

PHILIPPINE NATIONAL STANDARD

PNS/PAES 159:2011
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ICS 65.060.01

**Agricultural machinery – Sugarcane
Planter – Methods of Test**



BUREAU OF PRODUCT STANDARDS

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National Foreword

This Philippine Agricultural Engineering Standards PAES 159:2011, Agricultural machinery – Sugarcane Planter – Specifications was approved for adoption as Philippine National Standard by the Bureau of Product Standards upon the recommendation of the Agricultural Machinery Testing and Evaluation Center (AMTEC) and the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development of the Department of Science and Technology (PCARRD-DOST).

Foreword

The formulation of this national standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) under the project entitled “Development of Standards for Agricultural Production and Postharvest Machinery” funded by the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development - Department of Science and Technology (PCARRD-DOST).

This standard has been technically prepared in accordance with 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.

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

Dafa’alla, A.M. and M.A.Hummeida. 1991. Performance evaluation of a sugarcane planter. J. King Saud. Univ. Vol.3. Agric. Sci. (1). 5-14.

Patil, A., A.K. Dave and R.N.S. Yadav. 2004. Evaluation of sugarcane cutter planter. Sugar Tech. Vol.6 (3):121-125.

United States Patent US5357882. Sugar Cane Planter.

United States Patent US4084465. Sugar Cane Planter.

United States Patent US5469797. Sugar Cane Planter.

United States Patent US4450778. Sugar Cane Billet Planter.

United States Patent US6712013 B2. Methods of Planting Sugarcane Seed to Achieve a High Plant Density.

World Intellectual Property Organization.1985. WO 85/05082

<http://www.popularpsw.com/product/PopularAutomaticSugarcanePlanter>

<http://www.iisr.nic.in>

Agricultural Machinery – Sugarcane Planter – Specifications

1 Scope

This standard specifies the manufacturing and performance requirements for a sugarcane planter.

2 References

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

AWS D1.1:2000	Structural Welding Code - Steel
PAES 102: 2000	Agricultural Machinery – Operator’s Manual – Content and Presentation
PAES 106: 2000	Agricultural Machinery – Soil Tillage and Equipment – Terminology
PAES 118: 2001	Agricultural Machinery – Four-Wheel Tractor – Specifications
PAES 311:2001	Engineering Materials – Bolts and Nuts for Agricultural Machines – Specifications and Applications
PAES 160: 2011	Agricultural Machinery – Sugarcane Planter – Methods of Test

3 Definitions

For the purpose of this standard, the definitions given in PAES 106:2000 and the following definitions shall apply:

3.1**drawbar**

bar at the rear of a tractor to which implements are attached

3.2**feeder**

person who aids in dropping sugarcane billets into the furrow

3.3**feeding shank**

component of the sugarcane planter that cuts the sugarcane billets and drops it into the furrow

3.4**gauge wheel**

auxiliary component of the sugarcane planter that helps maintain uniform depth of furrows

3.5**main frame**

part of the sugarcane planter that holds the transverse toolbars and gauge wheels together

3.6**shank**

structural member primarily used for attaching a tillage tool to a beam or a standard

3.7**sugarcane billet**

sugarcane stalks containing buds used as planting material (Fig.1)

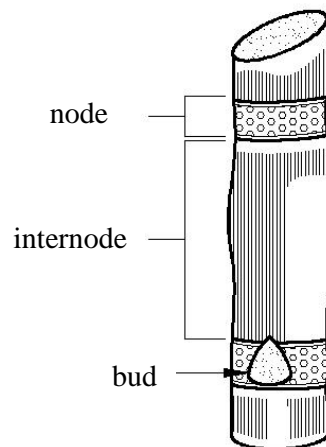


Figure 1. Sugarcane billet

3.8**sugarcane planter**

agricultural equipment used for planting sugarcane billets (Fig.2)

4 Classification**4.1 Semi-automatic sugarcane planter**

Type of sugarcane planter that is capable of chopping sugarcanes into billets which are dropped into the furrows (Fig.2).

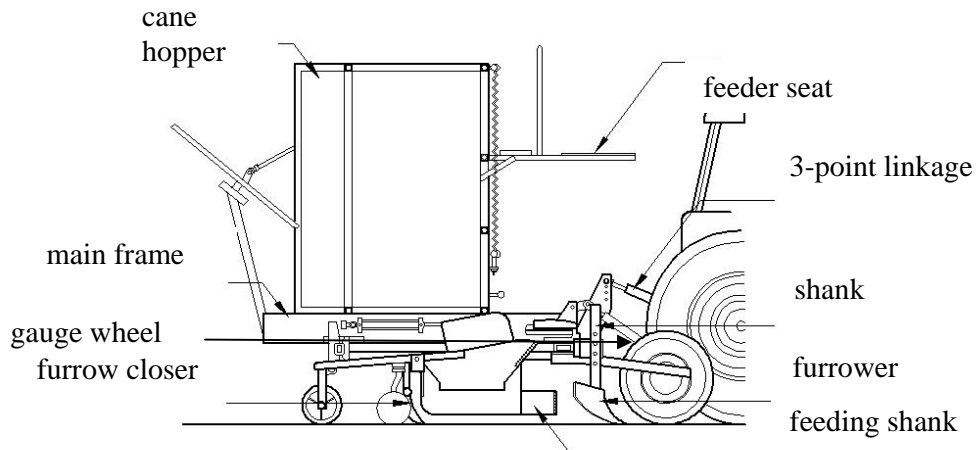


Figure 2. Semi-automatic sugarcane planter

4.2 Manual sugarcane planter

Type of sugarcane planter that is not capable of chopping sugarcane but instead, requires pre-cut billets for planting (Fig.3).

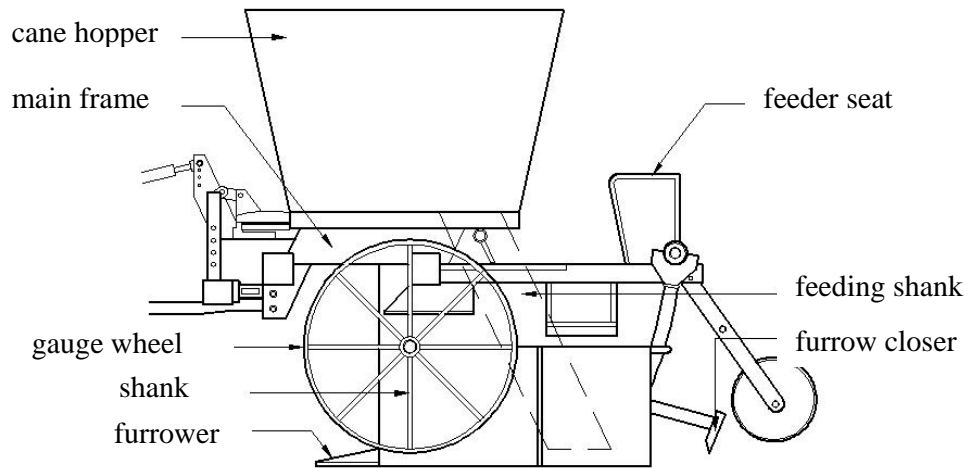


Figure 3. Manual sugarcane planter

5 Principle of Operation

The sugarcane planter shall be mounted on the tractor. After being transported to the field, the implement shall be lowered on the soil. The desired operating depth shall be set by adjusting the gauge wheels or through the action of hydraulic cylinders. The sugarcane planter shall be pulled by the tractor for the furrower to cut through the soil.

5.1 For semi-automatic sugarcane planter, the sugarcane shall be cut in the chopper and shall be dropped evenly into the furrows through the feeding shanks. The

furrow closer of the sugarcane planter shall cover the sugarcane billets with soil after passing.

- 5.2** For manual sugarcane planter, the sugarcane shall be pre-cut into billets and shall be loaded into the hopper. The feeder shall drop the billets into the feeding shank of the sugarcane planter.

6 Manufacturing Requirements

Generally, the sugarcane planter shall consist of chassis assembly, gauge wheels, feeding shanks, chopper, chain and sprocket assembly, plow assembly, cane hopper and tractor engagement assembly. All specifications indicated below are minimum requirements.

- 6.1** The chassis assembly shall be made of mild steel or better material. It shall be constructed from 76 mm x 102 mm (3"x 4") square tube or channel bar or from a 76 mm angular bar with at least 6 mm thickness. It shall have a provision for attachment to the tractor as specified in PAES 118:2001.
- 6.2** The feeding shanks shall be made of mild steel or better material with a thickness of at least 6 mm.
- 6.3** The plow assembly shall consist of shanks, furrower and furrow closer.
- 6.3.1** Shanks shall be made of alloy steel (e.g. AISI 5160) or better material with at least 5 mm (3/16") thickness. The shanks shall be attached to the frame by bolt or shall be fully welded.
- 6.3.2** The furrower shall be made of heat- treated carbon steel (e.g. AISI 1080) or alloy steel or better material. It shall be bolted to the end of the shanks to allow replacement. It shall have a thickness of at least 5 mm (3/16").
- 6.3.3** The furrow closer shall be made of alloy steel (e.g. AISI 5160) or better material.
- 6.4** Gauge wheels should have an adjustable axle to allow modification of operating depth.
- 6.5** The cane hopper shall be made of mild steel (e.g. AISI 1020) or better material with a thickness of at least 6 mm. It shall have a cone-shaped construction.
- 6.6** Feeding shanks shall be made of mild steel (e.g. AISI 1020) or better material.
- 6.7** The tractor engagement assembly shall be attached to the chassis assembly. It shall be made of mild steel (e.g. AISI 1020) or better material with a thickness of at least 6 mm.
- 6.8** All welded parts shall be in accordance with the criteria set in AWS D1.1:2000.

- 6.8.1** There shall be no crack on welded area.
- 6.8.2** There shall be fusion between adjacent layers of weld metal and base metal.
- 6.8.3** Welded joints shall not be less than 4 mm size fillet weld.
- 6.8.4** Undercut shall not exceed 2 mm for any length of weld.
- 6.9** For semi-automatic sugarcane planter, the chopper shall be made of hardened steel (e.g. AISI 1085) or better material. Chopping mechanism shall be actuated by the gauge wheel.
- 6.10** The opening of the neck of the hopper shall conform with the size of the feeding shanks' arms.
- 6.11** There shall be provision for varying the distance between rows from 0.75 m to 1.5 m.

7 Performance Requirements

- 7.1** The sugarcane planter shall plant the billets at a depth ranging from 20 cm to 27 cm.
- 7.2** The sugarcane planter shall cover the planted billets with soil after passing.
- 7.3** There shall be at least 80% field efficiency.
- 7.4** The shank assembly and the gauge wheel assembly shall be intact after the test.
- 7.5** For semi-automatic sugarcane planter, there shall be a uniform distance between the billets planted.
- 7.6** The chopper of the semi-automatic sugarcane planter shall produce billets with three to four stalk eyes.

8 Safety, Workmanship and Finish

- 8.1** The sugarcane planter shall be painted and shall have a rust-free finish.
- 8.2** The sugarcane planter shall be free from manufacturing defects
- 8.3** All bolts shall conform with PAES 311:2001 for strength application and shall be made of hot-galvanized steel for corrosion resistance.

9 Warranty of Construction

- 9.1** The sugarcane planter's construction shall be rigid and durable without breakdown of its major components within six (6) months from the date of original purchase.
- 9.2** Warranty shall be provided for parts and services within six (6) months after installation and acceptance by the consumer.

10 Maintenance and Operation

- 10.1** An operator's manual which conforms with PAES 102:2000 shall be provided.
- 10.2** Grease points shall be provided.

11 Testing

Testing of the sugarcane planter shall be conducted on-site. The sugarcane planter shall be tested for performance in accordance with PAES 160:2011.

12 Marking and Labeling

- 12.1** The sugarcane planter shall be marked in English with the following information:
 - 12.1.1** Brand name or Registered trademark of the manufacturer (optional)
 - 12.1.2** Model and/or Serial number
 - 12.1.3** Country of manufacture (if imported)/"Made in the Philippines" (if manufactured in the Philippines)
- 12.2** Safety/precautionary markings shall be provided. Markings shall be stated in English and shall be printed in red color with a white background.
- 12.3** The markings shall have a durable bond with the base surface material and shall be water and heat resistant under normal cleaning procedures, it shall not fade, discolor, crack or blister and shall remain legible.
- 12.4** Reflectors shall be attached at the rear of the sugarcane planter for safety during transport.

Philippine Agricultural Engineering Standards

AMTEC-UPLB – PCARRD Project: “Development of Standards for Agricultural Production and Postharvest Machinery”

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