .07 cents/Kw and 8,000 hrs/year operation.)

Typical coalescers have a high initial "clean" pressure drop. While the filter is in operation the filter cartridge accumulates dirt and this pressure drop further increases. Frequent replacement of the cartridge is required when the operating pressure drop increases above the acceptable level. The cost of replacement cartridges and labor and parts maintenance added to the cost of pressure drop as stated above is another reason to compare the costs. The initial pressure drop across the Critical Service Filter element is almost immeasurable due to its unique **laminar flow** operation. The dirt holding capacity of the Mist Eliminator is 20 times the capacity of other cartridge filters.

## **Superior Removal of Particles**

Many of the oil and water droplets formed during compression and subsequent cooling are less than one micron in size. A standard coalescing filtration system is not highly efficient on these very small particles. The combination of very deep bed filtration with laminar flow velocities takes maximum advantage of the **Brownian** motion of the particles; coalescing a very high percentage of droplets. Independent tests have shown that 99.95% of all particles regardless of size are removed by the Mist Eliminator.

The laminar flow concept provides yet another important advantage. The problem of re-entrainment of coalesced liquid from the surface of the filter is eliminated. When filters operating at higher surface velocities become dirty, the surface velocities further increase. At high surface velocities, coalesced liquid can be "stripped" from the surface of the filter and re-entrain in the downstream flow. The Mist Eliminator, eliminates this problem since it operates at extremely low velocities.

Since the Mist Eliminator is designed to operate in laminar flow, there is no limit to the turndown characteristics of the filter, an important advantage where wide ranges of flow are possible. The efficiency of cartridge filters falls off rapidly at low flows. This occurs because cartridge filters depend upon impaction and interception for their performance. The Mist Eliminator Filter removes droplets through agglomeration caused by Brownian motion and residence time within the media.

Definitions provided by Encyclopedia.com and Exploratorium.edu

### **Brownian Motion:**

Irregular, zigzag motion of minute particles of matter suspended in a fluid. First observed (1827) by the botanist Robert Brown, the effect is a result of collisions between the particles and the fluid molecules, which are in constant thermal motion.

### **Laminar Flow:**

When fluid flows smoothly without vortices or other turbulence, the flow is called LAMINAR. Typically when a fluid is flowing this way it flows in straight lines at a constant velocity. Water flowing smoothly and slowly from your faucet can show laminar flow. If the water hits a smooth surface, a circle of laminar flow results until the flow slows and becomes turbulent.

# How The Mist Eliminator Works

## Types of Particle Removal

Mist containing oil and water enter the Mist Eliminator through the inlet at the top of the filter housing and move down through the element. Particles are collected by the fibers in the filter element causing them to coalesce and form droplets large enough to become heavy and drop to the bottom of the filter housing. The air flow pushes these droplets through the filter until they drop off and become waste water at the bottom of the filter housing. This waste water is then drained by several methods using the optional Flair Condensate Drain Valves. The clean air that is forced through the filter media exits the housing through the outlet. (See diagram below)

The filter's purpose is to eliminate 99.95% of all particles to the smallest micron. There are 3 levels at which the microns are removed. **Direct Interception** removes the largest particles 3 microns or more. **Inertial Impaction** removes particles between 1 and 3 microns. **Interception** removes particles smaller than 1 micron. (See definitions below)

### Direct Interception

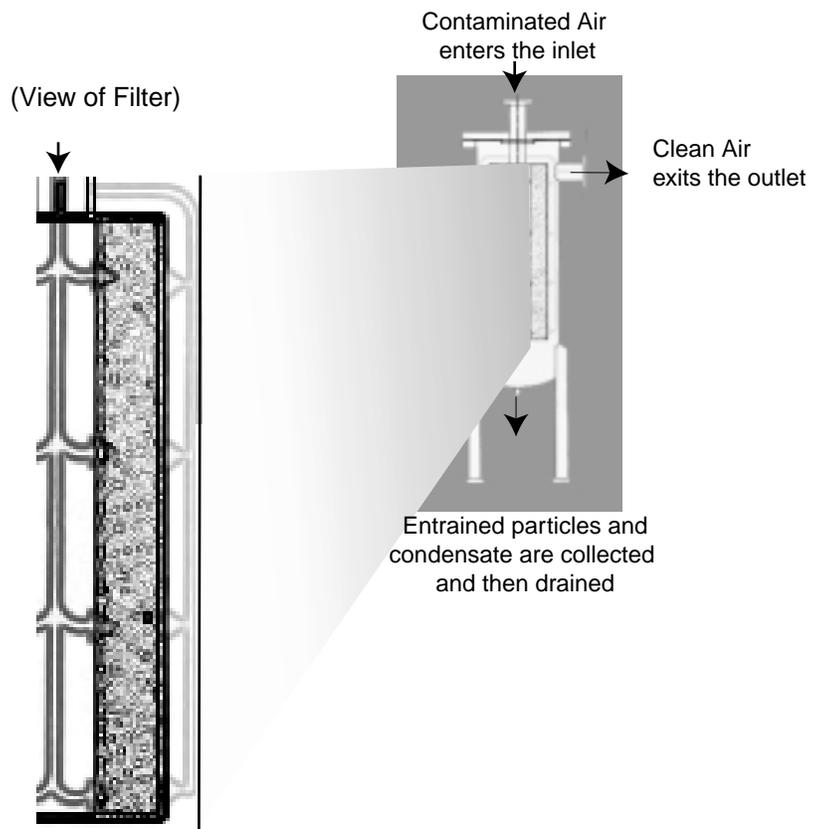
The largest micron are easily collected in the fine mesh of filter fibers. They are too large to flow through with the air flow.

### Inertial Impaction

Smaller particles, between 1 and 3 microns are held up by the fibers causing them to group together and be entrained in the condensate dropping them to the bottom of the filter housing

### Interception

The greatest benefit of the Mist Eliminator is the removal of the smallest of particles those under 1 micron. As described in the definition of Brownian Movement, the smallest particles are sent in a random movement causing them to collide with air molecules sending them into the filter fibers with a high probability of being entrained and eliminated.



## Characteristics of the Mist Eliminator

### High Efficiency

Removes 99.95% of microns down to 0.1 micron. The large surface area provides greater interception and impaction of larger size microns with less chance of clogging.

### Long Life

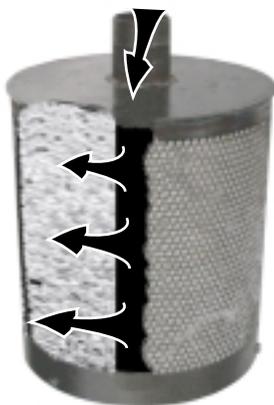
The estimated life span of the Mist Eliminator is 10 years, much greater than the standard coalescing filters. Saving time and money on replacement filters.

### Low Air Velocities

The low air velocity found in the Flair Mist Eliminator prevents particles from being re-entrained into the air stream.

### Self Cleaning

The specially designed housing and filter continually coalesces and drains making the Flair Mist Eliminator virtually Self Cleaning.



ME Element

## Models and Capacities

MODEL	70 PSIG	80 PSIG	90 PSIG	100PSIG	110 PSIG	120 PSIG	130 PSIG	150 PSIG
ME-250	185	206	228	250	272	294	315	359
ME-500	369	413	456	500	544	587	631	718
ME-1000	738	826	913	1000	1087	1174	1262	1436
ME-1500	1108	1238	1369	1500	1631	1762	1892	2154
ME-2100	1551	1734	1917	2100	2283	2466	2649	3015
ME-3000	2215	2477	2738	3000	3262	3523	3785	4308

Element construction: Carbon steel and special glass fiber packaging.

Vessel construction: Carbons Steel, Design Pressure 150 PSIG, Design Temperature: 150°F. Made and stamped in accordance with A.S.M.E. Code, Section VIII.

# FLAIR

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