WASTEWATER TREATMENT SYSTEMS

Highland Tank®

- Oil/Water Separators
- Oil/Sand Interceptors
- Filtration Systems
- Catch Basins

Proudly made in America

Unmatched Quality & Service

Our mission

Highland Tank's mission is to engineer and manufacture quality products while providing innovative solutions through relationships founded upon integrity and excellence in customer service.

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Highland Tank®

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Manufacturing Capabilities

Experience
Upholding a tradition of uncompromising craftsmanship and a commitment to providing solutions to even the most challenging storage and wastewater treatment tank projects has made Highland Tank the leader in the steel tank industry. Engineering depth, state-of-the-art equipment and skilled craftsmen with pride and the traditional American work ethic have given us the tools needed to maintain our dedication to quality production since 1946.

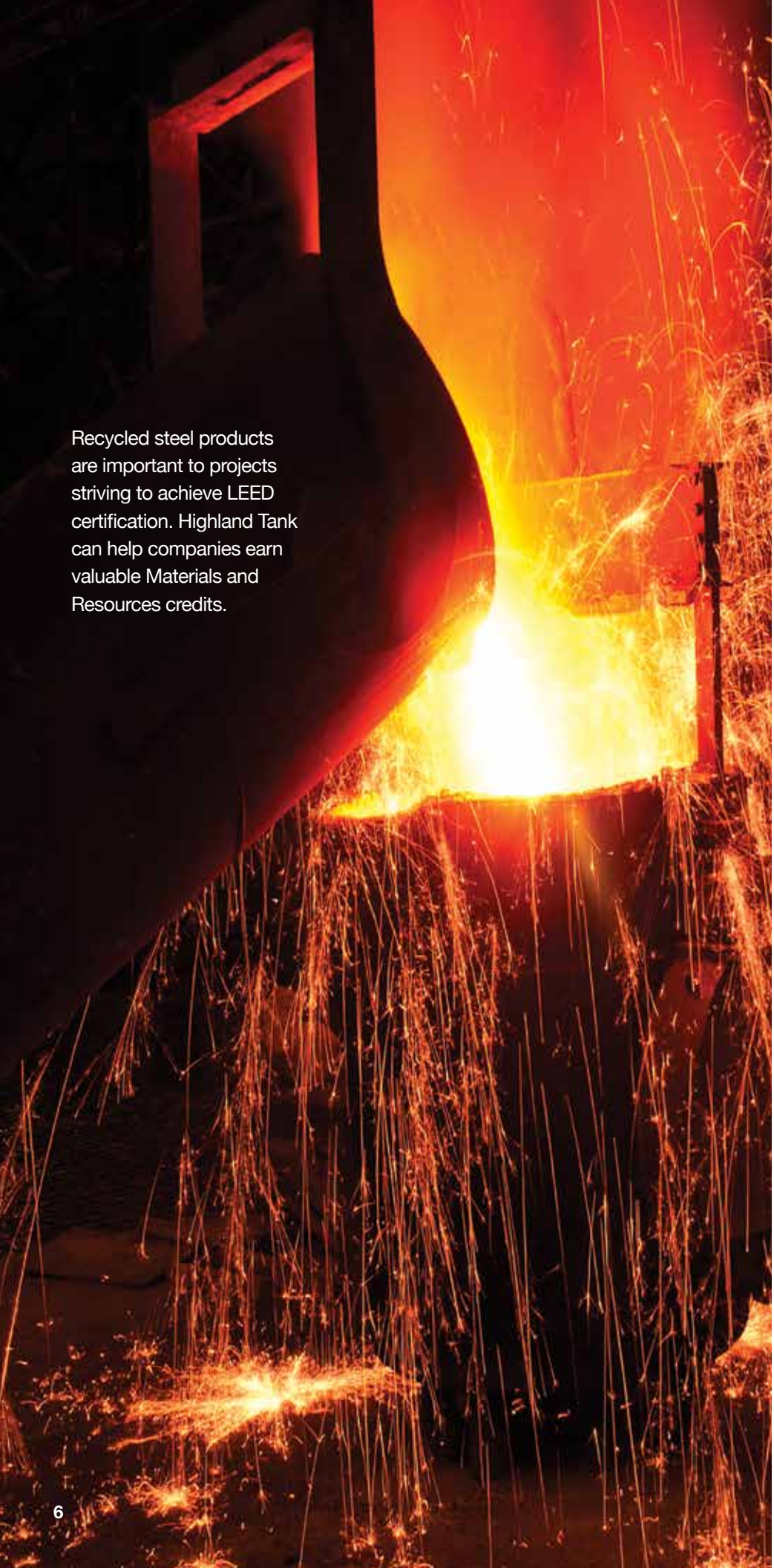
Capability, Capacity, Commitment
Highland Tank has facilities strategically located to serve our core markets in the United States. Our team works with the proper tools and latest technology to help build the highly customized products required in today's world. Steps are constantly being made to keep Highland Tank on the cutting edge. Even in times when many companies are cutting back and downsizing, Highland Tank is committed to our clients. We are adding a new, large, state-of-the-art facility, which will allow us to build the larger, heavier tanks and vessels that are in demand. This is just one more reason Highland Tank remains the leader in steel tank manufacturing.

Quality Assurance
All of our products are backed by our helpful support staff to ensure quality throughout every phase of your project. Highland's team of professionals in design, engineering, fabrication, sales, delivery and service provide you with outstanding solutions for your liquid storage and treatment challenges. Our products are competitively priced and readily available from our national distribution network and six manufacturing facilities.

Manufacturing area:
296,000 ft^2 at six locations

Maximum Physical Fabrication Size:
Horizontal separators: 70,000 gallons
Vertical tanks: 57,500 gallons
ASME pressure vessels: 60,000 gallons
Maximum diameter: 14'-0"
Maximum length: 90'-0"
Steel rolling - up to 1-1/4" thick

Product Transportation:
Highland Tank takes product delivery seriously. We have our own fleet of trucks and team of experienced drivers. Your product will be in the hands of people who transport oversized loads every day, taking pride in timely delivery and providing Highland's signature service.



Recycled steel products are important to projects striving to achieve LEED certification. Highland Tank can help companies earn valuable Materials and Resources credits.

The Steel Advantage

Steel is the material of choice at Highland Tank because of its many advantages, and it should be yours too. As a construction material, steel is strong, affordable, reliable and environmentally friendly. Steel's unique combination of properties and characteristics enable it to achieve performance levels required in today's storage and wastewater treatment tanks.

Specified for Strength

We buy steel according to our own strict guidelines and rigid ASTM specifications. Our mild carbon steel is fine grain with superior toughness and surface quality that offers both weldability and improved corrosion resistance. The time-tested strength and performance of steel remains unparalleled.

Steel's structural integrity can even withstand extreme weather conditions or natural disasters. State-of-the-art fabrication technology, welding, linings and coatings reinforce the durability of Highland's mild carbon and stainless steel products.

Steel: The Material of Choice

Superior Structual Strength

Environmental Benefits
Steel has the highest recycling rate of any durable material in the United States. Unlike concrete or plastic separators, even those reinforced with fiberglass, recycled steel separators ultimately keep a valuable commodity out of the nation's landfills. In addition, the latest recycling processes drastically reduce industrial emissions to air and water by over 70%, accompanied by a reduction of approximately 30% in the amount of energy required to produce new steel.

"Green" Building and Buying
Why is this important to our customers? Buying "green" is an opportunity to use our resources efficiently, build a better environment and provide cost savings. The EPA has even proposed new federal procurement guidelines for recycled products.

As all of our steel tank products are 100% recyclable, Highland Tank will form an integral part of your "green" building and will provide contemporary architects and engineers with a forceful response to our society's sensitive environmental concerns.

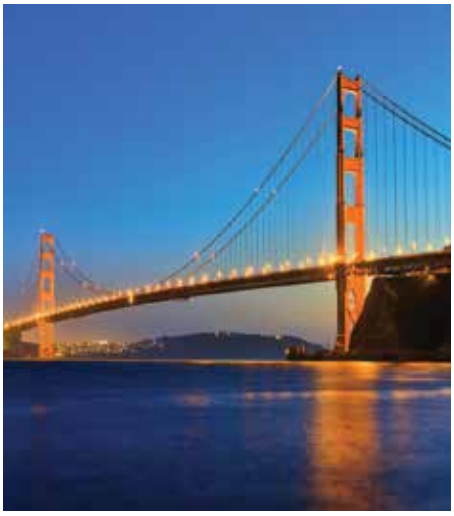
100% Recyclable

Stainless Steel Construction
Highland Tank has a long and successful record of manufacturing stainless steel wastewater treatment tanks for our commercial and industrial customers. Our oil/water separators and interceptors are manufactured from 304, 304L, 316 or 316L stainless steel for compatibility with many chemicals and corrosive environments.

Contemporary steel-making technology enables stainless steel to be welded and fabricated as readily as conventional steels. Additionally, stainless steel has many unique properties that may make it the best choice for your special requirements.

Advantages
The bright, easily maintained surface of stainless steel provides a clean, contemporary appearance. Stainless steel is corrosion-resistant to a large number of liquids. It is usually selected when carbon steel or internal linings are not compatible with the product to be stored.

Customized for Your Needs
Because every application is unique, Highland Tank's stainless steel tanks are made-to-order. When specifiying or ordering custom stainless steel tanks from Highland Tank, our experienced staff will assist you in selecting just the right grade and combination of features to meet your specific needs.



Highland Tank Sets the Standard

We offer innovative steel fabrication combined with a variety of specialty coatings designed to meet your specific needs. Many of our products feature patented technology, including Corella® coalescer, state-of-the-art coatings and linings and fabrication techniques. Highland Tank separators are built to one or more of the standards listed below:

American Petroleum Institute
- API - 421

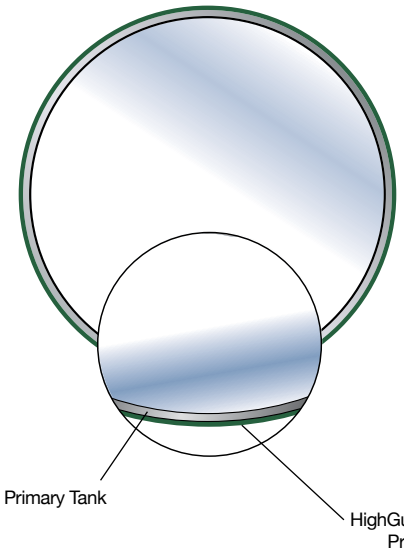
Underwriters' Laboratories, Inc.
- UL-58
- UL-142
- UL-1746
- UL-2085

Highland Tank Oil/Water Separators are available with a UL-SU2215 label meeting UL's strict construction and performance requirements.

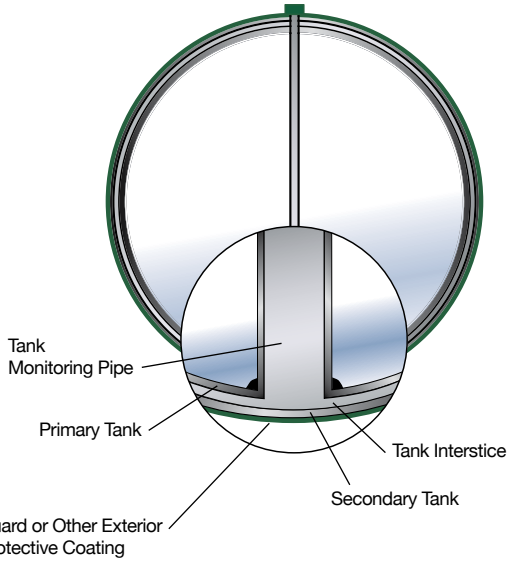
Single-Wall Construction
The fabrication process begins with rolling steel that meets ASTM specifications. Steel plates from 7 gauge to 1-1/4 inch thick are rolled to form the rigid shell. Steel plates are formed, fitted and lap-welded to provide superior "ribbed" strength. Flat-flanged heads are standard, as are continuous exterior welds on all joints.

Double-Wall Construction
Double-wall separators are constructed by wrapping a secondary wall completely around the primary tank. The space between the two walls, known as the interstice, assures a rapid fluid migration rate not less than one centimeter per second, vastly superior to the allowable rate. The interstitial space can be electronically monitored to immediately detect a leak.

Single-Wall Construction



Double-Wall Construction



Baffles, Bulkheads & Compartments
Baffles and impervious bulkheads are used to create compartments for multiple fluid and solids treatment and storage options.

Flange Fittings & Manway
Fittings of various sizes and styles (NPT and flanged) enable connections to external piping systems and for venting. Cylindrical manways up to 42" diameter are available.

Highland also manufactures large rectangular EZ-Access manways which allow for safe and convenient access for inspection and maintenance.

Factory Testing
A 5 psi factory air test and seam inspection is conducted on every separator. All double-wall underground separators are shipped with a vacuum on the interstice for continuous testing to guarantee integrity of both the primary and secondary tanks until installation.

Advanced Corrosion Protection

Performance Coatings
Proper surface preparation is an important factor in any successful coating or lining. Quality assurance is maintained through Highland Tank's complete in-house grit blast cleaning, finishing and curing facilities.

Our facilities are temperature-controlled for year-round application. Only qualified and experienced personnel, working under stringent guidelines, are permitted to apply our wide range of spray-applied high performance formulations, including epoxies and high-build polyurethanes. Exterior coatings and interior linings are selected to meet specific site conditions and service requirements.

HighGuard

The HighGuard corrosion protection system is Highland Tank's own innovative coating. This coating demonstrates an excellent balance of flexibility, impact strength and protection from abrasion and corrosion. The plural-component polyurethane has been approved by Underwriters' Laboratories, Inc. under UL 1746 Part IV. HighGuard's 75 mil thick coating provides permanent and fully effective corrosion protection that can be measured in decades rather than years.

In addition to HighGuard, Highland Tank also offers several Steel Tank Institute approved systems, with or without pre-engineered cathodic protection.

Saving Our Environment for Future Generations

The public's increasing interest in the conservation of our nation's water resources has directly affected industries worldwide. Pressure to control harmful oil spills and discharges from industrial facilities has resulted in more stringent regulations, causing industries to face costly penalties for noncompliance.

Industrial facilities with oil storage and handling activities commonly produce wastewater containing oil, grease, floating debris and settleable solids. Highland's extensive line of wastewater treatment systems helps these facilities comply with the EPA's NPDES regulations for the proper treatment and discharge of contaminated storm water runoff. These systems also satisfy SPCC requirements for spill control and secondary containment.

The method of treatment depends on the concentration, the type of contaminants in question and the location of the discharge. The key to success for collecting, separating and treating oily wastewater on-site is properly configuring the best available technologies to optimize performance and limit operational costs of the system.

A well-designed drainage system equipped with a Highland Corella® Oil/Water Separator or Sand/Oil Interceptor as the primary step, frequently combined with an Advanced Hydrocarbon Filtration System (AHFS) secondary step, can economically treat most wastewater flows to achieve nearly all discharge limitations and water quality standards for petroleum compounds.


HighGuard

Oil/Water Separators

Featuring Patented Corella® Technology

Highland Tank provides the strongest and most reliable oil/water separators in the industry.

Our separators are designed to remove oil, grease, light petroleum products and oily-coated solids from a variety of wastewater discharges.

They are typically installed in industrial areas and receive oily wastewater generated during processes such as bulk petroleum storage and handling, aircraft and vehicle fueling, maintenance and washing and environmental remediation of petroleum contaminated sites.

The effluent from oil/water separators is typically discharged to either a storm sewer or a sanitary sewer system.

Since 1986, Highland's Oil/Water Separators have set the standard for reliability. Our parallel plate separators are highly efficient — treating wastewater under a wide range of conditions.

Unlike other oil/water separators, they are easy to install, operate and maintain.

A wide range of industrial applications require high-efficiency oil/water separators. Some examples include:

- Airports & Aircraft Services
- Electric Utilities & Power Plants
- Environmental Remediation
- Industrial Facilities
- Military & Government Installations
- Municipalities
- Petroleum Production & Marketing Facilities
- Railroad Yards
- Transportation Companies

They are also located in vehicle service areas associated with each of these facilities:

- Fueling Facilities
- Repair and Maintenance Shops
- Wash Areas

Unparalleled in Performance

Our separators are unparalleled in performance, ease of maintenance, structural strength, product compatibility and corrosion resistance. With over 15,000 units in commercial operation worldwide, our patented oil/water separators have a proven record of reliability.

Highland Tank's engineers have designed a functional means of primary separation that meets and surpasses federal, state and local oil and grease discharge limitation requirements.

- Highland's separators can be designed to handle high flow rates and remove oils with specific gravities from 0 to .95
- API-421 design criteria can be employed to engineer a separator to the specified wastewater flow rate, temperature, oil globule size and specific gravity of oil and wastewater
- Effluent quality down to 10 ppm has been consistently demonstrated on our high-performance Mode HTC UL-SU2215 labeled oil/water separators

Our products are available in a wide range of standard sizes and capacities available in either single-wall or double-wall construction. Double-wall oil/water separators with electronic leak etection are required for those states and counties where underground oil/water separators are considered to be "commercial underground storage tanks."

More importantly, they may be mandated if the EPA's proposal to eliminate the deferral on certain wastewater treatment tanks is promulgated.

We also offer a variety of design options complete accessory packages, including leak and level sensors, alarm/control panels, influent, effluent and oil pump systems. Whether your oil/water separator application is for emergency spill control or high performance wastewater treatment, Highland Tank has the product for you.

Few names in the field of oil/water separator manufacturing are as widely recognized as Highland Tank.

The Corella® Coalescer

The Corella® inclined parallel plate coalescer combines the features of both a flat plate separator and a corrugated plate separator into a “self-cleaning” design that performs better than traditional plate coalescers.

The primary reason for oil/water separator failure is coalescing plates clogging with settleable solids. The Corella® solves the problem of extensive separator shutdown and maintenance by simultaneously separating free oil droplets and settleable or suspended solids from water, without clogging the coalescer.

The difference lies in our precise manufacturing of the coalescer with inclined parallel plates that are flat on the top and corrugated on the bottom.

The plates are constructed and arranged to allow settleable solids to accumulate on the flat top of the plates and slide downward, while the oil coalesces into sheets on the corrugated undersides and flows upward. Unlike other oil/water separators, both oil and solids can be removed without shutting down the separator for periodic cleaning.

Utilizing Highland's EZ Access manways, inspection of the Corella® is made easy, without a dangerous confined space entry. Both oil and solids can be removed without shutting down the separator. The access from above permits separator pumpout and cleaning using a high-pressure washer with the coalescer in place, so that hazardous materials are not discharged at grade during the cleaning process.

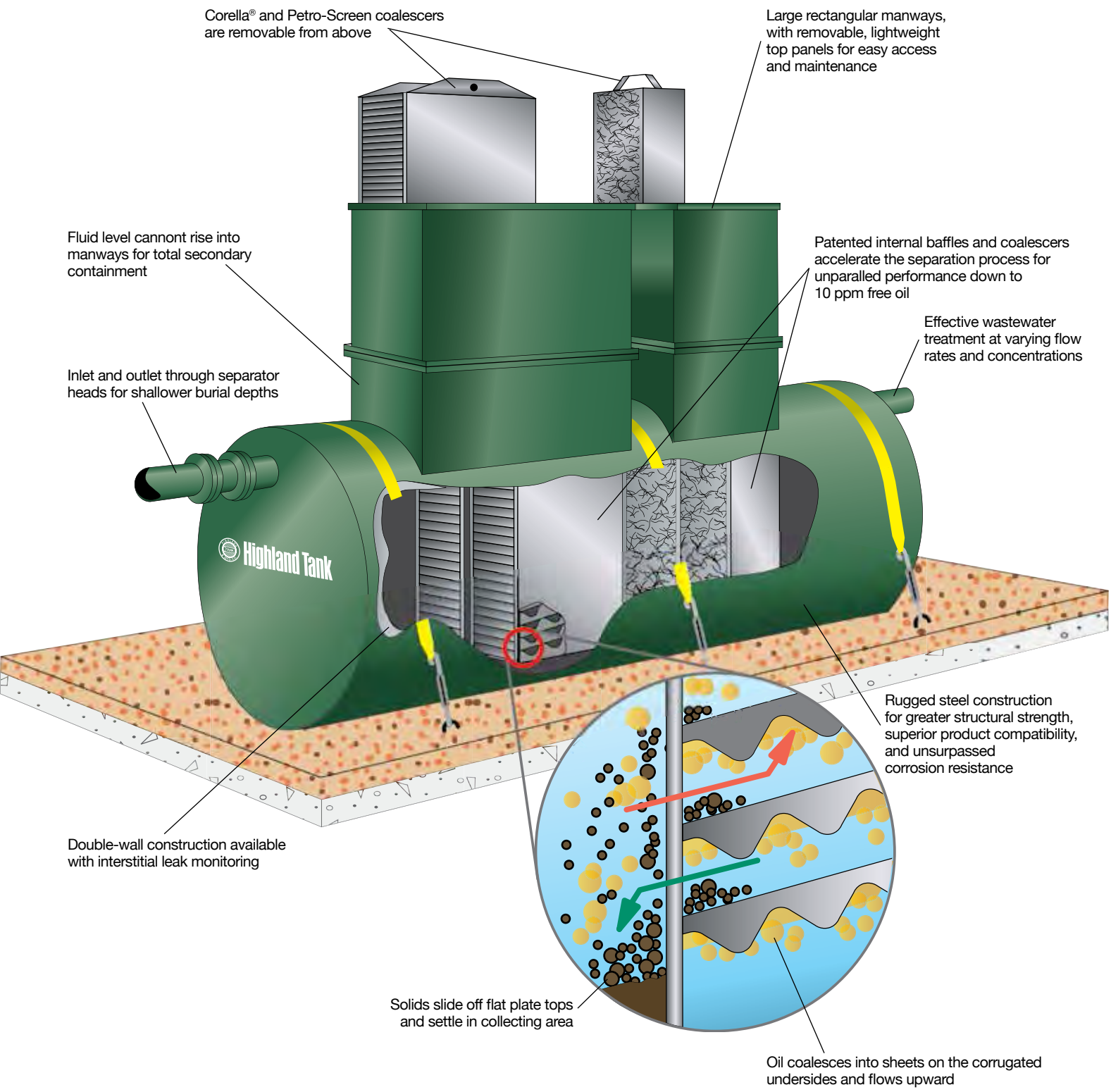
This “self-cleaning” design performs better than traditional plate coalescers. Corella® plate packs are available with a variety of pack lengths and angles and are tailored to the specified separator duty. They can be configured to meet a wide variety of capacities and conditions and can be integrated with many other unit operations to provide a total solution to a water treatment problem.

Features, Advantages & Benefits

- Permits separation of mixtures containing both oil and settleable solids without the solids clogging the coalescer
- Provides improved oil separating efficiency
- Operates on water temperatures from 40º to 120º F (Higher operating temperature units are available)
- Handles wide range and specific gravities of oil and suspended particle concentration
- Manufactured of oleophilic (oil-attracting) materials or stainless steel
- Constructed using multiple cartridges to allow for easy removal
- Custom packs are available for higher flow rates, temperatures or solids loading

Corella®

The Corella® Coalescer is a removable, inclined parallel, flat/corrugated plate coalescer that enhances separation of both oil and solids from all strata of the wastewater stream. It is individually engineered to specific application and job-site requirements to maximize utility.



Cleaner, Safer, Smarter

How It Works

Highland Tank's patented oil/water separators are stationary wastewater treatment tanks, filled with water. They contain specially designed internal baffles and coalescers to accelerate the separation process.

The tank is designed to allow convenient access for inspection and maintenance from above. Inlet flow is directed against the velocity head diffusion baffle to reduce flow turbulence and to distribute the flow evenly over the separator's cross-sectional area.

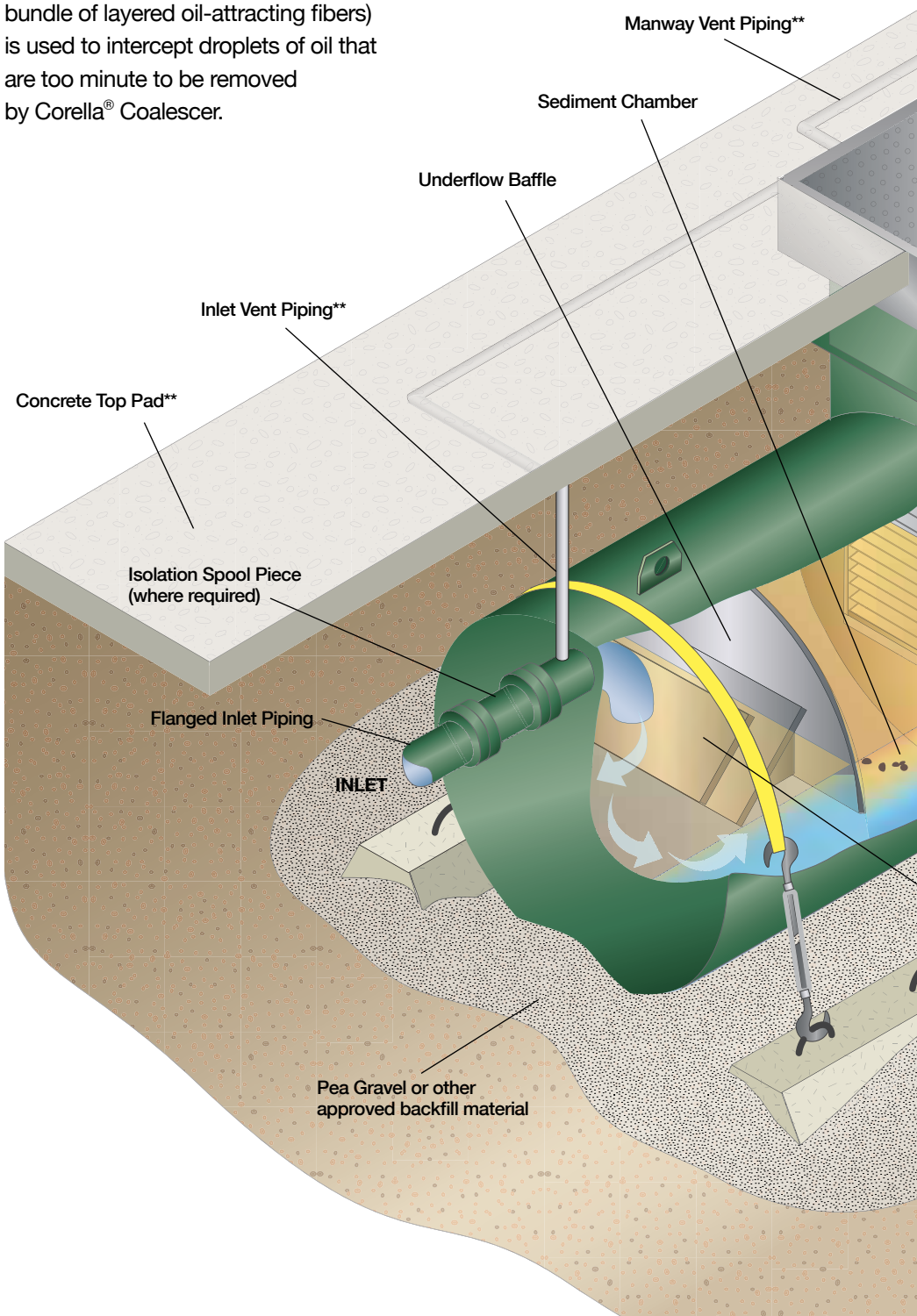
In the sediment chamber, heavy solids settle out and concentrated oil rises to the surface. The oily water then passes through the Corella® Coalescer, an inclined arrangement of stacked, parallel, flat and corrugated plates. The corrugated underside of the Corella® plates causes the oil to coalesce into sheets.

The oil globules then rise to the surface of the separation chamber, where the separated oil accumulates.

Any remaining solids sink to the top of the plates and slide off the plates to the solids collection area. The effluent flows down and toward the outlet and is discharged by gravity displacement.

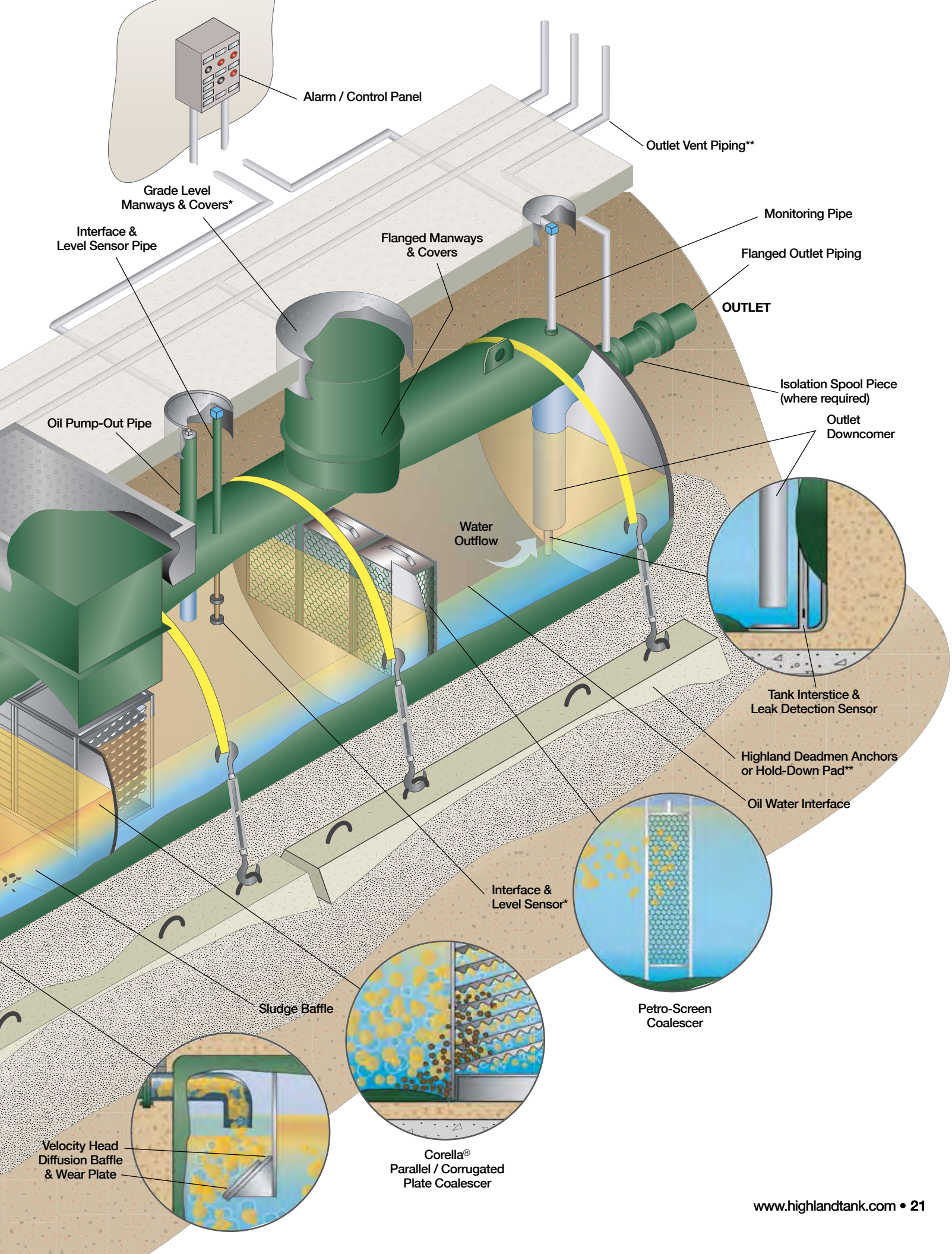
A Petro-Screen polypropylene impingement coalescer (an encased bundle of layered oil-attracting fibers) is used to intercept droplets of oil that are too minute to be removed by Corella® Coalescer.

Electronic oil level controls sound an alarm at high oil levels so that waste oil can be removed from the separator. Double-wall separators are monitored with electronic leak detection systems for the interstitial space.

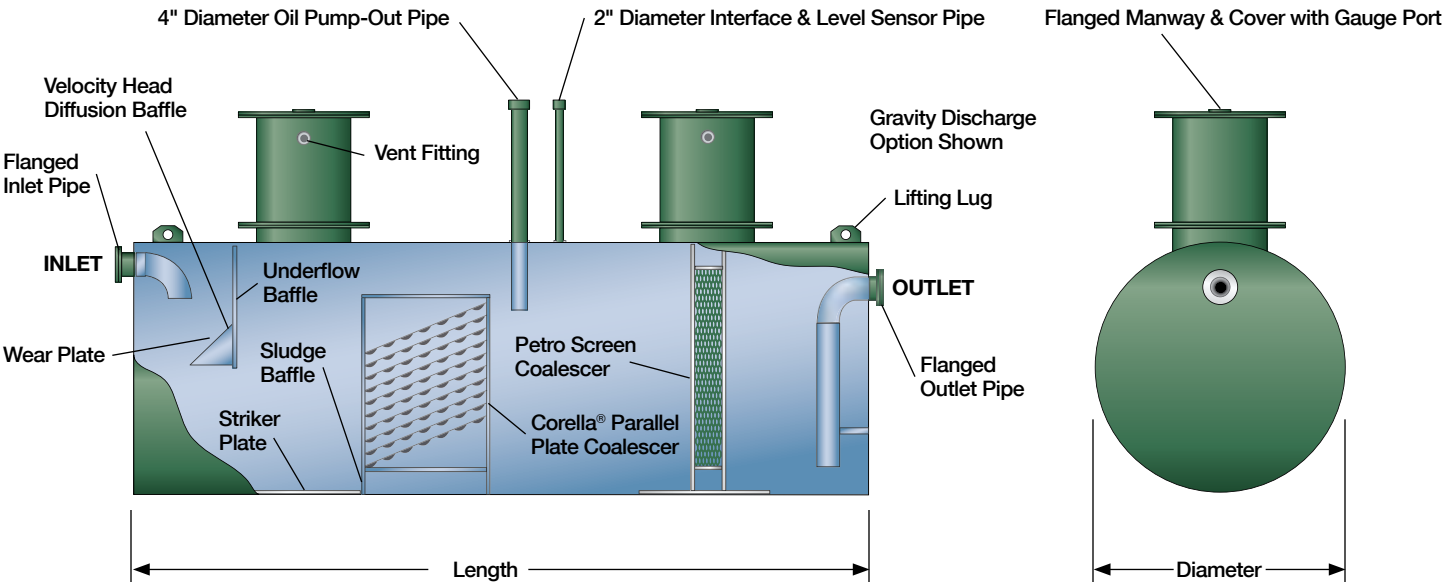


Model HTC Oil/Water Separator
with EZ Access option shown.

*Optional equipment available from Highland Tank.
**Installer supplied equipment


Alarm / Control Panel
Outlet Vent Piping**
Grade Level
Manways & Covers*
Interface &
Level Sensor Pipe
Flanged Manways
& Covers
Monitoring Pipe
Flanged Outlet Piping
OUTLET
Isolation Spool Piece
(where required)
Oil Pump-Out Pipe
Outlet
Downcomer
Water
Outflow
Tank Interstice &
Leak Detection Sensor
Highland Deadmen Anchors
or Hold-Down Pad**
Oil Water Interface
Interface &
Level Sensor*
Sludge Baffle
Petro-Screen
Coalescer
Velocity Head
Diffusion Baffle
& Wear Plate
Corella®
Parallel / Corrugated
Plate Coalescer

Cylindrical Separator Sizing Guide



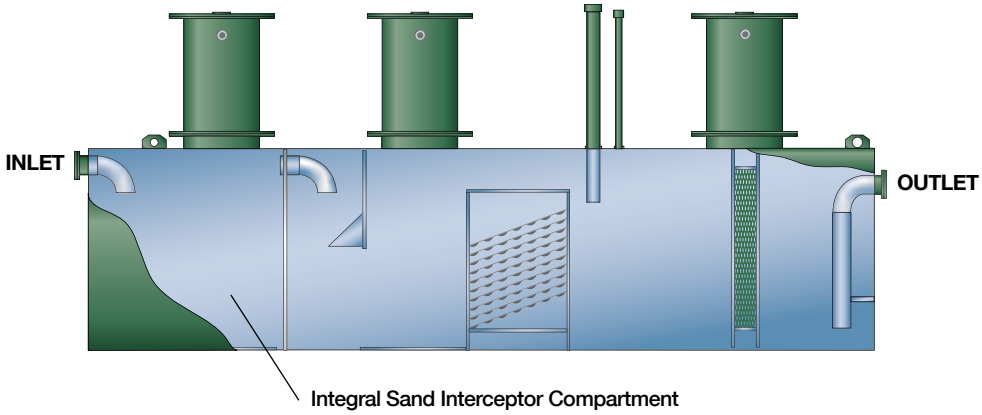
Model HT or HTC	Flow Rate Gal/Min	Total Volume Gallons	Recommended Oil Pump-out Gallons	Dimensions		Inlet & Outlet Diameter
				Diameter	Length	
350	35	350	70	3'-6"	6'-0"	4"
550	55	550	110	3'-6"	7'-9"	4"
1,000	100	1,000	200	4'-0"	10'-9"	6"
2,000	200	2,000	400	5'-4"	12'-0"	6"
3,000	300	3,000	600	5'-4"	18'-0"	8"
4,000	400	4,000	800	5'-4"	24'-0"	8"
5,000	500	5,000	1,000	6'-0"	23'-10"	8"
6,000	600	6,000	1,200	6'-0"	28'-8"	10"
7,000	700	7,000	1,400	7'-0"	24'-4"	10"
8,000	800	8,000	1,600	7'-0"	28'-0"	10"
9,000	900	9,000	1,800	8'-0"	24'-0"	12"
10,000	1,000	10,000	2,000	8'-0"	26'-8"	12"
12,000	1,200	12,000	2,400	8'-0"	32'-0"	12"
15,000	1,500	15,000	3,000	10'-0"	25'-6"	14"
20,000	2,000	20,000	4,000	10'-6"	31'-0"	16"
25,000	2,500	25,000	5,000	10'-6"	38'-9"	18"
30,000	3,000	30,000	6,000	10'-6"	46'-6"	20"
40,000	4,000	40,000	8,000	12'-0"	47'-3"	24"
50,000	5,000	50,000	10,000	12'-0"	59'-6"	24"
60,000	6,000	60,000	12,000	13'-0"	60'-6"	24"

Plate spacing and orientation may vary depending on site conditions. Custom sizing is available.
Consult Highland Tank for Series G & J sizing information.

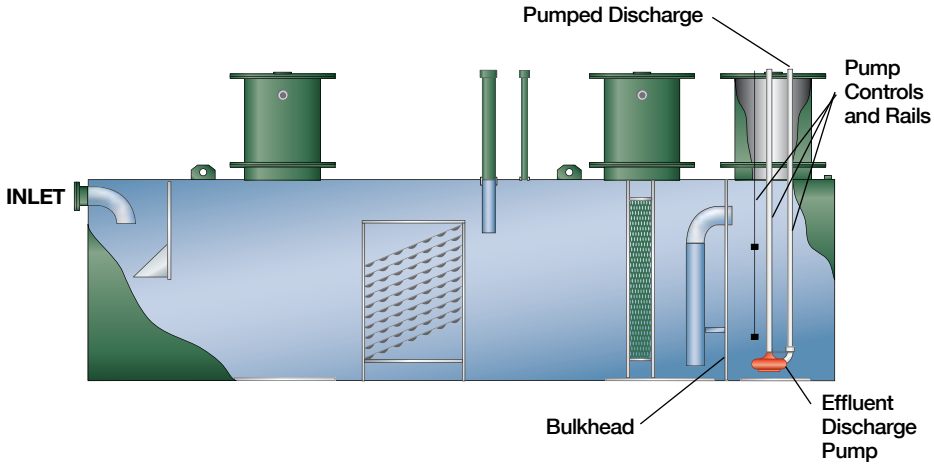
Pre-Engineered Design Options

Solution Oriented Designs

Series - G Oil/Water Separators feature an integral sand interceptor compartment to permit sand and gravel to settle out before the wastewater enters the separation chamber.



Series - J Oil/Water Separators have an integral effluent pump-out compartment with level controls. The pumped effluent can be routed through Highland's Advanced Filtration System to further reduce the oil content.



Highland Tank Oil/Water Separators are listed and approved under one or more of the following patents and approvals:

Underwriters' Laboratories, Inc. UL-SU2215

U.S. Patents - 4,722,800; 5,520,825 & 6,605,224

Canadian Patents - 1,325,179; 1,296,263 & 2,389,065

City of New York, Board of Standards and Appeals
under Calendar Number 1215-88-SA

Massachusetts Board of State Examiners of Plumber and Gas Fitters
Approval Code P1-0594-25

Evaluated to DIN Parts 4 & 5, DIN 38-409 Part 18

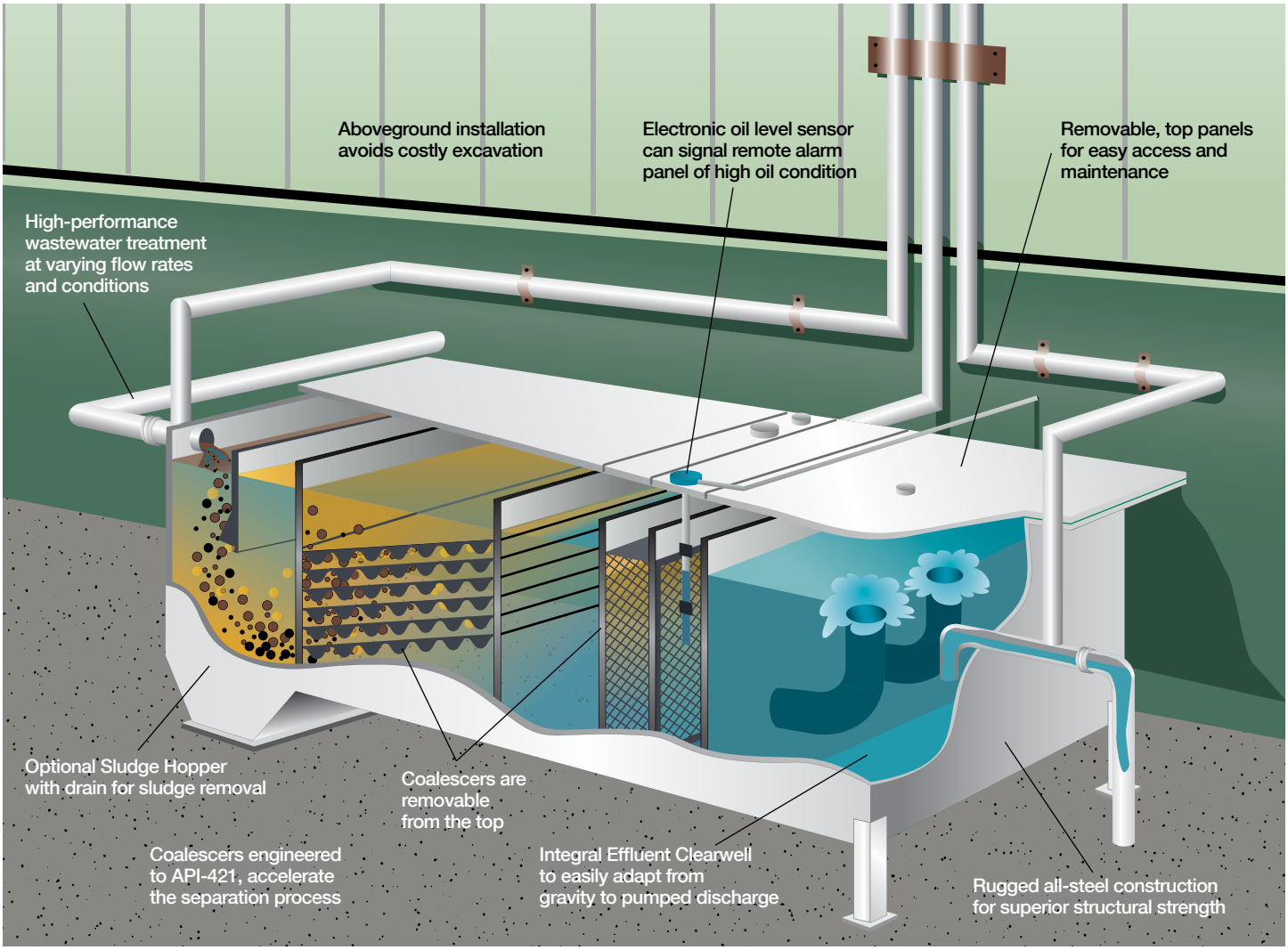
Innovation, Quality and Economy

Rectangular separator design permits total, unconfined, unrestricted OSHA compliant top access for safe visual inspection, cleaning and maintenance.

Rectangular separators can serve as a stand-alone oil/water separator or can be readily adapted for use in conjunction with polishing systems, like our Trickle Filters or Advanced Filtration Systems.

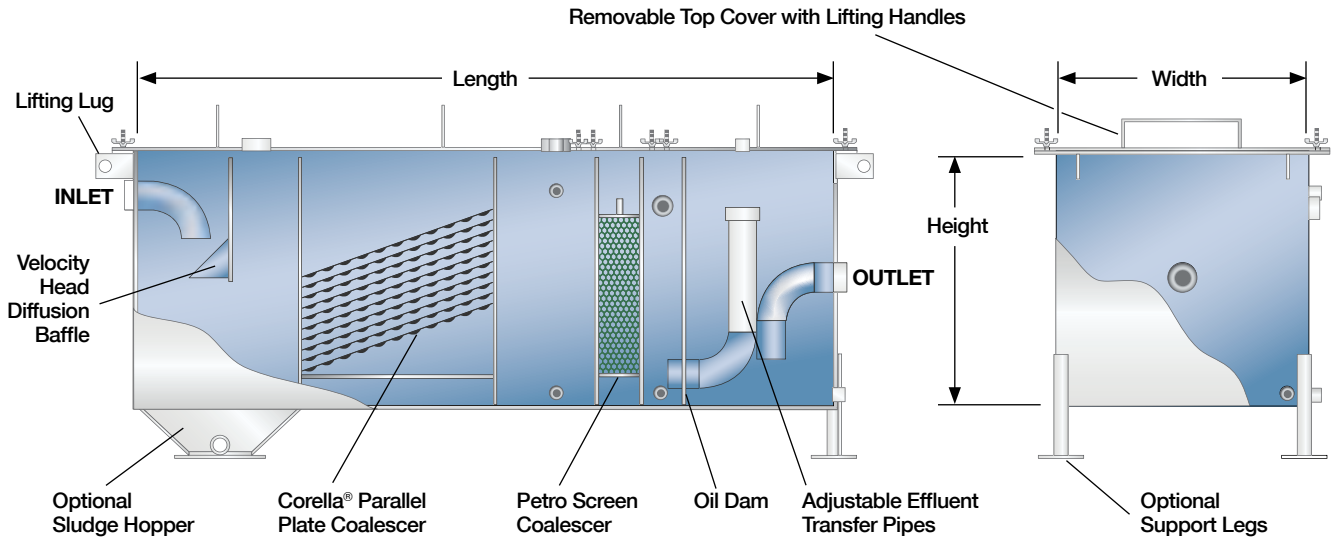
Rectangular Oil/Water Separators

Easy to Install, Operate & Maintain
Rectangular oil/water separators can be installed aboveground to help industrial facilities comply with the EPA's spill and discharge regulations. Like our cylindrical, underground units, these separators are equipped with our non-clogging Corella® coalescers that accelerate the separation process and greatly reduce the level of oil and oily-coated solids discharged into municipal storm or sanitary sewer.



Also available with a UL-SU2215 Label

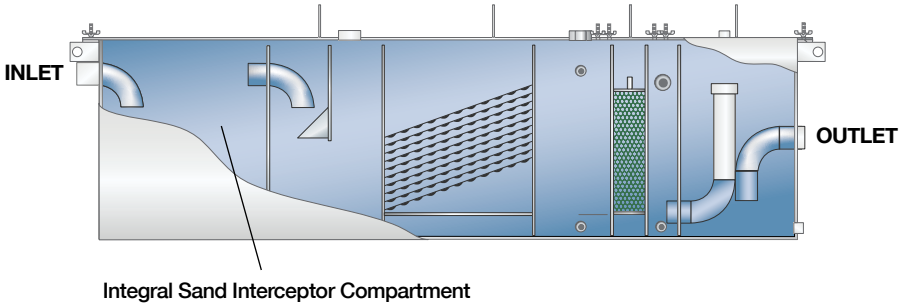
Rectangular Separator Sizing Guide



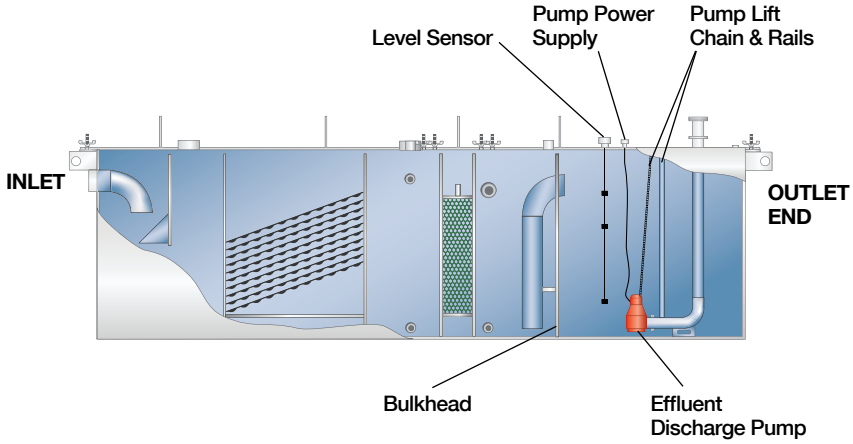
Model R-HT or R-HTC	Flow Rate Gal/Min	Total Volume Gallons	Recommended Oil Pump-out Gallons	Tank Dimensions L x W x H	Inlet & Outlet Diameter
100	5	100	20	5'-0" x 1'-6" x 3'-0"	1"
200	10	200	40	5'-0" x 2'-0" x 3'-0"	2"
300	25	300	60	7'-0" x 2'-0" x 3'-0"	3"
600	50	600	120	9'-0" x 3'-0" x 3'-0"	4"
900	75	900	180	10'-0" x 3'-0" x 4'-0"	6"
1,000	100	1,000	200	11'-0" x 4'-0" x 4'-0"	6"
2,000	200	2,000	400	12'-0" x 5'-0" x 5'-0"	8"
3,000	300	3,000	600	18'-0" x 5'-0" x 5'-0"	10"
4,000	400	4,000	800	18'-0" x 6'-0" x 5'-0"	10"
5,000	500	5,000	1,000	20'-0" x 6'-0" x 6'-0"	10"
6,000	600	6,000	1,200	19'-2" x 7'-0" x 6'-0"	10"
7,000	700	7,000	1,400	19'-2" x 7'-0" x 7'-0"	10"
8,000	800	8,000	1,600	19'-2" x 8'-0" x 7'-0"	10"
9,000	900	9,000	1,800	18'-10" x 8'-0" x 8'-0"	12"
10,000	1,000	10,000	2,000	20'-11" x 8'-0" x 8'-0"	12"
12,000	1,200	12,000	2,400	19'-10" x 9'-0" x 9'-0"	12"
15,000	1,500	15,000	3,000	24'-9" x 9'-0" x 9'-0"	14"
20,000	2,000	20,000	4,000	29'-9" x 10'-0" x 9'-0"	16"
25,000	2,500	25,000	5,000	33'-6" x 10'-0" x 10'-0"	18"
30,000	3,000	30,000	6,000	40'-10" x 10'-0" x 10'-0"	20"

Plate spacing and orientation may vary depending on site conditions. Custom sizing is available.
Consult Highland Tank for Series G, J, S & TF sizing information.

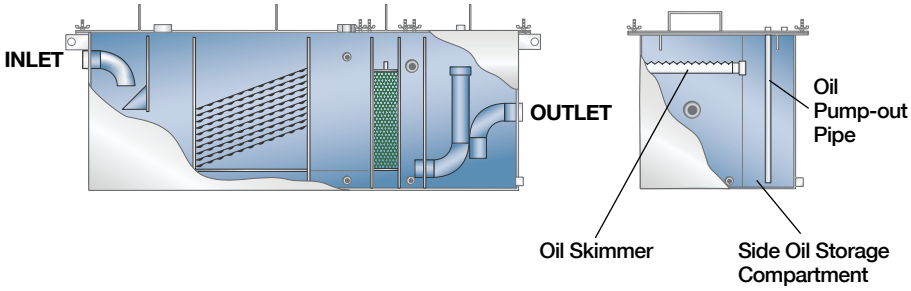
Series - G Oil/Water Separators feature an integral sand interceptor compartment to permit sand and gravel to settle out before the wastewater enters the separation chamber.



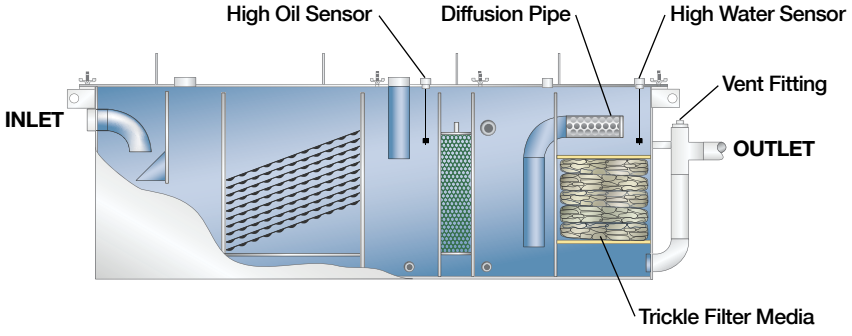
Series - J Oil/Water Separators feature an integral effluent pump-out compartment with level controls to operate a pump at prescribed levels. The pumped effluent can then be routed through Highland's Advanced Hydrocarbon Filtration System to further improve performance.



Series - S Oil/Water Separators feature an integral side product compartment for storing separated oil. The special side product compartment permits the removal of only the skimmed oil by pump-out. The effluent is discharged either by pump or gravity flow.



Series - TF Oil/Water Separators feature an integral “trickle filter" to remove dispersed and mechanically emulsified oils that may pass through the separator untreated. Water flows freely out of the separator to the diffusion pipe and passes through the oleophilc trickle filter media bags to remove any troublesome discharges. The media bags can be easily removed and replaced when necessary.



DSB Separator Systems

High-Performance Separators with Influent Pump Packages

The Deep Sump Basin (DSB) is a complete packaged system consisting of the DSB with Integral Grit and Pump Lift Chambers, Influent Pump Package, and Model R-HTC Rectangular Aboveground Oil/Water Separator. The system is designed to remove free-floating oil, grease and settleable oily-coated solids from a vehicle maintenance facility's fuel area, wash area and service bay drains.

They are installed in vehicle repair and service facilities, car and truck dealerships and fast lube shops to help prevent discharges of harmful pollutants into the storm or sanitary sewer system.

Highland Tank's standard DSB Systems feature flow rates from 25 to 200 gal./min. Custom systems with higher flow rate systems are also available. Pneumatic sensor and influent pump systems are standard, with electronic systems available.

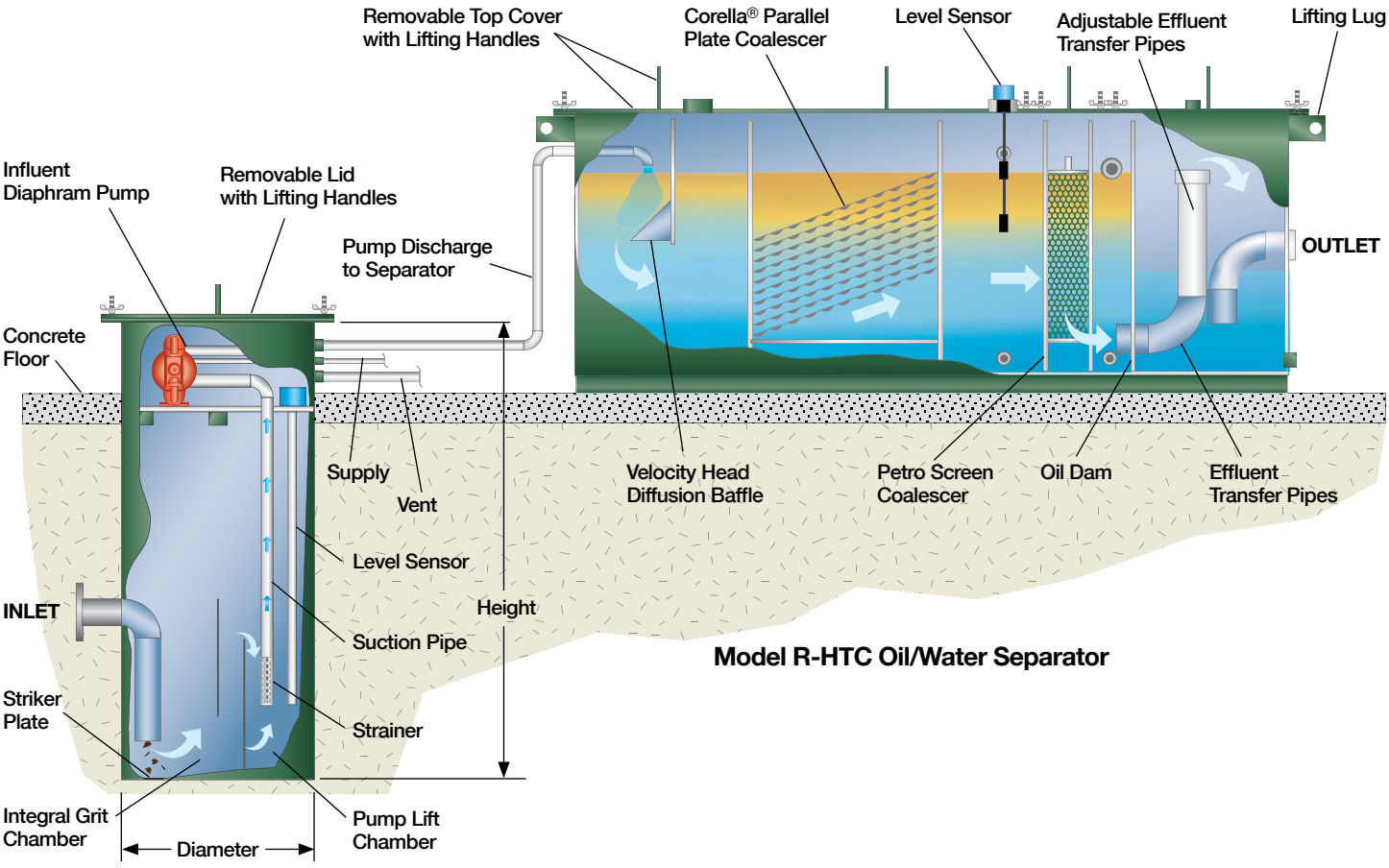
Features

- Automatic for ease of operation
- Utilizes patented Corella® coalescer technology
- Rugged all-steel design & construction
- Easy installation with limited excavation
- Removable vapor-tight top covers for service and maintenance

Standard Components

- Deep Sump Basin with inlet
- Pneumatic influent diaphragm pump with air filter regulator, suction pipe and strainer
- Model R-HTC Oil/Water Separator with level sensor and controls

Turnkey Treatment Systems



Model R-HTC Oil/Water Separator

Deep Sump Basin

DSB Sizing Guide

Model DSB	Flow Rate Gal/Min	Recommended Oil Pump-out Gallons	Separator Dimensions Length Width Height	Inlet & Outlet Diameter	Sump Dimensions Diameter x Height
300	25	60	7'-4" x 2'-4" x 3'-0"	1" / 3"	2'-6" x 6'-0"
600	50	120	9'-4" x 3'-4" x 3'-0"	1.25" / 4"	2'-6" x 6'-0"
900	75	180	10'-0" x 3'-0" x 4'-0"	2" / 6"	4'-0" x 8'-0"
1,000	100	200	11'-0" x 4'-0" x 4'-0"	2" / 6"	4'-0" x 8'-0"
2,000	200	400	12'-0" x 5'-0" x 5'-0"	4" / 8"	5'-4" x 9'-0"

Oil/Sand Interceptors

Simple, Rugged, Reliable

Highland Tank's Oil/Sand Interceptor (OSI) is a wastewater treatment tank designed to intercept and collect sand, grit, free-oil and grease (hydrocarbons and other petroleum products) and prevent their entry into the sanitary sewer system.

Designed to accept gravity flow, the interceptor's large volume allows for a lengthy retention time for sand, grit, free oil and grease to separate from the water due to their differences in specific gravity.

The interceptor contains one to four compartments (basins) where oil separates and floats to the surface, while sand and grit settle to the bottom sludge baffle.

The clearer water beneath flows downward to the outlet downcomer where it is discharged from the quiescent section of the interceptor.

OSI sizing and construction conforms to recognized plumbing codes and meets or exceeds many municipal industrial sewer pretreatment regulations.

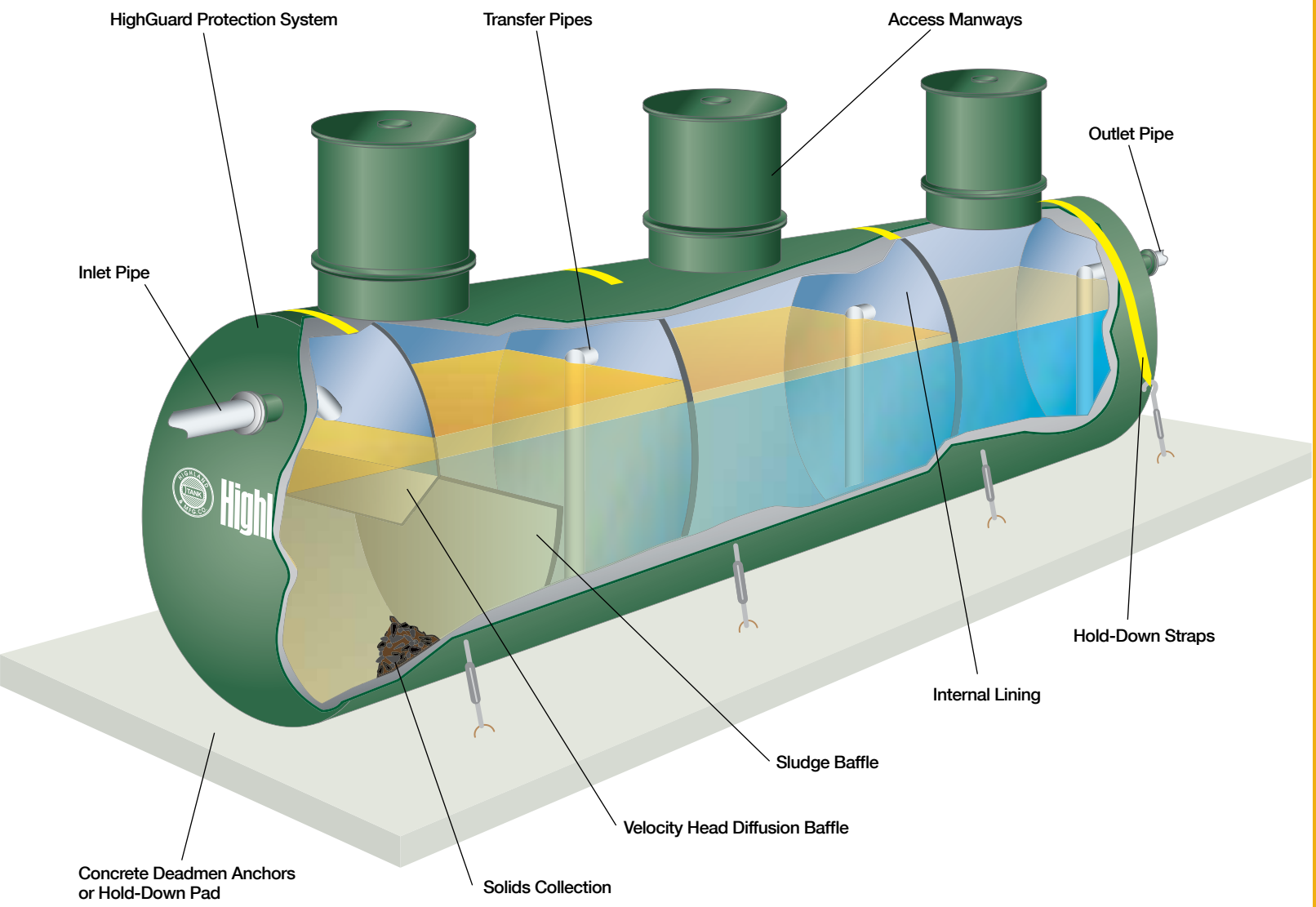
They are available in double-wall construction for those states and counties where underground oil/water separators and interceptors are considered to be "commercial underground storage tanks."

These lighter than concrete interceptors can be sized for greater volumes and retention time. Unlike many competitive concrete units, they are watertight and pressure or vacuum testable in both the factory and the field.

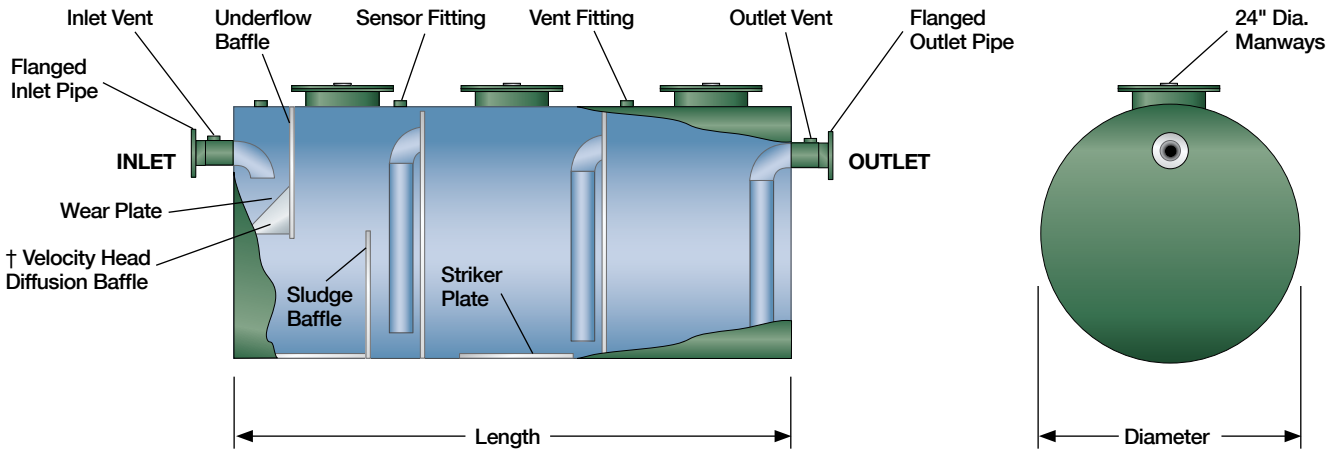
We offer an extensive range of standard sizes and capacities with complete accessory packages, including leak and level sensors, alarm/control panels, influent, effluent and oil pump systems. Variations in capacity, arrangement, dimensions and pipe penetration locations can be made to fit your specific requirements.

Dependable, Durable Design

Oil/sand interceptors are required in all facilities that conduct washing, servicing, repairing, maintenance or storage of motor vehicles including car washes, commercial vehicle garages, repair facilities, service stations and similar sites where oil or flammable liquid may be introduced into the sewer system.



Oil/Sand Interceptor Sizing Guide

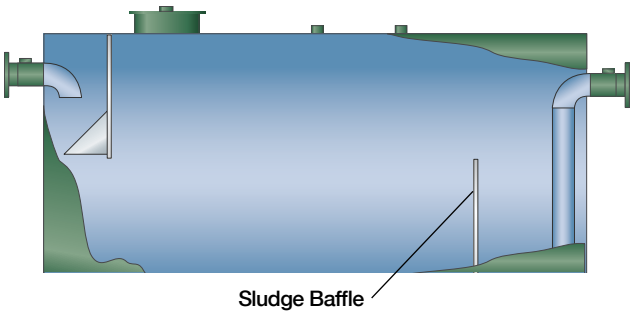


Model OSI	Flow Rate Gal/Min	Total Volume Gallons	Recommended Oil Pump-out Gallons	Dimensions		Inlet & Outlet Diameter
				Diameter	Length	
*350	35	350	88	3'-6"	4'-3"	4"
**550	55	550	138	3'-6"	7'-9"	4"
750	75	750	188	4'-0"	8'-0"	6"
1,000	100	1,000	250	4'-0"	10'-9"	6"
1,500	150	1,500	375	5'-4"	9'-0"	6"
2,000	200	2,000	500	5'-4"	12'-0"	6"
3,000	300	3,000	750	5'-4"	18'-0"	8"
4,000	400	4,000	1,000	5'-4"	24'-0"	8"
5,000	500	5,000	1,250	6'-0"	23'-10"	8"
6,000	600	6,000	1,500	6'-0"	28'-8"	10"
7,000	700	7,000	1,750	7'-0"	24'-4"	10"
8,000	800	8,000	2,000	7'-0"	28'-0"	10"
9,000	900	9,000	2,250	8'-0"	24'-0"	12"
10,000	1,000	10,000	2,500	8'-0"	26'-8"	12"
12,000	1,200	12,000	3,000	8'-0"	32'-0"	12"
15,000	1,500	15,000	3,750	10'-0"	25'-6"	14"
20,000	2,000	20,000	5,000	10'-6"	31'-0"	16"
25,000	2,500	25,000	6,250	10'-6"	38'-9"	18"
30,000	3,000	30,000	7,500	10'-6"	46'-6"	20"
40,000	4,000	40,000	10,000	12'-0"	47'-3"	24"
50,000	5,000	50,000	12,500	12'-0"	59'-0"	24"
60,000	6,000	60,000	15,000	13'-0"	60'-6"	24"

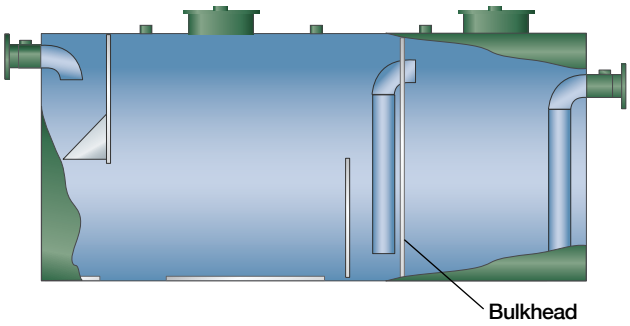
Note: NPT available for 4-6" inlet and outlet; 8" and larger will be flanged connections. Optional sampling/monitoring ports available.
*Available as single basin ONLY with one manway. **Available as single and double basin ONLY with one manway.
† Not available on all sizes, contact Highland Tank for more information.

Pre-Engineered Design Options

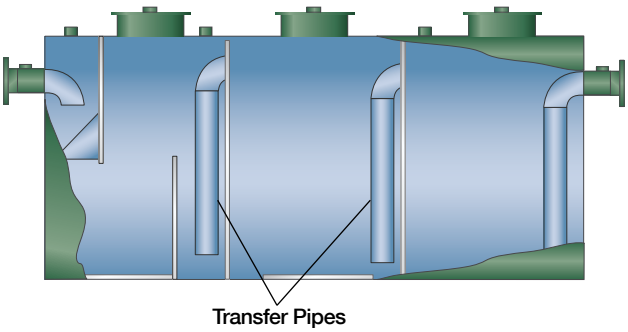
Single Basin Interceptors have a single collection chamber and sludge baffle to remove sand, grit, grease and free oil. This is our simple oil/sand "knock-out" design.



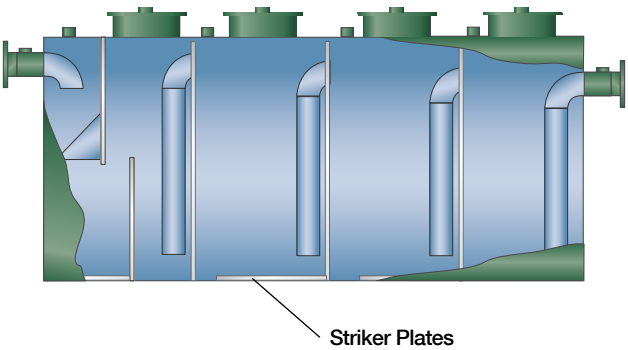
Double Basin Interceptors have two collection chambers and a sludge baffle. They are commonly used in car wash and commercial or municipal vehicle washing applications for oil and sand removal prior to discharge to a recycle wash system. An optional overflow bypass directs excess flow to an auxiliary retention area.



Triple Basin Interceptors* have three collection chambers and a sludge baffle. Our most popular and versatile design has a variety of applications, such as car washes and commercial garages. Floatables, oil, sand and other sediments are trapped in the first compartment and any remaining oil is trapped in the second compartment. The third chamber can be equipped with an effluent pump system when used in conjunction with Highland Tank's HighCycle Washwater Recycle System.



Quad Basin Interceptors have four collection chambers and a sludge baffle. In addition to their use at large commercial vehicle washes, they are commonly used at construction sites for oil, dirt and debris removal during site dewatering operations to comply with strict stormwater regulations.



*HT-TB - Conforms to IAPMO - PS - 80 - 2006.

Solids Stormwater Interceptor

The SSI is a simple, inexpensive hydrodynamic separation device designed to remove debris and settleable and suspended solids from stormwater runoff through gravitational settling and trapping of pollutants.

Solids Stormwater Interceptors (SSI) perform a key role in removing floating debris and settleable solids from a stormwater stream prior to its entry into a detention basin, constructed wetland or collection system.

The SSI is designed to slow the flow velocity through the interceptor, thereby allowing solids and associated pollutants to settle and accumulate on the bottom. The SSI contains a series of settling chambers separated by baffles to capture sand, sediment and grit. It also has integral specially designed trash-screens to capture larger materials, trash and floatables.

In operation, stormwater enters the interceptor by gravity flow and encounters the velocity head diffusion screen. Floating solids are trapped and the flow velocity decreases allowing particles to settle. The baffles impede particle movement — as suspended solids strike the baffles they begin to settle.

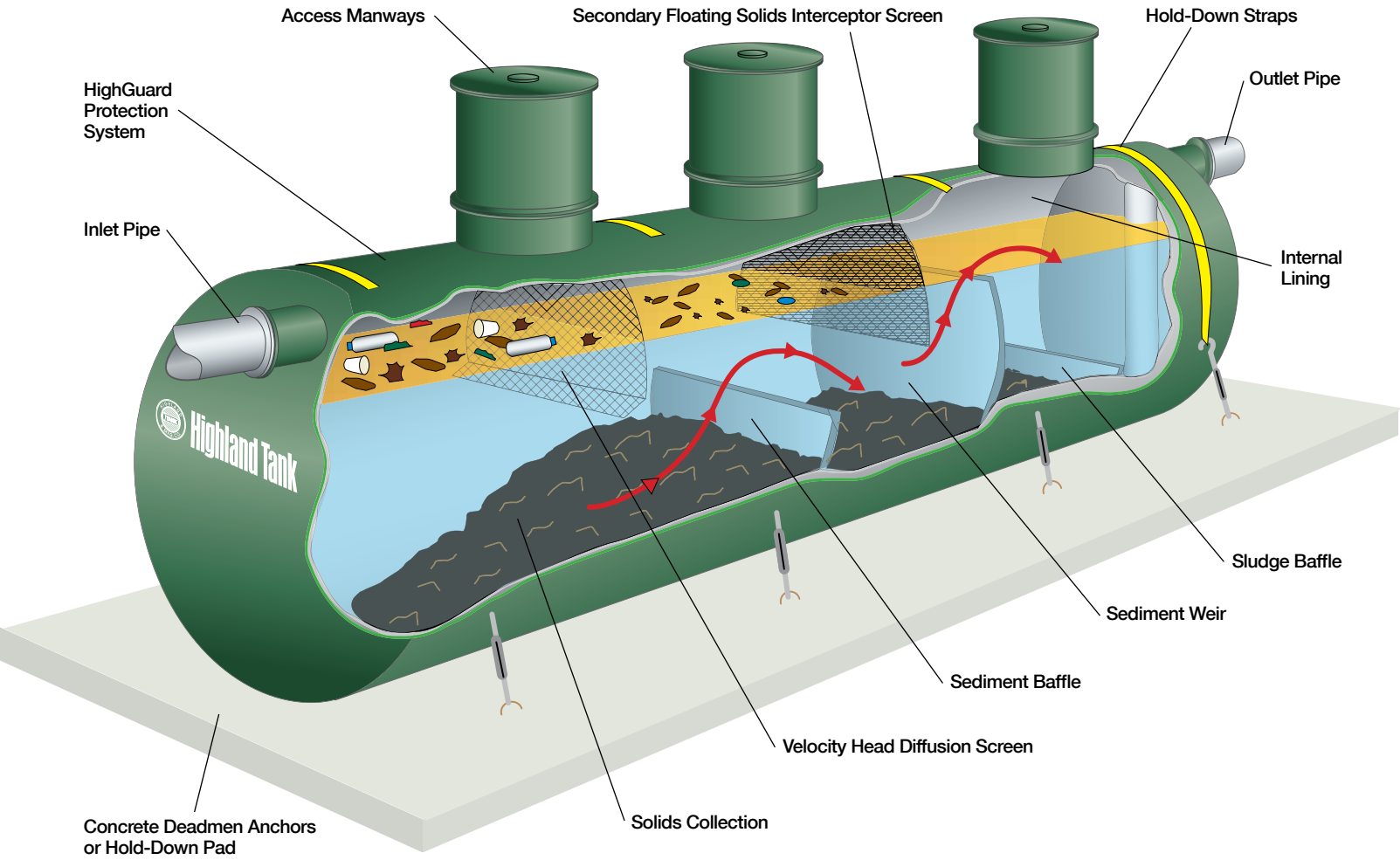
Large particles settle out first and accumulate in the first chamber while smaller particles usually settle out in subsequent chambers. Large access manways allow maintenance personnel to inspect and remove the accumulated waste from grade level.

The SSI system is typically designed to bypass runoff flows in excess of the design flow rate. A diversion structure installed ahead of the SSI as well as an outfall adapter can be provided to allow flows in excess of the “first flush" to bypass the SSI, preventing wash out.

SSIs are constructed from protected steel, meeting ASTM specifications. Industry and factory specifications are followed to assure complete internal and external corrosion protection.

We offer complete interior and exterior blast and finish coatings, including Highland's HighGuard protective coating. An additional internal polyurethane lining assures years of continuous service. Stainless steel and/or double-wall construction are available.

How It Works

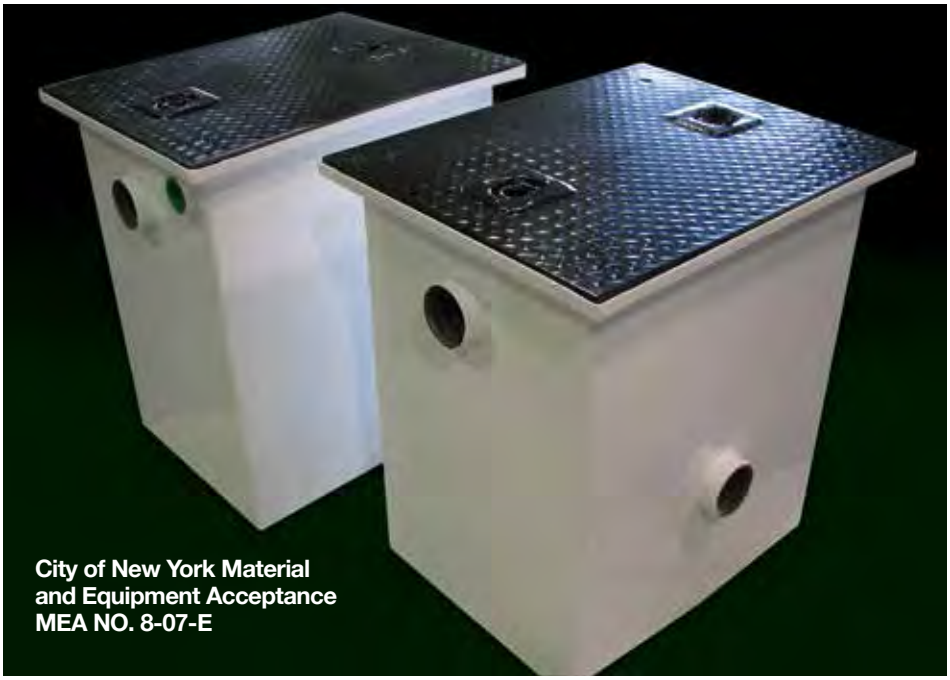


Solids Interceptor Sizing Guide

Model SSI	Drainage Area Acres	Required *WQTV Gallons	Flow Rate Gal/Min-Ft³/s	Total Volume Gallons	Sediment Volume Ft³	Dimensions Dia / Length	Inlet & Outlet Diameter
2,000	.125	1,700	300 - 0.668	2,000	186.2	5'-4" x 12'-0"	6"
4,000	.25	3,400	500 - 1.114	4,000	361.7	5'-4" x 24'-0"	8"
8,000	.50	6,800	1,000 - 2.228	8,000	746.2	8'-0" x 21'-4"	10"
12,000	.75	10,200	1,500 - 3.342	12,000	1,128.5	10'-0" x 20'-6"	12"
15,000	1.00	13,600	1,700 - 3.787	15,000	1,382.1	10'-0" x 25'-6"	14"
20,000	1.25	17,000	2,500 - 5.570	20,000	1,836.8	10'-6" x 31'-0"	16"
25,000	1.50	20,400	3,000 - 6.684	25,000	2,312.3	10'-6" x 38'-9"	18"
30,000	2.00	27,200	3,500 - 7.798	30,000	2,710.2	10'-6" x 46'-6"	18"
40,000	2.50	34,000	4,500 - 10.026	40,000	3,551.0	12'-0" x 47'-9"	24"
50,000	3.00	40,800	5,200 - 11.585	50,000	4,425.1	12'-0" x 59'-6"	24"
60,000	4.00	54,400	6,100 - 13.591	60,000	5,361.5	13'-0" x 60'-6"	24"

Standard SSI will provide efficient removal of pollutant particles (.50" inch solids/sieve size 200 sediment) for the majority of site conditions. WQTV* is the Water Quality Treatment Volume ("FirstFlush") or the first .50" of rain water runoff from the drainage area. 24" dia. manways are standard; 30", 36", and large rectangular EZ-Access manways are available.

Manual Oil Interceptors



City of New York Material
and Equipment Acceptance
MEA NO. 8-07-E

Manual Oil Interceptors (MOI) are designed to trap sediment and retain free floating oil and grease (petroleum hydro-carbons and other volatile liquids) from wastewater discharged from floor drains such as those found in aircraft and vehicle maintenance, storage and washing facilities. MOIs prevent the discharge of sediment, oil, grease and other substances harmful to the building drainage system, the public sewer or sewage treatment plant or processes.

Construction

MOIs are constructed of mild carbon steel and coated with heavy-duty polyurethane for superior corrosion resistance. Stainless steel construction is also available. MOIs are suitable for installation above or below grade and are available in configurations to fit almost any requirement.

Top Deck Plate Covers allow for flush-with-floor installation for easy access for maintenance and cleaning. Vapor-tight quick opening covers or hinged-hatch doors are available as an option. Highland Tank offers an extensive range of standard sizes and capacities. Custom manufacturing and many options and accessories are available.

Operation

Manual Oil Interceptors are installed between the floor drain(s) and the sanitary sewer. The operation of the MOI is simple. MOIs retain wastewater long enough to allow those contaminants with specific gravities different than water to separate out by gravity. Since oil is lighter than water, the oil floats and can be manually skimmed from the surface of the interceptor.

Conversely, solids settle to the bottom and accumulate at the sludge baffle. The accumulating waste oil and solids are periodically removed and properly disposed.

Manual Oil Interceptors Taken to the Next Level

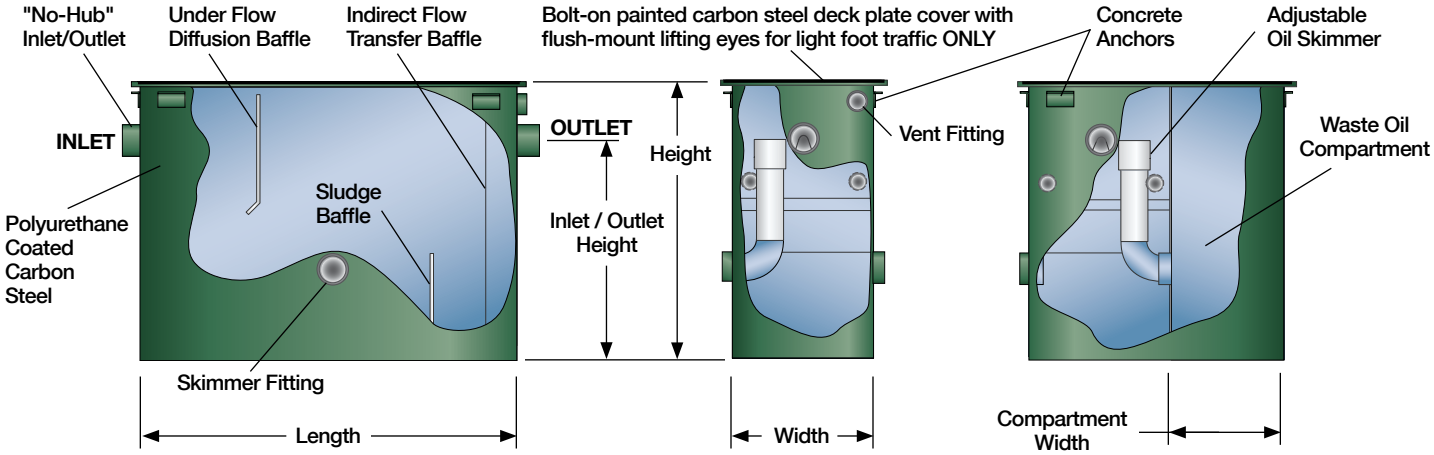
MOIs are also available with an integral Side Oil (SO) waste storage compartment. This simplifies the installation and maintenance of the interceptor system by putting the oil separation chamber and storage tank in one unit, thus eliminating the need to pipe and vent a separate oil storage tank. This new feature also eliminates any problems with a regulated underground storage tank.

Operation of the MOI-SO is simple: separated oil floats to the surface of the separation compartment; then it is removed via the adjustable oil skimmer into the adjacent oil compartment by gravity.

A certified waste hauler can then regularly remove the collected oil. Access hatches are supplied for each compartment of the interceptor for ease of inspection and maintenance.

Manual Oil Interceptors Sizing Guide

MOI **MOI-SO - with Side Oil Compartment**



Model MOI	*Flow Rate Gal/Min	Total Volume Gallons	Total Volume Ft.^{3}	Dimensions Length	Dimensions Width	Dimensions Height	**Inlet & Outlet NPT	CL Inlet & Outlet Height	Waste Oil Storage Compartment Width	Waste Oil Storage Compartment Volume
25	25	55.2	7.4	26"	20"	34"	3"	26"	17.25"	50
35	35	74.7	10.0	32"	22"	34"	3"	26"	14.00"	50
50	50	80.8	10.8	32"	22"	36"	3"	28"	25.75"	100
75	75	168.9	22.6	46"	32"	36"	3"	28"	18.00"	100
100	100	187.5	25.1	49"	34"	36"	4"	28"	33.00"	200
125	125	195.2	26.1	51"	34"	37"	4"	28"	33.00"	200
150	150	214.3	28.6	56"	34"	38"	4"	28"	29.50"	200
200	200	291.4	39.o	66"	34"	42"	4"	32"	33.00"	300
250	250	426.4	57.0	72"	38"	50"	4"	38"	22.75"	300
300	300	511.3	68.3	76"	42"	52"	4"	40"	25.50"	300
350	350	549.7	73.5	78"	44"	52"	4"	40"	37.00"	500
400	400	621.3	83.1	80"	46"	54"	4"	42"	34.375"	500
450	450	664.5	88.8	82"	48"	54"	4"	42"	33.50"	500
500	500	781.8	104.5	84"	50"	58"	4"	46"	30.00"	500

* Intermittent flow. **NPT 6" and larger – companion flanged connection. Also available with 8" or 10" inlet or outlet. “No-Hub" connections can be supplied for floor mounting or partially recessed installations. Note: Vent Connections are 2" or 3" NPT, on outlet end of MOI. Check and advise for local code requirements. Contact your local Highland representative for assistance with the local Authority Having Jurisdiction (AHJ) regulations.

MEMBER

Elevator Sump Pump Interceptor

Removes petroleum hydrocarbons from elevator sump discharges and meets new ASME A17.1 standards for elevator safety

Hydraulic oil in an elevator sump is a code violation and a danger for all personnel working on and around the elevator equipment. This condition also causes damage to the elevator equipment and is a potential contaminant if drained or pumped into the environment. Hydraulic oil will also penetrate concrete, seeping into the ground, requiring an environmental cleanup and removal of all contaminated soils.

Highland Tank, Elevator Sump Pump Interceptors (ESP-INT) are designed to trap sediment and retain free floating oil and grease (petroleum hydrocarbons and other volatile liquids) in wastewater discharged from elevator pit sumps.

ESP-INTs prevent the discharge of sediment, oil, grease and other substances harmful or hazardous to the building's drainage system, the public sewer, sewage treatment plant or other treatment processes.

Elevator Sump Pump Interceptors are constructed of mild carbon steel and coated with heavy duty polyurethane for superior corrosion resistance.

Stainless steel construction is also available. ESP-INTs are suitable for installation above or below grade, and are available in configurations to fit almost any requirement.

Our design goes beyond baffle and coalescer plate-style interceptor's performance rated for separation of free floating oils and gravity waste stream flow and addresses oils that become emulsified in a pumped waste stream flow.

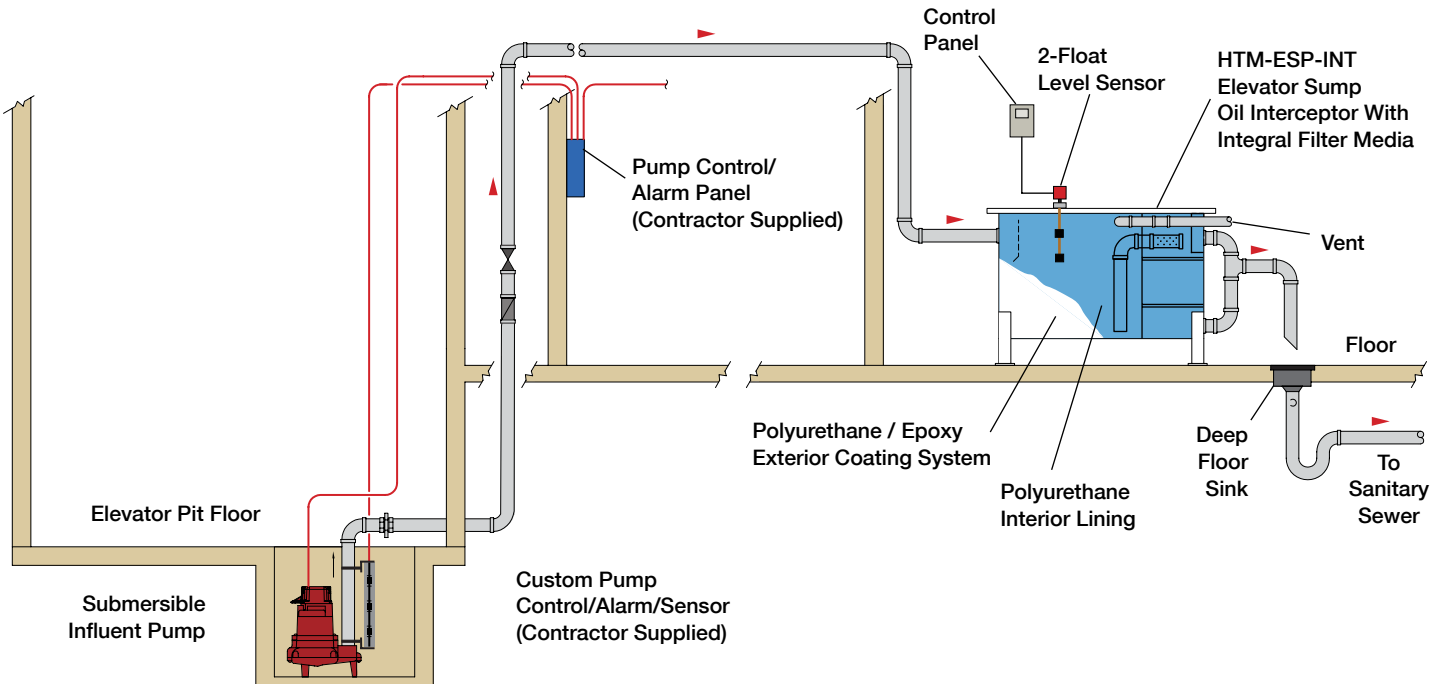
Options

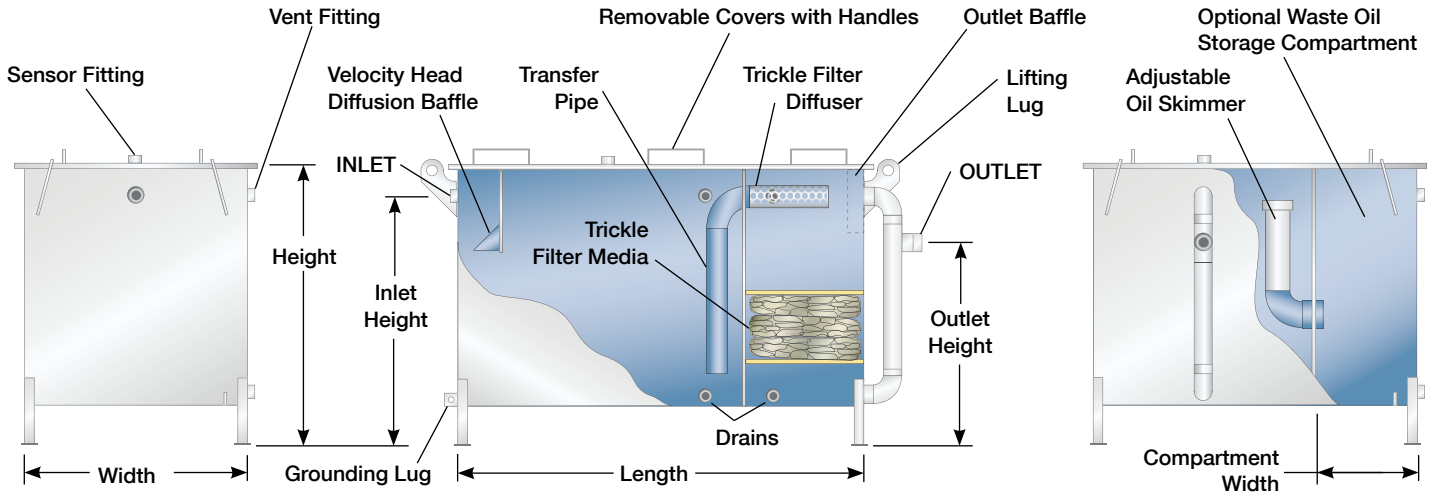
- Side oil storage compartment
- Sump pumps
- Control panels
- Interceptor controls
- Double-wall construction
- Leak detection systems

Approved by Michigan Costruction Code Commission

Elevator Sump Pump Interceptor Sizing Guide

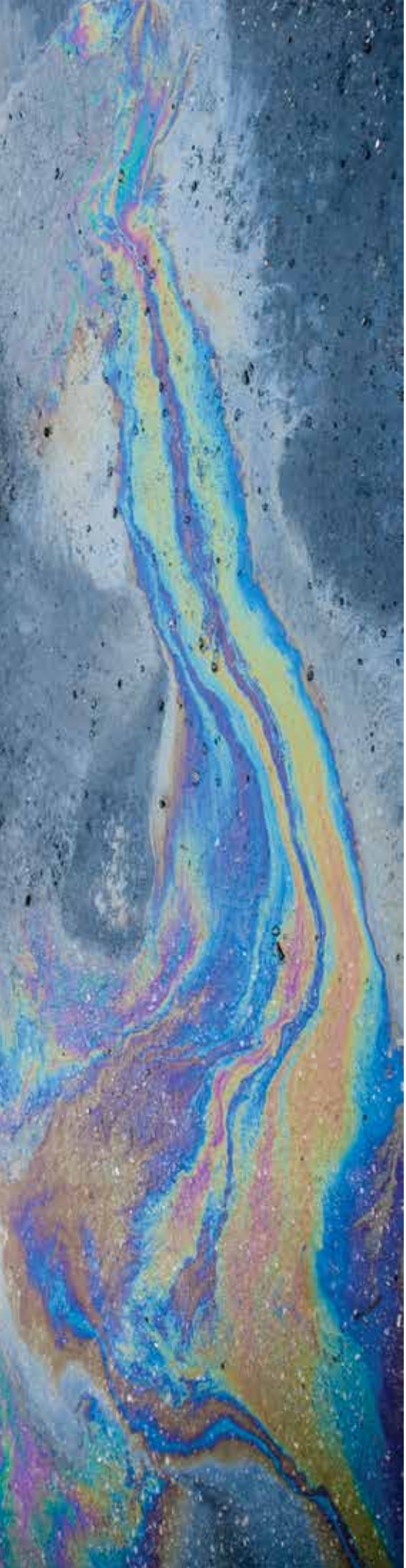
Typical Above-Floor Installation





Model ESP INT	*Flow Rate Gal/Min	Total Volume Gallons	Total Volume Ft.³	Dimensions Length	Dimensions Width	Dimensions Height	Inlet & Outlet Diameter NPT	Centerline Inlet & Outlet Height	Oil Storage Capacity Gallons	Waste Oil Storage Compartment Width	Waste Oil Storage Compartment Volume
50	50	307	41	58"	34"	42"	2"/4"	38"/28"	45	18"	100
100	100	572	76.5	78"	42"	48"	3"/4"	44"/30"	53	18"	200
150	150	897	120	90"	48"	51"	3"/6"	47"/27"	60	18"	200
200	200	1157	154.7	110"	48"	57"	4"/6"	52"/25"	68	18"	300

* Intermittent flow. Note: Vent Connections are 2" or 3" NPT, on outlet end of MOI.
Check and advise for local code requirements.



Collection Catch Basin

Collection Catch Basins (CB) are designed to capture sand, grit, debris and associated pollutants discharged from vehicle maintenance and fueling facilities and then prevent their entry into the drainage system.

When installed in conjunction with an oil/water separator, the catch basin acts as a simple pretreatment device to collect this trash and help prevent it from clogging the drain lines. This also results in less waste material entering into the separator.

Catch basins are easy to install, operate and maintain. The catch basin's removable drop-in wastebasket collects trash that may be deposited at the service bay drains or fuel islands. A second screen, welded inside the catch basin, further protects the separator from incoming waste.

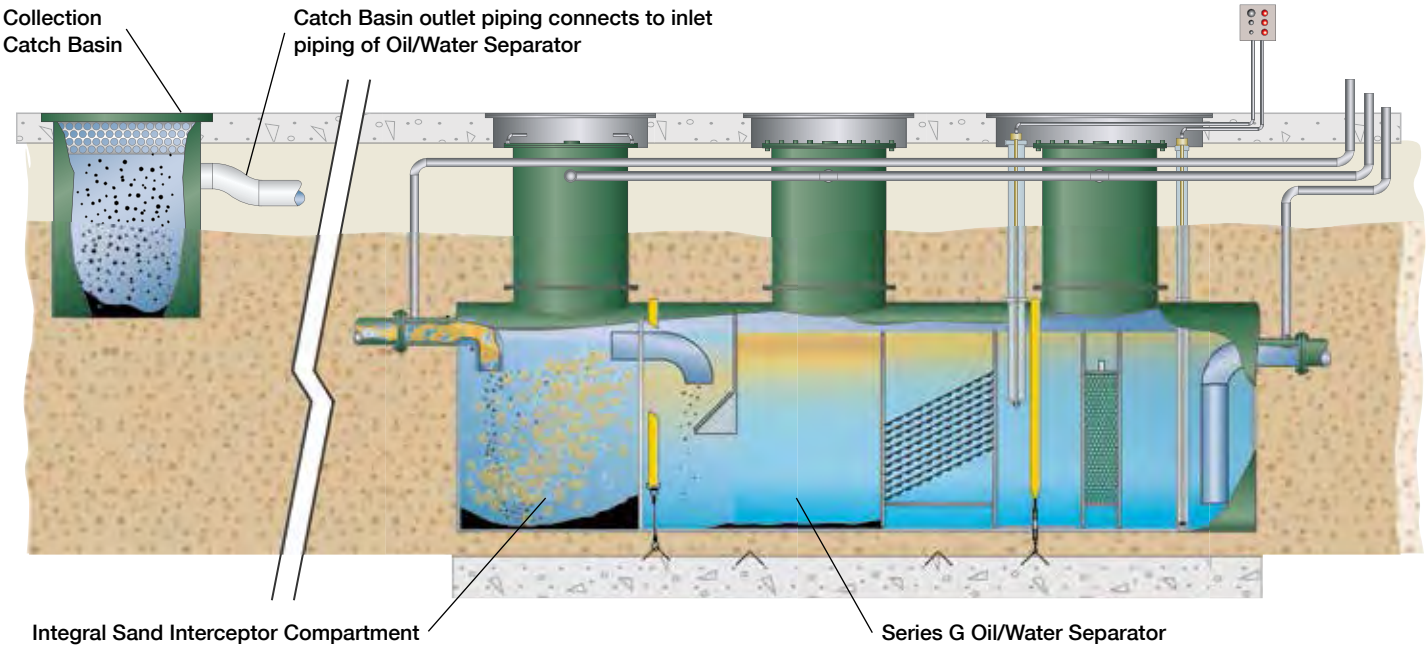
Features

- Coated mild carbon or stainless steel construction
- Pre-formed attached grating frame with heavy-duty grate
- Easy access removable basket for trash collection and removal
- Screened discharge pipe
- Large sediment retention

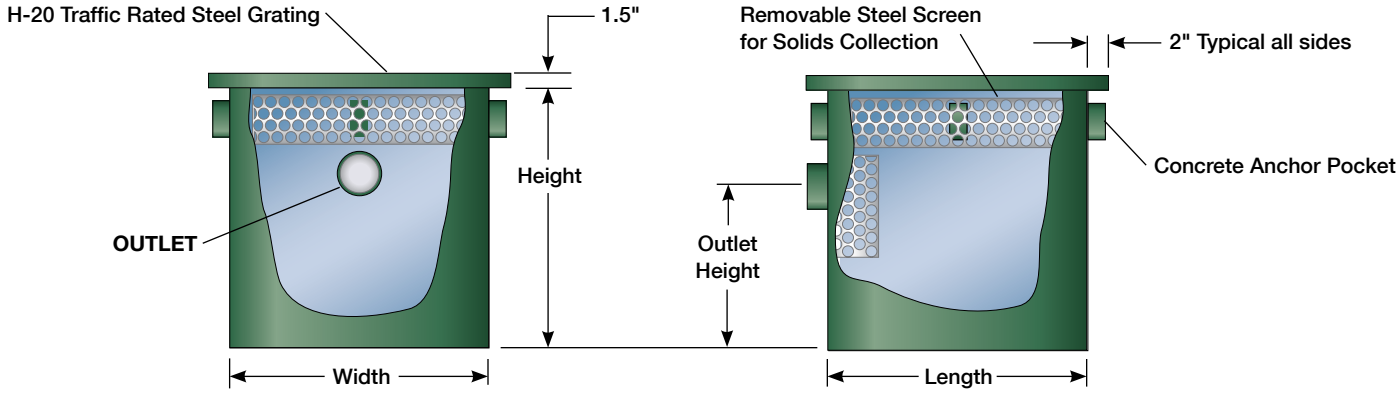
Options

- Side inlet connections
- Hooded outlet or down-turned 90º downcomer pipe helps prevent petroleum products, floatable solids and trash from entering the storm drain system and/or separator
- Custom sizing
- Pedestrian grating
- Bottom outlet connections
- No-hub or flanged connections

Capture Sand, Grit and Debris



Collection Catch Basin Sizing Guide



Model CB	Dimensions		Outlet Diameter	Outlet Height
	Width	Length	Height	
30	18"	18"	36"	4"	24"
55	24"	24"	36"	4"	24"
125	30"	36"	42"	6"	30"
150	36"	36"	42"	6"	30"

Advanced Hydrocarbon Filtration System

Advanced Hydrocarbon Filtration Systems (AHFS) are used in applications where hydrocarbon removal beyond the capability of a normal oil/water separator is necessary. These robust, field-proven filtration systems provide efficient and cost-effective removal of a variety of hydrocarbons, ranging from BTEX to crude oil, from water. They also help safeguard the environment and personnel from harmful persistent chemicals and pollutants.

AHFSs contain oleophillic filters that utilize a patented hydrocarbon removal technology that instantly bonds hydrocarbons to the filter media, making them hydrophobic and viscoelastic. This property completely removes the hydrocarbons from the water.

The single-pass efficiency through the filter cartridges is often as high as 99.9% with very little pressure drop created by oil saturation.

Features and Benefits:

- Ideal for use by a diverse range of industries
- Consistently high hydrocarbon removal efficiency
- Ensures compliance with environmental regulations
- Durable construction & simple servicing
- Compact design - small footprint
- Easy operation & maintenance
- Minimizes waste disposal

Our custom built AHFSs are skid-mounted with filters, pumps, motors, controls, valves, piping and wiring. By designing our AHFS from the ground up, Highland's skilled engineers can assemble all the components necessary to meet your specific applications.

For Superior Hydrocarbon Removal

How It Works

The Advanced Hydrocarbon Filtration System (AHFS) is engineered to enhance the performance of any oil/water separator system.

The influent wastewater passes through the high-performance R-HTC oil/water separator with Corella® and Petro-Screen coalescers designed for gravity separation of free oils along with settleable solids from water.

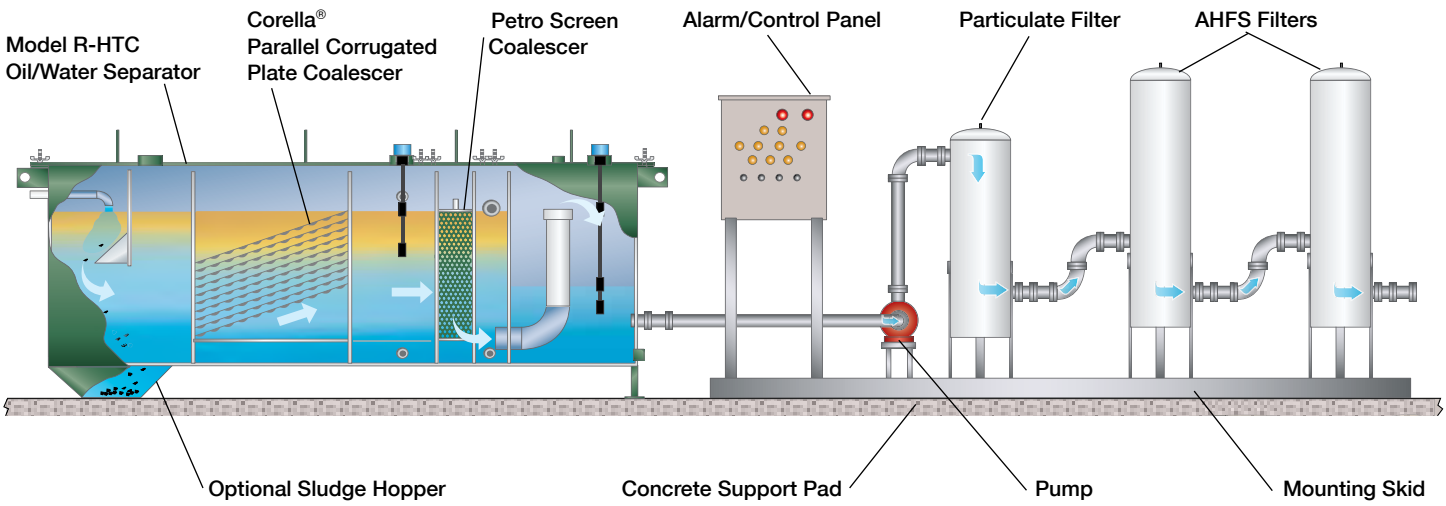
These wastes accumulate in the separator while the wastewater passes through the effluent transfer pipes to the effluent clearwell. The effluent pump's automatic level controls start and stop the pump at predetermined levels.

The effluent is then pumped through the AHFS consisting of particulate and oleophilic filters that utilize a patented hydrocarbon removal technology.

Oil and grease, total petroleum hydrocarbons, dissolved hydrocarbons, solvents, Volatile Organic Compounds (VOC) and organically bound metals are removed here prior to the final discharge of the effluent.

In many applications, especially MTBE remediation, Granular Activated Carbon (GAC) is added to the treatment system. GAC offers an excellent final polishing step to meet critical discharge levels.

Advanced Hydrocarbon Filtration System



Modular Cartridge AHFS Sizing Guide

Model HT-M	Number of Cartridges	Housing Diameter Approx.	Flow Rate Gal/Min	Approx. Oil Capacity		Treatment Capacity 10 mg/l Removal Rate Approx. Gallons
				Kg.	Lb.	
4-40	4	7.5"	80	3.5	7.7	93,000
12-40	12	11.0"	240	10.5	23.1	279,000
21-40	21	14.5"	420	18.5	40.7	488,000
33-40	33	17.5"	660	29.0	63.8	767,000
50-40	50	24.0"	1,000	44.0	96.8	1,162,000

HighCycle - Wash Water Recycle System

The HighCycle Wash Water Recycle System is designed to process wastewater discharged from vehicle cleaning operations at military, commercial and municipal maintenance facilities.

This modular system is capable of effectively removing sand, grit, settleable oily-coated solids, free-floating hydrocarbons and mechanically emulsified or semi-miscible oils. Wastewater can be either recycled or discharged, according to the facility's proper discharge procedures.

Highland Tank offers a wide variety of standard systems for most vehicle washing applications. In addition, custom-built systems can be designed and manufactured for specific applications.

Advantages

- Rugged compact design
- Proven performance of Highland Tank Oil/Water Separators and Interceptors
- Modular design allows for closed-loop recycle system, partial sewer discharge or total discharge configurations
- Eliminates the need for dangerous treatment chemicals
- Designed for minimal service and low operating cost

High-Performance, Heavy-Duty

How It Works

The HighCycle is easy to install, operate and maintain. Vehicle wash water is collected in the Collection Catch Basin (HT-CB) where trash, sand and grit are removed. Wash water flows by a gravity drain to the Triple Basin Interceptor (HT-TB) for additional solids and oil removal.

Water is drawn from the HT-TB's effluent compartment using a sensor-controlled, self-priming transfer pump and forced through the hydrocyclone where additional solid particles are removed and transferred back to the interceptor.

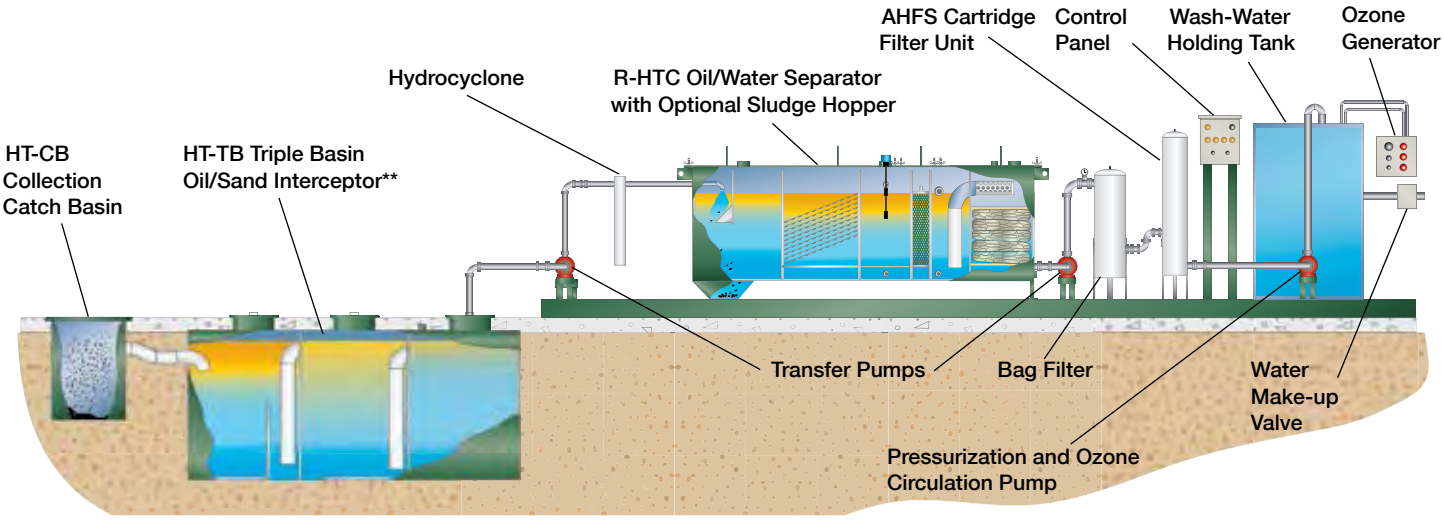
The workhorse of the system is the high performance oil/water separator (R-HTC) with Corella® and Petro-Screen Coalescers to effectively remove free oils down to 20 microns. A high-oil level sensor in the R-HTC will indicate the need for stored oil removal.

At this stage, a second sensor-controlled, self-priming transfer pump draws water from the R-HTC clear-well and forces it through the bag-filter for final solids removal. Pressure gauges on either side of the bag filter unit permit manual monitoring of solids collection.

The final oil removal process is performed by the Advanced Hydrocarbon Filtration System (AHFS).

These specially treated oleophilic cartridge filters remove mechanically emulsified and semi-miscible oils. Cartridges can be visually inspected for oil capacity. They are easily replaced in a matter of minutes, requiring no special tools, equipment or back washing.

A clean water storage tank is provided as a reservoir for the final ozone treatment process. Ozone, which helps purify the wastewater, is produced on site in the Ozone Generator. Ozone is added to oxidize any remaining contaminants and keep the water free from bacteria and odor. The final pump recirculates the water in the tank and completes the cycle by providing a clean, pressurized water source for the facility's vehicle wash system.

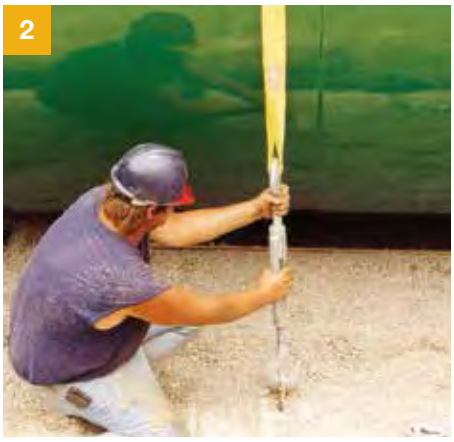


HighCycle Sizing Guide

Model HSC	System Rate Gal/Min	Catch Basin Model	Oil/Sand Interceptor Model	R-HTC Oil/Water Separator Model	Filter Skid Footprint Approximate
10	10	CCB - 55	550	300	8'-0" x 6'-0" x 2'-0"
25	25	CCB - 125	550	600	8'-0" x 6'-0" x 2'-0"
50	50	CCB - 150	1,000	900	9'-0" x 6'-0" x 3'-0"

*Filtration component skid dimensions subject to change as required by site and application requirements.
** Interceptor size may vary based on sludge and oil storage requirements and individual site conditions.


1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7


8

Accessories

To Meet Your Specific Needs

Highland Tank's accessory line is designed to augment our wide selection of Wastewater Treatment Systems, making it easy to quickly and efficiently turn any of our separators or interceptors into a complete operating system. From level sensors and control panels to anchoring systems and grade level manways, Highland Tank is equipped to take your next project from concept to reality. Here are some of our quality accessories:

1. Deadmen Anchoring System
Deadmen help anchor underground separator installations where there is potential for high water. They can be used with our standard underground separators from 550 to 60,000 gallons. (See pp. 48-49 for details).

2. Hold-Down Straps
Designed to secure separators in areas where high water levels may result in flotation. Hold-Down Straps are available in four different designs to accommodate specific installation requirements: Standard, Safety, Deadmen and Polyester.
(See pp. 50-51 for details).

3. Leak and Level Sensors
A wide variety of sensors used to detect leaks, liquid levels and interface levels are available to monitor your system.

4. Complete Pump Package System
Complete influent, effluent and oil pump systems, platform or separator mounted.

5. Alarm and Control Panels
A comprehensive panel selection for leak and level alarm, valve actuation, heating or pump controls is available.

6. Grade Level Manways (GLM)
Designed to AASHTO H-20 requirements. Round GLMs are available in sizes ranging from 12" to 48" diameter. Rectangular GLMs are available in widths from 48" to 72" and lengths from 48" to 150".
(See pp. 52-53 for details).

7. Insulation Systems and Heaters
External batt with metal jacket, external spray-on or injected foam insulation is available as are electric or steam heating systems. (See p. 54 for details).

8. Ladders, Stairs, Platforms and Walkways
Internal and external ladders, stairs, platforms and walkways are designed to comply with strict OSHA specifications. Mounting brackets and other structural accommodations are factory-fitted to facilitate field installation. (See p. 55 for details).

Deadmen Anchoring System

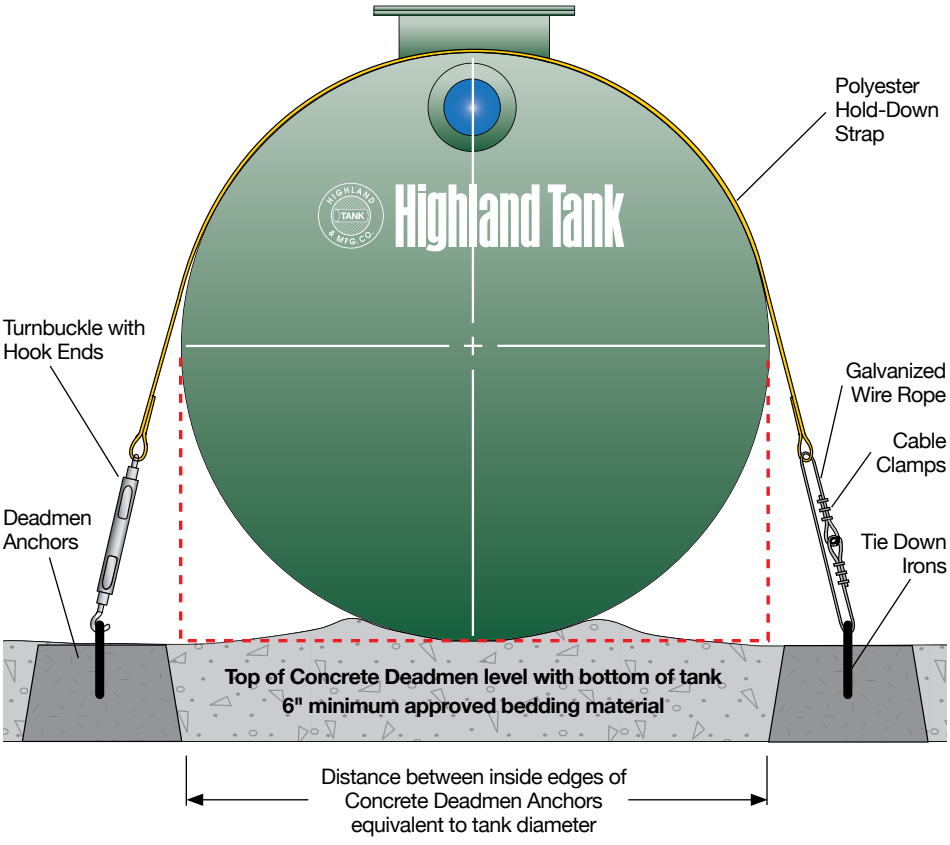
Highland Tank's Deadmen Anchoring Systems are designed to secure separators and interceptors at installations. Polyester or steel Hold-Down Straps and concrete beams are used to anchor separators and interceptors to counteract their natural buoyant forces.

Polyester Hold-Down Straps
Polyester Hold-Down Straps are intended for underground use only. They are made from 3" wide 100% polyester webbing. These straps have a large reinforced loop at each end for connecting to the Concrete Deadmen Anchor hardware. A length of 1/2" diameter wire rope and six cable clamps are included with each strap for connecting the strap to one side of the concrete anchoring. A hook-to-hook turnbuckle is used for attaching the strap to the anchoring on the other side.

Standard Features

- No strap liners are required because there are no metallic components in the strap system that can make contact with the separator
- Available without the cable, clamps and turnbuckles, for use with Concrete Deadmen Anchors
- Available for tank diameters 3'-2" to 13'-0"

Polyester Hold-Down Straps Installation Detail



Deadmen Anchors are beams of reinforced concrete placed alongside the OWS in the bottom of the excavation. The weight of the backfill on the Deadmen Anchors provides additional resistance to buoyancy forces acting on the OWS. Properly installed Deadmen Anchors, when used exclusively with Polyester Hold-Down Straps and the supplied hardware, prevent OWS flotation and cost less than a concrete bottom hold-down pad. Best of all, there is no delivery charge for Concrete Deadmen Anchors when they are shipped on the same truck along with a Highland Tank OWS.

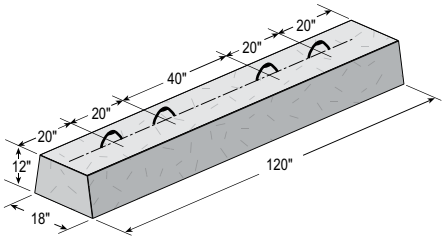
Standard Features

- Designed to work with standard underground OWS from 350 to 60,000 gallons
- Utilize a 4,000 psi concrete mix reinforced with #4 rebar
- Dimensions:
  CDA-15: 120" L, 18" W, 12" H
  CDA-45: 120" L, 36" W, 18" H
- Volume:
  CDA-15: 15 cubic feet (approx.)
  CDA-45: 30 cubic feet (approx.)
- Weight:
  CDA-15: 2,200 pounds (approx.)
  CDA-45: 6,500 pounds (approx.)

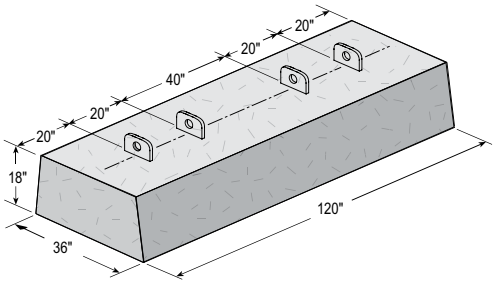
Tank Volume Gallons	Dimensions		Required Deadmen	Required Straps
	Diameter	Length		
*350	3'-6"	4'-3"	2	2
350	3'-6"	6'-0"	2	2
550	3'-6"	7'-9"	2	2
*750	4'-0"	8'-0"	2	2
1,000	4'-0"	10'-9"	2	2
*1,500	5'-4"	9'-0"	2	2
2,000	5'-4"	12'-0"	2	2
3,000	5'-4"	18'-0"	2	2
4,000	5'-4"	24'-0"	4	4
5,000	6'-0"	23'-10"	4	4
6,000	6'-0"	28'-8"	6	6
7,000	7'-0"	24'-4"	4	4
8,000	7'-0"	28'-0"	4	4
9,000	8'-0"	24'-0"	4	4
10,000	8'-0"	26'-8"	6	6
12,000	8'-0"	32'-0"	6	6
**15,000	10'-0"	25'-6"	4	4
**20,000	10'-6"	31'-0"	6	6
**25,000	10'-6"	38'-9"	8	8
**30,000	10'-6"	46'-0"	10	10
**40,000	12'-0"	47'-3"	10	10
**50,000	12'-0"	59'-6"	12	12
**60,000	13'-0"	60'-6"	12	12

* Oil/sand interceptor sizes only, all others are oil/water separators. ** Model CDA-45 required.

CDA - 15



CDA - 45



Notes:

1. Above recommendations assume a 36" burial depth to top of OWS or INT, have at least one access sump and are installed exclusively with Highland Polyester Hold-Down Straps.
2. To be effective, Deadmen Anchors must be placed outside the OWS or INT diameter and extend the full length of the OWS or INT.
3. A limited number of Deadmen Anchors require the installation of supplemental methods of restraint, such as 8" grade-level reinforced concrete pads (as recommended by PEI RP 100-11).

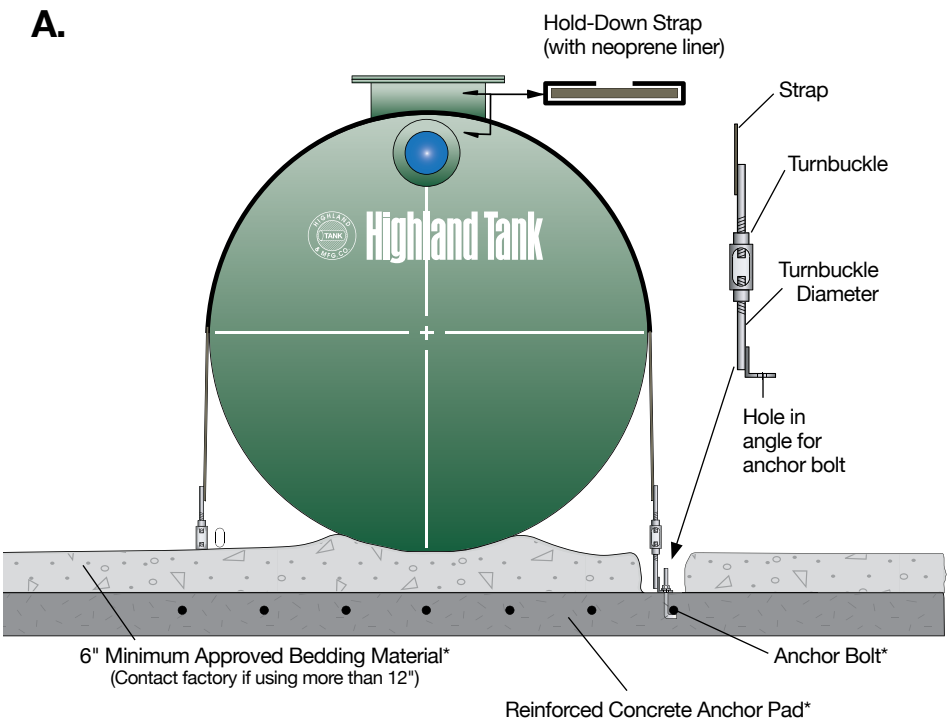
Hold-Down Straps

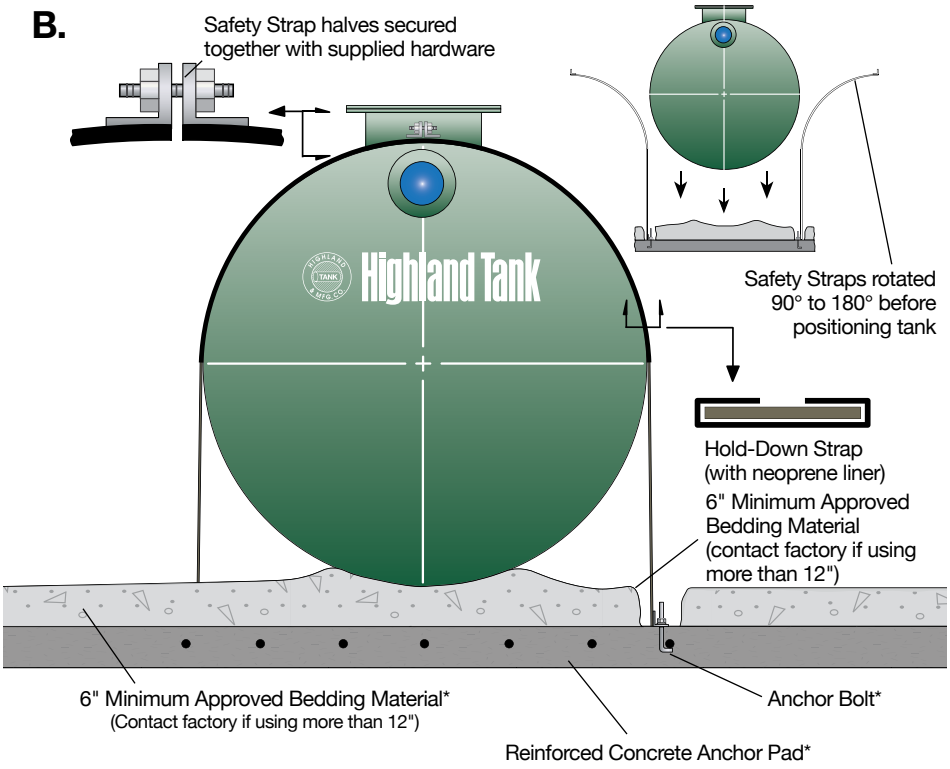
This guide provides information about Steel Hold-Down Straps manufactured specifically by Highland Tank. The guide references dimensions of standard underground OWSs. Also referenced are Hold-Down Strap specifications, recommended quantity, spacing and anchor bolt requirements. Contractor-supplied anchor bolt sizes must be in accordance with this guide for proper fit and system performance.

This guide is intended only as an aid to professional engineers. Highland Tank recommends that underground OWS's anchorage systems be designed by a licensed professional engineer.

A. Standard Hold-Down Straps are manufactured from mild-carbon steel with an adjustable turnbuckle and angle clip on each end for securing OWSs in place. Neoprene rubber liners are supplied for electrical isolation and coating protection. Standard straps are sized so that when the turnbuckles are completely closed, there will be six (6") inches between the anchor pad and the OWS bottom. Turnbuckles can be opened to allow up to twelve (12") inches of clearance.

B. Safety Hold-Down Straps are designed to avoid having installation personnel in the excavation during OWS placement. They are manufactured in two pieces and shipped connected with a threaded tie rod at top center. These straps are designed to be installed before placing the OWS in the excavation. By loosening the tie rod, the two pieces are separated and each is rotated 90º to 180º away from their original position. After the OWS is positioned, the strap's sides are rotated back toward each other and tightened over the OWS with the tie rod and nuts.





*Contractor Supplied Items

Steel Hold-Down Straps Sizing Guide

OWS Volume Gal.	OWS Dimensions		Hold-Down Strap	
	Dia.	Length	Required Quantity	Size W x T
*350	3'-6"	4'-3"	2	2" x .25"
350	3'-6"	6'-0"	2	3" x .25"
550	3'-6"	7'-9"	2	3" x .25"
*750	4'-0"	8'-0"	2	3" x .25"
1,000	4'-0"	10'-9"	2	3" x .25"
*1,500	5'-4"	9'-0"	2	3" x .25"
2,000	5'-4"	12'-0"	2	3" x .25"
3,000	5'-4"	18'-0"	2	3" x .25"
4,000	5'-4"	24'-0"	2	3" x .25"
5,000	6'-0"	23'-10"	2	3" x .375"
6,000	6'-0"	28'-8"	2	3" x .375"
7,000	7'-0"	24'-4"	2	3" x .375"
8,000	7'-0"	28'-0"	3	3" x .375"
9,000	8'-0"	24'-0"	3	3" x .375"
10,000	8'-0"	26'-8"	4	3" x .375"
12,000	8'-0"	32'-0"	4	3" x .375"
15,000	10'-0"	25'-6"	3	4" x .50"
20,000	10'-6"	31'-0"	4	4" x .50"
25,000	10'-6"	38'-9"	5	4" x .50"
30,000	10'-6"	46'-6"	6	4" x .50"
40,000	12'-0"	47'-3"	8	4" x .50"
50,000	12'-0"	59'-6"	10	4" x .50"
60,000	13'-0"	60'-6"	12	4" x .50"

* Oil/sand interceptor sizes only, all others are oil/water separators.

Notes:

1. This information is provided as a service to our customers to assist with budgetary estimates.

2. Hold-Down Straps are designed to assist on boyancy restraint of fully installed and backfilled tanks.

3. Safety straps are required for use on all tanks 10'-0" diameter and larger when using steel hold-down straps.

4. Underground OWS anchorage systems should be designed by a licensed professional engineer for the particular geographic location, soil conditions and installation requirements of the specific jobsite. Highland Tank assumes no liability for errors or omissions in this information or for any consequential damages incurred by use or misuse of this guide.

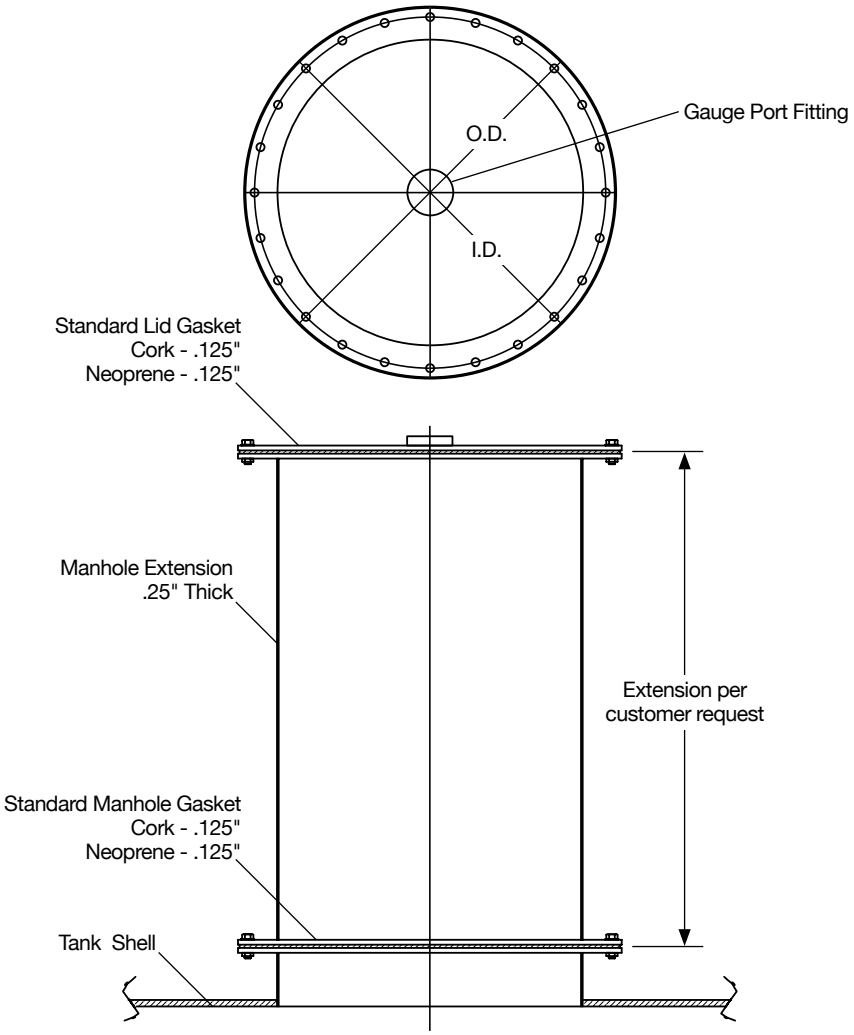
5. Additionally, supplemental methods of restraint, such as grade-level reinforced concrete pads, should be designed in accordance with PEI/RP-100-11.

6. Refer to appropriate Highland Tank and Steel Tank Institute Installation Instructions for additional information.

Manways and Manway Extensions

Manways are manufactured and protected against corrosion using the same methods and quality control procedures as the storage tank. The welding and fabrication specifications are in strict accordance with Underwriters' Laboratories, Inc. and OSHA. By manufacturing our own manways, covers and extensions, we assure our customers of the same high quality as in our OWSs.

Manways are available in standard 18", 20", 24", 30", 36", 42" and 48" diameters. Larger diameter cylindrical and custom rectangular manways are also available. Manway assemblies include the bolted cover and gasket. The cover provides a convenient location for fittings. Manway extensions lengths can vary and are made to order.



Diameter		Thickness Manway/Lid	Bolt Size	Number Bolts	Bolt Circle
ID	OD				
18"	24"	.25"-.25"	.50"	18	21"
20"	26"	.25"-.375"	.50"	24	23"
24"	30"	.25"-.375"	.50"	24	27"
30"	36"	.375"-.375"	.50"	42	34"
36"	42"	.375"-.375"	.50"	42	40"
42"	48"	.375"-.375"	.50"	52	45"
48"	54"	.375"-.375"	.50"	60	51"

Grade Level Manways

Grade Level Manways (GLM) are designed to AASHTO H-20 requirements. Round GLMs are available in sizes ranging from 12" to 48" diameter. Rectangular GLMs are available in lengths from 48" to 150" and widths from 48" to 72".

Each manway is constructed using A36 steel plate from 10 gauge to .25" thick. Standard manways are fabricated with a 12" skirt depth and fitted with 1.5" x 2" x 3" steel concrete anchors seal welded to the manway skirt to ensure a secure installation. Standard manway lids are constructed of .375" reinforced checkered steel plate. Optional .375" checkered plate reinforced aluminum lids are available. Steel components receive a brush blast and are coated with black enamel paint. Optional polyurethane or epoxy coatings are available.

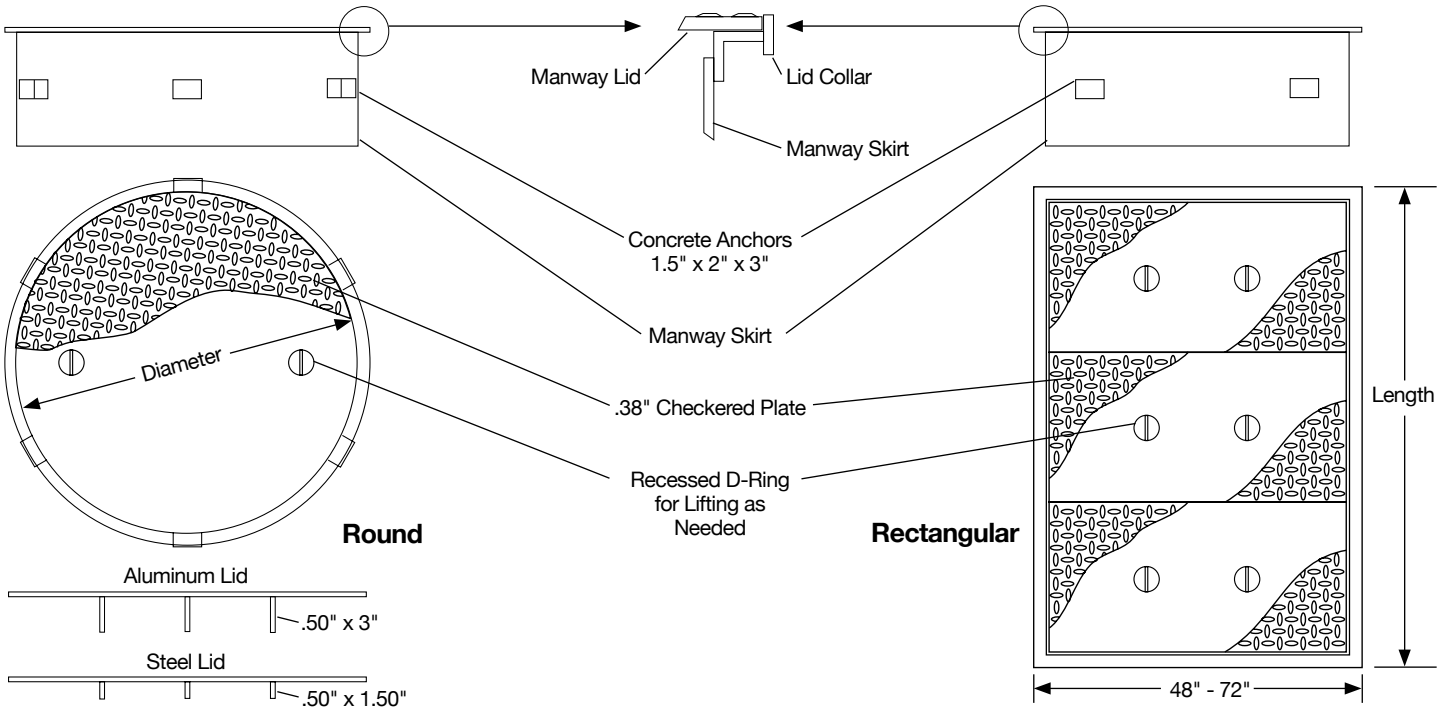
Rectangular manways are custom fabricated to site-specific requirements. Custom diameters and depths are available upon request.

Cylindrical Design

Model Number	Nominal Manway Diameters			Skirt Thickness
	Skirt I.D.	Collar I.D.	Lid O.D.	
GLM-12	12"	14.5"	14"	10ga
GLM-18	18"	20.5"	20"	7ga
GLM-24	24"	26.5"	26"	7ga
GLM-30	30"	32.5"	32"	7ga
GLM-32	32"	34.5"	34"	7ga
GLM-36	36"	38.5"	38"	7ga
GLM-42	42"	44.5"	44"	.25"
GLM-48	48"	50.5"	50"	.25"

Rectangular Design

Model	Number of Doors	Maximum Overall Length	Skirt Thickness
R-GLM-48	1	48"	.25"
R-GLM-60	2	60"	.25"
R-GLM-90	3	90"	.25"
R-GLM-120	4	120"	.25"
R-GLM-150	5	150"	.25"



Insulation Systems

Custom Insulated Oil/Water Separators

Custom thermal insulation can be applied to OWSs to help reduce energy costs associated with heating or maintaining heat in the separation process for efficient and effective operation.

We have multiple methods for insulating OWSs depending on your specific requirements:

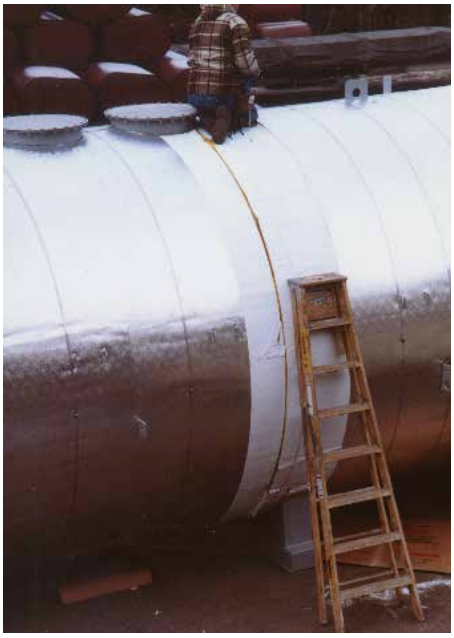
External Spray-on Insulation System

External Spray-on Insulation System

- A complete 360º wrap of sprayed-on insulating material (nominal thickness- 1.5")
- A protective finish coating over the foam insulation to prevent UV damage

Injected Insulation System

- A complete 360º second wrap, steel skin
- The interstice is injected with a special time-activated foam insulating material that expands to completely fill all voids and eliminate air pockets



External Batt & Skin Insulation System

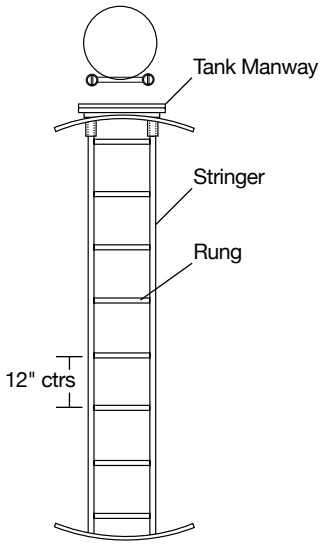
External Batt with Jacket Insulation System

- A complete 360º wrap with insulating batts of mineral wool, fiberglass or ceramic material
- A complete 360º wrap with a 24-26 gauge aluminum skin to ensure insulation integrity

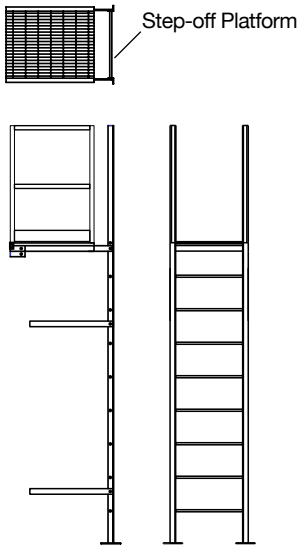
Ladders, Platforms and Walkways

Ladders, platforms and walkways are designed to comply with strict OSHA specifications. Carbon steel fabrication with a painted finish is standard.

Stainless steel or galvanized finish is available upon request. Mounting brackets and other structural accommodations can be factory-fitted to facilitate field installation. OSHA compliant interior access ladders require a properly sized access manway for safety clearance. OSHA compliant standard or caged external access ladders are designed for access to the OWS top, gauge port, manways, or other appurtenances. Handrails and provisions for anchoring to a support pad are also included.



OWS - Internal Ladder



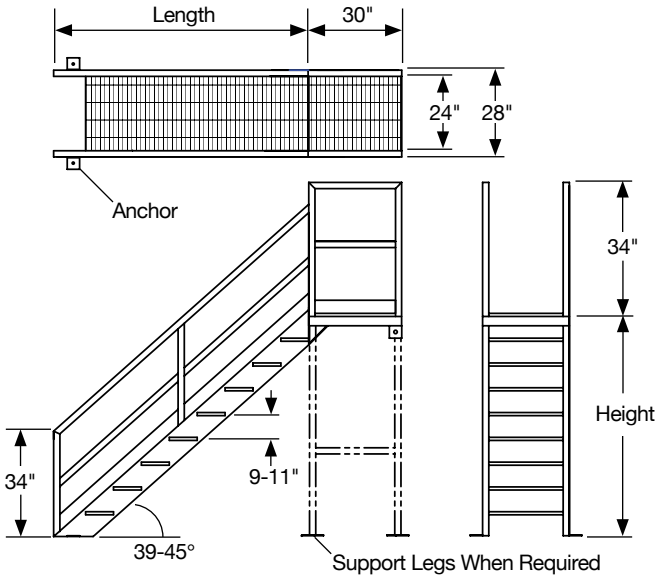
OWS - External Ladder

Stairways and Ships Ladders

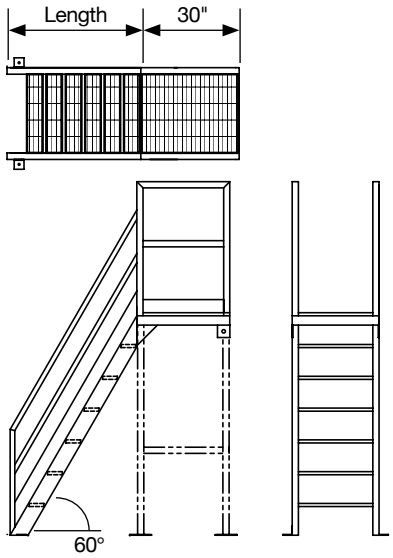
Highland fabricates standard and custom stairs to facilitate access to OWS gauge ports and manways. OSHA standard-design stairways provide access to the top of the OWS from a platform attached to one end of the OWS and include non-skid fiberglass grating on the stair treads and platforms. Handrails and provisions for anchoring stairway to a support pad are also included.

In addition, Highland will manufacture Ships Ladders for job sites with limited space and can custom fabricate ladders, platforms, and walkways to suit your site-specific needs.

Stairways



Ships Ladders



Note: OSHA compliant internal ladders measure 16" wide and external ladders measure 24" wide.

Our Commitment to You

Highland Tank is committed to building successful, long-standing relationships with our customers. We are dedicated to providing oil/water separators and oil/sand interceptors of the highest craftsmanship and performance. Within a business of ever-changing technology, we are constantly striving to exceed all your expectations.

Our family owned and managed business formed a humble philosophy many years ago that continues to hold true: manufacture a solid product at a competitive price and stand behind it with unparalleled service. Our hard work and dedication has helped to develop the high quality, dependability and craftsmanship put into every product we manufacture.

Engineering depth, state-of-the-art equipment, and skilled craftsmen with old-fashioned pride and the traditional American work ethic have given us the tools needed to maintain our dedication to quality production.

Visit highlandtank.com where you can access product literature, CADD drawings, specifications, sizing calculators and more.

An American Manufacturer Proven to Stand Behind its Products.

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Our mission

Highland Tank's mission is to engineer and manufacture quality products while providing innovative solutions through relationships founded upon integrity and excellence in customer service.