SURFACE VEHICLE STANDARD

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Self-Propelled Sweepers and Scrubbers Battery Run-Time

RATIONALE

The technical report covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

STABILIZED NOTICE

This document has been declared “Stabilized” by the SAE MTC2, Sweeper, Cleaner, and Machinery Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. SCOPE

This SAE standard applies to all electric battery-powered machines that fall within the scope of SAE J2130-2.

1.1 Purpose

To define a uniform method of determining the time a battery-powered machine can continue operating normally with a given set of batteries.

2. REFERENCES

2.1 Applicable Documents

The following publication form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publication

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J2130-2 Identification of Self-Propelled Sweepers and Cleaning Equipment Part 2 - Machines with a Gross Vehicle Mass Up to 5000 kg

3. DEFINITIONS

3.1 BATTERY A h RATING

The capacity of a battery to supply a specified current for a specified time before reaching the cut-off terminal voltage.

3.2 CUT-OFF TERMINAL VOLTAGE

The battery manufacturer's recommended voltage cut-off point beyond which the battery shall not be used because damage to it and or the equipment it is powering can occur.

3.3 RUN-TIME

The time between the start-of-test and the end-of-test.

3.4 START-OF-TEST

The point during a test when the key switch is first placed in the 'on' position, after following applicable manufacturer's 'starting' procedures.

3.5 END-OF-TEST

The point in time during a test when the cut-off terminal voltage has been reached.

3.6 CLEANING MODE

All brushes and brooms shall be in contact with the floor and in operation. All brush and broom adjustments shall be in the floating or average load position as disclosed in the manufacturer's operating instructions. All optional equipment shall be 'off' unless otherwise declared in the test results. The cleaning solution flow rate shall be set to the middle or average position. All dust control systems and water pick-up systems shall be operating. The machine shall be driven at a speed mid-way between the fastest and slowest cleaning speeds. The resulting operating speed is to be listed in the result Section 7.

3.7 TRANSPORT MODE

All motors and systems except for the propulsion drive motor shall be shut-off. The machine should be traveling at the maximum transport speed.

3.8 CLEANING SOLUTION

Water without any additional chemicals.

3.9 RECYCLING MACHINES

Machines that can filter and reuse the recovered cleaning solution. These machines are defined in SAE J2130-2.

4. TEST CONDITIONS AND INSTRUMENTATION COMMON TO ALL TESTS

4.1 Condition of Machine

The machine shall have been operated for at least one h before a test. The machine shall be prepared for use as defined by the manufacturer.

4.2 Condition of the Battery

The battery shall have been conditioned by being discharged and charged at least ten times but no more than one hundred times. Prior to the test the battery shall be fully charged.

4.3 Environmental Conditions

Battery charge and run-time test shall be conducted within a temperature range of 15 to 27 °C.

5. RUN-TIME TEST FOR SWEEPERS

5.1 The surface for cleaning shall consist of a level clean smooth concrete surface. A weight shall be secured in the hopper. This weight shall be equivalent to the mass of sand needed to fill half of the heaped capacity of the hopper. The sweeper shall be run for one h in the cleaning mode followed by five minutes in the transport mode after which the machine shall be brought to rest and the hopper cycled through a dump cycle. This cleaning-transport-dump cycle shall be repeated to discharge the battery until the battery has reached the cut-off terminal voltage.

6. RUN-TIME TEST FOR SCRUBBERS

6.1 Non-Recycling Machines

The surface for cleaning shall consist of a level clean smooth concrete surface. The scrubber is to be operated in the cleaning mode until the solution tank is empty. The machine is then stopped for ten minutes while the solution tank is filled and the recovery tank is emptied. This cleaning-drain-refill cycle should be repeated to discharge the battery until the battery has reached the cut-off terminal voltage.

6.2 Recycling Machines

The surface for cleaning shall consist of a level clean smooth concrete surface. The scrubber is to be operated in the cleaning mode with the recycling system on for two h. The machine is then stopped for ten minutes while the solution tank is filled and the recovery tank is emptied. This cleaning-drain-refill cycle should be repeated to discharge the battery until the battery has reached the cut-off terminal voltage.

7. REPORTING METHOD OF TEST RESULTS

7.1 The following information shall be declared in the test results;

a. Run-time in hours.

b. Model name or number.

c. Ampere-Hour rating of batteries used during the test.

d. Which options were operating during the test.

e. The number of solution refill cycles for a wet floor scrubber or the number of dump cycles for a floor sweeper.