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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 EZ Access Underground Cylindrical Double-wall Oil/Water Separator

with 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-EZ-1000 Underground Double-wall Parallel Flat/Corrugated Plate Gravity Displacement Oil/Water Separator(s). Separator shall be furnished with oil level alarm and leak detection systems 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. 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: 4-feet, 0-inches, as indicated on the drawings.

 Nominal Length: 10-feet, 9-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 100 gal/min. Nominal 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 standards. 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 40% 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, non-clogging flow distributor and energy dissipater device, stationary under flow baffle, pre-settling area for solids, sludge baffle, oil coalescing chamber with removable parallel corrugated 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, large rectangular access way(s) 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

The separator shall be a 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 velocity head diffusion baffle at the inlet to:

 • reduce horizontal velocity and flow turbulence.

 • distribute the flow equally over the separator’s 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 area 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 inclined, parallel, flat/corrugated coalescer plates, sloped downward toward the sediment chamber, to:

 • shorten the vertical distance than an oil globule has to rise for effective removal. Minimum plate spacing to
 be 1-1/4".

 • 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.

Two, large rectangular EZ-Access manways complete with removable vapor tight cover, gasket, and corrosion-resistant bolts. Highland Tank can offer optional corrosion-resistant, lockable cover(s) that can be accessible near or above grade level. Manways are designed to allow for maintenance and cleaning from grade level.

 • EZ-Access manway(s) shall be placed over the plate pack and Petro-Screen to facilitate solids removal and provide access to the Corella® plate and Petro-Screen coalescers for removal and maintenance.

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

A 6-inch flanged effluent connection.

Two factory supplied saddles, seal welded to the OWS, located as shown on the drawing.

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

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

• Internal surfaces commercial grit blast and coated with minimum 15 mils DFT

 heavy-duty polyurethane.

Accessories & Options

• 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 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 contain both level sensor and
 leak detection control. The control panel shall be NEMA 4. Power to the control panel is to be [\_\_\_\_\_] volt,
 [\_\_\_\_\_] phase.

• Separator shall be supplied with a freeze protection system, consisting of immersion heaters and insulation.
 Heaters shall be sized to maintain 40ºF inside the insulated OWS, at a minimum ambient temperature of
 \_\_\_ºF. Insulation shall consist of 2” thickness of closed cell foam, contained without a steel exterior wrap of
 steel. Insulation to provide a minimum R factor of R14.

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

 polyester hold-down straps and concrete deadman anchors.

• Electronically actuated valves

• Influent, Effluent and 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.

Quality Control: Quality control, inspection procedures, shall be considered part of the submittal package. Quality Control reports shall be available upon request after fabrication.

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 Manufacturer

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

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

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