



JONELL SYSTEMS™

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# PROGUARD

## AUTOMATED BACKWASH TECHNOLOGY

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Making the world safer, healthier and more productive®



**JONELL** SYSTEMS™  
Filtration Group®

# PROGUARD - AUTOMATED BACKWASH TECHNOLOGY

The ProGuard automatic backflushing filter is specifically designed for the robust requirements of refinery streams for catalyst bed protection.

It is important to remove particulate from the hydrotreater and hydrocracker feeds to protect the catalyst bed in the reactors and maintain the run life on catalyst beds at minimal cost.

For refineries to take advantage of opportunity crudes, the design of the filtration solutions needs to consider the higher variability in contaminants and the importance of optimized filtration systems cannot be overstated.

The ProGuard solution is designed to stand "Guard" and protect the catalyst beds. The solution can be tailored to the needs of the plant to suit the specific application.

Tubular backwashable filters are designed to remove solids from liquids by capturing solids on a permanent reusable filter element. At a predetermined pressure differential, the system reverses flow through each filter element in the system, one element at a time, while the other elements continue filtering to provide continuous operation.



## BACKWASH TECHNOLOGY COMPARISON

Jonell Systems refinery feed filter systems have been installed in over 250 refineries worldwide.

	CARTRIDGE BASED SOLUTION	4000 SERIES PROGUARD	FR SERIES PROGUARD
<b>Solution details</b>	<ul style="list-style-type: none"> <li>· Low solids loading</li> <li>· Less than 450F</li> <li>· Suitable for solids removal</li> <li>· Versatile filtration capability</li> </ul>	<ul style="list-style-type: none"> <li>· Low moderate solids loading</li> <li>· Up to 750F</li> <li>· Multiple backwash medium options (stream and liquid) for efficient contaminant removal</li> </ul>	<ul style="list-style-type: none"> <li>· Low to high solids loading</li> <li>· Up to 500F</li> <li>· Versatile technology with wide application range</li> </ul>
<b>Typical applications</b>	Hydrotreating and Hydrocracking feed up to 450F except high temperature Gas Oil feed	Hydrotreating & hydrocracking for: <ul style="list-style-type: none"> <li>· Resid</li> <li>· Gas oil</li> <li>· Heavy coker Gas oil product</li> </ul>	Hydrotreating and hydrocracking feed up to 500F. Coke Cutting Water, plant process and cooling water
<b>Footprint</b>	Small footprint	Large footprint	Medium footprint
<b>Maintenance</b>	Regular filter change outs based on dP	Periodic external cleaning of wedge wire filters. Half yearly valve maintenance	Half yearly inspection and replacement of filter media on site
<b>Operating cost</b>	No recycle	Less than 2% recycle feed	Less than 0.1% recycle feed
<b>Capital cost</b>	Low	High	Moderate

# PROGUARD 4000 SERIES



## 4000 SERIES

4000 series tubular backwash filter systems provide cost effective continuous protection for catalytic reactors. These filter systems are designed for high temperature, high pressure critical refinery applications where low maintenance, continuous operations are a necessity.

Tubular backwash systems are specified by process licensors for feed stocks such as gas oil, coker gas oil and heavy resids. Additional applications of the 4000 series filters include clarification of a broad range of distillates, amine, glycol, synthetic heating oils and finished products. The 4000 series filter is usually custom designed by engineering specifications. Each filter system can be modified to accommodate special components and accessories, to meet plant design standards or other customer requirements.

FEATURES	BENEFITS	ADVANTAGE
<b>Rugged filter media</b>	<ul style="list-style-type: none"> <li>· Suitable for multiple applications</li> <li>· Longevity of solution</li> <li>· Multiple backwash medium options</li> </ul>	Suitable for high temperature applications
<b>Multiple backwash medium alternatives</b>	<ul style="list-style-type: none"> <li>· Upset condition management</li> <li>· Ability to handle variable contaminant loads</li> </ul>	Operational flexibility
<b>Modular design</b>	Standardized components	<ul style="list-style-type: none"> <li>· Lower capital cost</li> <li>· Low cost of maintenance</li> </ul>
<b>Ability to customize design</b>	<ul style="list-style-type: none"> <li>· Designed to meet local design standards</li> <li>· Ability to meet site specific requirements</li> <li>· No "special tools or parts"</li> </ul>	<ul style="list-style-type: none"> <li>· Globally available</li> <li>· Easier maintenance</li> </ul>
<b>High temperature</b>	Ability to handle feeds up to 750F	Greater flexibility of operation and location



# PROGUARD 4000 SERIES

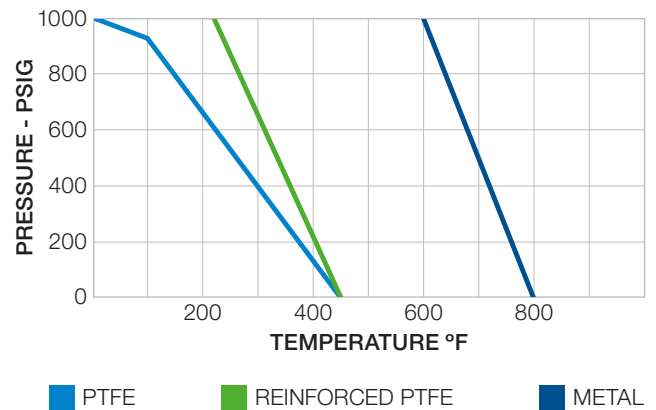
## TECHNICAL DATA

The 4000 Series filtration systems are designed for up to ANSI Class 900 pressures and temperatures and feature carbon steel construction as standard. Other materials, such as stainless steel or other special alloys, are available. The inlet and outlet headers come in 4, 6, 8 and 10 inch pipe sizes to handle specific flow rate requirements. The filter and backwash flow are controlled by flanged-end ball valves with seal materials designed to be compatible with the temperature requirements.

The 4000 series uses commercially available ball valves with a flanged-end design and utilizes gland type stem seals for ease of maintenance and leak prevention over the life of the valve.

The valve brand can be recommended by ProGuard or may be entirely specified by the customer to provide compatibility with the customer's existing spare parts inventory.

Valve Temperature vs. Pressure Rating chart



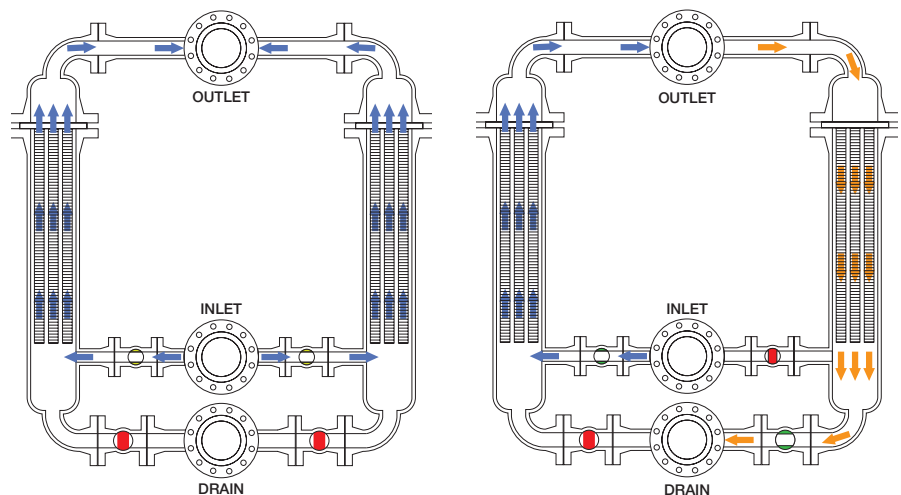
## OPERATING PRINCIPLE

The ProGuard 4000 series filtration system is a:

- self-contained, fully- assembled filter consisting of individual filter tubes with elements manifolded in parallel to common inlet, outlet and drain headers for either internal or external backwash.
- Pressurized fluid, from the outlet header or introduced through a connected backwash supply header, flows in reverse through the individual filter elements, which carries the collected contaminants to the drain.

The ProGuard 4000 series filtration system:

- features a maintenance free, programmable logic controller (PLC).
- The PLC allows backwash at a predetermined time or differential pressure. The PLC can also be interfaced from one filter bank to the next in large filtration systems so that only one start signal is required to clean the whole system.
- The flexibility of the PLC allows for additional process monitoring functions not available with conventional electrical or pneumatic control systems.
- The backwash cycle is always accomplished with the system online, allowing continuous operation during cleaning and maintenance.
- The controller also allows for manual override to facilitate troubleshooting or maintenance and it can be interfaced with the plant or process controller. The PLC can also be recommended by ProGuard or specified by the customer to help make program changes or upgrades less costly.





## FR SERIES PROGUARD

Used in hydrocarbon refining, process water and coke cutting water, the ProGuard FR provides high filtration efficiency with large filter surface area from pleated mesh filter elements, continuous filtration with automatic self-cleaning and low backflush rates.

Wedge wire elements are also available.

This modular design to accommodate wide range of process flow rates is built to ASME Code, Section VIII, Division 1 with optional CE or CRN certification available.

FEATURES	BENEFITS	ADVANTAGE
<b>Focused backwash</b>	<ul style="list-style-type: none"> <li>· Low backwash consumption</li> <li>· Increased backwash efficiency</li> <li>· Minimized reprocessing</li> <li>· Continuous operation</li> </ul>	<ul style="list-style-type: none"> <li>· Less maintenance and longer run times leading to greater throughput</li> </ul>
<b>Multilayer pleated mesh filter media</b>	<ul style="list-style-type: none"> <li>· High percentage open area</li> <li>· High removal efficiency</li> </ul>	<ul style="list-style-type: none"> <li>· Lower cost</li> <li>· Smaller footprint</li> </ul>
<b>Modular design</b>	<ul style="list-style-type: none"> <li>· Smaller footprint</li> <li>· Standardized components</li> </ul>	<ul style="list-style-type: none"> <li>· Lower capital cost</li> <li>· Low cost of maintenance</li> </ul>
<b>Ability to customize design</b>	<ul style="list-style-type: none"> <li>· Designed to meet local design standards</li> <li>· Ability to meet site specific requirements</li> <li>· No "special tools or parts"</li> </ul>	<ul style="list-style-type: none"> <li>· Globally available</li> <li>· Easier maintenance</li> </ul>
<b>Unique filter basket design</b>	Easily replaceable pleated mesh	On-site maintenance

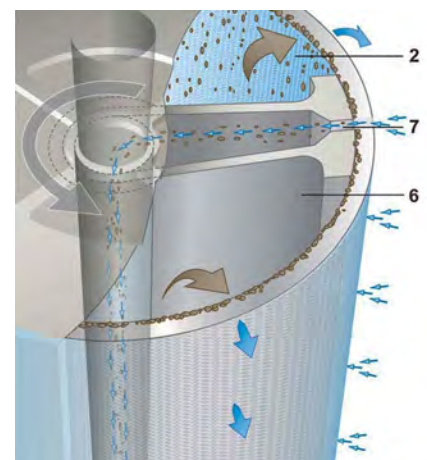
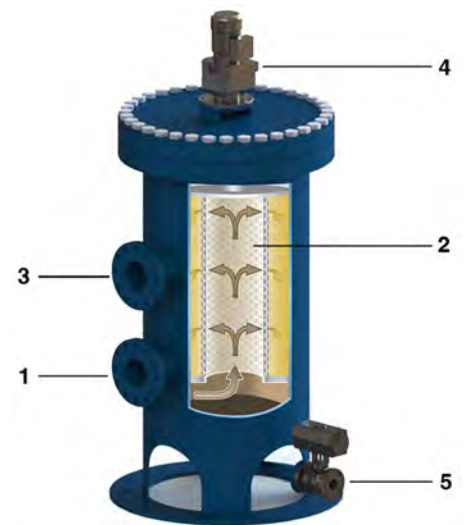
# PROGUARD FR SERIES

## TECHNICAL DATA

SPECIFICATIONS	
Connection	ANSI 4" to ANSI 6"
Flange	150# & 300# ANSI B16.5
Material	316 Stainless Steel Carbon Steel
Std. max. operating pressure	350 psi
Std. max. operating temp.	450 °F
Filter element	Screen basket with pleated wire cloth or optional wedge wire
Filter rating	25 to 1000 µm absolute
Code Standards (optional)	ASME Section VIII, Div. 1 CE, CRN

## OPERATING PRINCIPLE

- The medium being filtered flows via the inlet nozzle (1) into the filter housing and into the filter insert, which is open at the bottom (2). The medium passes through the filter element from the inside to the outside. During this process, contaminants are trapped on the inner side of the wire cloth.
- The filter housing contains a filter element with pleated wire cloth through which the medium flows and where contaminants are trapped (2).
- The fully automatic backflush process starts when a defined differential pressure is reached or after a pre-set time interval. In order for the backflushing process to be efficient, there must be an operating overpressure on the outlet side (clean side) of the filter (3).
- When the differential pressure or the pre-set time interval triggers an automatic backflush process, the flush valve (5) opens and the gear motor (4) starts to turn the flushing nozzle (6), which is located in the filter element. Thereby the whole filter surface (2) passes the flushing nozzle.
- The process medium that has already been filtered flows at high speed in the opposite direction through the vertical slot (7), which is located directly on the filter element. The trapped contaminants (7) are discharged from the system via the flush pipe.
- The flush valve closes again when the filter element has been turned approximately 400°, so that the backflush process is completed in only a few seconds.
- Operation is not interrupted during the cleaning cycle.





## We take our responsibility in partnering our customers seriously

Our decades of field experience is supported by in house lab testing facilities to analyze feeds, spent cartridges and more to accurately identify existing issues and propose the right solution for the filtration & process challenge.

Jonell Systems has field tried & tested solutions that can be rapidly customized using standard parts to build the appropriate solution needed for the specific refinery process with in house engineering and manufacturing.

Jonell Systems has solved many refinery challenges by applying innovation in the field on the use of standard filtration solutions including using backwashable systems and cartridge based solutions together to solve feed filtration challenges.

## Get in touch to discuss your filtration challenge today!



### Engineering Services

- Process Design Consultation/Optimization
- 
- Existing Vessel Evaluation
- 
- Feed Study
- 
- New Vessel Design



### Field Services

- Element Change Out Assistance
- 
- Process Observation / Optimization
- 
- Field Support for Lab Services On-Site Training
- 
- Trouble Shooting



### Lab Services

- Dissection & Particle Distribution Analysis
- 
- Quality Assurance
- 
- Compatibility & Efficiency Testing
- 
- Contaminant Characterization
- 
- Fluid Quantification
- 
- Vessel Re-purposing



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