



EVERSEP

LIQUID-LIQUID COALESCER

EVERSEP LIQUID-LIQUID COALESCER

INTRODUCTION

The chemical processing and refining industry encompasses a number of applications where two liquid phases are made to intimately contact one another. This leads to the dispersion of one liquid phase in the other. The key to effective process performance is an efficient way to separate the two phases once again.

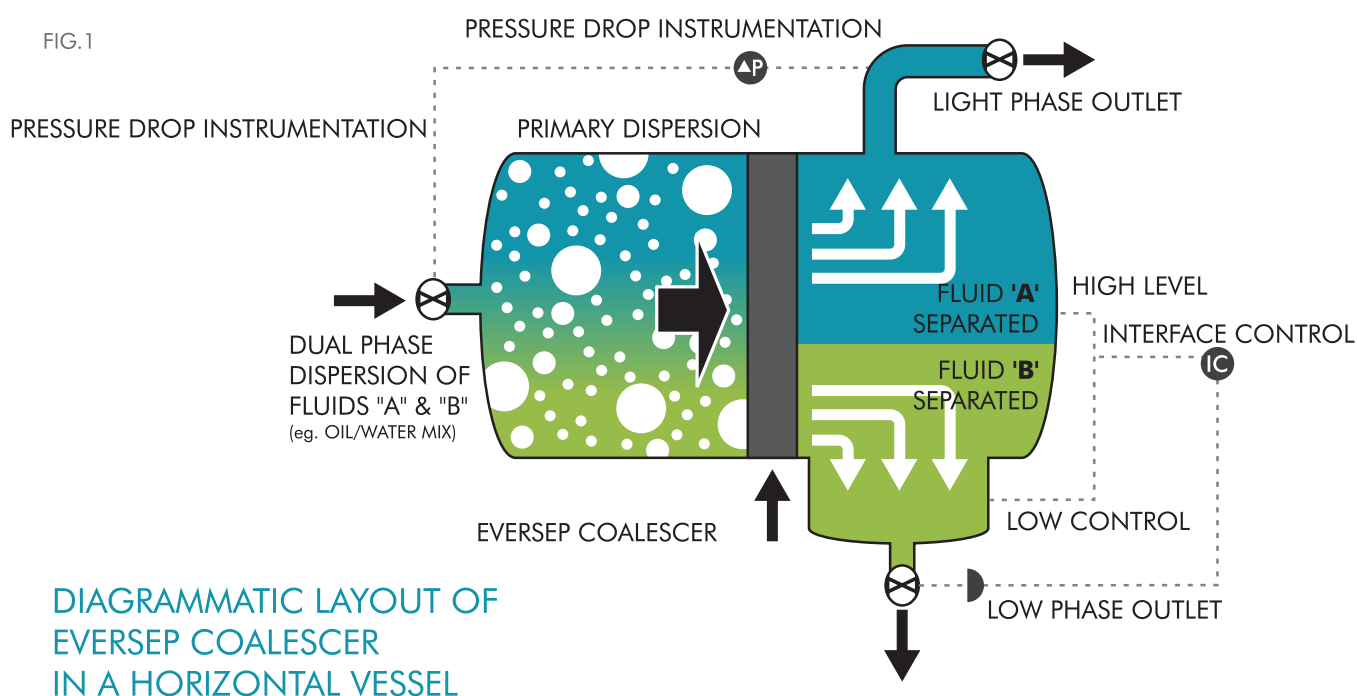
The EVERSEP range of liquid-liquid coalescers is a family of products specially designed to optimize the coalescence of droplets and separate these droplets into their respective phases.

PERFORMANCE

A mixture of immiscible liquids can generally be separated by a process of settling as a result of the density difference between the two phases. However, gravitational settling becomes increasingly difficult as the droplet size of the dispersed phase decreases. The settling process can be enhanced considerably by passing the dispersion through a suitable coalescer pack/media.

EVERGREEN has, at its disposal a large number of configurations of coalescers for the myriad requirements of its customers. These include standard mesh pads, co-knits of materials of differing surface energies, elements of speciality micro fibres, parallel plate assemblies, etc.

A modern coalescer assembly allows a capacity increase of 50%-200% over conventional gravity settlers. The removal rates or efficiency levels achievable are an outlet stream quality with a dispersed phase concentration of 20-200ppm in the continuous phase and vice-versa. These values refer to the free amount of liquid (over & above the solubility limits).



DESIGN

Selecting the right coalescing media for the duty depends on several factors, with initial consideration given to the droplet size in the dispersion and the target separation performance.

Trace impurities, pH changes, the presence of surfactants and solids are other factors that can dramatically alter coalescer performance. In view of the above, we strongly recommend a laboratory test followed by pilot plant trials or onsite slipstream testing before installing a full size commercial unit.

TYPES OF COALESCERS	PARTICLE SIZE (micron)	PERFORMANCE RANGE (%)
Parallel Plate Coalescer	100-100	90-95% Removal
Corrugated Plate Coalescer	50-500	>95%
Mesh Pad Coalescer	5-100	>99%
Cartridge Coalescer	1-20	>99.9%

COALESCER ARRANGEMENTS

Liquid-liquid coalescer separator vessels are usually arranged horizontally as shown in figure 1.

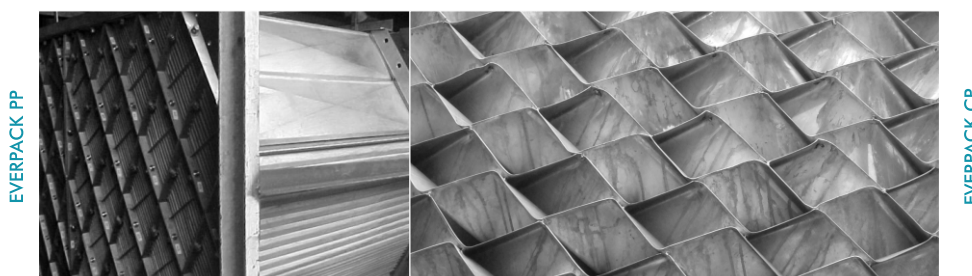
PLATE COALESCER

A plate type coalescer is recommended for fouling services with a plate spacing and plate orientation (slope) to suit service conditions. Generally a 45 degree slope is used for plate coalescers, but this can be increased to 60° for particularly fouling service to ensure all solids fall from the plates into the drainage channels.

EVERGREEN offers Plate Coalescers in two basic types:

PARALLEL PLATE (EVERPACK PP) type consists of a series of plates arranged parallel to the direction of flow but they can be angled or tilted so as to assist the drainage of settled liquids. Their typical length may vary between 900mm and 1800mm depending on the required separation duty.

CORRUGATED PLATE (EVERPACK CP) type which is a honeycomb structure (similar to structured packing without the embossed surface and perforations), typically 600mm thick (less when used principally for wave suppression).



MESH PAD AND CARTRIDGE COALESCER

For clean service conditions, a mesh coalescer (or the very efficient dual media co-kint coalescer) is the optimum choice. For a new gravity separator, the vessel size can be reduced significantly with these high efficiency mesh pad coalescers. They can also be retrofitted into existing gravity separators to improve their performance and enable them to meet the efficiency requirements. Demanding services may utilise a cartridge coalescer, which is recommended for high efficiency applications.



EVERGREEN HIGH EFFICIENCY COALESCING MEDIA

TYPE	MEDIA	TARGET SIZE	APPLICATION	PRESSURE DROP & EFFICIENCY
EM-PACK	Knitted Mesh (metal, plastic or bi-component)	100-500 microns	Stream Stripping, Crude desalter effluent, reflux drums	Low - Medium
EDC-PACK	Co-Knits of Wire & fibre	10-100 microns	Extractor effluent & raffinates, NGL recovery	Medium-high
EK-PACK	Alternating Knit mesh pads types and fibre bed	5-50 microns	Alkylation, ethylene dehydration	High - Very High
EF-PACK	Compressed micro-fibers (glass, plastic or metals)	1-35 microns	Jet fuel haze, seal oil drying	Very High

VERTICAL VESSELS

Vertical vessels, while offering a smaller footprint, must be larger in diameter than horizontal vessels because of the countercurrent flow. In the case of dispersed phases, the settling droplets must overcome the upward flow of continuous lighter phases. Coalescer elements installed at the top and/or bottom of existing vertical extraction columns (agitated, packed bed or trayed) will significantly increase product and solvent purities, even for low interfacial tensions systems.

INSTALLATIONS

Our team of engineers will assist you at various stages of implementation and as a first step we require detailed information from you in the form of a completed coalescer data questionnaire. In many applications, a side stream pilot trial at site is recommended prior to full scale commercial operations.

PRINCIPAL ADVANTAGES OF EVERSEP COALESCERS ARE:

- 1.Improved separation efficiency (as compared to gravity settlers), leading to enhanced product purity.
- 2.Compliance with strict environmental rules.
- 3.De-bottlenecking of processes is possible by increasing the maximum loading for the vessel.

TYPICAL APPLICATIONS OF EVERSEP COALESCERS.

Refineries: Separation of aqueous solutions following caustic and amine treatment of hydrocarbons. Separation of dispersions following water washing stages. Reduction of entrainment from liquid/liquid extraction columns.

Offshore: Improve separation of oil/produced- water dispersions with either phase dispersed. Reduction of vessel size in 3-phase separators. Reduction of entrainment in bilge water effluent treatment plants.

Chemical Process Industry: Separation of dispersion formed by condensation following azeotropic distillation. Separation of liquids following steam stripping.



Evergreen Technologies Pvt. Ltd.
 3D, Maker Bhavan No. 2,
 18 New Marine Lines, MUMBAI 400020 (INDIA)
 Tel: 91-022-61566969/22012461/22012706
 Fax: 91-022-22010024
 Email: info@evergreenindia.com
 www.evergreenindia.com

