

PYRAMID 2000[®] EVOLUTION² Refrigerated Compressed Air Treatment Systems

Some Questions and Answers about Pyramid 2000[®] Evolution² Systems

Q. What is a Pyramid 2000[®] Ev² System?

A. A Pyramid 2000[®] Ev² system is a self-contained compressed air treatment system engineered to combine the best of Deltech's drying, filtering and condensate draining techniques in a single package to deliver performance unmatched by any other single unit the market today.

Because of its unique capability to remove liquid oil, water, particulates and oil mists, the 810 Series filter has been integrated into the drying process to function as both filter and separator. Filtering at 35°F, where there is a higher concentration of condensed oil vapor, virtually eliminates the condensation of oil vapor further downstream. Result: superior performance with only single-point installation in the user's air system. Contrast a Pyramid 2000[®] Ev² system to the multi-component installations recommended by other manufacturers and you will quickly see the value of the "package" approach.

Q. What advantage is there in using such a system?

A. The refrigerated air dryer cools the compressed air to approximately 35°F, condensing water and oil vapors in the process. Once these vapors are in liquid form, the 810 Series filter removes them at an efficiency far exceeding that of a conventional separator. Vapors will pass through any

coalescing filter, but the vapor content can be significantly less at 35°F than at 100°F. Therefore the total efficiency of a Pyramid 2000[®] Ev² system will exceed 99%. Total efficiency takes into account condensable hydrocarbons (vapors) as well as liquids.

Q. Filter manufacturers claim efficiencies as high as 99.99998%. Isn't this better than the 99% achieved with a Pyramid 2000[®] Ev² system?

A. Filter manufacturers base their efficiency on the removal of only liquid and particulates. They ignore the presences of vapor. The following chart shows how filter efficiency should really be applied to determine total oil carry-over.

Filtration Temperature	Hydrocarbon Concentration (ppm)						Actual Efficiency
	At Filter Inlet			At Filter Outlet			
	Liquid	Vapor	Total	Liquid	Vapor	Total	
100°F	2	0.62	2.62	0.0004	0.62	0.6204	76.3%
35°F	2.616	0.004	2.62	0.00052	0.004	0.00452	99.8%

When the total filtration efficiency is considered, the advantage of filtering at the lowest possible temperature is obvious. When the end user is so concerned with clean air that he is willing to play the 9s game with efficiency (999.9998...etc.), he certainly should not ignore the presences of vapor, since the vapor will very likely condense after it passes through the filter. However, condensing the vapor before filtration results in the removal of more of the inlet oil load, increasing the overall efficiency of the filter.



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Q. Why can't other manufacturers combine their filters and dryers in the same way?

A. In a Pyramid 2000® Ev² system, filtration occurs immediately after the chiller. At this location, the air contains the highest concentration of oil mist as well as liquid water condensed in the chiller. Because of its unique design, the 810 Series filter functions as both a separator, to remove the condensed liquids, and a coalescer, to remove the oil mist. No single competitive filter on the market today can function in this way.

Q. Can't you get the same efficiency by placing another manufacturer's filter after a refrigerated dryer?

A. No. Typical refrigerated dryers reheat the air before it leaves the dryer, and therefore filtration at the dryer outlet would not be at the lowest air temperature.

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Q. What about smaller dryers that do not reheat the exit air?

A. These dryers still need a typical separator, usually mounted externally at the dryer outlet. A typical coalescing filter must be preceded

by a particulate filter to avoid a rapid increase in pressure drop and frequent element changes. By the time the air reaches the coalescing element it has warmed up considerably, and again filtration is not at the lowest air temperature. In addition, this "stringing" of components greatly increases pressure drop and consequently operating costs.

Q. How will I know when to change the element in the 810 Series filter when it is part of a Pyramid 2000®Ev² System?

A. 810 Series filter elements are changed on the basis of pressure drop. In a Pyramid 2000® Ev² system, a differential pressure switch is mounted on the filter and wired to a panel-mounted light. The light indicates the need to change the element.

Q. Who needs a Pyramid 2000® Ev² system?

A. Anyone who wants super clean, dry air free from condensable hydrocarbons and water vapor, as long as air lines will not be exposed to temperatures below 35°F. Typically, pharmaceutical, electronics and food processing applications are a few of the target uses. Actually, anyone who needs to filter and dry compressed air should consider the cost benefits and superior performance of a Pyramid 2000® Ev² system. Pyramid 2000® Ev² systems provide the cleanest air at the lowest overall cost of all clean air packages, or dryer-filter combinations, needed to achieve similar performance.