Retardation Capability of Off-Highway Dumpers and Scrapers—SAE J1430 OCT83

SAE Recommended Practice
Approved October 1983

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PREPRINT

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SAE Recommended Practice

Report of the Off-Road Machinery Technical Committee, approved October 1983. Rationale statement available.

1. Purpose

1.1 To define test procedures for verifying that the machine will at least meet the manufacturer's published continuous retarding capability curve.

1.2 To recommend a common format for reporting retardation performance.

2. Scope—This recommended practice applies to newly manufactured off-highway dumpers and scrapers.

3. Definitions

3.1 Continuous Retarding Capability—The steady-state energy absorption rate at which the stated critical parameters of the machine's retarding system are stabilized and are not exceeded.

3.2 An Auxiliary Retarder—An energy absorbing device normally used to control the speed of the machine while descending grades.

4. Methods of Testing—Satisfactory results from any one of the following methods will constitute verification of published curve:

4.1 Towing test

4.2 On-grade test

4.3 Full scale dynamometer test

5. Test Procedure

5.1 Facilities and Instrumentation

5.1.1 FACILITIES

5.1.1.1 *Towing and On-Grade Test*—The test course shall consist of a hard, dry surface (ground moisture may be present to the extent that it does not adversely affect the braking surface) with a well compacted base. The course shall be of sufficient length, smoothness, and uniformity to assure maintaining required test speed. Additionally, when using the towing test, the average grade in the direction of travel must be within ±1%.

5.1.1.2 *Dynamometer Test*—Driving equipment may consist of motors, motoring dynamometers, or rolls which shall be used within their manufacturer's stated range of limitations.

5.1.2 INSTRUMENTATION

5.1.2.1 To determine equivalent machine speed within ±5% of actual speed.

5.1.2.2 To determine the machine mass (weight) within ±3%.

5.1.2.3 To determine towing force within ±5%.

5.1.2.4 To determine grade within ±½ deg.

5.1.2.5 To measure dynamometer output power within ±5%.

5.1.2.6 To monitor the stated critical parameters of the machine's systems within ±2% located per manufacturer's recommendation.

5.1.2.7 To determine that the service brakes, if separate from the retarder, are fully disengaged.

5.1.2.8 To measure ambient temperature within ±1°C (±2°F).

5.2 Test Requirements

5.2.1 Test to be conducted with the retarding system fully serviced and adjusted to the manufacturer's specifications.

5.2.2 Test to be conducted with machine at normal operating temperature or higher.

5.2.3 If the auxiliary retarder uses common energy absorbing components with service and/or secondary brake system, the machine must continue to comply with the applicable SAE Braking Performance documents at the completion of the retarding test.

5.3 Retarding Test for Verification

5.3.1 Using published continuous retarding curves, determine desirable combination of test machine rimpull and speed for test.

5.3.1.1 Service brake system must be checked for proper operation and to insure capability to stop machine at test speed.

5.3.1.2 *Caution*—Prior to testing, check with manufacturer for limitations of other machine systems.

5.3.2 Instrument machine to monitor and record necessary data pertaining to stated critical parameters.

5.3.3 Conduct test runs as necessary to determine the machine's continuous retarding capability. The average results from three consecutive test runs must be at least 95% of the power as calculated from the published data. One point from the published curves shall be sufficient for test verification and that point should be at a maximum continuous power point. See paragraph 6.2 for illustration of maximum power point "A." Test data to be taken at an ambient temperature range of 27–32°C (80–90°F).

NOTE: If retarding capability is not affected by ambient temperature, requirement may be ignored.

6. Retarding Performance Presentation Format

6.1 When a machine's retarding capability is to be published, the continuous retarding capability curve for 32°C (90°F) ambient temperature must be shown. Additional curves may also be shown.

6.2 The retarding capability shall be shown using the following format: