PHILIPPINE NATIONAL STANDARD

PNS/BAFS PAES 255:2018
ICS 65.060.99

Agricultural Machinery- Cacao Roaster- Specifications

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Foreword

The Philippine National Standards (PNS) for Agricultural Machinery- Cacao Roaster-Specifications (PNS/BAFS PAES 255:2018) has been prepared by the Technical Working Group (TWG) for Various Agricultural Machinery as per approved Department of Agriculture Special Order No. 1045 series of 2016.

This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2.

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 fabrication and performance requirements for cacao roasters run by electric motors.

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 documents. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

PAES 101:2000, *Agricultural Machinery – Technical Means for Ensuring Safety – General*

PAES 102:2000, *Agricultural Machinery – Operator's Manual – Content and Presentation*

PAES 103:2000, *Agricultural Machinery – Methods of Sampling*

PNS/BAFS/ PAES 192:2016, *Agricultural Machinery – Guidelines on After-Sales Service*

PNS/BAFS PAES 256:2018, *Agricultural Machinery – Cacao Roaster – Methods of Test*

3 Terms and Definitions

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

3.1
batch roaster
a type of roaster that roasts a given quantity of dry cacao at a given time, with definite start and stop time

3.2
cacao beans
cocoa beans
refers to the whole seed which has been fermented and dried

3.3
cacao roaster
machine used to roast dry cacao

3.4
dry cacao
commercial term used to designate cacao beans which are evenly dried and has a moisture content between 6-8%

3.5
heat source
supplies heat to the roasting chamber

3.6
roasted cacao beans
product obtained from roasting dry cacao

3.7
roasting
heat treatment that produces fundamental chemical and physical changes in the structure and composition of cacao beans and brings about darkening of the beans and the development of the characteristic chocolate flavour and aroma of the roasted cacao beans with 2% maximum moisture content

3.8
roasting capacity
total weight of loaded dry cacao over the total roasting time, expressed in kilogram per hour (kg/h)

3.9
roasting efficiency
uniformity of roasted cacao beans in terms of moisture content

4 Classification

The classification of cacao roaster should be based but not limited to the following.

4.1 Drum or cylinder roaster

The drum or cylinder roaster uses a drum to hold the dry cacao to be roasted. As the drum spins, hot gases transfer heat to the drum and then to the dry cacao.

Not drawn to scale

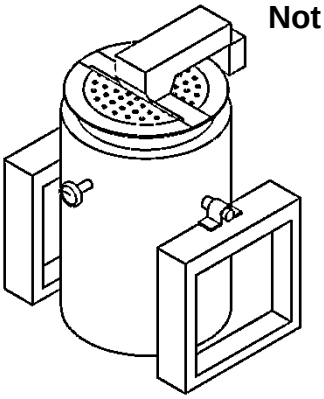

Figure 2 – Drum-type cacao roaster

4.1.1 Perforated drum

It is a type of drum roaster with drum that is fully perforated on the sides. The hot gas enters the rear of the drum and radially flows outward through the bean-covered and bean-free portions of the drum wall.

4.1.2 Solid drum

The hot gas enters the central port at the rear of the roaster and contacts with the dry cacao then flows axially through the length of the roaster and exits to a port at the front of the drum.

4.2 Heat source

4.2.1 Liquefied petroleum gas (LPG)
4.2.2 Electricity
4.2.3 Biomass

5 Fabrication Requirements

5.1 Steel bars, metal sheet or plate and mild steel shall be generally used for the manufacture of the different components of the cacao roaster. Parts that are in direct contact to the cacao beans shall be made of corrosion resistant and food grade materials in compliance to the food safety standards.

5.2 Frame and stand shall be able to support the whole cacao roaster assembly during operation.

5.3 Cacao roaster shall have a mechanism for adjustment of the temperature, timer and thermostat. Drum type roasters shall have mechanism for the adjustment of the rotational speed.

5.4 Cacao roaster shall be provided with cooling trays and dasher.

5.5 There shall be provision for sampling point in the middle of the roasting chamber for checking purposes within the roasting process.

5.6 Bolts and nuts, screws, bearings, bushing and seals to be used shall conform to the food safety requirements, PAES or other international standards.

6 Performance and Other Requirements

6.1 Roasting capacity shall meet the manufacturer's specifications.

6.2 The performance criteria for cacao roaster shall be as specified in Table 1.

Table 1 – Performance Criteria for Cacao Roaster

Criteria	Performance Data
Roasting Efficiency, percent, minimum	95
Roasting Temperature, minimum	120 ˚C

7 Safety, Workmanship, and Finish

7.1 The noise level should conform with the provisions given in Annex A.

7.2 There shall be earmuffs or other ear protective devices provided for the operators to use when 95 db (A) is exceeded during operation.

7.3 Cacao roaster shall be free from any manufacturing defects that may be detrimental to its operation.

7.4 All metal surfaces shall be free from rust**.**

7.5 All moving parts shall be provided with cover or guard.

7.6 The cacao roaster shall be free from sharp edges and surfaces that may injure the operator. Warning notices shall be provided in accordance with PAES 101:2000.

7.7 The cacao roaster shall be compliant with the Good Manufacturing Practices (GMP).

8 Warranty for Fabrication and Services

Warranty shall be provided for parts and services except for normal wear and tear of expendable or consumable maintenance parts for at least one (1) year upon the acceptance of the procuring entity. General requirements of the warranty shall conform to PNS/BAFS/PAES 192:2016.

9 Maintenance and Operation

9.1 Each unit of cacao roaster shall be provided with a set of manufacturer's standard tools required for maintenance.

9.2 Operator's manual based on PAES 102:2000, maintenance schedule and list of warrantable parts of the cacao roaster shall be provided.

9.3 The cacao roaster shall be easy to clean and operate.

10 Sampling

Cacao roaster shall be sampled for testing in accordance with PAES 103:2000 or any other suitable method of selection.

11 Testing

Cacao roaster shall be tested in accordance with PNS/BAFS PAES 256:2016.

12 Marking and Labeling

12.1 Each unit of cacao roaster shall be marked at the most visible place with the following information.

12.1.1 Registered trademark of the manufacturer

12.1.2 Brand

12.1.3 Model

12.1.4 Year of Manufacture

12.1.5 Serial Number

12.1.6 Name, address and contact details of the manufacturer/importer/distributor

12.1.7 Country of manufacture/origin (if imported) / “Made in the Philippines” (if manufactured in the country)

12.1.8 Roasting capacity, kg/h

12.1.9 Recommended roasting temperature, ^{o}C

12.2 Safety/Precautionary markings shall be provided. It shall be stated in English and Filipino and printed in red color with a white background.

12.3 The markings shall be durably bonded to the base surface material. It shall be all weather resistant and under normal cleaning procedures. It shall not fade, discolor, peel, crack or blister and shall remain legible.

Annex A
(informative)

Occupational Safety and Health Standard (Rule 1074.01 – 1074.03)

A.1 Threshold Limit Values for Noise

The threshold limit values refer to sound pressure that represents conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect on their ability to hear and understand normal speech.

Feasible administrative or engineering controls shall be utilized when workers are exposed to sound levels exceeding those specified in Table 8b hereof when measured on a scale of a standard sound level meter at slow response. If such controls fail to reduce sound within the specified levels, ear protective devices capable of bringing the sound level to permissible noise exposure shall be provided by the employer and used by the worker.

A.2 Permissible Noise Exposure

A.2.1 The values specified in Table 2 apply to total time of exposure per working day regardless of whether this is one continuous exposure or a number of short-term exposures but does not apply to impact or impulsive type of noise.

Table 2 – Permissible Noise Exposure

Duration per day, hours	Sound Levels [dB(A)], slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼	115

A.2.2 If the variation in noise level involves maximum intervals of one (1) second or less, it shall be considered as continuous. If the interval is over one (1) second, it becomes impulse or impact noise.

A.2.3 When the daily noise exposure is composed of two or more periods noise exposure of different levels, their combined effect should be considered rather than the effect of each.

If the sum of Equation A exceeds one (1), then the mixed exposure should be considered to exceed the threshold limit value. However, the permissible levels found in the table shall not be exceeded for the corresponding number of hours per day allowed. Noise exposures of less than 90 dBA are not covered by Equation A.

$$X = \frac{C_1}{T_1} + \frac{C_2}{T_2} + \frac{C_3}{T_3} \qquad (Equation\ A)$$

where: X is the sum of the ratios of C and T
C is the total time of exposure at a specified noise level
T is the total time of exposure permitted at the level

A.2.4 Exposures to impulsive or impact noise shall not exceed 140 decibels peak sound pressures level (maximum value).

Bibliography

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OSHC-DOLE (2016). *Occupational Safety and Health Standard, Rule 1074:01-03 – 2013*

PNS 88:2012, *Code of Practice for Philippine Tablea*

PNS/BAFPS 58:2008, *Cacao or Cocoa Beans - Specifications*

PNS/BAFPS 88:2012, *Code of Practice for Philippine Tablea*

PNS/BAFPS 131:2014, *Code of Practice for Prevention and reduction of Ochratoxin A (OTA) contamination in Philippine Tablea*

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