



June 12, 2015

Dear Valuable Customer:

Pentair Filtration Solutions, LLC and Norspec Filtration LTD are pleased to announce a supply/distribution partnership for the Eastern Canada region. The strategic alliance will provide enhanced customer service, rapid technical support, and superior sourcing options for further reducing operational expenditures, lead times and supply costs, while simultaneously increasing plant process efficiencies. With decades of filtration experience, Pentair Filtration Solutions and Norspec are proven solutions providers within the oil, gas and chemical industry.

The Pentair/Norspec team would like to ensure a seamless transition of your procurement requirements and request that all filtration orders be placed with Norspec starting June 14, 2015. Please feel free to contact Pentair or Norspec Filtration (contact information below) for any questions or concerns.

Best regards,

A handwritten signature in black ink that reads "Leontina Tompea".

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SAFETY // SUSTAINABILITY // SAVINGS

SEPARATION ANXIETY?

YOU CAN RELAX

Pentair designs and manufactures advanced technologies for the high performance separation of liquids, solids, and gases from process streams.



www.pentairseparations.com
(936) 788-1000



@PentairEnergy

OBJECTIVE

OPTIMIZE THE PLANT AND THE PROCESS

Our objective is to partner with our clients to enhance safety, sustainability and savings by optimizing the performance and throughput of a plant or process.

Understanding Precedes Solutions

We provide separations solutions with the aim of overall process optimization. Through effective contaminant control, we look to optimize plant throughput and profitability while minimizing ongoing operating costs and, in the case of plant expansions or de-bottlenecking, minimization or elimination of capital equipment costs. Our solutions are also designed to reduce both operator and maintenance requirements as well as the generation of waste associated with separations.

INDUSTRIES

SERVING THE OIL & GAS INDUSTRY FOR OVER 25 YEARS



APPLICATIONS & TECHNOLOGIES

CONTAMINATION OUT. EFFICIENCY UP. COSTS DOWN.

APPLICATIONS

Produced Water
(Onshore and Offshore)
Salt Water Disposal
Inlet Gas Separation
Lube Oil Systems
Glycol Dehydration
Frac Fluid Clean Up
Deep Well
NGLs / Fractionation
BTX

Ethylene
Coatings
Silicones
Specialties

Hydroprocessing
Amine Systems
Alkylation
Fuels/Custody Transfer
Fuel Gas
Sour Water
Reforming
UDEX / Solfulane

Steam Turbines
Gear Boxes
Power Transmission
Combustion Turbines
Renewable Energies



TECHNOLOGIES

ULTISEP®

Liquid-Aerosols
from Gases

HRT®

Hydrocarbon Recovery
Technology

LIQUISEP®

Liquid-Liquid
Separations

POLAREX®

Extractive
Separations

PROCESSOR®

Particle-Liquid
Separations

INTERSEP®

Particle Gas
Separations

HIGH PERFORMANCE TECHNOLOGIES CONTAMINATION OUT. EFFICIENCY UP. COSTS DOWN.

ULTISEP® Liquid-Aerosols from Gases

UltiSep® sets a new standard in high-performance gas/liquid separation. UltiSep® utilizes Pentair's proprietary microfiber media technology and APEX® element design. These technologies are applied for high efficiency bulk liquid and aerosol removal from process streams. APEX® technology affords the user an unprecedented ability to reduce liquid carryover and pressure drop while providing smaller footprints and lower capital costs. UltiSep® housing configurations are designed via the use of Computational Fluid Dynamics (CFD) and other proprietary computer models that ensure accurate and complimentary design in conjunction with APEX®. The implementation of these technologies offers the ideal business model for value added and optimized systems.

UltiSep® offers the ability to maximize operational profitability by minimizing entrained liquids in process gas streams. Eliminating liquid and solid carry-over minimizes process upsets and the corresponding issues associated with them, such as; product loss, fluid make-up, off-spec products, contamination in feed streams entering processes, emulsions, foaming, fouling, corrosion and mechanical wear.

UltiSep® allows the removal of liquids ranging from bulk fluids to entrained droplets as small as a viral particle, improving operational efficiency and profitability.



HRT® Hydrocarbon Recovery Technology

HRT® provides petroleum producers, refiners and gas processors dramatically improved **solids control and hydrocarbon recovery** from process water and produced water streams relative to what is achievable by conventional solutions like residence tanks, separators, hydrocyclones, walnut shell filters, or IGF/DAF.

Residence tanks are ineffective at separating emulsified hydrocarbon from aqueous streams, allowing essentially all dispersed hydrocarbon to pass through. Likewise, conventional methods such as walnut shell filters or induced gas / dissolved air flotation (IGF or DAF) are limited to applications with less than 200-300 ppm oil and under the best of circumstances are typically 90% - 95% effective.

HRT® removes solids as fine as 1/2 micron to 99.98% efficiency if desired and intercepts and recovers even stable emulsified hydrocarbons, allowing essentially zero free hydrocarbons to pass through. Consequently, HRT® provides vast improvements in the treated water quality attainable in various produced or process water systems.



HIGH PERFORMANCE TECHNOLOGIES

CONTAMINATION OUT. EFFICIENCY UP. COSTS DOWN.

LIQUISEP® Liquid-Liquid Separations

LiquiSep® technology was developed to address the inherent deficiencies of conventional coalescers, making it possible to remove essentially all immiscible water dispersions from hydrocarbon process streams. It overcomes the limitations of conventional separators, vane pack coalescers, wire mesh coalescers and even “high efficiency” mesh pads and filter separators, achieving superior separations under demanding conditions.

LiquiSep® makes use of proprietary media and our APEX® element design to intercept entrained droplets of even sub-micron geometries and effectively remove them from the process. The high-surface energy media effectively disrupts the stabilized water droplets, allowing for efficient capture. Additionally, the fiber geometries are specifically designed to promote accumulation and removal of free water from the process stream. The APEX element design works in concert with the media technology promoting uniform fluid flow, while minimizing the potential for turbulence and high fluid velocities which might interfere with water removal from the process stream.

LiquiSep® protects critical assets from water contamination and the salts, acids and bases which it may contain. The application of LiquiSep® allows optimized performance of downstream treaters, salt beds, exchangers and reactors while assuring the elimination of haze from finished products.

POLAREX® Extractive Separations

Polarex® technology provides chemical manufacturers, refiners and gas processors dramatically improved separation of entrained and dissolved contaminants relative to that achievable through implementation of conventional water wash or solvent scrubbing towers. Conventional approaches to washing or scrubbing are often limited by contact efficiency and subsequent separation efficiency, resulting in limited performance and large capital investments. The Polarex® platform was developed utilizing our advanced micro and nano-fiber technology to create a single stage, highefficiency, structured contactor / separator.

The patented Polarex® technology may be applied to the extraction of soluble components from either liquid or gas process streams. It has application to both contaminant removal (e.g. - caustic, dissolved acids, salts, acid gases or reaction by-products) as well as recovery of valuable products or solvents (e.g. - recover soluble amines from treated LPG) for as little as 20% of the capital associated with a conventional wash system.

Applied to batch chemical processes, Polarex® increases process speed and operational flexibility. Traditional approaches to neutralization or product washing require a lengthy neutralization or wash step followed by decanting and transfer. Not only do these steps slow reactor turn over, they also frequently result in carry over of salts and impurities due to the limited separation effectiveness of decanting, particularly with emulsified product / water mixtures. Polarex® allows neutralization or washing to proceed on-line during product transfer, allowing the wash / decant steps to be eliminated entirely.



HIGH PERFORMANCE TECHNOLOGIES

CONTAMINATION OUT. EFFICIENCY UP. COSTS DOWN.

PROCESSOR® Particle-Liquid Separations

ProcessOR® provides high performance solid-liquid separation. Solid contaminants range from sub-micron particulates as small as viruses to particles several hundred microns in size. The liquids range from aqueous to hydrocarbon systems with viscosities up to 60,000 cP. Pentair's solid-liquid technology have been applied in refineries, gas processing plants, chemical plants, and power plants around the world.

You may choose to **upgrade your existing filter vessel** (see next page) to our COMPAX® coreless element technology, which is featured in the above mentioned ProcessOR®. The element consists of two parts: the COMPAX® coreless element and the reusable core. The reusable core is semi-permanently installed into the existing filter vessel **without the need for special tools**. After installation of the cores, the open end of the COMPAX cartridge slides down over the length of the core and engages a positive sealing O-ring to integrally seal the filter and core together. The reusable cores have standard collapse ratings of 75 or 150 psi, depending on the series and material of construction. Higher collapse ratings are available upon request. COMPAX® coreless filters are available with a broad range of media types and micron ratings to match requirements of the application.



INTERSEP® Particle-Gas Separations

The InterSep® high performance separation system is designed and manufactured to separate particulate contaminants from natural gas/vapor streams. It utilizes a Hybrid™ media composed primarily of inorganic microfibers bonded with proprietary epoxy binder. With a media efficiency of 99.99% @ 0.9 micron, you are sure to reduce your operational costs and enhance safety and sustainability measures. Recommended change out is 25 PSID maximum.



RENTAL SKIDS

ALL THE BENEFITS, QUICKLY

RENTAL SKIDS & VESSELS

The performance of Pentair's technology with a preferred means of acquiring the equipment, through renting a self-contained skid. When there is a need for an immediate solution, renting is an ideal solution. Vessels available include:

PROCESSOR®	Particle-Liquid Separations
LIQUISEP®	Liquid-Liquid Separations
ULTISEP®	Liquid-Aerosols from Gases
HRT®	Hydrocarbon Recovery Technology
INTERSEP®	Particle Gas Separations
POLAREX® -	Extractive Separations



FILTER UPGRADES

NEX-SYS™ VESSEL RE-ENGINEERING

The Nex-Sys™ Vessel Re-Engineering Program allows us to adapt existing filter vessel to utilize our high performance coreless element technologies. Each system is designed to address the specific operational and mechanical constraints of the facility.

Some examples where upgrades have been done include:

- String-Wound Cartridge Upgrade: Selexol System
- Cartridge Upgrade: Rich MDEA System
- Sour Water Filter Upgrade
- Ethylene Feed Filter Upgrade
- Stacked Disk Filter Upgrade: Silicones
- Natural Gas Processing: Filter / Separator Upgrade

Conventional filter systems can prove to be laborious during change outs, have high change out frequencies and carry significant disposal volumes and costs. An optimized system achieves maximum utility at minimal investment in manpower.



ADVANCING THE SCIENCE OF SEPARATION

S.T.A.R. LABS

Pentair's STAR Labs, which stands for Scientific Testing Analysis and Research, is staffed with Ph.D scientists and engineers who are constantly innovating, creating unmatched value for our clients.

From research and development to client sampling, we work to achieve real world advances, like APEX®, a technology specifically intended to keep annular velocities constant across the entire height of the element.

Our client's critical processes and optimization are at the forefront of what we do. It's why, with that focus for more than 25 years, we have been able to lower their capital and operational costs, as well as enhance their safety and sustainability efforts.

Our aggressive research and development efforts are supported by our lab, which is equipped with the most advanced scientific instruments for the development, testing and certification of filtration products and filter media.

We use state of the art equipment to develop and refine filter media, membranes and optimize the characteristics of a particular medium, device or system for individual applications. From concept to production, STAR™ Labs is an integral part of our business. It creates the mold of partnerships with our clients by being able test, analyze and research their critical products and processes.



TECHNICAL EXPERTS

THE HEART OF WHAT WE DO AND WHO WE ARE

STAR Labs

- Chemical Engineers
- PhD Chemists
- Lab Technicians



Systems Apps Team

- Mechanical Designers
- Skid Layout
- Process Engineers



Nex-Sys Upgrade Team

- Application Engineers
- Application Specialists
- On-site Technicians

