Foreword

The pursuance of this standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) and with support from the Department of Agriculture.

This standard has been technically prepared in accordance with PNS 01-4:1998 (ISO/IEC Directives Part 3:1997) – Rules for the Structure and Drafting of International Standards.

The word "shall" is used to indicate requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted.

The word "should" is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that certain course of action is preferred but not necessarily required.

In the preparation of this standard, the following documents/publications were considered:

Japan International Cooperation Agency. Text Book of Agricultural Machinery.1976.

Kepner, R.A., R. Bainer and E.L. Barger.1978. Principles of Farm Machinery. 3rd Edition. AVI Publishing Company, Inc. Westport, Connecticut.

Regional Network for Agricultural Machinery (RNAM) Test Codes And Procedures for Farm Machinery. Technical Series No. 12 :1983.

Regional Network for Agricultural Machinery (RNAM). 1991. Agricultural Machinery Design and Data Handbook (Seeders and Planters).

Resurreccion, A.N. 1979. Design of a Metering Device of Rootzone Granular Fertilizer Applicators. Philippine Agricultural Engineering Journal. X(4).

Stevens G.N. 1982. *Equipment Testing and Evaluation*. Overall Division, National Institute of Agricultural Engineering (NIAE), Wrest Park, Silsoe Bedford England.

Agricultural Machinery – Granular Fertilizer Applicator – Specifications

1 Scope

This standard specifies the requirements for construction and performance of a granular fertilizer (2.5 to 3.0 mm in diameter) applicator used for agricultural purposes.

2 References

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

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

PAES 103:2000, Agricultural Machinery – Methods of Sampling

PAES 107:2000, Agricultural Machinery – Hitch for Walking-Type Agricultural Tractor – Specifications

PAES 118:2001, Agricultural Machinery – Four-Wheel Tractor – Specifications

PAES 146:2005, Agricultural Machinery – Granular Fertilizer Applicator - Methods of Test

3 Definitions

For the purpose of this standard the following definitions shall apply:

3.1
application rate
amount of fertilizer applied in the field per unit area

3.2
delivery tube
part of the applicator which directs the distribution of fertilizer in the field

3.3
furrow closer
device which covers the distributed fertilizer in the furrow

3.4
furrow opener
device which makes the trench for the placement of fertilizer

3.5
granular fertilizer applicator
device for applying granular fertilizer

3.6
ground wheel
part of the fertilizer applicator which drives the metering device

3.7
metering device
mechanism used to regulate the amount of fertilizer to be discharged

4 Classification

4.1 Based on fertilizer distribution

4.1.1 Row fertilizer applicator

Type of fertilizer applicator which applies fertilizer in rows (Figure 1).

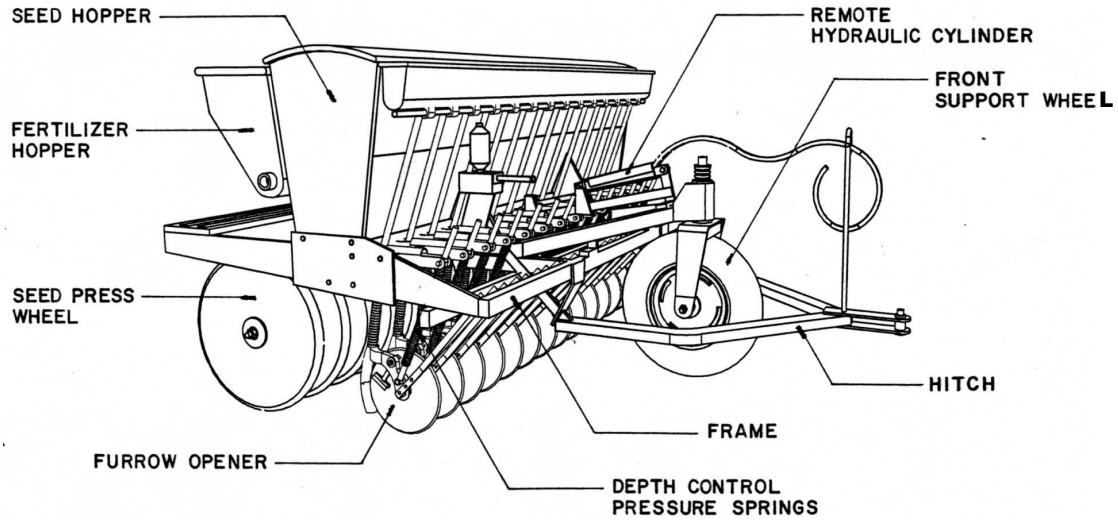


Figure 1 – Row seeder-fertilizer applicator

4.1.2 Broadcaster

The type of fertilizer applicator used to spread fertilizer uniformly in the field without rows (Figure 2).

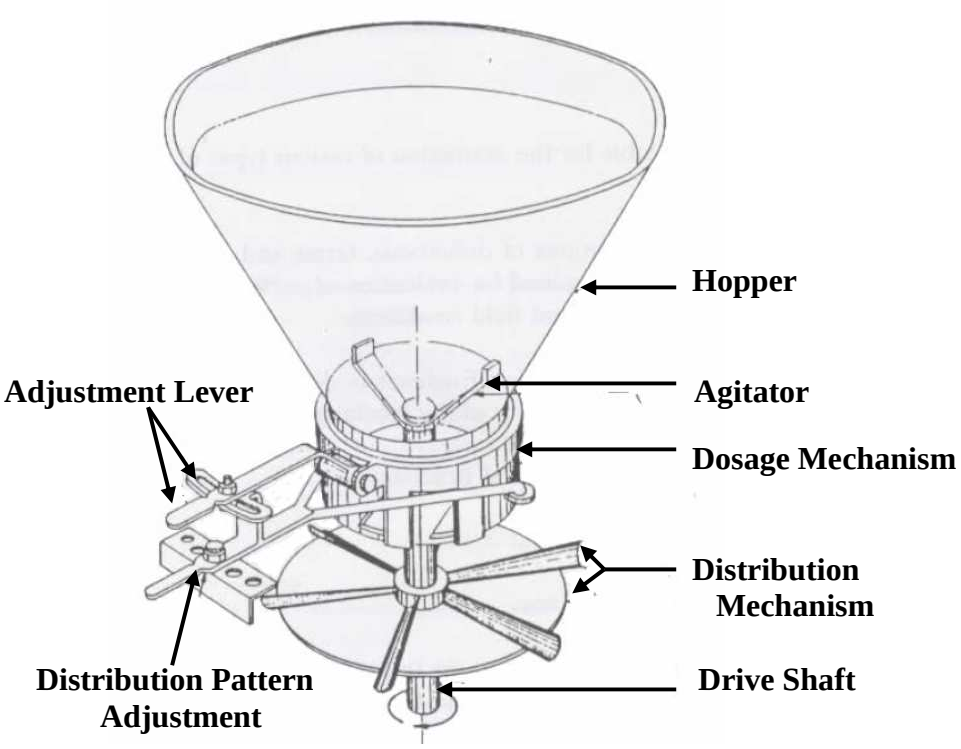


Figure 2. Broadcaster

4.2 Based on power source

4.2.1 Animal - drawn

4.2.2 Manually-operated

4.2.3 Engine driven

4.2.4 Tractor-drawn

4.2.4.1 Two-wheel tractor-drawn

4.2.4.2 Four-wheel tractor-drawn

4.3 Based on metering device

4.3.1 Star-wheel

Consist of a star-shaped agitating device located at the bottom of the hopper with an adjustable gate to regulate the discharge (Figure 3a and 3b)

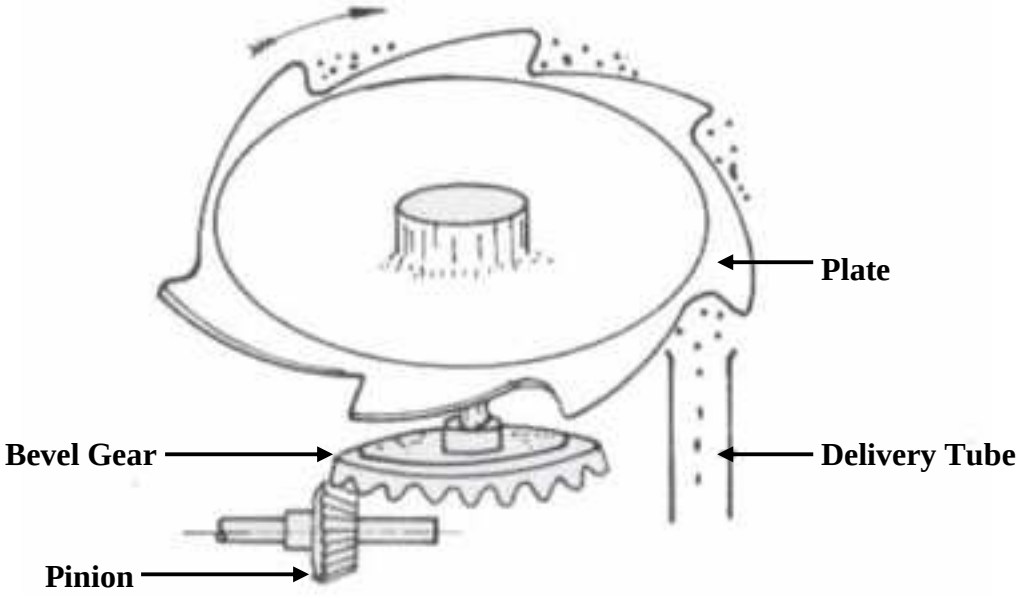


Figure 3a – Star-wheel type

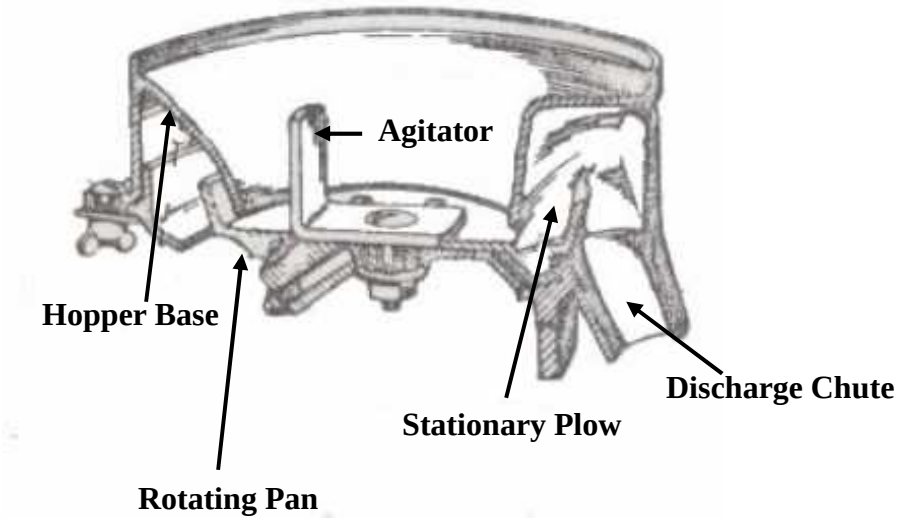


Figure 3b – Revolving bottom type

4.3.2 Auger type

Consists of a variable speed auger at bottom of hopper and agitator to discharge fertilizer (Figure 4)

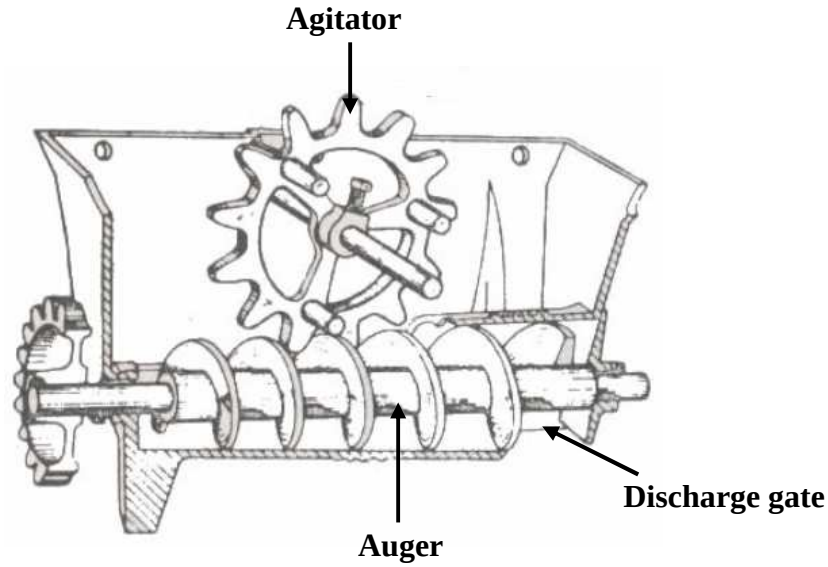


Figure 4 – Auger type

4.3.3 Belt type

Consists of moving belt located at the bottom of the hopper with an adjustable gate to discharge fertilizer (figure 5)

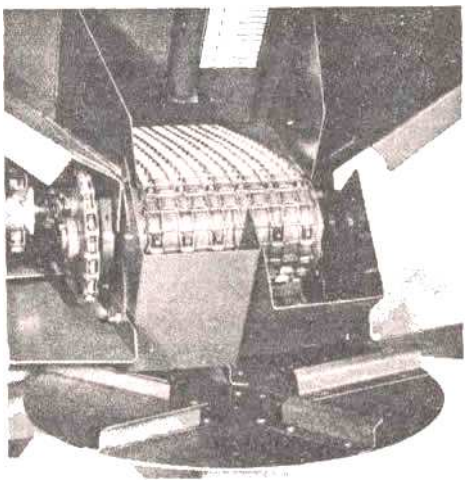


Figure 5 – Belt type

4.3.4 Plate and flicker type

Consists of a slowly rotating plate, which carry a layer of fertilizer under an adjustable gate from the inside to the outside of the hopper, where it is flicked from the plate by a series of fingers (Figure 6)

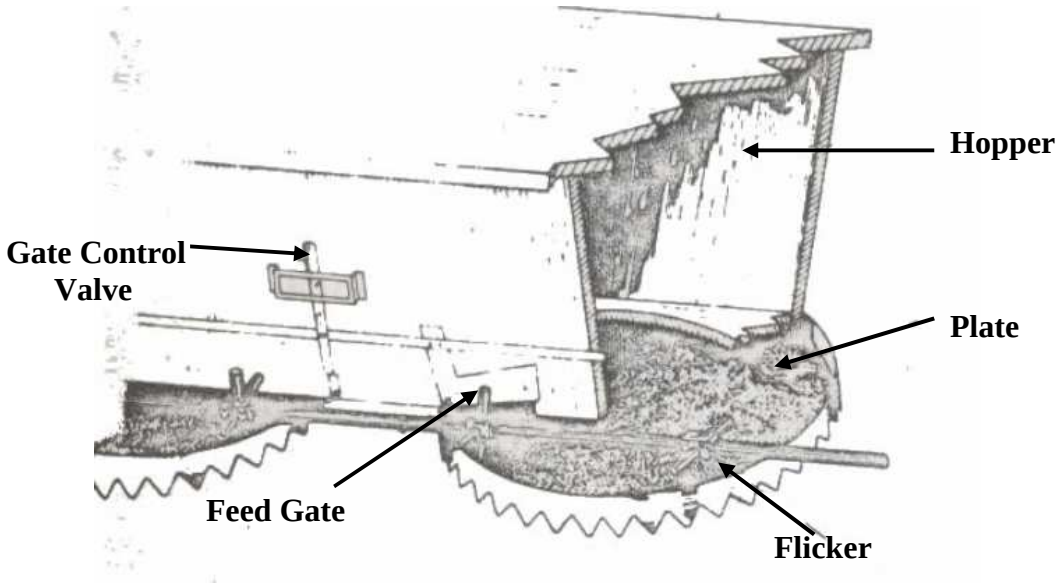
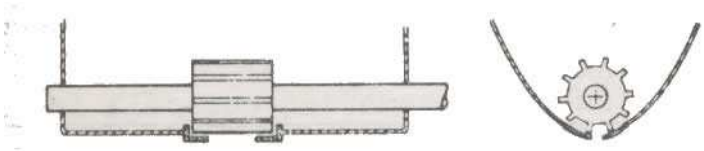


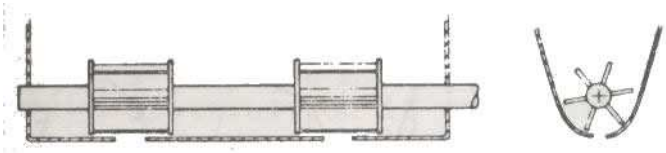
Figure 6 – Plate and flicker type

4.3.5 Rotor type

Consists of a ground-wheel-driven vane or fluted rotor above an adjustable discharge opening (Figure 7)



a. Fluted roller



b. Vane-type rotor

Figure 7 – Rotor Type

5 Materials of Construction

5.1 The main structure of granular fertilizer applicator shall be generally made of steel

5.2 The hopper and metering device should be made of corrosion-resistant materials (i.e. wood, stainless steel, plastics, etc.).

6 Construction Requirements

6.1 The row fertilizer applicator shall consist of hopper, metering device, delivery tube, furrow opener and furrow closer.

6.2 The hopper shall be designed to contain fertilizer with minimum frequency of refilling during operation.

6.3 The hopper shall be easy to empty and to disassemble for thorough cleaning.

6.4 For manually-operated fertilizer applicator, height adjustment for handle bar shall be provided.

6.5 The hitch of tractor-drawn fertilizer applicator shall conform to the hitch of the tractors specified in PAES 107 for two-wheel tractor and PAES 118 for four-wheel tractor.

7 Performance Requirements

7.1 The field capacity and application rate specified by the manufacturer shall be attained.

7.2 The granular fertilizer applicator shall produce good quality work such as accuracy, uniformity of fertilizer placement and ease of operation and maintenance.

8 Workmanship and Finish

8.1 The granular fertilizer applicator shall be free from manufacturing defects that may be detrimental to its operation.

8.2 Any uncoated metallic surface shall be free from rust and shall be painted properly.

8.3 The granular fertilizer applicator shall be free from unnecessary sharp edges and surfaces that may injure the operator.

9 Warranty for Construction

9.1 The construction shall be rigid and without major breakdown of its major components within (six months) from the date of purchase.

9.2 Warranty shall be provided for parts and services within six months after the purchase of the granular applicator except for fast moving and easy to wear parts.

10 Maintenance and Operation

10.1 A set of tools required for adjustment during field operations shall be provided.

10.2 An instruction manual, which conforms to PAES 102, shall be provided.

11 Sampling

The granulated fertilizer applicator shall be sampled in accordance with PAES 103.

12 Test Method

The sampled granular fertilizer applicator shall be tested for performance in accordance with PAES 146.

13 Marking and Labeling

Each granular fertilizer applicator shall be marked in English with the following information using a plate, stencil or by directly punching it at the most conspicuous place:

13.1 Registered Trademark of the Manufacturers

13.2 Brand

13.3 Model

13.4 Serial number

13.5 Name and address of the manufacturer

13.6 Name and address of the importer, it imported (optional)

13.7 Country of manufacture (if imported)/ “Made in the Philippines” (if manufactured in the Philippines)

13.8 Safety/ precautionary markings