



## Oil/Water Separator Drainage Systems and Compliance with NFPA 409 Standard on Aircraft Hangars



Oil/water separators for spill control and discharge compliance shall be provided in conjunction with the trench drainage systems serving all aircraft storage and servicing areas.

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Aircraft hangars are closed building structures used to protect fixed and rotary wing aircraft from the weather and direct sunlight. Aircraft maintenance, repair, manufacture, assembly and storage are regularly performed in aircraft hangars at an assortment of commercial, fixed base or military airfields.

These operations may result in spilled oil or fuel on the hangar floor that may reach the hangar drainage system.

As a result, oil/water separators are regularly installed in aircraft hangars. They are installed in the hangar drainage system to intercept oil or fuel spilled on the hangar floor before it enters the discharge pipe.

Here, the oily wastewater is collected, and the oil and fuel are retained at the top of the separator with the oil-free water being released into the sewer system and the final waste water treatment plant.



Oil/water separator installation is a code requirement. National Fire Protection Association NFPA 409 Standard on Aircraft Hangars 2016 states that:

5.11.2.10 Oil separators shall be provided for the trench drainage systems serving all aircraft storage and servicing areas.

These separators shall be permitted to serve each hangar trench drainage system or a group of hangar trench drainage systems or be installed as part of a general airport trench drainage system.

AFFF (Aqueous Film Forming Foam) fire suppression systems are also typically provided in aircraft hangars to satisfy fire codes. AFFF systems have superior fire extinguishing capability and can effectively control a flammable or combustible liquid fire. This type of protection is necessary to protect valuable and mission-essential aircraft and hangar facilities.

AFFF firefighting foam is simply a stable mass of small air-filled bubbles, which have a lower density than oil, gasoline or water. Foam is made up of three ingredients - water, foam concentrate and air. When mixed in the correct proportions, these three ingredients form a homogeneous foam blanket which is lower in density than flammable liquids. AFFF is used principally to form a cohesive floating blanket on flammable and combustible liquids, and prevents or extinguishes fire by excluding air and cooling the fuel.

A concern of AFFF system installation is with the discharge of AFFF foam solution. In large volumes, AFFF foam can be harmful to the environment. AFFF solution should not be allowed to flow untreated into the ecosystem or into the sewage systems in large quantities. The primary concern is discharge from unwanted activations and from periodic testing.

NFPA 409 addresses this concern:

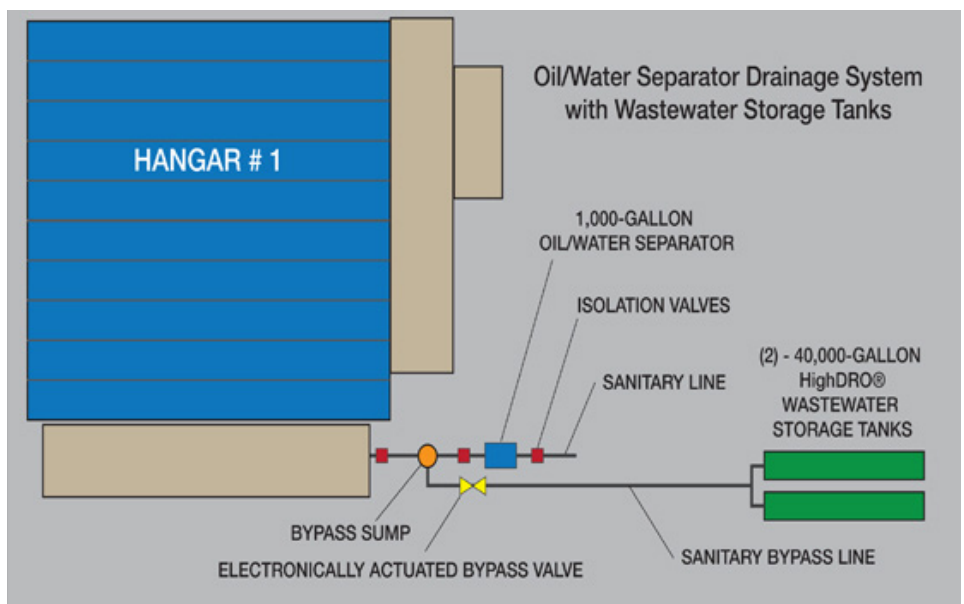
5.11.2.11 In aircraft storage and servicing areas protected by water sprinkler systems or foam-water systems, a bypass shall be provided around the separator to allow for emergency direct disposal of water and flammable liquids. Separator systems shall discharge flammable liquid products to a tank, cistern, or sump located away from any exposures.

As stated, the crux of the problem here is the AFFF and its adverse effects to the environment. There is also an adverse effect on oil/water separation process.

The AFFF Fire Control Agents used at these sites typically are composed of water and synthetic detergents and surfactants that cause chemical emulsification of the oil and water.

Highland Tank and industry in general state, "it is recommended that detergents and surfactants be excluded from the separator system. A gravity separator will not remove chemical emulsions and their presence retards the recovery of oil that would otherwise be separated." The synthetic detergents and surfactants will cause serious foaming problems, in the oil/water separator and, more importantly, in the waste water treatment system aeration basins.

There is a solution to the problem of designing an aircraft hangar drainage system protected by foam-water system – a simple By-Pass Sump and Discharge Valve installed in conjunction with the Oil/Water Separator.



The basis for this design is that during the fire training operations using AFFF, a valve will basically open the bypass shutting off the flow into the Oil/Water Separator. The AFFF is then allowed to by-pass the Oil/Water Separator and be discharged to large underground wastewater storage tank(s) installed after the Oil/Water Separator.

The AFFF mixture is then pumped out by a waste hauler for proper disposal.

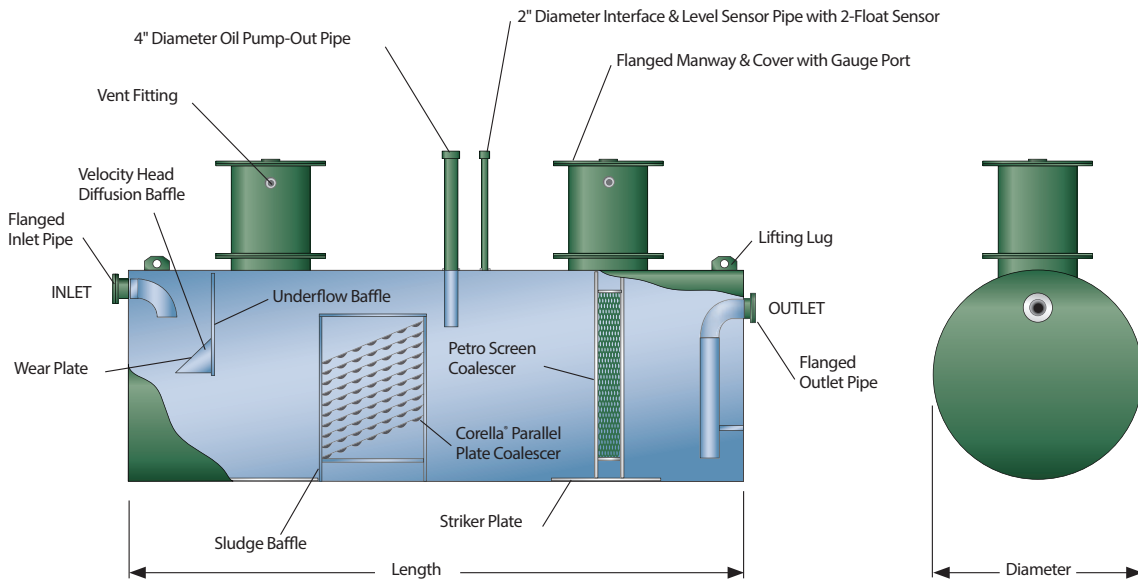
In operation, the trench drains servicing the aircraft storage and servicing areas are allowed to discharge to the sanitary line. That line leads to a deep sump basin with one line directed to the underground Corella® Oil/Water Separator:

A bypass line with electronically actuated valve remains closed until the AFFF Suppression System turns on.

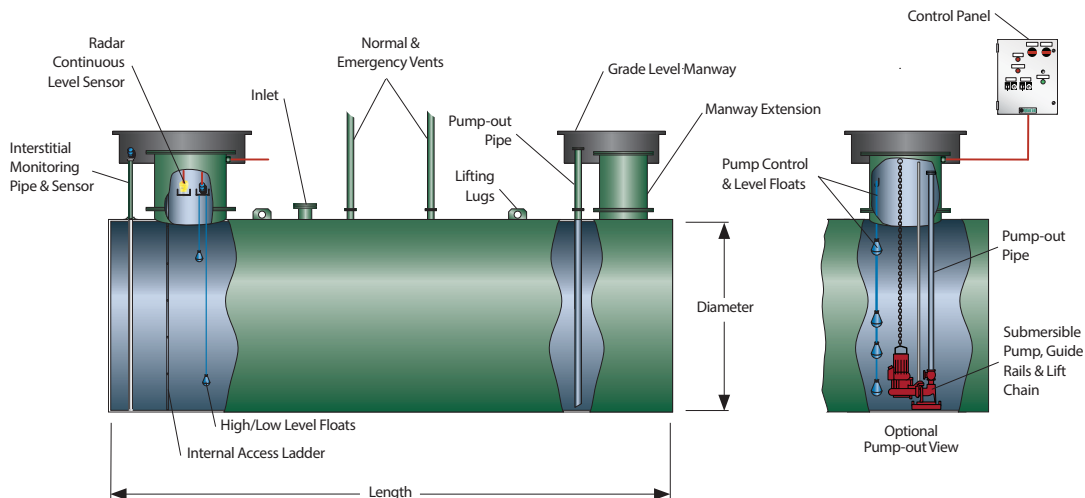
The flow is then directed to two (2) large volume belowground HighDRO® Wastewater Storage Tanks to allow for emergency direct disposal of water and flammable liquids. The tanks can be pumped out or discharged at a controlled rate to the sanitary sewer, whichever is required.

The minimum capacity of underground HighDRO® Wastewater Storage Tanks should be adequate to handle anticipated maximum flows.

**Highland Tank's Corella® Oil/Water Separators are highly efficient - treating wastewater under a wide range of conditions.**



**Highland Tank's High-DRO® Wastewater Storage Tanks are available in a wide range of sizes, capacities, and arrangements, many with complete pump and control packages.**



For open fire extinguishing systems, the capacity should be based upon the one event that can produce the largest single discharge amount from an inadvertent activation. For closed fire extinguishing systems, the anticipated flow is that produced during acceptance and periodic system testing.

There have been instances where the authority having jurisdiction (AHJ) requires the belowground HighDRO® Wastewater Storage Tanks to be sized for the exact firefighting water storage volume or sometimes additional storage volume. This design addresses the concern of full system operation if one tank was full of AFFF contaminated wastewater. There would always be a reserve to allow for one more volume of emergency water and flammable liquids while waiting for the full tank to be evacuated.

Highland Tank has extensive experience in the design, manufacture and installation of storage and wastewater treatment tank systems but as with all Oil/Water separator or wastewater treatment tanks discharge applications, it is always best to check with the AHJ before proceeding with the design.



*If AFFF discharge is not contained and controlled in large volume wastewater storage tanks, relatively large volumes of AFFF discharge can flow into the drainage system and have a negative impact to the environment, as well as produce bad side effects, such as foaming.*

Call 814-893-5701 today or visit us at [www.highlandtank.com](http://www.highlandtank.com) for more information on wastewater treatment systems.

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