PHILIPPINE NATIONAL STANDARD

PNS/BAFS PAES 242:2018
ICS 65.060.99

Agricultural Machinery – Corn Combine Harvester – Methods of Test

BUREAU OF AGRICULTURE AND FISHERIES STANDARDS
BPI Compound Visayas Avenue, Diliman, Quezon City 1101 Philippines
Trunkline: **(632) 928-8741 to 64 loc. 3301-3319**
E-mail: **info.dabafs@gmail.com**
Website: **www.bafs.da.gov.ph**

Contents

Foreword

The Philippine National Standard (PNS) for Agricultural Machinery – Corn Combine Harvester - Specifications (PNS/BAFS PAES 242:2018) has been prepared by the Technical Working Group (TWG) for Various Agricultural Machinery as per approved Department of Agriculture Special Order No. 1045 series of 2016.

This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2.

The word “shall” is used to indicate mandatory requirements to conform to the standard.

The word “should” is used to indicate that among several possibilities one is recommended as particularly suitable without mentioning or excluding others

1 Scope

This standard specifies the methods of test for self-propelled corn combine harvesters. Specifically, it shall be used to:

1.1 verify the mechanisms, dimensions, materials and accessories of the corn combine harvester, and the list of specifications submitted by the manufacturer;

1.2 determine the performance of the machine;

1.3 evaluate the ease of handling and safety features;

1.4 determine the effect of harvesting on kernel quality through laboratory analysis, and

1.5 report the results of the test.

2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

PNS/PAES 102:2000, *Agricultural Machinery – Operator's Manual – Content and Presentation*

PNS/PAES 103:2000, *Agricultural Machinery – Method of Sampling*

PNS/BAFS PAES 241:2018, *Agricultural Machinery – Corn Combine Harvester – Specifications*

ISO 6540:1980, *Maize – Determination of moisture content (on milled grains and on whole grains)*

3 Terms and Definitions

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

3.1
actual field capacity
ratio of the actual area covered per unit of time

3.2
corn combine harvester
machine which performs a combination of harvesting (cutting, picking, or snapping corn ear) and dehusking; shelling; separating; cleaning; and conveying kernels into a holding bin and discharging harvest residue onto the ground

3.3
corn ear
pistillate inflorescence of the plant *Zea mays* L., enclosed with a leaf-like protective covering known as husk

3.4
cracked kernels
kernels which show any signs of fissures, fractures and/or splinters

3.5
field efficiency
ratio of the actual field capacity and theoretical field capacity, expressed in percent

3.6
harvesting recovery
ratio of the total cleaned shelled kernel output to the potential yield, expressed in percent

3.7
kernel
physiologically matured seed developed from the ovary of the corn ear

3.8
mechanically damaged kernels
output kernels that were broken and/or scratched during the corn combine harvesting

3.9
overall height
distance between the horizontal supporting surface and the horizontal plane touching the uppermost part of the corn combine harvester

NOTE All parts of the corn combine harvester projecting upwards are contained between these two planes.

3.10
overall length
distance between the vertical planes at the right angles to the median plane of the corn combine harvester and touching its front and rear extremities

NOTE All parts of the corn combine harvester, in particular, components projecting at the front and at the rear are contained between these two planes. When an adjustment of components is possible, it shall be set at minimum length.

3.11
overall width
distance between the vertical planes parallel to the median plane of the corn combine harvester; each plane touching the outermost point of the harvester on its respective side

NOTE All parts of the corn combine harvester projecting laterally are contained between these two planes.

3.12
potential yield
estimated yield per unit area, expressed in tons/ha

3.13
purity
ratio of the weight of clean corn kernels, to the total weight of unclean corn kernels sample, expressed in percent

3.14
running-in period
preliminary operation of the machine to make various adjustments prior to the conduct of test until the operation is stable

3.15
separation loss
ratio of the weight of the cleaned kernels that came out or mixed with the chaff at the chaff and cob outlet to the total kernel input expressed as percentage by weight

3.16
test applicant
manufacturer, direct importer, or any legitimate distributor, dealer, or end-user of the machine

3.17
theoretical field capacity
computed rate of harvesting in a given area per unit of time

3.18
total kernel input
summation of cleaned kernels, separation loss, and unshelled loss expressed in kilograms, kg

3.19
unpicked loss
corn ears that have remained unharvested during the combine harvesting operation

3.20
unshelled kernels
kernels that remain in the cob after shelling

3.21
unshelled loss
ratio of the weight of unshelled kernels, to the total weight of the total corn kernel input of the sheller, expressed in percent

4 General Conditions for Test and Inspection

4.1 Selection of corn combine harvester to be tested

Corn combine harvester to be tested should be in accordance with PAES 103:2000 or any other suitable method of selection.

4.2 Role of test applicant

The test applicant shall submit specifications and other relevant information about the corn combine harvester. They shall abide with the terms and conditions set forth by the official testing agency, provide testing materials and shoulder other variable cost such as fuel, etc.

4.3 Role of the representative of the test applicant

An officially designated representative of the test applicant shall operate, demonstrate, adjust, repair as the case maybe and decide on matters related to the operation of the machine.

4.4 Test site conditions and test material

Each test, with three replications, shall be carried out in the rectangular field area with sides in the ratio of 2:1, as much as possible. The test area should not be less than 1000 m^2. The field shall be completely dried before harvesting to prevent additional water absorption of the kernels.

Corn plant to be used shall be commonly or locally grown corn. The corn ear shall be mature and ready for combine harvesting with at most 28% moisture content.

4.5 Suspension/Termination of test

If during the test run, the machine stops due to breakdown or malfunction so as to affect the machine's performance, the test may be suspended. If the machine will not be able to continue operation, the test shall be terminated.

5 Test Preparation and Inspection

5.1 Preparation of the corn combine harvester for testing

The representative of the test applicant and testing agency shall check the corn combine harvester so as to ensure that the machine has been assembled and installed in accordance with the instruction of the manufacturer. The official testing agency will test the corn combine harvester according to the desired output of the manufacturer.

5.2 Test instruments and other materials

The suggested list of minimum field and laboratory test equipment and materials needed to carry out the corn combine harvester test is shown on Annex A. These

instruments should be calibrated regularly. Before and after each test, these instruments shall be physically checked and cleaned respectively. A checklist of instruments and materials to be used before departure to and from the testing area shall be prepared.

5.3 Running-in and preliminary adjustments

The corn combine harvester shall have undergone a running-in period before starting the test. During the running-in period, the various adjustments of the machine shall be made according to the recommendation of the manufacturer.

6 Pre-test observation

6.1 Verification of specifications

The specifications claimed by the manufacturer and the physical details given in Annex B shall be verified by the testing agency. A stable and level surface shall be used as reference plane for verification of dimensional machine specifications.

6.2 Initial field and crop condition

Initial data such as field conditions and crop condition shall be collected before the test and shall be recorded in Annex C.

6.3 Potential Yield

Before the test run, randomly select a 3 m length column from each three (3) randomly selected rows within the test field and count the number of corn ears within the selected area. Five corn ear samples from each selected rows shall be manually harvested, and labelled for laboratory analysis. Other sampling procedures are as described in Annex C.

NOTE: Average row space shall be obtained.

6.4 Test samples

Representative test samples shall be collected by the testing agency from the field for the analysis of the moisture content and the potential yield of the test material input. Sampling procedures is shown in Annex C.

7 Performance Test

7.1 Operation of the corn combine harvester

The corn combine harvester shall be operated for sufficient duration with load at the test site by the official representative of the test applicant using the recommended setting of the manufacturer. The testing agency shall make all measurements, which form part of the test and take the prescribed samples. This procedure shall be repeated for the succeeding test trials.

NOTE No other adjustments shall be permitted during the test.

7.2 Test trials

A minimum of three (3) test trials shall be adopted.

7.3 Sampling

Random representative test samples shall be collected by the testing agency for the analysis of the losses (recovery), purity, cracked kernels and mechanically damaged kernels. Sampling procedure is shown in Annex C.

7.4 Data Collection

7.4.1 Total Operating Time

Total operating time shall be measured once the machine starts to harvest up to the time it harvests the last stalk.

7.4.2 Field Capacity Determination

7.4.2.1 Operating Speed

Outside the longer side of the test plot, two poles 20 m apart, measured with a tape measure of at least 50m in length, (A, B) are placed approximately in the middle of the test plot (Figure 1). On the opposite side, two poles are also placed in similar position, 20 m apart (C, D) so that all four poles form corners of a rectangle, parallel to at least one long side of the test plot. The speed will be calculated from the time required for the machine to travel the distance (20 m) between the assumed line connecting two poles on opposite sides AC and BD. The reference point (e.g. corn combine harvester's cutting mechanism) of the machine should be selected for measuring the time.

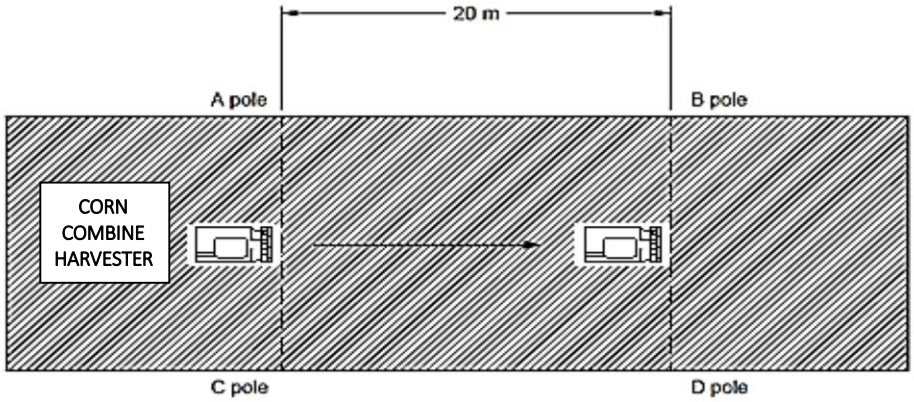

Figure 1 - Measurement of Operating Speed

7.4.2.2 Working Width Determination

Working width of the corn combine harvester and the dimensions of the test field will also be quantified using the tape measure.

7.4.3 Soil Hardness

The soil hardness shall be measured using soil penetrometer.

7.4.4 Noise level

7.4.4.1 The sound emitted by the machine, with and without load, shall be measured using a sound level meter at the location of the operator/s. The noise level, expressed in decibel [dB (A)], shall be measured 50 mm away from the ear level of the operator/s.

7.4.4.2 For each data to be taken, there shall be a minimum of five (5) observations. Before taking data, it should be ensured that the feed rate, speed, and other functional characteristics have stabilized. The time of recording shall be properly spaced during the whole duration of the test trial.

7.4.5 Fuel consumption

Before the start of each test trial, the fuel tank shall be filled to its capacity. After each test trial, the tank shall be refilled using graduated cylinder. The amount of refueling is the fuel consumption for the test. When filling up the tank, keep the tank horizontal so as not to leave empty space in the tank. The corn combine harvester shall be levelled.

7.5 Data Recording and Observations

Record sheet for all data and information during the test is given in Annex C. Observations to be taken during the performance test shall be recorded in this sheet.

8 Laboratory Analysis

Laboratory analysis shall be made to determine the kernel moisture content, purity, potential yield, net cracked kernel, mechanically damaged kernel and losses (harvesting, separation, and unshelled). The laboratory procedures to be followed in the analysis are given in Annex E while the data sheet is given in Annex F.

9 Presentation of Results

Machine specifications and the results of the test shall be presented in tabular form in which data shall be taken from Annexes B and D. Observations made on the machine while in operation shall be supported with photographs.

10 Formula

The formulas to be used during calculations and testing are given in Annex G.

11 Test Report

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

11.1 Name of testing agency

11.2 Test report number

11.3 Title

11.4 Summary

11.5 Purpose and scope of test

11.6 Methods of test

11.7 Table 1 – Machine specifications

11.8 Results and discussion

11.9 Table 2 – Field performance test data

11.10 Observations (include pictures)

11.11 Name, signature and designation of test engineers

Annex A
(informative)

Minimum List of Field and Laboratory Test Equipment and Materials

A.1	Equipment	Quantity
A.1.1	**Field**	
A.1.1.1	Grain Moisture Meter (duly calibrated using the standard method)	**1**
A.1.1.2	Penetrometer	**1**
A.1.1.3	Noise Level Meter	**1**
A.1.1.4	Timers	**2**
A.1.1.5	Measuring Tapes (at least 5 m and 50m)	**2**
A.1.1.6	Camera	**1**
A.1.1.7	Weighing Scale Capacity: at least 100 kg Scale divisions: at least 0.5 kg	**1**
A.1.1.8	Graduated Cylinder (at least 2-L capacity)	**1**
A.1.2	**Laboratory**	
A.1.2.1	Weighing Scale (Sensitivity: at least 0.1 g)	**1**
A.1.2.2	Magnifying Lens (minimum of 10 magnifications)/ Crack Inspector	**1**
A.1.2.3	Grain Sample Cleaner	**1**
A.1.2.4	Grain Sampler/Divider	**1**
A.1.2.5	Laboratory Oven	**1**
A.1.2.6	Moisture Cans	**20**
A.2	**Materials**	
A.2.1	Canvas Sheet (4m x 8m)	**1**
A.2.2	Nylon-Catch Bag (1.5 m x 1.5 m x 0.5 m, minimum)	**1**
A.2.3	Nylon Net (1.5 m x 1.5 m, minimum)	**1**
A.2.4	Sample bag (Resealable bag)	**20**
A.2.5	Labeling Tags which include:	**20**
A.2.6.1	Date of test	
A.2.6.2	Machine on test	
A.2.6.3	Sample source	
A.2.6.4	Variety	
A.2.6.5	Trial number	

Annex B
(informative)

Specifications of the Corn Combine Harvester

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

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

GENERAL INFORMATION

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

ITEM	Manufacturer's Specifications	Verification by the Testing Agency
B.1 Overall dimensions		
B.1.1 Length, mm		
B.1.2 Width, mm		
B.1.3 Height, mm		
B.3 Machine condition		
B.3.1 No. of rows		
B.3.2 Harvesting method		
B.3.3 Working width, mm		
B.3.4 Harvesting speed, kph		
B.4 Traction Type		
B.5 Field capacity, ha/h		
B.6 Engine		
B.6.1 Brand		
B.6.2 Model		
B.6.3 Serial Number		
B.6.4 Type (stroke/ignition)		
B.7 Safety Features (enumerate)		

Annex C
(normative)

Sampling Procedures

C.1 Sampling procedures for potential yield determination

The conditions of the corn ear shall be taken using three (3) “representative samples,” which represent the different conditions of the input in the area. This is done by randomly taking samples within the randomly selected rows. Samples from each randomly selected rows shall be placed in appropriate containers for laboratory analysis.

C.2 Sampling procedures for corn kernels in bulk

The conditions of the corn kernels such as purity, losses and cracked or damaged kernels to be obtained in each trial shall be taken using three (3) “representative samples,”. This is done by taking samples, each at the top middle and bottom of the pile. Samples representing the materials for each test trial shall be placed in appropriate containers for laboratory analysis.

C.3 Sampling from the different outlets

During each test trial, three (3) samples, shall be collected from the different outlets of the corn combine harvester to be analyzed in the laboratory.

C.4 Handling of samples

All samples to be taken to the laboratory shall be placed in appropriate containers and properly labeled and sealed. If the samples are not to be immediately analyzed, it should be stored in proper condition and kept in dry and airtight containers. Care should be taken so as to prevent alterations of the conditions of the test samples.

NOTE The minimum amount of sample to be taken shall be twice as much as what is needed for a particular analysis. Half of the sample shall be used for laboratory analysis and the other half shall be used for reference purposes or for an eventual second check in case of review.

Annex D
(informative)

Field Performance Test Data Sheet

Test Trial No.: _____ Date: _____
Test Engineers: _____ Location: _____
Assistants: _____ Machine: _____
Test Applicant: _____ Manufacturer: _____

ITEMS	TRIAL			
	1	2	3	Ave.
D.1 Crop condition				
D.1.1 Variety				
D.1.2 Plant Height				
D.1.3 Moisture Content of the Kernels				
D.1.4 Maturity Period				
D.1.5 Row spacing				
D.1.6 Average plant height, 10 observations (m)				
D.1.7 Plant population/m^2, 10 observations				
D.2 Field conditions				
D.2.1 Location of test field				
D.2.2 General topography				
D.2.3 test field dimension (length x width in meters)				
D.2.4 Soil Hardness (kg/cm^2)				
D.3 Test conditions				
D.3.1 Date of test				
D.3.2 Total operating time, min				
D.3.3 Unproductive Time				
D.3.3.1 Adjustments, min				
D.3.3.2 Minor repair, min				
D.3.3.3 Others (specify, min)				
D.3.4 Operating speed, m/s				
D.3.5 Fuel consumed, mL				
D.3.6 Fuel consumption, L/h				
D.3.7 Noise level, db(A)				
D.3.8 Height of cut or height of stubbles, mm				
D.3.9 Actual field capacity, ha/h				
D.3.10 Theoretical field capacity, ha/h				
D.3.11 Field efficiency, %				

D.4 Failure or abnormalities that may be observed on the implement or its component parts during and after the operation.

_____
_____

D.5 Safety

_____
_____

D.6 Labor Requirements

_____
_____

D.7 Ease of operation and stability when machine is working and turning

_____
_____

D.8 Ease of manipulating the operating levers

_____
_____

D.9 Ease of adjusting

_____
_____

D.10 Other observations

_____
_____

Annex E
(normative)

Laboratory Analysis

E.1 Potential Yield Determination

Randomly select five (5) corn ears from each of the obtained row field samples. Manually shell the kernels from the cob from each sample separately. Clean the kernels to remove the impurities and foreign matters. The clean kernels shall be weighed and recorded. Calculate the average weight of kernels per corn ear and the weight of kernels per area.

E.2 Moisture Content Determination

This shall be taken following the standard procedures for routine method on whole grains (ISO 6540:1980).

E.2.1 For each test trial, select five (5) representative samples weighing at least 25 g of test materials and place them in the moisture can. The moisture cans shall be sealed to ensure that no moisture is lost or gained by the samples between the times they were weighed. Record the initial weight on the data sheet (Annex F).

E.2.2 Dry the samples in the oven with temperature of 130 ºC – 133 ºC for 38 h ± 2 h.

E.2.3 After removing the samples from the oven, it shall be covered rapidly and placed in desiccators and allowed to cool to ambient temperature.

NOTE Never place dishes on top of one another in the desiccator.

E.2.4 Weigh each moisture cans including the dried sample. Record the final weight. Calculate the moisture content using the equation in Annex G.

E.3 Purity Determination

Take three 500 g from the final sample taken from the main kernel outlet. Clean the kernels to remove foreign matters. The clean kernels shall be weighed and recorded. The percent purity is calculated using the formula in Annex G.

E.4 Determination of Losses

E.4.1 Separation loss

Three (3) samples shall be taken at the chaff and cob outlets to collect kernels mixed with the chaff and cob. Each sample shall be cleaned and weighed. The weight of the cleaned kernels and time of collection shall be taken and recorded for the computation of separation loss.

NOTE The duration of sampling shall be at least 10 sec.

E.4.2 Unshelled loss

Three (3) samples of the unshelled kernels collected at the cob outlet shall be manually shelled and weighed. The weight of the cleaned kernels and time of collection shall be taken and recorded for computation of unshelled loss.

NOTE The duration of sampling shall be at least 10 sec.

E.4.3 Harvesting Loss

After the test run, randomly select a 3 m length plot from each three (3) randomly selected rows within the test field, then manually collect and label the unpicked corn ears within the plot. The total number of corn ears collected shall be recorded for computation of harvesting loss.

E.5 Determination of Net Percent Cracked Kernel

Three (3) samples from manually-shelled and machine-shelled kernels shall be taken for analysis. Each sample shall consist of 100 kernels. These kernels shall be inspected for the presence of fissures. The net percent cracked kernels shall be taken as the difference between the values obtained from the manual and machine-shelled kernel samples.

E.6 Determination of Percent Mechanically Damaged

Three (3) 100 g samples from machine-shelled kernels shall be taken for analysis. Separate those kernels that were broken or crushed and weigh. Compute for the percentage of mechanically damaged kernels.

Annex F
(informative)

Laboratory Analysis Data Sheet

Machine Tested:_____ Analyzed by: _____
Date of Test.: _____ Date Analyzed: _____

F.1 Kernel Conditions

F.1.1 Purity Determination

Initial Weight of Samples (uncleaned) = 500 grams

ITEMS	Trial 1				Trial 2				Trial 3				Gen. Ave.
	1	2	3	Ave	1	2	3	Ave	1	2	3	Ave	
Cleaned Kernels (g)													
Purity (%)													

F.1.2 Moisture Content

Trial No.	Input test material		
	Initial Weight (g)	Final Weight (g)	%MC
1			
2			
3			
4			
5			
Average			

F.1.3 Potential Yield Determination

Area No.	Weight of Sample, g/corn ear					Ave., g/corn ear	Total no. of corn ear harvested	Wt. of kernels per area, g/m^2
	1	2	3	4	5			
1								
2								
3								
Ave.	-	-	-	-	-		-	

Sample Area (m^2): _____
Potential Yield (kg): _____

F.1.4 Blower/Separation Loss, Unshelled Loss and Unpicked Loss

Trial No.	Separation Loss		Unshelled Loss		Harvesting Loss		
	Duration:		Duration:		Sample Area:		
	Kernel wt., g/time	Total wt., g	Kernel wt., g/time	Total wt., g	Total No. of Corn Ears Collected	Kernel wt.*, g/area	Total wt., g
1a							
1b							
1c							
Ave.							
2a							
2b							
2c							
Ave.							
3a							
3b							
3c							
Ave.							
Gen. Ave.							
Total Area (T_A): _____ Total Operating Time (T): _____ Total Losses (L_T): _____ Total Grain Loss (TGL): _____							

*** Multiply the average weight of kernels per corn ear obtained from the potential yield determination to the total no. of corn ears collected.**

F.1.5 Percent Cracked Kernels Determination

Trial No.	No. of Cracked Kernels								
	Manually Shelled				Mechanically Shelled				Difference
	1	2	3	Ave.	1	2	3	Ave.	
1									
2									
3									
Ave.									

F.1.6 Broken Kernel Determination

Trial No.	Total Weight, g	Weight of the Broken Kernel, g	Percent Mechanically Broken Kernel, %
1a			
1b			
1c			
Ave.			
2a			

Trial No.	Total Weight, g	Weight of the Broken Kernel, g	Percent Mechanically Broken Kernel, %
2b			
2c			
Ave.			
3a			
3b			
3c			
Ave.			
Gen. Ave.			

Annex G
(informative)

Formula Used During Calculations and Testing

G.1 Effective Field Capacity

$$efc = \frac{A_T}{T}$$

where:

efc is the actual field capacity (ha/h)
A_T is the area covered during test (ha)
T is the total operating time (h)

G.2 Theoretical Field Capacity

$$tfc = \frac{WS_A}{10}$$

where:

tfc is the theoretical field capacity (ha/h)
W_C is the working width (m)
S_A is the average Operating speed (km/h)

G.3 Field Efficiency

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

where:

Eff is the field efficiency (%)
EFC is the effective field capacity (ha/h)
TFC is the theoretical field capacity (ha/h)

G.4 Separation Loss

a) Amount

$$S_W = \frac{W_{SK}}{D_C} \times T$$

where:

S_W is the separation loss (kg)
W_{SK} is the weight of separated clean kernel (kg)
D_C is the duration of collection (h)
T is the total operating time (h)

b) Percentage

$$B_P = \frac{B_W}{TKI} \times 100$$

where:

S_P is the separation loss (%)
S_W is the separation loss (kg)
TKI is the total kernel input (kg)

G.5 Unshelled loss

a) Amount

$$US_W = \frac{W_{Us}}{D_C} \times T$$

where:

US_W is the unshelled loss (kg)
W_{Us} is the weight of unshelled clean kernel (kg)
D_C is the duration of collection (h)
T is the total operating time (h)

b) Percentage

$$US_P = \frac{US_W}{TKI} \times 100$$

where:

US_P is the unshelled loss (%)
US_W is the unshelled loss (kg)
TKI is the total kernel input (kg)

G.6 Harvesting loss

c) Amount

$$HL_W = \frac{W_{HL}}{A} \times T_A$$

where:

H_L is the harvesting loss (kg)
W_{HL} is the weight of unharvested, manually shelled-clean kernel (kg)
A is the sample area (m^2)
T_A is the total area of the field (m^2)

d) Percentage

$$HL_P = \frac{HL_P}{P_Y} \times 100$$

where:

HL_p is the harvesting loss (%)
HL_W is the hasrvesting loss (kg)
P_Y is the potential yield (kg)

G.7 Total losses

$$L_T = S_W + US_W$$

where:

L_T is the summation of all losses (kg)
S_W is the separation loss (kg)
US_W is the unshelled loss (kg)

G.8 Total Kernel Input

$$TKI = W_{CS} + L_T$$

where:

TKI is the total kernel input (kg)
W_{CS} is the weight of cleaned shelled kernels (kg)
L_T is the summation of all losses (kg)

G.10 Total Grain Loss

$$TGL = \frac{L_T}{TKI} \times 100\%$$

where:

L_T is the summation of all losses (kg)
TKI is the total kernel input (kg)

G.9 Purity

$$P = \frac{W_C}{W_U} \times 100$$

where:

P is the purity (%)
W_U is the weight of uncleaned kernel (g)
W_C is the weight of cleaned kernel (g)

G.10 Harvesting Recovery

$$HR = \frac{SK}{P_Y} \times P \times 100\%$$

where:

HR is the harvesting recovery (%)
SK is the total cleaned shelled kernel (kg)
P_Y is the potential yield (kg)
P is the purity

G.11 Fuel consumption

$$FC = \frac{F}{T}$$

where:

FC is the fuel consumption (L/h)
F is the amount of fuel consumed (L)
T is the total operating time (h)

G.12 Cracked kernels

$$NC_K = \frac{C_{ME} - C_{MA}}{100\ kernel\ sample} \times 100$$

where:

NC_K is the net cracked kernels (%)
C_{ME} is the number of cracked kernels due to mechanical shelling
C_{MA} is the number of cracked kernels due to manual shelling

G.13 Mechanically Damaged or Broken kernels

$$B_K = \frac{W_{BK}}{T_W} \times 100$$

where:

B_K is the mechanically damaged or Broken kernels (%)
W_{BK} is the weight of broken kernels (kg)
T_W is the total weight of the sample (kg)

Bibliography

PNS/PAES 225:2015, *Agricultural Machinery – Rice Combine Harvester – Methods of Test*

Department of Agriculture
Bureau of Agriculture and Fisheries Standards

Technical Working Group (TWG) for the Development of Philippine National Standard for Agricultural Machinery – Corn Combine Harvester

Chairperson

Cristy Cecilia Polido
Bureau of Agricultural and Fisheries Engineering

Co-Chairperson

Aurelio Delos Reyes Jr.
Agricultural Machinery Testing and Evaluation Center

Members

1 Romulo Eusebio
Agricultural Machinery Testing and Evaluation Center

2 Fatima Joy Raytana
Agricultural Machinery Testing and Evaluation Center

3 Janice Vargas
Bureau of Agricultural and Fisheries Engineering

4 Jessa Rica Pandiño
Bureau of Agricultural and Fisheries Engineering

5 Arjay Sabasaje
Bureau of Agricultural and Fisheries Engineering

6 Rose Ann Arienda
Bureau of Agricultural and Fisheries Engineering

7 Darwin Aranguren
Agricultural Machinery Testing and Evaluation Center

8 Victor Rodulfo Jr.
Center for Agricultural and Biosystems Mechanization

9 Donald Mateo
Philippine Center for Postharvest Development and Mechanization

10 Triniza Jardin-Millare
Department of Agriculture – Regional Field Office – IVA

11 Dennis Tactac
Department of Agriculture – Regional Field Office – I

Project Managers

Lara Navarro
John Gregory Aquino
Charmine Diann Mejia
Abbygail Jaylo

Adviser

Vivencio Mamaril
Karen Bautista

BUREAU OF AGRICULTURE AND FISHERIES STANDARDS

BPI Compound Visayas Avenue, Diliman, Quezon City 1101 Philippines
T/ (632) 928-8741 to 64 loc. 3301-3319
E-mail: info.dabafs@gmail.com
Website: www.bafs.da.gov.ph