

Foreword

The pursuance of this national standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) under the project entitled "Enhancing the Implementation of AFMA Through Improved Agricultural Engineering Standards" which was funded by the Bureau of Agricultural Research (BAR) of the Department of Agriculture (DA).

This standard has been technically prepared in accordance with PNS 01-4:1998 (ISO/IEC Directives Part 3:1997) – Rules for the Structure and Drafting of International Standards.

The word “shall” is used to indicate requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted.

The word “should” is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that certain course of action is preferred but not necessarily required.

In the preparation of this standard, the following documents/publications were considered:

AMTEC Test Reports on Drilling Rigs

Agricultural Mechanization Development Program (AMDP), University of the Philippines Los Baños (UPLB) Model II Drilling Rig – Operator’s Manual

Agricultural Machinery – Drilling Rig – Methods of Test

1 Scope

This standard specifies the methods of test and inspection for drilling rig. Specifically, it shall be used to:

- 1.1 verify the main dimensions, weight, and other technical data of the drilling rig submitted by the manufacturer/dealer
- 1.2 evaluate the operator's manual as to clarity, usefulness and adaptability
- 1.3 determine the performance of the drilling rig during the operation
- 1.4 prepare a report on the results of the tests

2 Reference

The following normative document contains provisions, which, through reference in this text, constitute provisions of this National Standard:

PAES 103:2000, Agricultural Machinery – Method of Sampling

PAES 127:2002, Agricultural Machinery – Drilling Rig – Specifications

3 General Conditions for Test and Inspection**3.1 Drilling Rig on Test**

The drilling rig submitted for test shall be sampled in accordance with PAES 103. The manufacturer/dealer shall submit the technical data and information of the drilling rig.

3.2 Role of the Manufacturer/Dealer

The manufacturer/dealer shall submit to the official testing agency the specifications and other relevant information on the drilling rig. An official representative shall be appointed to conduct minor repair, handle, adjust and witness the test. It shall be the duty of the representative to make all decisions on matters of adjustment and preparation of the machine for testing. The manufacturer/dealer shall abide with the terms and conditions set forth by the official testing agency.

3.3 Preparation of Drilling Rig for Testing

The drilling rig shall be installed complete with accessories necessary for its operation.

3.4 Pre-test Operation of the Drilling Rig

The pre-test operation of the drilling rig shall be done by the manufacturer's representative(s) prior to testing.

3.5 Operation of the Drilling Rig

During test, the drilling rig shall be operated by the manufacturer's official representative(s) in accordance with the published operator's manual.

3.6 Suspension of Test

If during test run, the drilling rig malfunctions so as to affect the machine's performance, the test may be suspended with the concurrence of both the official testing agency and the manufacturer's representatives.

4 Tests and Inspection

4.1 Verification of Manufacturer's Technical Data and Information

4.1.1 This inspection is carried out to verify that the main dimensions, weight of the drilling rig and other pertinent data conform to the list of technical data and information submitted by the manufacturer.

4.1.2 A plain and level surface shall be used for this investigation.

4.1.3 Observations of the following data shall be made:

4.1.3.1 Portability of equipment (including weight and space requirement);

4.1.3.2 Adequacy of arrangements for lubrication of moving parts;

4.1.3.3 Presence of safety features; and

4.1.3.4 Whether operator's manual and spare parts catalogue, accessories, and special tools required for adjustments and repair are available and are supplied to buyers.

4.1.4 The items to be inspected, verified and observed are given in Annex A.

4.2 Performance Tests

4.2.1 At least two separate test trials shall be carried out with the same setting at different locations. The test is finished if the recommended depth of drilling at the desired diameter is attained.

4.2.2 The drilling rig shall be operated for at least 100 mm diameter of bore hole and minimum depth of 30 m.

4.2.3 The time of operation shall be recorded starting from the time the drilling bit touches the soil surface and ended as soon as the recommended depth and diameter of bore hole has been attained. The time in adding drilling stems shall be included.

4.2.4 During operation, the operating speeds of the engine and gearbox shall be recorded.

4.2.5 The fuel consumption of the engine(s) shall be taken.

4.2.6 During operation, soil samples shall be obtained at different depths to establish the soil profile description of the test area.

4.2.7 Items to be measured and recorded are given in Annex B.

4.3 Laboratory Analysis

4.3.1 This test is carried out to analyze the soil samples taken during the performance test to determine the soil profile description of the test area.

4.3.2 Each soil sample taken at different depths is initially weighed and then passed through series of sieves.

4.3.3 The type of soil (i.e. gravel, sand, silt and clay) that is retained in a particular sieve corresponding to its grain size is then weighed. (see Table 1)

Table 1 – Soil Type based on its Grain Size

Soil Type	Grain Size mm	Remarks
Gravel	> 2.0	Retained by the 2 mm sieve
Sand	2.0 – 0.05	Passed through the 2 mm sieve but retained by the 0.05 mm sieve
Coarse	2.0 – 0.5	Passed through the 2 mm sieve but retained by the 0.5 mm sieve
Medium	0.5 – 0.25	Passed through the 0.5 mm sieve but retained by the 0.25 mm sieve
Fine	0.25 – 0.05	Passed through the 0.25 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

4.3.4 The total weight, individual weights of soil based on grain size, and percent by weight are measured, computed and recorded in Annex C – Table C1.

4.3.5 Each sample taken shall be classified based on the relative amounts of gravel, sand, silt and clay (i.e. gravel with coarse sand; coarse sand with silt and clay; fine sand, etc).

4.3.6 Soil profile of the test site shall be recorded in Annex C – Table C2.

5 Test Report

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

- 5.1** Name of Testing Agency
- 5.2** Test Report Number
- 5.3** Title
- 5.4** Summary
- 5.5** Purpose and Scope of Test
- 5.6** Methods of Test
- 5.7** Description of the Drilling Rig
- 5.8** Table1 – Drilling Rig Specifications
- 5.9** Table 2 – Results of Performance Test
- 5.10** Observations
- 5.11** Name and Signature of Test Engineers

ANNEX A

Inspection Sheet for Drilling Rig

Name of Applicant : _____

Address : _____

Telephone No. : _____

Name of Distributor : _____

Address : _____

Name of Manufacturer : _____

Factory Address : _____

GENERAL INFORMATION

Brand : _____ Model : _____

Serial No. : _____ Type : _____

Production date of drilling rig to be tested : _____

Items to be inspected

ITEMS	Manufacturer's Specifications	Verification by the Testing Agency
A1 Type		
A2 Overall dimensions in transport		
A2.1 Length, mm		
A2.2 Width, mm		
A2.3 Height, mm		
A3 Base frame assembly		
A3.1 Length, mm		
A3.2 Width, mm		
A3.3 Material		
A3.4 Feature		
A4 Main rig assembly		
A4.1 Type		
A4.2 Height, m		
A4.3 Material		
A5 Rotary water inlet assembly		
A5.1 Type		
A5.2 Feature		

ITEMS	Manufacturer's Specifications	Verification by the Testing Agency
A6 Drilling stem		
A6.1 Diameter, mm		
A6.2 Length, mm		
A6.3 Material		
A7 Drill bits		
A7.1 Type		
A7.2 Brand		
A7.3 Name of manufacturer		
A7.4 Country of manufacture		
A7.5 Diameter, mm		
A7.6 Configuration/shape		
A7.7 Material		
A7.7.1 Construction material		
A7.7.2 Hardness		
A8 Primemover		
A8.1 Brand		
A8.2 Model		
A8.3 Serial number		
A8.4 Type		
A8.5 Manufacturer's continuous rated power, kW		
A8.6 Rated speed, rpm		
A9 Accessory pump		
A9.1 Brand		
A9.2 Model		
A9.3 Size		
A9.4 Type		
A9.5 Manufacturer's continuous rated power, kW		
A9.6 Rated speed, rpm		
A10 Power transmission system		
A10.1 Engine to power tiller Transmission (if applicable)		
A10.1.1 Engine pulley		
A10.1.1.1 Diameter, mm		
A10.1.1.2 Type, cross-section		
A10.1.2 Transmission pulley		
A10.1.2.1 Diameter, mm		
A10.1.2.2 Type, cross-section		
A10.1.3 Belt		
A10.1.3.1 Type, cross-section		
A10.1.3.2 Size		

ITEMS	Manufacturer's Specifications	Verification by the Testing Agency
A10.2 Engine to centrifugal pump		
A10.2.1 Engine pulley		
A10.2.1.1 Diameter, mm		
A10.2.1.2 Type, cross-section		
A10.2.2 Pump pulley		
A10.2.2.1 Diameter, mm		
A10.2.2.2 Type, cross-section		
A10.2.3 Belt		
A10.2.3.1 Type, cross-section		
A10.2.3.2 Size		
A10.3 Engine to gearbox		
A10.3.1 Engine pulley		
A10.3.1.1 Diameter, mm		
A10.3.1.2 Type, cross-section		
A10.3.2 Gearbox pulley		
A10.3.2.1 Diameter, mm		
A10.3.2.2 Type, cross-section		
A10.3.3 Belt		
A10.3.3.1 Type, cross-section		
A10.3.3.2 Size		
A11 Other features (dish plate and other accessories)		

Annex B

Performance Test Data Sheet

Test Conditions:

Ambient Temperature

Dry bulb, °C : _____

Wet bulb, °C : _____

Relative Humidity, %: _____

Atmospheric Pressure, mb: _____

Items to be Measured and Inspected

ITEMS	Trials		Average
	1	2	
B1 Drill bit diameter, mm			
B2 Drilling depth, m			
B3 Time of installation, min			
B4 Drilling time, min			
B5 Surging time, min			
B6 Total time of operation, inclusive of time for attaching drilling stems, h			
B7 Rate of drilling, m/min			
B8 Operating speed of components (with load), rpm			
B8.1 Primemover shaft			
B8.2 Pump shaft			
B8.3 Input shaft of transmission			
B8.4 Gearbox			
B8.5 Drill bit			
B9 Noise level, db (A)			
B10 Engine fuel consumption, L/h			
B10.1 Pump			
B10.2 Primemover			

Annex C

Laboratory Analysis Data Sheet

Table C1 – Analysis of Soil Sample

Depth m	Total Weight g	Gravel		Coarse Sand		Medium Sand		Fine Sand		Silt		Clay	
		g	%	g	%	g	%	g	%	g	%	g	%
0 – 3													
3 – 6													
6 – 9													
9 – 12													
12 – 15													
15 – 18													
18 – 21													
21 – 24													
24 – 27													
27 – 30													

Table C2 – Soil Profile of the Test Area

Test Site/Location: _____

Depth m	Soil Classification
0 – 3	
3 – 6	
6 – 9	
9 – 12	
12 – 15	
15 – 18	
18 – 21	
21 – 24	
24 – 27	
27 – 30	