

# **BHUTAN STANDARD**

## **Paddy Transplanter – Basic Requirements (Part 1)**



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**BHUTAN STANDARDS BUREAU**

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**Price group A**



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## **Paddy Transplanter – Basic Requirements**

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## Table of Contents

<b><i>NATIONAL FOREWORD .....</i></b>	<b><i>iv</i></b>
<b><i>1 Scope.....</i></b>	<b><i>1</i></b>
<b><i>2 Normative References.....</i></b>	<b><i>1</i></b>
<b><i>3 Terms and Definition .....</i></b>	<b><i>1</i></b>
3.1 Paddy transplanter .....	1
3.1 Walk behind type transplanter.....	1
3.2 Mat Type Seedlings .....	1
3.3 Seedlings density .....	1
3.4 Leaf stage of seedlings .....	1
3.5 Total (missing hills).....	2
3.6 missing hills.....	2
3.7 Floating hills.....	2
3.8 Buried hill .....	2
3.9 Damaged seedling .....	2
3.10 Soil hardness .....	2
3.11 Theoretical field capacity .....	2
3.12 Actual field capacity.....	2
3.13 Field efficiency.....	2
3.14 Transplanting speed.....	2
3.15 Total Transplanting faults .....	2
<b><i>4 General Requirement.....</i></b>	<b><i>2</i></b>
4.1 Safety Requirements .....	2
4.2 Structure Requirements.....	3
4.3 Requirement of Operational Performance .....	3
4.4 Test Sample .....	3
<b><i>Bibliography.....</i></b>	<b><i>4</i></b>

## **NATIONAL FOREWORD**

Bhutan Standards Bureau (BSB) is a National Standards Body of Bhutan. This standard for Paddy Transplanter-Basic Requirement (Part 1) was developed by Agriculture Machinery Certification Program, Agriculture Machinery Centre under Department of Agriculture, MoAL after the draft finalization by the Mechanical Engineering Technical Committee, TC 08 and approved by the Bhutan Standards Bureau Governing Body on date Month year.

This standard specifies basic requirements for paddy transplanter. This standard is drafted in accordance with the BSB Rule for Structure and Drafting of Bhutan Standards, 2018. Some of the elements of this standard may be the subject of copyrights.

This standard is subject to systematic review after five years to keep pace with the market trends, industrial and technological developments. Amendments are issued to standards as the need arises on the basis of comments.

# BHUTAN STANDARD

## Paddy Transplanter – Basic Requirements

### 1 Scope

This standard specifies the basic requirements for wet land paddy transplanters applicable for engine driven with mat type seedlings.

### 2 Normative References

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

*ANTAM 003-2017 – Antam Standard Code for Testing of Paddy Transplanter*

*ICS 65.060.30 – Indian standard (paddy transplanter- test code)*

*PNS/PAES 151:2010 – Agriculture machinery- Mechanical Rice Transplanter – Specifications.*

### 3 Terms and Definition

For the purpose of this document, the following terms and definitions shall apply:

#### 3.1 Paddy transplanter

Machine, which is used to perform paddy seedlings transplanting in wet land.

#### 3.1 Walk behind type transplanter

Machine, where the operator has to walk from behind to operate it.

Riding Type transplanter

Machine, where the operator sit on the machine to operate it.

#### 3.2 Mat Type Seedlings

The paddy seedlings that are raised in the nursery box/tray as mat.

#### 3.3 Seedlings density

It indicates the number of seedlings per unit area on the mat.

#### 3.4 Leaf stage of seedlings

The leaf stage indicates the number of leaves or height of the seedlings.

Note 1-For optimal efficiency in machine transplanting, seedlings should meet either of the following conditions:

- Have between 3 to 6 leaves.
- Be 10 to 15 cm in height.

## **DBTS XXX: 2025**

### **3.5 Total (missing hills)**

Total number of floating, buried and missing hills per 1 m<sup>2</sup> area.

### **3.6 missing hills**

nonexistence of seedlings in any transplanting points/hills.

### **3.7 Floating hills**

Seedlings that remain afloat on the water due to inability of planting finger to place the seedlings in the soil-

### **3.8 Buried hill**

Seedlings that remain completely buried in the soil/mud layer after transplanting.

### **3.9 Damaged seedling**

Seedlings which have had some damages during picking, planting and other machine operations.

### **3.10 Soil hardness**

The soil hardness at transplanting operation is expressed with the depth of penetration of a drop type cone penetrometer and called "cone depth".

### **3.11 Theoretical field capacity**

This is calculated by multiplying the theoretical working width of the machine and the average operational speed of the machine.

### **3.12 Actual field capacity**

Area transplanted by the machine during total operating time.

Note: Total operating time includes turning, travelling, stoppage, minor breakdown and adjustment.

### **3.13 Field efficiency**

Ratio between actual field capacity and theoretical field capacity, expressed as a percentage.

### **3.14 Transplanting speed**

The forward speed of the transplanter during seedlings transplanting.

### **3.15 Total Transplanting faults**

The sum total of missing hills, floating seedlings, buried seedlings and damaged seedlings in 1m<sup>2</sup>.

## **4 General Requirement**

### **4.1 Safety Requirements**

4.1.1 The exposed transmission and rotating parts shall have protective cover.

4.1.2 The position and the direction of the exhaust port shall avoid the driver and other operators who are supposed to stand on the machine.

4.1.3 For riding type, the operator work floor shall be flat and non-slip.

4.1.4 The row marker shall have locking mechanism for operator safety.

4.1.5 The operation symbols shall be pasted near the key controls.



- 4.1.6 For riding type transplanter, the pedal shall have non-slip surface and easy to clean.
- 4.1.7 The positive pole of the battery shall have the protective cover to prevent the short circuit.
- 4.1.8 Riding type transplanter shall be equipped with footsteps on both sides.
- 4.1.9 All exposed sharp edges and corners shall have smooth finishing.
- 4.1.10 Transplanters should be equipped with a proper lighting facility.
- 4.1.11 Riding type transplanters shall be equipped with a reverse horn.
- 4.1.12 There shall be safety guard for all moving parts and guard shall be placed in between the moving parts and operator at appropriate safe distance.
- 4.1.13 The guard shall have enough strength and durability under the normal operational condition
- 4.1.14 Safety signs and symbols shall be illustrated clearly in English/Dzongkha which are visible to operators.
- 4.1.15 The machine shall be equipped with instruction and operation manuals in English.
- 4.1.16 The hot parts of the machine shall be placed at a safe distance from fuel system.

#### **4.2 Structure Requirements**

- 4.2.1 The main components shall not be abnormal or broken.
- 4.2.2 There shall not be oil leakage.
- 4.2.3 The operator shall not have difficulty in controlling the components.
- 4.2.4 There shall not be any defects that may affect the operator.
- 4.2.5 The diameter and grip of the handle shall be designed for comfortable and efficient use.

#### **4.3 Requirement of Operational Performance**

- 4.3.1 Noise of tested machine shall not exceed 100 dB(A) for continuously working for 2 hours.
- 4.3.2 Vibration of tested machine shall not exceed 15 m/sec<sup>2</sup>.
- 4.3.3 The water shall not enter the transmission and axle case while performing waterproof test.
- 4.3.4 Riding type transplanter wheel shall be observed for 5 minutes and shall not move in unload condition while parked on the 18% slope upward and downhill.
- 4.3.5 The total transplanting faults in 1 m<sup>2</sup> shall not exceed 10 %.
- 4.3.6 There shall be a field efficiency of at least 80%.
- 4.3.7 The planting finger shall pick rice seedlings uniformly.
- 4.3.8 The distance between hills and rows shall be uniform based on the desired setting.

#### **4.4 Test Sample**

The test sample shall be new machine and it shall be adjusted as per the manufacturer's specification. The testing shall be carried out as per methods outline DBTS XXX: 2025 Paddy Transplanter-Test Code (Part 2).

### **Bibliography**

- [1] *Antam 003-2017 –Antam standard code for testing of paddy transplanter*
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- [3] Agricultural machinery – mechanical rice transplanter – specifications, pns/paes 151:2010 (paes published 2010) ics 65.060.01.

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