Foreword

This standard is a revision of the Philippine National Standard (PNS) 556:1992 – Method of Sampling". The revision 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 revised standard was reviewed by the Technical Committee for Study 1- Development of Standards for Agricultural Production Machinery and was circulated to various private and government agencies/organizations concerned for their comments and reactions. This standard was presented to the Philippine Society of Agricultural Engineers (PSAE) and subjected to a public hearing organized by the National Agriculture and Fisheries Council (NAFC). The comments and reactions received during the presentation and public hearing were taken into consideration in the finalization of this standard.

This standard has been technically revised in accordance with PNS 01:Part 4:1998 - Rules for the Structure and Drafting of Philippine National Standards. The main changes are listed below:

- title of the standard has been modified in conformity to the format of International Standard; and
- modification of the sampling method and providing example for each step.

In the preparation of this standard, reference was made to Design and Analysis of experiments 3rd edition by Douglas C. Montgomery.

Agricultural Machinery – Method of Sampling

1   Scope

This standard prescribes the procedures for sampling agricultural machinery and its components, unless specified in the respective product specification. This applies to the finished products in the production line.

2   Definitions

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

2.1
acceptance test
test carried out on samples selected from a lot for the purpose of acceptance of the lot

2.2
lot
in any consignment, all components or equipment under study

NOTE   To constitute a lot, all components or equipment of the same kind, type, size, and manufactured from the same material shall be grouped together.

2.3
routine test
test carried out on each and every component or equipment to check the specifications which are likely to vary during production

2.4
type test
test carried out to prove conformity to the requirements of the relevant specification

NOTE   This is intended to check the general qualities and design of a given type of component or equipment.

3   Procedure

3.1   Acceptance of Test Sampling

3.1.1   Scale of Sampling

3.1.1.1 The sample shall be selected at random from the lot using the following procedure:

3.1.1.1.1   Determine the value of **r** using the following equation:

$$Let \quad r \ = \ \frac{N}{n}$$

where:
>   **r**   is the upper limit of the set of numbers which will be used in selecting the components or equipment in the sample.
>
>   **N** is the size of the lot
>
>   **n** is the size of the sample for a given lot size (see Table 1)

Table 1 – Scale of Sampling

Lot Size N	For Visual and Dimensional Tests Sample size n	For other Tests Sample size n
Up to 10	1	1
11 to 25	2	2
26 to 50	3	2
51 to 100	5	2
101 to 300	13	3
301 to 500	32	5
501 to 1000	50	8
1001 to above	80	13

3.1.1.1.2   Draw any number from 1 to **r** at random.

3.1.1.1.3   Let this number as **z**, representing the first sample starting from any component or equipment in a lot, count them in one order as 1, 2, 3…up to **z** where the unit corresponding to **z** will be the first sample.

3.1.1.1.4   Then start counting from the next until r. Every **r**[th] component or equipment thus counted shall be withdrawn to give the required number of component or equipment in the sample. (see the following example)
Example:

a)   For instance, a lot size (**N)** equal to 20 shall have a sample size (**n)** equal to 2 from Table 1. Therefore,

$$r = \frac{N}{n} = \frac{20}{2} = 10$$

b)   Let say from 1 to 10, the number drawn is 8 which is our **z**. Since the component H is the 8th component, it shall be the first sample to be considered.

c)   Starting from component I, count them in order up to 10. The 10th component is component **R**. Therefore; it is the second sample to be considered.

Components	A	B	C	D	E	F	G	**H**	I	J	K	L	M	N	O	P	Q	**R**	S	T
step b	1	2	3	4	5	6	7	8												
step c									1	2	3	4	5	6	7	8	9	10	1	2

3.1.1.2 The samples from each lot shall be tested for ascertaining the conformity of the lot to the requirements of the relevant product specification. The number of samples from each lot shall be taken according to columns 1 and 2 of Table 2.

Table 2 – Scale of Sampling and Permissible Number of Defectives

Lot Size N	For Visual and Dimensional Tests		For other Tests	
	Sample size n	Permissible Number of Defectives	Sample size n	Permissible Number of Defectives
Up to 10	1	0	1	0
11 to 25	2	0	2	0
26 to 50	3	0	2	0
51 to 100	5	0	2	0
101 to 300	13	1	3	0
301 to 500	32	3	5	0
501 to 1000	50	5	8	1
1001 to above	80	7	13	1

3.1.2   Conformity

3.1.2.1 Tests for visuals and dimensional characteristics – The component or equipment selected at random according to sub-clause 3.1.1.1 shall be examined for visual and dimensional characteristics. The component or equipment failing to satisfy any one or more of these requirements of the specification shall be considered as defective. The lot shall be considered as conforming to the requirements for these characteristics, if the number of defective component or equipment in the sample does not exceed the number given in column 3 of Table 2.

3.1.2.2 Tests for other than the visual and dimensional characteristics – If the lot conforms to the requirements for visual and dimensional characteristics, a sub-sample of size

given in column 4 of Table 2 shall be taken at random from the component or equipment selected in sub-clause 3.1.2.1. Each of the component or equipment in the sub-sample shall be taken at random and shall be tested for the requirements of characteristics other than visual and dimensional characteristics.

A component or equipment not satisfying any one or more of the requirements shall be considered as defective. The lot shall be considered as conforming to the requirements if the number of defectives in the sub-sample does not exceed the number given in column 5 of Table 2.

Note: If no requirement other than visual and dimensional is specified in an individual specification, columns 4 and 5 of Table 2 and sub-clause 3.1.2.2 shall not be considered. In such cases, the lot fulfilling the tests given in sub-clause 3.1.2.1 shall be considered as conforming to the requirements of the specification.

3.2   Routine tests

Each component or equipment shall be tested for routine tests. Specific tests to be conducted shall be as given in the relevant specification.

3.3   Type tests

3.3.1   For type tests, the manufacturer or the supplier shall furnish to the testing authority one sample of product. The test sample shall be selected by the testing authority with agreement of the manufacturer or the supplier. All the relevant information regarding the component or equipment along with a detailed specification shall also be furnished by the manufacturer or the supplier.

3.3.2   The sample so selected, shall be tested for all the requirements specified in the specification of the product. If the sample passes all the requirements of the specification, the product shall be considered to be eligible for type approval.

3.3.3   In case the sample fails, two more samples shall be taken in accordance with sub-clause 3.3.1 and tested for all requirements. If in the repeat test no single failure occurs, the product shall be considered eligible for type approval. If the sample fails in the repeat test, the product shall be disapproved. The manufacturer or the supplier shall be asked to improve the design and resubmit the product for type approval.