

## Postharvest Machinery – Rotary Drum Composter



### AGRICULTURAL MACHINERY TESTING AND EVALUATION CENTER

Roberto C. Bautista Hall, Pili Drive, UPLB, College, Laguna 4031  
+63 49 253 4956|+63 917 156 1059|+63 921 400 7137  
amtec.uplb@up.edu.ph|www.amtec.ceat.uplb.edu.ph



**Contents**

	Page
Foreword .....	1
<b>1 Scope .....</b>	<b>2</b>
<b>2 Normative References .....</b>	<b>2</b>
<b>3 Terms and Definitions .....</b>	<b>2</b>
<b>4 General Conditions for Test.....</b>	<b>5</b>
<b>5 Test Preparation .....</b>	<b>6</b>
<b>6 Pre-test Observation .....</b>	<b>7</b>
<b>7 Performance Test .....</b>	<b>7</b>
<b>8 Laboratory Analysis .....</b>	<b>9</b>
<b>9 Presentation of Results.....</b>	<b>9</b>
<b>10 Formula.....</b>	<b>9</b>
<b>11 Test Report .....</b>	<b>10</b>
<b>Annex A (informative) Minimum List of Field and Laboratory Test Equipment and Materials.....</b>	<b>11</b>
<b>Annex B (informative) Specifications of Rotary Drum Composter.....</b>	<b>12</b>
<b>Annex C (normative) Sampling Procedures.....</b>	<b>16</b>
<b>Annex D (informative) Performance Test Data Sheet.....</b>	<b>17</b>
<b>Annex E (normative) Laboratory Analysis .....</b>	<b>20</b>
<b>Annex F (informative) Laboratory Analysis Data Sheet .....</b>	<b>21</b>
<b>Annex G (informative) Formula Used During Calculations and Testing .....</b>	<b>23</b>
<b>Bibliography.....</b>	<b>25</b>

## **Foreword**

The formulation of this AMTEC Methods of Test (AM) was initiated by the Agricultural Machinery Testing and Evaluation Center-University of the Philippines Los Baños (AMTEC-UPLB) in response to the need for a reference standard for the testing of grain collectors. It was made in collaboration with the Bureau of Agricultural and Fisheries Engineering (BAFE)-Department of Agriculture (DA) as the regulatory agency for agriculture and fisheries machinery and infrastructures.

The draft AM underwent a series of reviews and online circulations among AMTEC engineers and stakeholder consultation on March 24, 2022 via online platform before its finalization and endorsement to the BAFE-DA.

This AM was drafted in accordance with the Bureau of Agriculture and Fisheries Standards (BAFS)-Standards Development Division (SDD) Standardization Guide No. 1: Writing the Philippine National Standards.

The word “shall” is used to indicate mandatory requirements to conform to the standard.

The word “should” is used to indicate that, among several possibilities, one is recommended as particularly suitable without mentioning or excluding others.

## 1 Scope

This standard specifies the methods of test and inspection for rotary drum composter. Specifically, it shall be used to:

- 1.1 verify the mechanism, dimensions, materials, accessories of the machine, and the list of specifications submitted by the test applicant;
- 1.2 determine the performance of the machine;
- 1.3 evaluate the ease of handling and safety features; and
- 1.4 prepare the report for the test results.

## 2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

Agricultural Machinery Testing and Evaluation Center (AMTEC)-University of the Philippines Los Baños (UPLB). (2021). Agricultural and fishery machinery – General Methods of test (AM 001:2021)

AMTEC-UPLB. (2000). Agricultural machinery – Method of sampling (PAES 103:2000)

## 3 Terms and Definitions

For the purpose of this standard, the following definitions shall apply.

### 3.1

#### **compost**

product of plant or animal origin that has undergone decomposition and is used to improve the structure and provide nutrients to the soil

### 3.2

#### **raw material**

naturally occurring material used in the production of compost

### 3.3

#### **loading capacity**

total weight of raw material at full capacity of the rotary drum composter, expressed in kilogram per batch (kg/batch)

**3.4****overall height**

distance between the horizontal supporting plane surface and the horizontal plane touching the uppermost part of the machine

**3.5****overall length**

distance between the vertical planes perpendicular to the median plane of the machine, each plane touching the front and rear extremities of the machine

**3.6****overall width**

distance between the vertical planes parallel to the median plane of the machine, each plane touching the outermost point of the machine on its left and right sides

**3.7****rotary drum composter**

in-vessel-type composter with a horizontal, cylindrical chamber moving in a circulating motion along an axis used for the production of compost (Misra et al., 2003)

**3.7.1****composting drum**

part of the rotary drum composter where composting takes place

**3.7.2****prime mover**

electric motor or internal combustion engine used to run the rotary drum composter

**3.8****running-in period**

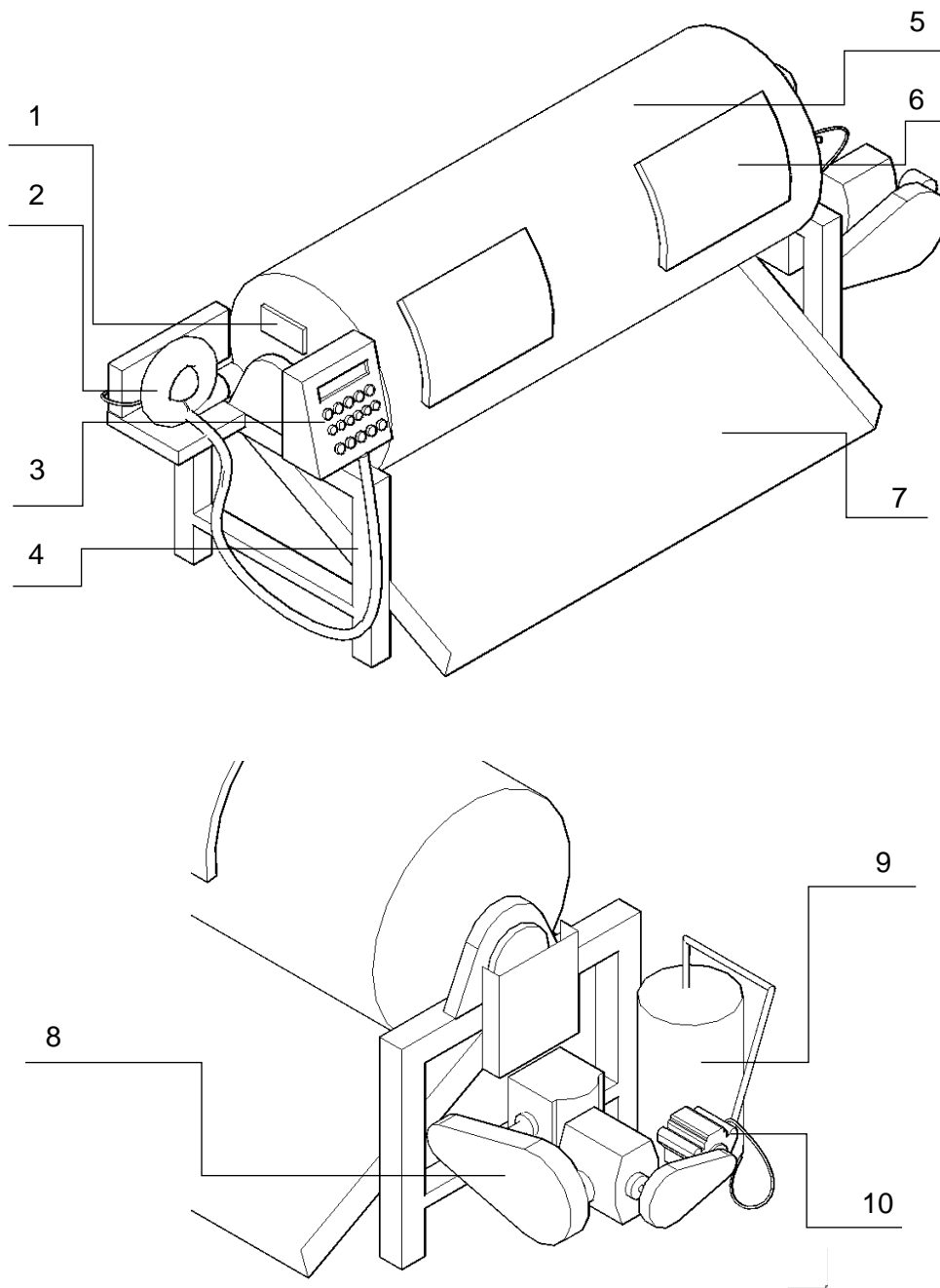
preliminary operation conducted before the actual testing of the machine to make various adjustments until the operation is stable

**3.9****test applicant**

manufacturer, inventor, direct importer, legitimate distributor, dealer, or end-user of the machine that officially applied for a test

**3.10****wet basis moisture content**

weight of moisture over the fresh weight of the sample, expressed in percent (%)



- |                    |   |
|--------------------|---|
| 1. Air vent        | 6. Loading/unloading door               |
| 2. Blower          | 7. Discharge chute                      |
| 3. Control panel   | 8. Power transmission system with guard |
| 4. Main frame      | 9. Liquid solution tank                 |
| 5. Composting drum | 10. Prime mover                         |

Figure 1. Parts of rotary drum composter

## **4 General Conditions for Test**

### **4.1 Selection of machinery to be tested**

The rotary drum composter submitted for testing shall be sampled in accordance to PAES 103:2000 or any other suitable method of sampling.

### **4.2 Role of the test applicant**

The test applicant shall provide the necessary information or documents on the specifications of the machine to be tested. They shall abide with the terms and conditions set forth by the AMTEC, provide test materials, and shoulder other variable costs to carry out the test.

### **4.3 Role of the representative of the test applicant**

An official representative from the test applicant shall operate, demonstrate, adjust, repair as the case maybe, and decide on matters related to the operation of the machine

### **4.4 Role of the test engineer**

The certified test engineer shall lead the conduct of the performance testing in accordance with the provisions of this Standard and the specific AMTEC Standard for the machinery. Furthermore, the test engineer shall oversee other relevant activities prior and subsequent to the conduct of the testing.

### **4.5 Test site conditions**

The rotary drum composter shall be installed and tested for normal operation in an area with ample space. The site should have ample provisions for material handling and temporary storage. Adequate ventilation and lighting shall be provided in the area.

## 4.6 Suspension/Termination of test

4.6.1 During the testing operation, the test may be suspended if the machine stops or cannot operate or cannot be tested due to the following.

Item No.	Conditions for Suspension
4.6.1.1	Minor breakdown or malfunction
4.6.1.2	Insufficient amount of test material
4.6.1.3	Nonconformity of the test material to the recommended characteristics and quality
4.6.1.4	Nonconformity of the test plot to the recommended characteristics and conditions
4.6.1.5	Unmatched prime mover or tractor used
4.6.1.6	Clogged or choked part/s of the machine
4.6.1.7	Absence of power source for the machine due to power outage or brownout
4.6.1.8	Accident and injury of the personnel/representatives of test applicant or AMTEC
4.6.1.9	Poor and severe weather conditions that may affect the test

At such instances, the AMTEC may allow the representatives of the test applicant to repair and/or replace with similar specifications an assembly of a machine and to change a test material with a new one that conforms to the recommended size, characteristics, quality, and/or conditions. The AMTEC may also await such instances until they are resolved to continue the test operation.

4.6.2 During the testing operation, the test shall be terminated if the machine cannot continue its operation due to the following:

Item No.	Conditions for Termination
4.6.2.1	Three breakdowns during the whole duration of all test trials
4.6.2.2	Three clogging or choking during the whole duration of all test trials
4.6.2.3	Major malfunction, breakdown, or damage affecting performance of the machine

## 5 Test Preparation

### 5.1 Preparation of the machine for testing

The official representatives of both the test applicant and AMTEC shall check the machine to ensure that it has been assembled and installed in accordance with the instruction of the manufacturer. The AMTEC shall test the machine according to the specifications and conditions set by the manufacturer.

### 5.2 Test instruments and other materials

The suggested list of minimum field and laboratory test equipment and materials needed to carry out the test for the rotary drum composter is shown in Annex A. These instruments shall be calibrated regularly. Before and after each test, these instruments shall be physically checked for operation and shall be cleaned, respectively. A checklist of



instruments and materials to be used before departure to and from the testing area shall be prepared.

### **5.3 Test material**

Test materials to be used shall be shredded, mixed vegetable or market wastes. The amount of test material to be supplied shall be sufficient for the required test trials, running-in period, and laboratory tests. Specifically, the amount of test material shall be sufficient to fill up one full loading capacity of the rotary drum composter. If the test materials are not compliant with the recommended quantity and characteristics, the AMTEC shall not proceed with or shall suspend the test.

### **5.4 Running-in and preliminary adjustments**

The machine shall have undergone a running-in period before starting the test. During the running-in period, the various adjustments of the machine shall be made accordingly to the recommendation of the manufacturer. No adjustments shall be permitted during the test proper.

## **6 Pre-test observation**

### **6.1 Verification of specifications**

The specifications claimed by the manufacturer and other physical details given in Annex B shall be verified by the AMTEC. A stable and level surface shall be used as reference plane for verification of dimensional machine specifications.

### **6.2 Test sample conditions**

The conditions of the raw materials including source and moisture content shall be obtained and recorded. Representative test samples shall be collected by the AMTEC from the raw materials for analysis. Sampling procedure is shown in Annex C.

## **7 Performance Test**

### **7.1 Operation of the rotary drum composter**

The rotary drum composter shall be operated for mixing, with and without load, by the official representative of the test applicant using the recommended settings of the manufacturer and/or test applicant. The same recommended setting shall be maintained during the test operation. As part of the test, the AMTEC shall make all measurements and shall take the prescribed samples. No other adjustments shall be permitted during the test.

### **7.2 Test trial**

A minimum of three (3) test trials should be conducted.

### **7.3 Data collection**

#### **7.3.1 Duration of test**

The duration of each test trial shall commence at the start of the mixing process and shall end after fifteen (15) minutes of mixing operation.

#### **7.3.2 Noise level**

**7.3.2.1** The sound emitted by the machine, with and without load, shall be measured using a sound level meter at the zone of the operator/s' ear level.

**7.3.2.2** There shall be a minimum of five observations for each data to be taken. It should be ensured that the feed rate, speed, and other functional characteristics have stabilized before taking data. The time of recording shall be properly spaced during the whole duration of the test trial. There shall be at least ten (10) data or readings obtained.

#### **7.3.3 Speed of components**

The shaft speed of the major rotating components of the rotary drum composter, with and without load, shall be measured using a tachometer in rpm. Requirements for each data to be taken shall conform to 7.3.2.2.

#### **7.3.4 Fuel consumption/ Power requirement**

##### **7.3.4.1 For rotary drum composter using engine as prime mover**

**7.3.4.1.a** Total operating time of the engine from the time it started until the time it stopped shall be recorded.

**7.3.4.1.b** To get the amount of fuel consumed, refill method shall be used. Fill the tank to full capacity or to a certain level before the test. After the test, fill the tank with measured fuel to the same level before the test. When filling up the fuel tank, extra attention shall be paid to keep it horizontal and to ensure that empty space is not left inside.

##### **7.3.4.2 For rotary drum composter using electric motor as prime mover**

The input power requirement of rotary composter powered by an electric motor shall be measured using a power meter. Connect a power meter to the input terminals or wires of the motor to measure the voltage, current, and the total electric power requirement of the machine. Requirements for each data to be taken shall conform to 7.3.2.2.

#### **7.3.5 Air velocity**

The air velocity generated by the fan/blower of the rotary drum composter, without load, shall be measured using an air velocity meter in m/s.

### **7.3.6 Composting temperature (if heater is present)**

**7.3.6.1** The average temperature inside the composting chamber shall be recorded.

**7.3.6.2** Divide the composting chamber into at least three sections along the drum (right, middle, and left).

**7.3.6.3** Measure the temperature at each section using thermocouples. The said temperature shall be measured at 5-minute intervals during the during the fifteen of mixing.

### **7.3.7 Ambient conditions**

The ambient temperature and relative humidity shall be measured using a thermohygrometer. The said conditions shall be obtained at 5-minute intervals during the fifteen of mixing.

### **7.3.8 Loading capacity**

The maximum amount of raw material required to fill up the rotary drum composter for proper operation shall be verified when filling it at the beginning of the test. The loading capacity shall be measured in terms of weight.

## **7.4 Sampling**

Samples shall be collected from the output or mixed raw materials during each test trial. The sampling procedure is shown in Annex C.

## **7.5 Data recording and observations**

The record sheet for all data and information during the test is given in Annex D. Necessary observations to be taken during the performance test shall also be recorded in this sheet.

## **8 Laboratory Analysis**

Laboratory analyses shall be conducted to determine the moisture content of each raw material used and the output material. The laboratory procedures are given in Annex E. The laboratory test data sheet to be used is given in Annex F.

## **9 Presentation of Results**

Machine specifications and the results of the test shall be presented in tabular form in which data shall be taken from Annexes B and D. Observations made on the machine while in operation shall be supported with photographs.

## **10 Formula**

The formula to be used during calculations and testing are given in Annex G.

## **11 Test Report**

The AMTEC test report shall include the following information in the order given:

**11.1** Name of Testing Agency

**11.2** Test Report Number

**11.3** Title

**11.4** Summary of Results

**11.5** Observations

**11.6** Purpose and Scope of Test

**11.7** Methods of Test

**11.8** Description of the Machine

**11.9** Specifications

**11.10** Results

**11.11** Other Observations (include pictures)

**11.12** Names, Signatures, and Designation of Test Engineers and AMTEC Director

**Annex A**  
(informative)

**Minimum List of Field and Laboratory  
Test Equipment and Materials**

<b>A.1</b>	<b>Field Test Equipment and Material</b>	<b>Quantity</b>
A.1.1	Air velocity meter Range: 0-30 m/s	1
A.1.2	Thermocouple/Thermometer	
A.1.3	Data logger (4-channel) Resolution: 0.5 °C Accuracy: ±1.0 °C	
A.1.4	Thermohygrometer	
A.1.5	Tachometer (contact or non-contact type)	1
A.1.6	Sound level meter Range: 30 to 130 dB (A)	1
A.1.7	Timer Minimum resolution: 0.1 sec	1
A.1.8	Measuring tape (at least 5m)	1
A.1.9	Camera	1
A.1.10	Clamp-on type power meter/Multimeter	1
A.1.11	Weighing scale Capacity: at least 100 kg Resolution: 0.5 kg	1
A.1.12	Caliper	1
A.1.13	Graduated cylinder Capacity: at least 1000 mL	1
A.1.14	Sample bags	20
A.1.15	Labeling tags which include: Date of test Rotary drum composter on test (Brand and Model) Trial number Raw material Source	20
<b>A.2</b>	<b>Laboratory Test Equipment and Materials</b>	<b>Quantity</b>
A.2.1	Digital weighing scale Resolution: 0.01 g	1
A.2.2	Air oven	1
A.2.3	Desiccator	1
A.2.4	Aluminum moisture cans	6

**Annex B**  
(informative)

**Specifications of Rotary Drum Composter**

Name of Applicant : \_\_\_\_\_  
Address : \_\_\_\_\_  
Tel. No. : \_\_\_\_\_

Name of Manufacturer : \_\_\_\_\_  
Address : \_\_\_\_\_  
Tel. No. : \_\_\_\_\_

**GENERAL INFORMATION**

Make : \_\_\_\_\_ Type : \_\_\_\_\_  
Serial No. : \_\_\_\_\_ Brand/Model : \_\_\_\_\_  
Date of Manufacture: \_\_\_\_\_  
Testing Agency : \_\_\_\_\_ Test Engineer: \_\_\_\_\_  
Location of Test : \_\_\_\_\_ Date of Test : \_\_\_\_\_

Item	Manufacture's specification	AMTEC Verification
<b>B.1</b> Main structure		
<b>B.1.1</b> Overall dimensions, mm		
<b>B.1.1.1</b> Length		
<b>B.1.1.2</b> Width		
<b>B.1.1.3</b> Height		
<b>B.1.2</b> Weight without prime mover, kg		
<b>B.2</b> Rated loading capacity, kg/batch		
<b>B.3</b> Loading/Unloading door		
<b>B.3.1</b> Material		
<b>B.3.2</b> Number		
<b>B.3.3</b> Dimensions of opening, L x W, mm		
<b>B.4</b> Composting chamber		
<b>B.4.1</b> Shape		
<b>B.4.2</b> Orientation		
<b>B.4.3</b> Dimensions, L x D x t, mm		
<b>B.4.4</b> Material		
<b>B.4.5</b> Mixing device		
<b>B.4.5.1</b> Mixing blade/paddle		
<b>B.4.5.1.1</b> Shape		

Item	Manufacture's specification	AMTEC Verification
B.4.5.1.2	Dimensions, L x W x H, mm	
B.4.5.1.3	Material	
B.4.5.1.4	Number	
B.4.5.2	Mixing baffle	
B.4.5.2.1	Dimensions, L x W x H, mm	
B.4.5.2.2	Material	
B.4.5.2.3	Number	
B.5	Discharge slide	
B.5.1	Dimensions, L x W, mm	
B.5.2	Material	
B.6	Frame	
B.6.1	Material	
B.6.2	Dimensions, L x W, mm	
B.7	Air vent	
B.7.1	Dimensions, L x W, mm	
B.7.2	Number	
B.7.3	Size of perforation, mm	
B.8	Prime mover	
B.8.1	Engine	
B.8.1.1	Brand	
B.8.1.2	Model	
B.8.1.3	Type (cycle and ignition)	
B.8.1.4	Serial number	
B.8.1.5	Make or manufacturer	
B.8.1.6	Rated power, kW	
B.8.1.7	Rated speed, rpm	
B.8.1.8	Starting system	
B.8.1.9	Cooling system	
B.8.2	Electric motor	
B.8.2.1	Brand	
B.8.2.2	Model	
B.8.2.3	Type	
B.8.2.4	Serial number	
B.8.2.5	Make or manufacturer	
B.8.2.6	Rated power, kW	
B.8.2.7	Rated speed, rpm	
B.8.2.8	Electrical service requirement	
B.8.2.9	Voltage, V	

Item	Manufacture's specification	AMTEC Verification
<b>B.8.2.10</b> Current, A		
<b>B.8.2.11</b> Frequency, Hz		
<b>B.9</b> Blower		
<b>B.9.1</b> Brand		
<b>B.9.2</b> Model		
<b>B.9.3</b> Type		
<b>B.9.4</b> Make or manufacturer		
<b>B.9.5</b> Rated power, kW		
<b>B.9.6</b> Rated speed, rpm		
<b>B.9.7</b> Rated flow rate, m <sup>3</sup> /h		
<b>B.9.8</b> Voltage, V		
<b>B.9.9</b> Current, A		
<b>B.10</b> Heater		
<b>B.10.1</b> Brand		
<b>B.10.2</b> Model		
<b>B.10.3</b> Type		
<b>B.10.4</b> Make or manufacturer		
<b>B.10.5</b> Rated power, kW		
<b>B.10.6</b> Heat output (kJ/h)		
<b>B.10.7</b> Method of temperature control		
<b>B.11</b> Pumpset		
<b>B.11.1</b> Brand		
<b>B.11.2</b> Model		
<b>B.11.3</b> Type		
<b>B.11.4</b> Serial number		
<b>B.11.5</b> Make or manufacturer		
<b>B.11.6</b> Maximum discharge, m <sup>3</sup> /h		
<b>B.11.7</b> Maximum total head, m		
<b>B.11.8</b> Prime mover		
<b>B.12</b> Speed reducer		
<b>B.12.1</b> Brand		
<b>B.12.2</b> Model		
<b>B.12.3</b> Speed ratio		
<b>B.13</b> Power transmission system		



Item	Manufacture's specification	AMTEC Verification
B.13.1 _____ to _____		
B.13.2 _____ to _____		
B.13.3 _____ to _____		
B.13.4 Others (specify)		
B.14 Safety features		
B.15 Special features		

**Annex C**  
(normative)

**Sampling Procedures**

**C.1 Sampling from Input Test Material**

The conditions of each raw material shall be determined using ten (10) representative samples, each weighing 200 g. This is done by randomly taking samples at the top, middle, and bottom portions of the bulk. Half of the sample shall be used for laboratory analysis and the other half shall be used for reference purposes or for eventual second check in case of review.

**C.2 Sampling Procedures for Output Material**

After the test trials, ten (10) samples shall be randomly taken from the output or mixed raw materials to be analyzed in the laboratory for moisture content. The minimum amount of sample to be taken shall be 200 g or twice as much as what is needed for all the laboratory analyses. The excess sample shall be used for reference purposes or for an eventual second check in case of review.

**C.3 Handling of Samples**

All samples to be taken to the laboratory shall be placed in appropriate containers and shall be properly labeled. If the sample is to be used for determining moisture content, it shall be kept in dry and airtight containers. Extra precaution should be taken to prevent alterations of the conditions of the test samples.

**Annex D**  
(informative)

**Performance Test Data Sheet**

Test Trial No. : \_\_\_\_\_ Date : \_\_\_\_\_  
Test Engineers : \_\_\_\_\_ Location : \_\_\_\_\_  
Assistants : \_\_\_\_\_ Machine : \_\_\_\_\_  
Test Applicant : \_\_\_\_\_ Manufacturer: \_\_\_\_\_

Item	Trial 1	Trial 2	Trial 3	Average
<b>D.1</b> Condition of test materials				
<b>D.1.1</b> Raw material				
<b>D.1.2</b> Weight of raw materials, kg				
<b>D.1.2.1</b> Raw material 1				
<b>D.1.2.2</b> Raw material 2				
<b>D.1.2.3</b> Raw material 3				
<b>D.1.4</b> Moisture content, % <sub>wb</sub>				
<b>D.1.4.1</b> Raw material 1				
<b>D.1.4.2</b> Raw material 2				
<b>D.1.4.3</b> Raw material 3				
<b>D.2</b> Performance test				
<b>D.2.1</b> Weight of input, kg				
<b>D.2.2</b> Loading capacity, kg/batch				
<b>D.2.3</b> Output moisture content, % <sub>wb</sub>				
<b>D.2.4</b> Average composting temperature, °C				
<b>D.2.5</b> Ambient air condition				
<b>D.2.5.1</b> Dry bulb temperature, °C				
<b>D.2.5.2</b> Relative humidity, %				
<b>D.2.6</b> Speed of components, rpm				
<b>D.2.6.1</b> Prime mover				
<b>D.2.6.1.1</b> Without load				
<b>D.2.6.1.2</b> With load				
<b>D.2.6.2</b> Composting drum				
<b>D.2.6.2.1</b> Without load				
<b>D.2.6.2.2</b> With load				
<b>D.2.7</b> Fan air velocity (without load), m/s				

<b>Item</b>	<b>Trial 1</b>	<b>Trial 2</b>	<b>Trial 3</b>	<b>Average</b>
<b>D.2.8</b> Noise level, dB(A)				
<b>D.2.8.1</b> Without load				
<b>D.2.8.2</b> With load				
<b>D.2.9</b> Fuel consumed, L				
<b>D.2.10</b> Total fuel consuming time of engine, h				
<b>D.2.11</b> Fuel consumption, L/h				
<b>D.2.12</b> Power consumption				
<b>D.2.12.1</b> Input power, kW				
<b>D.2.12.1.1</b> Without load				
<b>D.2.12.1.2</b> With load				
<b>D.2.12.2</b> Line voltage, V				
<b>D.2.12.2.1</b> Without load				
<b>D.2.12.2.2</b> With load				
<b>D.2.12.3</b> Load current, A				
<b>D.2.12.3.1</b> Without load				
<b>D.2.12.3.2</b> With load				

**D.3 Other Observations**

**D.3.1** Number of operators

---

**D.3.2** Ease of loading

---



---

**D.3.2** Ease of cleaning parts

---



---

**D.3.4** Ease of adjusting and repair of parts

---



---

**D.3.5** Ease of collecting output

---



---

**D.3.6** Ease of transporting the machine

---



---

**D.3.7** Safety features

---

---

**D.3.8** Number of operators

---

---

**D.3.9** Failure or abnormalities that shall be observed on the rotary drum composter or its component parts during and after the composting operation.

---

---

**D.3.10** Other remarks

---

---

**Annex E**  
(normative)

**Laboratory Analysis**

**E.1 Moisture Content Determination by Air Oven Method**

**E.1.1** Manually remove all foreign matter from the sample. Randomly obtain three (3) 100 g of threshed grains previously stored after manual threshing. Ensure that no moisture is lost or gained by the sample between the time it was collected until it is weighed in a moisture can. Weigh and record all the initial weights ( $M_0$ ).

**E.1.2** Dry the samples in the oven with the recommended temperature (e.g., 105 °C) and duration (e.g., 72 hours) or until constant weight is attained.

**E.1.3** After removing the samples from the oven, place the moisture can with samples in a desiccator and allow them to cool in the ambient temperature.

**E.1.4** Weigh the moisture can with the dried sample. Record the final weight ( $M_1$ ). Calculate the moisture content using the formulas in Annex G.

**Annex F**  
 (informative)

**Laboratory Analysis Data Sheet**

Machine Tested: \_\_\_\_\_ Date Tested: \_\_\_\_\_  
 Analyzed by: \_\_\_\_\_ Date Analyzed: \_\_\_\_\_

**F.1 Determination of Moisture Content (% wet basis) by Air Oven Method of Raw Materials**

Raw material	Sample no.	Initial weight, g	Final weight, g	Moisture content, % <sub>wb</sub>
Raw material 1	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	<b>Ave.</b>			
Raw material 2	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	<b>Ave.</b>			
Raw material 3	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	<b>Ave.</b>			

**F.2 Determination of Moisture Content (% wet basis) by Air Oven Method of Output Material**

<b>Sample no.</b>	<b>Initial weight, g</b>	<b>Final weight, g</b>	<b>Moisture content, %<sub>wb</sub></b>
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
<b>Ave.</b>			



**Annex G**  
(normative)

**Formula Used During Calculations and Testing**

**G.1 Loading Capacity**

$$C_l, kg/batch = \frac{W_i}{1 \text{ batch}}$$

where:

$C_l$  is the loading capacity (kg/batch)  
 $W_i$  is the total weight of raw materials per batch (kg)

**G.2 Fuel Consumption**

$$F_{ct} = \frac{F_v}{T_e}$$

where:

$F_{ct}$  is the fuel consumption rate (L/h)  
 $F_v$  is the volume of fuel consumed (L)  
 $T_e$  is the total fuel consuming time of engine (h)

**G.3 Electric Power Requirement**

**G.3.1 For Single-Phase**

$$P_r = \frac{V \times I \times PF}{1000}$$

where:

$P_r$  is the electric power requirement (kW)  
 $V$  is the voltage (V)  
 $I$  is the current (A)  
 $PF$  is the power factor

### G.3.2 For Three-Phase

$$P_r = \frac{V \times I \times \sqrt{3} \times PF}{1000}$$

where:

$P_r$  is the electric power requirement (kW)  
 $V$  is the voltage (V)  
 $I$  is the current (A)

### G.4 Wet-Basis Moisture Content

$$MC_{wb} = \frac{W_i - W_f}{W_i} \times 100$$

where:

$MC$  is the moisture content in % wet basis (%)  
 $W_i$  is the initial weight of the sample (g)  
 $W_f$  is the final weight of the sample (g)

**Bibliography**

Agricultural Machinery Testing and Evaluation Center (AMTEC)-University of the Philippines Los Baños (UPLB). (2022). AMTEC test reports for seed sorter.

Misra, R. V., Roy, R. N., & Hiraoka, H. (2003). On-farm composting methods.  
<https://www.fao.org/3/y5104e/y5104e00.htm#Contents>

**University of the Philippines Los Baños (UPLB)  
Agricultural Machinery Testing and Evaluation Center (AMTEC)**

in partnership with:

**Department of Agriculture (DA)  
Bureau of Agricultural and Fisheries Engineering (BAFE)**

**Project Management Team for the Development of AMTEC Methods of Test  
(AM) on Rotary Drum Composter**

**Management Team**

Ray D. Alipio, ABE  
Ellthon I. Turtor, ABE  
Glory Yster M. Reginio, ABE  
Deo-Jay T. Manglal-lan, ABE  
Paul John S. Dizon, ABE  
AMTEC-UPLB

**Advisers**

Fajardo, Arthur, PhD  
AMTEC-UPLB  
  
Ariodear C. Rico, ABE  
Janice P. Vargas, ABE  
BAFE-DA