

Phoenix

Pneumatic Phoenix



Electro-Pneumatic Phoenix



The Phoenix is the most advanced, automatic, non-disposable liquid filtration system. The patented design allows for 24/7 uninterrupted operation. The Phoenix is designed to handle flow rates from 40 gpm to 250 gpm with the lowest installed footprint. Duplex and triplex Phoenix arrangements allow for even higher flows.

Phoenix	Precision Absolute Gap							
Design Flowrate	20 μ	35 μ	50 μ	75 μ	100 μ	150 μ	200 μ	400 μ
	60 gpm	100 gpm	135 gpm	150 gpm	180 gpm	180 gpm	180 gpm	180 gpm

NOTES:

1. **The design flowrate is a GUIDELINE based upon a clean differential pressure of 2 psi or less. The solids loading in the feed stream can also impact the design flowrate. MAXIMUM flowrates are documented in the Product Specification Sheets.**
2. Backwash Volume: < 5 gallons
3. Based on "663" V-Coil filter elements

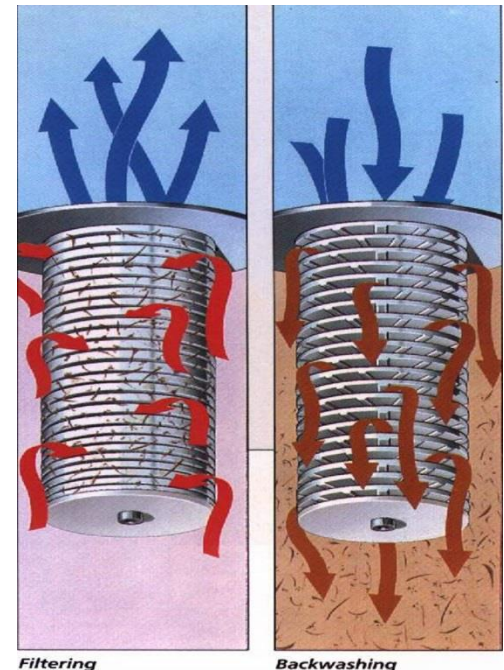
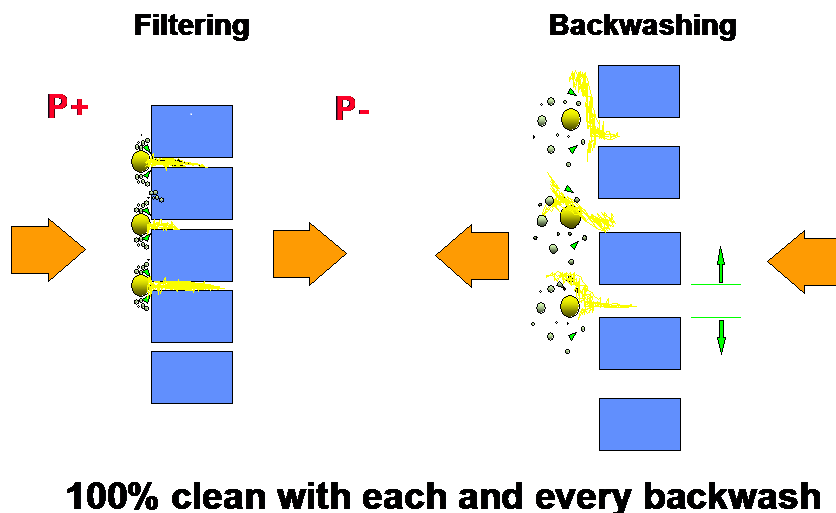
The standard Phoenix is fabricated from 304 stainless steel and engineered plastics. It is fully compatible with a wide range of liquids and operating conditions up to 190°F and 120 psi. The Phoenix is also available in 316 stainless steel and Super Duplex when more corrosion resistance is required. The standard filter element is fabricated from 316 stainless steel. For additional corrosion resistance, ZGF can provide also provide elements fabricated from super duplex and Inconel.

There are three models, Electric, Electro-Pneumatic and Pneumatic. Your choice depends upon site and process conditions. The backwash of the Phoenix is accomplished by rotating a polyacetal "shoe" on the diverting valve, powered by either a 24 VDC motor/gearbox assembly (Electric / Electro-Pneumatic) or a pneumatic actuator indexing a pair of dog clutches (Pneumatic). The controls are either contained within the filter for compactness (Electric / Electro-Pneumatic) or in a wall mounted NEMA enclosure for hazardous, wet and hot applications (Pneumatic). Both control packages provide alarm condition / feedback. The Phoenix features three modes of backwash control - automatic based on differential pressure or time, and manual override.

The compact (18 in³), economical design utilizes six (6) patented ZG variable coil ("V-Coil") filter elements arranged in a radial configuration around the inlet chamber. The V-Coil permanent media filter element is a coil wound with a variable pitch that allows the filter element to open evenly from top to bottom ensuring that all contaminants are completely removed from the filter element with each and every backwash. The V-Coil filter element is manufactured with precision raised nidges. These nidges create an absolute gap that allow the V-Coil to capture > 99% of spherical particles larger than the micron rating of the filter.

A normal coil does not open evenly from top to bottom. The full opening of the V-Coil allows lodged or wedged particles to be easily removed as the gap is increased. While in backwash, the fluid flowing in the reverse direction causes the coil to shimmer which further enhances the cleaning capability of the backwash process. The backwash is:

- ✓ Quick - 2 to 4 seconds per filter element
(Phoenix: 15 second complete backwash cycle, includes dwell time between individual filter element backwashes.)
- ✓ Efficient - <1 gallon per filter element (Phoenix: < 5 gallons for the complete backwash cycle)
- ✓ Effective - 100% clean along the entire length of the filter element with each and every backwash



The ability of the V-Coil filter element to open uniformly along its entire length during backwash provides three distinct benefits not achievable by auto-backflushing filters with fixed geometric screens (i.e. wedge wire, etc.). The benefits are as follows:

1. Particles wedged or lodged are quickly released and washed away as the gap is increased.
2. Fluid flowing in the reverse direction causes the coils of the filter element to "shimmer" which further enhances the cleaning process.
3. The moment the filter element begins to open during backwash, the fluid velocity is instantaneously increased and subsequently followed by a surge in flow that scours the coil effectively and efficiently removing the contaminants.

Phoenix – Basic Description & Operation

Below is a basic description of operation for the pneumatic Phoenix. The “basic” operation of the electro-pneumatic Phoenix is similar. However, the drive mechanism for the indexer differs.

The filter contains six (6) pods in a radial design around an inlet chamber with a filter element in each pod. Liquid enters the Phoenix via a 3” inlet on the bottom of the filter and is then diverted to enter each of the six pods/filter elements. The entry to each pod is on a tangent, which produces a centrifugal action within each pod allowing the heavier particles to remain in suspension while the filter elements remove the finer particles. This allows the filter to accommodate heavier particle loading than would otherwise be possible. In filter mode, the fluid flow is from outside the element to the inside. The filtered liquid from each pod/filter is then joined in a common doughnut shaped chamber, situated on the top of the Phoenix filter and exits via the 3” flange on the side of the filter.

A pressure transducer is fitted on common inlet and outlet of the Phoenix. The inlet and outlet pressure are continuously monitored. The Phoenix will initiate an automatic backwash sequence once the differential pressure reaches a predetermined set point established by the user.

Each Phoenix filter has two pneumatic actuators. On top of the Phoenix filter is a pneumatic ‘Indexer’, which rotates the filter’s internal diverting valve through the 360 degree, 7-position backwash process. (The filter has 6 filter element positions and 1 home position). A small proximity switch located in the top of the filter tells the control system that the backwash cycle has been completed and stops any further advancing of the indexer. Fitted on the backwash outlet is a pneumatically operated $\frac{3}{4}$ ” backwash valve. This valve opens and closes six times throughout the backwash process, once for each element, thereby allowing uninterrupted flow during the backwash process.

During backwash, the pneumatic indexer advances and moves the internal diverting valve 51° ($360/7$) so that the ‘shoe’ is positioned over the inlet to pod 1, thereby shutting off its inlet. After a pause of 0.5 seconds, the pneumatic backwash valve opens. By opening the backwash valve to atmosphere, a portion of clean filtered liquid is allowed to travel in a reverse direction from the inside to the outside of the filter element. This reverse supply of clean liquid will cause the filter element to open along its entire length while ‘shimmering’ at the same time. The combination of the filter element opening and ‘shimmering’ allows for a very quick and efficient backwash.

In this way, all debris is removed from the outside of the filter element, even debris that may be lodged on the surface of the filter element. The result is a very efficient backwash with very little fluid required. The backwash sequence to clean each pod is normally 2 seconds (adjustable depending on system pressure and contaminant). When one pod has been backwashed, the next pod is then selected and so on until all six pods have been backwashed. Once the backwash has been completed, the filter will return to its clean differential pressure every time.

Simplicity, consistency, reliability, and lowest cost of ownership make the Phoenix an ideal answer for many filtration applications!

Features & Benefits

- Full 1-year warranty on filter assembly and 5-year warranty on filter elements → **reduces operating and maintenance costs.**
- Precision engineered absolute gap → **ensures consistent and efficient particle capture and removal from the process (*captures and removes >99% of spherical particles equal to or larger than the precision machined filter element gap*).**
- Fully automatic, self-cleaning operation → **requires no manual intervention freeing up labor for other value-added plant services.**
- Uninterrupted flow even during backwash → **24 hour / 7 day operation, eliminates downtime and allows for optimized operational productivity.**
- The V-Coil filter element is a coil wound with a variable pitch → **allows the filter element to open evenly from top to bottom and shimmer during backwash ensuring that all contaminants are completely cleaned off the filter element with every backwash.**
- Compact design → **saves valuable floor space.**
- Low energy requirement → **reduces load on plant utilities and lowers operating costs.**
- Efficient and environmentally responsible design → **uses <0.75 % of total feed volume for backwash.**
- Permanent media filter elements (316 stainless steel, Inconel/Super Duplex) → **do not require replacement thereby reducing labor and disposal costs, and increasing productivity**
- Minimal moving parts through simplicity of design → **increases reliability thereby reducing maintenance and operating costs.**

ALL OF THE ABOVE = BEST AVAILABLE & MOST ENVIRONMENTALLY RESPONSIBLE TECHNOLOGY AND LOWEST 10 YR LIFECYCLE COST IN THE INDUSTRY

THE ANNUAL TOTAL COST FOR A PHOENIX IS <\$2,000 / YEAR, INCLUDING:

- **ANNUALIZED CAPITAL COST & REFURBISHMENT AFTER 10 YRS**
- **OPERATING COSTS – COMPRESSED AIR & ELECTRICITY (<\$50 / YR)**
- **SPARE PARTS (<\$100 / YR)**
- **MAINTENANCE – LABOR FOR SEMI-ANNUAL INSPECTION (<\$200 / YR)**

ANNUAL O & M COST → <\$350 / YR