Kleerwater™ Oil Water Separator Specifications

SPECIFICATIONS August, 2005

UNDERGROUND STEEL OIL/WATER SEPARATOR SPECIFICATIONS

SECTION XXXXX
DRAINAGE

PART 1: GENERAL

1.01 Related Documents

1. The provisions of the General Conditions, Supplementary Conditions, Sections included under Division 1, General Requirements, and Section _____ of this Division are included as part of this Section as though bound herein.
2. Refer to details and schedules on the drawings for additional requirements.

1.02 Related Work

1. Concrete drop out box: contractor to furnish and install (1) precast drop out box.
2. Plastic pipe: contractor to furnish and install all necessary PVC drainage pipe and fittings. Contractor shall install one butterfly valve between the drop out box and tank inlet, as well as one additional butterfly valve between the outlet of the separator and the effluent pipe.

1.03 Description/Summary

1. The Contractor shall furnish the labor, materials, equipment, appliances, services and hauling, and perform operations in connection with the construction and installation of the work. Work shall be as herein specified and as denoted on the accompanying Drawings but not limited to the following general terms of work:

    a. Storm sewers.
    b. Sanitary sewer
    c. Catch basin and manholes
    d. Trench drains
    e. Concrete Vaults or chambers
    f. Oil/water separators

2. Provide _____ (single) (dual) wall _____ gallon steel oil/water separator tank(s), hold-down straps and anchoring system, manway extension(s), piping and venting for influent and effluent, vent piping and cap for tank, and oil draw-off pump(s) (if necessary) required to make a complete installation ready for use.
3. The oil/water separator shall be pre-packaged, pre-engineered, ready to install unit. The Contractor shall provide filling of tank(s) with clean water.
4. Tanks/anchoring system shall be constructed for non-flotation under full submersion of water.
5. The Contractor shall mechanically unload the oil/water separator at the job site.

1.04 Governing Standards

1. UL 58 Underwriters Laboratories Inc. Steel Underground Tanks for Flammable and Combustible Liquids
2. UL 1746 Underwriters Laboratories Inc. External Corrosion Protection Systems for Steel Underground Storage Tanks
3. UL Subject 2215 Underwriters Laboratories Inc. Outline of Investigation for Oil/Water Separators
4. National Fire Protection Association (NFPA 30) Flammable and Combustible Liquids Code, (NFPA 30A) Automotive and Marine Service Station Code, (NFPA 70) National Electric Code.
5. Unified Facilities Guide Specification 13202A (July 2002) Division 13, Special Construction, Fuel Storage Systems.
6. All tanks and piping shall be properly installed in accordance with the manufacturer's instructions and either Petroleum Equipment Institute (PEI) Recommended Practice RP100, latest edition; Recommended Practice for Installation of Underground Liquid Storage Systems, or American Petroleum Institute (API) Publication 1615-87; Installation of Underground Petroleum Storage Systems.
7. ASTM Specification D2996, Filament Wound Reinforced Thermosetting Resin in Pipe.
8. EPA Test Method 1664A, Oil and Grease, Recoverable Extraction).

1.05 Quality Assurance

1. Test Data: The manufacturer must provide Certificate of Compliance from Underwriters Laboratories proving that the oil/water separator is capable of producing effluent with no more than 5 ppm free oil and grease (not dissolved nor chemically emulsified with soaps or detergents) when tested using the EPA Test Method 1664A. The test inlet oils are a 50/50 mixture per the UL Subject 2215 guidelines. The testing and results will show results for:
    a. Test will per the UL SU2215 guidelines. The oil/water effluent cannot exceed average of 5 ppm.

2. Oil/water separator tank shall be _____ wall steel, UL labeled, constructed to meet governing standards with certification plate (UL Label) affixed.
3. Shop Drawings: Contractor shall submit _____ copies of shop drawings for each OWS tank. Drawings shall include all critical dimensions, locations of fittings and accessories, i.e.: manways, hold-down straps, manway extensions, etc.
4. All OWS tanks, equipment and piping materials shall be physically inspected and air tested before being installed. Any defects observed shall be immediately brought to the attention of the Owner. It shall be the sole responsibility of the Contractor to correct any deficiencies, with the manufacturer in strict accordance with manufacturer's recommendations, at no additional cost to the Owner.
5. Contractor shall submit _____ copies of the manufacturer's literature including _____ copies of manufacturer's current installation instructions to the Owner.
6. The Contractor shall be a licensed UST installer in the State of _____, during the entire duration of the project. The Contractor shall have the responsibility of notifying and coordinating with all local and state officials, including _____ and the City of _____ Fire Department (where required). The Contractor shall coordinate with the Owner to provide a written site safety plan (where required).
7. Oil/water separators specified herein will not remove oils with specific gravities greater than 0.95, chemical or physical emulsions, dissolved hydrocarbons, or volatile organic compounds (VOC).
8. The Contractor shall obtain and pay for all permits, tests, inspections, etc. required by the local boards that have jurisdiction over the project. All work shall be executed and inspected in accordance with all local and state codes, rules, ordinances, or regulations pertaining to the particular work involved. Should any changes in the contract drawings and specifications be required to conform to such ordinances, notify the Owner at time of submitting bid. After entering into the contract, the Contractor shall be held responsible for the completion of all work necessary for a complete and approved installation without extra expense to the Owner.

PART 2: PRODUCTS

2.00 Acceptable Manufacturers

1. Oil/Water Separator: Modern Welding Company or other Kleerwater authorized manufacturer.
2. Manway Extensions: Modern Welding Company or other Kleerwater authorized manufacturer.
3. Oil/Water Separator Control System: Modern Welding Company or other Kleerwater authorized manufacturer.
4. Oil/Water Interface Float Sensor: Modern Welding Company or other Kleerwater authorized manufacturer.
5. Leak Detection Monitoring System: Modern Welding Company or other Kleerwater authorized manufacturer.
6. Concrete Drop Out Box and Catch Basins: local supplier
7. Concrete Vaults: local supplier or contractor
8. Gate/Butterfly Valves: local supplier or contractor
9. Manholes: local supplier or contractor
10. Vent Cap and Piping: local supplier or contractor
11. Oil Draw Off By Vacuum Truck: local supplier or contractor
12. Pipe Materials: local supplier or contractor
13. Trench Drains: local supplier or contractor

OPTIONAL

14. Oil Storage Tank: Modern Welding Company or other Kleerwater authorized manufacturer.
15. Oil Draw Off Pump: local supplier or contractor
16. Control Panel: Modern Welding Company or other Kleerwater authorized manufacturer.
17. Overfill Sensor for Scavenger Tank: Modern Welding Company or other Kleerwater authorized manufacturer.
18. Extra Sensors: Modern Welding Company or other Kleerwater authorized manufacturer.

Manufacturer equals must be submitted to the engineer for approval at least ____ days prior to bidding. If approved, the engineer shall then forward addendum out for Contractor's consideration.

2.01 OIL/WATER SEPARATOR TANKS: Provide single or double wall steel underground or aboveground oil/water separator tank with fittings and accessories as denoted on the Drawings.

1. Loading Conditions: Tank shall meet the following Design Criteria:

    a. External Hydrostatic Pressure: Buried in ground with five feet of overburden over the top of the tank. (Consult manufacturer for burial depths greater than five feet). The design thickness of the tank shall be based on UL 58 / 1746.
    b. Surface Loads: When installed according to manufacturer's installation instructions, finished grade surface shall withstand surface H-20 axle loads (32,000 lbs/axle) without transferring surface loads to separator tank.
    c. Internal Load: Tank shall withstand 3 psi air pressure test. Test prior to installation, since this design condition is the test for leakage.
    d. Tank shall be designed to support accessory equipment as denoted on plans when installed according to manufacturer's recommendations and limitations.
2. Tank must be separately vented at the influent tee, oil/water separator chamber or manway(s), and at the effluent tee.
3. Tank shall be capable of storing liquids with specific gravity of up to 1.0.
4. Tank shall be capable of storing grease and oils at temperatures not to exceed 100 degrees Fahrenheit at the internal tank surface.
5. Tanks shall be chemically inert to petroleum products.
6. Special coalescing media and associated packs must be purchased from the original tank manufacturer.
7. Provide anchor straps for each tank as necessary. Number and locations of straps shall be as specified by manufacturer.
8. Threaded fittings on UL labeled tanks shall be of a material of construction consistent with the requirements of the UL label. Fittings to be supplied with thread protectors. See contract drawings for size and locations of fittings.
9. Threaded fittings on UL labeled tanks shall have nylon bushings installed for isolation purposes, unless specified piping is PVC or FRP.

CAPABILITY AND DIMENSIONAL REQUIREMENTS

1. Oil/water separator shall be a single or double wall tank.
2. Flow rate shall be from zero (0) to _____ gallons per minute.
3. Nominal volume of the separator tank shall be _____ gallons.
4. The total spill capacity shall be _____ gallons.
5. The total oil storage capacity shall be _____ gallons.
6. Emergency oil storage capacity shall be _____ gallons.
7. Inlet free oil specific gravity shall range from 0.70 to 0.95.
8. Inlet free oil concentration shall be no more than 200,000 parts per million.
9. Effluent free oil shall be no greater than ____ parts per million.
10. Inlet flange diameter shall be _____ inches.
11. Outlet flange diameter shall be _____ inches.

12. Nominal overall length of the tank shall be _____ feet.
13. Nominal outside diameter of the separator shall be _____ feet.
14. Oil/water separator shall be for non-emulsified oil/water mixtures.
15. Operating temperatures of the influent oil/water mixture shall range from 40 degrees Fahrenheit to 120 degrees Fahrenheit.
16. 1-3 access manways shall be provided with each tank.
17. All manways shall be furnished complete with gaskets, bolts, and covers.
18. Location – See standard tank drawings.

2.02 MANWAY EXTENSIONS: Provide manway extensions as shown on the drawings if applicable.

1. Manway extensions shall be provided by the manufacturer, including all bolts, gaskets, covers, etc.
2. Manway extensions shall be furnished with sacrificial anodes per manufacturer's specifications and drawings.
3. The height of the manway extension(s) shall be _____ feet high.

2.03 OIL/WATER SEPARATOR CONTROL SYSTEM: Provide an electronic control panel constructed of UL listed electronic components. The control panel power source is 120 VAC (Contractor provided wiring). The sensor monitoring circuit shall be an intrinsically safe circuit, i.e., the circuit is incapable of releasing sufficient electrical or thermal energy to cause ignition of specific hazardous material under "normal" or "fault" operating conditions.

1. The model number shall be provided by the oil/water separator manufacturer.
2. The number of monitoring circuits shall be four.
3. The electrical components rating shall be weatherproof (NEMA 4).
4. The dimensions of the control unit are dependent on the amount of controls that are being monitored by the control unit.
5. The oil interface level sensor(s) are connected at the control panel.
6. All control panels include:
    a. Visual alarm(s)
    b. Audible alarm(s)
    c. Auxiliary dry contacts switch output for each sensing circuit
    d. Panel housing materials: Epoxy coated steel, fiberglass, or plastic
    e. Warning horn silence switch
    f. Electronics do not require shielded cable. Sensor cable uses #16 AWG up to 450 feet (provided by Contractor) *

    NOTE: All wiring materials and electrical connections are to be provided by the Contractor. Wiring is required from the power source to the control panel and from the control panel to the control assembly. Sensor wires must be in a separate conduit from the power wires.

2.04 OIL/WATER INTERFACE FLOAT SENSOR: Provide an Oil/Water Interface Alarm Sensor(s) that is used to determine two separate high waste oil levels in the separator. Level one is to activate at 20% oil and activates a visual alarm. Level two is to activate at 40% oil and activates a visual and audible alarm.

1. The oil/water interface sensor shall be furnished by the oil/water separator manufacturer.
2. The Contractor is responsible for finalizing the height of the riser pipe and for contacting the oil/water separator manufacturer with the details so the proper length model can be provided.
3. First Oil Level Warning Alarm: This alarm warns that the oil/water separator tank is at a high level and the oil will need to be removed soon.
4. Second Oil Level Warning Alarm: This alarm warns that the oil/water separator tank is at a dangerously high level and the oil will need to be removed immediately.

2.05 TANK LEAK DETECTION SYSTEM (DOUBLE WALL TANKS ONLY): Double wall tanks shall provide an interstitial space between the primary and secondary tank wall to allow for monitoring liquids between the tank walls. The sensor shall be capable of alarming in either water or hydrocarbons. The alarm shall be connected to the control panel and shall have visible and audible alarms. When the sensor is activated, the alarms shall be energized for the Owner to investigate the possible leak.

1. Oil/water separator tank manufacturer shall provide the interstitial sensor when requested by Owner.

2.06 CONCRETE DROP OUT BOX AND CATCH BASINS: Contractor to furnish and install precast drop out box and catch basins.

1. Catch basins shall be precast concrete conforming to ASTM C478, latest edition.
2. Bottom, sides and top shall be designed and constructed to withstand backfill pressures and surcharge pressures resulting from AASHTO H20-44 loading.
3. Castings shall be gray iron conforming to ASTM A48 and shall be designed to sustain AASHTO H20-44 wheel loads.

2.07 GATE/BUTTERFLY VALVES: Contractor shall furnish a _____ -inch gate/butterfly valve with stem extensions. Valves shall be located between the drop out box and tank inlet, as well as one located downstream of the effluent.

1. The valves must be 100% open during normal operation to prevent flow turbulence.
2. The valves must be the same size as the piping with no valve seat or trim reduction.
3. When gate valves are used, the Contractor shall provide access to the operating stem with PVC pipe. The PVC pipe should overlap the containment manhole skirt to prevent backfill intrusion.

2.09 INLET AND OUTLET PIPING: Provide _____ -inch inlet and _____-inch outlet tees for the described separator system. The flanges are to be standard ANSI class 125/150 flanges.

1. Plug the inlet and outlet pipe until the drainage site is paved and the drop out box is installed.
2. Inlet and outlet piping to and from the separator tank must be greater than or equal to the tank inlet and outlet diameter.
3. Both inlet and outlet piping elbows must be vented individually to the atmosphere.

2.10 MANHOLES: Provide manholes as needed from the schedule shown below:

1. Oil Draw Off Manhole: Industry standard spill containment manhole. Emco Wheaton A1003-009 or OPW 4580 or equal.
2. Oil/Water Interface Sensor Manhole: Round manhole with gaskets. Manhole to be offset to allow maximum clearance between oil draw off manhole and interface sensor manhole.
3. Access Manhole for clean grit chamber.
4. Access Manhole for Coalescer removal.

2.11 VENT CAP AND PIPING: Provide vent materials according to the schedule below. Contractor to use 2-inch FRP or PVC single wall piping.

1. Vent Cap: 2-inch aluminum upward “V” vent cap. OPW 23 or equal.
2. The OWS tank inlet, outlet, and tank itself must be vented separately to the atmosphere to ensure proper operation of the OWS tank. See drawing for details.
3. All vents must be separate. Manifolding of vent pipes is only allowed on tank vents, manway to manway. No other manifolding is allowed.

2.13 PIPE MATERIALS: Provide the following materials as specified on the drawings.

1. Ductile iron pipe, designated DIP on the drawings, shall be centrifugally cast push on joint ductile iron pipe conforming to ANSI Specification A21.51 with rubber gaskets conforming to ANSI Specification A21.11 Fittings shall be ductile iron conforming to ANSI Specification A21.10.
2. Polyvinyl chloride pipe and fittings, designated PVC on the drawings, shall conform to ASTM D3034, SDR 35.
3. Reinforced concrete pipe, designated RCP on the drawings, shall conform to ASTM C76, Class IV, Wall B, with gasketed joints conforming to ASTM C443.

2.14 TRENCH DRAINS: Provide the following materials as specified on the drawings.

1. Trench drains shall be a precast polymer concrete system of interlocking channel sections with fitting outlets, endcaps, and catch basins equal to Polydrain as manufactured by ABT Inc., Troutman, N.C.

2. Grate shall be ductile iron frame and grate equal to Polydrain Part Number 514 with the Locking Device Number 815c.

2.15 OPTIONAL WASTE OIL/SCAVENGER TANK: Provide _____ gallon single or double wall underground or aboveground steel tank with fittings and accessories as denoted on the drawings.

1. Loading Conditions: Tank shall meet the following design criteria:
    a. External Hydrostatic Pressure: Buried in ground with five feet of overburden over the top of the tank. (Consult manufacturer for burial depths greater than five feet). The hole fully flooded and a safety factor of 3:1 against general buckling.
    b. Surface Loads: When installed according to manufacturer's installation instructions, finished grade surface shall withstand surface H-20 axle loads (32,000 lbs/axle) without transferring surface loads to separator tank.
    c. Internal Load: Tank shall withstand 3-5 psi air pressure test. Test prior to installation, since this design condition is the test for leakage.
    d. Tank shall be designed to support accessory equipment as denoted on plans when installed according to manufacturer's recommendations and limitations.
2. Tank must be separately vented at the influent tee, oil/water separator chamber or manway(s), and at the effluent tee.
3. Tank shall be capable of storing liquids with specific gravity of up to 1.
4. Tank shall be capable of storing grease and oils at temperatures not to exceed 100 degrees Fahrenheit at the tank interior face.
5. Tanks shall be chemically inert to petroleum products.
6. Provide anchor straps for each tank as shown. Number and locations of straps shall be as specified by manufacturer. Each strap shall be capable of withstanding the buoyancy load for tank diameter.
7. Threaded fittings on UL labeled tanks shall be of a material of construction consistent with the requirements of the UL label. Fittings to be supplied with metallic plugs. See contract drawings for size and locations of fittings.

2.16 OPTIONAL OIL DRAW OFF PUMP: Separator shall be furnished with oil level/liquid level controls to start and stop oil pump at predetermined levels. Contractor to furnish a 2-inch secondarily contained pipe to connect the pump to the oil/water separator tank.

2.17 OPTIONAL OVERFILL SENSOR FOR SCAVENGER TANK: Contractor to provide a tank product level alarm float switch for the scavenger tank. This sensor is used to determine when the waste oil in the scavenger tank approaches a predetermined level. The control panel alarm shall activate when the high level float hits the set point. The sensor will not provide overfill shutoff.

1. The sensor is to be stainless steel or brass as determined by the oil/water separator manufacturer.
2. The sensor is to have stainless steel or brass stem.

3. The sensor is to have intrinsically safe circuits.

2.18 OPTIONAL WATER RETURN SUPPLY: Contractor to provide an automatic water return supply to the oil/water separator. This supply is required when using Option 2.15. The oil/water separator will only operate properly when it is full of water. Option 2.15 removes the waste oil from the tank which drops the water level in the tank and will cause it to not function effectively. Therefore, the Contractor must supply a 2-inch water return line with a water control valve. When the oil draw off pump shuts off, the control panel switches the water control valve to open. A water level sensor inside the oil/water separator reaches its designated set point at 90-100% full level in the tank. When this set point is reached, this triggers the control panel to shut the water control valve. All of the sensors are to have intrinsically safe circuits. All sensor wiring and power wiring to be run in separate conduits.

2.19 OPTIONAL INTERSTITIAL SENSORS: Contractor to provide a monitoring system to monitor the interstitial space in a double wall oil/water separator tank. The sensor is to be tied into the control panel.

PART 3: EXECUTION

2.20 3.1 INSTALLATION OF TANKS

1. Refer to current installation instructions for Kleerwater Oil/Water Separator Tanks.

3.2 START UP AND OPERATING INSTRUCTIONS

1. Refer to current start up and operating instructions for Kleerwater Oil/Water Separator Tanks.

3.3 MAINTENANCE INSTRUCTIONS

1. Refer to current maintenance instructions for Kleerwater Oil/Water Separator Tanks.

3.4 GENERAL NOTES

1. Refer to Kleerwater general notes.