ZGF EZ Clean EZ100
Product Data Sheet
with Description and Operation

The Most Advanced, Automatic, Non-Disposable Liquid Filtration System

ZERO GRAVITY FILTERS

The Most Advanced, Automatic, Non-Disposable Liquid Filtration System
Performance, Simplicity, Consistency, Reliability and the Lowest Cost of Ownership

The EZ100's modular "pod" design can meet any flow requirement from 1 gpm to over 100 gpm.

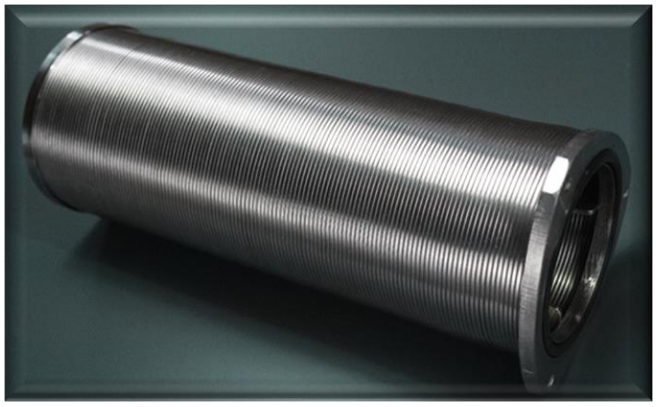
The EZ100 liquid filtration system can be manufactured to ASME Section VIII standards to meet all design and manufacturing requirements for the oil & gas industry or any other application requiring pressure vessel certification.

The design allows for 24/7 uninterrupted operation.

The standard EZ100 is a non-code system fabricated from 304 stainless steel. ZGF can also provide the pods and manifolds in 316 stainless steel and Super Duplex.

The EZ100 features three modes of backwash control - automatic based on differential pressure or time, and manual override.

Each EZ100 Pod includes (1) ZGF Spring Filter element. The proprietary, non-disposable, absolute gap filter elements are available in micron ratings ranging from 20 – 400 micron and are guaranteed for 5-years!



The ZGF Spring Filter element to opens uniformly along its entire length during backwash. The benefits are as follows:

1. Particles wedged or lodged are quickly released and washed away as the gap is increased.
2. The Spring filter element "shimmers" 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.

EZ100	Precision Absolute Gap							
Design Flowrate per Pod	20 µ	35 µ	50 µ	75 µ	100 µ	150 µ	200 µ	400 µ
	10 gpm	15 gpm	20 gpm	22 gpm	28 gpm	28 gpm	28 gpm	28 gpm

NOTES:

1. ***The design flowrate is a GUIDELINE based upon a clean differential pressure of 2.5 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*: ~1 gallon per Pod**
3. *Based on "663" Spring Filter elements.*
4. *The solids loading, physical characteristics, material and density of the particles impact system sizing / design flowrate. 500 ppm is typical maximum loading for ZGF EZ Clean filtration systems utilizing the proprietary ZGF Spring Filter elements.*
5. *Designed for continuous service up to 190°F and pressures from 45 - 192 psi.*

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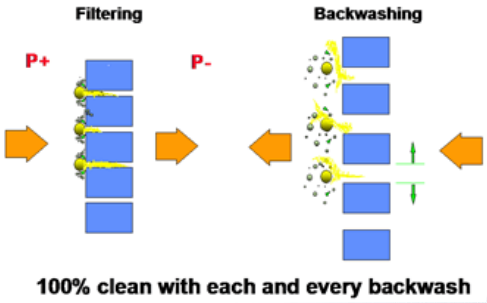
ZGF EZ100 filters provide value in several industries including Automotive, Steel, Power Generation, Food Processing, Pulp & Paper, HVAC, and Oil & Gas. EZ100 systems are ideal for filtering oil & gas field fluids such as flowback / produced water. These systems are also used to filter machining coolant, wash solutions, process / cooling water, wastewater, white water, surface water and many other aqueous fluids.

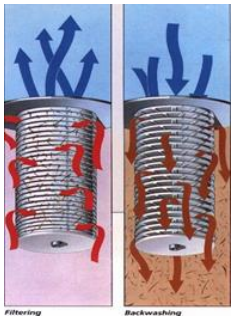
EZ100 FEATURE	YOUR BENEFIT
Full 1-year warranty on Phoenix filter assembly & 5-year warranty on Spring Filter elements	Peace of mind, Reduced operating and maintenance costs
Fully automatic, self-cleaning operation	Reduced maintenance and operating costs, Labor is now available for other value-added plant services
ZGF Spring Filter - precision engineered "Absolute Gap" manufactured to Aerospace specifications	Consistent and efficient particle capture & removal, Improved quality and lower operating costs
ZGF Spring Filter element "Continuous Coil wound with a Variable Pitch"	All contaminants are cleaned off the filter element during the backwash cycle, Consistent & reliable performance
Uninterrupted flow, even during backwash (with 3 or more pods)	24-hour / 7-day operation, eliminates downtime, allows for optimized operational productivity
Consistent and reliable performance	Improved quality and lower operating costs
In-line design	Eliminates need for additional pumps, motors and controls reducing maintenance and operating costs
Modular design	Easily configured to fit available space, Easy to expand
Low energy requirement	It uses less energy than a light bulb. Economically and environmentally responsible
Efficient and environmentally responsible design	Creates no additional waste (i.e. no disposable media, no packaging). It uses less energy than a light bulb.
Secondary batch processing system (Green Screen)	Allows for recovery of valuable process fluids and reduces waste. Reduced operating costs.
Permanent media (i.e. non-disposable) filter elements (316 Stainless Steel, Inconel/Super Duplex)	Replacement not required, No waste, No disposal, Improved Productivity
Minimal moving parts through simplicity of design	Increased reliability, Reduced maintenance and operating costs



100% clean with each and every backwash

ZGF Phoenix Backwash

- ✓ Quick: 3 to 4 seconds per filter element
- ✓ Efficient: <1 gallon per filter element
- ✓ Effective: 100% clean with each backwash



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EZ100, 3 or more pods – Basic Description & Operation

1. Each pod will hold one (1) filter element.
2. Each pod will have a 1” inlet and outlet connection, as well as a 1” backwash port.
3. Each pod will have a 1” pneumatically actuated, 3-way ball valve at the pod inlet on the bottom of the pod.
4. The pods will be connected to common inlet and outlet manifolds. Manifold size will be determined based upon flowrate and established/accepted design velocities, and/or customer specifications.
5. Each pods’ backwash will be connected to a common backwash manifold.
6. A pressure transducer is fitted on the common inlet and outlet manifolds. The inlet and outlet pressures are continuously monitored. The EZ100 will initiate an automatic backwash sequence once the differential pressure reaches a predetermined set point established by the user.

Filter Mode:

1. Liquid enters the EZ100 through the inlet manifold and then to each of the pods via their 1” inlets, which are fitted with a 3-way ball valve at the bottom of the pod.
2. Fluid flows from the bottom of the pod to the top and from outside of the element to the inside.
3. All debris is kept to the outside of the filter elements while the clean water is discharged from the top of each pod via their 1” outlets.
4. The common outlet manifold then joins the clean discharge from each pod.
5. The inlet and outlet pressure are continuously monitored by the ZGF control system.
6. The EZ100 will continue to operate in Filter Mode until a Backwash is initiated

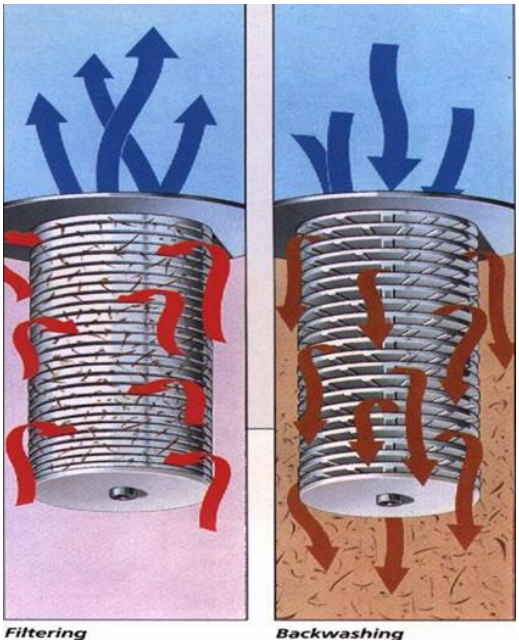
Backwash Mode:

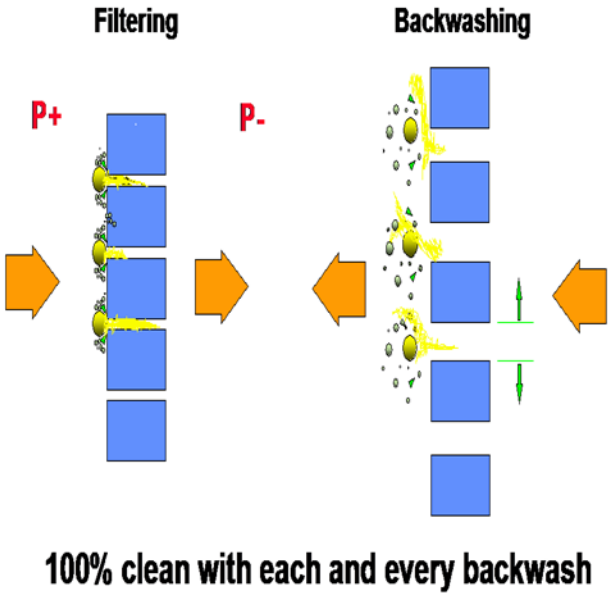
1. The backwash cycle can be initiated 3 ways:
   - ✓ differential pressure (user-defined set-point)
   - ✓ time interval (user-defined)
   - ✓ manual initiation
2. Once initiated, the filter will complete a self-cleaning operation called a backwash. This backwash operation is designed to clean all the pods in sequence while still maintaining flow of clean liquid to the downstream process

Backwash Sequence:

1. Once initiated, the 3-way ball valve fitted at the bottom of Pod 1 cycles / rotates. The 1" inlet port closes while simultaneously opening the 1' backwash port. The backwash port is now open to atmosphere (i.e. no backpressure).
2. With the majority of the clean, filtered fluid flowing to the process / operation, a small portion of the clean, filtered solution is directed through Pod 1 in a reverse flow direction. The reverse flow of liquid opens the Spring Filter element along its entire length and causes the coil to shimmer. The opening of the gap combined with the shimmering of the coil (i.e., shaking effect) allows for complete removal of all the debris that was trapped by the filter.
3. The backwash valve is fitted immediately below the pod to enable the debris to be removed as efficiently and effectively as possible
4. This backwash process takes approximately 3-4 seconds to clean each Spring Filter element. Once the first pod is cleaned, the 3-way valve rotates to the filter position and all other pods are cleaned sequentially following the same procedure.
5. During the backwash process, there is uninterrupted flow of filtered water / fluid to the process / operation.

During backwash, 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 an effective (*clean element*) and efficient (*minimal backwash volume*) backwash. Once the backwash has been completed, the filter will return to its clean differential pressure each time. ***Each EZ100 pod uses ~1 gallon of fluid per backwash. The minimum backwash flowrate / volume requirement for a single pod (i.e. Spring Filter element) is 5.0 gpm / 0.5 gallon***





Controls

The EZ100 is monitored and controlled by means of a ZGF Printed Circuit Board control system.

Control system features include the following.

1. NEMA 4 steel control enclosure painted ZGF Blue.
2. Parker air solenoid valves
3. A solid-state, proprietary ZGF printed circuit board (PCB) controller
4. The ZGF PCB control system is equipped with enclosure door mounted touch pad user interface and LED display allowing for operator interface without opening the enclosure. The ZGF PCB control system has the following features and capabilities.
   - ✓ Displays system and alarm conditions
   - ✓ Allows for adjustment of designated program variables (i.e. backwash differential pressure set-point, backwash duration, etc.)
   - ✓ Allows for manual initiation of the backwash cycle
5. LED lights on the touch pad display system condition (power on, alarm condition, backwash)
   - ✓ GREEN lamp - indicates that the 110 VAC electrical supply is connected
   - ✓ BLUE lamp - indicates that a backwash cycle is in progress
   - ✓ RED lamp - indicates an alarm condition (high differential pressure, loss of pressure transducer input signal)

The standard control package includes the following:

a) Manual backwash (i.e. “clean” button - used to manually initiate a backwash.

b) Backwash duration timer - length of time in seconds for backwashing each pod.

c) Backwash interval timer - maximum length of time before the filter will initiate a backwash.

d) Backwash set point adjustment - the differential pressure at which the filter will backwash.

e) High set point adjustment – the differential pressure at which the filter will provide alarm indication that there is an excessive differential pressure across the filter.

f) Backwash counter - non-reset counter that is incremented at completion of each backwash.

g) The controls are housed in a painted steel enclosure rated to NEMA 4.

h) Air solenoid valves situated in the control panel or mounted to the frame for operation of the pneumatically actuated butterfly valves.

i) Two stainless steel wetted pressure transducers provide the inlet and outlet pressure data. The pressure differential is calculated by the ZGF PCB controller. The backwash set-point will be the differential at which the filter will initiate a backwash. The high set point will signal an alarm condition.

j) Two pressure gauges are fitted to monitor the filter’s performance.

EZ100 – Standard Materials of Construction

Component	Materials of Construction
Spring Filter Element	316 Stainless Steel
Spring Filter Pod / Cage	304 Stainless Steel
Manifolds (pipe & fittings)	304 Stainless Steel
Valves (wetted – disc & stem)	Stainless Steel
Valve Seats / O-Rings	Buna or Viton
Frame	Stainless Steel
Control Enclosure	NEMA 4 (painted steel, ZGF Blue)