

# ***VAUGHAN CHOPPER PUMP***

## ***ACES FUNCTIONAL PERFORMANCE TESTS AT TECHNICAL UNIVERSITY, BERLIN***



***Vaughan***<sup>®</sup>  
Unmatched Reliability

### **CASE STUDY:**

In 2023 Prof. Dr. Paul Uwe Thamsen and his team at the Department of Fluid Dynamics and Technical Acoustics, Technische Universität Berlin (Technical University, Berlin), created and conducted a study to evaluate the functional and long-term functional performance of various wastewater pumps. The two-part process involves three load tests on wastewater pumps to determine their ability to pass and clear varying contamination levels of solid waste. To date, the test has been performed on over 60 impellers for wastewater pumps. In conducting these tests, the testing team has created artificial wastewater using pre-saturated dry wipes measuring 22 x 30 centimeters (8.7 x 11.8 inches), each weighing 3.8 to 4.3 grams (0.13 to 0.15 ounces).

## Functional and Long-term Functional Testing Processes

Modern wastewater treatment systems face increasing challenges today due to the introduction of difficult-to-process materials, which are notorious for causing blockages. If a pump is inefficient in breaking, passing and clearing waste, it can clog the system and even lead to system failures. For this reason, it has become crucial to identify pumps capable of efficiently handling solid waste to prevent costly repairs, operational downtime and early equipment replacement.

To address these challenges and assess pump performance, the testing team simulated real-world wastewater conditions using a three-cubic-meter (approximately 106 cubic feet) tank filled with pre-saturated dry wipes. **Vaughan Chopper Pump** model *HE6W8CS-118* was tested for its ability to process this waste without clogging.

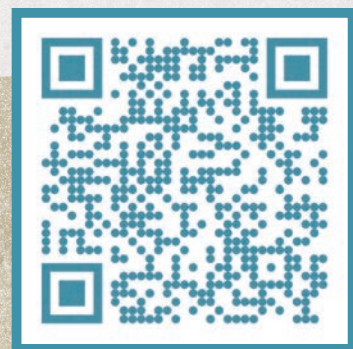
The *functional performance test* measured Vaughan Chopper Pump's immediate effectiveness under normal conditions. Artificial wastewater was introduced in the testing apparatus in three separate processes— representing low, medium and high concentration contamination levels with varying number of wipes. The dry weight of the wipes was measured before and after each cycle. Total clogging was then calculated based on the weight of waste that remained in the pump, helping determine functional performance.

In an analogous assessment, the *long-term functional performance test* evaluated the pump's ability to prevent clogging over time. In this test, artificial wastewater with the three varying contamination levels was circulated in the testing equipment in a loop for 60 minutes per cycle. The total waste introduced to the system was then compared to the waste accumulated in the impeller while also factoring in pump efficiency. These values helped measure the pump's proficiency in passing and clearing solid load over its service life.

After both tests, the pump's performance was graded on a scale of 0 to 1, where a higher value means better performance. Scores above 0.70 indicate very good functional performance and the pump's effectiveness in handling waste.



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THE VIDEO**



## Vaughan Chopper Pump Demonstrates Excellent Performance, Receiving Near-perfect Scores

In 2024, Vaughan Company's model *HE6W8CS -118* (300mm) horizontal chopper pump underwent the Berlin team's testing. In this scenario, the pump used has a flow rate of 300 cubic meters per hour (1,320 gallons per minute), a total dynamic head (TDH) of 9.6 meters (31.5 feet), an efficiency point of 71.7 percent and a rotational speed of 1,460 revolutions per minute (RPM). In both the functional performance test as well as the long-term functional performance test, the chopper pump demonstrated outstanding results, achieving consistently high scores across various levels of contamination.

In the low contamination stage of the functional performance test, where 75 wipes were introduced, the chopper pump achieved a score of 0.94, indicating excellent proficiency in handling the solids load. During the medium contamination stage, with 150 wipes, it maintained this strong performance, scoring 0.93. Finally, in the high contamination stage, where the pump processed 300 pre-saturated wipes, the chopper pump's proficiency continued to excel, achieving a near-perfect score of 0.98.



The Vaughan Chopper Pump operated equally well in the long-term performance test, where artificial wastewater was circulated in the set for over an hour. During the low-level contamination cycle, the chopper pump successfully passed more than 85 percent of solid waste and received a score of 0.85 out of 1. The pump's efficiency further increased in the subsequent medium and heavy contamination cycles, clearing a higher percentage of waste and earning a score of 0.9 in each.

In all the tests, Vaughan's chopper pump demonstrated exceptional performance, consistently securing scores much higher than the established 'very good' benchmark of 0.70. A reliable solution, Vaughan Chopper Pump's performance underscores its ability to manage increasing levels of solid waste consistently over its service life. This, in turn, demonstrates Vaughan Chopper Pump's suitability for challenging wastewater applications.

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TO REVIEW YOUR PROJECT NEEDS.**



***SPECIAL THANKS TO KLEDZIK PUMPEN AND OLIVER ENSSLEN FOR THEIR ROLE  
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PROF. DR. THAMSEN AT TECHNISCHE UNIVERSITÄT BERLIN (TU BERLIN).***



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