

ELEMENT LIFE

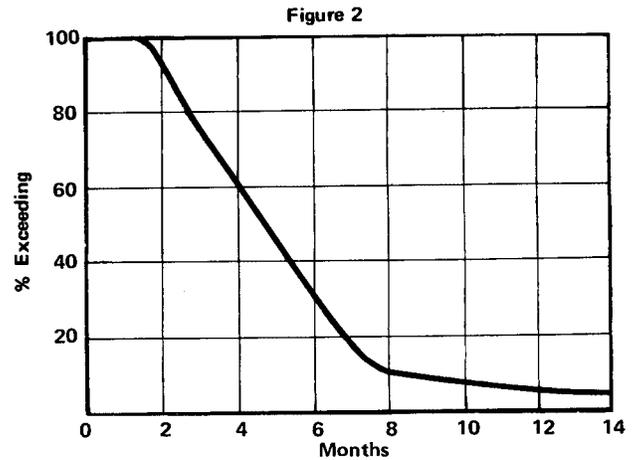
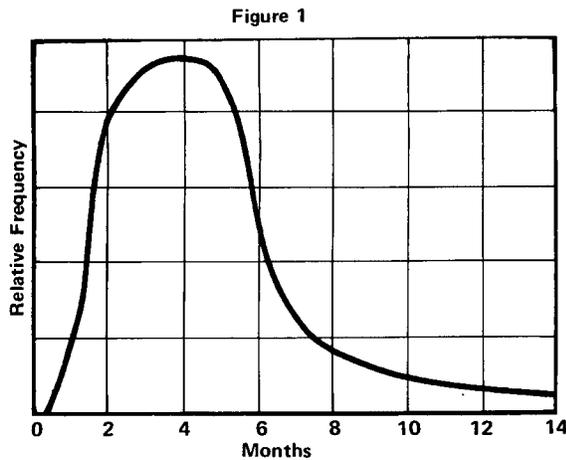
DELTECH COLOR CHANGE FILTERS

Probably the most frequently asked question about Deltech Filters is, "How long do the elements last before having to be replaced?" While it is difficult to estimate lifetime for any specific case, the range which may be expected is well known. The figures below, based on study of more than five hundred cases, show service life of elements actually experienced in field installations.

Figure 1 shows the frequency with which the lifetime of an element may be expected to occur. Element lifetimes shorter than one month occur infrequently. Most elements have a lifetime in the range of 2 to 5 months. Many exceed 5 months and some exceed one year. These data are based on filter applications involving steady-state flow conditions. For pulsed or intermittent flow conditions in which the filter undergoes periodic loading and unloading, element lifetime may be expected to vary from the distribution shown in Figure 1.

Figure 2 shows the same information in different form. This figure is read in the following manner: 98% of the filters give more than one month element life; 88% of the cases are longer than two months; 50% of the installations have element lifetimes more than four months; 26% are greater than six months; etc.

Generally speaking, an element life of three to four months might be reasonably expected, if the air is supplied by a reciprocating compressor. However, sliding vane and rotary screw compressors can have a high oil carryover, and shorter element life can be expected. In the case of a rotary screw compressor, the internal oil separator will prevent oil "slugs" from reaching the filter. If these separators fail, the filter will protect downstream equipment until the filter is saturated, or until the compressor shuts down on low oil pressure. However, element life can be very short.



WATER IN COMPRESSED AIR

Water is found in compressed air in two forms: entrained liquid water, and water vapor in a gas state which humidifies the air. The quantity of water which can exist in the stream as a true gas is determined by the temperature. Lowering the temperature will reduce the quantity of water which the air can hold and cause condensation, converting water vapor to entrained water droplets.

Water mist, made up of water droplets, is usually formed in the aftercooler by condensation. The water droplets are considerably larger (50 microns and up) than the small oil particles that are formed in high shear areas of a compressor (fast moving pistons and valves). They agglomerate readily to form still larger particles, while the much smaller oil particles tend to maintain their identity. Separation of water droplets from compressed air is much easier than the removal of oil mist.

An efficient filter, such as the Deltech filter, removes the condensed water droplets as well as scale, dirt, rust, water and oil mist that the air may have contained, but leaves the air saturated with water vapor. The Deltech filter is not a dryer. It does not reduce the dewpoint of air. *No filter is capable of removing water vapor which is in the true gas state.*

If the temperature of the filtered air is lowered even slightly, additional condensation will occur and additional moisture mist will form. This is not a result of filtration efficiencies, but because of the reduced vapor pressure of water at the lower temperature. The appearance of water mist in air, even after perfect filtration, must be expected whenever the air temperature is lower at the point of use than it was at the filter. Under

these circumstances, it is impossible to provide air, free of water mist, with filtration equipment.

Any reduction in air pressure after the filtration equipment will result in a state in which the compressed air is less than fully saturated with water. This is true even during adiabatic expansion, which will result in slight cooling of the air (Joule-Thomson effect). However, to prevent condensation, a large reduction in pressure is necessary to compensate for a relatively small reduction in temperature.

Where the use of the air requires that there be no water present, the air should be dried after compression. This can be accomplished only in dehydrating equipment.

PRESSURE DROP

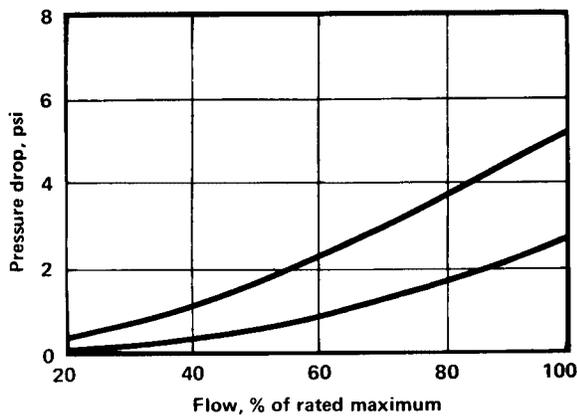
Pressure drop through Deltech Filters is given below not only for freshly installed elements but also at the maximum which is to be expected at any time during the life of the filter element. This is in contrast to the normal practice of stating pressure drop for a clean, newly installed element before it begins to plug with material removed from the air stream.

As oil is absorbed from the air stream the granular particles in the filter element swell slightly, restricting the free area and causing a small increase in pressure drop. This effect is shown by the width of the bands in the figures below. A fresh filter element will produce a pressure drop at the bottom of the range shown.

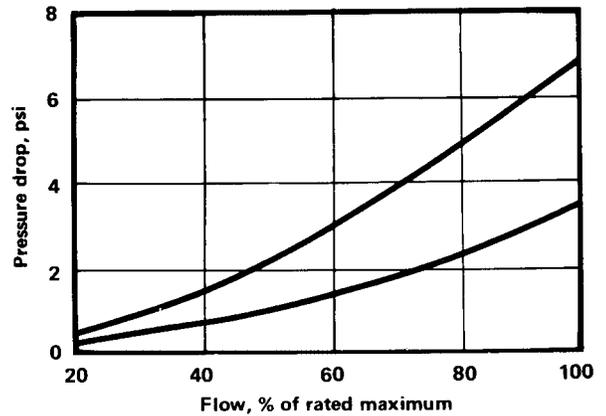
Note that the air flow is given as the percent of maximum rated flow at the operating pressure involved. Maximum flow ratings are given in sales bulletin.

These pressure drop figures include the total filter and are not significantly affected even if a reduction in pipe size should be required to adapt to the filter fittings. For example, flow of 650 CFM free air at 100 PSI through a Model 170R Deltech Filter is well within the recommended range. Although long piping systems for this service may use 6 inch or 8 inch pipe to avoid excessive pressure drop through the long piping, the air passages inside the filter are short. Reducing the pipe size to fit the 2 inch pipe connections in the filter gives perfectly satisfactory operation.

**All Models except
170R**



Model 170R



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