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Earth-moving machinery — Determination of slope limits for machine fluid systems operation — Static test method

*Engins de terrassement — Détermination des pentes limites pour
l'aptitude au fonctionnement des systèmes de fluides équipant les
engins — Méthode d'essai statique*



Reference number
ISO 10266:1992(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 10266 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Sub-Committee SC 1, *Test methods relating to machine performance*.

Annex A forms an integral part of this International Standard.

Earth-moving machinery — Determination of slope limits for machine fluid systems operation — Static test method

1 Scope

This International Standard specifies laboratory test procedures to establish the static slope capability of fluid system(s) operation of earth-moving machines (engine, power train, fuel system, oil system, etc.). It evaluates the performance parameters that limit the static slope capability of machine system(s) operation.

The preferred static slope capability test method is with the machine on a tilt platform or on a prepared slope. An acceptable alternative method is the testing of complete fluid systems on a test bench. In either method, precautions are necessary to ensure safety.

This International Standard applies to earth-moving machines as given in ISO 6165, with combinations of standard mounted attachments.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was 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 edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6165:1987, *Earth-moving machinery — Basic types — Vocabulary*.

3 Definitions

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

3.1 machine orientation: Position of the longitudinal axis of the machine (expressed in degrees) on the slope. The 0° position is when the front of the machine is upslope. All positions are measured clockwise from the 0° position.

3.2 stabilized operating temperature: Fluid temperature showing no more than 2 °C change per minute during operation.

3.3 fluid system(s): Any system(s) that use(s) oil or water solutions for cooling, lubrication actuation and power transmission together with the fuel system.

3.4 (machine) static slope capability: Maximum slope, expressed in degrees, that the machine fluid system(s) can operate on without malfunction or damage to any fluid system, at all the machine orientations specified in 3.5 and 3.6.

3.5 (machine) longitudinal static slope capability: Maximum slope, expressed in degrees, that the machine can achieve longitudinally (i.e. oriented at 0° and 180°) during the static slope evaluation without exceeding performance parameters.

3.6 (machine) lateral static slope capability: Maximum slope, expressed in degrees, that the machine can achieve laterally (i.e. oriented at 90° and 270°) during the static slope evaluation without exceeding performance parameters.

4 Test equipment

4.1 Tilt platform or prepared slope surface that will position the machine at the desired slope.

4.2 Suitable equipment to restrain the machine in a safe position on the slope. Note that tipping of the machine may occur before the fluid system(s) limits are reached.

4.3 Suitable instrumentation to monitor the pressures and temperatures in the fluid system(s) and also to monitor the slope.

5 Measuring equipment and accuracy

The measuring equipment shall have the following accuracy.

Parameter measured	Accuracy
Slope angle	$\pm 2\%$
Pressure	$\pm 2\%$
Temperature	$\pm 1\text{ }^{\circ}\text{C}$
Engine speed	$\pm 2\%$ of maximum
Orientation angle	$\pm 2^{\circ}$

6 Machine preparation

6.1 Machines requiring roll-over protective structures (ROPS) or where ROPS are available, should be so equipped for these tests. Where machines are not equipped with ROPS, special safety precautions shall be taken. During the test, an operator shall occupy his working position on the machine.

6.2 The slope tests shall be conducted with the fluid systems filled initially to the minimum levels specified by the manufacturer. The fluid levels shall be checked with the systems at stabilized operating temperatures. The fuel tank shall be at the full mark.

6.3 Record the fluid system(s) and tyre (wheeled machines) pressures to ensure that they are within the manufacture's specifications.

7 Slope capability

7.1 Place the machine on the tilt platform or the prepared slope at the longitudinal and lateral orientations as defined in 3.5 and 3.6. Depending on the system(s) design and location in the machine, other

additional orientations may be chosen. Secure the machine as necessary to ensure the machine will not tip over or slide.

7.2 Operate the engine throughout the speed range and simultaneously operate all fluid systems through their maximum range until all fluid systems are within the stabilized temperature operating range specified by the manufacturer.

7.3 With the engine operating at maximum speed, record system(s) pressures and temperatures at 5 min intervals until all fluid system(s) have stabilized, or fallen outside of the manufacturer's recommendations, or the following are noted:

- any system(s) pressure has dropped to less than 90 % of the pressure recorded in 6.3;
- any leaks, noise, abnormal fluid system temperatures, or operational characteristics of any of the system(s) have occurred.

7.4 Repeat 7.1 to 7.3 at other machine orientations and slope angles as necessary to the manufacturer's specified machine system(s) slope capability.

7.5 Repeat 7.1 to 7.4 with maximum fluid levels in all systems.

8 Criteria

The machine fluid system(s) slope capability as defined in 3.4 shall meet the conditions specified in 7.3.

9 Recording of test results

Summarize results in accordance with annex A.

Annex A

(normative)

Model test report

Test facility: Date:

Machine make: Model: Serial No.:

Attachments: Type: Model:
 Type: Model:
 Type: Model:

Engine make: Model: Serial No.:
 High idle: r/min Low idle: r/min

Transmission make: Model: Serial No.:

Ambient temperature: °C

Tyres	Position	Size	Ply rating	Type	Pressure	Condition
.....						
.....						
.....						
.....						

Track	Width	Gauge	Type	Condition
.....				
.....				

Machine orientation	0°	90°	180°	270°
Slope capability	°	°	°	°
Min. fluid level				
Max. fluid level				

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