

**1 Foreword**

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3 The Philippine National Standard (PNS) Code of Hygienic Practice for Processing and  
4 Handling of Corn Grits (PNS/BAFS 142:2015) was developed to provide guidance for  
5 the processing and handling of quality corn grits. The code aims to prevent  
6 contamination and infestation of the said product with hazards like aflatoxin, heavy  
7 metals and pesticide residues. It includes sections on the overall process of making the  
8 corn grits: pre-processing, processing and post processing with consideration of the  
9 management and supervision, documentation and records, traceability, and its product  
10 recall procedure.

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12 In 2017, the Bureau of Agriculture and Fisheries Standards (BAFS) took the initiative to  
13 review and revise the Standard to account for results of recent studies and advances on  
14 the processing and handling of corn grits. This revision is in accordance with the  
15 protocol of the Bureau's Standards Development Division (SDD) to review and, if  
16 applicable, revise standards every two years, especially those that pose risk to  
17 consumer safety and health. A Technical Working Group (TWG) for the revision of the  
18 Standard was created and authorized under Special Order Nos. 301 and 814 Series of  
19 2017. The TWG was composed of the following agencies and institutions: National Food  
20 Authority, National Food Authority – Food Development Center, Department of  
21 Agriculture Corn Program, Philippine Center for Postharvest Development and  
22 Mechanization, University of the Philippines Los Baños, National Corn Competitiveness  
23 Group, Inc., and Philippine Maize Federation Inc.

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25 This document was drafted in accordance with the editorial rules of the BPS Directives,  
26 Part 3.

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28 This Standard cancels and repeals PNS/BAFS 142:2015.

**29 Introduction**

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31 Corn or maize is one of the most popular cereals in the world and forms the staple food in  
32 many countries including the Philippines. According to the analysis made by Department of  
33 Agriculture, white corn is preferred by about 14 million Filipinos to be their main staple  
34 while yellow corn is accounted for the 50 % of livestock mixed feeds. Aside from being a  
35 source for human and animal consumption, corn contributes to the country's economy,  
36 livelihood, and industry.

37

38 White corn is a low-fat complex carbohydrate that deserves a regular place on our healthy  
39 table. Health benefits of corn have been undeniable and deserve attention. According to the  
40 study made by World Food Program (2012), white corn is the staple food of 20% of the  
41 Filipino population primarily in the Visayas and Mindanao area. White corn is processed  
42 into grits and then mixed with rice called "rice composite" which is more nutritious and  
43 filling. White corn has low glycemic index which is good for people with diabetes.

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45 The creation of the code of hygienic practice for the processing and handling of corn grits is  
46 important to ensure the safety and quality of the produced corn grits. It will help promote  
47 white corn grits as grain staple and provide awareness and in depth understanding to corn  
48 stakeholders the potential health benefits of eating white corn as alternative or  
49 complementary staple to rice.

**1 Objectives**

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52 With the Philippine National Standard (PNS) Corn (maize) grits – Grading and classification  
53 (PNS/BAFS 15:20XX) already concerned with the classification of corn grits based on their  
54 physical characteristics and current practices in existing sectors, this Code aims to provide  
55 guidance for the processing, handling and storage of quality corn grits in order to prevent  
56 the risk of contamination and infestation of the said product with hazards like aflatoxin,  
57 heavy metals and pesticide residues.

**2 Scope and use of document****2.1 Scope**

63 This Code of Hygienic Practice applies to the overall production of corn grits derived from  
64 corn grains through proper harvesting, drying, shelling, milling, packaging, and storage.

**2.2 Use of document**

68 The provisions of this document are supplemental to and should be used in conjunction  
69 with PNS/BAFS 15:20XX.

**3 Normative references**

73 The following documents are referred to in the text in such a way that some or all of their  
74 content constitutes requirements of this document. For dated references, only the edition  
75 cited applies. For undated references, the latest edition of the referenced document  
76 (including any amendments) applies.

78 PNS/BAFS 15:20XX, *Corn (maize) grits – Grading and classification*

79 PNS/BAFS 20:2018, *Good Agricultural Practices (GAP) for corn*

80 PNS/BAFS 193:2017, *Code of Good Warehousing Practices for bagged grains*

**4 Terms and definitions**

84 For the purposes of this document, the following terms and definitions apply.

**4.1****corn grits**

88 milled corn grains where the outer covering (pericarp) and germ (embryo) have been  
89 removed leaving only the endosperm that passed through different sieve sizes

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91  
92  
93

94 **4.2**95 **Good Manufacturing Practices (GMP)**

96 quality assurance system aimed at ensuring that products are consistently manufactured,  
97 packed, repacked or held to quality standards appropriate for the intended use. It is thus  
98 concerned with both manufacturing and quality control procedure

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100 **5 Primary production**

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102 **5.1 Raw materials**

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104 The principles and guidelines supplement those contained in PNS Grains – Grading and  
105 classification - Corn (PNS/BAFS 10:2017).

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107 **5.2 Environmental hygiene**

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109 The farm environment, farm structure and facility maintenance for corn should conform  
110 with PNS Good Agricultural Practices (GAP) for corn (PNS/BAFPS 20:2018).

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112 **5.3 Hygienic production of corn grits**

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114 **5.3.1 Pre-processing**

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116 It is recommended that the raw materials covered in this section be prepared and handled  
117 in accordance with the appropriate sections of the PNS Code of practice for the prevention  
118 and reduction of aflatoxin contamination in corn (PNS/BAFS 27:2018) and PNS/BAFS  
119 20:2018.

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121 **5.3.1.1 Harvesting**

122

123 Harvesting practices of should conform with PNS/BAFS 20:2018 and PNS/BAFS 27:2018 in  
124 order to prevent damage and contamination of corn ears to be processed to corn grits.

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126 **5.3.1.2 Dehusking**

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128 The husk should be properly removed after harvest prior to drying or shelling depending  
129 on the moisture content of the corn grains.

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131 Sorting should be done prior to drying to remove poor quality corn ears.

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133 **5.3.1.3 Drying**

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135 **5.3.1.3.1 First stage drying:**

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137 Matured corn ears should be pre-dried within 24 hours after harvest to reduce the  
138 moisture content (MC) to at most 20 % to enhance shelling recovery using mechanical  
139 and/or sun drying.

140  
141 If immediate drying is not possible, corn ears should be temporarily stored in cribs or any  
142 appropriate structure with proper aeration to minimize heat build-up and microbial  
143 growth.

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145 **5.3.1.3.2 Second stage drying:**

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147 Shelled corn grains should be dried to 13-14 % MC to avoid or minimize grain  
148 deterioration from mold and insect infestation using the appropriate methods of drying.

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150 **5.3.1.4 Shelling**

151  
152 Corn ears should be shelled at most 20 % MC using clean, dry, and appropriate sheller.  
153 Shelled corn grains should be dried to 13-14 % MC (second stage drying).

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155 **5.3.2 Storage and transport of corn grains**

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157 Storage and transport of corn grains should be in accordance with the PNS Code of Good  
158 Warehousing Practices (GWP) for Bagged Grains (PNS/BAFS 193:2017).

159  
160 **5.3.3 Processing**

161  
162 The corn mill to be used for the milling should conform with the PNS Agricultural  
163 Machinery - Corn Mill for Food Purposes - Specifications (PNS/BAFS/PAES XXX:2018).

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165 **5.4 General hygienic practice**

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167 **5.4.1 Contaminants control**

168  
169 The level of aflatoxin, heavy metals, live insects, and pesticide residues should conform  
170 with the appropriate guidelines specified in the PNS/BAFS 15:20XX.

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172 **5.4.2 Packaging**

173  
174 The packaging materials to be used should be suitable and compliant with PNS/BAFS  
175 15:20XX.

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177 **5.4.3 Storage**

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179 **5.4.3.1** The storage area for corn grits should be designed and constructed to:

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- 181 - prevent wetting of corn grits and maintain the recommended moisture content to a  
182 maximum of 14 % MC during storage to ensure product quality;  
183  
184 - minimize the entry of insects, birds, rodents and other animals using appropriate  
185 measures; and  
186  
187 - provide proper ventilation for the stored corn grits.  
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189 **5.4.3.2** The processors should conduct regular monitoring of corn grits quality  
190 during storage and prior to distribution. No corn grits should be released to the market  
191 containing more than 20 µg/kg aflatoxin level.  
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#### 193 **5.4.4 Equipment and utensils**

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195 Other items of equipment, containers and utensils coming into contact with the product  
196 should be designed and constructed using materials that are easily cleaned, disinfected and  
197 regularly maintained to avoid contamination of corn grits.  
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### 199 **5.5 Documentation and record keeping**

200  
201 Corn mill operators should have updated records of corn grits production to include  
202 procurement, processing, storage and distribution as integral part of the food safety control  
203 system. All records should be archived for at least 12 months.  
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## 205 **6 Establishment: Design and facilities**

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### 207 **6.1 Plant construction and layout**

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#### 209 **6.1.1 Site and premises of the corn mill**

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211 **6.1.1.1** The site including its facilities should follow environmental, zoning and other  
212 relevant requirements or regulations set by the competent authority.  
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214 **6.1.1.2** Potential sources of contamination have to be considered in the location of  
215 the corn mill. In particular, corn mills should not be in:  
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217 - areas with industrial and other activities which pose a serious threat of  
218 contaminating corn grits;  
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220 - flood prone/vulnerable areas;  
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222 - areas prone to storage pest infestation;  
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224 - areas where wastes (either solid or liquid) cannot be removed effectively.

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226 **6.1.1.3** Mill owners/operators should secure immediate perimeter with adequate  
227 fences or gate to prevent any unwanted intrusion whether by humans and/or animals.  
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**6.1.2 Building and plant facilities**

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231 It is recommended that the provision of this section be referred to the appropriate section  
232 of the Department of Health Administrative Order No. 153 s. 2004 Revised Guidelines on  
233 Current Good Manufacturing Practice in Manufacturing, Packing, Repacking, or Holding  
234 Food or the latest issuance and National Food Authority *Revised Rules and Regulations on*  
235 *Grains Business*.  
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**7 End product specification**

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239 Corn grits should conform with the quality grade requirements as stated in PNS/BAFS  
240 15:20XX).

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**8 Product information**

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245 **8.1 Labeling**  
246 Labeling of corn grits should be in accordance with the provisions of PNS/BAFS 15:20XX).  
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**8.2 Traceability**

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250 Each product package should be traceable to the source (miller/processor).

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307 Republic Act No. 10611. An act to strengthen the food safety regulatory system in the  
308 country to protect consumer health and facilitate market access of local foods and food  
309 products, and for other purposes. (For definitions 3.2, 3.3, and 3.4)