BHUTAN STANDARD

Portable Brush Cutter-Test Code -Part 2



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BHUTAN STANDARD

Portable Brush Cutter – Test Code (Part -2)

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FOREWORD

This Bhutan Standard was adopted by Bhutan Standards Bureau after the draft finalized by the Mechanical Engineering Technical Committee, TC 08 and approved by the Bhutan Standards Bureau Board (BSB Board) on Day Month 2021.

This standard is subject to systematic review after five years to keep pace with the market trends, industrial and technological developments. Any suggestions and further information may be directed to the concerned Technical Committee.

BHUTANSTANDARD Portable Brush Cutter -Test Code

1 Scope

This standard specifies the test methods for Portable Brush Cutter.

2 Normative References

The following document is indispensable for application of this document. For dated references, only the editions cited are applies. For undated references, the latest edition of the referenced document are (including any amendments) applies.

BTS 36: 2018, Walk Behind Power Reaper: Basic Requirements (Part 1).

BTS 37: 2018, Walk Behind Power Reaper: Test Code (Part 2).

3 Terms and Definitions

For the purposes of this standard, the definitions given in BTS 36: 2018, BTS 37: 2018 and the following shall apply.

3.1 Others

Any additional verifications that may be required to be undertaken for enhancing the precision of any test items.

3.2 Field capacity

The field capacity of the farm machines is expressed as the area covered by tested machine in a given time period.

3.3 Accuracy

It is the difference between the total grain losses that occurs during harvesting by machine over the reference value.

3.4 Total operating time

It is the time taken from start to end of harvesting.

3.5 Header loss

Header loss is expressed as the percentage of grains loss on the ground over the total grain loss from the harvesting in the given test.

3.6 Discharge loss

The discharge loss is expressed as the percentage of the grains collected on the discharge area over the total grain loss that occurs from the harvesting in the given test.

3.7 Cereal

Tall grass like plants that produce kernels at the top of their stalks such as wheat and paddy.

3.8 Grass

It is vegetation consist of typical plants with long, narrow leaves which are grown in wild or cultivated on lawn and pasture as fodders and crops.

4 General condition of the test

4.1 The portable brush cutter subjected to the test shall be adjusted and run as per the manufacture's operation manuals and specifications.

4.2 The fuel and lubricants used for the tests shall be selected from those indicated by the manufacturer.

4.3 All the measuring instruments used for the test shall be calibrated with relevant agencies.

5 Test items and methods

5.1 Verification of structure

The objective of the test is to confirm the specification of the portable brush cutter given by the manufacturer. The items shall be verified as per the Annex A.

5. 2 Safety test

The objective of this test is to ascertain the safety features of the portable brush cutter. It shall be performed as per:

- a) Instruction and operation manual
- b) Requirement of safety labels
- c) Requirement of safety devices
- d) Others (If it is necessary)

5.3 Operation test

The objective of the test is to assess the performance and harvesting adaptability of the machine in the field. Following condition shall be maintained;

- a) The manufacturer's specification, instruction and operation manuals shall be followed for fitting the accessories and any other adjustments.
- b) The test shall be conducted for relevant cereal crops.
- c) The portable brush cutter shall be operated by at least two experienced operators for confirmation of handling.
- d) The reference test by manual harvesting shall be conducted to evaluate the efficiency of the portable brush cutter.

5.3.1 The items to be measured or investigated

- 1) Field capacity
- 2) Total grain loss
- 3) Ease of operation
- 4) Noise and vibration level
- 5) Others (if it is necessary)

6 Formulae

The field capacity, header loss, discharges loss, total grain loss shall be calculated as follows:

6.1 Field capacity

 $FC = \frac{Ac}{T}$Eq.1

Where:

FC: Field capacity (acre/h)

Ac: Area covered during test (acre) T: Total operating time (h)

6.2 Header Loss

 $LH = \left(\frac{WH}{WT}\right) * 100....Eq.2$

WH=WH1+WH2+WH3

Where:

LH: Header loss (%) WH: Weight of total header loss (kg) WH1: Weight of loss grain on the ground (kg) WH2: Weight of grains from the cut panicles but fallen on ground (kg) WH3: Weight of grains from uncut panicles fallen on ground after harvesting (kg) WT: Summation of weight of discharge loss on the discharging area, weight of the grain removed from the stalk on the discharging area and weight of the total header loss (kg)

6.3 Discharging loss

$$LD = \left(\frac{WD}{WT}\right) * 100....Eq.3$$

Where:

LD: Discharge loss (%)

WD: Weight of loss grain caused by discharging (kg) WT: Summation of weight of discharge loss on discharging area, weight of the grain removed from the stalks on discharging area and weight of the total discharge loss.

6.4 Total grain loss

LD = LH + LD Eq.4

Where:

LT: Total grain loss (%) LH: Header loss (%) LD: Discharge loss (%)

7 Protection range of protective cover (blade guard) against scattering

The objective of this test is to confirm the safety zone for scattering of materials from cutting blade. It shall be performed by:

- a) Portable brush cutter shall be placed at operating position.
- b) Safety standard screen shall be placed at 850 mm distance from center of blade in the direction of main pipe axis.
- c) Protective cover should hide zone1, (500 mm wide, and height of 400mm from the ground).
- d) When the screen is seen from point (A) and (B) on the blade for harvester operated from right-hand side of the body, or the range (3) for the harvester operated from left-hand side.
- e) When the screen is seen from points (B) and (C) on the blade, the protective cover should hide the range (2) (500mm wide at the height of 600mm from the ground) (range (4) for harvester operated on the left-hand side of the body).



8 Inspection after disassembling

If any abnormalities are observed during any of the above tests, causes may be investigated by disassembling the specific parts.

Annex A (Normative)

Specification sheet for Portable Power Harvester

A-1 Portable Power Harvester

- 1. Model:
- 2. Make:
- 3. Type:
- 4. Overall Dimensions (mm)
 - a) Length:
 - b) Width:
 - c) Height:
 - d) Weight (kg):

A-2 Engine

- a) Model:
- b) Make:
- c) Type:
- d) No. of cylinder:
- e) Power(kW):
- f) Revolution per minute (rpm):
- g) Fuel used:

A-3 Fuel system

a) Type of fuel feed system:

b) Fuel tank capacity (L):

A-4 Power transmission

a) Type:

A-5 Cutting device

- a. Type:
- b. Cutting width (mm):
- c. Minimum Cutting Height (mm):

A-6 Personal Protective Equipments (PPE)

- a. Goggles (Yes/No):
- b. Safety helmet (Yes/No):
- c. Apron (Yes/No):
- d. Gloves (Yes/No):
- e. Ear muff (Yes/No):
- f. Safety Shoe (Yes/No):
- g. Others

BIBLIOGRAPHY

- [1] BTS 36: 2018 Walk Behind Power Reaper: Basic Requirements (Part 1).
- [2] BTS 37: 2018 Walk Behind Power Reaper: Test Code (Part 2).
- [3] ISO 5349-1:2001(en) Mechanical vibration Measurement and evaluation of human exposure to hand-transmitted vibration Part 1: General requirements.
- [4] Farm Machinery Testing No.7-Test Code for Reaper. Institute of Agriculture Machinery, Bio-Oriented Technology Research Advancement Institution, Tsukuba International Center.
- [5] Regulation on Occupational Health, Safety and Welfare, 2012, Department of Labour, Ministry of Labour and Human Resources, Thimphu.
- [6] Test Codes and Procedures for Farm machinery, Technical Series No. 12:1995, Regional Network for Agricultural Machinery (RNAM).

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