

Oil & Gas Applications

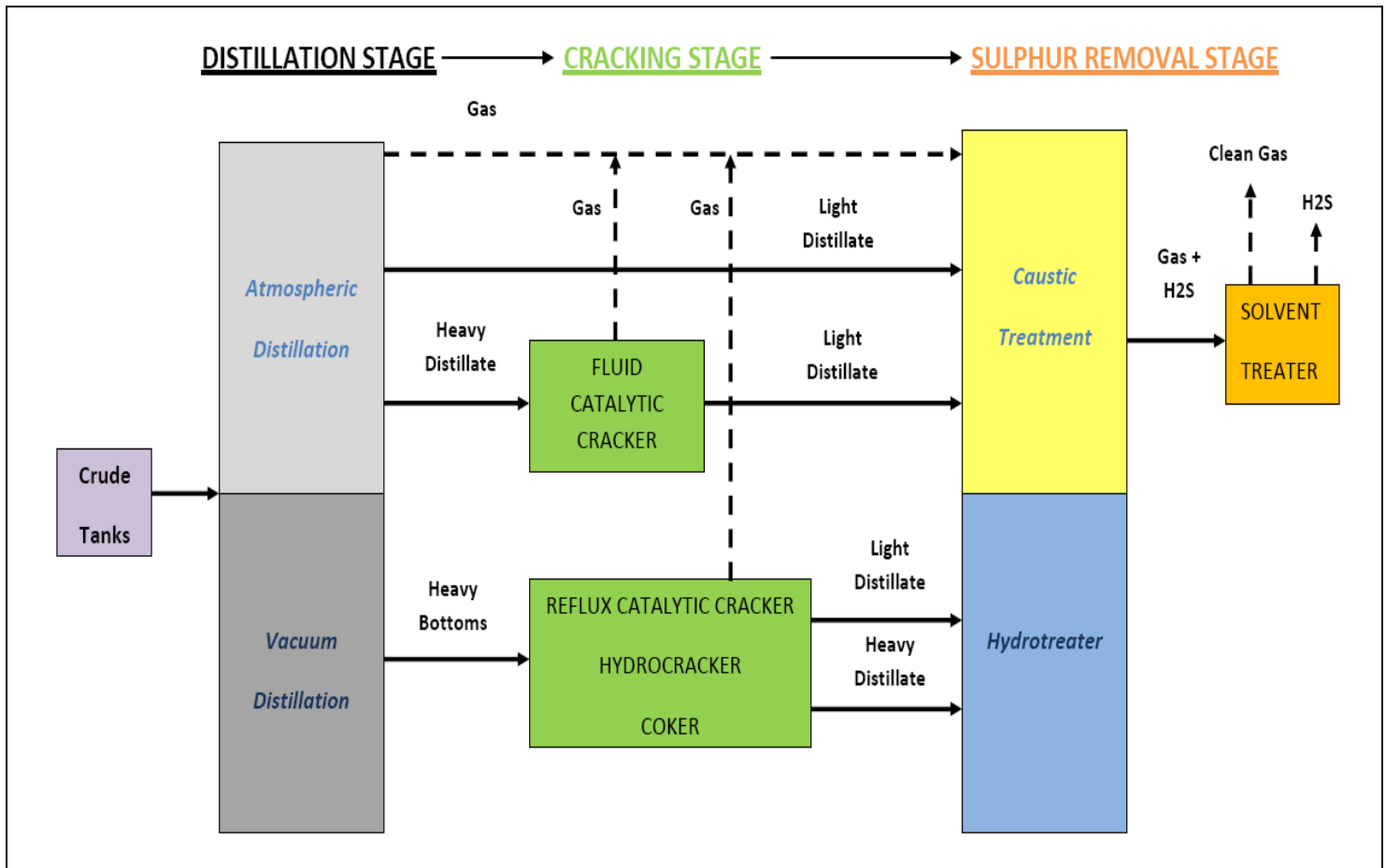
**Chevron Vane Packs,
Demisters, Liquid-Liquid
Coalescers, Inlet Diffusers,
Cyclone and Filter Separators**

BEGG COUSLAND EQUIPMENT AND EXPERIENCE IN OIL & GAS APPLICATIONS

Begg, Cousland has been a leading global supplier of knitted wire mesh demisters and coalescers to oil refineries and gas plants since 1950. We are able to supply these items usually in 304 / 316 / 321 Stainless Steel or Monel, but also in many more materials. An Oil processing overview is shown in the diagram below.

BEGG COUSLAND ENVIROTEC PRODUCT DEVELOPMENT AND TECHNOLOGY PARTNER

Begg, Cousland Envirotec has an exclusive licence from Infinity International Malaysia involving the Design Technology for State-of-the-Art Liquid-Liquid Separation systems, improved designs to optimise production processes and unique designs to reduce oil & gas plant and equipment size / cost.



The products we include in this brochure can mostly be classed either as **Separators**. We can also supply **Filters** as shown on the bottom table – please contact us for further details.

Separation Equipment

Separation Duty	Chevron Vane	Plate Pack	Wiremesh Demister	Co-Knit Coalescer	Cylinder Coalescer	Cyclones	CPI IGF	Nut Shell Filter
Gas/Liquid (Options)	Standard Vane		Metal knitted meshpad	Metal + fibre knitted meshpad		Inlet / De-Foaming Cyclone Cluster	CPI IGF	Nut Shell Filter
	Double Pocket Vane					Cyclone Tube Array		
Liquid/Liquid (Min. Exit)		≥150ppm	≥75ppm	≥30ppm	≥10ppm			≥5ppm
Liquid/Solid (Min. Exit)							≥100µ CPI ≥20µ IGF	

Filtration Equipment

Filtration Duty	Gas Filters	Pleated Filters	Wedge Wire Screen	Woven Wire Screen
Gas/Liquid	99.9% >0.3µ			
Gas/Solid		99.9% >1µ		
Liquid/Solid			≥5µ	≥25µ

SEPARATOR PRODUCTS REVIEW

1. CHEVRON VANES

We offer both standard vane designs and Double Pocket type, for higher efficiency applications.

BCE-STV Series (Standard Vane Packs)

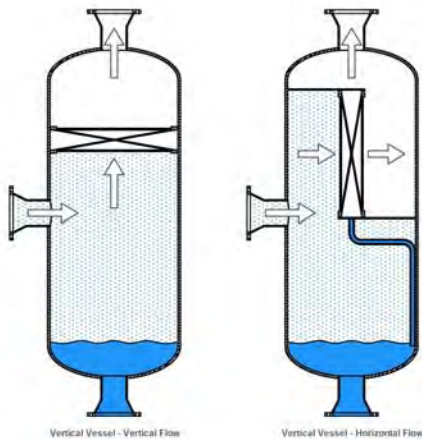


These vane packs are made of uniformly spaced corrugated or wave-form plates that force the gas to follow the path between the plates. As the gas changes direction the momentum of the liquid particles force them to Impact on the surface of the blades, where they then coalesce into larger droplets which drain off by gravity. They are commonly used to collect liquid particles over 20 microns, with low pressure loss.

The spacing of the blades can be designed from 12mm to 75mm depending on the duty, especially if there are solids also in the gas.

BCE-STV Vane Packs are available in various types of metal and plastic.

This vane pack design can be installed in either a horizontal or a vertical arrangement. The vertical arrangement, with horizontal gas flow is the only practical option for Double Pocket Vanes.



General features include :

- Low pressure loss / energy requirement
- Efficient handling of viscous/mild foaming liquid
- Resist slugs of liquid & high liquid load upsets
- Reduce the filter's risk of solids blockage

BCE-DPV Series (Double Pocket Vane Packs)

The Double Pocket BCE-DPV vane packs have a unique geometry, which removes the collected liquids away from the gas within the unit. Therefore the unit can handle twice the gas volume of a BCE-STV Vane with no risk of liquid re-entrainment. The benefits are :

- increased capacity of an existing Vane installation
- reduced size of a new vessel & Vane installation
- increased efficiency of collection compared to standard Vane installations



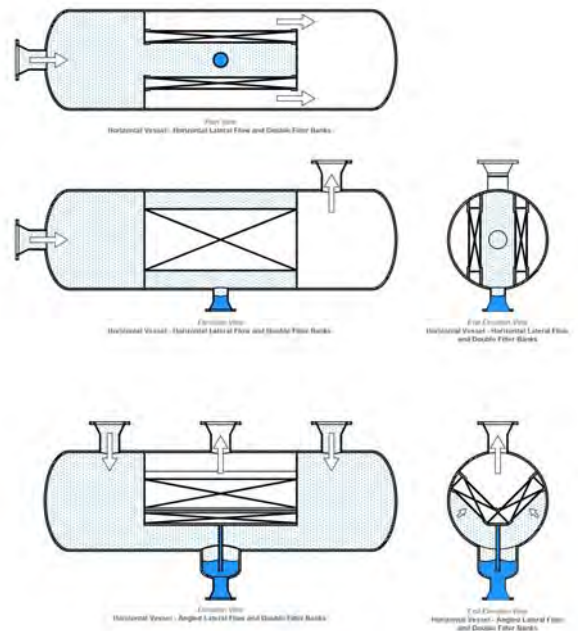
BCE-DPV Vane Packs are available in most metals.

General features include :

- Similar efficiency to a meshpad demister (99.9% >8μ) at higher velocity but not with higher pressure loss
- Efficient handling of viscous & waxy matter
- Minimise the filter's risk of solids blockage

Comparison of BCE-STV & BCE-DPV Types

Type	BCE-STV		BCE-DPV
	Vertical Flow	Horizontal Flow	Horizontal Flow
Capacity	K = 0.5	K = 0.65	K = 1.2
Efficiency	99% > 20μ	99% > 20μ	99.9% > 8μ



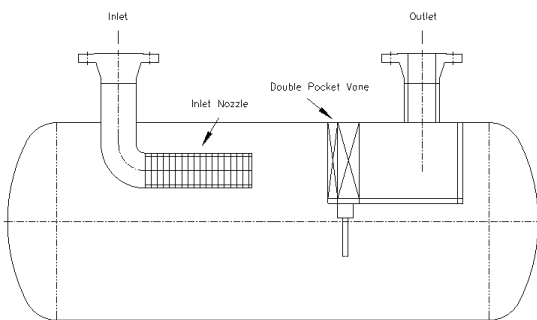
2. BCE-EFQ INLET DIFFUSERS

In many plants there is a problem of bad gas distribution, entering (or leaving) a separator vessel. We can design and supply Inlet Diffusers, to allow the installed internals to work properly, new or retrofit.

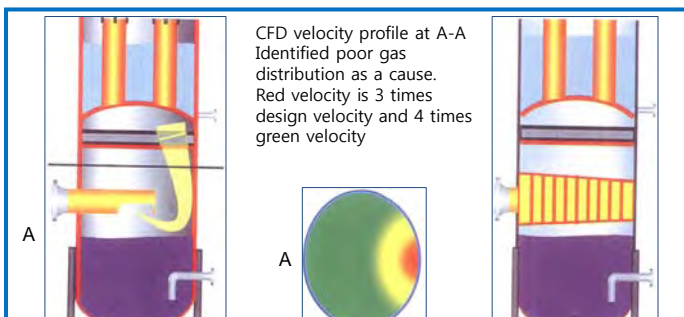


Major Benefits :

- Remove high liquid loads & mild inlet foaming
- Spreads the incoming gas flow pattern evenly
- Can reduce vessel size (height or length)
- Can de-bottleneck an existing separator vessel without re-entraining sump liquid



The sketch above shows a concept of an Inlet Diffuser solving bad filter performance due to mal-distribution. We can also see from CFD software the impact of a good design Inlet Diffuser to correct problems :



3. KNITTED WIRE MESH PAD DEMISTERS

We offer all types of knitted meshpad demisters, in a variety of metal and plastic wire materials, with many options of density, wire diameter, surface area and open volume possible. See the Table below.

Material	Mesh Type	Wire Dia. (mm)	Density (Kg/m3)	% Free Volume	Surface Area (m2/m3)
Stainless Steels Or Other Metals	H	0,28	192	97.5	360
	SH	0.28	144	98.0	256
	L	0.28	112	98.5	210
	UL	0.28	80	99.0	151
	H237	0.152	135	98.3	430
	UL238	0.152	54	99.3	194
	H1241	0.112	430	94.6	1936
Polyprop	HL	0.250	21	97.7	369
	SH	0.250	15	98.3	264
	HSH	0.50	50	94.5	439

We have also advanced styles of meshpad, using combinations of the mesh types shown above, to suit modern vessel designs and separation demands.

Generally the meshpad itself is 100mm or 150mm thick, fitted with a top and bottom support grid, and supplied in sections where required, sized to fit through access manways, and for easy site handling.



The meshpad demister can also be made using a fibre material as a co-knit, so that the fibre yarn is stitched along with the wire or monofilament. Most common are Teflon, Glass and Polypropylene yarns.

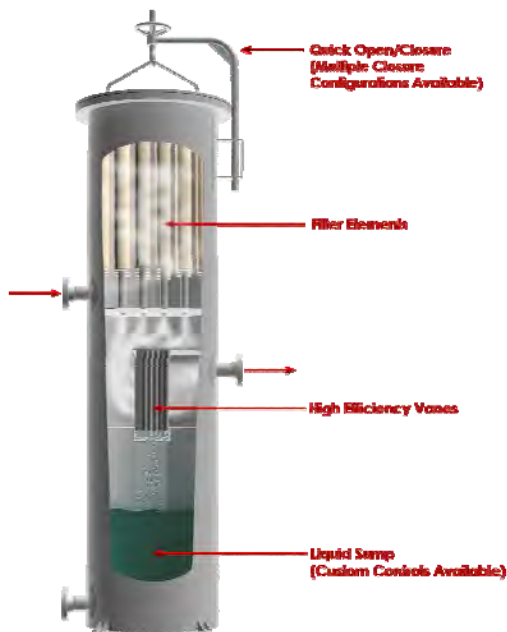
All meshpads (wire only or co-knitted with fibre) use lower K values than Chevron Vanes, as they have more surface area than a Vane pack for the same capacity. As a guide only, see the table below of typical Vane & Meshpad K Values & Efficiencies

Filter Type	K Value		Efficiency
	Vertical Flow	Horizontal Flow	
BCE-STV Vane	0.5	0.65	99.9% > 20μ
BCE-DPV Vane	-	1.0 - 1.2	99.9% > 8μ
Demister Mesh H, SH, L & UL	0.35	0.45	99.9% > 10μ
Demister Mesh H & SH (with L drain Layer)	0.4	0.5	99.9% > 10μ
Demister Mesh H237 UL238 & H1241	0.3	0.4	99.9% > 5μ
Co-Knit Mesh	0.25	0.35	99.9% > 2μ

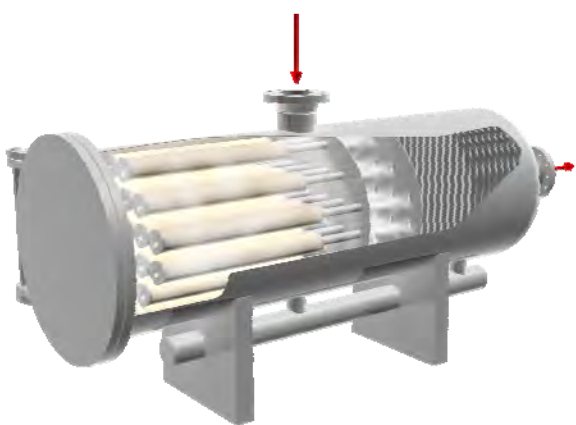
4. COALESCING FILTER SEPARATORS

Two stage filter separator technology allows you to have the smallest possible vessel diameter, resulting in the lowest cost, while removing aerosol liquids and solid particles efficiently.

The separator's first stage contains replaceable BCE-GLF coalescing filters mounted on a tube sheet. Here the larger liquid particles and the solids are removed while the aerosol liquid mist coalesces into large droplets (>10 microns). Some of these coalesced droplets fall off the filter but the majority are carried to the second stage. In the second stage, these large droplets are removed by a high capacity BCE-DPV Double Pocket Vane.



Filter separators can be vertical or horizontal

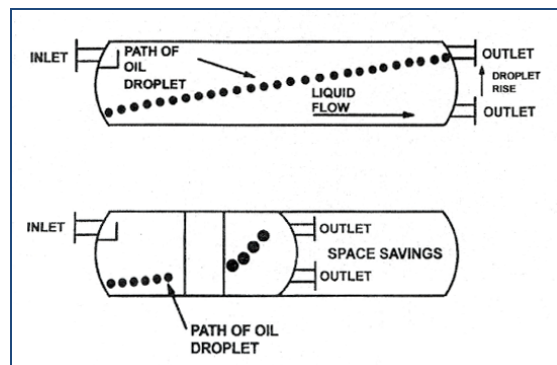


Major Benefits :

- Removes **aerosol mist** to protect downstream equipment from damage, fouling, pitting corrosion or deactivation of catalyst or molecular sieves
- Reduces amine or glycol foaming problems by removing inlet solids and free liquid particles
- Allows low cost vessel designs
- Debottlenecks existing equipment, and adds up to 100% more capacity in an existing separator

5. BECOPHASE LIQUID-LIQUID COALESCER

Coalescing technology and media are also used to separate immiscible liquids. These are typically emulsions or hazy mixtures, and by separating them it can reduce the volume of contaminated liquid effluent, or improve a process or a final product quality. There are many different separation needs in industry, which use similar concepts to those usually found in oil extraction and refining. Water separation from oil, oil from water, or sometimes removal of solids at the same time.

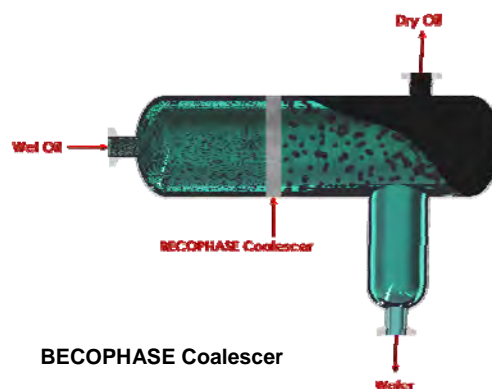


Our coalescing media can greatly improve the efficiency and speed of separation, and minimise the size of vessels. As shown above a gravity separation vessel can be made smaller & cheaper.

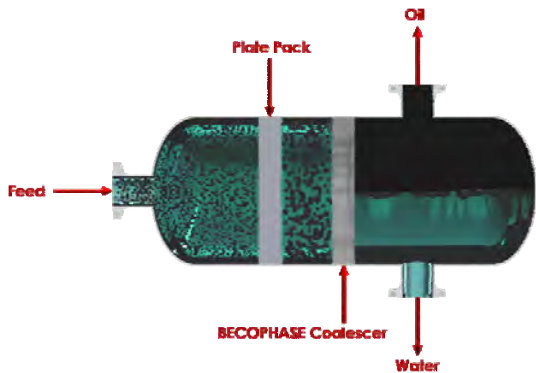


Major Benefits :

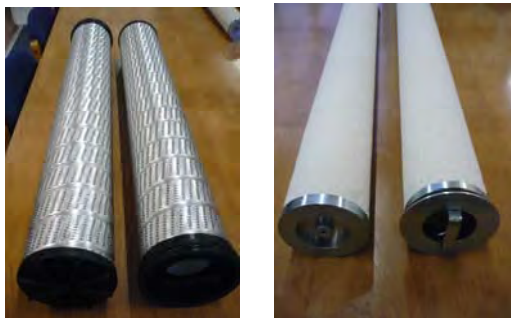
- Reduce vessel size and cost
- Increase capacity of an existing vessel
- Recover more of valuable products
- Remove unwanted haze from a product
- Reduce delays in blending
- Reduces waste water production from tanks, separators and desalters



The type of media required is carefully selected and the design tailored to the specific needs of each plant's operation. We can use knitted metal wire packs, co-knitted metal wire and fibre packs or plate packs (which can also provide a flow stabilising benefit to the liquid flow in the vessel, thereby ensuring the correct performance of the system even under many upset process conditions.

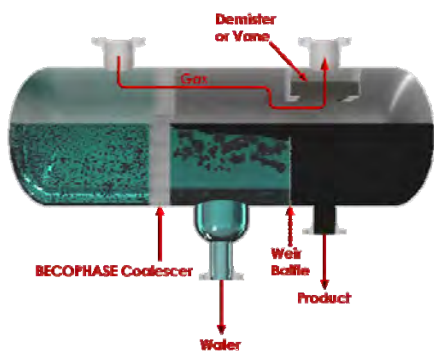


We also have a range of cylindrical coalescers for Liquid-Liquid separation, instead of meshpads, and these are often used in series with a BCE-DPV Vane pack downstream.



6. 2 AND 3 PHASE SEPARATORS

It is also a coalescing requirement when 2 or 3 phase separation involving vapour is designed. The gas entering a separator vessel should cause most of the entrained liquid to fall out to the bottom, while the gas passes to the exit, via a demister or vane pack. Meantime the 2 liquid phases flow through a coalescer pack (or if there are solids present, first through a plate pack to remove them), and cause the 2 liquid phases to separate and discharge from different outlets. See example below.



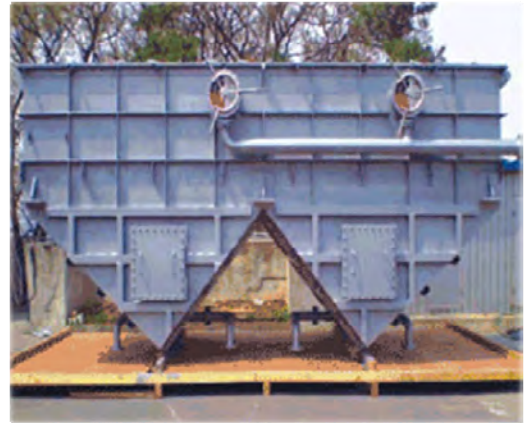
Cyclones

Please contact us about our inlet cyclone cluster and vortex systems for de-foaming duty, saving you the cost of de-foaming chemicals, and improved separator performance.

7. OTHER TYPES OF SEPARATORS

Coalescers and Oily Wastewater Separators

Begg Cousland & IIM will design and supply for you the most efficient and most appropriate separator to improve your process. For example CPI systems for primary wastewater treatment, removing 5000ppm of oil / solids down to 500ppm



Also Begg Cousland's 'Becophase' Coalescer packs can be retrofitted to upgrade existing CPI System separators giving them more capacity and better efficiency than 500ppm. Oil/water separating to < 15ppm is common with our Coalescers.

After a CPI System there may be the need for an IGF unit for secondary separation of oil / solids down to 100ppm. We will optimise this unit for you.



A Nut Shell filter is a final stage for oil / solids removal efficiency to 5ppm. Our technology for this is well established and has been proven to give the best results and reliability.



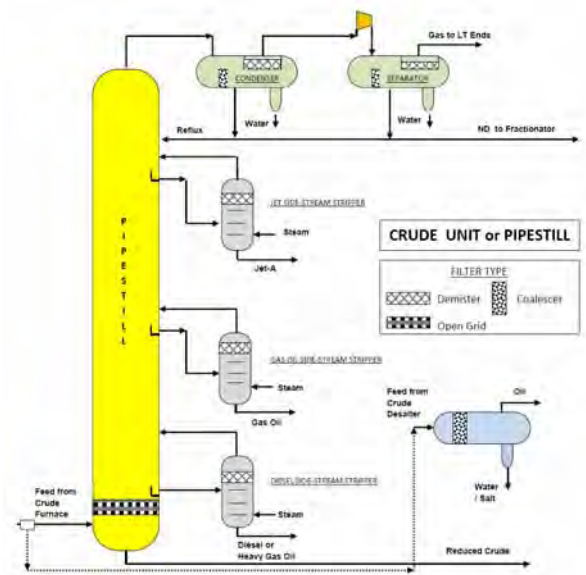
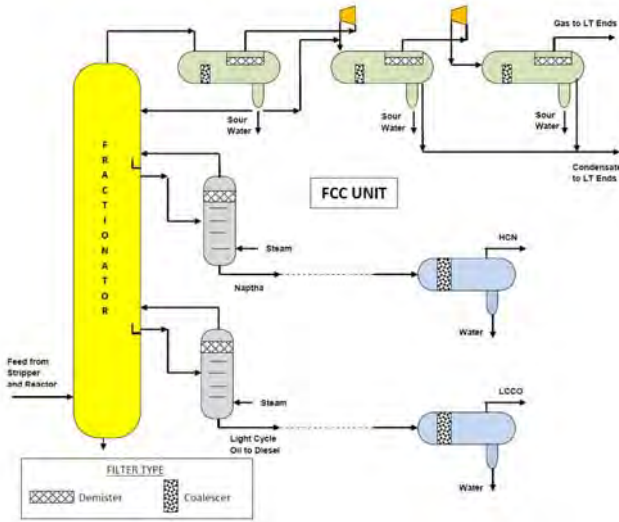
Please contact us for more information on any of the above technologies and equipment.

PROCESS APPLICATIONS REVIEW

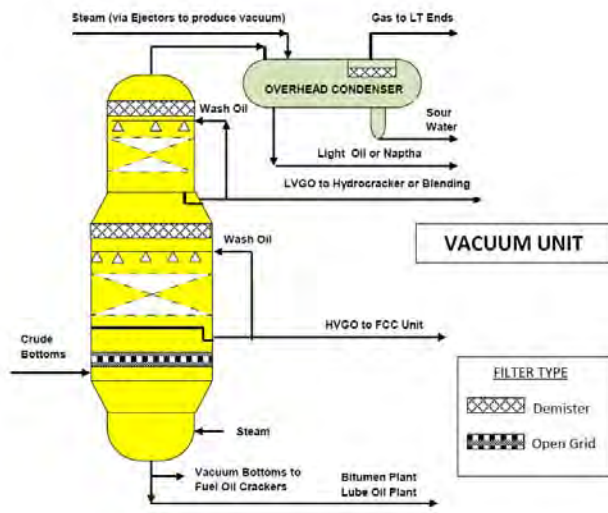
We show below some of the most common duties.

Fluid Catalytic Cracking Applications

- Stripper Knock Out Drums
- Reflux Overhead Systems
- Caustic Wash Liquid-Liquid Coalescer Separators



BECOIL DEMISTER FOR K.O. DRUMS



Overhead Condenser / Reflux Systems

These are used with Crude Units, FCC Units, Coker Units, Hydrotreaters and Splitter Towers to prevent 'hazy' product and water return with the reflux to the Fractionator.

Optimum water removal prevents salt build up / tray blockage and tray corrosion in the Fractionator. Retrofits possible.

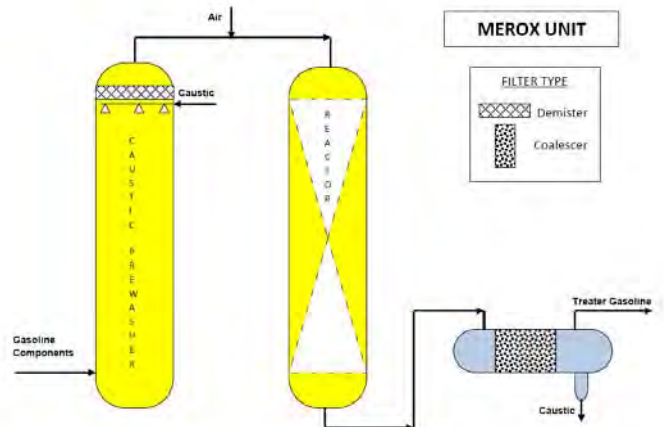
Benefits include :

- Better product quality
- Better blending efficiency
- Better condenser throughput
- Reduced effluent pollution & treatment costs.

Caustic Treating Systems

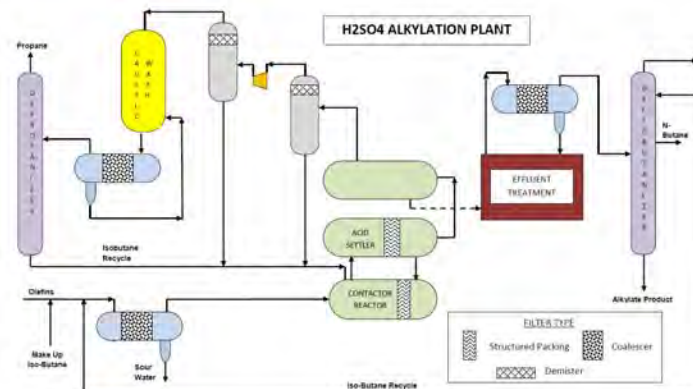
In FCC Units, LGP Units, Alkylation Units, (UOP) Mercox Units, Crude Distillate Treaters, where crudes are acidic, Caustic is used to reduce H₂S traces and the Mercaptan Sulphur content

A Demister is used on the exit of the Caustic prewash, and a Becophase Liquid-Liquid Coalescer Separator is designed to remove the Caustic and to prevent product 'haze'.



Alkylation Plant Applications

- Sulphuric Acid
 - Feed Coalescer
 - Product Coalescers
 - Contactor & Acid Settler Separators
 - Knock Out Drums

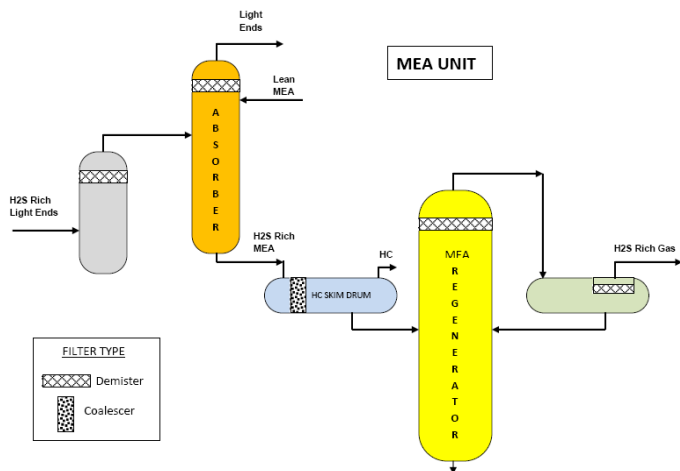


Solvent Sweetening Systems

In refineries with Desulphurisation Units, LPG Plants, Hydrogen Plants, Fluid Cat Crackers (FCC), and Coker Units, and also at on- and off-shore Oil and Gas Production sites, you may find the need for these systems.

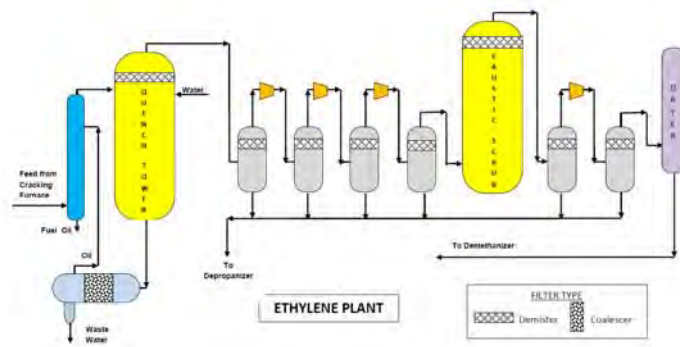
The purpose is to remove water and/or carbon dioxide and typical solvents are DEA, MEA, MDEA, Sulfinol & Glycol.

For optimum system performance, however, the use of the correct demister or coalescer can make a big difference to capacity, solvent recovery and foam-free operation.



Ethylene Plant

There are multiple uses of demisters or vanes in Knock Out Drums in the compressor train, as well as on the Quench tower and Caustic Scrubber. An Oil / Water Coalescer Separator is needed also.



For further information, please contact us at

Begg Cousland Envirotec Ltd.

205 White Studios,

62 Templeton Street,

Glasgow G40 1DA

United Kingdom



Tel + 44 141 556 2289

Fax + 44 141 550 1653

E-mail : info@bcenvirotec.com

Web : www.beggcousland.com

In association with Infinity International Malaysia, from whom some items shown are licensed

