

DRAFT EAST AFRICAN STANDARD

**Agricultural machinery — Mouldboard ploughs — Part 2: Specification
for tractor operated ploughs**

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

In order to achieve this objective, the Community established an East African Standards Committee mandated to develop and issue East African Standards.

The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

DEAS 1178-2 was prepared by Technical Committee EASC/TC 042, *Production and general engineering*.

Agricultural machinery — Mouldboard ploughs — Part 2: Specification for tractor operated ploughs

1 Scope

This draft East African Standard specifies the requirements for tractor-operated mouldboard ploughs used for tilling land.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8910, *Machinery and equipment for working the soil – Mouldboard plough working elements – Vocabulary*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

DEAS 1182, *Agricultural machinery — Disc and mouldboard ploughs — Test methods*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions shall apply:

3.1 colter

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

3.2 frame

structure to which the standards (refer to clause 3.12) are fitted

3.3 frog

central part of the plough to which the share, mouldboard 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 plough 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 plough bottom to the furrow bottom

3.7 mouldboard

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

3.7.1 general-purpose mouldboard

plough 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 mouldboard

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

3.7.3 sod mouldboard

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

3.7.4 stubble mouldboard

plough 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)

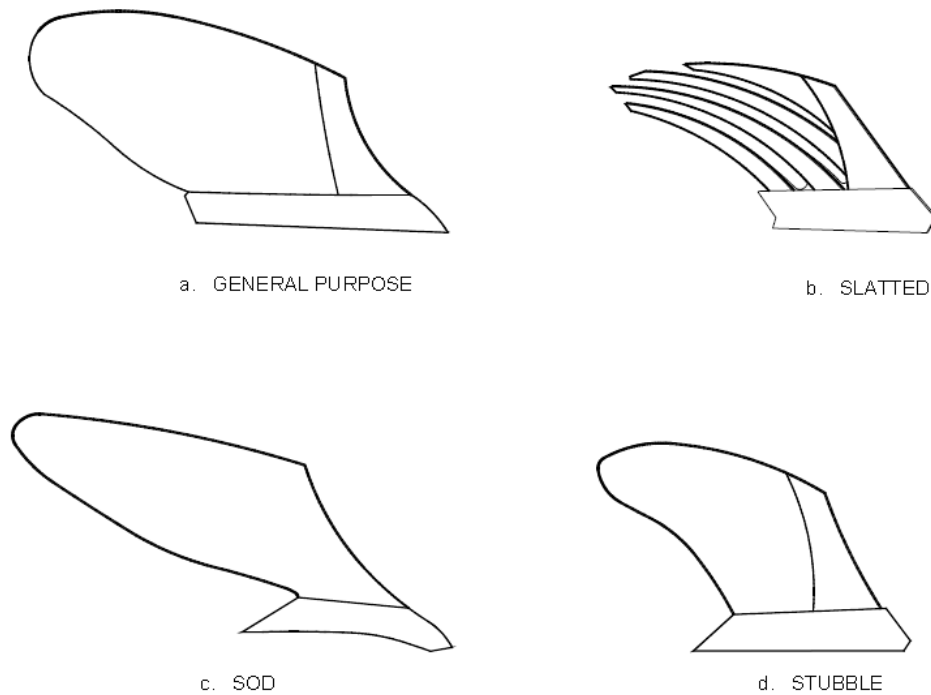


Figure 1 – Types of Mouldboard

3.8 mouldboard plough

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, mouldboard and landside.

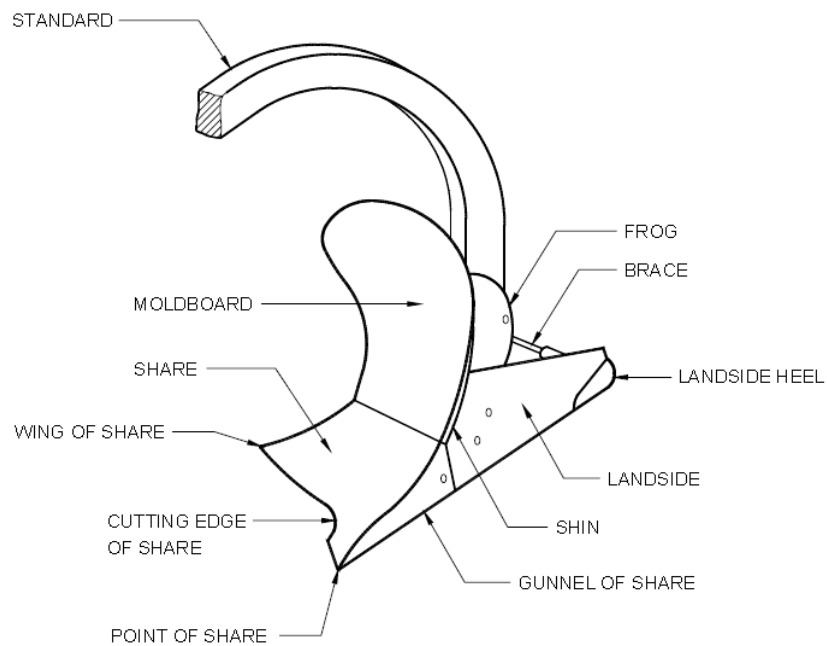


Figure 2 – Mouldboard plough

3.8.1 left-hand plough

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

3.8.2 right-hand plough

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

3.8.3 two-way plough (reversible plough)

reversible plough

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

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

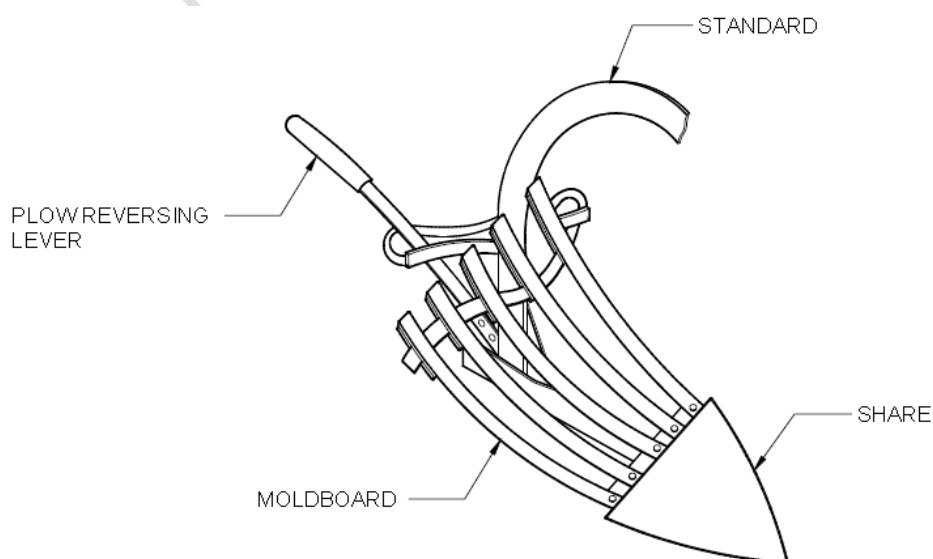


Figure 3 – Reversible plough for two-wheel tractor

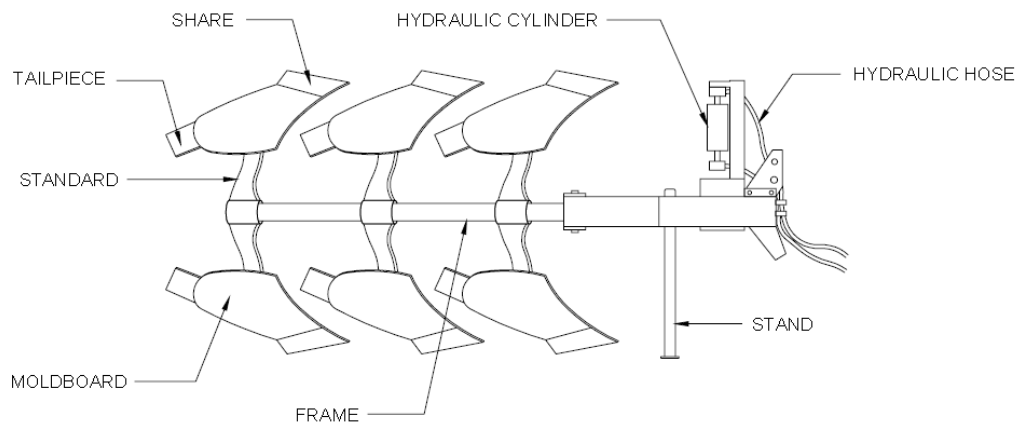


Figure 4 – Reversible plough for four-wheel tractor

3.9 plough bottom

working part of the plough which includes the share, mouldboard, and landside, all attached to the frog

3.10 share

part of the plough 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.

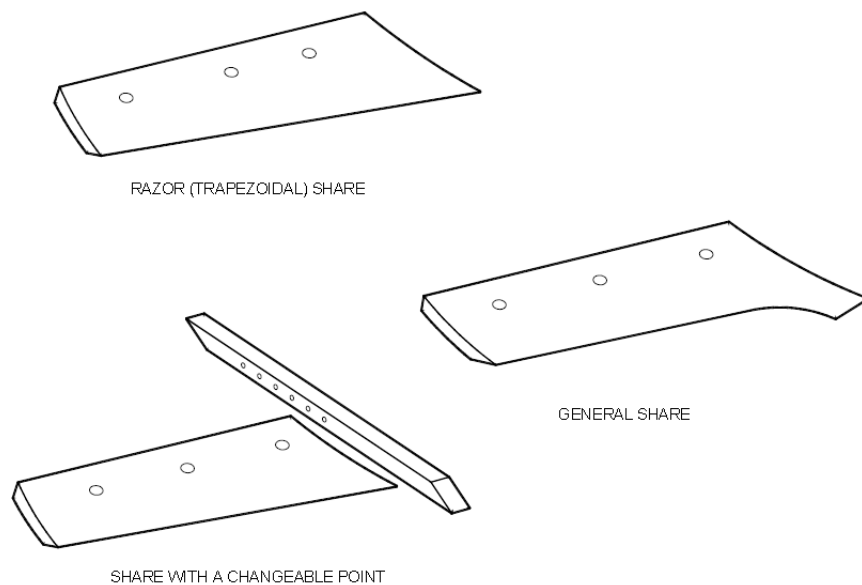


Figure 5 – Types of Share

3.11 shin

leading edge of the mouldboard located above the landside

3.12 standard (leg)

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

3.13 suction, horizontal

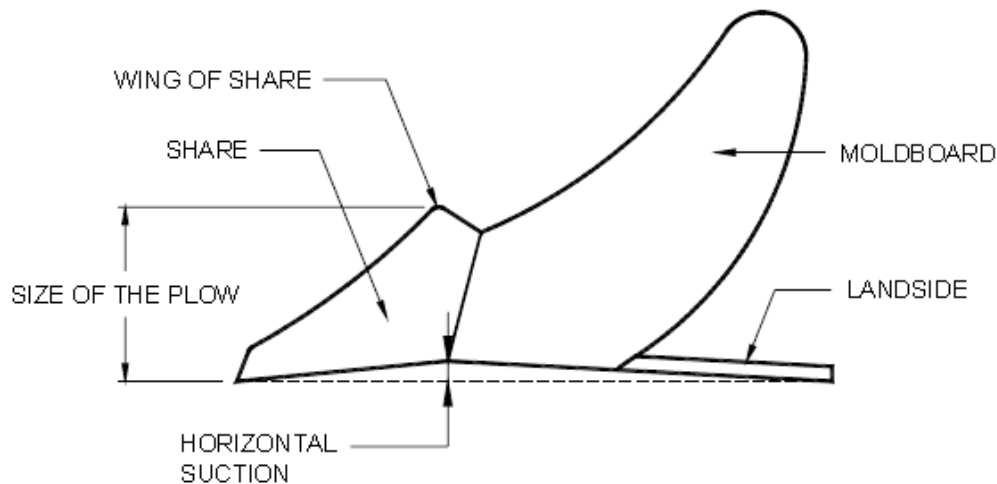
horizontal clearance

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-operated mouldboard plough)

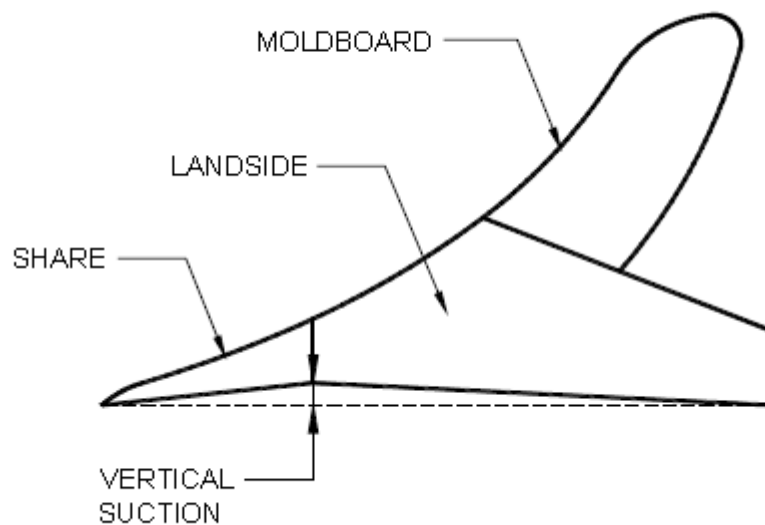
3.14 suction, vertical

vertical clearance

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



a. Top View



b. Side View

Figure 6 – Horizontal and Vertical Suction

3.15 tailpiece

optional accessory, attached to the wing of the mouldboard 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

3.17 four-wheel tractor or riding tractor

self-propelled, wheeled vehicle having two axles designed to carry, pull or propel agricultural implements and machines

3.18 headland

unploughed portion of the field at both ends of the furrow strip initially used for turning the tractor and implement

3.19 mouldboard plough

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

3.20 walking agricultural tractor (two-wheel tractor/ hand tractor/ pedestrian tractor)

two-wheel tractor

hand tractor

pedestrian tractor

self-propelled machine having a single axle designed primarily to pull and propel trailed or mounted agricultural implements and machinery

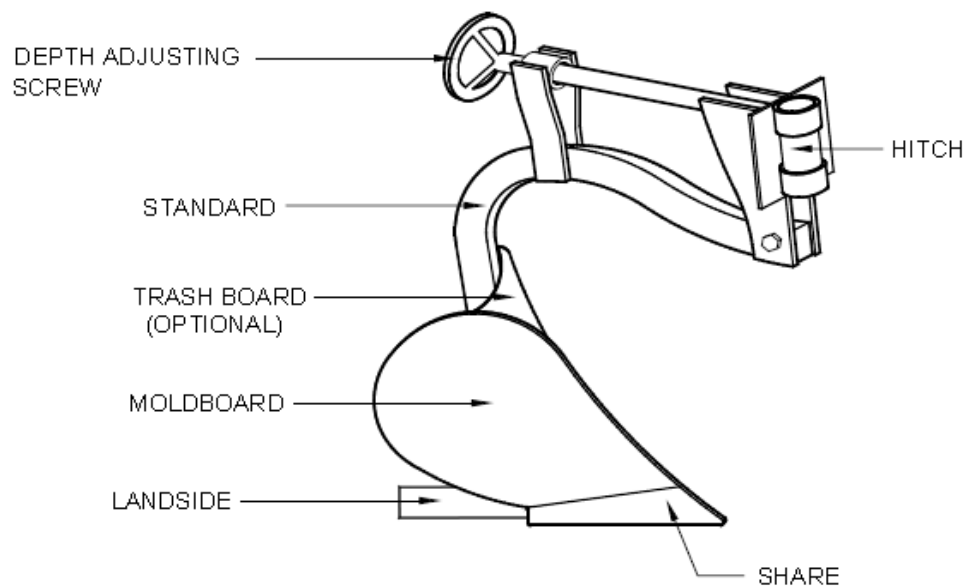
4 Classification**4.1 Tractor-operated mouldboard plough****4.1.1 Two-wheel Tractor (see Figure 7)**

Figure 7 – Mouldboard plough for two-wheel tractor

4.1.2 Four-wheel Tractor**4.1.2.1 Tractor-mounted mouldboard plough**

Type of plough mounted on the tractor's three-point linkage and depends upon the tractor for its general operation (see Figure 8)

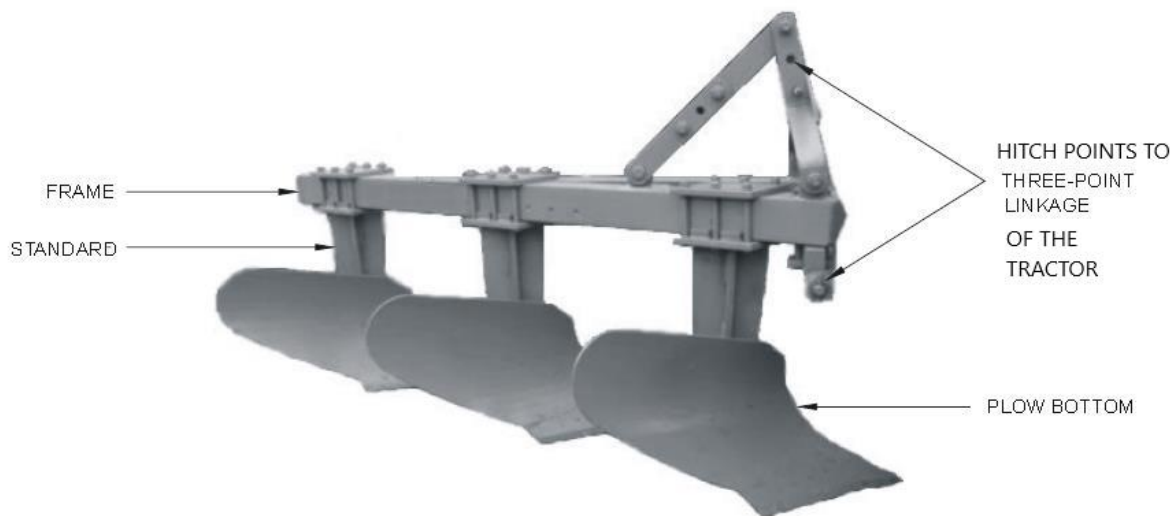


Figure 8 – Tractor-mounted mouldboard plough

4.1.2.2 Semi-mounted mouldboard plough

Type of plough 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 plough is also equipped with hydraulic lines and cylinders for its lifting and/or depth control. (see Figure 9)

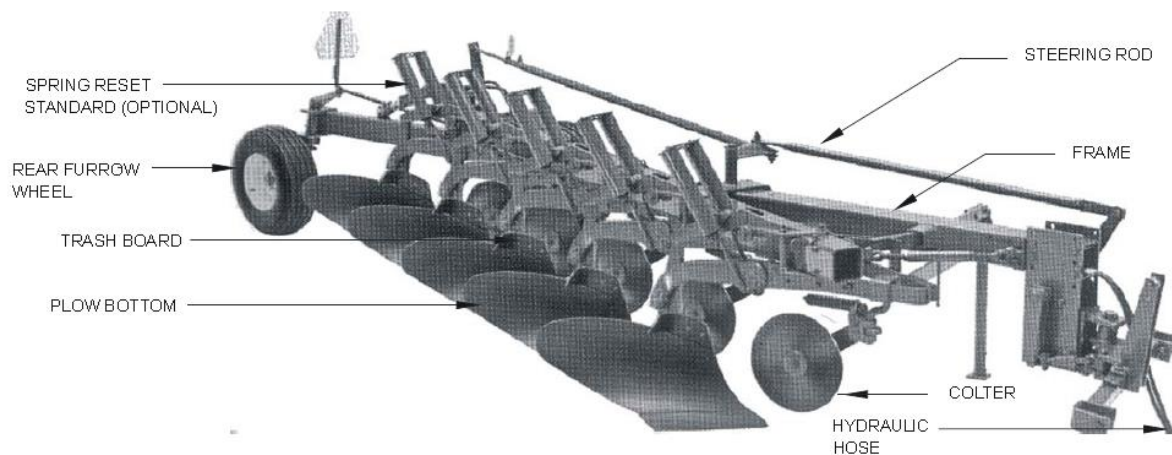


Figure 9 – Semi-mounted mouldboard plough

4.1.2.3 Trailing mouldboard plough

Type of plough 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 10)

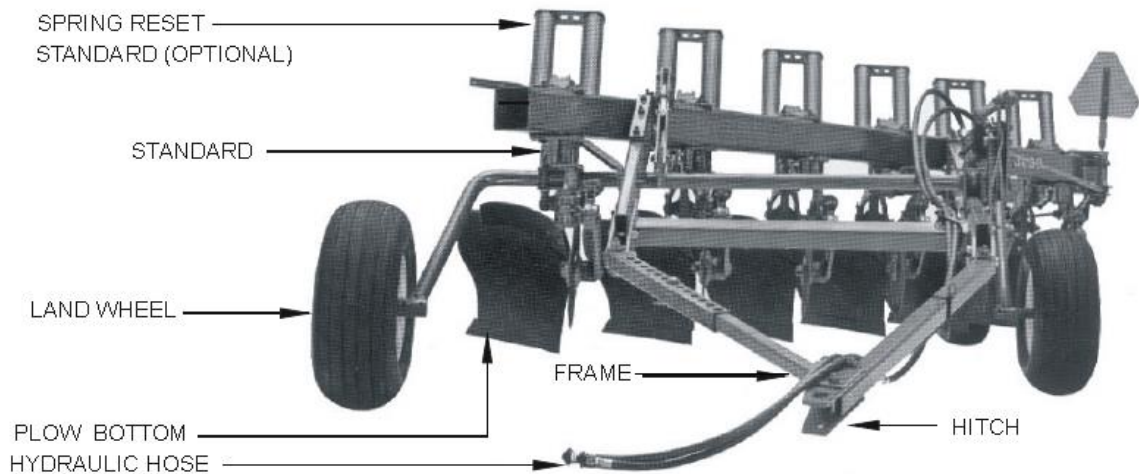


Figure 10 – Trailing mouldboard plough

5 Size

The size of the plough 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 Material requirements

6.1 Tractor-operated ploughs

6.1.1 Two-wheel tractor-operated ploughs

6.1.1.1 Forged steel and/or mild steel should be used in the manufacture of the standard, frame, landside and frog.

6.1.1.2 Forged steel, mild steel, stainless steel and/or hard plastic should be used in the manufacture of the mouldboard.

6.1.1.3 Share and Share Point — The material shall preferably be medium carbon steel of minimum hardness 360 HBW.

6.1.2 Four-wheel tractor-operated ploughs

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

6.1.2.2 Share and Share Point — The material shall preferably be medium carbon steel of minimum hardness 360 Brinell Hardness number.

6.1.2.3 The mouldboard may be coated with plastic or ceramics when used in sticky soils.

7 Performance requirements

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

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

Table 1: Approximate four-wheel tractor engine power for specific mounted and semi-mounted mouldboard plough sizes

Tractor Engine Power kW (hp)	No. of Plow Bottoms	Mouldboard plough 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 mouldboard plough

8.1.1 The hitch of the mouldboard plough shall be compatible with the hitch of the two-wheel tractor.

8.1.2 The hitch of the mouldboard plough shall be compatible with the drawbar or three-point linkage of the four-wheel tractor.

8.2 The plough shall be easy to operate such as:

- hitching to and unhitching from a wheeled tractor;
- adjusting the depth of cut;
- changing the position of the plough with respect to the line of pull of the draft tractor;
- maneuverability during turning;
- clearing blockages such as trashes, weeds, etc; and
- changing from transport mode to work position and vice versa.

9 Workmanship and finish

9.1 The mouldboard plough 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 plough bottom, other uncoated metallic surfaces shall be free from rust and shall be painted properly.

10 Sampling

The mouldboard plough shall be sampled for inspection and testing in accordance with ISO 2859-1.

11 Test methods

The sampled ploughs shall be tested in accordance with DEAS 1182.

12 Marking and Labeling

12.1 Each plough shall be marked with the following information using a plate, stencil or by directly punching it at the most conspicuous place:

- Name of the manufacturer or registered trademark
- Model and size
- Serial number/ Batch number
- Country of origin
- Safety/precautionary markings shall be provided.

- 12.2 The markings shall have a durable bond with the base surface material. The markings shall be weather resistant and under normal cleaning procedures, it shall not fade, discolor, crack or blister and shall remain legible. Safety/precautionary markings shall be in red color with a white background.

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Bibliography

- 1) PAES 131:2004, Agricultural Machinery – Mouldboard plough – Specifications

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