

Technical Note

TN 1.17 Arcadia™ Hydrodynamic Separator with Grated Inlet

The Arcadia Hydrodynamic Separator (Arcadia | Stormwater Solutions from ADS) is a manufactured water quality treatment device that removes suspended solids and light liquids from stormwater. Arcadia is certified by the New Jersey Department of Environmental Protection (NJDEP) to achieve a weighted TSS removal efficiency of 50.1% for a Maximum Treatment Flow Rate (MTFR) of 1.68 cubic feet per second (cfs), or 754 gpm, for a 4-ft unit, or a surface loading rate of 60 gpm/ft² for other sizes, when configured with a single inlet pipe. Arcadia can also be installed with a grated inlet; this technical note outlines ADS' testing to ensure Arcadia maintains performance in that configuration.

Technology

The Arcadia internal components, molded from either polyethylene or polypropylene, can typically be installed in either a precast concrete or a polypropylene manhole. In Arcadia, stormwater is directed to an inlet chamber inside the unit, which then directs the flow into the vertical cylinder. A weir separates the inlet chamber from the outlet chamber. Once water has flowed through the inlet chamber and down through the vertical cylinder to the sump, the water rises through a series of angled baffles up to the outlet pipe. The angled baffles have concentric openings, alternating in location between the outer wall and the vertical cylinder, causing the water to flow upward in a circuitous path, which enhances settling and reduces resuspension.

Testing

Following the guidance of the NJDEP Protocol and under the supervision of a third-party observer, as well as utilizing independent analytical laboratories for suspended solids and particle size distribution analyses, removal efficiency test runs were completed on the Arcadia 4-ft model (AR4) with a grated inlet at flow rates of 0.375 and 1.125 cfs and an influent concentration of 200 mg/L, with the same sediment used for NJDEP certification testing. A mass balance on the system was used to calculate the sediment removal efficiencies at each flow rate. As shown in the table, the removal efficiencies achieved are within 2% of that achieved during the certification testing.

Scour testing was performed at 3.36 cfs. The average adjusted effluent concentration was 0.0 mg/L, thus demonstrating the Arcadia's suitability for online installation with a grated inlet.

Figure 1: Arcadia Standard Detail

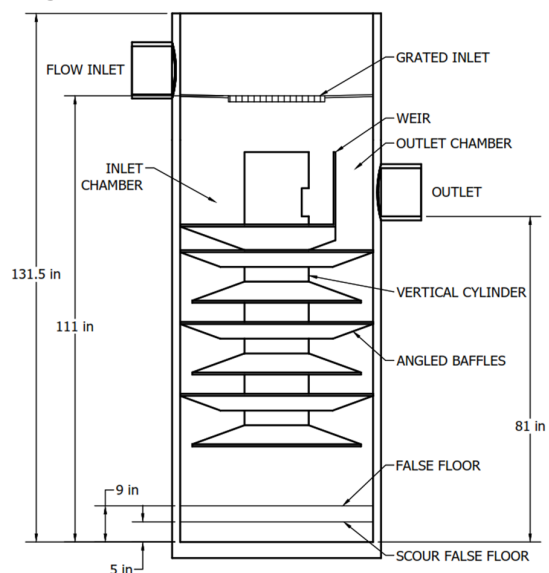


Table 1: Arcadia Scour Testing

	Certification Test		Grated Inlet Test	
Flow Rate, cfs (L/s)	0.375 (10.619)	1.125 (31.856)	0.375 (10.619)	1.125 (31.856)
Sediment Fed, lb (kg)	26.6 (12.1)	29.5 (13.4)	27.4 (12.4)	29.4 (13.3)
Sediment Captured, lb (kg)	17.1 (7.76)	15.0 (6.80)	17.6 (7.98)	14.4 (6.53)
Removal Efficiency, %	64.2	50.8	64.4	48.9
Difference in Removal Efficiency, %	N/A	N/A	0.2	1.9

Conclusion

Based on the testing summarized above, the Arcadia is expected to perform equivalently with a grated inlet as with a single-inlet-pipe configuration.

