PHILIPPINE NATIONAL STANDARD

PNS/BAFS PAES 245:2018
ICS 65.060.99

Agricultural Machinery – Cassava Granulator – Specifications

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Foreword

The Philippine National Standard (PNS) for Agricultural Machinery – Cassava Granulator – Specifications (PNS/BAFS PAES 245:2018) has been prepared by the Technical Working Group (TWG) for various Agricultural Machinery as per approved Department of Agriculture Special Order (SO) 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 cassava granulator. This covers the production of cassava granules for feeds.

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.

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 246:2018, *Agricultural Machinery – Cassava Granulator – Methods of Test*

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

3 Terms and Definitions

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

3.1
cassava chips
chopped cassava tubers

3.2
cassava granulator
machine that reduces the size of the cassava tubers into cassava granules or granulated cassava

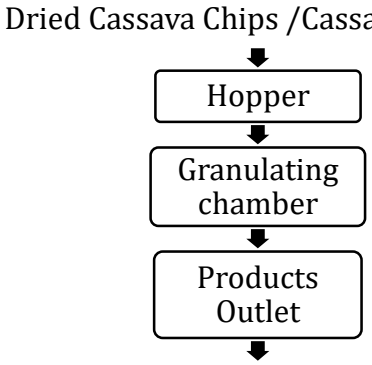

Figure 1 – Schematic diagram of Cassava Granulator

3.3
cassava granules
dried cassava with 8 to 10 mm dimension

3.4
cassava tubers
cassava roots
underground part of plant which has brown fibrous skin and starchy flesh

3.5
granulated cassava
output fresh cassava with 10 to 12 mm dimension obtained by granulating fresh cassava tubers

3.6
granulating mechanism
a rotating assembly where cassava tubers are being size reduced

3.7
granulating recovery
ratio between the total weight of cassava granules or granulated cassava collected at the product outlet to the total weight of dried cassava chips or cassava tubers loaded in the hopper of the machine, expressed in percent

3.8
hopper
part of the machine where dried cassava chips or cassava tubers are loaded

3.9
input capacity
weight of dried cassava chips or cassava tubers fed into the granulator per unit time, expressed in kilogram per hour

3.10
product outlet
part of machine where cassava granules or granulated cassava are being discharged

4 Classification

The classification of cassava granulator should be based on the type of granulating mechanism but is not limited to:

4.1 Peg-type

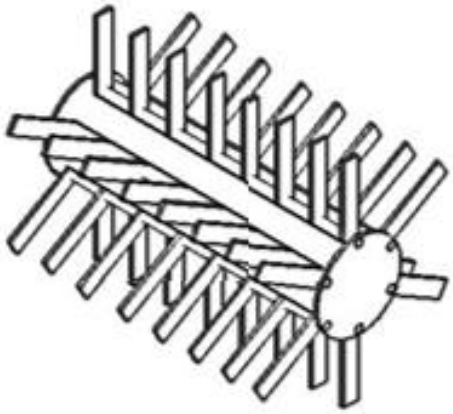

Figure 2 – Peg-type

4.2 Paddle-type

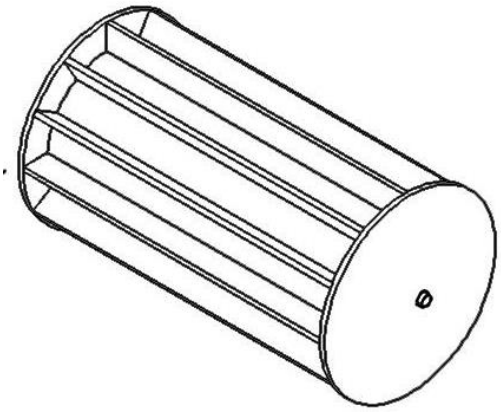

Figure 3 – Paddle-type

4.3 Bladed drum-type

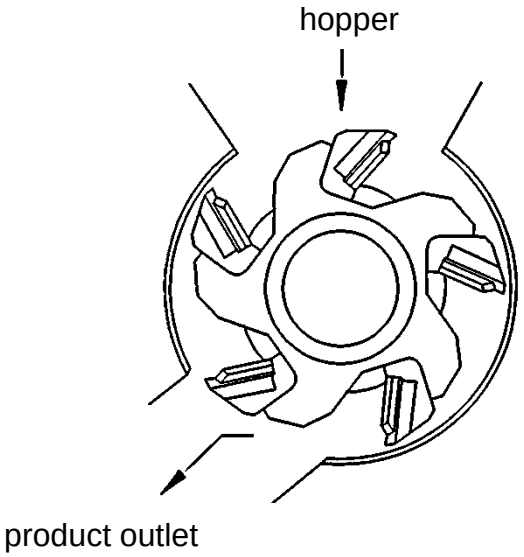

Figure 4 – Bladed drum-type

5 Fabrication Requirements

5.1 Steel bars, metal sheet or plate and/or heavy duty mild steel shall be generally used for the manufacture of the different components of the cassava granulator. However, parts that are in direct contact to the cassava shall be made of corrosion resistant.

5.2 Frame and stand shall be able to support the whole cassava granulator assembly during operation.

5.3 There shall be safety mechanism preventing users from using their hands to push the fresh crop into the hopper.

5.4 Provisions for the safety of the operators in the feeding port and other moving parts shall be included in the granulator.

5.5 Provisions for belt tightening and adjustments shall be provided.

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 Requirements

6.1 Granulating capacity shall meet the manufacturer’s specification.

6.2 The performance criteria for cassava granulator shall be specified in Table 1.

Table 1 – Performance Requirements

Criteria	Performance Data
Granulating recovery, percent, minimum	99
Size Coefficient of Variation	7

7 Safety, Workmanship, and Finish

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

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

7.3 The cassava granulator shall be free from any manufacturing defects that may be detrimental to its operation.

7.4 The rotating components of cassava granulator shall be statically and dynamically balanced. There shall be covers or guards for the rotating parts to protect the operator.

7.5 Granulating mechanism shall be replaceable when needed. There shall be provisions for the adjustment of the clearance.

7.6 All metals shall be free from rust and shall be painted/coated properly.

7.7 Mechanism for emergency stop shall be provided.

7.8 The external part of the cassava granulator shall be free from sharp edges and rough surfaces that may injure the operator. Warning notices shall be provided in accordance with PAES 101:2000.

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 of the machinery. General requirements of the warranty shall conform to PNS/BAFS/PAES 192:2016.

9 Maintenance and Operation

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

9.2 Operator's manual shall be provided based on the PAES 102:2000. The list of warrantable parts of the cassava granulator shall be provided.

9.3 The cassava granulator shall be easy to clean and operate.

10 Sampling

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

11 Testing

The cassava granulator shall be tested in accordance with PNS/BAFS PAES 246:2018.

12 Marking and Labeling

12.1 Each unit of cassava granulator 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 (if imported) / “Made in the Philippines” (if manufactured in the Philippines)

12.1.8 Input capacity, kg/h

12.1.9 Power requirement, kW

12.1.10 Recommended granulating speed, rpm

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. The markings 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 2 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 dB(A) 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 dB (A) peak sound pressures level (maximum value).

Bibliography

PNS/BAFS 29:2017 Part II, *Dried Cassava Chips and Granules for Feeds and Industrial Use*

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

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