

Water Solutions

COMBOSEP™ Flotation Systems

The COMBOSEP™ separator from Siemens Water Solutions is typically comprised of a vertical and horizontal flotation system or a vertical/vertical vessel, mounted on a common skid complete with interconnect piping. The vertical unit (SPINSEP™ or CYCLOSEP™ system) can be packaged on a skid separate from the horizontal VEIRSEP™ unit. This sophisticated design precludes the need for a gravity separator or skimmer upstream of the flotation system.

Applications

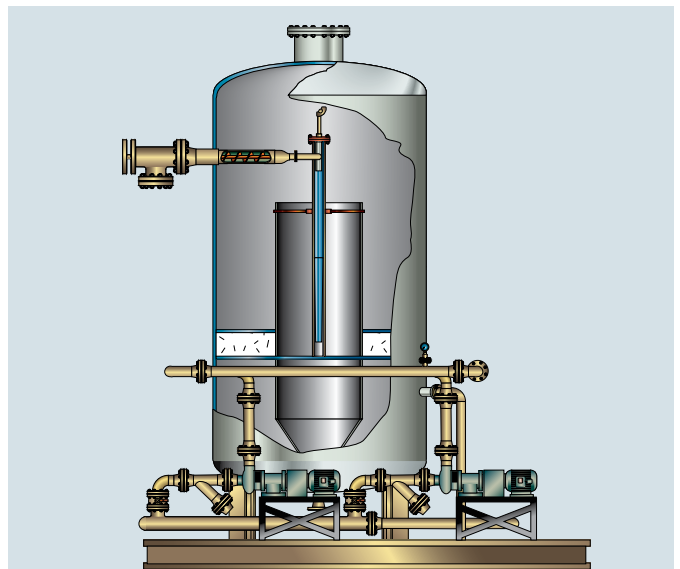
- Offshore produced water treatment
- Refinery wastewater treatment
- Petrochemical plants
- Water treatment facilities

COMBOSEP™ System

The COMBOSEP™ system is designed to replace the traditional use of LP separators, skimmers and flotation polishing separate systems. It can replace an entire produced water treatment system with two vessels; a vertical skimmer and horizontal flotation unit. The COMBOSEP™ system has the ability to replace multiple treatment vessels due to flotation capabilities in both COMBOSEP™ vessels. This unit is offered in multiple configurations:

- SPINSEP-P™/VEIRSEP™ System
- CYCLOSEP-P™/VEIRSEP™ System
- SPINSEP-P™/SPINSEP™ System

The vertical SPINSEP™ or CYCLOSEP™ unit is the primary separator system of the COMBOSEP™ System. The CYCLOSEP™ system, if used in this application, would include a built-in cyclonic device used to separate the solids and oil from the produced water. After exiting the internal cyclone, the concentrated solids fall to the bottom while the water and oil particles rise.



The vertical portion of the COMBOSEP™ system can be either a Spinsep™ or Cyclosep™ separator, shown here.

Model No	Vessel Flow Rate		Vessel Weight		Water		Oil	Combosep		
	GPM	BPD	Dry lbs/KG	Operating lbs/KG	Inlet In/cm	Outlet In/cm	Outlet In/cm	Height Ft-In/cm	Width Ft-In/cm	Length Ft-In/cm
3MCO	60	3M	16730/7589	26750/12134	4/122	4/122	2/61	13'7"/414	7'0"/213	18'6"/564
5MCO	150	5M	34000/15422	64320/29175	4/122	4/122	2/61	14'0"/427	10'0"/305	26'0"/792
7.5MCO	220	7.5M	45820/20784	98450/44657	6/183	6/183	3/91	14'0"/427	11'0"/335	28'0"/854
10MCO	300	10M	53500/24267	127500/57834	6/183	6/183	4/122	17'0"/518	11'4"/345	30'0"/914
15MCO	450	15M	56220/25501	153756/69743	8/244	8/244	4/122	17'0"/518	12'0"/366	32'0"/975
20MCO	600	20M	65500/29711	145500/65998	8/244	8/244	4/122	18'5"/561	14'0"/427	32'0"/975
25MCO	750	25M	86400/39191	164000/74390	8/244	8/244	4/122	20'6"/625	16'0"/488	42'0"/1280
30MCO	875	30M	105140/47691	185400/84097	8/244	8/244	4/122	22'0"/671	17'6"/533	45'0"/1372
40MCO	1170	40M	155230/70412	226450/102717	10/305	10/305	6/183	23'6"/716	18'6"/564	49'0"/1494
50MCO	1460	50M	187850/85207	275960/125173	10/305	10/305	6/183	25'0"/762	20'0"/610	51'0"/1554

Note: The following dimensions are for reference only and are subject to change.

Once the water and oil reach the top of the sand hopper, oils continue to rise while the water is channeled through the packing material and bubbles for further scrubbing.

The remaining oil droplets travel to the surface where they come in contact with gas bubbles. The free phase oil is then skimmed over a weir into an oil compartment and removed.

Next, the water flows down, traveling through the pack section where small oil droplets are coalesced in size to facilitate gravity separation towards the surface. The processed water flows through a micro-fine bubble section, completing the process of removing oil droplets from the processed water.

If a SPINSEP™ system is selected for your application, the same flotation process would occur with the exception that this unit does not include the internal cyclone for solids removal.

VEIRSEP™ System

The final polishing vessel of the COMBOSEP™ system includes a VEIRSEP™ flotation system that removes the remaining oil to achieve discharge limits. The unit is comprised of six separation chambers, has no internal moving parts and can be equipped with either DGF or eductor technology to provide gas bubbles that attach and lift the oil to the surface where it is skimmed into the oil compartment.

Design Options

We offer several design configurations to suit your individual needs:

- ASME Code or Non-Code Vessel Construction
- DGF, Eductor or Sparge Tube Flotation Design
- Coalescing Pack constructed of Polypropylene or Stainless Steel (COMBOSEP-PLUS™ System)
- Client determines controls, valve configuration and safety controls



The horizontal portion of the COMBOSEP™ system includes our VEIRSEP™ separator, shown here.

COMBOSEP, COMBOSEP-PLUS, SPINSEP, SPINSEP-P, CYCLOSEP, CYCLOSEP-P and VEIRSEP are trademarks of Siemens, its subsidiaries or affiliates.

The information provided in this literature contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of the contract.

Siemens AG
Freyeslebenstrasse 1
91058 Erlangen
Germany

Siemens AG
Energy Sector
Oil & Gas Division
Wolfgang-Reuter-Platz
47053 Duisburg
Germany

Siemens Energy Inc.
411 Commercial Parkway
Broussard, LA 70518
USA
Phone: +1.337.837.3071
E-mail: water.energy@siemens.com

Order No. E50001-E450-A120-X-7600 | © 11.2013 Siemens AG