Form B6_Appendix 2_Q7g

Class 1 Oil/ Water Separator (Interceptor) Operation and Effluent Discharge Quality

1. Introduction

A Class 1 interceptor is an oil–water separation device designed to remove free oil, grease, and suspended solids from surface water before discharge to a sewer system or watercourse.

Class 1 interceptors are designed to achieve a high level of oil removal, typically producing an effluent with a maximum oil concentration of 5 mg/L or less under standard test conditions.

2. Principle of Operation

A Class 1 interceptor works primarily on the principle of gravity separation, which relies on the difference in density between water and oil.

2.1 Inlet Stage

Surface water enters the interceptor through the inlet chamber. At this point:

- The flow velocity is reduced.
- Large debris begin to settle at the bottom of the chamber.
- Initial separation of free oil begins.

2.2 Separation Chamber

The main chamber allows oil droplets to rise to the surface while heavier solids settle to the base.

Key processes include:

- Sedimentation: Heavier solids fall to the bottom forming sludge.
- Flotation: Oil and hydrocarbons, being less dense than water, rise to the surface forming an oil layer.
- Retention time: The chamber is sized to provide sufficient time for separation to occur.

2.3 Coalescing Filter (Class 1 Feature)

A distinguishing feature of Class 1 interceptors is the coalescing filter unit.

This component:

- Consists of a structured filter media.

- Causes small oil droplets to combine (coalesce) into larger droplets.
- Larger droplets rise more quickly to the surface due to buoyancy.

2.4 Outlet Stage

After passing through the separation and coalescing stages, the treated water exits through the outlet pipe.

The outlet is positioned below the oil layer but above the sediment layer to ensure only clarified water leaves the interceptor.

3. Effluent Discharge Quality

The treatment system is designed to achieve a high standard of effluent quality.

For a Class 1 interceptor, the typical discharge performance is:

- Maximum oil concentration: ≤ 5 mg/L

5. Maintenance Requirements

To maintain the required effluent discharge quality, regular maintenance is essential.

Typical maintenance tasks include:

- Oil removal.
- Sludge removal from the base of the interceptor.
- Cleaning of coalescing filters.
- Routine inspections.

7. Conclusion

A Class 1 interceptor is a highly effective oil separation system designed to remove hydrocarbons and suspended solids from surface water runoff. Through a combination of gravity separation and coalescing filtration, the system achieves a treated effluent oil concentration of 5 mg/L or less. Proper design, installation, and maintenance ensure the interceptor continues to protect drainage networks.