Highland Tank & Mfg. Co., Inc. 04000HGDWHTCULCSI

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**Corella® Cylindrical, Underground, Double-Wall Steel Oil/Water Separator**

Product Guide Specification

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format, including *MasterFormat, SectionFormat,* and *PageFormat,* as described in *The Project Resource Manual - CSI Manual of Practice, Fifth Edition.*

This section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the Drawings. Delete all “Specifier Notes” after editing this section.

Section numbers are from *MasterFormat 2014 Edition*.

SECTION 46 25 13

CORELLA® COALESCING OIL/WATER SEPARATOR(S)

Specifier Notes: This section covers Highland Tank & Mfg. Co., Inc. Corella® Cylindrical, Underground, Double-Wall Steel Oil/Water Separator **Model 04000HGDWHTCULCSI**. Consult Highland Tank & Mfg. Co., Inc. for assistance in editing this section for the specific application.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Corella® Cylindrical, Underground, Double-Wall Steel Oil/Water Separator(s).

1.2 RELATED REQUIREMENTS

Specifier Notes: Edit the following list of related sections as required. Delete related sections not required. List other sections with work directly related to this section.

A. Section 03 15 19 - Cast-In Concrete Anchors (Anchor Bolts for Hold-Down Straps)

B. Section 03 30 00 - Cast-in-Place Concrete (Concrete for Anchor Pad)

C. Section 22 14 13 - Facility Storm Drainage Piping

1.3 REFERENCE STANDARDS

Specifier Notes: List reference standards mentioned in this section, complete with designations and titles. Delete reference standards not included if guide specification is edited. This article is merely a listing of some of the standards used for equipment compliance.

A. AASHTO - American Association of State Highway and Transportation Officials

B. ANSI - American National Standards Institute

C. API - American Petroleum Institute

* API Publication 421, Monographs on Refinery Environmental Control - Management of Water Discharges.

D. ASTM - American Society for Testing and Materials

* ASTM Standard Specification for Carbon Structural Steel - ASTM International.

E. AWS - American Welding Society

* Structural Welding Code – Steel.

F. NEC - National Electric Code

G. NEMA - National Electric Manufacturers Association

H. NFPA - National Fire Protection Association

* NFPA 30, Flammable and Combustible Liquids Code;
* NFPA 70, NEC National Electric Code.

I. OSHA - U. S. Department of Labor, Occupational Safety and Health Administration

* OSHA 29 CFR 1910.106, Occupational Safety and Health Standards, particularly Flammable and Combustible Liquids.

J. PEI - Petroleum Equipment Institute.

* RP100, Recommended Practices for Installation of Underground Liquid Storage Systems.

K. SSPC - Steel Structures Painting Council/NACE - National Association of Corrosion Engineers.

* SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning;
* SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning.

L. STI - Steel Tank Institute

M. UL - Underwriters Laboratories, Inc.

* UL 58 - Steel Underground Tanks for Flammable and Combustible Liquids;
* UL 1746 - Corrosion Protection of Underground Tanks;
* UL SU2215 - OWS Design, Construction, and Performance Standards.

N. U.S. Code of Federal Regulations (CFR) Title 33 and Title 40

* Oil Pollution Act (Title 33 U.S.C. 2701 ET SEQ.; 104 STAT. 484);
* Clean Water Act (Title 40 Effluent Guidelines and Standards).

O. U.S. EPA - United States Environmental Protection Agency

* EPA Test Method 1664A - Oil and Grease Recoverable Extraction.

Specifier Notes: In case of differences between building codes, state laws, local ordinances, utility company regulations, and contract documents, the most stringent shall govern. The codes and standards listed are the latest as of this publication. Codes and standards are continuously updated. The Contractor shall confirm the construction standard edition enforced by the authority having jurisdiction.

1.4 SUBMITTALS

Specifier Notes: Edit submittal requirements as required. Delete submittals not required.

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Submit shop drawings of the coalescing oil/water separator(s) by the manufacturer showing principal dimensions and location of all fittings.

C. Product Data: Submit manufacturer’s product data, including installation, operation, and maintenance instructions.

D. Quality Control: Quality control, inspection procedures, and reports shall be considered part of the submittal package.

E. Manufacturer’s Certification: Submit manufacturer’s certification that the coalescing oil/water separator(s) comply with specified requirements and are suitable for intended application.

F. Warranty Documentation: Submit manufacturer’s standard warranty.

Specifier Notes: There shall be a limit to the number of submittals for the specified oil/water separator. If the oil/water 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.

1.5 QUALITY ASSURANCE

A. Manufacturer’s Qualifications:

1. Manufacturer regularly engaged, for past 20 years, in manufacture of coalescing oil/water separator(s) of similar type to that specified. No subcontracting of oil/water separator(s) fabrication shall be permitted.

2. Manufacturer shall be able to provide written documentation from Underwriter’s Laboratories, Inc. that the separator has been fabricated and tested to the applicable requirements of Underwriters Laboratories, Inc. UL SU2215.

3. Manufacturer shall provide written documentation that the oil/water separator was “Made in USA.” The product must be "all or virtually all" fabricated in the United States, including the 50 states, the District of Columbia, and the U.S. territories and possessions.

B. Installer's Qualifications:

1. Installer regularly engaged, for past 5 years, in installation of coalescing oil/water separator(s) of similar type to that specified.

2. Employ persons qualified for proper installation of coalescing oil/water separator(s).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle coalescing oil/water separator(s) in accordance with manufacturer’s instructions.

B. Protect coalescing oil/water separator(s) during delivery, storage, handling, and installation to prevent damage.

1.7 WARRANTY

A. Warranty Period:

1. The manufacturer shall:

 a. warrant its products to be free from defects in material and workmanship for a period

 of one (1) year from the date of shipment. The warranty shall be limited to repair or

 replacement of the defective part(s).

 b. supply a ten (10) year limited warranty against external corrosion on terms provided

 by manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Highland Tank & Mfg. Co., Inc.

 One Highland Road

 Stoystown, PA 15563

 Phone 814-893-5701

 Fax 814-893-6126

 E-mail: wastewater@highlandtank.com

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

Specifier Notes: Specify type of facility or operation.

2.2 CORELLA® COALESCING OIL/WATER SEPARATOR(S)

A. Corella® Coalescing Oil/Water Separator(s) shall be designed for gravity separation of free oils (hydrocarbons and other petroleum products) along with some settleable solids from wastewater associated with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ operations.

1. Separator shall be installed underground with top access near or above grade level.
2. The source of the influent to the separator shall be gravity flow from storm water runoff, hydrocarbon spills, and/or cleaning/maintenance operations.

B. The free oil and grease concentration in the effluent from the Corella® Coalescing Oil/Water Separator(s) shall not exceed 10 mg/l (10 ppm). To achieve this goal, it will be necessary to remove all free oil droplets equal to and greater than 20 microns.

Specifier Notes: Specify quantity and nominal oil/water separator(s) capacity, diameter, and length. Nominal separator capacities range from 350 to 50,000 gallons.

C. Quantity: \_\_\_\_\_\_

D. Nominal Oil/Water Separator Capacity: 4,000-gallons, as indicated on the drawings.

 1. Oil/Water Separator capacity and associated oil holding capacity have been calculated to comply with Spill Prevention Control and Countermeasures (SPCC) plan and National Pollutant Discharge Elimination System (NPDES) permit requirements of 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.

E. Nominal Dimensions:

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

2. Nominal Length: 24-feet, 0-inches, as indicated on the drawings.

F. Maximum Flow Rate: 400-gallons/minute, as indicated on the drawings.

G. Conformance:

1. UL SU2215 – Oil/Water Separator Design, Construction, and Performance Standards.
	1. The oil/water separator(s) shall be listed under Underwriter’s Laboratories, Inc. UL SU2215. Construction and performance of the oil/water separator(s) must be in accordance with UL SU2215.
	2. Provide current Underwriter’s Laboratories, Inc. UL SU2215 Certificate of Compliance.
	3. UL SU2215 label shall be prominently displayed on the oil/water separator.
2. API Publication 421, Monographs on Refinery Environmental Control - Management of Water Discharges.
	1. Oil/Water 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.”
	2. 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.
	3. An oil/water separator with lower effective surface area than required is not permissible.
3. Oil/Water 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 integral Steel Secondary Containment.
	1. The inner steel wall shall be completely contained within the outer steel wall, enclosing 100% of the separator volume.
	2. The oil/water separator must have a double steel shell with a space between the layers. The space between the inner and outer steel walls shall be monitored with an approved electronic interstitial monitoring device through a pipe that extends vertically to the top of the separator.
	3. Oil/Water Separator construction using thin wall primary steel wall with external fiberglass jacket shall not be permissible.
4. Pressure testing of oil/water separator.
	1. The oil/water separator(s), their welds, seams and connecting fittings must be factory-tested for tightness using standard engineering practices.
	2. Oil/Water Separator(s) must be guaranteed by the manufacturer to be tight.
	3. Double-Wall Oil/Water Separator(s) shall be shipped with a factory applied vacuum on the interstitial space. Manufacturer shall provide confirmation of vacuum gauge reading after loading for shipment.
5. Oil/Water 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.
6. Oil/Water Separator shall comply with National Fire Protection Association NFPA 30 Flammable and Combustible Liquids Code.
7. Oil/Water Separator volume shall allow for a nominal hydraulic retention time of ten (10) minutes.
	1. Oil/Water Separator volume has been calculated to ensure laminar flow conditions which result in hydraulic uniformity and high effluent quality.
	2. Volume reduction will adversely affect oil/water separator performance by increasing horizontal velocity and turbulence, therefore a separator of smaller volume is not permissible.
8. The oil/water separator shall have the structural strength to withstand static and dynamic hydraulic loading while empty and during operating conditions.
	1. 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.
	2. Calculations, signed and stamped by a Registered Professional Engineer shall be submitted to document structural strength under specified overbearing or external pressure.
	3. An oil/water separator with a reduced shell thickness is not permissible.
9. To prevent extensive shutdown and maintenance, the oil/water separator’s coalescer 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.
	1. The use of plastic perforated tubes, spherical balls, or irregular shaped media will increase the facility’s maintenance costs and shall not be permitted.

H. Construction:

1. Oil/Water Separator shall be cylindrical, horizontal, atmospheric-type double-wall steel vessel intended for the separation and storage of flammable and combustible liquids.
	1. Separator shall be fabricated of \_\_\_\_\_\_ thick mild carbon steel with shell seams of continuous lap weld construction. (Steel thickness determined by burial depth.)
2. The oil/water separator shall be a pre-packaged, pre-engineered, ready to install unit consisting of:
	1. An influent connection 8-inch, flanged.
		1. An internal influent nozzle at the inlet end of the separator.
		2. Nozzle discharge to be located at the furthest diagonal point from the effluent discharge opening.
	2. A velocity head diffusion baffle at the inlet to:
		1. reduce horizontal velocity and flow turbulence.
		2. distribute the flow equally over the separators cross sectional area.
		3. direct the flow in a serpentine path in order to enhance hydraulic characteristics and fully utilize all separator volume.
		4. completely isolate all inlet turbulence from the Oil/Water Separation Chamber.
3. A Sediment Chamber to disperse flow and collect oily solids and sediments.
4. A sludge baffle to retain settleable solids and sediment and prevent them from entering the Oil/Water Separation Chamber.
5. An Oil/Water Separation Chamber containing a removable Corella® inclined parallel flat/corrugated plate coalescer.
	1. The coalescer shall have individual removable plates, sloped towards the Sediment Chamber.
	2. 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 to minimize the facility’s maintenance costs.
	3. 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.
	4. The Corella® coalescer shall:
		1. effect separation of both oil and solids from all strata of the wastewater stream.
		2. 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 one inch.
		3. 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.
		4. direct the flow paths of the separated oil to the surface of the separator and separated solids to the bottom of the separator.
		5. allow solids to fall unhindered by turbulence, and oil droplets to rise, without risk of re-emulsifying due to collisions with interfering solids.
6. The Oil/Water Separation Chamber shall also contain a sectionalized removable "Petro-Screen" polypropylene impingement coalescer designed to intercept oil globules of 20 microns in diameter and larger.
	1. Heavy, one-piece impingement coalescers are not permissible for safety reasons.
7. An internal effluent downcomer at the outlet end of the separator, to allow for discharge from the bottom of the Oil/Water Separation Chamber only.
8. An effluent connection 8-inch, flanged.
9. Fittings for vent, interface/oil level sensor, interstitial monitoring sensor, waste oil pump-out, and gauge.
10. Two (2) 24-inch diameter manways, UL approved, complete with \_\_\_\_\_\_ extension, cover, gasket, and bolts. (Manway extension length determined by burial depth.)
	1. One manway shall be placed between the inlet and the parallel flat/corrugated plate coalescer to facilitate access into Sediment Chamber for solids removal.
	2. 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.
11. Lifting lugs at balancing points for handling and installation.
12. Identification plates: Plates to be affixed in prominent location and be durable and legible throughout equipment life.

Specifier Notes: Specify quantity and size of any additional threaded NPT fittings in item F.

1. Threaded NPT Fittings: Threaded fittings with thread protectors shall be supplied as follows:

a. One (1), 2-inch Diameter: Interface/Oil Level Sensor

b. One (1), 2-inch Diameter: Interstitial Monitoring Sensor

c. One (1), 2-inch Diameter: Normal Vent (per manway in manway extension)

d. One (1), 4-inch Diameter: Oil/Sludge Level Gauging (per manway in manway cover)

e. One (1), 4-inch Diameter: Oil Pump-Out

f. \_\_\_ (\_\_\_), \_\_\_-inch Diameter: NPT fittings located as indicated on the drawings.

I. Corrosion Protection System:

1. Exterior Protective Coating:
	1. Surface Preparation: Steel Grit blast - SSPC-SP 6/NACE No.3 Commercial Blast Cleaning.
	2. External surfaces coated with 75 mils DFT HighGuard Self-Reinforcing Polyurethane.
	3. Polyurethane coating shall have a high cross-link density, which is, in essence, self-reinforcing or self-fibrating. Artificial fillers or reinforcement (chopped fiberglass or roving) shall not be permitted.
	4. Coating shall be subjected to a 15,000 volt spark test after application to ensure coating integrity and effective corrosion protection.
2. Internal Protective Lining:
	1. Surface Preparation: Steel Grit blast - SSPC-SP 10/NACE No. 2, Near-White Blast Cleaning.
	2. Internal surfaces coated with 15 mils DFT solvent-free, two component polyurethane lining. The lining must comply with UL SU2215 and be subjected to the required Physical Properties, Corrosion Resistance, Permeation, and Impact Tests.

Specifier Notes: Specify Optional Equipment. Indicate quantities, delete unwanted items.

Contact Highland Tank for assistance.

J. Corella® Coalescing Oil/Water Separator(s) Options/Accessories:

1. \_\_\_\_\_ UL listed and UL SU2215 approved Interface/Oil Level Sensor, Interstitial Monitoring

 Sensor, and Controls.

* 1. Oil/Water Separator shall be supplied with an audible and visual alarm system that:
		1. indicates a high level and high-high level (audible and visual) of accumulated oil in the oil/water separator.
		2. detects liquid (oil or water) in the interstice of the oil/water separator.
	2. Sensors to be intrinsically-safe, separator-mounted magnetic float probes, suitable for use in Class I, Division II, Group D locations.
	3. Sensor floats to be made of stainless steel.
	4. The control panel shall be NEMA 4X (FRP).
	5. A silence control shall be provided for the audible alarms.
	6. Power to the control panel is to be [ \_\_\_\_\_ ] volt, [ \_\_\_\_\_ ] phase.
1. \_\_\_\_\_ Hold-Down Straps. When oil/water separator(s) anchoring is required.
	1. Polyester corrosion resistant, hold-down straps with turnbuckles and a cable restraint system will be provided.
	2. Steel hold-down straps with neoprene liners shall be provided where polyester straps are not applicable.
2. \_\_\_\_\_ Prefabricated Concrete Deadman Anchors.
	1. Pre-engineered and pre-fabricated concrete deadman anchors may be an acceptable means of anchoring the oil/water separator(s) provided buoyancy calculations are submitted and signed by an engineer of the separator manufacturer.
	2. The concrete deadman anchors must be supplied by the separator manufacturer and have been a standard product for at least five years.
	3. All pre-fabricated concrete deadman anchors shall be sized and installed in accordance with the separator manufacturer’s guidelines.
3. \_\_\_\_\_ Cylindrical and/or rectangular steel Grade Level Manways designed to

 AASHTO H20 requirements.

* 1. Grade Access Manways will consist of:
		1. Structural steel frames with integral concrete anchors and 12” deep steel concrete retention skirts. Manway access covers shall be flush style, skid free composite construction with recessed picking handles for easy removal. All manways will be H-20 truckload rated. Manways shall be furnished by oil/water separator manufacturer.
		2. Oil pump-out and oil level sensor riser pipes shall be recessed below one single grade access manway or multiple manways as shown on contract drawings.
		3. Interstitial sensor riser pipe shall be recessed below 12” dia. x 12” deep grade access manways that is bolted, gasketed and have the words “Tank Monitor” cast into cover.
		4. All grade access manways for a complete oil/water separator installation shall be supplied by the manufacturer for single source supply.
1. \_\_\_\_\_ Spill Container:
	1. Oil/Water Separator shall include one (1) spill container to contain product spills from the Oil Pump-Out Pipe.
		1. Spill container shall be painted or plated steel, 14 gauge minimum thickness.
		2. Hinged lockable metal rainproof lid shall be provided.
		3. Spill container shall have a capacity of not less than five gallons.
		4. Spill containment shall comply with NFPA codes.
2. \_\_\_\_\_ Manufacturer On-Site Training Assistance
	1. On-site training will be included. This project requires Factory Personnel/Factory Representative to perform on-site training upon completion of field wiring and filling of oil/water separator(s).

PART 3 EXECUTION

**3.1 GENERAL**

A. Installation and testing shall be in strict accordance with the Highland Tank’s Oil/Water Separator Users’ Manual available at [www.highlandtank.com](http://www.highlandtank.com).

B. No modifications shall be made to the oil/water separator(s) without the prior written approval of the manufacturer and the Engineer. This includes any welding on separator shells, adding penetrations, modifying the separator structure, or repairing damage that might affect the integrity of the oil/water separator(s).

C. Contractor shall install oil/water separator(s), piping, and equipment (inlet/outlet shut off valves, sensors, pumps, vents, gauges, etc.) in accordance with the manufacturers' installation instructions, industry standard recommended practices and federal, state and local regulations.

D. Oil/Water Separator(s) shall be handled, lifted, stored, and secured in accordance with the

 manufacturer's instructions.

E. The hazards associated with the cleaning, entry, inspection, testing, maintenance or other aspects of oil/water separator(s) are significant. Safety considerations and controls should be established prior to undertaking physical activities associated with oil/water separator(s).

1. Never enter an OWS or enclosed space, under any condition, without proper training and OSHA approved equipment. (Consult OSHA regulation 29 CFR 1910.146 “Permit Required Confined Spaces.”)
2. Entry and cleaning of oil/water separator(s) must be per federal (OSHA), state, and local regulations as well as company requirements.

F. Familiarity with the Site.

1, Contractor shall familiarize self with the location of all public utility facilities and structures that may be found in the vicinity of the construction.

2. The Contractor shall conduct his operation to avoid damage to the utilities or structures.

3. The Contractor is responsible for meeting all the requirements established by the agencies for utility work, as well as work affecting utilities and other government agencies.

3.2 EXAMINATION

A. Examine excavation to receive underground Corella® Coalescing Oil/Water Separator(s).

B. Notify site supervisor or engineer of conditions that would adversely affect installation.

C. Do not begin installation until unacceptable conditions are corrected.

3.3 PREPARATION

Specifier Notes: Include the following paragraph when specifying “HighGuard” Double-Wall Corella® Coalescing Oil/Water Separator(s).

A. Air Test (if required):

1. Perform air test of oil/water separator(s) above ground before installation in accordance with manufacturer’s instructions in Highland Tank’s Oil/Water Separator Users’ Manual or with PEI/RP100.

2. Test Pressure: 5 psi maximum.

3. Bubble solution applied to welded seams.

B. Before Placing Oil/Water Separator(s) in Excavation:

1. Remove dirt clods and similar foreign matter from oil/water separator(s).

2. Visually inspect oil/water separator(s) for damage.

3. Notify site supervisor of damage to oil/water separator(s).

4. Repair or spark test damaged areas of oil/water separator coating in accordance with manufacturer’s instructions in Highland Tank’s Oil/Water Separator Users’ Manual.

a. Spark Testing: Set holiday detector at a minimum of 15,000 volts.

b. Coat holidays, damaged oil/water separator(s) coating, and exposed steel surfaces in accordance with manufacturer’s instructions with compatible coating furnished by separator manufacturer.

c. Retest holidays at 15,000 volts.

3.4 INSTALLATION

A. Install underground Corella® Coalescing Oil/Water Separator(s) in accordance with manufacturer’s instructions in Highland Tank’s Oil/Water Separator Users’ Manual, NFPA 30, and PEI/RP100.

B. Install underground oil/water separator(s) at locations and to elevations indicated on the Drawings.

C. Ensure oil/water separator(s) excavation is free from materials that may cause damage to oil/water separator(s) or separator’s coating.

D. Do not allow foreign matter to be introduced into excavation or backfill during oil/water separator(s) installation.

E. Bottom of Excavation: Cover with clean sand or gravel to depth indicated on the Drawings, suitably graded and leveled.

F. Oil/Water Separator(s) located in areas subject to flooding must be protected against floatation.

G. Oil/Water Separator(s) Placed on Concrete Pad for Anchoring Purposes.

Specifier Notes: Specify the section number for cast-in-place concrete.

1. Concrete for Pad: Specified in Section 03 30 00.

2. Do not place oil/water separator(s) directly on concrete pad.

3. Spread layer of fine gravel, pea gravel, clean sand, or ASTM D 448 #8 coarse aggregate a minimum of six inches deep, evenly spread over dimensions of concrete pad to separate oil/water separator(s) from pad.

4. Oil/Water Separator(s) Bedding Material for Installation in Tidal Area: Fine gravel or pea gravel.

H. Oil/Water Separator(s) Handling:

1. Ensure equipment to handle oil/water separator(s) is of adequate size to lift and lower oil/water separator(s) without dragging, dropping, or damaging oil/water separator or separator coating.

2. Carefully lift and lower oil/water separator(s) with cables or chains of adequate length attached to lifting lugs provided.

3. Use spreader bar where necessary.

4. Do not use chains or slings around oil/water separator shell.

5. Maneuver oil/water separator with guidelines attached to each end of the separator.

I. Hold-Down Straps:

1. Install polyester hold-down in accordance with manufacturer’s instructions in Highland Tank’s Oil/Water Separator Users’ Manual.

2. If steel hold-down straps are used, ensure hold-down straps are separated from oil/water separator by separating pads made of inert, insulation dielectric material.

3. Separating Pads:

a. Minimum two inches wider than width of hold-down straps.

b. Place separating pads at locations on oil/water separator where hold-down straps could come into direct contact with oil/water separator shell.

J. Backfill:

1. Backfill Material: Clean sand, ASTM D 448 #8 crushed aggregate or fine gravel.

2. Place backfill material along bottom side of oil/water separator(s) by shoveling and tamping to ensure oil/water separator(s) are fully and evenly supported around bottom quadrant.

3. Deposit backfill material carefully around and over oil/water separator(s) to avoid damage to oil/water separator(s) and separator coating.

4. Deposit backfill material to depth over oil/water separator(s) as indicated on the Drawings.

K. Plugs:

1. Remove plugs at unused oil/water separator(s) openings, add pipe compound, and reinstall plugs in unused openings.

2. Do not cross-thread or damage oil/water separator(s) fittings when replacing plugs or installing separator piping.

L. Before Placing Backfill Over Oil/Water Separator(s):

1. Final Inspection: Visually inspect oil/water separator(s), separator coating, and pipe connections.

**3.5 ELECTRICAL**

A. Installation of all electrical components including (Electric level sensors, alarm/control panels, electronic actuated inlet/outlet shut off valves, pumps, etc.):

1. Installation shall be in accordance with manufacturers' installation instructions and shall conform to state and local electrical codes with special attention to compliance with requirements for work in classified areas.

2. Provide explosion-proof electrical junction boxes, conduit and seal offs as specified in Article 500 514 of the National Electrical Code.

3. Contractor shall provide wiring and seal-offs for all conduits.

3.6 PROTECTION

A. Protect installed underground steel storage oil/water separator(s) from damage during construction.

**3.7 START-UP, OPERATION AND MAINTENANCE**

A. Corella® Coalescing Oil/Water Separator(s) shall be started, operated and maintained according to the Highland Tank’s Oil/Water Separator Users’ Manual in effect at time of installation.

END OF SECTION