

འཕུལ་སྒྲུང་རྒྱུང་བ། བརྟག་དབྱུང་སྒྲིག་ལུགས། གོ་རིམ་ ༢ བ།

**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

Price group.....

འཕུལ་སྒྲུང་རྒྱུང་བ། བརྟག་དཔྱད་སྒྲིག་ལུགས། བོ་རིམ་ ༢ པ།

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Draft Bhutan Standards for public comments only

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Director General  
Bhutan Standards Bureau  
Thimphu-11001  
Tel : 00975-2-325104/325401  
Fax: 00975-2-323712/328298  
Web: [www.bsb.gov.bt](http://www.bsb.gov.bt)  
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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.

# འཕུལ་སྒྲུབ་ཚུང་བ། བརྟམ་དཔྱད་སྒྲིག་ལུགས། གོ་རིམ་ ༢ བ།

## 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.

37 4.3 The appropriate size of agriculture fields shall be used for ploughing and rotary tilling.

38 4.4 The fuel and lubricants used for the test shall be selected from those recommended by the  
39 manufacturer.

40 **4.5** All measuring instruments used for the test shall be calibrated with relevant agencies or  
41 certification body.

42  
43 4.6 The mini tiller shall be tested by skilled operators.

## 44 **5 Test items and methods**

### 45 **5.1 Verification of structure**

46 The objective of this test is to confirm the specifications of a mini tiller given by a manufacturer. The items  
47 shall be verified as per the annex A.

### 48 **5.2 Safety test**

49 The objective of this test is to ascertain the safety features of the mini tiller.

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

### 53 **5.3 Engine power test.**

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

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

#### 57 **5.3.1 The items to be measured or investigated are:**

- 58 a) Atmospheric condition
- 59 b) Torque of the loaded shaft
- 60 c) Revolutions per minute of loaded shaft
- 61 d) Fuel consumption
- 62 e) Temperature of important parts
- 63 f) Mechanical trouble or failure
- 64 g) Others

### 66 **5.4 Operation test**

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

- 69
- 70 a) Field operation with plough, rotavator and available implements
- 71 b) Road operation with attachment of trailer if available

#### 72 **5.4.1 The items to be measured or investigated are:**

- 73 a) Field condition
- 74 b) Ease of hitching implements
- 75 c) Travelling speed
- 76 d) Working depth

- 77 e) Working width
- 78 f) Field efficiency
- 79 g) Brake performance
- 80 h) Ease of operation
- 81 i) Noise and vibration
- 82 j) Others

83

#### 84 **5.5 Waterproof test.**

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

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

#### 93 **5.5.1. Items to be investigated are:**

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

97

### 98 **6 Inspection after disassembling**

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

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123 **ANNEX A (Normative)**

124 (Clause 5.1)

125 **Specification Sheet for Mini Tillers**

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127 **A.1 Mini Tiller**

128 a) Model:

129 b) Make:

130 c) Serial number:

131 d) Overall dimensions (mm)

132 i. Length:

133 ii. Width:

134 iii. Height:

135 **A.2 Engine**

136 a) Type:

137 b) Number of cylinders:

138 c) Type of combustion:

139 d) Make:

140 e) Model:

141 f) Serial number:

142 g) Year of manufacturer:

143 h) Rated engine power (.....hp/kW@.....rpm)

144

145 **A.3 Fuel system**

146 a) Type of fuel feed system:

147 b) Fuel tank capacity (L):

148 c) Type of fuel:

149 d) Type of carburetor:

150

151 **A.4 Air cleaner**

152 a) Type:

153

154 **A.5 Exhaust system**

155 a) Outlet smoke direction:

156

157 **A.6 Lubrication system**

158 a) Oil sump capacity (L):

159

160 **A.7 Cooling system**

161 a) Type (Air or liquid):

162

163

164 **A.8 Electrical system**

165 a) Lights (Watt, Voltage):

166

167 **A.9 Power transmission system**

168 a) Main Clutch:

169 b) Steering clutch:

170 c) Number of speeds

171 i. Forward:

172 ii. Reverse:

173 d) Nominal speed at rated engine speed at the highest gear (km/h):

174

175 **A.10 Parking brake:**

176 a) Type:

177

178 **A.11 Tyre**

179 a) Size:

180 b) Ply rating:

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

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203 **Bibliography**

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250  
251  
252**Mechanical Engineering Technical Committee (TC-08)****Organization****Representatives****Chairman**Agriculture Machinery Centre,  
Ministry of Agriculture and Forest

Mr. Chetem Wangchen

**Members**Agriculture Machinery Centre,  
Ministry of Agriculture and Forest

Mr. Kinga Norbu

Agriculture Machinery Centre,  
Ministry of Agriculture and Forest

Mr. Sangay Lhendup

Construction Development Corporation Limited

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Farm Machinery Corporation Limited,  
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Department of Agriculture,  
Ministry of Agriculture and Forest

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Road Safety and Transport Authority,  
Ministry of Information and Communication

Mr. Phuntsho Wangdi

Technical Training Institute, Samthang,  
Ministry of Labour and Human Resources

Mr. Sangay Wangchuk

Bhutan Standards Bureau

Mr. Sonam Phuntsho, Director General  
(Ex- Officio member)**Member Secretary**Pelden Dendup  
Standardization Division,  
Bhutan Standards Bureau

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