

Foreword

The formulation of this National Standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) with support from the Department of Agriculture (DA).

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:

American Society of Agricultural Engineers (ASAE) S276.3:1984 – Slow-Moving Vehicle Identification Emblem.

International Organization for Standardization (ISO) 8910:1993 - Machinery and equipment for working the soil – Mouldboard plough working elements – Vocabulary.

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

Republic Act No. 7394 otherwise known as “The Consumer Act of the Philippines” enacted on July 22, 1991.

Smith, H. P. and L. H. Wilkes. *Farm Machinery and Equipment*. 6th Edition. Tata McGraw-Hill Publishing Company Ltd. New Delhi. 1977.

Textbook of Agricultural Machinery. Japan International Cooperation Agency. 1976.

Agricultural Machinery – Moldboard Plow – Specifications

1 Scope

This standard specifies the requirements for animal-drawn and tractor-drawn moldboard plows.

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 – Method of Sampling

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

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

PAES 132:2004, Agricultural Machinery – Disc/Moldboard Plow – Methods of Test

3 Definitions

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

3.1**colter**

flat knife or revolving disc, mounted in front of the plow bottom, which cuts the soil vertically

3.2**frame**

structure to which the standards are fitted

3.3**frog**

central part of the plow to which the share, moldboard and landside are attached

3.4**hitch**

part of an implement designed to connect it to a power source

3.5**landside**

part of the plow that presses and slides against the furrow wall, providing lateral stability during operation

3.6**landside heel**

part, attached to the rear of a landside, which applies the vertical load of the plow bottom to the furrow bottom

3.7**moldboard**

part of the plow which lifts, inverts and throws the furrow slice to one side

3.7.1**general-purpose moldboard**

plow bottom that has less curvature than the stubble and can be used easily for stubble, ordinary trash and stalk cover land (see Figure 1a)

3.7.2**slatted moldboard**

plow bottom which is used in sticky soils and soils that does not scour on solid moldboard (see Figure 1b)

3.7.3**sod moldboard**

plow bottom that has long, narrow and less sloping moldboard with a gradual twist that allows complete inversion of the furrow slice with minimum breakage (see Figure 1c)

3.7.4**stubble moldboard**

plow bottom that has short, broader and curved more abruptly along the top edge and is suited to work in soil which has been cultivated from year to year (see Figure 1d)

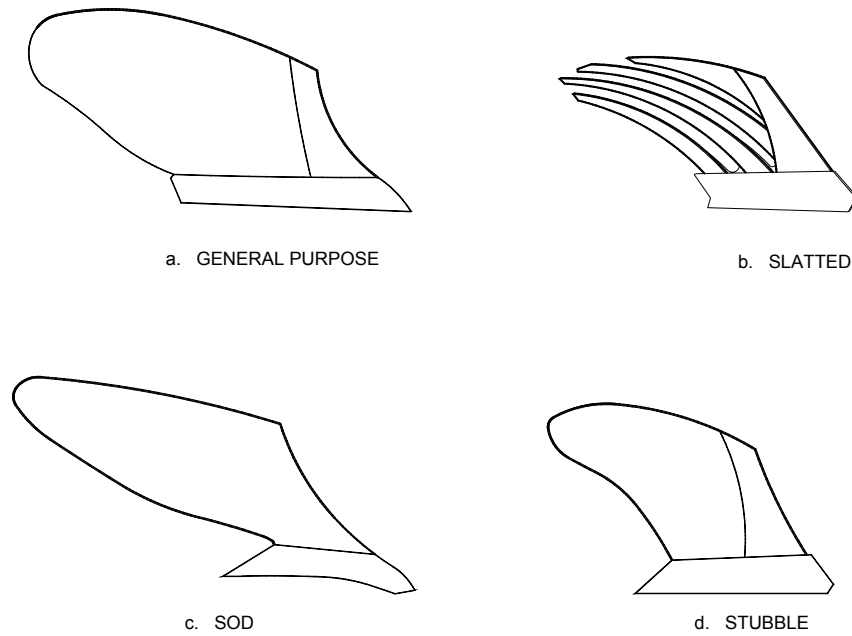


Figure 1 – Types of Moldboard

3.8

moldboard plow

sliding implement that cuts, lifts, inverts and throws to one side a layer of soil (furrow slice) to bury surface materials (see Figure 2)

NOTE: Main component consists of share, moldboard and landside.

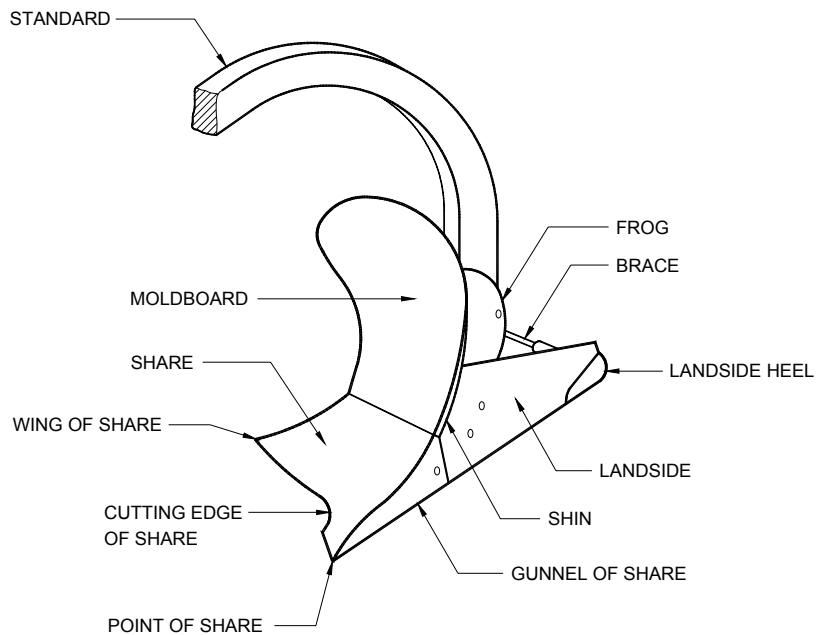


Figure 2 – Moldboard Plow

3.8.1

left-hand plow

throws the furrow slice to the left of the plow's direction

3.8.2

right-hand plow

throws the furrow slice to the right of the plow's direction

3.8.3

two-way plow

reversible plow

throws the furrow slice either to the left or right of the plow's direction

NOTE: It consists of both the right-hand and left-hand plow with one type being used at a time. (see Figures 3 and 4)

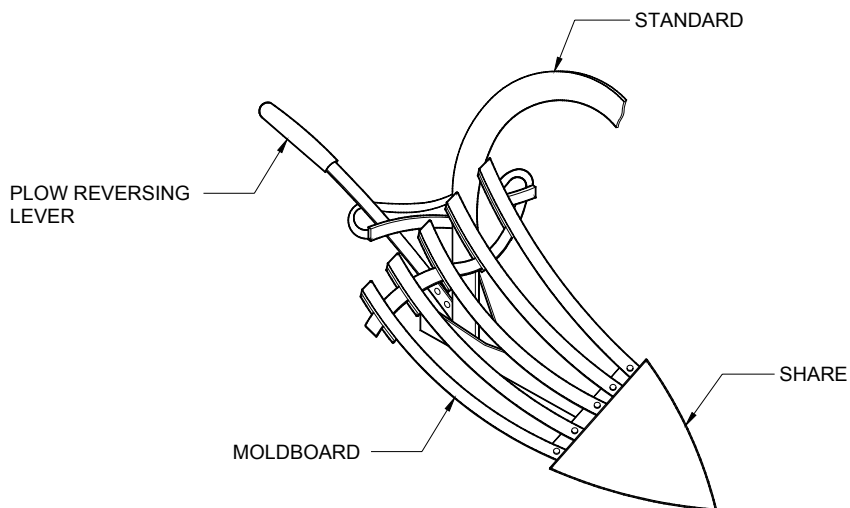


Figure 3 – Reversible Plow for Two-Wheel Tractor

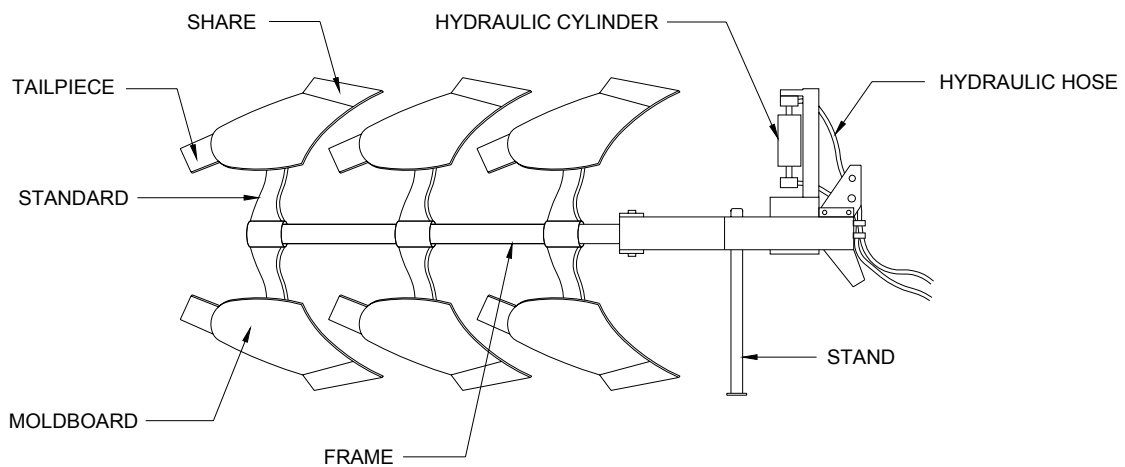


Figure 4 – Reversible Plow for Four-Wheel Tractor

3.9

plow bottom

plow body

working part of the plow which includes the share, moldboard, and landside, all attached to the frog

3.10

share

part of the plow that penetrates the soil and cuts the furrow slice horizontally

NOTE: It may be single integral piece or may consist of replaceable components as illustrated in Figure 5.

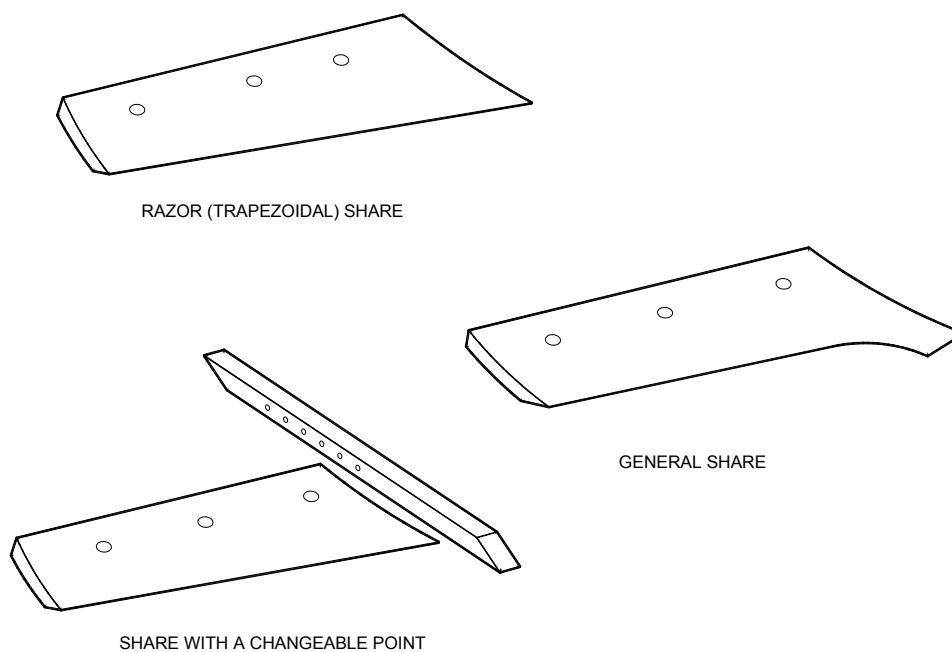


Figure 5 – Types of Share

3.11

shin

leading edge of the moldboard located above the landside

3.12

standard

beam

leg

upright support which connects the plow bottom to tillage implement frame (see Figure 2)

3.13**suction, horizontal**

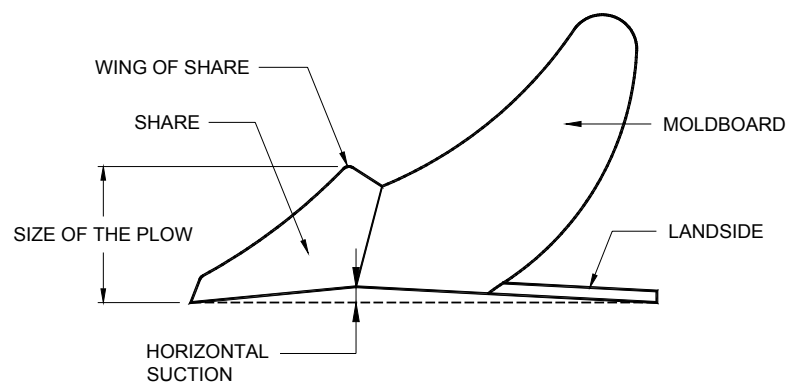
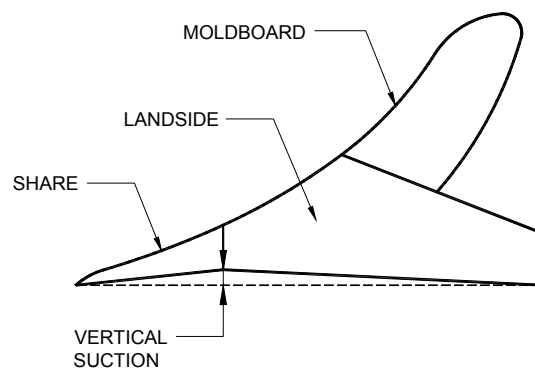
horizontal clearance

distance by which the point of the share is bent out of line with the landside to cut the proper furrow width (see Figure 6a for tractor-drawn moldboard plow)

3.14**suction, vertical**

vertical clearance

distance by which the point of the share is bent downward for the plow to penetrate the soil to the proper depth (see Figure 6b for tractor-drawn moldboard plow)

**a. Top View****b. Side View****Figure 6 – Horizontal and Vertical Suction****3.15****tailpiece**

optional accessory, attached to the wing of the moldboard to improve inversion of the furrow slice

3.16**trash board**

optional accessory, mounted above the shin, which deposits the upper edge of the furrow in the furrow bottom

4 Classification

4.1 Animal-drawn Moldboard Plow (see Figure 7)

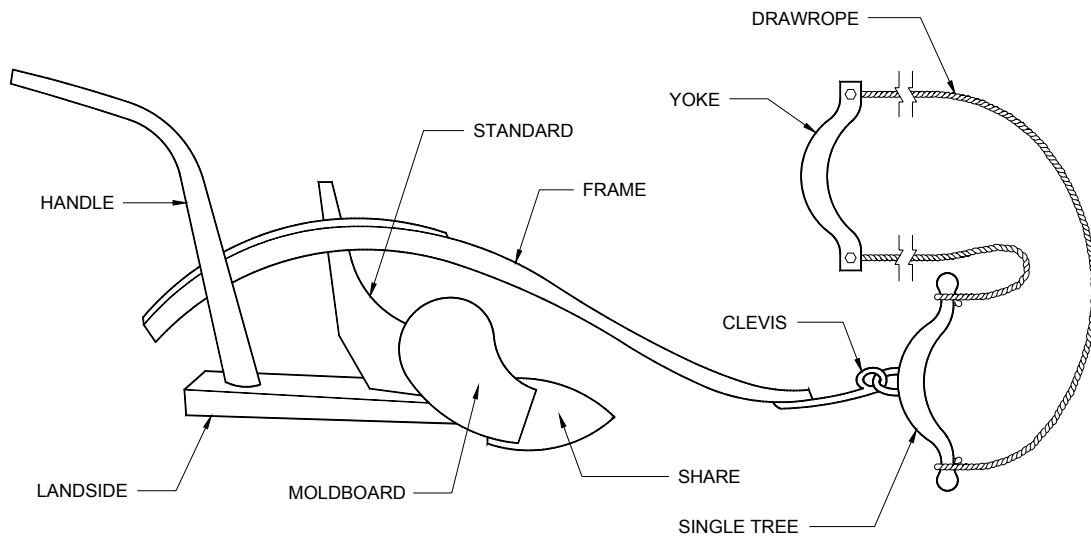


Figure 7 – Animal-drawn Moldboard Plow

4.2 Tractor-drawn Moldboard Plow

4.2.1 Two-wheel Tractor (see Figure 8)

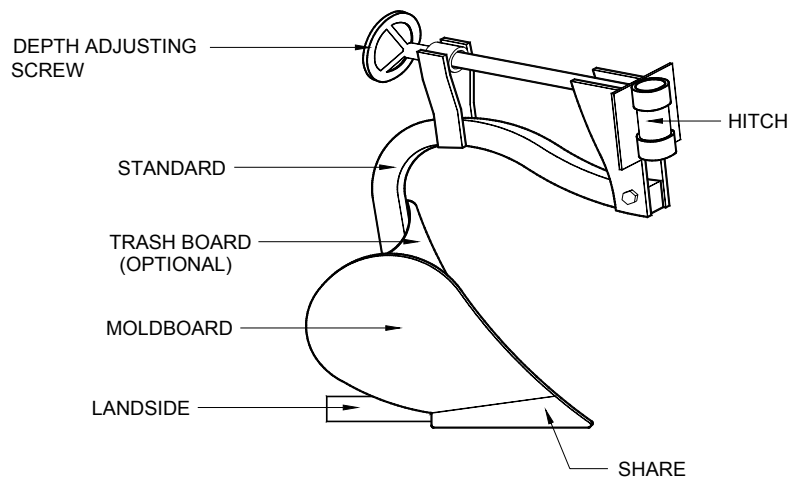


Figure 8 – Moldboard Plow for Two-wheel Tractor

4.2.2 Four-wheel Tractor

4.2.2.1 Tractor-mounted Moldboard Plow

Type of plow mounted on the tractor's three-point linkage and depends upon the tractor for its general operation (see Figure 9)

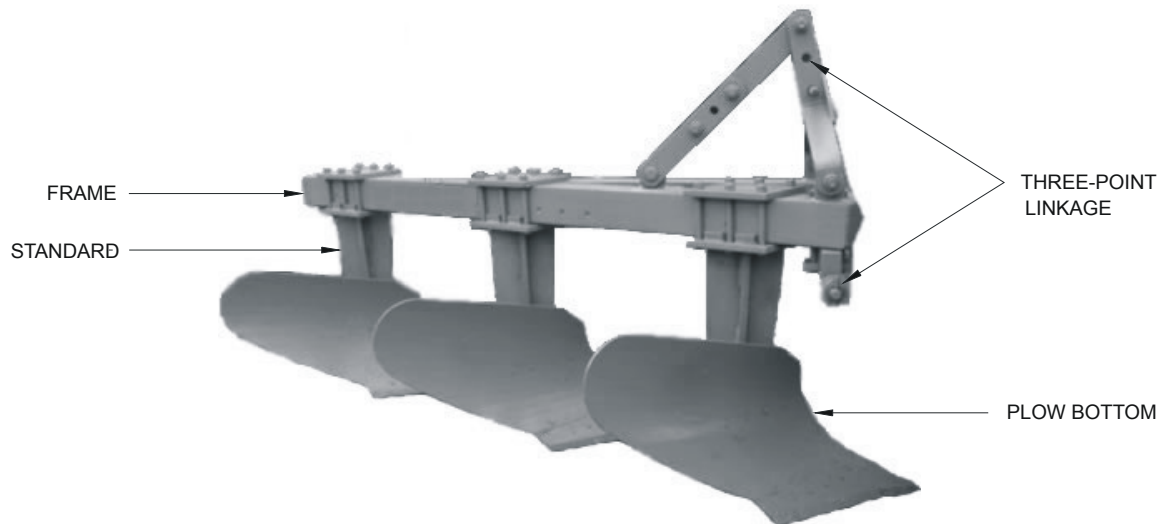


Figure 9 – Tractor-Mounted Moldboard Plow

4.2.2.2 Semi-mounted Moldboard Plow

Type of plow that has the front end directly connected to the tractor's three-point linkage and its rear end is supported by furrow and land wheels. The plow is also equipped with hydraulic lines and cylinders for its lifting and/or depth control. (see Figure 10)

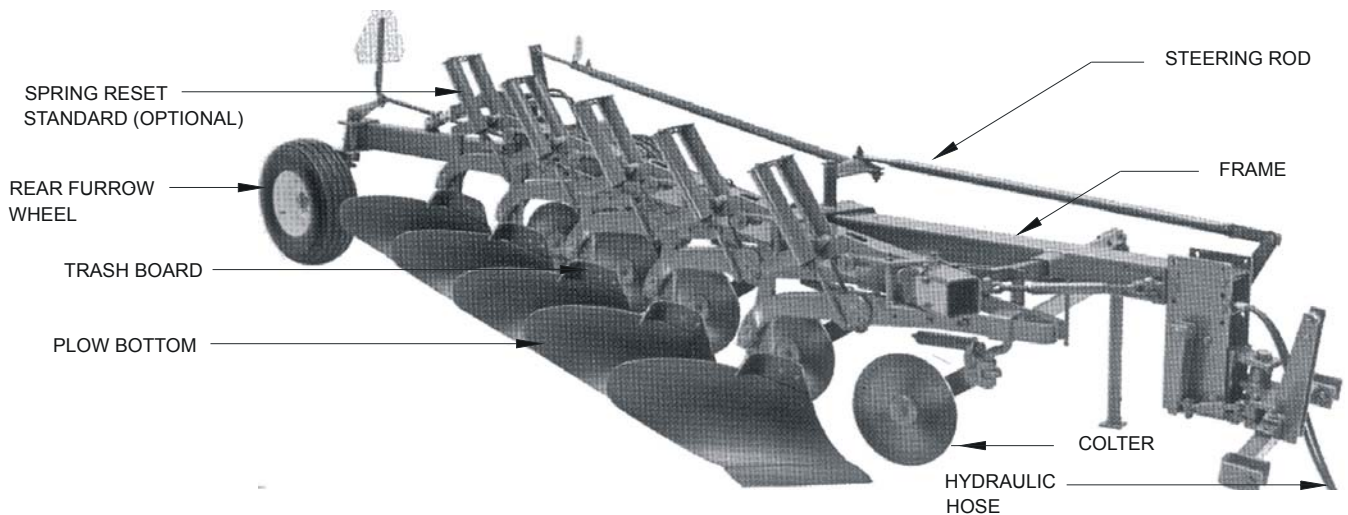


Figure 10 – Semi-Mounted Moldboard Plow

4.2.2.3 Trailing Moldboard Plow

Type of plow hitched to the drawbar or lower links of the tractor, supported by two or three wheels and equipped with hydraulic lines and cylinders for lifting and/or depth control (see Figure 11)

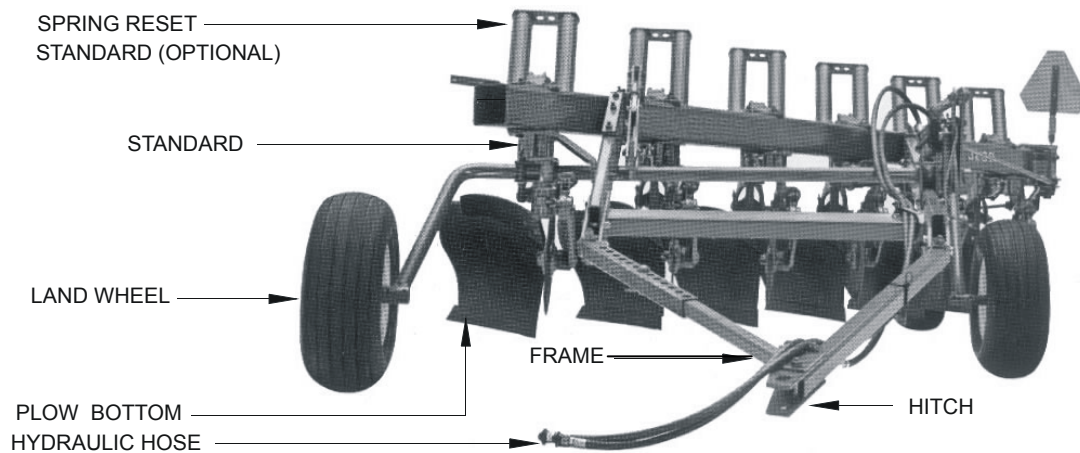


Figure 11 – Trailing Moldboard Plow

5 Size

The size of the plow shall be determined by measuring the distance from the wing to the landside. The measuring device shall be held perpendicular to the landside during measurement (see Figure 6a).

6 Materials of Construction

6.1 Animal-drawn plows

6.1.1 Hard wood and/or mild steel should be used in the manufacture of standard, frame and landside.

6.1.2 Cast iron, mild steel, stainless steel and/or hard plastic should be used in the manufacture of the moldboard.

6.1.3 Carbon steel with at least 80% carbon content (e.g. AISI 1080) shall be used in the manufacture of the share.

6.2 Tractor-drawn plows

6.2.1 Two-wheel tractor-drawn plows

6.2.1.1 Cast iron and/or mild steel should be used in the manufacture of the standard, frame, landside and frog.

6.2.1.2 Cast iron, mild steel, stainless steel and/or hard plastic should be used in the manufacture of the moldboard.

6.2.1.3 Carbon steel with at least 80% carbon content (e.g. AISI 1080) shall be used in the manufacture of the share.

6.2.2 Four-wheel tractor-drawn plows

6.2.2.1 Cast iron and/or mild steel should be used in the manufacture of the moldboard, standard, frame, landside and frog.

6.2.2.2 Carbon steel with at least 80% carbon content (e.g. AISI 1080) or alloy steel with at least 0.0005% boron content shall be used in the manufacture of the share.

6.2.2.3 The moldboard may be coated with plastic or ceramics when used in sticky soils.

7 Performance Requirements

7.1 The maximum depth of cut of the plow at the recommended power range specified by the manufacturer shall be attained.

7.2 Approximate four-wheel tractor engine power for specific moldboard plow sizes under average operating conditions is given in Table 1.

**Table 1 – Approximate Four-Wheel Tractor Engine Power
for Specific Moldboard Plow Sizes**

Tractor Engine Power kW (hp)	No. of Plow Bottoms	Moldboard Plow Sizes cm (inches)
6 to 9 (8 to 12)	1	30 (12)
11 to 15 (15 to 20)	1	41 (16)
	2	25 (10)
19 to 22 (25 to 30)	2	36 (14)
26 to 34 (35 to 45)	3	36 (14)
	3	41 (16)
37 to 45 (50 to 60)	4	36 (14)
48 to 56 (65 to 75)	5	41 (16)
60 to 97 (80 to 130)	6	41 (16)

8 Other Requirements

8.1 Hitch of the Moldboard Plow

8.1.1 The hitch of the moldboard plow shall be compatible with the hitch of the two-wheel tractor as specified in PAES 107.

8.1.2 The hitch of the moldboard plow shall be compatible with the drawbar or three-point linkage of the four-wheel tractor as specified in PAES 118.

8.2 The plow shall be easy to operate such as:

- a. hitching to and unhitching from draft animal/tractor;
- b. adjusting the depth of cut;
- c. changing the position of the plow with respect to the line of pull of the draft animal/tractor;
- d. maneuverability during turning;
- e. clearing blockages such as trashes, weeds, etc; and
- f. changing from transport mode to work position and vice versa.

8.3 The plow shall be fitted with slow-moving vehicle (SMV) emblem. The emblem shall be located at the rear of the plow with dimensional requirement as shown in Figure 12.

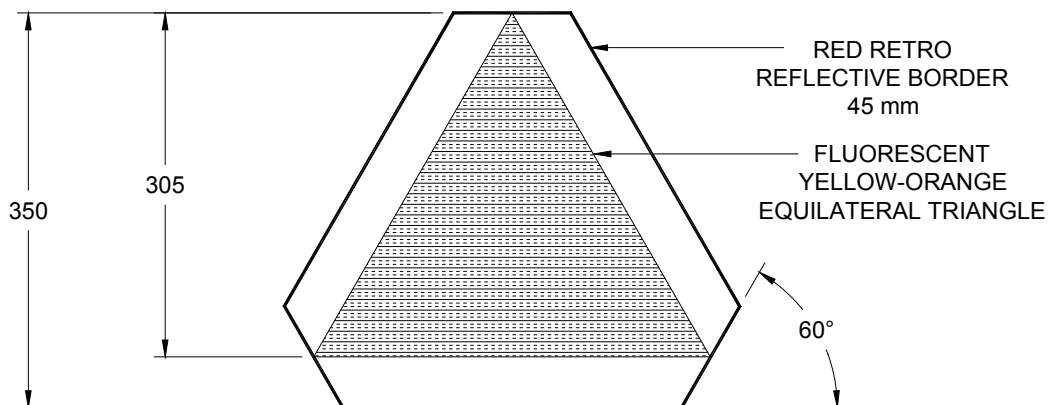


Figure 12 – Slow-Moving Vehicle (SMV) Emblem

9 Workmanship and Finish

9.1 The moldboard plow shall be free from manufacturing defects (i.e. sharp edges and surfaces, casting and/or welding defects) that may be detrimental to its operator.

9.2 Except for plow bottom, other uncoated metallic surfaces shall be free from rust and shall be painted properly.

10 Warranty for Construction and Durability

10.1 Warranty against defective materials and workmanship shall be provided for parts and services except for normal wear and tear of consumable maintenance parts within six months from the purchase of the moldboard plow.

10.2 The construction shall be rigid and durable without breakdown of its major components within six months from purchase by the first buyer.

11 Maintenance and Operation

11.1 A set of manufacturer's standard tools required for maintenance shall be provided.

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

11.3 The required power to pull the plow shall be included in the operator's manual or brochure.

12 Sampling

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

13 Testing

The sampled plow shall be tested in accordance with PAES 132.

14 Marking and Labeling

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

14.1.1 Registered trademark of the manufacturer

14.1.2 Brand

14.1.3 Model

14.1.4 Type and size

14.1.5 Serial number

14.1.6 Production date (optional)

14.1.7 Name and address of manufacturer

14.1.8 Name and address of the importer, if imported

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

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

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

14.4 The markings shall be weather resistant and under normal cleaning procedures, it shall not fade, discolor, crack or blister and shall remain legible.