

Submitted for recognition as an American National Standard

Self Propelled Sweepers and Scrubbers Battery Run-time

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

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

2. References

2.1 Applicable Publication—The following publication forms 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, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J2130—Self-Propelled Sweepers and Cleaning Equipment

2.2 Related Publication—The following publication is provided for information purposes only and is not a required part of this document.

2.2.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1634—Electric Machine Energy Consumption and Range Test Procedure

3. Definitions

3.1 Battery Ampere-Hour 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 may 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.

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- 3.6 Cleaning Mode**—All brushes and/or 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.
- 4. Test Conditions and Instrumentation Common to All Tests**
- 4.1 Condition of Machine**—The machine shall have been operated for at least one hour 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 hour 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 hours. 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.

7.2 The battery run-time test results may be declared in the following format (see Figure 1).

SAE J2474
SELF-PROPELLED SWEEPERS AND SCRUBBERS
BATTERY RUN-TIME

Machine Run Time:

Make:

Type:

Serial No:

Battery Ampere-Hour Rating:

Cleaning or Dump Cycles:

Operating Speed:

Options: on/off

Certifying Engineer:

Date: Certification Reference:

FIGURE 1—FORMAT OF TEST RESULTS

PREPARED BY THE SAE MACHINERY TECHNICAL COMMITTEE SC2—
SWEEPER, CLEANER, AND MACHINERY