

PHILIPPINE NATIONAL STANDARD

PNS/BAFS 413:2025
ICS 65.060.20

Disc Harrow — Methods of Test



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Foreword

The Department of Agriculture (DA)-Bureau of Agriculture and Fisheries Standards (BAFS) was mandated under Section 21 (Standards Development and Enforcement) particularly Rule 21.2 of the Implementing Rules and Regulations (IRR) for Republic Act (RA) No. 10601 (Agricultural and Fisheries Mechanization [AFMech] Law) to update existing standards under the Philippine Agricultural Engineering Standards (PAES) in collaboration with concerned agencies.

In 2022, the DA-Bureau of Agricultural and Fisheries Engineering (BAFE) endorsed a list of aged PNS/PAES/PABES with concerns to DA-BAFS to be considered for revision/amendment, which commenced after the standard was presented by the DA-BAFS during the DA-Philippine Council for Agriculture and Fisheries (PCAF)-National Sectoral Committee on Agriculture and Fishery Mechanization (CAFMech) Regular Meeting held on October 30, 2024. Accordingly, PAES 133:2004 (Agricultural Machinery — Disc Harrow — Methods of Test) was included in the 2025 priority list for standardization to update its provisions in line with evolving industry practices and enhance clarity, consistency, and usability for stakeholders. The development of the standard was prompted through a Table Review to validate and re-evaluate the relevance and applicability of methods of test against current scientific and technological developments, regulatory, and market requirements, and industry practices while ensuring alignment with related regional and international standards.

The revision was guided by the Technical Working Group (TWG) officially created under Special Order (SO) No. 745, series of 2025 (Composition of Technical Working Groups (TWG) and Project Management Team (PMT) for the Development of the PNS for Agricultural and Fishery Products and Machinery). The TWG was composed of representatives from the relevant government agencies, academe/research institutions/intergovernmental organizations, private sector organizations, and Civil Society Organizations (CSO). The draft PNS underwent a series of TWG writeshops and stakeholder consultations conducted via online platforms and a hybrid setup before its endorsement to the DA Secretary for approval.

This Standard includes the following significant changes compared to the previous version:

- a) Modification on the scope;
- b) Revision on the terms and definitions and inclusion of overall height, overall length, and overall width;
- c) Inclusion of principles of test;
- d) Modification in the general considerations and test site conditions;
- e) Modification in the performance test and procedures and changing 7 to 8 kph to 6 to 8 kph traveling speed of the machine;
- f) Inclusion of provisions related to noise level;
- g) Modification in the test report information; and
- h) Modification on all annexes and inclusion of a new annex related to soil analysis.

This document cancels and replaces PAES 133:2004 which has been technically

revised. This document was written in accordance with the formatting and editorial rules of the Standardization Guide No. 1 (Writing the PNS) and SG No. 5 (Writing the PNS for Agricultural and Fishery Machinery and Infrastructures) standard developed by the Standards Development Division (SDD) of the BAFS-DA.

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1 Scope

This Standard specifies the methods of test and inspection for disc harrows with four-wheel tractors. Specifically, it shall be used to:

- a) Verify the mechanism, main dimensions, materials, accessories of disc harrow, and the list of specifications submitted by the test applicant;
- b) Determine the performance of the machine;
- c) Describe the handling and safety features; and
- d) Prepare the test report.

2 Normative References

The following documents are referred to in the text in such a way that some or all their contents constitute the requirements of this document. The latest edition of the referenced document (including any amendments) applies.

Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2025). Disc Harrow — Specifications (PNS/BAFS 412:2025).

3 Terms and Definitions

For the purpose of this Standard, the definitions given in PNS/BAFS 412:2025 (Disc harrow — Specifications) and the following shall apply:

3.1

overall height

distance between the horizontal supporting plane surface and the horizontal plane touching the uppermost part of the machine (Agricultural Machinery Testing and Evaluation Center [AMTEC]-University of the Philippines Los Baños [UPLB], 2021)

3.2

overall length

distance between the vertical planes perpendicular to the median plane of the machine, each plane touching the front and rear extremities of the machine (AMTEC-UPLB, 2021)

3.3

overall width

distance between the vertical planes parallel to the median plane of the machine, each plane touching the outermost point of the machine on its left and right sides (AMTEC-UPLB, 2021)

4 Principles of Test

The test shall be carried out to verify the actual specifications of the disc harrow. Its specifications shall be validated with PNS/BAFS 412:2025 (Disc harrow — Specifications).

5 Test Equipment and Materials

The test shall be carried out using the suggested minimum list of test equipment and materials in Annex A (Minimum list of test equipment and materials). The test equipment and instruments to be used shall be calibrated regularly, physically checked for operation, and shall be cleaned before and after each test.

6 General Considerations

6.1 Test site conditions

6.1.1 The test site should be in an appropriate environment with ample space and suitable for safe working conditions.

6.1.2 The test shall be carried out on a plowed dry plot as specified by the manufacturer, where the conditions of the plot are to be recorded. The plot shall have a loamy or clay soil texture but shall not be sand/sandy. Soil texture, soil moisture content, and soil bulk density shall be determined using the recommended methods given in Annex B (Soil Analysis [Laboratory Method])

6.1.3 Harrowing operation shall be done in plots of not less than 1,000 m² and should be rectangular in shape with sides in the ratio of 2:1.

6.1.4 The soil moisture content of the test site shall be determined right before the harrowing of the soil.

6.1.5 The test site should be relatively flat and should have minimal stones.

6.2 Pre-test activities

6.2.1 Running-in and preliminary adjustments

The disc harrow shall have undergone a running-in period, and various adjustments shall be made by the test applicant according to the manufacturer's recommendation prior to the conduct of testing to ensure the readiness of the machine.

6.2.2 Verification of specifications

The specifications claimed by the manufacturer and other physical details given in Annex C (Specifications of disc harrow) shall be verified. A stable and level surface shall be used as a reference plane for verification of dimensional machine specifications when fully assembled and ready for testing.

6.2.3 Preparation of the disc harrow for testing

The disc harrow shall be checked to ensure that the machine has been properly assembled and installed in conformance with the instructions of the manufacturer. It shall undergo a running-in according to the protocol of the testing agency. The tractor to be used shall be compatible with the harrow in accordance with the manufacturer's specification of required power.

6.3 Suspension/termination of test

6.3.1 During the test run, if the disc harrowing operation stops (due to minor breakdown or malfunction), the test shall be suspended. The test applicant shall be given an opportunity to make minor repairs or adjustments within a reasonable time.

6.3.2 The test shall be terminated if the machine is unable to continue operation after three attempts and all efforts have been exerted without replacing any major parts that can affect the performance of the machine. The test applicant has the option to terminate the test voluntarily at any stage of the testing process. In cases of a terminated test, a test report shall be prepared.

7 Performance Test and Procedures

7.1 Field performance test

The performance test shall be carried out to obtain actual data on the overall performance of the equipment.

7.1.1 Operational pattern

Field capacity and field efficiency are influenced by the field operational pattern. The operational pattern shall follow the circuitous pattern rounded corners as shown in Figure 1.

7.1.2 Test trial

The test shall be conducted with at least three test trials. Test data shall be measured for each pass.

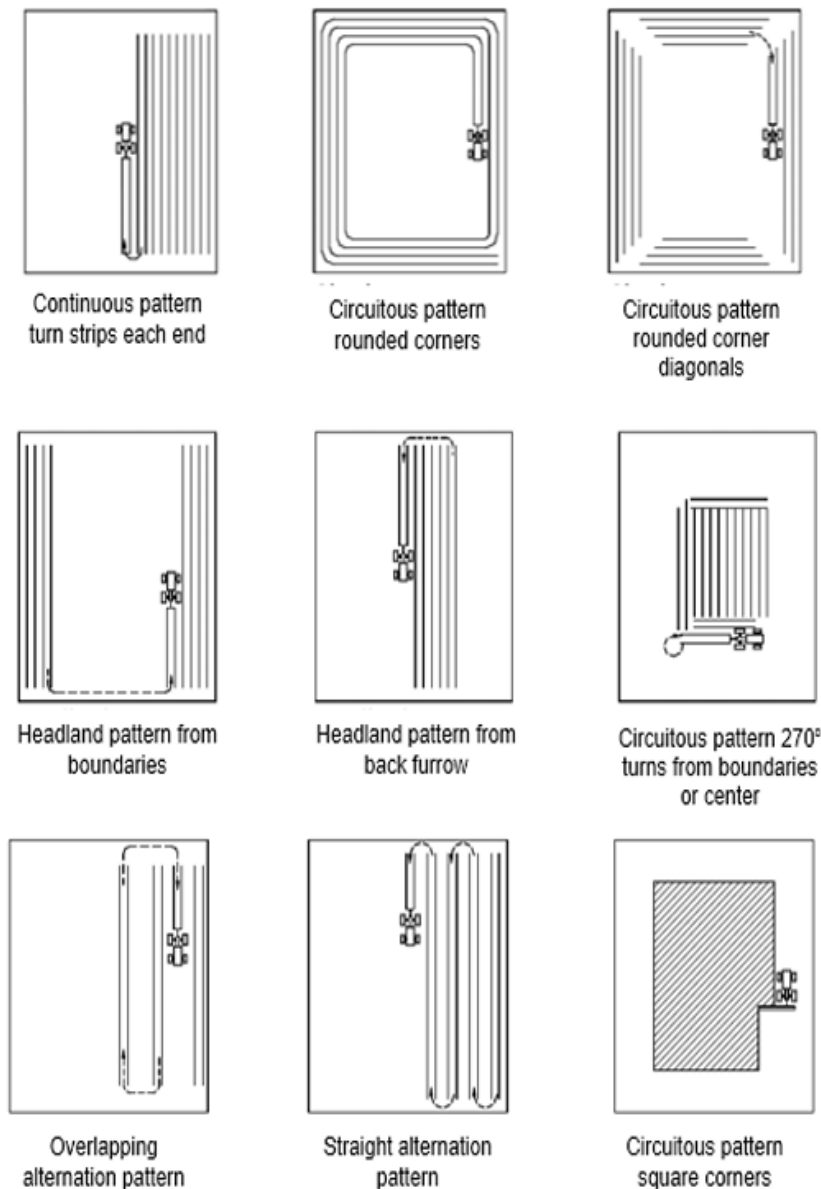


Figure 1. Field operational patterns (Regional Network for Agricultural Machinery [RNAM], 1995)

7.1.3 Test conditions

- 7.1.3.1** For single-action disc harrow, the travelling speed of 6 to 8 kph shall be maintained during operation. Two passes shall be done on the longer side of the plot.
- 7.1.3.2** For double-action or offset disc harrow, the travelling speed of 6 to 8 kph shall be maintained during operation. One pass shall be done on the longer side of the plot.

implement-mounted tractor through the dynamometer in neutral gear but with the implement in the operating position as shown in Figure 3. The draft in the measured distance of 20 m as well as the time it takes to traverse it shall be read and recorded. On the same plot, the draft in the same distance shall be read and recorded while the implement is lifted above the ground. The difference is the draft of the implement.

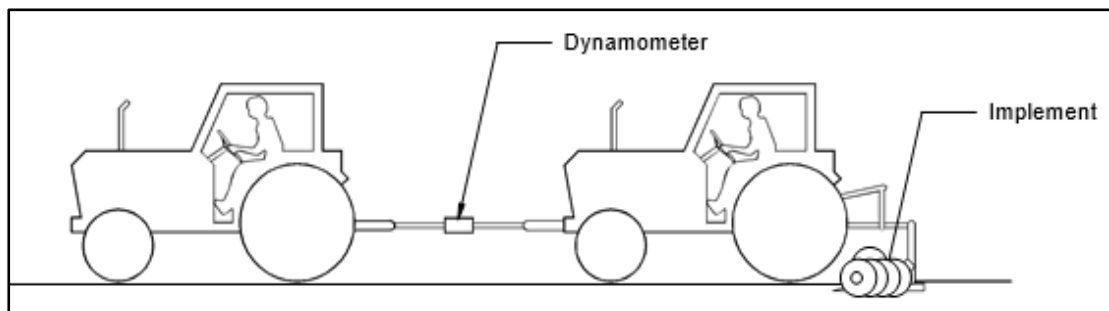


Figure 3. Draft measurement (adapted from AMTEC-UPLB, 2010)

7.4 Fuel consumption

The energy consumption of engine of the prime mover of the disc harrow may be obtained using any of the following methods:

a) Refilling the fuel tank

The fuel consumption of the machine shall be obtained by measuring the volume of fuel refilled after the test. The tank shall be filled to full capacity before and after each trial. The total operating time of the machine shall be recorded. The fuel consumption shall be computed using the formula specified in Annex D (Formula used for calculation and testing).

b) Using fuel consumption meter

The fuel consumption shall be obtained by connecting the engine fuel line to a fuel consumption meter. The total time to consume a given volume of fuel (e.g., 10 mL, 15 mL) shall be recorded. The fuel consumption shall be computed using the formula specified in Annex D (Formula used for calculation and testing).

7.5 Noise level

7.5.1 The sound emitted by the four-wheel tractor used during the harrowing operation, shall be measured 50 mm away from the ear level of the operator/s using a sound level meter, expressed in decibel [dB (A)].

- 7.5.2** There shall be a minimum of five observations in a two-minute interval. Before collecting data, it should be ensured that the operations and other functional characteristics of the disc harrow have stabilized. The time or recording shall be properly spaced during the whole duration of the test trial.

7.6 Data recording and observations

All data and information during the test shall be recorded using the record sheet provided in Annex E (Performance test data sheet). Necessary observations and other parameters to be taken during the field performance test should be recorded on this sheet.

8 Formula

The formulas provided in Annex D (Formula used for calculation and testing) shall be used.

9 Test Report

The test report shall include the following information in the given order:

- a) Name of testing agency;
- b) Test report number;
- c) Title;
- d) Summary of results;
- e) Purpose and scope of test;
- f) Methods of test;
- g) Description of the machine;
- h) Specifications;
- i) Results;
- j) Observations (include pictures); and
- k) Names, signatures, and designation of test engineers and assisting technicians.

Annex A
(Informative)

Minimum list of test equipment and materials

| | Test equipment and materials | Quantity |
|---------------|--|----------|
| A.1 | Test equipment and instruments | |
| A.1.1 | Sound level meter Range: 30 dB(A) to 130 dB(A) Resolution: 0.1 dB(A) | 1 |
| A.1.2 | Digital stopwatch (Timer) Resolution: 0.1 sec | 1 |
| A.1.3 | Measuring tape Minimum length: 10 m | 1 |
| A.1.4 | Camera | 1 |
| A.1.5 | Vernier caliper | 1 |
| A.1.6 | Weighing scale | 1 |
| A.1.7 | Graduated cylinder | 1 |
| A.1.8 | Computer | 1 |
| A.1.9 | Fuel consumption meter | 1 |
| A.1.10 | 3-inch-diameter aluminum ring | 1 |
| A.1.11 | Wood block or plastic insertion cap | 1 |
| A.1.12 | Rubber mallet or weight | 1 |
| A.1.13 | Flat-bladed knife | 1 |
| A.1.14 | 18-inch metal rod | 1 |
| A.1.15 | Resealable plastic bags | 6 |
| A.1.16 | Width and depth gauge | 1 |
| A.1.17 | Four-wheel tractor or Two-wheel tractor | 1 |
| A.1.18 | Convection oven or soil moisture meter | 1 |
| A.1.19 | Electronic balance Capacity: 1kg | 1 |
| A.1.20 | Sieve Sizes: 2 mm, 0.05 mm, and 0.0002 mm | 3 |
| A.2 | Test materials | |
| A.2.1 | Marking pegs | 20 |

Annex B
(Normative)

Soil analysis (Laboratory method)

B.1 Soil Texture Determination

- B.1.1** This test is carried out to analyze the soil samples taken during the performance test to determine the soil texture of the test area.
- B.1.2** Three soil samples shall be taken from the test area. Each soil sample shall be weighed and recorded.
- B.1.3** Each soil sample shall then be passed through a series of sieves.
- B.1.4** The type of soil (i.e. sand, silt, and clay) that is retained in a particular sieve shall be weighed. (see Table B.1)

Table B.1. Grain Size for Different Soil Types (AMTEC-UPLB, 2004)

| Soil type | Grain size, mm | Remarks |
|-----------|----------------|---|
| Sand | 2.0 – 0.05 | Passed through the 2 mm sieve but retained by the 0.05 mm sieve |
| Silt | 0.05 – 0.002 | Passed through the 0.05 mm sieve but retained by the 0.002 mm sieve |
| Clay | < 0.002 | Passed through the 0.002 mm sieve |

- B.1.5** The relative composition of each soil type expressed in percent shall be computed as follows:

$$\% \text{ Sand} = \frac{\text{Weight of sand}}{\text{Total weight of soil}} \times 100$$

$$\% \text{ Silt} = \frac{\text{Weight of silt}}{\text{Total weight of soil}} \times 100$$

$$\% \text{ Clay} = \frac{\text{Weight of clay}}{\text{Total weight of soil}} \times 100$$

B.1.6 The relative composition of the sand, silt and clay shall be used to determine the soil type using the soil texture triangle as shown in Figure 4.

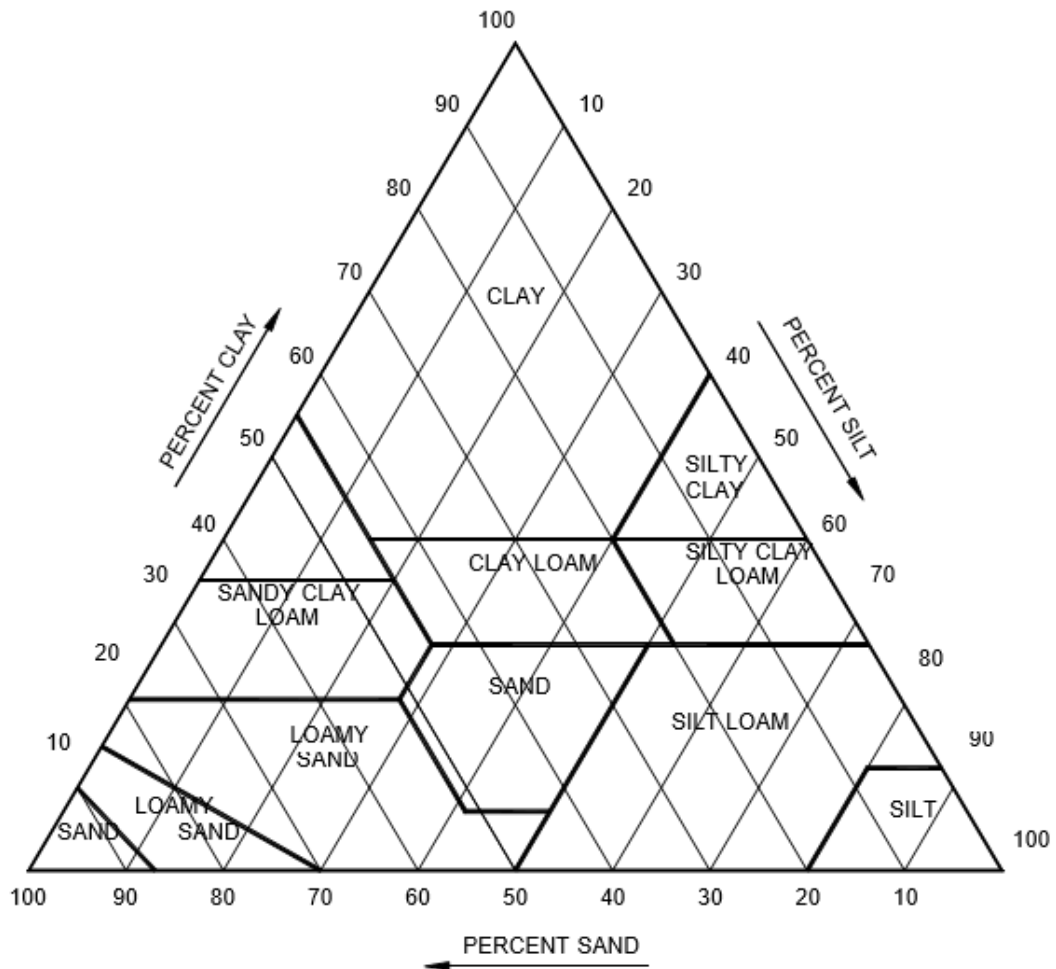


Figure 4. Soil texture triangle showing relative composition of texture class (Soil Survey Division Staff, 1993)

B.2 Soil Moisture Content Determination (Oven method)

B.2.1 This test is carried out to analyze the soil samples taken during the performance test to determine the soil moisture of the test area.

B.2.2 Three core soil samples in at least three different locations of test plots shall be taken randomly from the test area. Each soil sample shall be weighed and recorded as initial weight.

B.2.3 The samples shall be dried using a convection oven maintained at 105°C for at least eight hours.

B.2.4 The oven dried sample shall then be placed in a desiccator. Each soil sample shall be weighed and recorded as oven-dried weight.

B.2.5 The soil moisture (% dry weight basis) shall be computed as follows:

$$\text{Soil Moisture (\%dry weight basis)} = \frac{W_i - W_f}{W_f} \times 100$$

where:

W_i is the initial weight of the soil, kg

W_f is the oven-dried (final) weight of the soil, kg

B.2.6 The soil moisture content can also be measured using a soil moisture meter.

B.3 Bulk density determination

B.3.1 Soil sampling

B.3.1.1 A bottomless drum is to be placed on the soil. The bottomless drum shall be filled with water, allowing to wet naturally for 24 hours.

B.3.1.2 An undisturbed flat horizontal surface in the soil at a depth to be sampled shall be prepared.

B.3.1.3 The steel ring should be gently pushed into the soil. Pushing the ring in too far should be avoided.

B.3.1.4 The ring should be excavated without disturbing or loosening the soil it contains. The ring should be carefully removed with the soil intact

B.3.1.5 Any excess soil shall be removed from outside the ring along with any plants or roots at the soil surface.

B.3.1.6 The soil shall be placed into the plastic bag with appropriate marks, date and location, and seals.

B.3.2 Bulk density calculation

B.3.2.1 The soil sample shall be dried using a convection oven maintained at 105°C for at least eight hours.

B.3.2.2 The oven dried sample shall then be placed in a desiccator. The soil sample shall be weighed and recorded as oven-dried weight.

B.3.2.3 The volume of the ring shall be determined.

B.3.2.4 The bulk density can be computed as follows:

$$\text{Bulk density} = \frac{W}{V_s}$$

where:

W is the oven-dried weight of the soil, g
 V_s is the soil volume, cm³

Annex C
(Normative)

Specifications of disc harrow

Name of Applicant : _____
 Address : _____
 Tel. No. : _____

GENERAL INFORMATION

Make : _____ Type : _____
 Serial No. : _____ Brand and Model: _____
 Country of Manufacture/Origin : _____ Date of Manufacture : _____
 Testing Agency : _____ Test Engineer : _____
 Location of Test : _____ Date of Test : _____

| No. | Item ^a | Manufacturer's specification | Verification by the testing agency |
|----------------|--------------------------------------|------------------------------|------------------------------------|
| C.1 | Overall dimensions and weight | | |
| C.1.1 | Length, mm | | |
| C.1.2 | Width, mm | | |
| C.1.3 | Height, mm | | |
| C.1.4 | Weight, kg | | |
| C.1.5 | Weight per disc, kg | | |
| C.2 | Gangs | | |
| C.2.1 | Quantity | | |
| C.2.2 | No. of gangs | | |
| C.2.3 | Gang spacing, mm | | |
| C.2.4 | Gang Angle | | |
| C.2.4.1 | Front Gang Angle (if applicable) | | |
| C.2.4.2 | Rear Gang Angle (if applicable) | | |
| C.2.5 | Disc Angle | | |
| C.2.6 | Size and shape of gang shaft | | |
| C.3 | Disc | | |
| C.3.1 | Brand | | |
| C.3.2 | Make | | |
| C.3.3 | Type | | |
| C.3.4 | Diameter, mm | | |
| C.3.5 | Thickness, mm | | |
| C.3.6 | Concavity, mm | | |
| C.3.7 | Disc spacing, mm | | |
| C.3.8. | No. of discs | | |
| C.4 | Scraper (if applicable) | | |

| No. | Item ^a | Manufacturer's specification | Verification by the testing agency |
|--|--|------------------------------|------------------------------------|
| C.4.1 | Length, mm | | |
| C.4.2 | Width, mm | | |
| C.4.3 | Thickness, mm | | |
| C.5 | Spool | | |
| C.5.1 | Length, mm | | |
| C.5.2 | Shape and size of hole, mm | | |
| C.5.3 | Material | | |
| C.6 | Main frame | | |
| C.6.1 | Length, mm | | |
| C.6.2 | Width, mm | | |
| C.6.3 | Thickness, mm | | |
| C.6.4 | Material | | |
| C.7 | Transport wheels | | |
| C.7.1 | Quantity | | |
| C.7.2 | Width, mm | | |
| C.7.3. | Diameter, mm | | |
| C.8 | Additional weight, kg (if applicable) | | |
| ^a The parameter will be checked upon availability | | | |

Annex D
(Normative)

Formula used for calculation and testing

D.1 Field Capacity Determination

D.1.1 Effective working width

$$S = \frac{W}{2n}$$

where:

S is the effective working width, m
 W is the width of plot, m
 $2n$ is the number of passes

D.1.2 Total distance travelled

$$D = \frac{A}{S} = 2nL$$

where:

D is the total distance traveled, m
 A is the area of the plot, m²
 L is the length of the plot, m

D.1.3 Effective area accomplished

$$A_e = wD = 2nLw$$

where:

A_e is the effective area accomplished, m²
 w is the operating width, m

- a) If effective working width is less than the operating width, the operator has passed over part of the area twice to secure better coverage, therefore:

$$A_o = |A_e - A|$$

where:

A_o is the overlap (area which is harrowed twice), m²

- b) If the effective working width is greater than the operating width, the operator has left part of the area unplowed, therefore:

$$A_u = A - A_e$$

where:

A_u is the unharrowed area (area missed), m²

D.1.4 Actual field capacity

$$afc = \frac{0.006A_e}{t}$$

where:

afc is the actual field capacity, ha/h

t is the time used during the operation, min

D.2 Theoretical field capacity

$$tfc = \frac{w \times S}{10}$$

where:

tfc is the theoretical field capacity, ha/h

w is the operating width, m

S is the speed of operation, kph

D.3 Field efficiency

$$\varepsilon_f = \frac{afc}{tfc} \times 100$$

where:

ε_f is the field efficiency, %

D.4 Fuel consumption rate

$$F_t = \frac{V}{t}$$

where:

F_t is the fuel consumption rate, L/h
 V is the total volume of fuel consumed, L
 t is the total operating time, h

D.5 Effective fuel consumption rate

$$F_e = \frac{10,000V}{A_e}$$

where:

F_e is the effective fuel consumption rate, L/ha
 V is the volume of fuel consumed, L
 A_e is the effective area accomplished, m²

D.6 Power

$$P = \frac{Dv}{100.5}$$

where:

P is the power requirement of the implement, kW
 D is the draft of the implement, kg
 v is the speed of the tractor or draft animal, m/s

D.7 Size

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

a) For single-action:

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

b) For double-action type:

$$W = \frac{0.95NS + 1.2D}{1000}$$

c) For offset type:

$$W = \frac{0.95NS + 0.6D}{1000}$$

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

NOTE For measuring the width of cut, gang angle shall be set at 18° (in case of the offset disc harrow, included angle shall be set at 36°).

Annex E
(Normative)

Performance test data sheet

Test Trial No. : _____ Date : _____
 Test Engineer/s : _____ Location : _____
 Assistants : _____ Machine : _____
 Test Applicant : _____ Manufacturer : _____
 Serial No. : _____ Brand and Model: _____

| | Items | Trials | | | | | | Ave |
|--------------|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----|
| | | 1 | | 2 | | 3 | | |
| | | 1 st | 2 nd | 1 st | 2 nd | 1 st | 2 nd | |
| E.1 | Test conditions | | | | | | | |
| E.1.1 | Type of field operation | | | | | | | |
| E.2 | Condition of the plot | | | | | | | |
| E.2.1 | Location | | | | | | | |
| E.2.2 | Dimensions of plot (L x W), m | | | | | | | |
| E.2.3 | Area, m ² | | | | | | | |
| E.2.4 | Soil type (e.g., clay, clay loam, etc) | | | | | | | |
| E.2.5 | Moisture content, % | | | | | | | |
| E.2.6 | Soil hardness, kg/cm ² (optional) | | | | | | | |
| E.2.7 | Last crop planted (optional) | | | | | | | |
| E.3 | Draft measurement (optional) | | | | | | | |
| E.3.1 | Draft without load, kN | | | | | | | |
| E.3.2 | Draft with load, kN | | | | | | | |
| E.3.3 | Difference, kN | | | | | | | |
| E.4 | Field performance | | | | | | | |
| E.4.1 | Brand and model of the tractor used | | | | | | | |
| E.4.2 | Tractor's gearshift setting | | | | | | | |
| E.4.3 | Traveling or operating speed, kph | | | | | | | |
| E.4.4 | Width of tillage, mm | | | | | | | |
| E.4.5 | Depth of tillage, mm | | | | | | | |
| E.4.6 | Time lost, min | | | | | | | |
| E.4.7 | Turning, min | | | | | | | |
| E.4.8 | Others (specify), min | | | | | | | |
| E.4.9 | Duration of test, min | | | | | | | |

| | Items | Trials | | | | | | Ave |
|---------------|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----|
| | | 1 | | 2 | | 3 | | |
| | | 1 st | 2 nd | 1 st | 2 nd | 1 st | 2 nd | |
| E.4.10 | Actual field capacity, ha/h | | | | | | | |
| E.4.11 | Theoretical field capacity, ha/h | | | | | | | |
| E.4.12 | Field efficiency, % | | | | | | | |
| E.4.13 | Fuel consumption rate, L/h (optional) | | | | | | | |
| E.4.14 | Effective fuel consumption rate, L/h (optional) | | | | | | | |
| E.4.15 | Pattern of operation | | | | | | | |
| E.4.16 | Percent overlap or unharrowed | | | | | | | |

E.2 Observations**E.2.1 Special features**

E.2.2 Ease of handling and stability when machine is working

E.2.3 Quality of finished field for Tilt and Level

E.2.4 Non-adhesion of soil to disc

E.2.5 Ease of making adjustments

E.2.6 Durability of parts (based on wear of soil-working parts, visible deformation, etc)

E.2.7 Other observations (e.g., handling and safety features)

References

- Agricultural Machinery Testing and Evaluation Center (AMTEC)-University of the Philippines Los Baños (UPLB). (2001). Agricultural machinery — Four-Wheel Tractor — Methods of Test (PAES 119:2001). <https://amtec.uplb.edu.ph/wp-content/uploads/2019/07/119a.pdf>
- Agricultural Machinery Testing and Evaluation Center (AMTEC)-University of the Philippines Los Baños (UPLB). (2004). Agricultural machinery — Furrower — Methods of Test (PAES 135:2004). <https://amtec.uplb.edu.ph/wp-content/uploads/2019/07/paes-135.pdf>.
- Agricultural Machinery Testing and Evaluation Center (AMTEC)-University of the Philippines Los Baños (UPLB). (2010). Agricultural machinery — Subsoiler — Methods of Test (PNS/PAES 150:2010). <https://amtec.uplb.edu.ph/wp-content/uploads/2019/07/pns-paes-150-2010.pdf>.
- Agricultural Machinery Testing and Evaluation Center (AMTEC)-University of the Philippines Los Baños (UPLB). (2021). Agricultural and fisheries machinery — General methods of test (AS 001:2021). <https://amtec.ceat.uplb.edu.ph/wp-content/uploads/2023/04/AS-001-2021-Agricultural-and-Fisheries-Machinery-General-Methods-of-Test.pdf>
- Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2025). Disc harrow — Specifications (PNS/BAFS 412:2025).
- Regional Network for Agricultural Machinery (RNAM). (1995). RNAM Test codes and procedures for farm machinery (2nd Ed). United Nations.
- Soil Survey Division Staff. (1993). *Soil survey manual* (U.S. Department of Agriculture Handbook No. 18). U.S. Government Printing Office.

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