

Refineries: Application Focus

Hydroprocessing

Ensure your hydroprocessing reliably supports your daily production quotas and environmental protection needs.

Process Description

Hydroprocessing covers a range of catalytic processes including hydrotreating and hydrocracking for removal of sulfur, oxygen, nitrogen and metals. The process is critical in the production of low sulfur fuels to reduce emissions, as removing the S reduces SO_x emissions when fuels are combusted. Sulfur also poisons downstream noble metal reformer catalysts and must be removed (<0.5 ppm S is a typical naphtha feed spec). This “clean-up” also saturates olefins to yield easier-to-process intermediates.

The reaction is carried out in a hydrogen rich environment over a fixed catalyst bed. The process replaces sulfur or nitrogen contaminants in the hydrocarbon chains with hydrogen, making the process a consumer of hydrogen. Protection of the catalyst beds from fouling is critical to maintaining long term hydrotreating efficiency.

Treated products are then stabilized with heat to remove H₂S and light ends. Use of direct steam injection is common, especially on diesel.

Refinery Needs

- Achieve production quotas of low sulfur gasolines and diesels via reliable hydrotreatment of straight run and cracked products that otherwise become a bottleneck
- Provide consistent “clear and bright” transportation fuel quality
- Protect against downtime from fouling of the feed/effluent heat exchanger
- Protect against downtime from catalyst bed ΔP rise
- Protect against downtime from premature loss of catalyst activity
- Meet steadily increasing clean fuels specifications
- Reduce hazy product issues and high salt costs from overloaded downstream salt beds
- Achieve dryness specifications downstream of vacuum dryers and avoid dryer bottlenecks due to excessive water



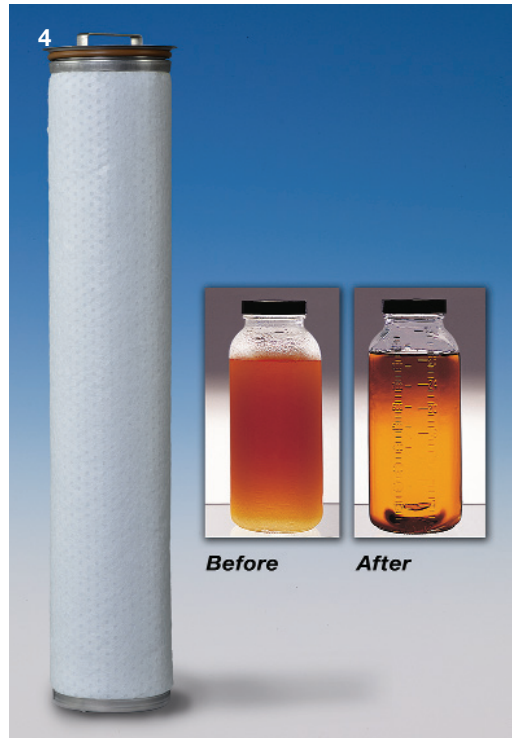
Key Applications/Filter Recommendations *(other applications not shown)*

Application	Pall Product	Advantages	Customer Benefits
1 Hydrotreater feed filtration	Ultipleat® High Flow filters Ultipleat High Flow HT filters Ultipor® HT filters	Removes scale, rust, and solid particles	Assured HDT profitability by protection from unscheduled reactor downtime or off-spec product due to exchanger fouling, catalyst bed activity loss or high delta P due to bed fouling
2 Hydrotreater feed water removal	AquaSep® XS or AquaSep EL liquid/liquid coalescers PhaseSep® liquid/liquid coalescers	Consistent water removal without disarming	
3 Liquid/liquid coalescer protection	Ultipleat High Flow filters	Removes scale, rust, and solid particles	Low operating costs by ensuring long coalescer life while meeting particulate specifications for final products
4 Sour water removal from hydrotreated product	PhaseSep® liquid/liquid coalescers	Removes sour water carryover from separator	Reduced steam stripper corrosion and capacity loss
5 Liquid/liquid coalescer protection	Ultipleat High Flow filters	Removes scale, rust, and solid particles	Low operating costs by ensuring long coalescer life while meeting particulate specifications for final products
6 Water removal from stabilized product	AquaSep XS or Plus liquid/liquid coalescers	Removes emulsions of direct steam injection stripping	Reliably meet 'clear and bright' final product specification Reduce costs for downstream salt dryers or desiccant dehydration units Improve water removal via downstream vacuum dryers by removing the free water load, enabling full vacuum attainment and maximum drying efficiency
7 Liquid/liquid coalescer protection	Ultipleat High Flow filters	Removes scale, rust, and solid particles	Low operating costs by ensuring long coalescer life while meeting particulate specifications for final products
8 Hydrocarbon removal from sour water	AquaSep EL or PhaseSep liquid/liquid coalescers	Reliable hydrocarbon removal from sour water flow to sour water stripper	Reduced contamination load to sour water stripper reduces stripper maintenance costs, capacity loss and extra loading on water treatment plant
9 Hydrogen recycle and make-up gas compressors protection	SepraSol™ Plus and Medallion™ HP liquid/gas coalescers	Removes liquids and solids from recycle hydrogen	Eliminate cost and revenue losses due to compressor rebuilds and unscheduled downtime due to fouling
10 Low NOx burner protection	SepraSol Plus and Medallion HP liquid/gas coalescers	Removes liquids and solids from refinery fuel gas	Elimination of burner tip fouling leading to burner maintenance costs, potential unit downtime or productivity loss due to poor burner performance

For fast track upgrades, NO CAPEX:

Pall-Fit filter and coalescer retrofits enable a move to Pall quality without change to your existing filter housing

Pall filter and coalescer housing rentals enable a technology upgrade for rapid problem resolution



1) SepraSol™ Plus Coalescer: compressor protection; 2) AquaSep® XS Coalescer: steam stripped diesel; 3) Filter Rental Fleet: quick problem resolution; 4) AquaSep XS Element: reliable diesel dehazing; 5) Utlipleat® High Flow Filter: catalyst guard



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