**2000HGDWHTCG**

Specifier to supply information for all yellow highlighted areas in specification. Contact Highland Tank if additional assistance is required. A [sizing guide](http://www.highlandtank.com/steel-storage-tank-sizing) is available on the Highland Tank web site.

Model HTC Series G Double-wall Oil/Water Separator with Integral Sand Interceptor Compartment, Corella® Coalescer Plate System and HighGuard Protection System

Project Description: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Scope

The separator shall be designed for gravity separation of free oils (hydrocarbons and other petroleum products) along with some settleable solids from wastewater associated with \_\_\_\_\_\_\_\_\_\_\_\_\_\_ operations. Separator shall be prefabricated with inclined, parallel, flat/corrugated plate and impingement coalescers. Separator shall be installed underground with top access at or above grade level. The source of the influent to the separator shall be gravity flow from stormwater runoff, hydrocarbon spills, and/or cleaning/maintenance operations.

Specifications

Provide Highland Tank Model HTC-2000 Series-G Underground Double-Wall Parallel Flat/Corrugated Plate Gravity Displacement Oil/Water Separator with Integral 501-gallon Sand Interceptor Compartment. Separator shall be furnished with oil level alarm and leak detection systems having a total volume of 200 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. 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.

Quantity: \_\_\_\_\_\_

Nominal Dimensions:

 Nominal Diameter: 5-feet, 4-inches, as indicated on the drawings.

 Nominal Length: 15-feet, 0-inches, as indicated on the drawings

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 55 gal/min. Minimum separator retention time shall be 10 minutes, based on total unit volume. (Actual retention time will be less due to air space above fluid level.)

Typical operating temperature range of the influent oil in water mixture: 40º F to 80º F.

 • Installation site operating temperatures: Minimum \_\_\_\_\_ º F, Maximum \_\_\_\_\_ º F.

Typical specific gravity range of the oils at operating temperatures: 0.71 to 0.92.

 • Installation site oils specific gravity: \_\_\_\_\_.

Typical specific gravity range of the fresh water at operating temperatures: 1.00 to 1.03.

 • Installation site fresh water specific gravity: \_\_\_\_\_.

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.” The total effective surface area of the parallel-corrugated plate coalescer shall be determined by OWS manufacturer for the flow, temperature, and oil specific gravity conditions specified above. The total effective surface area of the polypropylene impingement coalescer shall be determined by OWS manufacturer for the flow, temperature, and oil specific gravity conditions specified above. 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 capacities, dimensions, construction, and thickness shall be in strict accordance with Underwriters Laboratories, Subject UL-58 Standard for Safety, Steel Underground Tanks for Flammable and Combustible Liquids, Double-wall construction with 360-degree Steel Secondary Containment. Separator shall comply with National Fire Protection Association NFPA 30 Flammable and Combustible Liquids Code. The inner steel tank shall be completely contained within the outer steel tank, enclosing 100% of the tank volume. The tank must have a double steel shell without a defined space between the layers (UL Type I Double-wall). The space between the inner and outer steel walls shall be monitored with an approved electronic leak detection device through a pipe that extends vertically to the top of the tank from the bottom of the shell. Tank construction using thin walled primary tank with external fiberglass jacket shall not be 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 of 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 (to the greatest extend possible with consideration to shipping requirements) ready for installation.

Separator shall be cylindrical, 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. The Oil/Water Separator’s dimensions and thickness shall be in strict compliance with Roark’s Formulas for Stress and Strain as presented in UL 58. Calculations, signed and stamped by a Registered Professional Engineer shall be submitted to document structural strength under specified overbearing or external pressure. A separator with a reduced shell thickness is not permissible.

Separator shall have the following oil storage capacities:

 • High oil level (warning), equal to about 20% of the static vessel volume,

 • High-high oil (alarm), equal to about 43% of the static vessel volume,

* Emergency oil spill capacity equal to about 80% of the static vessel volume.

Separator shall consist of inlet and outlet connections, integral sand interceptor compartment, 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 coalesce and/or removable plates, and sectionalized removable polypropylene impingement coalescers to optimize separation of free oil from water, effluent downcomer positioned to prevent discharge of free oil that has been separated from the water, access ways for coalescers and each chamber, fittings for vent, oil pump-out, sampling, gauging, leak detection, and lifting lugs.

Separator Corrosion Control System shall be in strict accordance with Underwriters Laboratories Inc. Subject UL-1746 Standard for External Corrosion Protection Systems for Steel Underground Storage Tanks and HighGuard External Corrosion Protection Specifications.

Description

Separator shall be standard pre-packaged, pre-engineered, ready to install unit consisting of:

A 6-inch flanged influent connection with an internal influent nozzle at the inlet end of the separator. Nozzle discharge point will be located at the furthest diagonal point from the effluent discharge opening.

A 501-gallon integral sand interceptor compartment containing one (1) 18-inch diameter manhole, UL approved, complete with \_\_\_\_-inch extension, cover, gasket, and bolts. A heavy-duty bulkhead shall retain sand, grit, settleable solids or semisolids and prevent them from entering the separation chamber. Bulkhead shall have 4-inch transfer pipe.

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 removable Corella® inclined parallel flat/corrugated plates, sloped downward toward the sediment chamber to:

 • shorten the vertical distance that an oil globule or solid particle has to raise for effective removal.

 Minimum plate gap to be 1-1/4-inches.

 • 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 internal effluent downcomer at the outlet end of the separator, to allow for discharge from the bottom of the separation chamber only.

A 6-inch flanged effluent connection.

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

Two (2) 24-inch diameter manholes, UL approved, complete with \_\_\_\_-inch extensions (length based on burial depth), covers, gaskets, and bolts. One manway shall be placed between the inlet and the parallel-flat/corrugated plate coalescer to facilitate access into sediment chamber for solids removal.
One manway shall be placed between the parallel flat/corrugated plate coalescer and outlet to facilitate access into the oil water separation chamber for oil removal.

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.

HighGuard Corrosion Protection System consisting of:

 • External surfaces commercial grit blasted and coated with 75 mils DFT HighGuard

 self-reinforcing polyurethane.

 • 10-year Limited Warranty

Accessories & Options

 • Internal surfaces commercial grit blasted and coated with 15 mils DFT heavy duty polyurethane.

o    **High-LINK® LevelShield Series W**- Separator shall be supplied with a High-LINK® cloud based
 remote monitoring system in either of the below formats, dependent on oil/water separator design.
 Please [visit this link](https://www.highlandtank.com/app/data/literature/O_LIT_High-LINK-Oil-WaterShield-Wastewater-Monitoring-Systems.pdf) for product literature and description on the High-LINK® LevelShield Series W.

o   Overall High-LINK® system features include:

o   Provides remote, real-time cloud-based monitoring of system with annual
High-LINK®subscription package

o   Alerts personnel of activity & alarms via email. Email alerts are managed via
High-LINK® software application.

o   Can send an automatic alert to waste haulers when reaching capacity if customer desires

o   Prevents costly service with predictive maintenance tool by monitoring various system component performances.

o   Eliminate unnecessary cleanouts.

o   Verify vendor BOL and work performed

o   Collect history data for budget forecasting

o   **LevelShield Series WL-**

§  The control panel shall contain both level sensor and leak detection control. The control panel shall be NEMA 4 minimum enclosure rating. Power to the control panel is to be 120VAC volt, single phase.

§  Provides onsite continuous monitoring of overall liquid level, oil level in gallons, and set point alarm conditions for high oil level and high-high oil level in the oil/water separator.

§  An audible and visual leak detection alarm system for monitoring the interstice is also provided.

§  A silence control shall be provided for the audible alarms.

§  Panel shall include intrinsically safe connection to sensors. Level Sensor to be constructed of stainless steel with polyvinylidene floats.

o   **LevelShield Series WC-**

* + - Includes all the WL operations plus additional features for:
			* High sand and grit level detection
			* Pump and valve operations
			* Effluent quality monitoring
			* Variable site-specific monitoring or control points (please contact Highland Tank for custom monitoring & controls)

 • Separator shall be supplied with Highland Tank Deadman Anchoring System that includes

 polyester hold-down straps and concrete deadman anchors.

 • Polyester or steel hold-down straps (10’-6” maximum diameter for polyester straps)

* Grade Level Manways for vehicle traffic loading (H20)
* Electronically actuated valves
* Leak detection sensors
* Influent, effluent and/or oil pumps

Quality Assurance

Submittals:

Shop Drawings: Shop drawings for oil water separators shall show principal dimensions and location of all fittings.

Instructions: Separator installation, operation, and maintenance instructions are available at

[www.highlandtank.com](http://www.highlandtank.com)

Quality Control: Quality control, inspection procedures, 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).

Highland Tank 10-year limited warranty for external corrosion and structural defects.

Approved Manufacturers

Highland Tank and Mfg. Co., One Highland Road, Box 338, Stoystown, PA 15563,

Phone (814) 893-5701, FAX (814)-893-6126, shall manufacture the Oil/Water Separator.

For additional information, visit us at [**www.highlandtank.com**](http://www.highlandtank.com/)