
PHILIPPINE AGRICULTURAL ENGINEERING STANDARD PAES 521: 2008
Slaughterhouse Equipment – Splitting Saw for Large Ruminants – Specifications

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 Slaughterhouse Equipment for Large Ruminants” which was funded by the Department of Agriculture - National Meat Inspection Services (DA-NMIS).

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:

Kentmaster Meat Splitting Saw.

<http://midwesternresearch.com/KENTMASTER%20SAWS.htm>. <accessed April 01, 2008>.

Marks’ Standard Handbook for Mechanical Engineers. 8th ed. 1978. McGraw-Hill Book Company. New York.

PAES 411:2000 Agricultural Structures – Slaughterhouse for Swine, Small and Large Animals-General Requirements

PAES 129:2002 Agricultural Machinery – Electric Motor – Specifications

PAES 509:2008 Slaughterhouse Equipment – Splitting Saw for Hog Carcass – Specifications

Saws, Splitting, Handheld. http://www.technex.pl/supplier/Jarvis/engl/saws_splitting_hand.htm. <accessed March 27, 2008>.

Saws, Breaking, Reciprocating. <http://www.meatingplace.com/com/Jarvis/product.asp?iservice=620>. <accessed March 27, 2008>.

Slaughterhouse for Cattle. <http://www.renner-schlachthaus technik.de/ne/products/rinderschlachtung.html>. <accessed March 28, 2008>.

Stainless Steel – Martensitic.

<http://www.alleghenyludlum.com/ludlum/pages/products/xq/asp/G.1/qx/ProductLine.html>. <accessed April 09, 2008>.

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1 Scope

This standard specifies the requirements on the manufacture and performance of splitting saw for large ruminants such as cattle and carabao.

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 319:2002	Engineering Materials – Engineering Plastics – Specifications and Applications
PAES 522:2008	Slaughterhouse Equipment – Splitting Saw for Large Ruminants – Methods of Test

3 Definitions

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

3.1

backbone

refers to the vertebral column of an animal

3.2

blade guard

safety cover for the blade of the splitting saw

3.3

blade speed

linear displacement of the blade teeth per unit time, expressed in millimeter per second

3.4

blade teeth

small sharp points along the cutting side of the saw

3.5

cutting blade

blade of saw with small, sharp metal teeth along the cutting edge

3.6

gripping handle

part of the machine that provides friction against the hand

3.7

hanger mounting bracket

part of the saw located at the center of gravity used for suspending the entire machine

3.8

linear speed

linear displacement of the rotating blade at a given time, expressed in meter per second

3.9

main frame

body of the splitting saw

3.10

splitting

cutting or dividing the carcass into equal halves

3.11

splitting saw

machine with a metal blade designed to divide carcasses

3.12

pitch

spacing between the blade teeth, expressed in teeth per inch (TPI)

4 Classification

Splitting saw shall be classified according to:

4.1 Motion/Action

4.1.1 Circular saw

Mechanical splitting saw with circular blade. (Fig. 1 and 2)

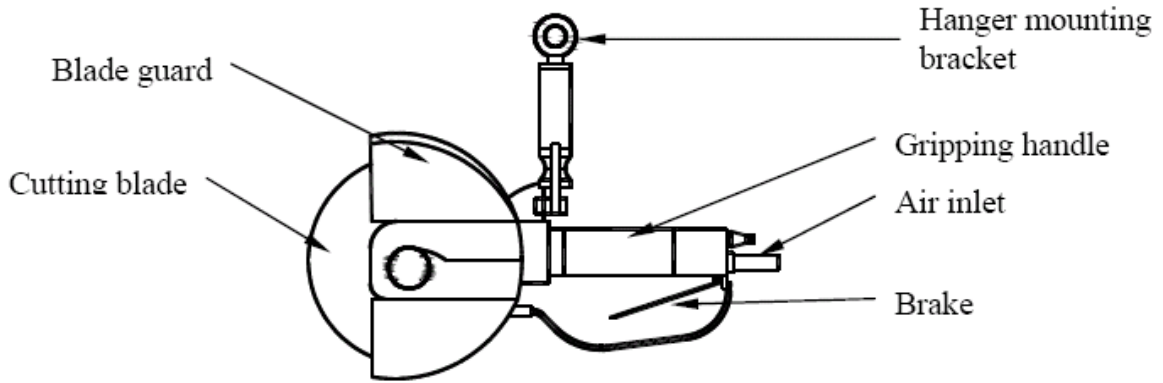


Figure 1. Air driven circular blade splitting saw with its components

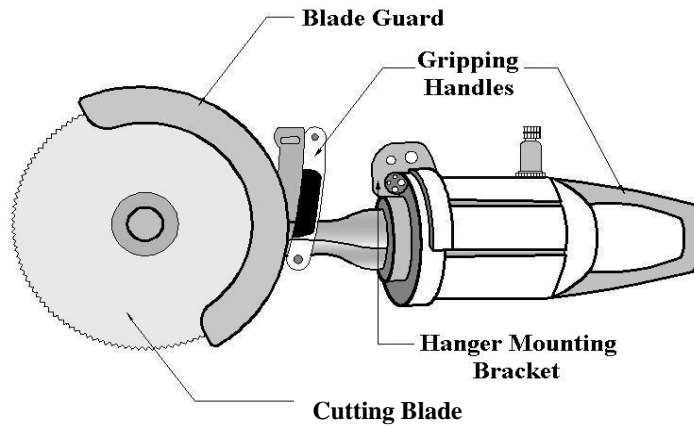


Figure 2. Motorized circular blade splitting saw with its components

4.1.2 Band saw

Mechanical splitting saw with blade consisting of long, narrow, flexible band of toothed metal. (Fig. 3)

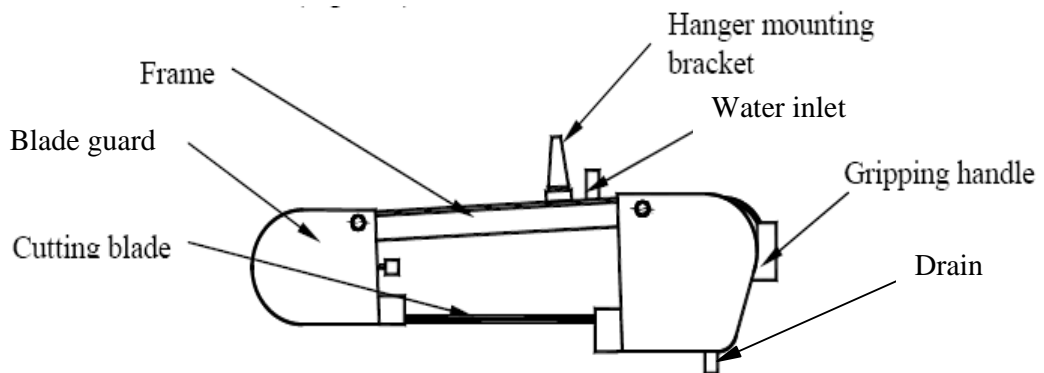


Figure 3. Continuous band splitting saw with its components

4.1.3 Reciprocating saw

Mechanical splitting saw in which the cutting action is achieved through a forward and backward movement of the blade. (Fig. 4)

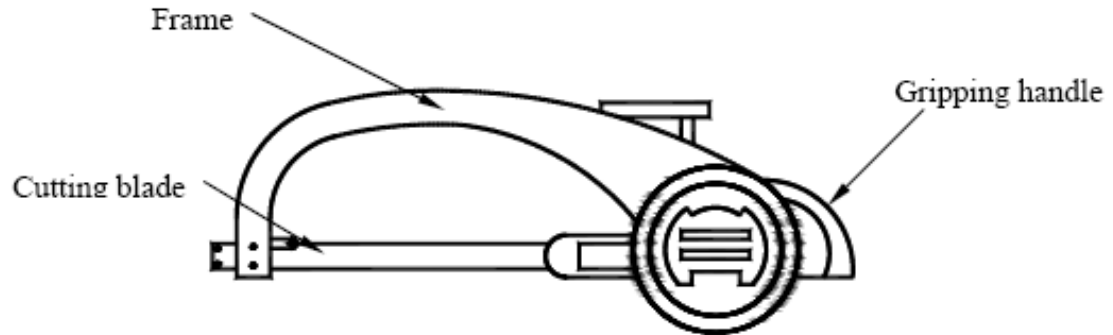


Figure 4. Reciprocating splitting saw with its components.

4.2 Power Source

4.2.1 Electric

Splitting saw that makes use of electrical energy to drive a mechanical load

4.2.2 Hydraulic

Splitting saw that makes use of liquid under pressure to drive a mechanical load

4.2.3 Pneumatic

Splitting saw that makes use of pressurized air to drive a mechanical load

5 Manufacturing Requirements

Generally, the parts of the splitting saw shall be readily serviceable and consumable parts shall be readily available.

5.1.1 The main frame of the splitting saw shall be made of non-corrosive or food grade materials (e.g. stainless steel, aluminum alloy).

5.1.2 The gripping handle shall be covered with non-slip material.

5.1.3 Mounting hanger shall be made of a solid and non-corrosive steel material rigidly fastened to the main frame of the saw.

- 5.1.4 The cutting blade shaft shall be made of tool steel.
- 5.1.5 The cutting blade shall be made of non-corrosive and food grade material (e.g. stainless steel grade 410 or higher).
 - 5.1.5.1 The plate body shall have a smooth finish to ensure minimum friction during cutting.
 - 5.1.5.2 For circular saw, blade should have a diameter of at least 230 mm (9 inches), blade thickness of 2 mm (5/32 inch) and 3 teeth per inch (tpi).
 - 5.1.5.3 For band saw, blade length should be at least 3.3 meters (127 inches) and blade thickness of 2 mm (5/32 inch).
 - 5.1.5.4 For reciprocating saw, blade length shall be at least 619 mm (24 inches), blade thickness of 2 mm (5/32 inch) and 3 teeth per inch (tpi).
 - 5.1.5.5 Blade teeth material shall resist wear to chemical corrosion.
- 5.1.6 Blade guard shall be made of non-corrosive metal sheet.

6 Performance Requirements

The splitting saw when tested in accordance with PAES 522 shall conform to the following requirements:

- 6.1 The cutting depth for circular saw shall be sufficient enough to split the carcass (e.g. 110 mm).
- 6.2 Circular and band saw shall be able to split a carcass within one minute.
- 6.3 Reciprocating saw shall be able to split a carcass within two (2) minutes.
- 6.4 For circular saw, the optimum speed of the cutting blade shall be at least 1387 teeth per second (tps).
- 6.5 For band saw, the optimum linear speed of blade shall be 853.6 m/min (2800 ft/min).
- 6.6 For reciprocating saw, the optimum speed of the saw shall be at least 849 teeth per second (tps).
- 6.7 The minimum splitting efficiency of the splitting saw shall be 80%.

7 Safety, Workmanship and Finish

- 7.1 All components shall be dynamically balanced for stable running with low noise levels.

- 7.2 The splitting saw shall be free from manufacturing defects that may be detrimental to the operator.
- 7.3 The splitting saw when suspended shall be balanced. A counterbalance adjustment shall be integrated.
- 7.4 Spiral-hose for water supply for cooling and rinsing of cutting surface shall be integrated to mechanical saw.
- 7.5 No part of the splitting saw shall be painted.
- 7.6 The splitting saw shall be free from sharp edges and surfaces that may injure the operator.
- 7.7 Sealed type bearings should be used as protection against water and foreign material. There shall be provision for lubrication of non-sealed type bearings and bushings.
- 7.8 Guard for the unused part of the cutting blade, pulley and/or belt mechanism shall be provided.
- 7.9 Mechanism for immediate disengagement of power transmission shall be provided.
- 7.10 Provision for emergency cut-off switch shall be provided.

8 Warranty for Construction and Durability

- 8.1 Warranty against defective materials and workmanship shall be provided for parts and services except for normal wear and tear of consumable maintenance parts such as blade for at least six (6) months from the purchase of the splitting saw.
- 8.2 The construction shall be rigid and durable without breakdown of its major components (i.e. drive shaft, etc) for at least six (6) months from original purchase.

9 Maintenance and Operation

- 9.1 An operator's manual, which conforms to PAES 102, shall be provided.
- 9.2 Each splitting saw unit shall be provided with a set of manufacturer's standard tools required for maintenance.
- 9.3 The splitting saw shall be easy to disassemble, reassemble to facilitate easy cleaning and disinfection. It shall be easy to operate.
- 9.4 Lubricating points shall be provided with food grade grease.

10 Testing

Testing of the splitting saw for large ruminants shall be conducted on-site during commissioning and shall be tested in accordance with PAES 522.

11 Marking and Labeling

11.1 Each splitting saw shall be marked in English with the following information in a plate:

11.1.1 Brand name or registered trademark/brand of the manufacturer (optional).

11.1.2 Model and/or Serial number

11.1.3 Splitting rate, mm/s (type of animal)

11.1.4 Name of the manufacturer

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

11.1.6 Name and address of the importer, if imported.

11.2 Safety/precautionary markings shall be provided when appropriate. Marking shall be stated in English or Filipino and shall be printed in red color with a white background.

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