

PHILIPPINE NATIONAL

STANDARD

PNS/BAFS PAES 188:2018
ICS 65.060.01

**Agricultural machinery - Coffee grinder -
Specification**



BUREAU OF PHILIPPINE STANDARDS (BPS)

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- International Organization for Standardization (ISO)
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Foreword

The implementation of Republic Act 10601 also known as the Agricultural and Fisheries Mechanization (AFMech) Law of 2013 mandated the Bureau of Agriculture and Fisheries Standards (BAFS) to develop standard specifications and test procedures for agricultural and fisheries machinery and equipment.

The Bureau, in collaboration with concerned Department of Agriculture (DA) Bureaus and attached agencies, Philippine Regulatory Board of Agricultural and Biosystems Engineering (PRB-ABE) and University of the Philippines Los Baños – Agricultural Machinery Testing and Evaluation Center (UPLB-AMTEC), embarked on a project entitled “Development of Philippine National Standard/ Philippine Agricultural Engineering Standard for Coffee Grinder”.

Coffee is one of the high value crops in the country. In 2013, Philippines has an existing coffee production area of 116, 459 hectares that produces 78, 634 metric tons (Philippine Statistics Authority).

Aside from roasting, another critical operation in coffee processing is grinding as it can reduce the quality and aroma in coffee. The development of standard specifications and test procedures for coffee grinders is therefore essential to preserve the overall quality of coffee and meet the varying requirements of the local and international market thereby safeguarding the country’s coffee industry.

This standard will serve as reference for Agricultural and Biosystems Engineers (ABEs) in the preparation and evaluation of specifications and test reports for coffee grinders pursuant to Republic Act No. 10915 otherwise known as the Philippine Agricultural and Biosystems Engineering Act of 2016.

This standard has been technically prepared in accordance with Bureau of Philippine Standards (BPS) Directives Part 3:2003 – Rules for the Structure and Drafting of International 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.

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Agricultural machinery - Coffee grinder - Specification

1 Scope

This standard specifies the material, fabrication and performance requirements for coffee grinders particularly those run by an electric motor.

2 References

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this National Standard

BAFS/PAES 138:2016, Agricultural Machinery – Guidelines on After-Sales Service

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 – Method of Sampling

PNS/BAFS/PAES 189:2018, Agricultural Machinery – Coffee Grinder – Methods of Test

OSHS Rule 1074:01, Threshold Limit Values for Noise - Occupational Safety and Health Center, Department of Labor and Employment (2013)

3 Definitions

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

3.1**coffee grinder**

machine that grinds the roasted coffee bean (RCB) into a desired fineness

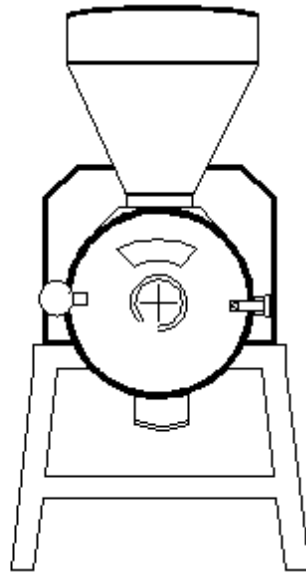


Figure 1- Coffee grinder

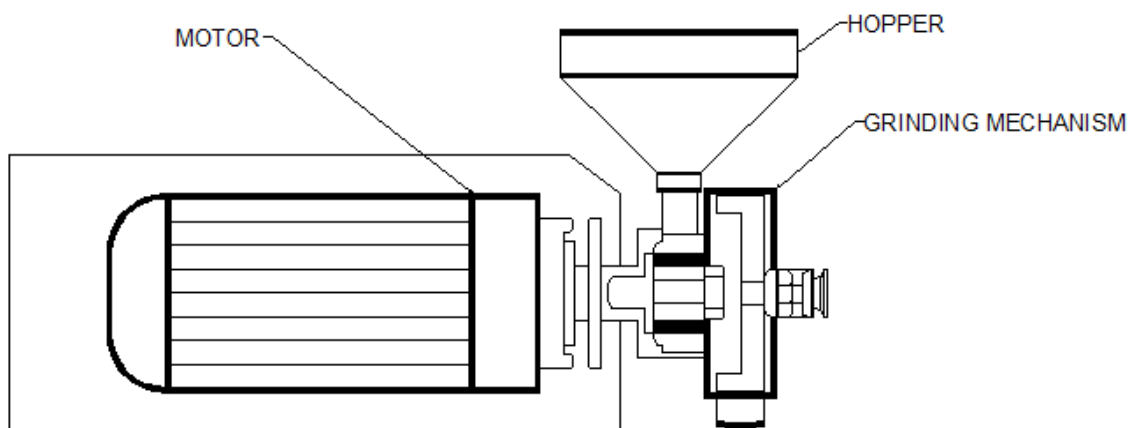


Figure 2- Coffee grinder and its essential components

3.2

green coffee bean (GCB)

commercial term designating the dried seed of the coffee plant, disengaged from their external envelopes

3.3

grinding

mechanical operation intended to produce fragmentation of RCB, resulting in ground coffee

3.4

grinding capacity

quantity of input materials that the coffee grinder can process to ground coffee per unit of total operating time, expressed in kilogram per hour

3.5

grinding recovery

ratio between the total weight of ground coffee collected at the outlet to the total weight of input RCB to the machine, expressed in percent

3.6

ground coffee

final output product when the RCB has undergone grinding process

3.7

ground coffee outlet

part of machine where ground coffee is discharged

3.8

input capacity

weight of RCB fed into the grinder per unit of time, expressed in kilogram per hour

3.9

output capacity

weight of ground coffee bean collected at the outlet per unit time, expressed in kilogram per hour

3.10

roasted coffee bean (RCB)

palatable coffee beans derived by subjecting GCB to dry heat, whether from an open flame, oven, or other heating source, to a desired physico – chemical changes such as brewing, caramelization, flavor development and moisture reduction

4 Classification

The classification of coffee grinder should be according to the following:

4.1 Grinding Mechanism

4.1.1 Flat burr grinder (Figure 3)

This type of grinder uses a pair of flat disks with a series of grooves on the disk face. One disk rotates while the other disk remains stationary. RCB are ground mainly by shearing action.

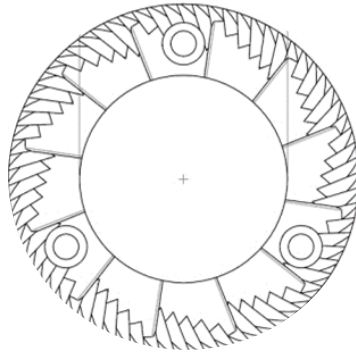


Figure 3. Flat burr grinder

4.1.2 Other Types of Grinding Mechanism

4.1.2.1 Hammer-type grinder (Figure 4)

Hammer-type grinder crushes RCB by impact. It has a number of hammer bars (fixed or swinging) mounted radially on a shaft rotating along the horizontal axis.

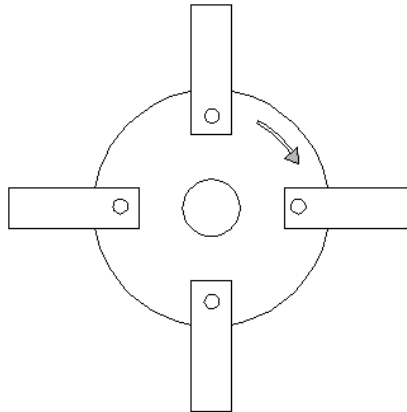


Figure 4. Hammer type grinder

4.1.2.2 Conical burr grinder (Figure 5)

This type of grinder has a conical shaped grinding surface capable of grinding RCB at a slower and quieter rate than flat burr grinder. This are usually found on low speed and gear reduction grinders.

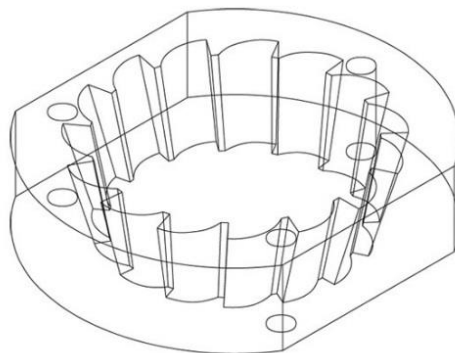


Figure 5 - Conical burr grinder

4.1.2.3 Blade grinder

Blade grinders use a metal blade that whirls to chop up the RCB.

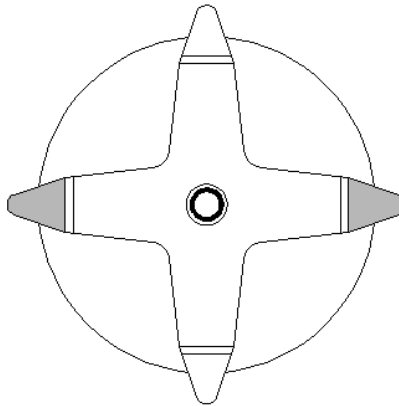


Figure 6 - Blade type grinder

4.2 Grinding unit orientation

4.2.1 Vertical

The shaft axis of grinding unit is vertical.

4.2.2 Horizontal

The shaft axis of grinding unit is horizontal.

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 coffee grinder. Parts that are in direct contact to the RCB such as the grinding mechanism and the grinding chamber shall be made of corrosion resistant and food grade materials (e.g. stainless steel grade 304, 316) in compliance to the food safety standards.

5.2 Coffee grinder shall use electric motor as prime mover.

5.3 Frame and stand shall be able to support the whole coffee grinder assembly during operation.

5.4 Coffee grinder shall have a mechanism for adjustment of the fineness of grinding of the coffee bean.

5.5 There should be provision of magnets to prevent metallic materials from entering the grinding chamber.

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

6 Performance and Other Requirements

The coffee grinder, when tested, shall conform to the following requirements:

6.1 Input and output capacity shall meet the manufacturer’s specifications.

6.2 The performance criteria for coffee grinder shall be specified in Table 1.

Table 1. Performance Criteria for Coffee Grinder

CRITERIA	PERFORMANCE DATA
Grinding Recovery, percent, minimum	96
Average Particle Size*, mm, maximum	1.5
*See PNS/BAFS/PAES 189: Agricultural Machinery – Coffee Grinder – Methods of Test, Annex H	

6.3 The noise level shall comply with the requirements of Occupational Safety and Health Center, Department of Labor and Employment depending on the daily duration of operation. (Table 2)

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
1-1/2	102
1	105
½	110
¼	115

7 Safety, Workmanship and Finish

7.1 Coffee grinder shall be free from any manufacturing defects that may be detrimental to its operation.

7.2 The base of the coffee grinder shall be rigid and durable without any noticeable cracks and weak joints.

7.3 The rotating components of coffee grinder shall be statically and dynamically balanced.

7.4 All metal surfaces shall be free from rust.

7.5 The external and internal part of the coffee grinder shall be free from sharp edges and rough surfaces. Warning notices shall be provided in accordance with PAES 101:2000 – Agricultural Machinery – Technical Means for Ensuring Safety – General.

7.6 Mechanism for immediate disengagement of power shall be provided.

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

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 procuring entity of the coffee grinder. General requirements of the warranty shall conform to PNS/BAFS/PAES 192:2016 – Agricultural Machinery – Guidelines on After-Sales Service.

9 Maintenance and Operation

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

9.2 Operator's manual shall be provided (PAES 102:2000 - Agricultural Machinery – Operator's Manual – Content and Presentation) and the manual should state the parts of the coffee grinder that are covered by warranty.

9.3 The coffee grinder shall be easy to clean and operate.

10 Sampling

Coffee grinder shall be sampled for testing in accordance with PAES 103:2000 – Agricultural Machinery – Methods of Sampling.

11 Testing

Coffee grinder shall be tested in accordance with PNS/BAFS PAES 189:2018.

12 Marking and Labeling

Each unit of coffee grinder shall be marked at the most visible place with the following information:

12.1 Registered trademark of the manufacturer

12.2 Brand

12.3 Model

12.4 Serial Number

12.5 Name and address of the manufacturer/importer/distributor

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

12.7 Input capacity, kg/h

12.8 Recommended grinding speed, rpm

12.9 Power requirement, kW

Bibliography

PNS/BAFS PAES 188:2018

- (1) PNS 01:2012 Green Coffee Beans
- (2) PNS/ FDA 29:2010 Recommended Code of Practice for the Processing and Handling of Processed Pili Nut Products
- (3) ISO 3509:2005 Coffee and Coffee Products- Vocabulary



Your partner in product safety

BUREAU OF PHILIPPINE STANDARDS (BPS)

3F Trade and Industry Building
361 Sen. Gil J. Puyat Avenue, Makati City 1200, Metro Manila, Philippines
T/ (632) 751.3127 / 751.4730 / 751.4735
F/ (632) 751.4706
E-mail address: bps@dti.gov.ph
Website: www.dti.gov.ph

**Department of Agriculture
Bureau of Agriculture Fisheries and Standards**

**Technical Working Group on the Development of the
Philippine National Standard for Coffee Grinder**

Chairpersons

- | | | | |
|---|--|---|---|
| 1 | Cristy Cecilia P. Polido | 3 | Karen S. Bautista |
| 2 | Rex L. Bingabing
Bureau of Agriculture and Fisheries
Engineering (BAFE)
DA Central Agriculture and Fishery
Engineering Division (DA-CAFED) | 4 | Karen Kristine A. Roscom
Bureau of Agriculture and Fisheries
Standards (BAFS) |

Co-chairperson

- 5 Aurelio A. Delos Reyes, Jr.
Agricultural Machinery Testing and
Evaluation Center (AMTEC)

Members

- | | | | |
|----|---|----|--|
| 6 | Romulo E. Eusebio | 15 | Marife L. Pesino
Philippine Society of Agricultural
Engineers (PSAE)
Central Bicol State University of
Agriculture (CBSUA) |
| 7 | Darwin C. Aranguren
Agricultural Machinery Testing and
Evaluation Center (AMTEC) | 16 | Reynaldo P. Gregorio |
| 8 | Fernando O. Paras, Jr. | 17 | Raymund Joseph P. Macaranas
Philippine Center for Postharvest
Development and Mechanization
(PHilMech) |
| 9 | Kevin F. Yaptenco
Institute of Agricultural Engineering
(IAE)
University of the Philippines, Los Baños
(UPLB) | 18 | Pedro S. Dumaraos |
| 10 | John F. Malamug | 19 | Francia M. Macalintal
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| 11 | Von Y. Amado
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Suki Trading Corporation
Agricultural Machinery Manufacturers
and Distributors Association (AMMDA) |
| 12 | Janice P. Vargas
DA Central Agriculture and Fishery
Engineering Division (DA-CAFED) | | |
| 13 | Francisco C. Dime | | |
| 14 | Remartin S. Maglantay
Metals Industry Research Development
Center (MIRDC) | | |

Project Manager

Lara V. Navarro
Jessa Rica C. Pandiño
Abbygail M. Jaylo

Bureau of Agriculture and Fisheries Standards