Machine Slope Operation Test Code—SAE J897

SAE Recommended Practice
Editorial change May 1978

THIS IS A PREPRINT WHICH IS SUBJECT TO REVISIONS AND CORRECTIONS. THE FINAL VERSION WILL APPEAR IN THE 1979 EDITION OF THE SAE HANDBOOK.

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LAND SEA AIR SPACE

PREPRINT

MACHINE SLOPE OPERATION TEST CODE—SAE J897

SAE Recommended Practice

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Purpose—The purpose of this code is to provide a field procedure to determine the ability of a machine to operate statically and dynamically on sloping surfaces.

Depending upon the objective of the test, any item listed as specified is to be selected at the discretion of either the manufacturer, the test agency, the customer, or a combination of these parties.

Scope—This code applies to mobile work machines and their combinations with mounted and/or trailed equipment.

Facilities and Apparatus

Facilities—The static test course shall consist of facilities to permit placing the machine on a specified sloping surface. (Components of machine may be at a different angle than the specified slope because of the suspension system). The dynamic test course may be used.

The dynamic test course shall be uniform in grade and sufficiently long and wide to permit ready maneuverability on either axis of orientation. The course as specified should be maintained in good condition consistent with the objective of the test. Use of seat belts and ROPS is advised on critical slopes and maneuvers.

Apparatus—Means to measure:

Time: ± 0.05 minute.
Temperature: ± 2°C.
Barometric pressure: ± 0.3 kPa.
Rotational speed: ± 2% of max.
Length: ± 0.5% of max.
Tire pressure: ± 3% of max.
Track adjustment: ± 5mm.
Oil pressure: ± 10kPa.
Slope: ± 0.5%.
Mass: ± 3% of max.

DATE _____

TESTING AGENCY _____ LOCATION _____
MACHINE: Make _____ Model _____ Type _____ Ser No. _____
ATTACHMENTS _____
WEIGHT: Prime Mover _____ Trld Eq _____ Payload _____ Total _____
ENGINE: Make _____ Power _____ Model _____ Ser No. _____
(rpm) High Idle _____ Low Idle _____ Full Load _____
Coolant Capacity (L) _____ Crankcase Oil Capacity (L) _____
TRANSMISSION: Make _____ Model _____ Ser No. _____
CONVERTER: Make _____ Model _____ Ser No. _____
OPERATING GEAR _____ TOTAL GEAR REDUCTION _____
TEST COURSE DESCRIPTION AND LOCATION _____
_____
ALTITUDE _____ HUMIDITY _____
AMBIENT TEMP. _____ BAROMETRIC PRESSURE _____

TIRES:

Position	Size	Ply Rating	Type	Pressure	Condition

TRACK:

Width	Type	Condition	Adjustment

Test No.		1	2	3	4	5	6	7	8	9	10
Direction											
Grade or Slope	%										
Test Distance (half cycle)	m										
Test Time	min										
Engine Speed	rpm										
Oil Pressure (max/min)	kPa										
Oil Temperature	C										
Coolant Temp (max/min)	C										
Machine Speed	km/h										
Cycles											

REMARKS:

OBSERVERS: _____

FIG. 1—MACHINE SLOPE OPERATION DATA SUMMARY

The ϕ symbol is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

Procedure—Prior to test operation a complete check of the machine should be made to assure specified mass, mass distribution, lubrication, coolant, and fuel. All adjustments, including governor, brakes, clutches, tire pressure, or track adjustment, should be set as recommended by the manufacturer.

If the machine has not previously been used it should be "limbered-up", as recommended by the manufacturer. Any malfunction or maladjustment that may develop during limbering-up should be corrected before proceeding further.

Prior to recording test data the machine shall be operated until reasonably stable temperatures have been attained in all lubricants and functional components.

Static Test—Tilt the machine at the specified slope with the longitudinal axis oriented with the forward end upgrade. The machine should be secured in position by application of brakes or use of wheel chocks. Idle the engine and auxiliary equipment if specified, continuously for specified period. Record the following at the specified intervals.

Engine rpm.
Coolant temperature (cylinder head temperature on air cooled engines).
Abnormal noise.
Oil pressure and temperature.
Observed "hot spots."
Observed oil or coolant leaks.
Special observations as required for auxiliary equipment.

The test shall be considered terminated at the time any specified critical temperature is reached, noise is indicative of component failure, engine stalls, oil pressure becomes erratic or drops below the minimum recommended by the manufacturer or the specified time interval elapses.

Repeat the test successively with longitudinal axis of the machine oriented on the slope as follows:

(a) With the forward end of the machine downgrade.
(b) With the forward end of the machine at 90 deg to the right of the inclination of the slope.
(c) With the forward end of the machine 90 deg to the left of the inclination of the slope.

Dynamic Test—With the front of the machine upgrade, it shall be maneuvered alternately forward and reverse continuously for a specified time interval. Speed shall be kept uniform and controlled within the range of the slowest gear selection for both forward and reverse movement. Record the following for the specified interval.

Coolant temperature (cylinder head temperature on air cooled engines).
Abnormal noise.
Oil pressure and temperature with corresponding engine rpm.
Apparent "hot spots."
Observed oil or coolant leaks.
Special observations as required for auxiliary equipment.
Number of cycles.

The test shall be considered terminated at the time any specified critical temperature is reached, noise is indicative of component failure, engine stalls, oil pressure becomes erratic or drops below the minimum recommended by the manufacturer or the specified time interval elapses.

Repeat the test exactly in the remaining three directions.

Computations and Records—Records will be summarized in accordance with Fig. 1, Machine Slope Operation Data Summary Sheet.