

# GENERAL PURPOSE FILTERS

## FILTER FUNCTION

General purpose compressed air filters remove water and particulate material from the air stream to protect downstream equipment from contamination. As air enters the filter, internal baffles create a swirling motion to the air so that entrained dirt and liquids are thrown against the sides of the filter bowl and then fall to the sump area at the bottom of the bowl.

Additional baffling keeps the air in the sump area relatively quiet; this ensures that the removed material is not returned to the air flow going to the filter element. The filter element will then collect smaller particles.

The most frequently used element in Master Pneumatic general purpose filters is rated at 5 µm, so that nearly all particles larger than 5 µm (*half the diameter of a human hair*) will be collected in the filter element.

## FILTER SELECTION

General purpose filter elements are available with 5-µm and 40-µm ratings; some units can also be provided with 20-µm-rated elements. The most efficient filter element is one selected by taking into consideration the dirtiness of the ambient air and the needed cleanliness of the air after filtration.

Some high-flow filters have 40-µm elements which are satisfactory for general piping. At point of use, and with smaller filters, the standard 5-µm element is most commonly used and recommended. See coalescing filters for finer filtration.

## GUIDE to GENERAL PURPOSE FILTERS

Filter Series	Modular Construction	Port Sizes								Pages	
		1/8	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2		2
<b>SENTRY</b> FD10 models †	yes	X	X								54-55
<b>MINIATURE</b> FD50 models	no	X	X								56-57
F50S stainless steel models	no		X								58-59
<b>GUARDSMAN</b> FD60 models	yes		X	X	X						60-61
<b>GUARDSMAN II</b> BFD70 models	yes		X	X	X						62-63
<b>Modular</b> F5A350 models	yes		X	X	X						64-65
<b>Full-Size VANGUARD</b> FD100 models	yes		X	X	X	X					66-67
<b>Full-Size SERIES 380</b> FD380 models	yes			X	X	X					68-69
<b>High-Flow VANGUARD</b> FD100, BFD100 models	no					X	X	X	X	X	70-71
BF6A400 models	no							X	X	X	74-75
BFD200 models	no					X	X	X	X		72-73 & 76-77

† Also available with quick-connect tube fittings up to 10 mm.

## FILTER MAINTENANCE

Filters must be attended to on a regular basis in order to rid them of water and other contaminants. The use of an automatic drain is highly recommended because it greatly reduces the need for frequent individual attention. This is especially important if access to the filter is difficult, because difficult access makes it much more likely that regular maintenance will be overlooked. If a filter is equipped with a manual drain, accumulated water must be removed regularly so that it does not clog the filter.

Pressure drop across filter elements increases as they continue to remove dirt from the air. They should be inspected on a regular basis, and replaced to restore full efficiency.

Under average conditions filter elements should be replaced each year.

## CARE OF PLASTIC BOWLS

Plastic bowls are made of high-strength polycarbonate, a very tough transparent material. Bowls are intended for use with compressed air, but can be adversely affected if contaminants such as alcohol or liquified petroleum gas are in the intake air. Some compressor oils, solvent fumes, and other substances can attack the bowl and lead to failure.

When a bowl is cleaned (by wiping inside and outside with a clean dry cloth) it should be inspected for cracks or scarring on the surface. If either condition occurs it is an indication that the ambient air contains harmful substances, and the bowl should be replaced, preferably with a metal bowl.

Just a few of the substances that can harm polycarbonate bowls are: acetone, ammonia, benzene, brake fluids, carbon disulfide, carbon tetrachloride, ethyl acetate, ethylene glycol, Freon, lacquer thinner, nitrocellulose lacquer, sodium hydroxide, toluene, turpentine, and many others.

Small bowls (i.e., Sentry and Miniature bowls) do not need bowl guards. However, metal shatterguards are supplied with larger bowls and must always be used.

Never use polycarbonate bowls at temperatures above 125°F (52°C) or pressures above 150 psig (10 bar). For conditions exceeding these limits use metal bowls.

## BOWL DRAINS

Manual drains are the simplest bowl drains, but they require frequent attention to rid the bowl of accumulated water and dirt particles. If a filter is located where it is difficult to access, it might not be drained as often as it should be. For this reason, and to save a lot of maintenance manpower, automatic drains (see next page) are standard equipment and provide a cost-effective way to maximize filter performance and reduce maintenance.

Tube-Away kits (see **ACCESSORIES**) supply tubing for **VANGUARD** filters with automatic drains to carry water and dirt to a suitable drainage outlet.

**HYDRO-JECTOR** external drains (see next page) for **SERIES 380** and **VANGUARD** filters are for use wherever severe condensate problems exist. They operate automatically whenever liquid in the bowl raises the float activating the drain.

The **WARRIOR** drain (see **ACCESSORIES**) is electronically controlled, and allows filter draining to occur at specific intervals and for specific lengths of time.

## IMPORTANT NOTE

Before inspecting or servicing a filter (or any other pneumatic component) be sure that the pneumatic pressure to the component is shut off and exhausted, and cannot be inadvertently turned on.

# BOWL DRAINS

## MANUAL DRAIN

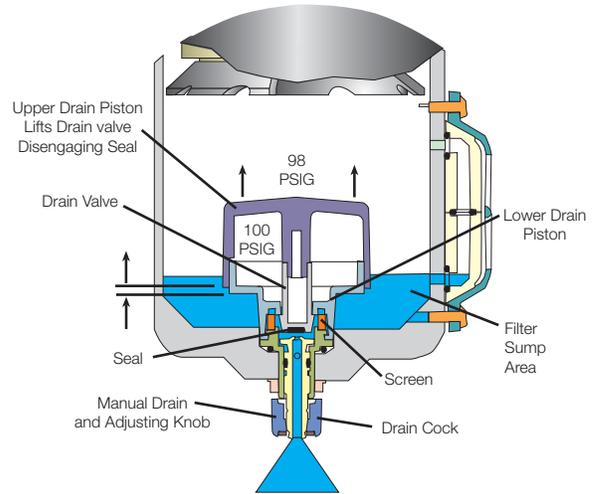
Manual drains are the simplest bowl drains, but they require frequent attention to rid the bowl of accumulated water and dirt particles. If a filter is located where it is difficult to access, it might not be drained as often as it should be. For this reason, and to save a lot of maintenance manpower, automatic drains are the standard equipment and provide a cost effective way to maximize filter performance and reduce maintenance.



Tube-Away kits supply tubing for filters with automatic drains to carry water and dirt to a suitable drainage outlet.

External drains for filters are used for use wherever severe condensate problems exist. They operate automatically whenever liquid in the bowl raises the float activating the drain.

automatic drain to expel accumulated liquid. The drain activates whenever the air supply is shut down and exhausted. An adjusting knob at the bottom of the filter on all products (except sentry and miniature series) can be set for sensitivity



## INTERNAL AUTOMATIC DRAIN

Manual draining is often inconvenient, and overlooked. Manual drains require frequent attention to rid the bowl of accumulated water and dirt particles. If a filter is located where it is difficult to access, it might not be drained as often as it should be. Automatic drains are standard on M/P Filters (D option), and we strongly recommend their use to improve filter effectiveness, lengthen service life, and reduce maintenance needs.



The automatic drain operates when liquids have accumulated in the filter bowl and a pressure drop of 2 psi (0.14 bar) or more occurs (e.g., when a valve or other device downstream is actuated). The pressure drop triggers the

## INTERNAL FLOAT DRAIN

Float drains are used as an alternative for continuous flow applications where pressure drop might only occur at the start of the duty cycle. When liquid is present the float will rise and the bowl will empty.

**Operating pressure:** 200 psig (13.8 bar) maximum and 30 psig (2.1 bar) minimum.

Internal float drain is available with plastic or brass drain stem.



## HYDRO-JECTOR EXTERNAL DRAINS

**HYDRO-JECTOR** drains are for use with the **SERIES 380** and **VANGUARD** filters wherever severe condensate problems exist. They can also be used to drain water separators, drip legs, and compressor receiver tanks. They operate with continuous, intermittent, or no air flow, and drain only when liquids are present.

Discharge rate is 300 gallons (1135 liters) per hour at 100 psig (6.9 bar). Flushing action is instantaneous with minimal air

loss compared to conventional drains. There is a manual override on the drain valve for clean-out and emergency use. **HYDRO-JECTOR** drains are available with 1/8 or 1/4 nipples. The 1/4 size is used with **SERIES 380** and **VANGUARD** filters.

The **HYDRO-JECTOR** is not recommended where heavy oil or foam is present, as can be the case in separators or large after-coolers.



**Model Shown:** E100-2

## A COST-EFFECTIVE SOLUTION TO THE REMOVAL OF WATER FROM A COMPRESSED AIR SYSTEM

Compressing ambient air to 100 psig creates air temperatures as high as 360°F (182°C) in the compressor cylinders. Typically, at this high temperature and with an air compressor rated at 450 scfm (210 l/s), the amount of water vapor generated will convert to 3.5 gallons (13 liters) of water for each hour of operation.

The hot air will be 100% saturated with water vapor, i.e., at its dew point. Even the smallest reduction in temperature will result in a “rain storm” within the compressed air system, and liquid water will accumulate. This water must be removed before it finds its way downstream where it can do considerable damage.

**VANGUARD** or **SERIES 380** heavy-duty filters paired with **HYDRO-JECTOR** drains provide a low-cost, and ef-

fective means for draining water from the system before it can do harm. Smaller plants, those with 100 to 500 scfm compressors, will find this an especially economical way to cope with the water problem.

**FILTER/HYDRO-JECTOR Installation:** The **VANGUARD** and **SERIES 380** filters must be ordered with the option designated “**LDC**”. This option removes the drain cock, and replaces it with a 1/4” threaded adapter. This will then receive the **HYDRO-JECTOR** drain which has a rubber spacer that goes between the filter and the drain.

See the sample compressor circuit below to see how the filter and **HYDRO-JECTOR** drains are used.

### TYPICAL COMPRESSOR CIRCUIT EMPLOYING HYDRO-JECTOR DRAINS

