Highland Tank Model DSB-1000 System

R-HTC Rectangular Oil/Water Separator

with Deep Sump Basin (DSB) and Influent Pump System

Project Description:

Scope

The separator shall be designed for gravity separation of sand, grit, settleable solids, or semisolids, and free oils (hydrocarbons and other petroleum products) from wastewater associated with \_\_\_\_\_\_\_\_\_\_\_\_ operations. Separator shall be installed aboveground, at grade, or below ground in a vault. The Deep Sump Basin shall be installed at or below grade level. The source of the influent to the system shall be gravity flow from storm water runoff, hydrocarbon spills, and/or cleaning/maintenance operations into the DSB. Influent shall be automatically pumped to separator from the DSB with a Pneumatic Influent Diaphragm Pump.

Specifications

Provide and install \_\_\_\_\_\_ Highland Tank Model DSB-1000 Deep Sump Basin. DSB shall be 4’-0” diameter by 8’-0” long. Influent shall be pumped from DSB at 100 gallons per minute to Model R-HTC-1000 UL-SU2215 Aboveground Parallel Corrugated Plate Gravity Displacement Oil/Water Separator. Separator shall be furnished with oil level alarm system. Oil/Water Separator shall be 11’-0” long X 4’-0” wide X 4’-0” high, having a total volume of 1000 gallons to comply with Spill Prevention Control and Countermeasures (SPCC) plan requirements at the facility. The sizing of this oil/water separator is consistent with industry protocols for complying with the minimum federal spill and discharge regulations therefore a separator of smaller volume is not permissible.

Performance

Influent Characteristics

Provide separator designed for intermittent and variable flows of water, oil, or any combination of non-emulsified oil-water mixtures ranging from zero to 100 gal/min. Minimum separator retention time shall be 10 minutes. Operating temperatures of the influent oil in water mixture shall range from 40 degrees F to 80 degrees F.

The specific gravity of the oils at operating temperatures shall range from 0.71 to 0.92.

The specific gravity of the fresh water at operating temperatures shall range from

1.00 to 1.03.

Effluent Characteristics

The free oil and grease concentration in the effluent from the separator shall not exceed 10 mg/l (10 PPM) to satisfy requirements of the NPDES stormwater discharge permit. To achieve this goal, it will be necessary to remove all free oil droplets equal to and greater than 20 microns.

Design Criteria

The separator shall be listed to Underwriter’s Laboratories UL-SU2215. Construction and performance of the oil/water separators must be in accordance with UL-SU2215. Provide certification documentation detailing criteria under which the system was tested. UL-SU2215 label shall be prominently displayed on cover.

Separator shall be designed in accordance with Stokes Law and the American Petroleum Institute Publication 421, "Monographs on Refinery Environmental Control - Management of Water Discharges; Design and Operation of Oil/Water Separators.” The total effective surface area of the parallel-corrugated plate coalescer shall be \_\_\_\_\_\_ sq. ft. The total effective surface area of the polypropylene impingement coalescer shall be \_\_\_\_\_\_ sq. ft. Calculations, signed and stamped by a Registered Professional Engineer shall be submitted to document specified effluent quality based on complete removal of the specified oil globule. A separator with lower effective surface areas is not permissible.

Separator shall be the standard patented product of a steel tank manufacturer regularly engaged in the production of such equipment. Manufacturer shall have at least 10 years experience in manufacturing similar units for identical applications. No subcontracting of tank fabrication shall be permitted.

Separator shall be fabricated, inspected, and tested for leakage before shipment from the factory by manufacturer as a completely assembled vessel ready for installation.

Separator shall be rectangular, horizontal, atmospheric-type steel vessel intended for the separation and storage of flammable and combustible liquids. The separator shall have the structural strength to withstand static and dynamic hydraulic loading while empty and during operating conditions.

Separator shall have an oil storage capacity equal to about 30% of the total vessel volume and an emergency oil spill capacity equal to 60% of the total vessel volume.

Separator shall consist of inlet and outlet connections, non-clogging flow distributor and energy dissipater device, stationary under flow baffle, presettling chamber for solids, sludge baffle, oil coalescing chamber with removable parallel corrugated plate coalescer, with removable plates, and sectionalized removable polypropylene impingement coalescers to optimize separation of free oil from water, oil dam, effluent transfer pipes, an effluent clearwell, effluent downcomer at the outlet end of the separator to allow for discharge from the bottom of the effluent clearwell only, access cover(s) for each chamber, fittings for vent, oil and sludge pump-out, sampling, gauging, drain, and lifting lugs.

Deep Sump Basin shall consist of \_\_\_\_\_\_ flanged inlet connection, \_\_\_\_\_\_ trap seal, removable vapor-tight top cover with gasket and bolts with large wing nuts, debris baffle, Pneumatic Influent Diaphragm Pump(s), level sensor(s), air regulator, compressed air and vent connections.

Description

Deep Sump Basin shall cylindrical and shall have:

1. Integral Grit Chamber designed to intercept and collect sand, grit, and debris from the facility’s drains.
2. Integral Pump Lift Chamber with Pneumatic Influent Diaphragm Pump, air filter-regulator, and Controls for fully automatic operation. Pump and Controls shall be accessible at grade for ease of maintenance and service.

Internal and external surfaces commercial grit-blast, coated with heavy duty Polyurethane.

Separator shall be standard prefabricated, inclined parallel-corrugated plate, gravity displacement type unit with removable top cover(s).

The separator shall be a pre-packaged, pre-engineered, ready to install unit consisting of:

An influent connection 2 inch, flanged. An internal influent nozzle at the inlet end of the separator. Nozzle discharge to be located at the furthest diagonal point from the effluent discharge opening.

A velocity head diffusion baffle at the inlet to:

· reduce horizontal velocity and flow turbulence.

· distribute the flow equally over the separators cross sectional area.

· direct the flow in a serpentine path in order to enhance hydraulic characteristics and fully utilize all separator volume.

· completely isolate all inlet turbulence from the separation chamber.

A sediment chamber to disperse flow and collect oily solids and sediments.

A sludge baffle to retain settleable solids and sediment and prevent them from entering the separation chamber.

An Oil/Water Separation Chamber containing a removable, inclined parallel corrugated plate coalescer, with removable corrugated plates sloped downward toward the sediment chamber, to:

· shorten the vertical distance than an oil globule has to rise for effective removal. Minimum plate gap to be 3/4".

· enhance coalescence by generating a slight sinusoidal (wave like) flow pattern thereby causing smaller, slow rising, oil globules to coalesce together on the undersides of the plates forming larger, rapidly rising sheets of oil.

· direct the paths of the separated oil to the surface of the separator.

and a sectionalized removable "Petro-Screen" polypropylene impingement coalescer designed to intercept oil globules of less than 20 microns in diameter. Heavy, one-piece impingement coalescers are not permissible.

An oil dam with two (2) effluent transfer pipes.

An effluent clearwell.

An internal effluent downcomer at the outlet end of the separator, to allow for discharge from the bottom of the effluent clearwell only.

An effluent connection 6 inch, flanged.

Fittings for vent, interface/level sensor, waste oil pump-out, sampling, drain, and gauge.

Removable vapor-tight top cover(s), gasket, and bolts with large wing nuts for easy access.

Lifting lugs at balancing points for handling and installation.

Identification plates: Plates to be affixed in prominent location and be durable and legible throughout equipment life.

Internal surfaces commercial grit blast and coated with heavy duty Polyurethane.

External surfaces commercial grit blast and coated with heavy duty Polyurethane.

Accessories

Separator shall be supplied with an audible and visual alarm system that indicates high oil level (visual only) and high high oil level (audible and visual) of oil storage in the oil/water separator, and high liquid level in DSB will be provided. A silence control shall be provided for the audible alarms. Level sensor(s) to be intrinsically safe. Level sensor floats to be made of stainless steel. The control panel shall be NEMA 4. Power to the control panel is to be [ ]volt, [ ] phase.

Quality Assurance

Submittals:

* Shop Drawings: shop drawings for oil/water separators shall show principal dimensions and location of all fittings.
* Instructions: provide three complete sets of installation, operation, and maintenance instructions with separator.
* Quality Control: Quality control, inspection procedures, and reports shall be considered part of the submittal package.

Warranty:

* The manufacturer shall warrant its products to be free from defects in material and workmanship for a period of one year from the date of shipment. The warranty shall be limited to repair or replacement of the defective part(s).

Approved Manufacturers

Highland Tank and Mfg. Co., One Highland Road, Box 338, Stoystown, PA 15563, Phone (814) 893-5701, Facsimile (814)-893-6126, [www.highlandtank.com](http://www.highlandtank.com/) shall manufacture the Deep Sump Basin and Oil/Water Separator.