BTS…...2016

འཕྲུལ་གྱང་ཆུང་བ། བརྒྱ་དཔྱད་སྒྲིག་ལུགས། གོ་རིམ ༢ པ།

BHUTAN STANDARDS

Mini Power Tillers (Less than 10.5hp) – Test Code (Part 2)

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BHUTAN STANDARDS BUREAU
The National Standards Body of Bhutan
THIMPHU 11001

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FOREWORD

This Bhutan Standards for mini Power Tillers (Less than 10.5hp) –Test Code (Part 2) was adopted by Bhutan Standards Bureau after the draft finalization by the Mechanical Engineering Technical Committee and endorsed by BSB Board.

འཛུལ་སྒང་ཆུང་བ། བརྟག་དཔྱད་སྒྲིག་ལུགས། གོ་རིམ ༢ པ།

BHUTAN STANDARDS

Mini Power Tillers (Less than 10.5hp) – Test Code (Part 2)

1 Scope

This test code specifies the testing methods of Mini Tillers and shall apply to pull type, tilling type and dual purpose types for the engine power less than 10.5hp

2 References

The following farm machinery test code contains provisions which through reference in this text, constitutes provisions of this national test code and standards for mini power tiller.

1. ISO 11449 :1994 –Walk Behind Powered Rotary Tillers – Definitions, Safety requirements and Test Procedures, International Organization for Standardization.
2. IS 9935:2002 Power Tiller: Test Code (second revision), Food and Agriculture Division Council Bureau of Indian Standards.
3. Institute of Agriculture Machinery, Bio-oriented Technology Research Advancement Institution, Tsukuba International Center: Farm Machinery Testing No:3 – National Test Code for the Agricultural Tractors (Walking type)

3 Definitions

For the purposes of this standard, the definitions given in BTS 34:2017 and the following apply.

3.1 Others

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

3.2 Water splashing

Water splashing is a condition verified during the water proof test. When the power tiller is operated in the water tank designed for water proof test as per the requirement of operation test procedures, water will be splashed from rubber and iron wheel and rotary unit to axle and transmission. This phenomenon is termed as water splashing.

4 General conditions of the test

4.1 The mini tiller subjected to the test shall be run as per the manufacturer’s recommendations and specifications.

4.2 The manufacturer’s specification and instruction manual shall be followed, while fitting the accessories and any other adjustments.

4.3 The appropriate size of agriculture fields shall be used for ploughing and rotary tilling.

4.4 The fuel and lubricants used for the test shall be selected from those recommended by the manufacturer.

4.5 All measuring instruments used for the test shall be calibrated with relevant agencies or certification body.

4.6 The mini tiller shall be tested by skilled operators.

5 Test items and methods

5.1 Verification of structure

The objective of this test is to confirm the specifications of a mini tiller given by a 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 mini tiller.

a) Verification of safety devices
b) Inspection of caution labels
c) Availability of the instruction and operation manuals

5.3 Engine power test.

The objective of this test is to know output power of the mini tiller engine. It shall be performed by:

a) Setting the governor control lever to maximum position.
b) Measuring output power from engine only.

5.3.1 The items to be measured or investigated are:

a) Atmospheric condition
b) Torque of the loaded shaft
c) Revolutions per minute of loaded shaft
d) Fuel consumption
e) Temperature of important parts
f) Mechanical trouble or failure
g) Others

5.4 Operation test

The objective of this test is to assess the ease of operation and adaptability to field condition. It shall be performed under two different operations:

a) Field operation with plough, rotavator and available implements
b) Road operation with attachment of trailer if available

5.4.1 The items to be measured or investigated are:

a) Field condition
b) Ease of hitching implements
c) Travelling speed
d) Working depth

e) Working width
f) Field efficiency
g) Brake performance
h) Ease of operation
i) Noise and vibration
j) Others

5.5 Waterproof test.

The objective of this test is to confirm water proof performance of the mini tiller. It shall be performed under the following conditions:

a) The mini tiller shall be equipped for puddling.
b) The test shall be conducted in a water tank designed for test.
c) The base of the wheel shall be submerged about 20 cm below the water surface.
d) Wheel speed shall be set to maximum throttle position and gear shall be as per the manufacturer's recommendation.
e) The test shall be conducted continuously for 2 hours.

5.5.1. Items to be investigated are:

a) Water splashed
b) Water entered in the transmission oil in transmission and auxiliary case
c) Waterproof system example bearing seal

6 Inspection after disassembling

The objective of the inspection after disassembling is to find out the defect parts in-case if any abnormalities are observed during any of the above tests. The causes shall be investigated by disassembling the specific parts.

ANNEX A (Normative)

(Clause 5.1)

Specification Sheet for Mini Tillers

A.1 Mini Tiller

a) Model:
b) Make:
c) Serial number:
d) Overall dimensions (mm)
   i. Length:
   ii. Width:
   iii. Height:

A.2 Engine

a) Type:
b) Number of cylinders:
c) Type of combustion:
d) Make:
e) Model:
f) Serial number:
g) Year of manufacture:
h) Rated engine power (…….hp/kW@…….rpm)

A.3 Fuel system

a) Type of fuel feed system:
b) Fuel tank capacity (L):
c) Type of fuel:
d) Type of carburetor:

A.4 Air cleaner

a) Type:

A.5 Exhaust system

a) Outlet smoke direction:

A.6 Lubrication system

a) Oil sump capacity (L):

A.7 Cooling system

a) Type (Air or liquid):

A.8 Electrical system

a) Lights (Watt, Voltage):

A.9 Power transmission system

a) Main Clutch:
b) Steering clutch:
c) Number of speeds
    i. Forward:
    ii. Reverse:
d) Nominal speed at rated engine speed at the highest gear (km/h)**:**

A.10 Parking brake:

a) Type:

A.11 Tyre

a) Size:
b) Ply rating:

A.12 Others (Trailer: reflector, brake system, etc.)

Bibliography

4. ISO 11449 :1994 –Walk Behind Powered Rotary Tillers – Definitions, Safety requirements and Test Procedures, International Organization for Standardization.
5. IS 9935:2002 Power Tiller: Test Code (second revision), Food and Agriculture Division Council Bureau of Indian Standards.
6. Institute of Agriculture Machinery, Bio-oriented Technology Research Advancement Institution, Tsukuba International Center: Farm Machinery Testing No:3 – National Test Code for the Agricultural Tractors (Walking type)

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