SURFACE VEHICLE STANDARD

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Self-Propelled Sweepers
Sweep-Ability Performance

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

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This document has been declared “Stabilized” by 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 establishes a method of disclosing the sweep-ability performance of self-propelled sweepers that use broom means for sweeping and collection, together with either a mechanical- or pneumatic-conveyance system for the transfer of “sweepings” into a collection hopper.

1.1 Purpose

The purpose of this document sets out to describe a test practice for gauging the sweep-ability performance by sweepers described in SAE J2130-1 together with a format for the presentation of the test results. The document can be used to disclose or compare particular operating performance criteria for similar conditions.

2. REFERENCES

2.1 Applicable Document

The following publication forms a part of this 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 J2130-1 Identification of Self-Propelled Sweepers and Cleaning Equipment Part 1 – Machines with a Gross Vehicle Mass greater than 5000 kg

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3. DEFINITIONS

3.1 SWEEPER

A self-propelled sweeper is primarily designed to sweep material from highways, parking lots, airport complexes, industrial and construction sites, and during road maintenance work. The sweeper may use broom means to dislodge and direct material into a collection mechanism, which may be mechanical, pneumatic, or a combination of both systems to convey the swept material into a collection hopper.

3.2 TEST SITE

Level paved area (±3%) on which the sweeping test is conducted.

3.3 TEST MATERIAL

Prepared materials used in the sweeping tests.

4. TECHNICAL REQUIREMENTS

4.1 Test Method

There are three separate tests - using an assortment of consistent test materials for each test.

4.2 Condition of Sweeper

Prior to a test, the sweeper shall be set at the normal operational settings according to the manufacturer's specification. Brooms and swept material containment curtains, etc., should be in like-new condition. Where the sweeper has variable duties of operation described in its instruction manual, then the sweeper shall be operated at its maximum-duty cycle. These settings shall be stated in the test report. Dust suppression systems if provided shall be active during the test.

4.3 Weather Conditions

Weather conditions shall be dry, with a wind speed less than 20 km/h and such that it does not disturb objects on the test course as depicted in test 3.

4.4 Test Site

4.4.1 Site

During the test run, the sweeping brooms (channel(s) or gutter broom(s)) shall be directed along the guideline depicted in the test site pattern in 4.4.3.

4.4.2 Site Preparation

The position and pattern of the test material placement zones is shown in the test site pattern in 4.4.3. If the type and sweeping width of the sweeper being assessed lacks sufficient capacity, then the zone size and materials can be varied, in which case full descriptions should be recorded with description of the criteria recorded in the test report.

4.4.3 Test Site Pattern

See Figure 1.

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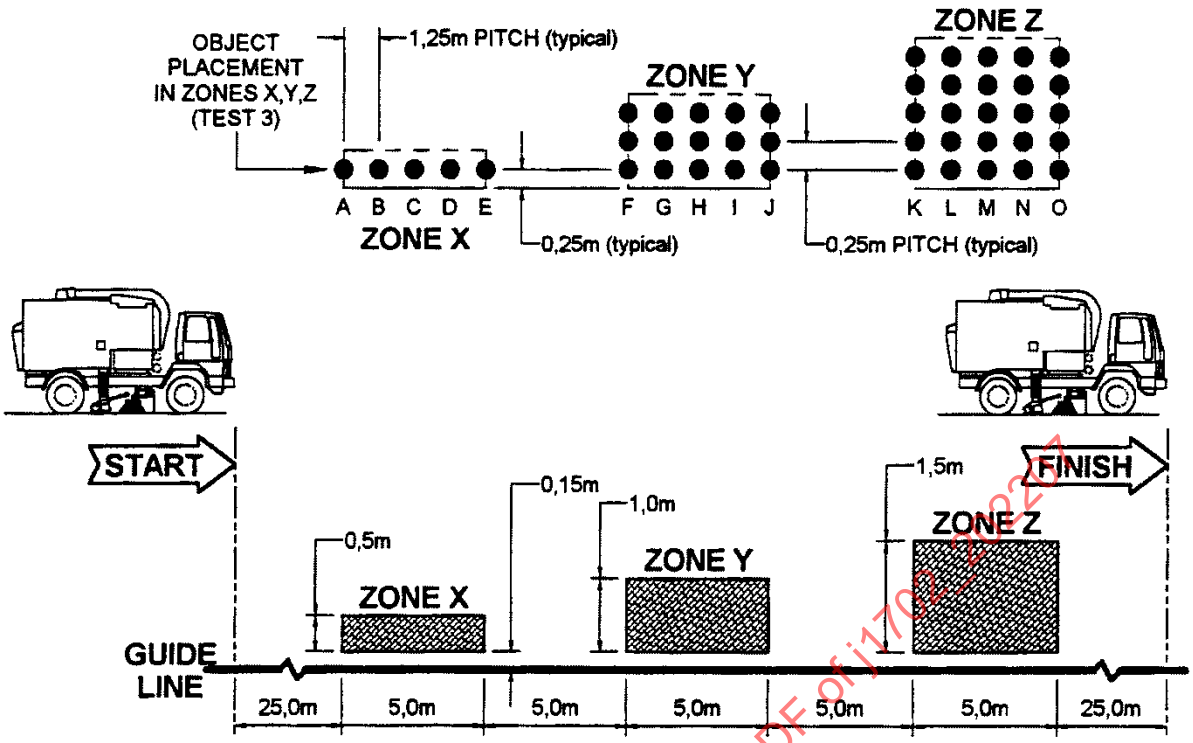

FIGURE 1 - TEST SITE PATTERN

4.5 Test Material

4.5.1 Test Material Pattern

The test material defined in 4.5.2 shall be placed in the three placement zones. The test material may be arranged to the right or to the left of the guideline to suit the construction and layout of the sweeper.

4.5.2 Test Material

Tables 1, 2, and 3 define the type and quantity of test material for tests 1, 2, and 3. The test material media and quantities may be varied according to the type and capacity of sweeper being assessed. The substituted test material quantity and placement shall be stated in the test report.

TABLE 1 - TEST 1 - SAND SPREAD QUANTITY

Zone	Test Material	Spread Quantity (Uniform Distribution)
X	Builders sharp sand	50 kg
Y	Average grain size 0.5 mm	50 kg
Z	Density ~ 1600 kg/m^3 (dry)	50 kg
		Total quantity 150 kg

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TABLE 2 - TEST 2 - GRAVEL SPREAD QUANTITY

Zone	Test Material	Spread Quantity (Uniform Distribution)
X	Gravel-granite road stone chips	50 kg
Y	12 mm sieve 100% pass	50 kg
Z	Density ~ 1800 kg/m^3	50 kg
		Total quantity 150 kg

TABLE 3 - TEST 3 - OBJECTS

Zone	Item	Object	Test Material (Simulant)	Quantity	Score Rating Per Item	Total Score Rating
X	A	Exhaust pipe	Steel tube 50 mm × 1.6 mm × 300 mm long	1	6	6
	B	Stick	Wooden dowel - 25 mm × 500 mm long	1	6	6
	C	Plastic bag	Polythene - 300 mm × 300 mm	1	6	6
	D	Carton (flattened)	Corrugated cardboard sheet - 300 mm × 300 mm	1	6	6
	E	Muffler/bottle	Steel tube 100 mm × 2.0 mm × 300 mm long	1	6	6
Y	F	Cobble stone	50 mm spherical flint cobble stone	3	3	9
	G	Beverage can (flattened)	Aluminum sheet - 80 mm × 150 mm × 2.0 mm thick	3	3	9
	H	Paper sheet	A3, 80 g copy paper	3	3	9
	I	Rope	10 mm hemp rope × 1000 mm	3	3	9
	J	Wooden baton	25 mm × 25 mm soft wood × 150 mm long	3	3	9
Z	K	Bolt	M16c hex head steel screw × 75 mm long	5	1	5
	L	Nut	M16c hex head steel nut	5	1	5
	M	Nail	5.0 steel bar × 75 mm long	5	1	5
	N	Washer	30 × 2 mm thick steel disk	5	1	5
	O	Pin	12.0 steel bar × 40 mm long	5	1	5
				Total score 100 or 100%		

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4.6 Sweeping Tests

The sweeper shall make three separate test runs over each of the three prescribed test courses in tests 1, 2, and 3 to collect measured amount of test material in a specific time or at a specific speed of operation. Test material for test 1 and test 2 shall be dry. If this is not possible, tests may be made with wet sand, in which case this must be stated with an indication of water inclusion in the test report. Test objects in test 3 that are beyond the capability of the sweeper may be removed from the test course but shall be recorded as not swept material. Any test material or objects being deflected out of or carried beyond the test course shall be reported as not “swept” in the test report.

4.7 Travel Speed

During each test run, the sweeper shall be driven at a predetermined speed or timed from start to finish.

In order to assess any quantities of residual test material being carried beyond the test course finish line in a speed related test, the sweeping mechanisms shall be disabled at the finish line. For a time-based test, the time taken to disable the sweeping mechanism shall be recorded within the total test time.

5. RESULTS

5.1 Test Analysis

All not-swept test material described in 4.5.2 resulting from each test run shall be collected and compared to the total amount initially distributed throughout the three test material placement zones (X, Y, and Z).

5.2 Ratings

In test 3, each object is to be rated using the score rating values in Table 3 in the test material schedule. The maximum value is 100 or 100% if all objects are swept and collected.

6. TEST RESULT PRESENTATION

In order to present the results of a sweep-ability performance test, a suggested test sheet of the following format could be adopted (Figure 2).

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