OTEK® WATER & WASTEWATER TREATMENT EQUIPMENT

VERTICAL IGF UNIT

BACKGROUND

CHALLENGES

Massive amount of produced water is being produced from the upstream of oil and gas industry through various operations from drilling, completion, fracturing, workover and production operations everyday.
Efficient and cost-effective removal of complex combination of oil, grease, suspended solids and other element from produced water is urgently needed by all oil and gas companies.
Every customer needs the equipment the next day which leaves narrow time margin for engineering and manufacturing.

WHAT IS OTEK® VIGF

OTEK® VIGF (Vertical Induced Gas Flotation) unit is designed for water & wastewater treatment to improve efficiency operationality and to lower equipment cost per unit water treated.
Sepration efficiency was based on Stokes Law:
$Vr = K \times (\delta w - \delta o) \times d2 / \mu$
Where:

Vr = Rise Velocity of separated oil
K = Constant
δw = Density of water
δo = Density of oil
d = Droplet size in microns
μ = Viscosity of the continuous phase liquid

WHY OTEK® VIGF

- Minimize Short Circuiting Flow Paths
- Maximize Gas / Oil Contact
- Minimize Footprint and Weight
- Minimize Droplet Breakup
- Reduce Motion Effects in Floating Systems
- Eliminate Gas Emissions
- Increase Droplet Size Through Coalescence
- Reduce Oil Skim Volumes

TECHNOLOGY

PROCESS DESCRIPTION

OTEK® VIGF is fundamentally a recirculation design involves introducing air or gas into the wastewater stream via an educator or static mixer, coalescing the oil/solids, releasing the water in a separation vessel, skimming the “floated” oil and solids from the surface of the vessel and discharging clarified effluent from the bottom of the vessel.

OTEK® VIGF combines all of these actions in a unique vertical design which incorporates the principles of stokes law by using finely dispersed gas to reduce the apparent density of the oil and solids, increase their droplet size and greatly increase buoyancy through coalescence. The vertical annular riser eliminates the potential for short circuit flow found in some horizontal designs, and combines “column flotation” technology with its downflow design, which promotes flotation of oil at the surface.

OTEK® VIGF process begins by providing pressurized water (approximately45 psi) to a venturi type eductor. Pressurized water passing through the eductor creates a vacuum at the air/gas suction port, whereby the air/gas stream is induced into the water stream. The mixture is then combined with the incoming wastewater stream and then passes through a dispersing mechanism where very small micron size bubbles are formed and uniformly distributed. This ensures that gas is entrained into the entire feed stream. The bubbles then attach to the oil and solids particles present. The stream then passes through a baffle section within the separator vessel central riser at a reduced velocity. This allows the air and oil/solids particles to flocculate together prior to being released at the surface of the vessel.

The oil/solids floc is radially dispersed towards the outer rim of the vessel. The skim is periodically skimmed from the vessel into the skim trough when an electro/pneumatic signal throttles back the level control valve. The controller raises the set point of the level causes the level to rise in the vessel above the skim trough. The frequency and duration can be controlled by a repeat cycle timer. When the skim cycle is complete, the level set point is reset and the unit returns to normal operation.

OPERATIONALITY

OTEK ™ VIGF utilizes full automatic designed to require minimum field manual interference during operation.
OTEK ™ VIGF is designed to endure the harshest environment from offshore to desert.
OTEK™ VIGF is designed to serve for more than 15 years with slight maintenance requirement.

APPLICATIONS

OTEK™ VIGF is specifically designed for water & wastewater produced from various upstream &

down stream operations for oil and gas industry.

FEATURES

- Elimination Of Short Circuit Flow
- Column Flotation Effect
- Enhanced Coalescer Section
- Gas Contact With Total Flow Stream
- Excellent Removal Of Oils And Solids.
- Compact Size And Weight
- No Moving Parts To Replace -
- Low Maintenance Cost
- Gas Tight Vessel Design -
- No Vapor Released To Atmosphere
- ASME Section VIII Code Vessels
- Low Skim Volume - Less Water To Reprocess
- System can be single stage to multi-stages

MODEL SELECTION

Standardized equipment design allows most time-efficient transition from design to manufacturing

MODEL	CAPACITY (GPM)	CAPACITY (BWPD)	VESSEL DIAMETER (FEET)	HORSEPOWER
VIGF-1	35	1200	2.0	3
VIGF-2	73	2500	3.0	5
VIGF-3	102	3500	3.5	6
VIGF-4	146	5000	4.0	6
VIGF-5	250	8500	5.0	7
VIGF-6	292	10,000	5.5	7.5
VIGF-7	438	15,000	6.5	10
VIGF-8	585	20,000	7.5	15
VIGF-9	730	25,000	8.0	15
VIGF-10	875	30,000	9.0	20
VIGF-11	1,170	40,000	9.5	30
VIGF-12	1,460	50,000	10.5	30
VIGF-13	1,750	60,000	11.0	30
VIGF-14	2,188	75,000	12.0	50
VIGF-15	2,917	100,000	13.0	75

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