



RPA Process Technologies

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RPA Process Technologies

Knowledge. Experience. Vision.

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Filtration solutions for the petroleum industry



RPA Process Technologies — **increase productivity, improve profitability, reduce maintenance**

Whether you're working upstream at the drilling site, in a refinery, or downstream in a petrochemical plant, RPA Process Technologies has a solution for the industry's widest range of applications.

With installations in over 500 of the world's leading oil, gas, chemical and petrochemical facilities, no one knows more about liquid filtration than RPA Process Technologies. We can help make your process more reliable, more efficient, and more effective.

Look beyond the obvious solution to engineer the optimum solution

We strive to understand more than just filtration — we want to know your entire process. This enables us to help



you realize enhanced system efficiency and product

quality improvements through proper filtration.

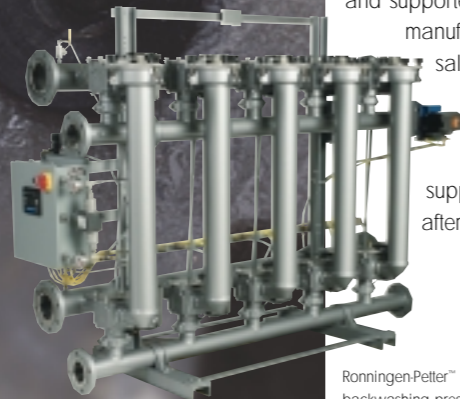
Fit the filter to your application

RPA Process Technologies builds the industry's most comprehensive range of petroleum filters — we sell what you need, not just what we have.

Our product families include backwashing pressure filters, mechanically cleaned filters, and bag/cartridge filters — all with added-value design features. And if that's not enough, we can fabricate almost any filter imaginable to develop the exact system your application demands.

Global power, local attention

RPA Process Technologies systems are manufactured, sold, operated and supported worldwide. With manufacturing, engineering, sales and service facilities around the world, we're always nearby to provide responsive support — before and after the sale.



Ronningen-Petter™ F-Series backwashing pressure filter system

Why do you need effective filtration?

Properly designed and implemented filtration will help achieve your overall production and business goals by ensuring your processes operate reliably and efficiently. By removing contaminants, protecting valuable process fluids, and providing a more clean, consistent flow of fluids in your plant, filtration can deliver tremendous return on investment. Some specific benefits of effective filtration include:

Protection of critical systems — without filtration, harmful contaminants (like pipe scale, corrosion products, heavy metals and sand) can damage or block expensive systems in your production field, refinery or petrochemical plant.

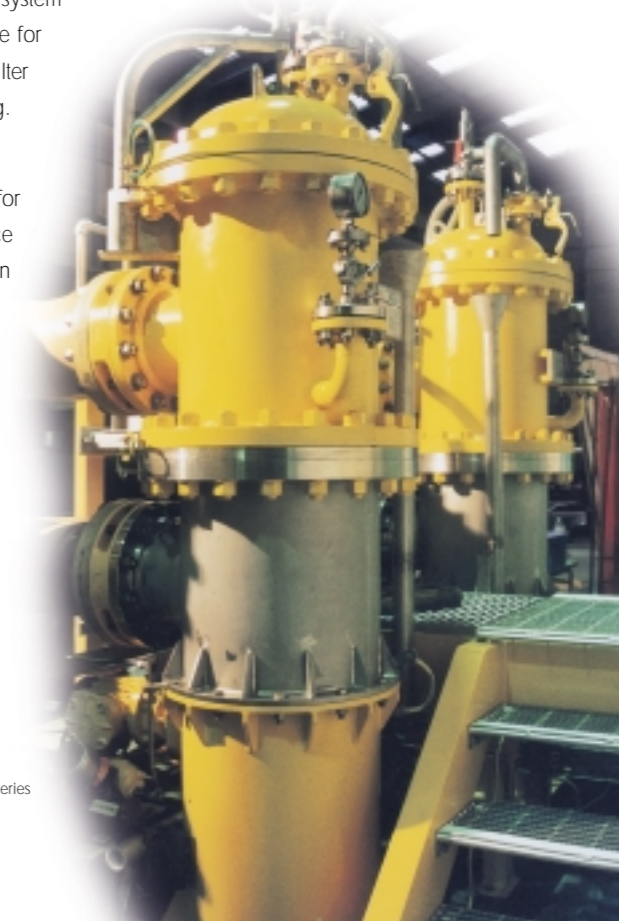
Increased uptime — with a properly designed filtration solution, system downtime can be reduced or eliminated. This is especially true for protection of critical refinery catalyst beds. Our self-cleaning filter designs remain on-stream while a filter element is regenerating.

Improved operator safety — many of the process elements in petroleum processing are dangerous to personnel. Any need for operator intervention increases this risk. With our clean-in-place and high-capacity filter systems, the need for operator attention is significantly reduced or eliminated.

Retention of valuable product — with effective filtration, contaminants are efficiently removed from a wide range of process liquids and finished products. For example, in a gas plant, proper filtration recovers expensive amines. With an RPA Process Technologies cleanable media filtration system, you only dispose of contaminants — not valuable product.



Ronningen-Petter CERTASEAL® multi-bag filter system



Fitres Philippe VWS-Series backwashing strainer

Petroleum refining — more solutions, more expertise

In the refinery, hydroprocessing fixed-bed catalytic reactors, acid gas treatment, and fluidized catalytic cracker operations are among the key areas that benefit from an RPA Process Technologies filtration solution.

Protection and production

At almost any point in your refinery, effective, efficient filtration can deliver tremendous benefits — including longer equipment life, reduced downtime, improved safety, and protection of costly process materials. With installations in many of the world's leading refineries, we bring the benefit of experience to your facility. And we understand the needs of your application — so our solutions meet your business goals and deliver rapid return on your investment.

Fixed-bed reactor catalyst protection for feedstocks

Catalysts, many containing noble metals, can cost millions of dollars for each reactor bed. Contaminants enter the reactor, where they deposit on the upper layers of the catalyst — interfering with the reaction rate and causing plugging, excessive differential pressure and poor feed distribution. Lack of effective feedstock filtration results in downtime, costly premature catalyst scraping or change-out, and lost production.

Ronningen-Petter REACTOGARD® — the original self-cleaning filter system for fixed-bed reactor catalyst protection. REACTOGARD

is engineered to maximize production and lower operating costs by extending reactor catalyst life and minimizing product loss. REACTOGARD systems feature a modular, expandable design that eliminates the need for redundant vessel systems. With effective filtration in the feedstream prior to the hydroprocessing reactor, turnaround time on the reactor will be dictated by catalyst reactivity, not by

pressure drop from contaminants. RPA Process Technologies also understands the intricacies of liquid filtration, including cake formation and the effect that flux rate, fluid viscosity, and temperature have on your system's filter efficiency and process performance.

The patented **ACCUFLUX®** media used in our backwashing pressure filter systems, including REACTOGARD, provide the key to more consistent separation and higher efficiency. ACCUFLUX media combine filtration efficiency and cleaning ease for unbeatable performance at retentions as small as 2 microns. The unique ACCUFLUX element design increases surface area dramatically, without increasing overall filter size.



Amine filtration

Solids build-up (such as pipe scale, rust, iron sulfide and sand) in closed-loop amine systems will foul flash drums, heat exchangers, strippers, re-boilers and carbon filters. These solids can also attract hydrocarbons, which cause system foaming. Proper filtration (both full-flow and slipstream) will protect your investment, extend equipment life, and maximize gas recovery.

Bag and cartridge filter systems —

RPA Process Technologies bag and cartridge filters are ideal for critical fine filtration requiring absolute ratings. Available in single- and multi-element configurations, these cost-effective systems provide greater dirt-holding capacity than conventional disposable media for longer run time and reduced changeout demands.

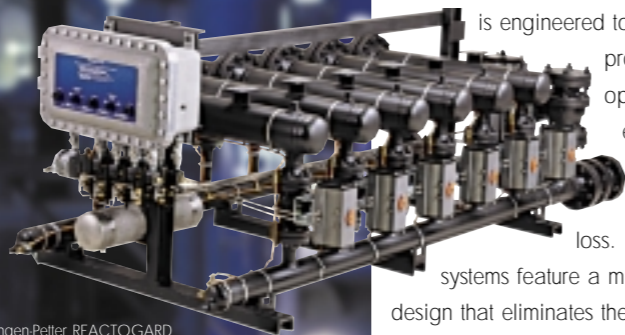
A range of other applications

In addition to catalyst protection and amine filtration, a wide range of other areas of your refinery can benefit from effective filtration. Some key applications include:

- Cooling water filtration
- Final product guard filtration
- Slurry oil filtration
- Catalyst recovery
- Seal & lube oil
- Glycol

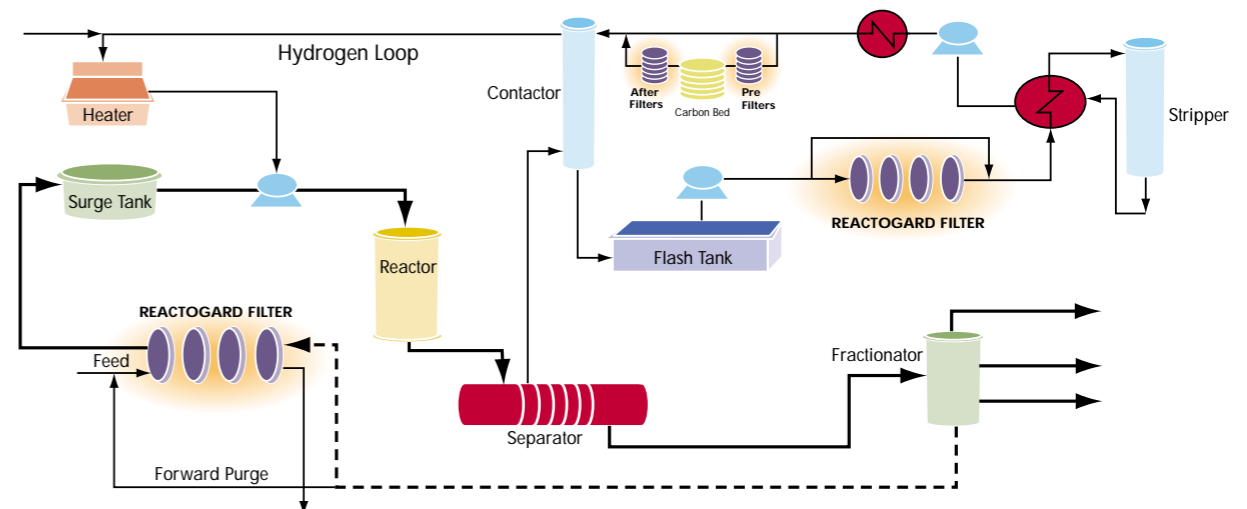


Ronningen-Petter MAXLOAD® cartridge filter system



Ronningen-Petter REACTOGARD backwashing pressure filter system

Refinery Flow Diagram



Production field and petrochemical advantages upstream and downstream processing —

Whether preventing plugging of the strata at a drilling site or providing final product filtration in a petrochemical plant, an RPA Process Technologies filtration solution will improve the efficiency, reliability, and safety of your extraction site or petrochemical processing location. Hundreds of the world's leading processors count on our filtration systems every day in locations around the globe — on-shore and off-shore.

The best filtration method for your process and business demands

A core philosophy at RPA Process Technologies is an emphasis on the use of cleanable media. Cleanable media increase productivity, reduce operator intervention, and eliminate media handling and disposal costs. For applications where cleanable media are not appropriate, our best-in-class cartridge and bag filter systems deliver reliable, cost-effective performance.

Experience in the production field

RPA Process Technologies provides a broad spectrum of filtration systems for applications upstream from the injection pump. By effectively using filtration, you can prevent lost production due to plugging of the strata. Key applications include:

- Deep-well injection
- Seawater injection
- Produced water
- CO₂ injection
- Chemical flooding

Ronningen-Petter AFR-Series backwashing pressure filter —

a unique, expandable circular design for increased capacity in a compact one-square-meter footprint. The AFR-Series is ideal for high volume, low viscosity applications with retentions as low as 2 microns.



Ronningen-Petter AFR-Series backwashing pressure filter system

Fillres Philippe VWS-Series backwashing pressure filter — for high-volume removal of solids from source water, the VWS-Series is capable of flow rates up to 22,000 gpm/4,997 m³/hr in a single unit (with the capability of multiplexing). The VWS-Series is capable of retentions from 100 to 2,000 microns in a compact configuration.

Petrochemical processing filtration

We're experienced in dozens of applications in petrochemical plants around the world. Some specific processes include:

- Water treatment
- Monomer and polymer production
- Lube and grease production
- Final product protection and guard

Ronningen-Petter F-Series backwashing pressure filter — for continuous, high-flow service and solids removal from 1 to 1,700 microns, our compact F-Series systems are ideal. The modular, scalable design of the F-Series enables easy reconfiguration as your process needs change.

Ronningen-Petter DCF mechanically cleaned filter —

an innovative, proven design that's especially well-suited to petrochemical processing. DCF systems ensure low waste volumes and unattended operation with expensive high-viscosity products such as monomers and polymers. These systems are capable of retentions as low as 25 microns.



Ronningen-Petter DCF-1600 Twin mechanically cleaned filter system

The RPA Process Technologies difference

Support — before and after the sale

At RPA Process Technologies, we understand the meaning of partnership. That's why we provide the industry's best, most knowledgeable support for our products. It begins with expert consultation to help optimize your filter system. Then we make sure your system is properly delivered, installed and commissioned. And, our knowledgeable application engineers are always available to ensure your system is performing at peak efficiency — or simply to answer your operational questions.

Engineering know-how — from simple components to total turnkey solutions

Experienced engineers in facilities worldwide enable us to develop the right filtration solution for your needs. As your process and business needs change, we can also provide engineering support to ensure your filtration solution remains appropriate.

Constructed to the highest standards by the best people

Our team has tremendous experience with building products to the world's most demanding standards — including ASME, TUV, CODAP, CE, CRN, CSA, NEC, CENELEC and others. Core staff expertise in advanced fabrication methods ensures an exceptional product that's built to last. All of our manufacturing facilities are also ISO-certified to further ensure a quality product.

Comprehensive test and analysis services

We take application engineering beyond computer simulation models and beta tests to offer real-world testing. We can perform extensive lab-based testing, including particulate size distribution and total solids analysis, to help recommend the right filtration solution. We also operate portable full-scale test modules for on-site testing. Using your process fluids in our filtration, we measure results and quantify payback — in fact, we're the only filtration system manufacturer to offer this service.