



# 810 Series

## COMPRESSED AIR FILTERS

### SOME QUESTIONS AND ANSWERS ABOUT DELTECH 810 SERIES FILTERS

**Q. How are contaminants removed in the 810 Series filter?**

- A. Air entering the 810 Series filter is forced by baffles in the element end plate to travel in a circular path; large droplets and particles, having greater inertia, tend to travel in a straight line and thus impinge on the inside of the housing, draining into a sump. This process is known as centrifugal separation.

The air passes through a series of layers of progressively finer glass fiber filter medium. The air flows around the fibers, but droplets of liquid impinge on them, coalesce or collect into larger droplets, and drain by gravity into another sump.

**Q. What is "pressure drop," and what is its significance for filter users?**

- A. Pressure drop is a difference in pressure between two locations in a compressed air system; for example, the inlet and outlet of a filter. It is caused by blocking of the air path and by friction. Excess pressure drop is undesirable because it wastes energy and robs compressed air of some of its capacity to do work. Pressure drop costs money!

**Q. How is the Deltech 810 Series filter superior to other manufacturers' "oil-removal" filters?**

- A. Most so-called oil-removal filters are coalescing filters. Coalescence is an effective means of removing oil from the air stream. If oil is the only contaminant, pressure drop, once the element is wet, will remain constant. Theoretically, under these conditions a coalescing element should last forever.

However, in actual service conditions this is never the case. All air contains solid particulates

and water. Particulates do not drain from a coalescing element they stick to the fibers and clog the element, causing pressure drop to increase. Eventually the element must be replaced. Elements with smaller fibers and smaller pore sizes clog more quickly. Water in the air stream will wash the oil through the element, re-entraining it at the outlet. Consequently, prefilters and dryers are necessary ahead of a typical coalescer to protect it from particulates and slugs of liquid water.

The Deltech 810 Series filter, by use of centrifugal separation and impingement, removes most solid contaminants and large droplets of liquid before they reach the element. Thus, few particulates and no liquid water reach the element. Pressure drop stays low, and element life is extended. Factory tests under actual operating conditions show that the Deltech 810 Series element can last more than twice as long as elements in competitors' coalescing-only filters.

**Q. What's the pressure drop for the 810 Series filter? How does it compare with that of competitive filters?**

- A. Initial pressure drop is 0.4 psi. Under typical operating conditions, average pressure drop over the life of the element is 3.5 psi. We recommend changing the element when pressure drop reaches 7 psi. Some competitive filters have an average pressure drop of 7 psi with a change recommended at 10 psi. Others may have even higher pressure drops. Extra pressure drop could cost the user thousands of dollars a year in energy costs. Some manufacturers also recommend a prefilter, which can more than double the pressure drop across the filtration system.

**Q. Most manufacturers recommend a prefilter. Why doesn't Deltech?**

A. Because the 810 Series filter doesn't need one. Based on a typical filter application the filter housing design allows the removal of up to 99+% (by weight) of incoming contaminants before they reach the element. Other manufacturers recommend particulate prefilters or additional coalescing filters to protect elements from clogging. With Deltech, one filter does the whole job.

**Q. How meaningful are efficiency and pressure drop ratings in relation to conditions found in the field?**

- A. Many manufacturers like to report impressively high efficiency ratings or impressively low pressure drop ratings for filter elements. These specifications may be misleading for several reasons:
- None of the commonly used tests for efficiency can predict the performance of a filter under actual operating conditions.
  - Tests are usually not run long enough to account for changes in efficiency and pressure drop due to fiber wetting or contaminant loading.

The efficiency of a filter depends on element pore or fiber sizes, design and construction, and actual operating conditions. These factors all influence pressure drop as well.

A ball valve, for example, would be an absolute "filter" no contaminants would get through! but pressure drop would be excessive (equal to the full compressor output pressure, since no air gets through, either). An empty filter housing

would have a low pressure drop, but efficiency would be low, too nearly all the contaminants would get through. Most filters, of course, fall somewhere between these extremes.

**Q. How can I tell when it's time to change the element?**

A. On the 810 Series filter a green/red differential pressure indicator is standard and tells when to change the element. For models 811 through 819, a "pop-up" pressure drop indicator changes from green to red to indicate when to change the element. For larger models, a gauge's pointer moves from green to red when an element change is due.

**Q. What is the recommended drain installation arrangement?**

A. The 810 Series filter has two sumps. The first one collects a large quantity of contaminants. Therefore, a Deltech automatic drain valve is recommended. The second sump collects only a small quantity of contaminants (coalesced oil). Manual draining is adequate, but a Deltech automatic drain valve installed with a dual port adapter can automatically drain both sumps.

**Q. How much oil carryover does the 810 Series filter allow?**

A. Oil carryover depends on the pressure and flow and on how much oil is in the inlet air. In a typical system, it can be less than 0.1 ppm of liquid oil.

**Q. Where should the filter be installed in relation to a refrigerated dryer?**

A. A refrigerated dryer will remove a considerable amount of oil and water from the air stream. Therefore, the filter should be installed downstream from the dryer, thus prolonging the life of the filter element.



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