

DRAFT EAST AFRICAN STANDARD

Agricultural machinery — Disc ploughs — Specification

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 1181:2023 was prepared by Technical Committee EASC/TC 042, *Production and general engineering*.

Agricultural machinery — Disc ploughs — Specification

1 Scope

1.1 This draft East African Standard specifies the requirements for disc ploughs used in four-wheel tractors or riding agricultural tractors.

1.2 This standard does not cover two-wheel tractors or walking agricultural tractors.

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 730, *Agricultural wheeled tractors — Rear-mounted three-point linkage — Categories 1N, 1, 2N, 2, 3N, 3, 4N and 4*

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 moldboard ploughs — Test methods*

3 Terms and definitions

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

3.1 concave disc

circular concave steel plate used for cutting and inverting the soil

3.2 concavity

vertical distance measured from the lowest point to the center of the disc when its concave side is placed on a flat surface

3.3 disc plough

implement with individually mounted concave disc blades which cut, partially or completely invert soil slices to bury surface material, and pulverize the soil

NOTE Blades are attached to the frame in a tilted position relative to the frame and to the direction of travel for proper penetration and soil displacement.

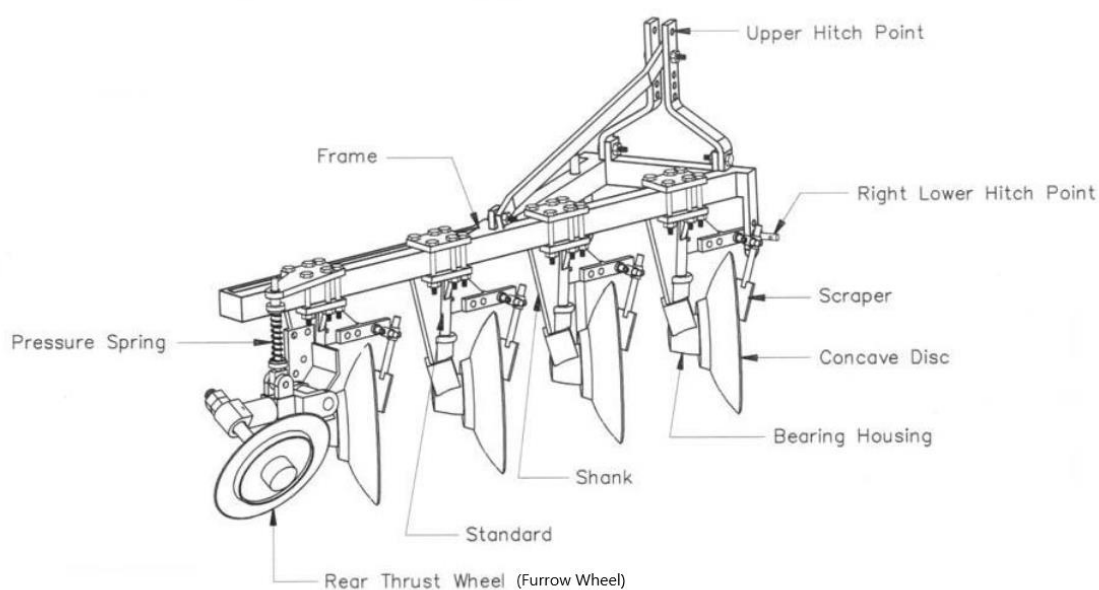


Figure 1 – Disc plough and its components

3.4 frame

structure on which the standards are fitted (see Figure 1)

3.5 hitch

portion of an implement designed to connect the implement to a power source (see Figure 1)

3.6 scraper

component which scrapes the soil adhering to the concave side of the disc (see Figure 1)

3.7 side angle (disc angle)

angle, in the soil surface plane, between a tool axis and a line, which is perpendicular to the direction of travel (see Figure 2)

3.8 standard

upright support which connects the shank to tillage implement frame (see Figure 1).

3.9 tilt angle

angle, in a vertical plane perpendicular to the direction of travel, between a tool axis and the soil surface (see Figure 2)

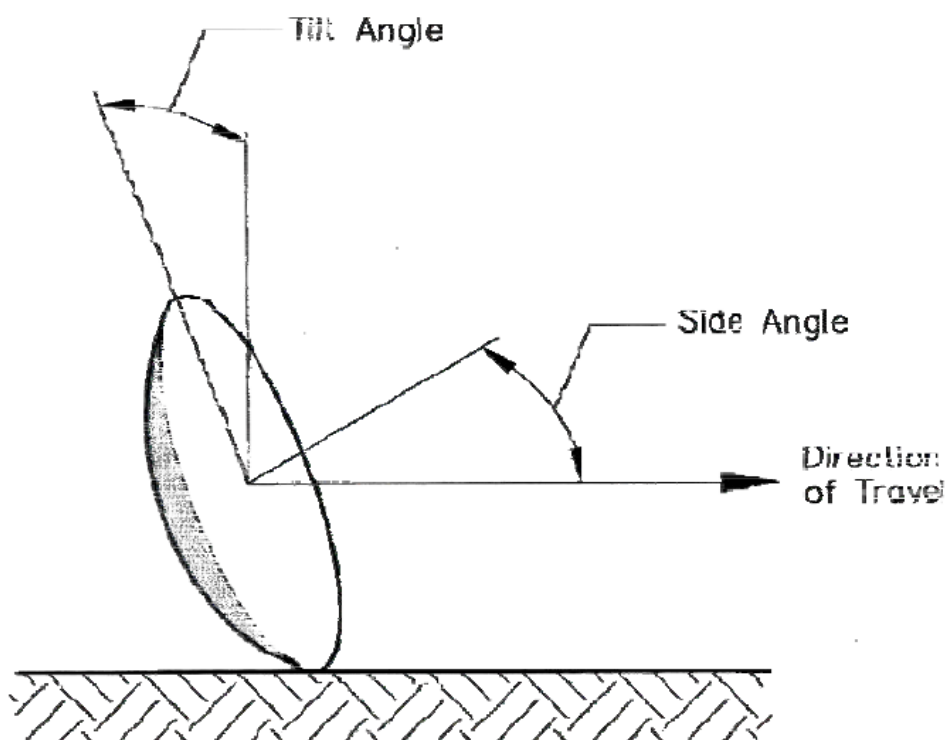


Figure 2 – Disc and tilt angle

3.10 width of cut

transverse distance between either the top or bottom cutting edges of the end discs

NOTE For measuring the width of cut, the tilt angle shall be set at 15° to 25° . For non-adjustable plough disc blades, the tilt angle shall be set at 18° to 20° .

4 Classification

4.1 One-way disc plough

Tractor-mounted or integral one-way disc ploughs are attached to the tractor by three-point hitch linkages and are fully carried by the tractor during transport.

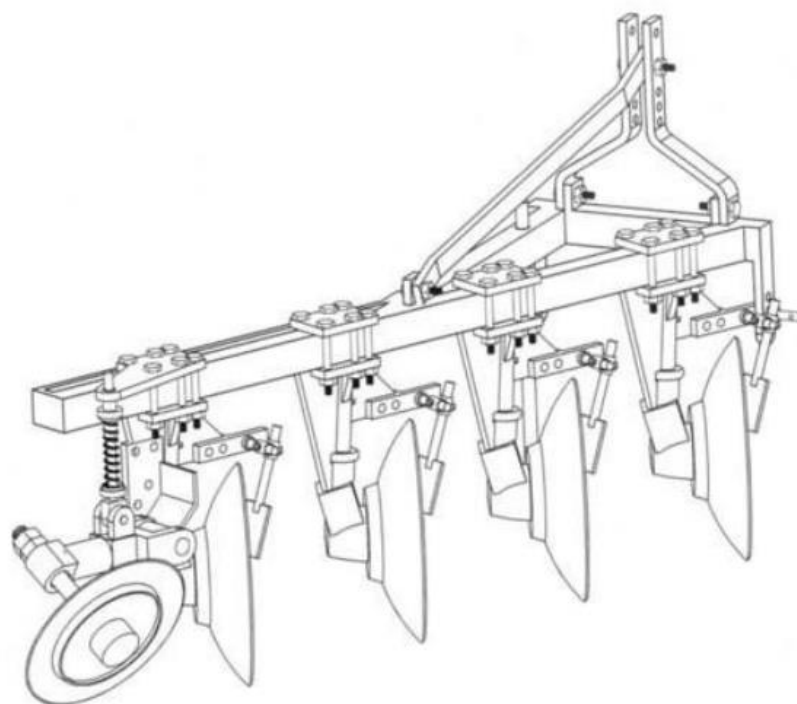


Figure 3 – Tractor-mounted disc plough

4.2 Reversible disc plough

4.2.1 Tractor-mounted reversible disc plough

This plough is attached to the three-point hitch and is fully carried by the tractor in transport. This type is usually limited in size (2-4 discs) due to tractor front-end stability and hydraulic lift capacity. (see Figure 4)

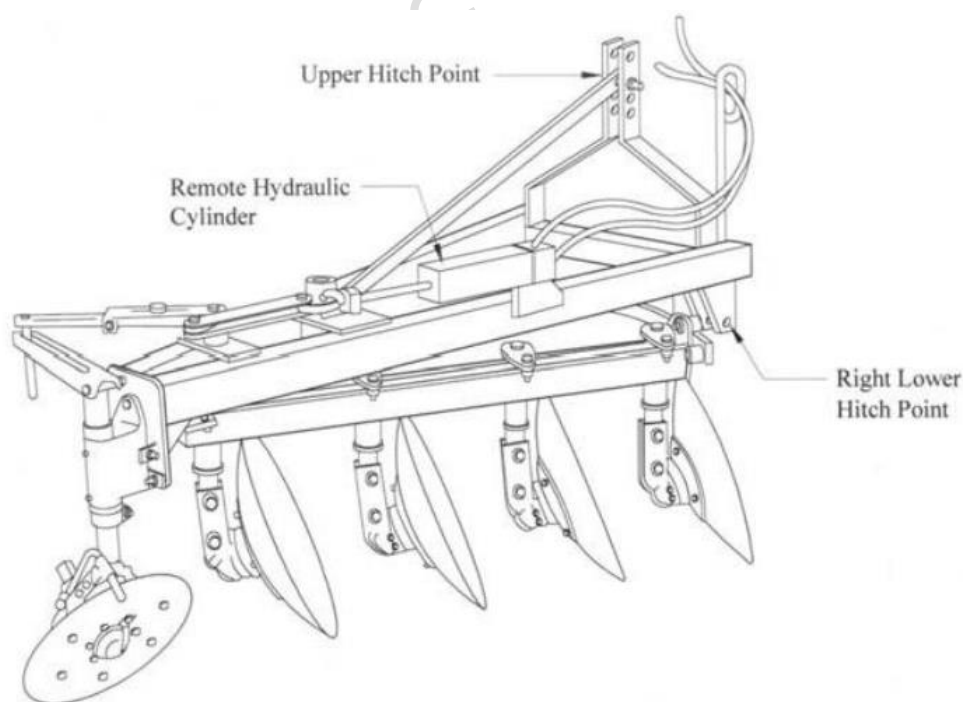


Figure 4 – Tractor-mounted reversible disc plough

4.2.2 Semi-mounted reversible disc plough

Semi-mounted or semi-integral reversible disc plough is attached to the tractor's lower hitch points and is raised/ lowered by the tractor hitch as well as a remote hydraulic cylinder on the rear transport wheel. On some of these ploughs, the rear wheel operates on the land and serves as a gauge wheel

when ploughing and as transport wheel (free to caster) when the plough is raised. The rear wheel is an attachment for converting a fully integral, reversible disc plough to semi-integral operation. (see Figure 5)

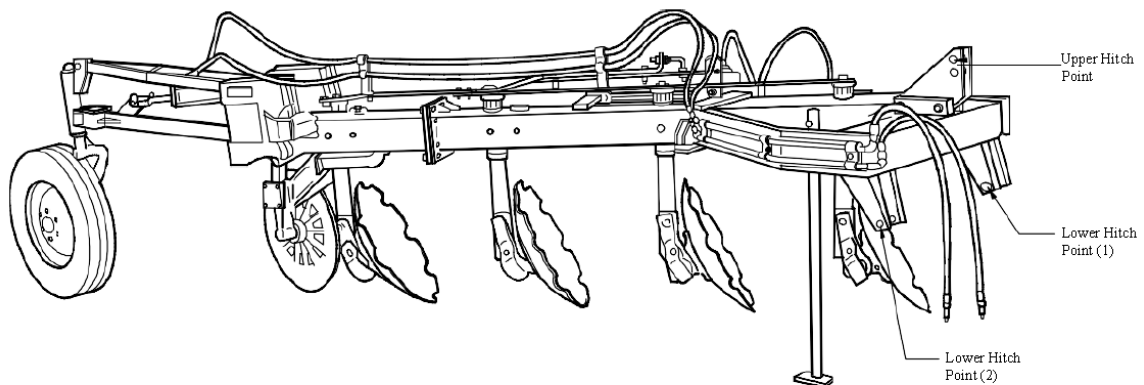


Figure 5 – Semi-mounted reversible disc plough

5 Size

The size of the plough shall be determined by the number and diameter of the discs and the width of cut. For size determination, width of cut shall be calculated by the following formula:

$$W = \frac{0.95NS + 0.3D}{1000}$$

Where: W is the width of cut, m
 N is the number of discs
 S is the disc spacing, mm
 D is the diameter of the disc, mm

6 Materials of construction

6.1 Mild steel shall be used in the manufacture of the frame, scraper, thrust wheel and hitch.

6.2 Mild steel, forged steel or tool steel shall be used in the manufacture of spool.

6.3 Carbon steel shall be used in the manufacture of hitch pin

6.4 Carbon steel shall be of minimum hardness 360 HBW used in the manufacture of the disc blades.

6.5 High carbon steel shall be used in the manufacture of standard.

7. Construction requirements for mounted and semi - mounted disc ploughs

7.1 The disc plough shall conform to the following requirements as shown in Table 1.

Table 1 – Construction requirements for disc plough

Items	Requirements
Type of disc	plain or notched
Number of disc	2 to 8
Diameter of discs, mm	260 to 810
Working width, mm	150 to 2000
Working depth, mm	50 to 400
Frame height, mm	300 to 800
Disc spacing, mm	300 to 750
Weight per disc*, kg	15 to 250
Drawbar power requirement per disc, kW (hp)	5 to 20 (6.7 to 26.8)
* It is the total weight of the plough divided by the number of discs.	

7.2 The thickness of the disc varies with the disc diameter, as shown in Table 2.

Table 2 – Disc diameter and its thickness

Disc diameter, mm	Thickness, mm
560	4 to 6
610	4 to 6
660	5 to 6.5
710	6.5 to 7.5
760	8 to 10
810	8 to 12
Note: The thickness of the disc is measured at the centre	

7.3 The concavity of the disc varies with the disc diameter, as shown in Table 3.

Table 3 – Disc diameter and its concavity

Disc diameter, mm	Concavity, mm
560	60 to 92
610	60 to 106
660	69 to 124
710	82 to 140
760	89 to 137
810	104 to 144

8 Performance requirements

8.1 The maximum depth of cut of the plough specified by the manufacturer shall be attained.

8.2 During operation, the plough shall produce good quality of work such as: quality of inversion (ease of burying plant residues) and uniformity of soil clods, especially between successive passes.

9 Other requirements

9.1 Each disc shall be fastened securely to the hub with four or five agricultural bolts.

9.2 The frame shall be rigid and durable.

9.3 The scrapers are fitted in such a way that they shall not touch the face of disc and shall be able to scrape the soil effectively.

9.4 Grease points for lubrication of bearings shall be provided. The bearings shall be properly aligned and provided with special dirt seals.

9.5 The hitch of the disc plough shall be compatible with the hydraulic system and the three -point linkages of the tractor.

9.6 The plough shall be easy to operate such as:

- a. hitching to and unhitching from tractor;
- b. adjusting the depth of cut;
- c. changing the position of the plough with respect to the line of pull of the tractor;
- d. moving the standards laterally on the frame;
- e. maneuverability during operation;
- f. clearing blockages;
- g. changing from transport to work position and vice versa; and
- h. adjustment of the scrapers when fitted.

10 Workmanship and finish

10.1 The disc plough shall be free from manufacturing defects that may be detrimental to its operation.

10.2 Except for disc blades, other uncoated metallic surfaces shall be free from rust and shall be painted properly.

10.3 The disc plough, except for disc blades, shall be free from sharp edges and surfaces that may injure the operator

11 Marking and labeling

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

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

11.2 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.

12 Sampling

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

13 Test methods

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

DEAS FOR PUBLIC COMMENTS STAGE

Bibliography

- 1) PAES 121:2001 Agricultural machinery – Disc plough – Specifications
- 2) TZS 1416:2011 Agricultural equipment – Disc ploughs – Specifications

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