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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

LY/T 3165-2019

**Forestry machinery -- Portable brush-cutters and
grass-trimmers -- Engine performance and fuel consumption**

林业机械 便携式割灌机和割草机 发动机性能和燃油消耗

(English Translation)

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Table of Contents

Foreword
1 Scope
2 Normative references
3 Equipment
4 Test environment
5 Test conditions
6 Operation method
6.1 General
6.2 Procedure
7 Test report

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard adopts the translation method equivalent to the international standard ISO 8893:1997 "Forestry machinery portable brush cutters and lawn mower engines Performance and Fuel Consumption.

Please note that some elements of this document may involve patents. The issuer of this document is not responsible for identifying these patents.

This standard is proposed and managed by the National Forestry Machinery Standardization Technical Committee (SAC/TC 61).

1 Scope

This standard specifies the methods for measuring the performance and fuel consumption of internal combustion engines used in portable brush cutters and lawn mowers.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this article. For undated references, the latest version (including all amendments) applies to this document.

ISO 5164 Motor Fuels-Determination of knock characteristics-Research method)

3 Equipment

3.1

Power test bench, torque test accuracy is $\pm 2\%$.

3.2

Tachometer, test accuracy is $\pm 0.5\%$.

3.3

Fuel consumption measuring device, test accuracy is $\pm 3\%$.

3.4

Thermometer with an accuracy of ± 1 K.

3.5

Barometer, test accuracy is $\pm 0.5\%$.

3.6

Humidity measuring device, accuracy is $\pm 2\%$.

4 Test environment

4.1

Ambient temperature. $15\text{ }^{\circ}\text{C} \sim 27\text{ }^{\circ}\text{C}$, measured at a distance of 15 cm from the air inlet.

4.2

Atmospheric pressure. $97.5\text{ kPa} \sim 105\text{ kPa}$.

4.3

According to the following formulas (1) to (4), modify the parameters according to standard atmospheric conditions.

$$x_{rPKP} = r \dots (1)$$

$$x_{rMKM} = r \dots (2)$$

$$x_{rrCKC} = \dots (3)$$

In the formula.

r--parameters under standard conditions;

x--parameters under measured conditions;

C--fuel consumption, in kilograms per hour (kg/h);

P--braking power in kilowatts (kW);

M--torque in Nm ($N \cdot m$);

rK-correction coefficient under standard atmospheric conditions;

rp-standard dry atmospheric pressure in kilopascals (kPa);

xp-measured dry atmospheric pressure (ie total pressure minus water vapor pressure), in kilopascals (kPa);

T-ambient temperature in Kelvin (K).

4.4

Standard atmospheric conditions should meet the following requirements.

a) $rT = 298 \text{ K}$ (dry ball);

b) $r_p = 99 \text{ kPa}$ (based on a total atmospheric pressure of 100 kPa , where the water vapor pressure is 1 kPa).

4.5

The values of xp and xT shall be calculated as the average of the test results of 6.2.3 and 6.2.6.

4.6

The change in xT value during the test shall not exceed $\pm 3 \text{ K}$.

4.7

Power-consuming accessories (such as electric heating handlebars) should be turned off.

4.8

The atmospheric pressure of the exhaust port and the air inlet should be equal.

4.9

No additional cooling or ventilation system is allowed.

4.10

Connection of engine and power test bench. The engine crankshaft and the dynamometer main shaft are aligned in a straight line, and can be connected by elastic couplings.

The engine can also be coupled with a power test bench with a clutch.

4.11

Because the speed regulator may be affected by the power test rig, the maximum value of the whole machine should be tested by hand operation first.

No-load speed. If the speed of the machine does not reach the maximum no-load speed on the test bench, the speed regulator connection should be disconnected.

4.12

The fuel oil shall be gasoline with a minimum octane number (research method) of 90 or more, as determined in accordance with ISO 5164. If it is a two-stroke launch Engine, use the two-stroke engine blend oil recommended by the manufacturer. At 15 ° C, the fuel density should be 725 kg/m³ to 755 kg/m³.

If the fuel fails to meet these technical requirements, the details of the fuel shall be stated in the test report.

5 Test conditions

5.1

Measurements should be performed on a machine equipped with standard equipment (configuration).

5.2

The engine should be fully configured, including auxiliary accessories necessary for product operation (air filter, muffler, cooling system, etc., but excluding power Transmission shaft, transmission shaft protection tube and power transmission device).

5.3

The engine should run at the speed required by the manufacturer's instructions.

6.1 General

Set the throttle to the fully open position, starting from the lowest speed, and stepping up the engine at a speed increase of 600 r/min, step by step. Record every Power, torque and fuel consumption corresponding to each measurement point. No adjustments to the machine are allowed during the test.

Read and record the data within 10 s after the temperature has stabilized.

Test and record at least 900 r/min below the maximum torque point and 900 r/min above the maximum power point Recorded data.

6.2 Procedure

Test in accordance with the procedures given in 6.2.1 to 6.2.6.

6.2.1

First warm up the engine and place the idle speed adjustment needle and the low-speed mixed gas adjustment needle in the optimal idle speed state recommended by the manufacturer.

Then install the engine on the power test bench.