20000RECSWHTCS

Highland Tank Model R-HTC Series “S” with Integral Side Oil Storage Compartment

Rectangular Oil/Water Separator with Corella® Coalescer

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 source of the influent to the separator shall be gravity flow from storm water runoff, hydrocarbon spills, and/or cleaning/maintenance operations.

Specifications

Provide and install \_\_\_\_\_\_ Highland Tank Model R-HTC-20000 Series “S” Aboveground Parallel Flat/Corrugated Plate Gravity Displacement Oil/Water Separator with Integral \_\_\_\_\_\_ gallon Side Oil Storage Compartment. Separator shall be furnished with oil skimmer and oil level alarm system. Oil/Water Separator shall be

29’-9” long X 10’-0” wide X 9’-0” high, having a total volume of 20000 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.

Separator to be furnished with a Corella® inclined parallel flat/corrugated plate coalescer to simultaneously separate free oil droplets and settleable or suspended solids particles from water without clogging of the coalescer.

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 2000 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

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.” Effective surface area 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 at design flow. A separator with lower effective surface area than required is not permissible.

Separator vessel volume shall allow for a hydraulic retention time of ten (10) minutes to ensure laminar flow conditions which result in hydraulic uniformity and high effluent quality. Volume reduction will adversely affect separator performance by increasing horizontal velocity and turbulence, therefore a separator of smaller volume 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 20 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.

To prevent extensive shutdown and maintenance, the separator design must allow solids to fall unhindered by turbulence, and oil droplets to rise without risk of re-emulsifying due to collisions with interfering solids.

The use of plastic perforated tubes, spherical balls, or irregular shaped media will increase the facility’s maintenance costs and shall not be permitted.

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 flat/corrugated plate coalescer, with removable plates, and sectionalized removable polypropylene impingement coalescers to optimize separation of free oil from water, oil skimmer, side oil storage compartment, 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.

Description

Separator shall be standard prefabricated, inclined parallel flat/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 16 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 Corella® inclined parallel flat/corrugated plate coalescer. The coalescer shall have individual removable plates, sloped towards the sediment chamber. Each coalescing plate shall be flat on the top and corrugated on the bottom. The flat top plate shall resist clogging and clotting with solids. The corrugations of each of the plate bottoms shall be shaped and positioned to enhance collisions between the rising oil droplets and coalescence between them thereby improving separator efficiency. The coalescer shall:

* effect separation of oil and solids from all strata of the wastewater stream.
* shorten the vertical distance that an oil globule or solid particle has to raise or sink, respectively, for effective removal. The minimum plate gap to be ¾.
* enhance coalescence and agglomeration by causing the smaller globules and particles (those possessing smaller rising/settling rates) to coalesce and collect on the plates thereby forming larger globules and particles that separate rapidly in water.
* direct the flow paths of the separated oil to the surface of the separator and separated solids to the bottom of the separator.
* allow solids to fall unhindered by turbulence, and oil droplets to rise without risk of re-emulsifying due to collisions with interfering solids.

The Oil/Water Separation Chamber shall also contain 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 skimmer to skim separated oil into the \_\_\_\_\_\_ gallon side oil storage compartment.

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 16 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 hi oil level (visual only) and high-high oil level (audible and visual) of oil storage in the oil/water separator 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.
* There shall be a limit to the number of submittals for the specified separator. If the separator is not “Approved” or “Approved as Noted” on the second submittal for approval, the engineer reserves the right to refuse further submittals from the same manufacturer and may require the contractor to submit for approval a different manufacturer’s product.

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, FAX (814)-893-6126, E-Mail [wastewater@highlandtank.com](mailto:wastewater@highlandtank.com), [www.highlandtank.com](http://www.highlandtank.com/) shall manufacture the Oil/Water Separator.