

# Water Quality Units

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Standards for storm water quality will vary by location and land use. The most targeted sources of runoff pollution are paved areas in urban and industrial sites. These are generally areas with high traffic loads, such as parking lots and gas stations, that generate significant concentrations of contaminant particles and hydrocarbons.

Because of land constraints, ADS underground Water Quality Units have become an increasingly efficient solution for treating storm water. These durable, lightweight structures have been specifically designed for fast installation and easy maintenance.

## Benefits

- Independent testing shows the following:
  - 80% TSS removal
  - 80% oil and grease removal
  - 74% heavy metals removal
  - Greater than 40% TP removal
- Removes floatable debris, such as oils and greases
- Available in 900-1500 mm (36"-60") diameters
- Lightweight High-Density Polyethylene (HDPE) unit installs easily with a minimum of manpower. Heavy cranes are not necessary to install the unit
- Each unit is fitted with access risers for easy inspection and maintenance of the sediment and oil chambers
- The unit is inexpensive because the design is simple and there are no moving parts
- The bypass system prevents re-suspension of captured solids by diverting water flows greater than the first flush
- HDPE resists abrasion and chemicals found in storm water and in the surrounding soil

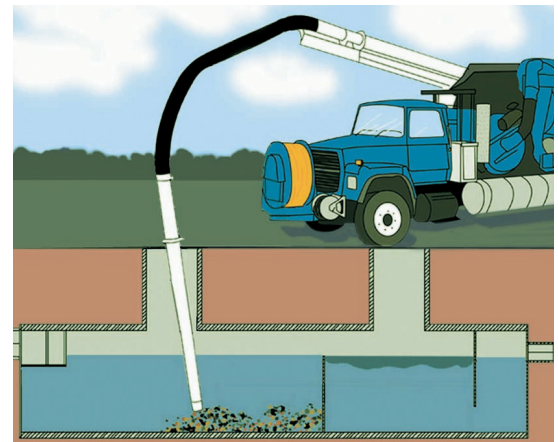
## Design and Installation

Available in 900-1500 mm (36"-60") diameters, ADS Water Quality Units (WQU) are modified sections of N-12<sup>®</sup> pipe with weir plates at specific locations and heights to remove high percentages of sediment and oils from the first flush of a storm event. They can be installed at any point in the sub-surface drainage system and are ideally suited to treat "hot spots" in existing storm water lines.

The unit is designed using the fundamental principles of Stoke's Law and a standard orifice outlet control. The settling velocity of a particle is calculated based on the smallest particle to be removed. Standard units offer a choice of 140 or 200 sieve size removal (106 and 75  $\mu\text{m}$ ) particle sizes, respectively.

The outlet orifice is sized to release a typical first flush discharge and to redirect any excess flow to a bypass piping system installed with the unit.

Water Quality Units are designed and manufactured to meet ASTM F27737 - Standard Specification for Corrugated HDPE Water Quality Units.



Installation of WQUs follows the same accepted practices as for the installation of large diameter flexible pipe. Specific installation instructions, along with details on specifying the proper size of a WQU, are available in Technical Note 1.03 and Installation Guide 2.01. You can also find more information on the ADS website [adspipe.com](http://adspipe.com).

### The heart of the treatment train

For many drainage sites, the Water Quality Unit by itself can provide the required degree of pollutant removal. However, certain sites with higher concentrations of hydrocarbons or sediment runoff will need further treatment upstream and/or downstream of the unit. This multi-tiered approach to storm water quality is known as the *treatment train*.

Upstream measures include sediment prevention (vegetated swales, etc.) and inlet protection devices such as screens, filters and silt fences. These techniques are designed to prevent a large percentage of pollutants from ever entering the storm drain system. For impervious surfaces such as paved parking areas, catch basin insert filters are most commonly used for early stage treatment.

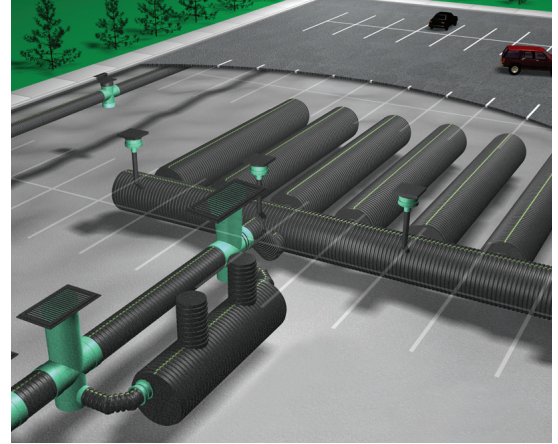
### Retention/Detention

Treatment downstream from the WQU generally involves some form of retention or detention system. Retention allows accumulated storm water to gradually percolate into the surrounding soil, while detention meters the water through an outlet to a ditch, stream or other receiving area.

Inlet designs to such underground storage vessels can also enhance pollutant removal. The “eccentric header system” consists of a large diameter manifold pipe with an invert positioned lower than those of the smaller inlet pipes to the storage vessels. The large header pipe thus acts as a sump into which suspended particles may settle. Manholes and/or risers may be installed to facilitate inspection and cleaning.

Designers can choose between two methods of constructing the retention or detention system. The first is the use of ADS N-12 large diameter corrugated HDPE pipe, known for its economy and ease of installation. The second option is StormTech®, specially engineered to meet the demands of subsurface storm water management applications.

ADS supplies a complete line of pipe, fittings and fabricated manifolds, along with detailed sizing, design and installation instructions on our website at [adspipe.com](http://adspipe.com).



# ADS Storm Water Quality Unit Specification

## Scope

This specification describes 900 to 1500 mm (36- through 60-inch) storm Water Quality Unit for use in onsite point source storm water treatment applications.

## Requirements

Water Quality Units shall have a smooth interior and annular exterior corrugations meeting the requirements of ASTM F2737.

The unit shall have at least three containment zones, each zone separated from the next by use of a weir or baffle plate.

Weir and baffle plates shall be welded at all interfaces between the plate and Water Quality Unit. First weir plate shall incorporate a saw tooth design and shall be reinforced with stiffeners positioned horizontally on the downstream side of the plate to be retained.

Water Quality units shall provide adequate clean-out and inspection areas.

## Joint Performance

Connections for the bypass line and the unit shall utilize the same joint quality as specified for the main storm sewer pipe. Couplers for the bypass line may be either split couplers, in-line bell couplers, snap couplers, bell-bell couplers, or welded bell couplers.

## Material Properties

Material for pipe and fittings used to produce Water Quality Units shall be high-density polyethylene conforming with the minimum requirements of cell classification 424420C for 100 to 250 mm (4- through 10-inch) diameters, and 435400C for 300 to 1500 mm (12- through 60-inch) diameters, as defined and described in the latest version of ASTM D3350. The pipe material shall be evaluated using the notched constant ligament-stress (NCLS) test as specified in Sections 9.5 and 5.1 of AASHTO M294 and ASTM F2306, respectively. All smooth baffle and weir plates shall be high density polyethylene.

## Installation

Installation shall be in accordance with the ADS recommended installation guidelines, utilizing a Class I (ASTM D2321) structural backfill material or flowable fill (CLSM - Controlled Low Strength Material). Contact your local ADS representative or visit [adspipe.com](http://adspipe.com) for the latest installation guidelines.

## Performance

Water Quality Units shall remove a minimum of 80% of the first flush total suspended solids (TSS) based on flow rates and corresponding sieve sizes shown in Table 1. Water Quality Units shall be installed "offline" to prevent re-suspension of solids in high flow situations. Offline installation shall be constructed utilizing an ADS bypass structure. Flow through the unit shall be controlled by an orifice fabricated on the outlet end of the structure.

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