

PHILIPPINE NATIONAL STANDARD

PNS/PAES 212:2015
(PAES published 2015)
ICS 65.060.50

Agricultural machinery – Rice reaper – Specifications



BUREAU OF PRODUCT STANDARDS*

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National Foreword

The Philippine Agricultural Engineering Standards PAES 212:2015, Agricultural machinery – Rice reaper – Specifications was approved for adoption as Philippine National Standard by the Bureau of Philippine Standards upon the recommendation of the Agricultural Machinery Testing and Evaluation Center (AMTEC) and the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology (PCAARRD-DOST).

This standard cancels and replaces PNS/PAES 212:2005 (PAES published 2004).

Foreword

The revision of this national standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) under the project entitled “Development of Standards for Rice Production and Postproduction Machinery” which was funded by the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) of the Department of Science and Technology (DOST).

This standard has been technically prepared in accordance with PAES 010-2 – 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 preparation of this standard, the following documents/publications were considered:

Regional Network for Agricultural Machinery (RNAM) Test Codes and Procedures for Harvesting Machine, Technical Series No. 12:1983.

1 Scope

This standard specifies the requirements for the manufacture and performance of rice reaper.

2 References

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

PNS/PAES 102:2000 Agricultural Machinery – Operator’s Manual – Content and Presentation

PNS/PAES 213:2015 Agricultural Machinery – Rice Reaper – Methods of Test

PNS/PAES 311:2001 Engineering Materials – Bolts and Nuts for Agricultural Machines – Specifications and Applications

PNS/PAES 313:2001 Engineering Materials – Screws for Agricultural Machines – Specifications and Applications

3 Definitions

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

3.1

actual field capacity

actual rate of reaping the rice crop in a given area per unit of time

NOTE The time pertains to the actual time which includes the time spent for turning at the headland, adjustment of machine and minor repairs.

3.2

conveying loss

grains that fall with the cut stalks during delivery and release at the side of the reaper during operation

3.3

field efficiency

ratio of the actual field capacity and theoretical field capacity, expressed in percent

3.4

header loss

shattering loss

grains that have fallen to the ground due to the machine's cutting operation

3.5

journal bearing

bearing that is used to reduce the friction in supported radial loads

3.6

reciprocating cutter knife

cutting mechanism consisting of fixed lower knife and reciprocating upper knife wherein its movement is controlled by the crank connected to the gear box or belt drive

3.7

rice reaper

machine that cuts and lays stalks of rice crop uniformly on one side

3.8

rotary knife

cutting mechanism consisting of planetary type circular saw-toothed blade which rotates at the same time with the pick-up triangular frame

3.9

shear pin

pin designed to shear in case of mechanical overload during operation to prevent damage to major parts

3.10

theoretical field capacity

computed rate of reaping paddy in a given area per unit of time

4 Classification

The classification of reaper (Figures 1 and 2) shall be based on the inspection of the machine according to the following:

4.1 Cutting mechanism

4.1.1 Rotary knife

4.1.2 Reciprocating cutting knife

4.2 Transmission system

4.2.1 Belt drive

4.2.2 Gear drive

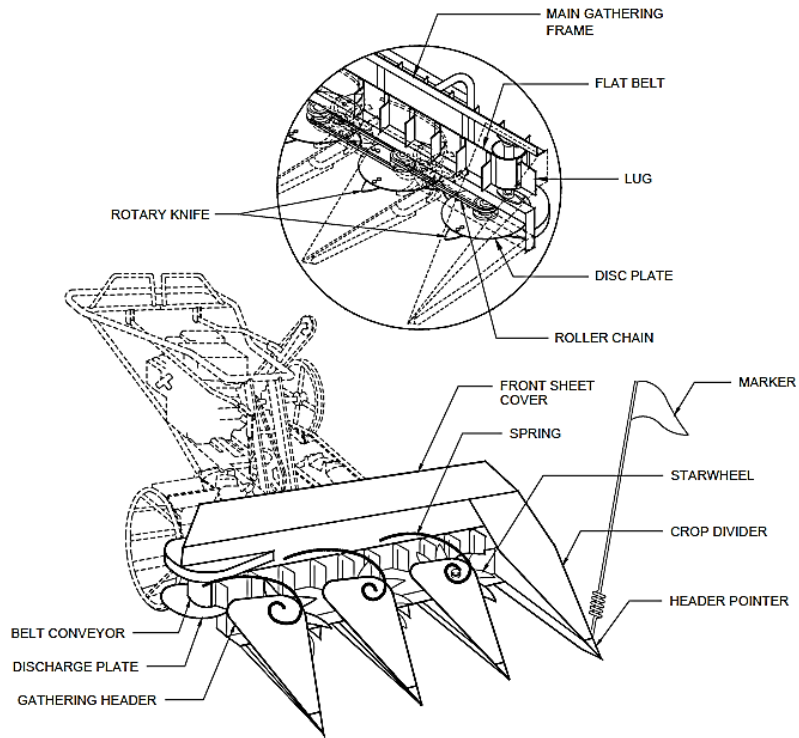


Figure 1 - Rice reaper with rotary knife

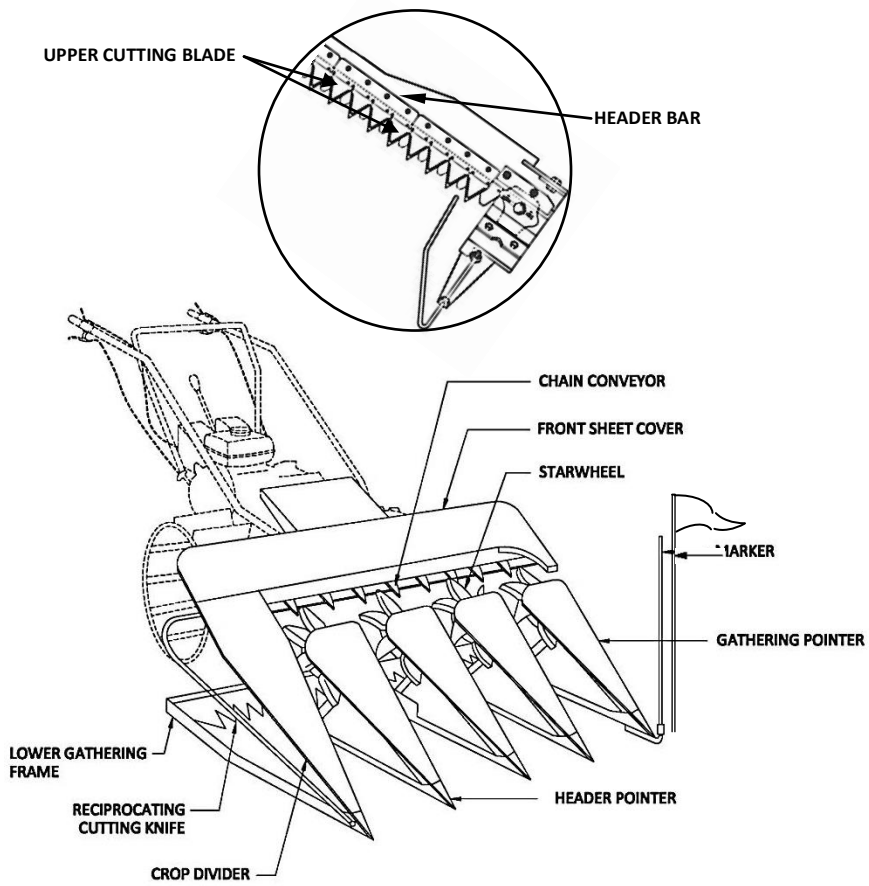


Figure 2 - Rice reaper with reciprocating cutter knife

5 Materials of Construction

5.1 Steel bars and metal sheet shall be generally used for the manufacture of the different components of the reaper.

5.2 Star wheels shall be made of non-corrosive material (e.g. engineering plastic) that can withstand shock caused by conveyor belt lugs.

5.3 Cutting elements should be made of either American Iron or Steel Institute (AISI) 1080 (carbon tool steel) to AISI 1085 (carbon steel) or its equivalent.

5.4 The serrated portion of the cutting elements should be case hardened at Rockwell C Scale (RC) 46 to RC 52 (Figure 3). The non-hardened portion of the cutting section shall have hardness within the range of RC 25 to RC 27.

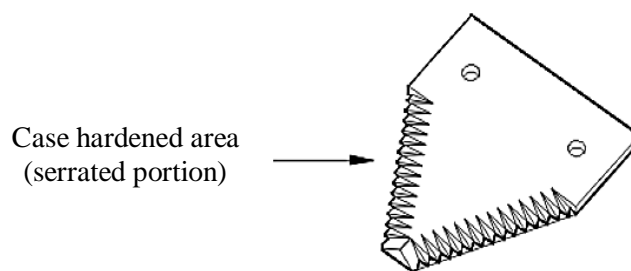


Figure 3 - Cutting knife

5.5 Bolts and screws to be used shall conform with the requirements of PNS/PAES 311:2001 Engineering Materials – Bolts and Nuts for Agricultural Machines – Specifications and Applications and PNS/PAES 313:2001 Engineering Materials – Screws for Agricultural Machines – Specifications and Applications.

6 Performance and Safety Requirements

The reaper when tested, in accordance with PNS/PAES 213:2015 Agricultural Machinery – Rice Reaper – Methods of Test shall conform with the following requirements:

6.1 The performance criteria for reaper shall be as specified in Table 1.

Table 1 - Performance criteria for reaper

| Criteria | Performance Data |
|---------------------------------|------------------|
| Field efficiency (%), minimum | 65 |
| Header loss (%), maximum | 0.5 |
| Conveying loss, (%), maximum | 1.0 |
| Total machine loss (%), maximum | 1.5 |
| Noise level, dB(A), maximum | 92* |

* Allowable noise level for six (6) hours of continuous exposure based on Occupational Safety Health Standards, Department of Labor and Employment, Philippines, 2013.

6.2 Sealed type bearings should be used as protection against dust. There shall be provision for lubrication of non-sealed type bearings and journal bearing.

6.3 Belt cover or guard and provisions for belt tightening and adjustments shall be provided.

7 Power Requirement

7.1 The rice reaper shall be operated using a minimum of 3.5 hp (2.6 kW) engine for a cutter bar cutting mechanism with 1.2 m width of cut while a minimum of 5 hp (3.7 kW) engine shall be used for a rotary cutting knife cutting mechanism with 1.2 m cutting width.

8 Other Requirements

8.1 Mechanism for cutter bar height adjustment shall be provided.

8.2 The manufacturer shall include a set of shear pins made of aluminum material to prevent the cutting mechanism from being damaged

8.3 Mechanism for easy disengagement of power transmission shall be provided.

8.4 Mechanism for reverse speed should be provided for easy maneuverability.

8.5 Emergency release lever shall be easily accessible to the operator.

9 Workmanship and Finish

9.1 The reaper shall be free from manufacturing defects that may be detrimental to its operation (e.g. cracked cutting knives).

9.2 Any uncoated metallic surfaces shall be free from rust and shall be painted properly. Cutting section shall be coated with anti-corrosive varnish.

9.3 Except for cutting blades, the reaper shall be free from sharp edges and surfaces to prevent injury to the operator.

10 Warranty for Construction and Services

10.1 A one (1) year warranty on parts and services, in accordance to the manufacturer's warranty policy, shall be provided. This shall start upon the delivery and acceptance of the reaper and shall not include normal wear and tear and consumable parts.

10.2 There shall be no breakdown of its major components under normal use (e.g., transmission systems, cutting and gathering mechanism, etc) within one (1) year from delivery and acceptance of the reaper, in accordance to the manufacturer's warranty policy.

11 Maintenance and Operation

11.1 Each reaper unit shall be provided with a set of manufacturer's standard tools required for maintenance.

11.2 An operator's manual, which conforms with PNS/PAES 102:2000 Agricultural Machinery – Operator's Manual – Content and Presentation shall be provided.

11.3 A training on the proper operation of the reaper shall be provided by the supplier to the owner/operator.

12 Testing

Rice reaper shall be tested in accordance with PNS/PAES 213:2015-Agricultural Machinery: Rice Reaper – Methods of Test.

13 Marking and Labelling

13.1 Each rice reaper shall be marked in English, with the following information, using a stencil or by directly punching it in a plate and shall be positioned at the most conspicuous place:

13.1.1 Registered trademark of the manufacturer

13.1.2 Brand

13.1.3 Model

13.1.4 Serial number

13.1.5 Rated capacity, ha/h

13.1.6 Power requirement, hp or kW

13.1.7 Name, address, contact information of the distributor

13.1.8 Name, address, contact information of the importer, if imported

13.1.9 Country of manufacture

13.2 Safety/precautionary markings shall be provided when appropriate. Marking shall be stated in English and Filipino that can be understood by the operator and shall be printed in red color with a white background.

13.3 The markings shall have a durable bond with the base surface material. The markings shall be water and heat resistant under normal cleaning procedures, it shall not fade, discolor, crack, peel and shall remain legible.

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