

BHUTAN STANDARD

Rice Mill – Test Code (Part 2)

1 Scope

This test code specifies the test methods for Rice Mill and shall apply to De-husker, Polisher and Combined types.

2 Normative References

The following document is indispensable for 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.

BTS 38: 2017, Rice Mill- Basic Requirements (Part 1)

3 Definitions

For the purposes of this standard, the definitions given in BTS 38:2017 and following shall apply.

3.1. Head Rice Recovery Rate

It is the percentage weight of head rice obtained from weight of input paddy to the tested machine or the machine for laboratory test.

3.2 Milling recovery rate

It is the weight of head rice and broken rice recovered from weight input rough rice of tested machine or laboratory test.

3.3 Milling Capacity

It is the quantity of paddy that a test machine (mill) can process over a given time period.

3.4 Head rice

It is the whole grain of milled rice with length equal to or greater than $\frac{3}{4}$ of average length of a whole grain.

3.5 Broken rice

It is the portion of milled rice grain with less than $\frac{3}{4}$ of the average length of a whole grain.

4 General conditions of the test

4.1 The rice mill subjected to the test shall be run as per the manufacturer's indication and specifications.

4.2 The rice mill subjected to the test shall be adjusted as per the requirement and the manufacturer's indication.

4.3 The prime mover used for the test shall be selected from those indicated by the manufacturer.

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

5 Test items and methods

5.1 Verification of structure

The objective of this test is to confirm the specifications of a rice mill given by a manufacturer. The items shall be verified are as per the Annex A.

5.2 Safety test

The objective of this test is to ascertain the safety features of the rice mill. It shall be performed by;

- a) Verifying safety devices
- b) Inspection of the caution labels
- c) Availability of instruction and operation manuals.
- d) Others

5.3 Operation test

The objective of this test is to assess the milling recovery rate, head rice recovery rate, milling recovery index, milling capacity and handling. To carry out this test, following conditions shall be maintained;

- a) The manufacturer's specification and instruction or operation manual shall be followed for fitting the accessories and any other adjustments.
- b) The rice mill shall be operated by at least two experienced operators.
- c) Milling recovery index shall be determined by the using the laboratory de- husker and polisher
- d) Milling recovery index will be used to assess the efficiency of the mill.

5.3.1 The items to be measured or investigated are:

- a) Test the conditions of rough rice
- b) Mechanical condition of the mill
- c) Operating condition of mill
- d) Milling recovery rate
- e) Milling capacity
- f) Power consumption
- g) Ease of handling
- h) Noise level
- i) Quality of milled rice
- j) Others

6 Formulae

The milling recovery rate, head rice recovery rate, milling recovery index, head rice recovery index and milling capacity shall be calculated as follows;

6.1 Milling Recovery Rate

$$RMR (\%) = \frac{(WH + WB)}{W} \times 100 \text{ -----Eq. 1}$$

Where:

RMR = Milling recovery rate

W = Weight of input paddy

WH = Weight of head brown rice or milled head rice

WB = Weight of broken brown rice or milled broken rice

6.2 Head Rice Recovery Rate

$$RH (\%) = \frac{WH}{W} \times 100 \text{ -----Eq. 2}$$

Where:

RH =Head Rice Recovery Rate

WH = Weight of head brown rice or milled head rice

W = Weight of input paddy

6.3 Milling Recovery Index

$$RMI = \frac{RMF}{RML} \text{ -----Eq. 3}$$

Where:

RMI: Milling recovery Index

RMF: Milling recovery rate in the field test

RML: Milling recovery rate in the laboratory test

6.4 Head rice recovery index

$$RHI = \frac{RHF}{RHL} \text{ -----Eq. 4}$$

Where:

RHI: Head rice recovery index

RHF: Head rice recovery rate in the field test

RHL: Head rice recovery rate in the lab test

6.5 Milling Capacity

$$CM \left(\frac{Kg}{hr} \right) = \frac{W}{T} \text{-----Eq. 5}$$

$$T (hr) = T_m + T_o$$

Where:

CM = Milling Capacity

W = Weight of input paddy

T = Total operation time

T_m = Milling time

T_o = Operation time other than milling

7 Inspection after disassembling

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

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Annexure A (Normative)
(Clause 5.1)
Specification sheet for Rice Mill

A.1 Rice mill

- a) Model:
- b) Make:
- c) Type :
- d) Serial number:
- e) Overall dimensions (mm)
 - Length:
 - Width:
 - Height:

A.2 Prime Mover

- a) Kind:
- b) Type
- c) Make:
- d) Model
- e) Rated power :
- f) Type of starter:
- g) Type of fuel
- h) Others
 - a. Diameter of driving pulley:
 - b. Diameter of Idler pulley :
 - c. Inlet size of gate hopper :
 - d. Outlet size :

A.3 Blade

- a. Thickness
- b. Length
- c. Breadth

A.4 Rice mill for the laboratory test

- a) Model:
- b) Type:
- c) Prime Mover: Single Phase Induction Motor,kW/.....rpm

A. 5 Polisher for the laboratory test

- a) Model:
- b) Type:
- c) Prime Mover: Single Phase Induction Motor,kW/.....rpm

Bibliography

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2. ASAE Standard: ASAES352, 1977 Moisture measurement – Grain and Seeds, American Society of Agricultural Engineers, St. Joseph, Michigan, USA
3. Agricultural Mechanization Institute: 1989 Diagrams of Large-scale and small-scale Rice Milling Systems in the Republic of Korea.
4. ISO: 3971-1977 (E/F) Rice Milling – Symbols and Equivalent Terms
5. ISO Recommendation R712: 1968 Determinations of Moisture Content Routine Method, International Organization for Standardization.
6. Regional Network for Agricultural Machinery (RNAM): 1995 Test Codes and Procedures for Farm Machinery, Technical Series No. 12

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