INTERNATIONAL STANDARD

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Earth-moving machinery — Retarders for dumpers and tractor-scrapers — Performance tests

Engins de terrassement — Ralentisseurs pour tombereaux et décapeuses — Essais de performance

Reference number
ISO 10268:1993(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10268 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Sub-Committee SC 1, *Test methods relating to machine performance*.

Annexes A and B of this International Standard are for information only.

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Earth-moving machinery — Retarders for dumpers and tractor-scrapers — Performance tests

1 Scope

This International Standard specifies a test procedure for verifying the manufacturer's published continuous retarding capability. It applies to dumpers, tractor-scrapers and other earth-moving machinery equipped with retarders.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3450:1985, *Earth-moving machinery — Wheeled machines — Performance requirements and test procedures for braking systems.*

ISO 9248:1992, *Earth-moving machinery — Units for dimensions, performance and capacities, and their measurement accuracies.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 retarder: Energy absorption device normally used to control machine speed while descending grades.

3.2 continuous retarding capability: Steady-state energy absorption rate at which the stated critical parameters of the machine's retarding system are stabilized and are not exceeded.

NOTE 1 The critical parameters should be defined by the manufacturer. The critical parameters will depend upon the retarder system design. Examples of what might be critical parameters are oil and coolant temperatures.

3.3 maximum continuous power: Value describing the maximum descend speed and rimpull force which can be obtained in the specified gear ratio when not exceeding the manufacturer's specified engine speed.

3.4 grade: Test course slope on which the on-grade tests are run.

4 Test method

Satisfactory results from any one of the following methods may be used for verification:

— towing

— on-grade

— dynamometer

5 Facilities

5.1 Towing and on-grade verification tests

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 friction characteristics of the surface) with a well compacted base. The course shall be of sufficient length, smoothness and uniformity of gradient to ensure the maintenance of the required test speed. Additionally, when using the towing test, the average grade in the direction of travel shall be level (0 % grade) within ±1 %.

5.2 Dynamometer test

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

6 Measurement accuracy

6.1 Generally accuracy of measuring instruments shall comply with ISO 9248.

6.2 Additionally grade slope shall be determined within ± 0,5°.

7 Test requirements

7.1 The test shall be conducted with the retarding system and the machine fully serviced and adjusted to the manufacturer's specifications.

7.2 The test shall be conducted with machine at normal operating temperature.

7.3 Service brakes, if separate from the retarder, shall be fully disengaged.

7.4 If the retarder uses common energy-absorbing components with the service and/or secondary brake systems, the machines shall continue to comply with the applicable clauses of ISO 3450 at the completion of the retarder verification test.

7.5 The verification test shall be conducted in an ambient temperature range of 27 °C to 32 °C, unless the performance is not affected by ambient temperature.

NOTES

2 In the event that an ambient temperature of 27 °C to 32 °C is not available, the 32 °C published performance cannot be verified, unless the performance is determined not to be affected by ambient temperature.

3 Because temperature correction factors are beyond the scope of this International Standard, it is necessary to conduct the test in a reference ambient temperature ranging from 27 °C to 32 °C, in order to be able to verify the published retarder performance for a reference temperature of 32 °C.

Ambient temperatures outside the range of 27 °C to 32 °C may be used for verification. When ambient temperatures outside the range of 27 °C to 32 °C are used, the verification temperature shall then be stated in the test results. The verification temperature shall be no greater than 5 °C higher than the ambient temperature recorded during the test by the manufacturer.

7.6 Information to be recorded during the test as appropriate to the test method used shall be:

a) machine speed;

b) machine mass;

c) towing force;

d) grade slope;

e) dynamometer output power;

f) ambient temperature.

8 Verification test

8.1 Using the manufacturer's published continuous retarding curves, determine the desirable combination of test machine rimpull and speed to be verified. Refer to figure A.1 for an example of the typically published information on a retarder performance.

8.2 Equip the machine with appropriate instruments to monitor and record necessary data pertaining to the stated critical parameters (see 3.2).

8.3 Determine any system limitations and follow any manufacturer's caution regarding machine operation.

8.4 Check the service brake system for proper operation and to ensure its capability of stopping the machine at the test speed, load and grade conditions.

8.5 Conduct test runs as necessary to determine the machine's continuous retarding capability. The average results from three consecutive test runs shall be at least 95 % of the power as calculated from the published data. One point from the published curves is sufficient for test verification: this point shall be at maximum continuous power.

9 Retarding performance presentation format

9.1 When a machine's retarding capability is to be published in accordance with this International Standard, the continuous retarding capability curve for 32 °C ambient temperature shall be shown. If the verification is not done at 32 °C, this shall be noted. Curves showing performance at additional temperatures may also be shown.

9.2 The retarding capability shall be shown using a format equivalent or similar to that presented in figure A.1.

9.3 Annex A demonstrates the use of the retarding performance chart.

Annex A
(informative)

Example of use of retarding performance chart

The use of the retarding performance chart is illustrated by the following example for a mechanical drive dumper. The maximum constant speed at which the machine model, for which the retarding performance is shown, can descend a given continuous grade is determined by following steps a) through e). The following information is known:

— downhill grade: 12 %

— rolling resistance: 2 %

— maximum machine mass: 136 000 kg

a) Calculate the effective grade. Subtract rolling resistance from downhill grade: (12 % – 2 % = 10 %).

b) Enter the chart at the maximum machine mass, 136 000 kg, point on the mass scale.

c) Move vertically downward until the 10 % effective grade line is intersected.

d) Move horizontally to the left until the transmission speed line is intersected.

e) Move vertically downward to the speed scale and determine maximum speed: 26 km/h.

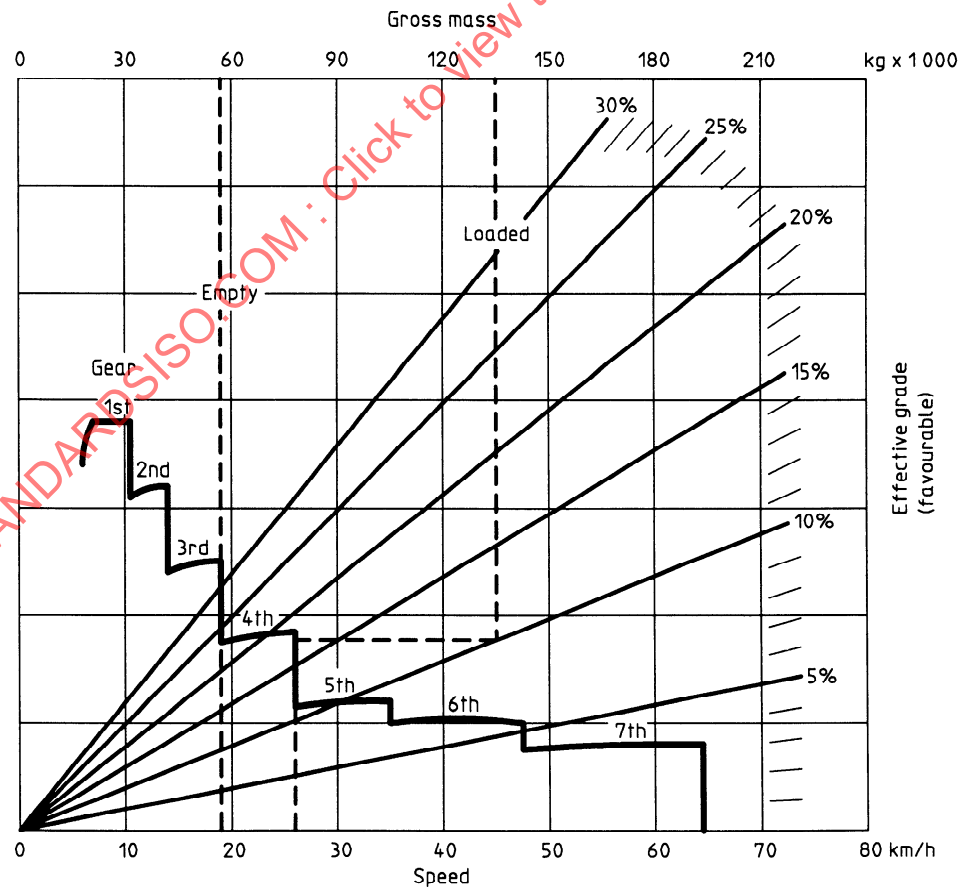

Figure A.1 — Retarding capability

Annex B
(informative)

Bibliography

[1] ISO 7132:1990, *Earth-moving machinery — Dumpers — Terminology and commercial specifications.*

[2] ISO 7133:1985, *Earth-moving machinery — Tractor-scrapers — Terminology and commercial specifications.*