

# PHILIPPINE NATIONAL STANDARD

PNS/BAFPS 10:2004  
ICS 65.020.20

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**Grains – Corn (*Zea mays indentata* Linn, *Zea mays indurata* Linn.  
and *Zea mays ceritina* K. Sturt. syn. *praecox*) –  
Grading and classification**

## **Foreword**

The formulation of this Philippine National Standard for Shelled Corn, **PNS/BAFPS 10:2004** was initially prepared by the National Food Authority (NFA). In July 2003, the Bureau of Agriculture and Fisheries Product Standards (BAFPS) reformatted the texts of the standard prepared by the NFA in accordance with the BPS standards for standards guidelines. Harmonization with Codex and US standards on the levels of aflatoxin were undertaken in view of the increasing concern for consumer health protection and fair practices in international trade.

In the 3<sup>d</sup> and 4<sup>h</sup> quarter of 2003, the Bureau of Agriculture and Fisheries Product Standards (BAFPS) conducted series of technical reviews and public consultations nationwide on the draft standards for shelled corn. Comments from the stakeholders were considered prior to its approval.

BAFPS organized a technical committee for shelled corn standards. The committee members were presented by several agencies of the Department of Agriculture, Food and Nutrition Research Institute of the Department of Science and Technology, Postharvest Horticulture and Training Center, University of the Philippines at Los Baños and private sectors, had set the classification of shelled corn based on their physical characteristics and current practices existing in the sectors concerned.

In the preparation of this standard the following documents were considered:

CAC Vol. 7. (1995) – Cereals, Pulses, Legumes and Derived Products and Vegetable Proteins

CAC/RCP 1-1969, Rev. 3-1997, Amd. (1999)- Recommended International Code of Practice General Principles of Food Hygiene

CAC Vol. 2 (1993) –Pesticide Residue in Foods

ISO 5233 (1983) - Test Sieves for Cereals

Philippine National Standards on Shelled Corn (2002)- National Food Authority- Unregistered

Primer on Philippine Grains Standardization Program (2002) -National Food Authority

US Standards for Corn- Revised 1997

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**1 Scope**

This standard applies to shelled maize (corn) ready for its intended use as human food or animal feed, presented in packaged form or sold or delivered loose from the package directly to the user. This standard specifies requirements for the whole grain shelled dent maize, *Zea mays indentata* L., shelled flint maize, *Zea mays indurata* L., and glutinous/waxy corn, *Z. ceritina* K. Sturt. syn. *praecox* and their hybrids.

**2 References**

The following standards contain provisions, which through reference in the text form part of this national standard. At the time of publication of this PNS, the editions indicated were valid:

PNS ISO 874:2004 – Fresh fruits and vegetables – Sampling

PNS ISO 712: 1985 – Determination of Moisture Content of Shelled Corn

**3 Definitions****3.1 defects****3.1.1 aflatoxin**

a group of highly poisonous and carcinogenic compounds which are produced by strains of the fungi, *Aspergillus flavus* and *Aspergillus parasiticus* on suitable substrate such as corn, peanuts, copra, and other oilseeds, cassava, etc. Aflatoxin content is expressed in parts per billion (ppb)

**3.1.2 damaged kernels**

kernels or pieces of kernels of corn which are heat damaged, sprouted, ground damaged, weather damaged, moldy, diseased, insect-bored, or otherwise materially damaged

**3.1.3 broken kernels and foreign matter**

kernel and pieces of kernels of corn and other matter pass a no. 12 sieve (a metal perforated with round holes 4.76 mm or 12/64 inch in diameter)

**3.1.4 foreign matter**

all matters other than corn grains such as sand, gravel, dirt, pebbles, stones, lumps of earth, clay mud, chaff, straw and other crop seeds

**3.1.5**

**filth**

impurities of animal origin

**3.1.6**

**shriveled and immature kernels**

kernels or broken pieces of kernels, which are not fully developed, thin and papery in appearance, except where shriveled is considered a varietal characteristic

**3.2**

**product definition**

**3.2.1**

**dent corn**

corn kernels, which have dent in, the broad end of the kernels caused by great shrinkage of soft starch between the two layers of corneous and flinty starch at the end of the endosperm

**3.2.2**

**flint corn**

corn kernel with relatively large amount of hard endosperm on the sides and the inner portion is composed of soft starch. The color of the endosperm is either white or yellow

**3.2.3**

**glutinous/waxy corn**

a type of corn, which contains 100% of a form of starch (amylopectin)

**3.2.4**

**maize (corn)**

is the whole shelled grain of the species defined in the scope

**3.2.5**

**mixed corn**

consists of corn kernels of the same type but of different colors

**3.2.6**

**white corn**

corn grains of white color with not more than the permitted percentage of corn of other colors as indicated in the grade requirement for corn. A slight tinge of color other than white shall not affect their classification as white corn

**3.2.7**

**yellow corn**

corn grains of yellow color with not more than the permitted percentage of corn of other colors as indicated in the grade requirement for corn. A slight tinge of color other than yellow shall not affect their classification as yellow corn

**4 Quality factors**

**4.1 Odor** – Corn shall not contain any abnormal or foreign odor as determined from samples representative of the lot.

**4.2 Color** – Corn shall reasonably be in uniform color according to type.

**4.3 Moisture content** – The water content of corn, expressed in % wet basis or as received basis.

**5 Classification**

**5.1** Corn shall be classified according to the following type and class:

**5.1.1 Type**

**5.1.1.1** White corn

**5.1.1.2** Yellow corn

**5.1.1.3** Mixed corn

**5.1.2 Class**

**5.1.2.1** Flint corn

**5.1.2.2** Dent corn

**5.1.2.3** Glutinous/Waxy corn

**6 Grading**

Shelled corn shall be in accordance with the quality grade requirements specified in Table 1.

**Table 1 – Quality grade requirements on shelled corn**

Grade factors (% by weight)	Grade			
	Premium	No.. 1	No. 2	No. 3
Moisture content, maximum	14.00	14.00	14.00	14.00
Aflatoxin, maximum Food Feed	20 ppb 20 ppb	20 ppb 20 ppb	20 ppb 50 ppb	20 ppb 50 ppb
Filth, maximum	0.1	0.1	0.1	0.1
Corn of other colors, maximum	2.00	4.00	6.00	8.00
Damaged kernels, maximum	3.00	5.00	7.00	10.00
Foreign matter, maximum	0.50	1.00	1.50	2.00
Shriveled and immature kernels, maximum	1.50	3.00	5.00	7.00
Broken kernels, maximum	1.00	2.00	4.00	6.00
Moldy kernels, maximum	0.10	0.10	0.10	0.10

**7 Sampling**

Sampling method to be used for ascertaining conformance to the requirements of this specification shall be in accordance with PNS/ISO 874.

**8 Determination of moisture content**

The moisture content of the grains shall be determined using officially calibrated moisture meters which are appropriate for the purpose and in accordance with ISO 712:1985/ICC Method No. 110/1 (1986).

**9 Packing**

Shelled corn shall be properly packed in 50 kilogram of light green woven polypropylene sacks to protect them against mechanical damage and to facilitate handling and transport.

**10 Marking**

The outside of each container shall have a label or legible characters grouped on the same side, stamped in indelible ink to provide the following:

- 10.1** Name of the product;
- 10.2** Grade;
- 10.3** Class;
- 10.4** Type;
- 10.5** Name of Trader / Miller; and
- 10.6** Net weight in kilograms.

**11 Contaminants**

**11.1 Aflatoxin**

Shelled corn shall comply with the allowable levels established by the Codex Alimentarius Commission for this commodity.

**11.2 Heavy metals**

Shelled corn shall comply with those maximum residue levels for heavy metals established by the Codex Alimentarius Commission for this commodity.

**11.3 Pesticide residues**

Shelled corn shall comply with those maximum residue levels established by the Codex Alimentarius Commission for this commodity.

## **12 Hygiene**

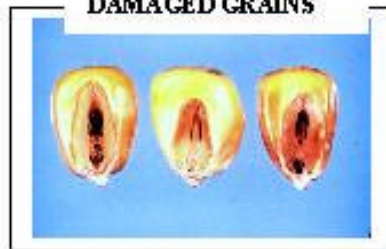
It is recommended that the produce covered by the provisions of this standard be prepared and handled in accordance with appropriate sections of the Recommended International Code of Practice General Principles of Food Hygiene (CAC/RCP 1 – 1969, Rev. 3 – 1997, Amd. (1999), and other relevant Codex texts such as Codes of Hygiene practice and Codes of Practice.

Annex A

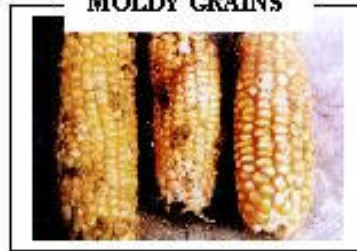
**NOT DAMAGED GRAINS**



**DAMAGED GRAINS**



**MOLDY GRAINS**



**BROKEN GRAINS**





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