

Coalescing Efficiency in Branded vs. Generic Replacement Filter Elements



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Not All Filters are Created Equal

Sacrificing Quality for Cost Savings - Is it Worth it?

High-efficiency coalescing filters are often specified when there is a need to protect sensitive equipment that is operated by compressed air. A high-efficiency coalescing filter can tame the effects of oil, water, and particulates that are present in virtually all compressed air supply lines. A high-quality coalescing filter element will typically have a rated filtration efficiency of somewhere 95% and 99.999+%. The required level of filtration efficiency is dependent upon the quality of the compressed air in the supply line, and the sensitivity of the equipment or process that is connected to the line. For example, when compressed air is used to propel paint to the surface of an automobile body, it is imperative that the

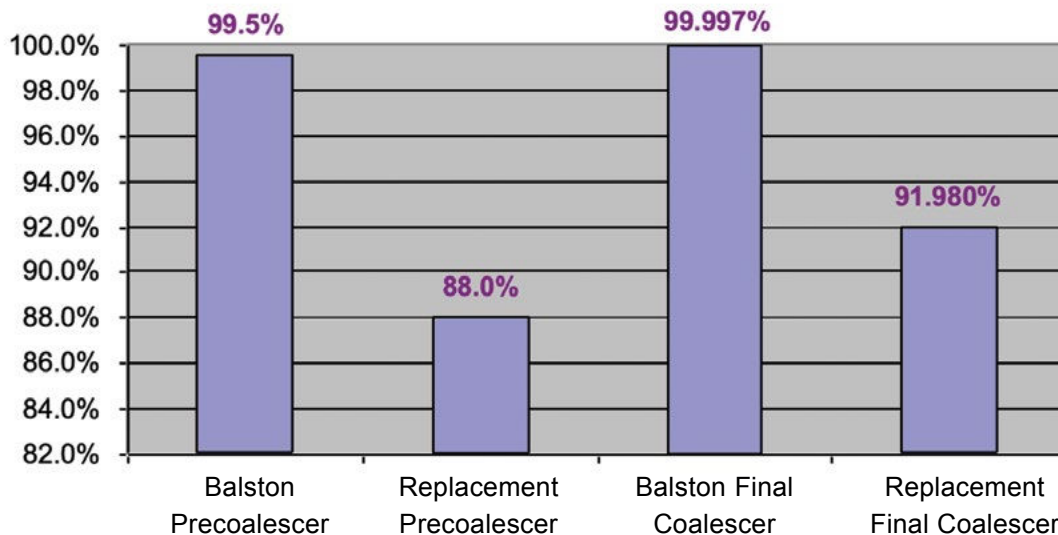
compressed air be as pure as possible in order to avoid defects in the painted surface. Therefore, coalescing filters with very high-efficiencies are often specified for critical applications.

Recently, a customer asked about the use of “non-branded” replacement filter elements, purchased from a retailer over the internet, to replace a coalescing filter element in a Parker Balston brand filter housing. According to the customer, the web site clearly stated that “All our replacements meet or exceed OEM specifications”, so the customer assumed that the performance of the replacement element would be as good as the performance of the Balston element. In order to answer his question, we decided to do some testing.

We ordered two different elements from the Parker Balston factory, and the same size and type non-branded replacement elements from an internet retailer that stated “All our replacements meet or exceed OEM specifications.” The coalescing testing was performed in an independent Parker testing facility, and the tests were carried out according to ISO-12500 part 1, an international standard that specifies how the testing of coalescing filters should be performed. All of the coalescing efficiency testing was done in one day, using the same test equipment, and all of the elements were tested using the same Parker Balston filter housing.

The graph shown below summarizes the results of the testing.

Fig. 1. Coalescing Efficiency



As you can see from the graph, the non-branded replacement filter elements did not meet or exceed the performance (or the specifications) of the Balston filter elements. In fact, the efficiency of the non-branded final coalescer was lower than the efficiency of the Balston precoalescer!

To put these efficiency numbers into perspective, let's look at the amount of oil carryover in a typical compressed air application. For these examples, we will assume that we have our filter installed on a compressed air line that is operating at a pressure of 100 PSIG, with an air flow rate of 100 SCFM, and an oil aerosol concentration of 10 ppm.

With no filtration, the amount of oil that is suspended in the compressed air amounts to 1.9 liquid ounces every 24

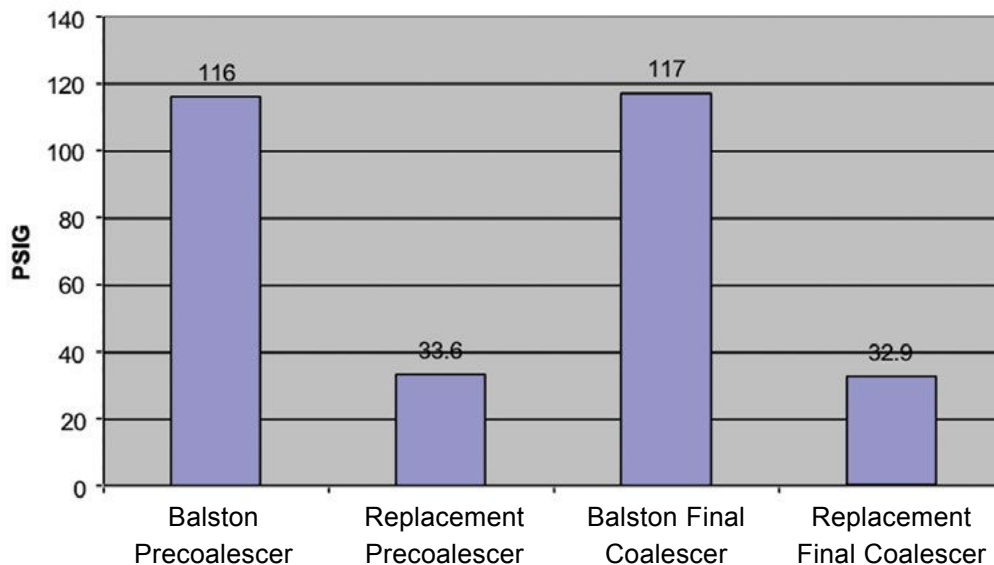
hours of operation. If we use the non-branded precoalescer, it would remove 88% of the oil, but 12% would continue downstream of the filter. In this case, at the rate of approximately **0.23 ounces every 24 hours**. This is two-thirds of a gallon over the course of just one year. If we were to use the Balston precoalescer, the amount of oil downstream of the filter element would be **0.0096 ounces every 24 hours**. This is only 3.5 ounces per year.

If we use the non-branded final coalescer, it would remove 91.98% of the oil, but 8.02% would continue downstream of the filter; in this case, approximately **0.15 ounces every 24 hours**. This is one half gallon over the course of just one year. If we were to use the Balston final coalescer, the amount of oil downstream would be

0.000058 ounces every 24 hours. This is less than 1/10th of an ounce per year.

Another important characteristic of a high-quality coalescing filter element is robustness. The filter element must be able to withstand the dynamic changes in pressure, temperature, and air flow that occur on a regular basis in a typical compressed air system. One measure of robustness is the pressure at which the filter element bursts, or fails to contain contaminants. Burst testing was performed on new, unused Parker Balston elements, and identical testing was performed on new, unused low cost "equivalent" replacement elements obtained from the internet retailer. *The results are shown in the graph below.*

Fig. 2. Burst Strength



The Parker Balston filter elements were able to contain the differential pressure generated by the test bench up to its capacity of 117 PSIG. The precoalescer filter element obtained from the internet retailer failed at 33.6 PSID, and the final coalescer element failed at 32.9 PSIG.

In a typical compressed air system that operates at 100 PSIG or higher, it is quite likely that the filter element will experience moments where the differential pressure will be greater than 34 PSIG. It is critical that the filter elements can withstand high differential pressure if they are to continuously protect sensitive equipment or vital processes downstream.

Although the web site clearly stated that “All our replacements meet or exceed OEM specifications”, it is obvious that the low-cost aftermarket elements do not perform at the same level as the original equipment Parker Balston filter elements.

When considering replacement elements for your high-efficiency coalescing filter applications it is important to realize the cost-of-poor filtration efficiency performance in terms of significant contamination being constantly introduced over time to the critical and sensitive end-use point.

In addition, the risk of filter element failure and the subsequent release of

filter element fragments, oil, water, rust and pipe scale downstream to the intended application will translate into far more costly problems such as machinery downtime, damaged instrumentation, product recalls, contaminated finished product and excessive maintenance and repairs.

The risks and costs associated with the use of non-branded filter element replacements far outweigh any savings realized on the purchase price.

Parker Balston filter elements provide consistent, high-efficiency filtration performance with the ability and robustness to hold up to the most aggressive compressed air systems.

