

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 hogs)” 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:

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

PAES 129:2002 Agricultural Machinery – Electric Motor – Specifications

PAES 407:2005 Agricultural Structures – Slaughterhouse for Swine, Small and Large Animals-General Requirements

PAES 510:2007 Slaughterhouse Equipment - Splitting Saw for Hog Carcass – Methods of Test

The Philippine Recommends for Pork Production. 1999. Philippine Council for Agriculture Forestry and Natural Resources Research and Development. Los Baños, Laguna.

Slaughterhouse Equipment - Splitting Saw for Hog Carcass - Specifications

1 Scope

This standard specifies the requirements for saw in splitting of suspended hog carcass through the backbone.

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

3 Definitions

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

3.1**backbone**

vertebral column of an animal

3.2**blade guard**

safety cover for cutting mechanism

3.3**blade holders**

holding mechanism for hand saw that tightens and keeps the blade in a vertical position

3.4**blade teeth**

small sharp points along the cutting side of the saw

3.5**cutting blade**

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

3.6

drive shaft

mechanism that delivers rotating motion from the motor to the cutting blade

3.7

gripping handle

part of the machine that provides friction against the hand, reducing the gripping force needed to achieve a reliable grip

3.8

gullets

spaces between each segment of the blade to provide cooling and slurry removal

3.9

hanger mounting bracket

part of the saw used for suspending the entire machine, such that the hanger mounting bracket is located at the center of gravity of the machine

3.10

main frame

body of the splitting saw

3.11

percent splitting efficiency

percent of actual work used during splitting operation

3.12

rotary saw

circular saw

machine with rotating circular blade used for cutting material

3.13

splitting rate

number of hog carcass split per hour, expressed in head/h

3.14

splitting saw

tool with a metal blade designed to cut the backbone of hog carcass

3.15

tooth pitch

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

4 Classification

The classification of splitting saw shall be:

4.1 Manual - Hand saw (Figure 1)

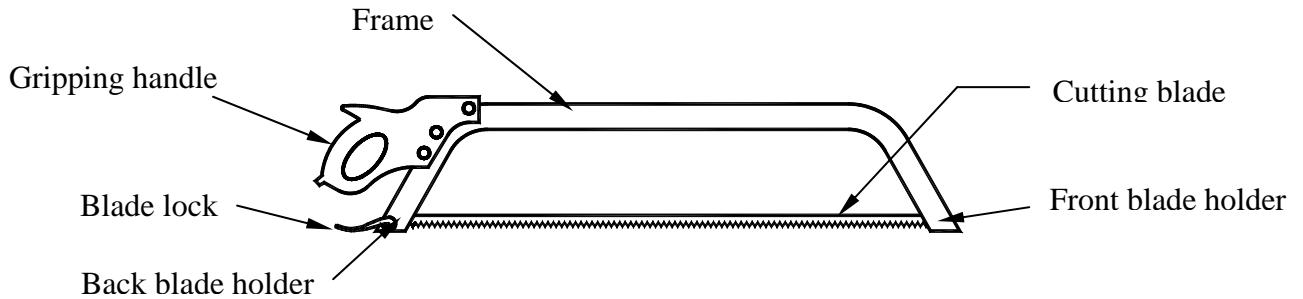


Figure 1. Manual splitting saw with its components.

4.2 Mechanical splitting saw

4.2.1 Mechanical splitting saw based on motion/action

4.2.1.1 Circular saw (Figure 2)

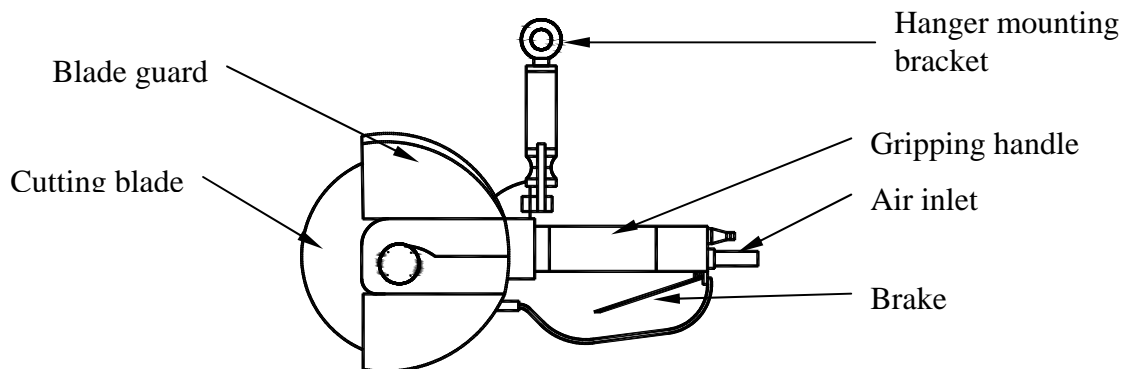


Figure 2. Circular blade splitting saw with its components.

4.2.1.2 Continuous band saw (Figure 3)

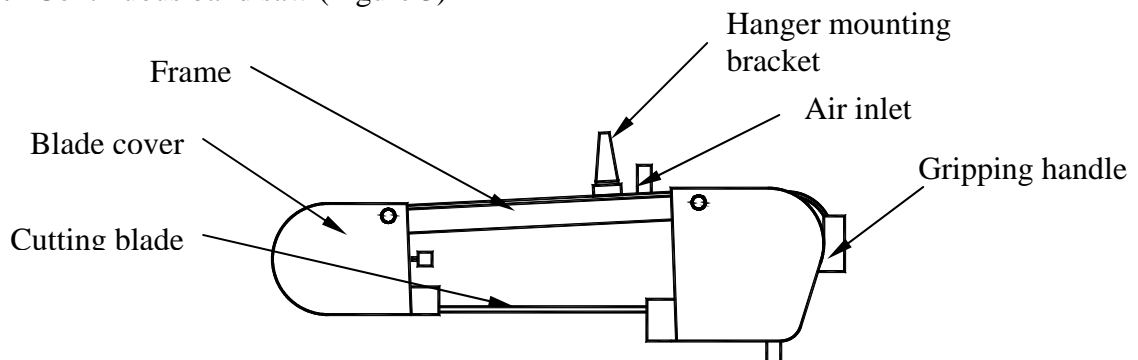


Figure 3. Continuous band splitting saw with its components.

4.2.1.3 Reciprocating saw (see Figure 4)

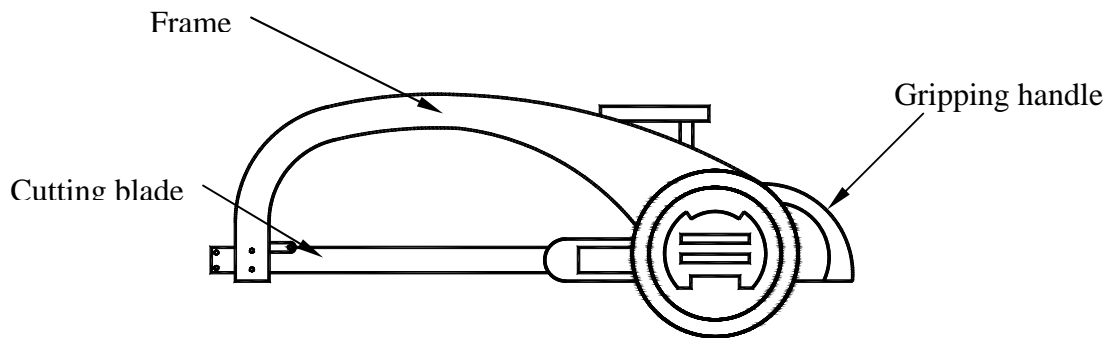


Figure 4. Reciprocating splitting saw with its components.

4.2.2 Mechanical splitting saw based on source of power

4.2.2.1 Electric system

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

4.2.2.2 Hydraulic system

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

4.2.2.3 Pneumatic system

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

5 Fabrication Requirements

Generally, the parts of the splitting saw shall be readily serviceable. Aluminum alloy or stainless steel, non-corrosive or food grade materials shall be used.

5.1 The frame for hand saw shall be made of solid non-corrosive steel material (e.g. stainless steel ASTM 304 or higher). The handle shall be made of high impact grade acrylic moldings as specified in PAES 319 and shall be heavy duty riveted to the frame.

5.2 The gripping handle shall be covered with non-slip rubber material to minimize slippage.

5.3 The cutting blade shaft shall be made of high-speed tool steel. Material requirement shall be carbide teeth that resist wear to chemical corrosion.

5.4 The cutting blade shall be made of stainless steel, non-corrosive or food grade material. The plate body is polish to a very smooth finish, to ensure that it will cut through the material with a minimum friction and heat.

5.4.1 For manual-hand saw, blade shall have a tooth pitch of four (4) teeth per cm at 762 mm blade length.

(For manual-hand saw, blade shall have a tooth pitch of ten (10) teeth per inch (TPI) at 30 inches blade length.)

5.4.2 For circular saw, blade shall have at least a diameter of 229 mm (9 inches), blade thickness of 1 mm (5/64 inch) and seventy-two (72) numbers of teeth.

5.5 Mounting hanger shall be made of a solid, non-corrosive and food grade steel material rigidly fastened to the main frame of the saw. A hole of at least 25 mm (1 inch) shall be provided.

5.6 Blade guard and covers shall be made of non-corrosive metal sheet of at least 2 mm thickness.

6 Performance Requirements

The splitting saw when tested in accordance with PAES 510 shall conform to the following requirements:

6.1 The splitting saw shall be easy to assemble, disassemble, set-up and operate.

6.2 Cuts made by the splitting saw shall be clean and straight and made without excessive force or unnecessary duplication.

6.3 The minimum percent splitting efficiency shall be 80%.

6.4 The optimum speed of the cutting blade for mechanical saw shall be 3500 to 4000 revolutions per minute (rpm) or a linear speed of 75 m/sec.

6.5 The noise emitted by the splitting saw measured 50 mm away from the operator's ear level shall not be more than 96 db (A)*.

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 its operation.

7.3 The splitting saw when suspended shall be balanced. A counterbalance adjustment shall be integrated.

7.4 The gross weight of the splitting saw shall not exceed 18 kg for small and medium-scale throughputs and 32 kg for high throughputs.

* Allowable noise level for four (4) hours of continuous exposure based on Occupational Safety and Health Standards, Ministry of Labor, Philippines, 1983.

7.5 Spiral-hose for water supply for cooling and rinsing of cutting surface shall be integrated.

7.6 Provision for the safety of the operators from moving parts.

7.7 No part of the splitting saw shall be painted.

7.8 The splitting saw shall be free from sharp edges and surfaces that may injure the operator except for the blade.

7.9 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.

7.10 Cover or guard for the unused part of the cutting blade, pulley and/or belt mechanism shall be provided.

7.11 Mechanism for immediate disengagement of power transmission shall be provided.

7.12 Provision for grounding to avoid electric shock 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 Each splitting saw unit shall be provided with a set of fabricator's standard tools required for maintenance.

9.2 An operator's manual, which conforms to PAES 102, shall be provided.

9.3 The splitting saw shall be easy to clean.

9.4 Lubricating points shall be provided with grease.

9.5 Food grade grease shall be used.

10 Sampling

The splitting saw shall be sampled for testing in accordance with PAES 103.

11 Testing

Splitting saw shall be tested in accordance with PAES 510.

12 Marking

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

12.1.1 Registered trademark/brand of the fabricator (optional)

12.1.2 Brand

12.1.3 Model

12.1.4 Serial number

12.1.5 Splitting rate, heads/h (type of animal)

12.1.6 Splitting efficiency (%), type of animal

12.1.7 Name of the fabricator

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

12.2 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.

12.3 The markings shall have a durable bond with the base surface material.

12.4 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.