

STANDARD SPECIFICATION FOR STORMWATER OIL AND SEDIMENT SEPARATOR

PART 1 – GENERAL

1.1 DESCRIPTION

The work covered by this section consists of the construction of a structural underground stormwater oil and sediment separator. The Contractor shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications.

1.2 REFERENCE STANDARDS

ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks
ASTM C 478: Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 443: Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

Ontario Provincial Standards

OPSS 1350 Material Specification for Concrete - Materials and Production
OPSD 401.01 Maintenance Hole Frame and Closed Cover
OPSD 405.010 Safety Steps
OPSD 701.030 1200 mm Diameter Precast Concrete Maintenance Hole Components
OPSD 701.050 1800 mm Diameter Precast Concrete Maintenance Hole Components
OPSD 701.060 2400 mm Diameter Precast Concrete Maintenance Hole Components
OPSD 701.070 3000 mm Diameter Precast Concrete Maintenance Hole Components
OPSD 701.080 3600 mm Diameter Precast Concrete Maintenance Hole Components

CAN/CSA-A257.4-M92 Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections, and Fittings Using Rubber Gaskets

CAN/CSA-A257.4-M92 Precast Reinforced Circular Concrete Manhole Sections, Catch Basins, and Fittings

Ontario Concrete Pipe Association Plant Prequalification Program - Prequalification Requirements for Precast Concrete Drainage Products

Ministry of Transportation - Ontario Highway Bridge Design Code, 3rd Edition

Canadian Highway Bridge Design Code

1.3 SHOP DRAWINGS

1.3.1 Shop drawings consisting of catalog cuts or fabricator drawings showing the structure and frames, grates, or covers shall be submitted by the Contractor to the Engineer for approval.

1.3.2 Where an external bypass is required, the manufacturer must provide calculations and designs for all structures, piping and any other required material applicable to the proper functioning of the system, stamped by a Professional Engineer.

1.4 HANDLING AND STORAGE

Care shall be taken in loading, transporting, and unloading to prevent damage to materials during storage and handling

PART 2 – PRODUCTS

2.1 GENERAL

The separator shall be circular and constructed from pre-cast concrete circular riser and slab components. The internal fiberglass insert shall be bolted and sealed watertight inside the reinforced concrete component. The separator shall be capable to be used as a bend or junction structure within the stormwater drainage system.

2.2 PRECAST CONCRETE SECTIONS

All precast concrete components shall be designed and manufactured to a minimum live load to Canadian Highway Bridge Design Code truck loading or based on local regulatory specifications.

2.3 PLANT PREQUALIFICATION PROGRAM

All concrete materials shall be manufactured and supplied from a pre-qualified plant certified by the OCPA Plant Prequalification Program.

2.3 JOINTS

The concrete joints shall be water-tight and meet the design criteria according to CSA A257.4. Mastic sealants or butyl tape are not an acceptable alternative.

2.4 FRAME AND COVER

The frame and cover shall include an indented top design with lettering of the unit's name cast into the cover to allow for easy identification in the field.

2.5 CONCRETE

All reinforced concrete components shall be manufactured according to local specifications and shall meet the requirements of ASTM C 478.

2.6 FIBERGLASS

The fiberglass portion of the water treatment device shall be constructed in accordance with the following standard: ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.

2.7 INSPECTION

All precast concrete sections shall be inspected to ensure that dimensions, appearance and quality of the product meet local specifications and ASTM C 478 or CSA A257.3 and CSA A257.4.

PART 3 – PERFORMANCE

3.1 GENERAL

The stormwater quality treatment device shall remove oil and sediment from stormwater.

3.3 TOTAL SUSPENDED SOLIDS

The treatment device shall be capable of removing 80 percent of the average annual total suspended solids (TSS) load without scouring previously captured pollutants.

Design methodologies shall provide calculations substantiating removal efficiencies and correlation to field monitoring results using both particle size and TSS removal efficiency.

All manufactures shall provide performance data that the stormwater quality treatment system does not scour previously captured pollutants based on the particle size distribution specified in section 3.5. Performance data should be laboratory testing with an initial sediment load of 50 percent of the unit's sediment capacity at an operating rate of 125% or greater. Particle size distribution (PSD) for the initial sediment load shall conform to table 3.5.

3.4 FREE OIL

3.4.1 The separator must be capable of removing 95 percent of the floatable free oil.

3.4.2 The first 16 inches (405 mm) of hydrocarbon storage shall be lined with fiberglass to provide a double wall containment of the hydrocarbon materials.

3.5 PARTICLE SIZE

3.5.1 The separator must be capable of trapping fine sand, silt, clay and organic particles in addition to larger sand, gravel particles and small floatables.

3.5.2 The stormwater quality treatment device shall be sized to a specific particle size distribution that is clearly identified in both diameter and specific gravity. The example below is a Fine Particle Size that is a common PSD used in design of water quality devices to ensure proper design for capturing smaller particles and the high load of associated pollutants.

Table 3.5 – Particle Size Distribution

Amount	Diameter	Specific Gravity
20%	20 micron	1.3
20%	60 micron	1.8
20%	150 micron	2.2
20%	400 micron	2.65
20%	2000 micron	2.65

3.5 CERTIFICATION

Only separators that have been verified by ETV Canada and the Ontario Ministry of Environment New Environmental Technology Evaluation (NETE) will be accepted.

PART 4 – EXECUTION

4.1 INSTALLATION

The installation of the pre-cast concrete stormwater quality treatment device should conform to provincial highway, municipal or local specifications for the construction of manholes. Selected sections of a general specification that are applicable are summarized below.

4.2 EXCAVATION

4.2.1 Excavation for the installation of the stormwater quality treatment device should conform to state highway, municipal or local specifications.

4.2.2 The stormwater quality treatment device should not be installed on frozen ground. Excavation should allow for adequate compaction around the structure. If the bottom of the excavation provides an unsuitable foundation additional excavation may be required.

4.2.3 In areas with a high water table, continuous dewatering should be provided to ensure that the excavation is stable and free of water.

4.3 BACKFILLING

Backfill material should conform to state highway, municipal or local specifications. Backfill material should be placed in uniform layers not exceeding 12 inches (300 mm) in depth and compacted to state highway, municipal or local specifications.

4.4 WATER QUALITY DEVICE CONSTRUCTION SEQUENCE

4.4.1 The concrete water quality device is installed in sections in the following sequence:

- aggregate base
- base slab
- treatment chamber section(s)
- transition slab (if required)
- bypass section
- connect inlet and outlet pipes
- riser section and/or transition slab (if required)
- maintenance riser section(s) (if required)
- frame and access cover

4.4.2 The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with gasketed joint seals, should be installed in accordance with the precast concrete manufacturer's recommendations.

4.4.3 Adjustment of the stormwater quality treatment device can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary. Once the stormwater quality treatment device has been constructed, any lift holes must be plugged with mortar.

4.5 DROP TEE AND RISER PIPE

Once the upper chamber has been attached to the lower chamber, the inlet drop tee, and riser pipe must be attached. Pipe installation instructions and required materials shall be provided with the insert.

4.6 INLET AND OUTLET PIPES

Inlet and outlet pipes should be securely set into the upper chamber using non-shrink grout or approved pipe seals (flexible boot connections, where applicable) so that the structure is watertight.

4.7 FRAME AND COVER OR FRAME AND GRATE INSTALLATION

The grade adjustment units should be laid in a full bed of mortar with successive units being joined using sealant recommended by the manufacturer. Frames for the cover should be set in a full bed of mortar at the elevation specified.