

CANADIAN ETV PROGRAM VERIFIED

TYMCO Model DST-4 Dustless Regenerative Air Street Sweeper
Technology Fact Sheet for TYMCO, Inc.



Performance Claim

The TYMCO Model DST-4 Dustless Regenerative Air Street Sweeper was operated according to the vendor's specifications at an average speed of 4.1 km/h in a controlled space where no water or any other liquids were permitted. No water sprays or gutter broom shrouds were used in the testing.

The sweeper was delivered to its optimum balance of dry dustless operational mode while also maximizing the pick-up and removal of test material (mean size of test material is 3 microns).

The final average performance indicators - at the 95% confidence interval - of the TYMCO Model DST-4 Dustless Regenerative Air Street Sweeper are as follows:

1. A removal efficiency of test material from surface of 89% ($\pm 2.1\%$);
2. Deposit of test material on sidewalk of 0.06% ($\pm 0.04\%$);
3. Maximum concentration of PM_{10} air contamination of 0.015 (± 0.005) $mg \cdot m^{-3} \cdot kg^{-1}$;
4. Total concentration of PM_{10} air contamination of 11.0 (± 2.3) $mg \cdot m^{-3} \cdot kg^{-1}$;
5. Maximum concentration of $PM_{2.5}$ air contamination of 0.011 (± 0.003) $mg \cdot m^{-3} \cdot kg^{-1}$; and
6. Total concentration of $PM_{2.5}$ air contamination of 7.5 (± 2.2) $mg \cdot m^{-3} \cdot kg^{-1}$.

Technology Application

TYMCO Regenerative Air Dustless Sweeping Technology (DST) is designed to thoroughly clean roads and streets while minimizing the release of dust into the air. The street sweeper can have a positive environmental effect by reducing the amount of materials entering the storm sewers which may otherwise end up contaminating surface waters. Additionally, removal of particulate from streets may help reduce airborne contamination by such particulate matter, particularly on windy days.

Performance Conditions

The TYMCO Model DST-4 Dustless Regenerative Air Street Sweeper was tested at the Prairie Agricultural Machinery Institute (PAMI) facility (Test Agent, TA) in Humboldt, Saskatchewan over three test days in June of 2008. The test facility was an enclosed tent about 80m x 11m. The test material was Camel-White[®], manufactured by Debro Chemicals and Pharmaceuticals, a calcium carbonate based powder with a mean diameter of about 3 microns. Approximately 274 kg were applied to the test track, which consisted of two strips, 2.75m x 30m each. The test agent conducted the testing and measurement according to the "PM₁₀ and PM_{2.5} Street Sweeper Efficiency Test Protocol" (City of Toronto, April 2008).

Environmental Technology Verification

Technology Description

The TYMCO Model DST-4 Dustless Regenerative Air Street Sweeper is a mid-sized street sweeper. The main components of TYMCO Regenerative Air Dustless Sweeping Technology (DST) are the blower, pickup head, pressurized hopper, multi-pass cylindrical centrifugal dust separator, and particulate air filters. The closed loop regenerative air system uses a large blower to develop airflow. The air enters a distribution manifold that runs across the pickup head, which has a discharge opening that directs a high velocity blast of air down and onto the pavement and into the cracks releasing dirt. The air and all captured dirt and debris are then drawn out of the pickup head through a hose and directed into the hopper.

After the debris-laden air stream is drawn into the large hopper, the air loses velocity allowing the larger debris to fall to the bottom. A screen at the top of the hopper prevents items such as leaves, paper, cans, and rocks from leaving the hopper. The air then enters the centrifugal dust separator. The multi-pass centrifugal dust separator further cleans the air as it spins on the curved wall of the centrifugal chamber skimming off dust particles and returning them into the hopper. The cleaned air is returned through the blower to the pickup head to start the regenerative air cycle again.

A small portion of the air leaving the blower is exhausted to atmosphere so that less air enters the pickup head than is being drawn off, thus maintaining the necessary vacuum in the pickup head. Prior to being exhausted, this small portion of air is further cleaned by being first run through a bank of small cyclone pre-cleaners and then through four membrane filters, which remove particles as small as 0.5 microns.

TYMCO Model DST-4 Dustless Regenerative Air Street Sweeper technology is engineered to allow the sweeper to perform in all types of weather conditions with no operator adjustments required.

Verification

The verification was conducted by ORTECH Environmental of Mississauga, Ontario as the Verification Entity using ETV Canada's General Verification Protocol (February, 2007). The verification was based on information supplied by TYMCO, Inc., and the performance tests conducted by the TA on the TYMCO Model DST-4 Regenerative Air Street Sweeper in June of 2008 according to the "PM₁₀ and PM_{2.5} Street Sweeper Efficiency Test Protocol" (City of Toronto, April 2008). The verification renewal completed in March 2017 also conforms to the ISO 14034:2016, Environmental management -- Environmental technology verification (ETV).

What is the ETV Program?

The Canadian Environmental Technology Verification (ETV) Program is delivered by GLOBE Performance Solutions under a license agreement from Environment Canada. The Canadian ETV Program is designed to support Canada's environment industry by providing credible and independent verification of technology performance claims.

For more information on the TYMCO Model DST-4 Dustless Regenerative Air Street Sweeper, please contact:

TYMCO, Inc.
225 E. Industrial Blvd.
Waco, Texas 76705 USA
Tel: 254-799-5546
Fax: 254-799-2722
Email: info@tymco.com
www.tymco.com

Canadian ETV Program Contact Information:

c/o GLOBE Performance Solutions
World Trade Centre
404 - 999 Canada Place
Vancouver, B.C. V6C 3E2 Canada
Tel: 604-695-5018
Fax: 604-695-5019
etv@globepformance.com
www.etvcanada.ca



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