PHILIPPINE NATIONAL STANDARD

PNS/BAFS 318:2021
ICS 59.060.10

Pineapple Fiber – Product Standard - Grading and Classification

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: **bafs@da.gov.ph**
Website: **www.bafs.da.gov.ph**

Foreword

In 2018, the Philippine Fiber Industry Development Authority (PhilFIDA) requested for the development of the Philippine National Standard (PNS) on pineapple fiber to improve its grading and classification systems to meet domestic and international market requirements. A Technical Working Group (TWG) was created through the Special Order (S.O.) No. 81, series of 2021 (Creation of Technical Working Groups [TWG] for the development of Philippine PNS for agriculture and fishery products, machinery and equipment] and S.O. No. 817, series of 2021 (Addendum to Special Order 81, series of 2021 entitled, "Creation of TWG for the development of PNS for agriculture and fishery products, machinery and equipment"). The TWG is composed of representatives from the Philippine Fiber Industry Development Authority (PhilFIDA), private sector, and civil society organizations. A series of field data gatherings was conducted in Kalibo and Balete, Aklan; T'boli and Polomolok, Cotabato; and Labo, Camarines Norte to support the drafting of the standard. Subsequently, the draft standard was presented to relevant stakeholders during the initial and final stakeholder consultations held on August 14-16, 2019 and May 12, 2021, respectively. The TWG convened to finalize the draft standard and endorsed it to the DA Secretary for approval.

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

Table of Contents

1 Scope

This Standard specifies requirements and establishes a system of grading and classification of commercial grades of pineapple fiber extracted from the leaves of pineapple plant (*Ananas comosus* L. Merr.). The pineapple varieties covered under this standard and their corresponding intended use/s are specified in Annex A (Pineapple varieties utilized for fiber production and their intended use/s).

2 Normative references

The following document is referred to in the text in such a way that some of its contents constitute the requirements of this document. For dated reference, only the latest edition applies. For updated reference, the latest edition of the referenced document (including any amendments) applies.

Department of Agriculture (DA) – Philippine Fiber Industry Development Authority (PhilFIDA). (2020). Rules and regulations to govern licensing, baling, tagging, marking, inspection, certification, and shipment of Philippine commercial fibers (DA – PhilFIDA Administrative Circular No. 12, series of 2020). http://www.philfida.da.gov.ph/images/Issuances/administrative-circular/ac-no-12-s-2020-rules-and-regulations.pdf

3 Terms and definitions

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

3.1
color
ranges from light ivory to dull brown and is influenced by the extraction method, oxidation, washing, drying, post-extraction management, and duration of storage

3.2
fiber
natural filament extracted from the plant

3.3
grade
fiber quality designated according to standards by an alpha-numeric code which is generally described as normal and residual

3.4
Grading Baling Establishments (GBE)
A firm engaged in buying, grading, baling, and selling commercial fibers for domestic and/or foreign consumption fully equipped with the required equipment, facilities, and manpower

3.5
length
unit of measure to describe the extent from end to end of pineapple fiber

3.6
pineapple fiber
fiber extracted from the leaf of the pineapple plant

3.6.1
hand-scraped pineapple fiber
fiber manually extracted by scraping the leaves of the pineapple plant

3.6.2
decorticated pineapple fiber
fiber extracted using a decorticating machine

3.6.2.1
brushed pineapple fiber
fiber subjected to mechanical brusher to disintegrate the fiber resulting in soft, cleaned, and lustrous fiber

3.6.2.2
unbrushed pineapple fiber
fiber not subjected to mechanical brusher

3.7
texture
basic quality of pineapple fiber which refers to the level of softness

3.8
tensile strength
maximum stress to which a fiber can be subjected before it breaks. It is measurable by a device called universal testing machine (expressed in kilogram-force or kgf/g.m.)

4 Cleaning classification

4.1. Excellent

Pineapple fiber is of excellent cleaning when extraction, washing, and brushing process are thoroughly done. The fiber is free from the presence of epidermal tissues attached to it.

4.2 Good

Pineapple fiber is of good cleaning when extraction, washing, and brushing processes are not sufficiently done. The fiber has minimal amounts of epidermal tissues attached to it.

4.3 Fair

Pineapple fiber is of fair cleaning when the extraction process and washing have not been sufficiently carried out and brushing is not done. The fiber has minimal amounts of epidermal tissues attached to it.

5 Minimum requirements

In all normal grades subject to the special provisions for each grade under Section 6 and the tolerances allowed, pineapple fiber shall meet the following requirements:

5.1 The pineapple fiber length shall not be less than 40 cm.
5.2 The pineapple fiber shall have undergone the same kind of extraction process.
5.3 The pineapple fiber of a certain grade shall not be mixed with other grades.
5.4 The pineapple fiber shall not be damped, soiled, stained or discolored, and shall be free from foreign matter.
5.5 The color of pineapple fiber shall be uniform that ranges from light ivory to dull brown, depending upon the cleaning and drying processes.
5.6 The texture of pineapple fiber shall be uniform, which ranges from soft to medium-coarse, depending upon the extraction process and the extent of its cleaning.

6 Grading

6.1 Hand-scraped pineapple fiber

Hand-scraped pineapple fiber shall be classified into various grades according to the epidermal layer of leaf it is extracted from, cleaning, texture, tensile strength, and elongation. Table 1 shows the characteristics of hand-scraped pineapple fiber based on the epidermal layer of leaf it is extracted from, texture, and degree of cleaning.

Table 1. Characteristics of hand-scraped pineapple fiber

Grade		Characteristics		
Name	**Alpha-numeric code**	**Extracted from**	**Texture**	**Cleaning**
Pineapple hand scraped one (*Liniwan*)	PIH-1	Lower epidermal layer of the pineapple leaf	Soft	Excellent
Pineapple hand scraped two (*Bastos*)	PIH-2	Upper epidermal layer of the pineapple leaf	Medium	Good

Table 2 shows the tensile strength and elongation of hand-scraped pineapple fiber for each grade. Detailed data of the tensile strength and elongation are found in Annex B (Tensile strength and elongation of hand-scraped pineapple fiber).

Table 2. Tensile strength and elongation of hand-scraped pineapple fiber

Grade		Characteristics	
Name	**Alpha-numeric code**	**Tensile strength (kgf/g.m.)**	**Elongation (%)**
Pineapple hand scraped one (*Liniwan*)	PIH-1	35.25 - 36.40	2.93 - 3.05
Pineapple hand scraped two (*Bastos*)	PIH-2	33.40 - 36.03	2.66 - 2.97

6.2 Decorticated pineapple fiber

Decorticated pineapple fiber shall be classified into various grades according to cleaning, color, texture, tensile strength, and elongation. Table 3 shows the characteristics of decorticated pineapple fiber based on whether they are brushed/unbrushed, texture, color, and quality of cleaning.

Table 3. Characteristics of decorticated pineapple fiber

Grade		Characteristics			
Name	**Alpha-numeric code**	**Brushed/ unbrushed**	**Texture**	**Color**	**Cleaning**
Pineapple decorticated one	PID-1	Brushed	Soft	Light ivory to almost white	Excellent
Pineapple decorticated two	PID-2	Brushed	Medium soft	Light ivory to light ochre	Good
Pineapple decorticated three	PID-3	Unbrushed	Medium -coarse	Light ochre to light brown	Fair
Pineapple decorticated four	PID-4	Unbrushed	Medium -coarse	Light brown to dull brown	Fair

Table 4 shows the classification of decorticated pineapple fiber based on tensile strength and elongation. The detailed data of tensile strength and elongation are found in Annex C (Tensile strength and elongation of decorticated pineapple fiber).

Table 4. Tensile strength and elongation of decorticated pineapple fiber

Grade		Characteristics	
Name	**Alpha-numeric code**	**Tensile Strength (kgf/g.m.)**	**Elongation (%)**
Pineapple decorticated one	PID-1	18.78 - 19.73	3.38 -3.51
Pineapple decorticated two	PID-2	22.19 – 26.66	2.61- 3.44
Pineapple decorticated three	PID-3	18.85 – 24.14	2.77 – 3.43
Pineapple decorticated four	PID-4	27.14 – 29.34	3.21 – 3.49

6.3 Residual

The grade is designated by either PIH-R or PID-R alpha-numeric code and residual consists of any or a combination of the following:

a) moldy, partly soiled, or stained fibers;
b) irregularly cleaned fibers;
c) discolored;
d) length with less than the minimum requirement of 40 cm; and/or
e) weak tensile strength (below the average tensile strength)

7 Length classification

The length of pineapple fiber is classified according to the specifications indicated in Table 5.

Table 5. Length classification of pineapple fiber

Description	Length (cm)
Long	more than or equal to 100
Normal	more than 60 to less than 100
Short	40 to less than 60
Very short	Less than 40

8 Tolerances

In all grades, a 5% tolerance level for the cleaning process and length shall be allowed whenever applicable.

9 Baling for Decorticated fiber

The baling of the pineapple fiber shall follow the specifications stated in DA-PhilFIDA Administrative Circular No. 12, series of 2020 (Rules and regulations to govern licensing, baling, tagging, marking, inspection, certification, and shipment of Philippine commercial fibers).

10 Labeling

The tagging and marking of bales shall be as follows:

10.1 Each bale shall bear a tag known as the long unstarched cotton cloth tag with a measurement of not less than 58 cm long and 10 cm wide. The one end of which shall be securely tied to the hank inside the bale and the other end shall project out from the bale about 25 cm.

10.2 The following data indicated in the order below shall be stamped, one below the other, on the long unstarched cotton cloth tag placed inside the bale:

10.2.1 The full or abbreviated name of the Grading Baling Establishment (GBE);
10.2.2 The name of the municipality or city where the establishment is located;
10.2.3 The establishment and lot number are separated by a dash;
10.2.4 The full or abbreviated name of the province of origin;
10.2.5 The date of pressing or baling; and
10.2.6 The initial of the station, the registered mark of the establishment, and the letter designation of the grade, the three forming one line separated from one another by bars.

10.3 The classifier's license number shall be indicated on the upper portion of the long unstarched cotton cloth tag tied inside the bale.

10.4 The other end of the long unstarched cotton cloth tag projecting out of the bale shall be divided into two sections. The one adjacent to the bale shall bear the same data stamped in the upper end of the tag in the same order, except the classifier's license number, and the rest of the long tag shall be reserved for the official stamps of the competent authority. The rest of the long tag shall be reserved for the official stamp of government grades and fiber inspector's Identification Control Number (ICN).

10.5 All markings on the unstarched cotton cloth tag, whether letters or numerals, shall be stamped with clear indelible stamping ink and shall not be less than 2 cm in height except the name of the municipality/city where the establishment is located and the date of pressing which shall not be less than 8 mm.

10.6 Data/marks required herein to be placed upon the cloth tags shall be stamped or stenciled in black paint, printer's ink, Chinese or Indian ink. Freehand marking shall not be accepted.

11 Sampling

The sampling method to be used for ascertaining conformance to the requirements of this specification shall be in accordance with the established procedures used by the competent authority.

ANNEX A

(Normative)

Common pineapple varieties utilized for fiber production and intended use

Table A.1 Common pineapple varieties utilized for fiber production and their intended use

Pineapple Variety	Intended Use
Red Spanish	textile
Hawaiian (F200)	textile and paper
Hawaiian (MG3)	textile and paper
Hawaiian (MD2)	textile and paper
Formosa (Queen)	Textile and paper

ANNEX B

(Normative)

Tensile strength and elongation of hand-scraped pineapple fiber

Table B.1 Tensile strength and elongation of PIH-1 pineapple fiber (Red Spanish variety from Antique)

Fiber Sample	Tensile Strength (kgf/g.m.)	Elongation (%)
PIH-1 A	33.84	2.66
PIH-1 B	36.03	2.78
PIH-1 C	33.70	2.97
Average	**34.52**	**2.80**

Table B.2 Tensile strength and elongation of PIH-2 pineapple fiber (Red Spanish variety from Aklan)

Fiber Sample	Tensile Strength (kgf/g.m.)	Elongation (%)
PIH-2 A	36.40	2.93
PIH-2 B	37.32	3.03
PIH-2 C	35.25	3.05
Average	**36.32**	**3.00**

ANNEX C

(Normative)

Tensile strength and elongation of decorticated pineapple fiber

Table C.1 Tensile strength and elongation of PID-1 pineapple fiber (Formosa Variety from Labo, Camarines Norte)

Fiber Sample	Tensile Strength (kgf/g.m.)	Elongation (%)
PID-1 A	19.73	3.45
PID-1 B	23.01	3.38
PID-1 C	18.78	3.51
Average	**20.51**	**3.45**

Table C.2 Tensile strength and elongation of PID-2 pineapple fiber (Formosa Variety from Labo, Camarines Norte)

Fiber Sample	Tensile Strength (kgf/g.m.)	Elongation (%)
PID-2 A	26.66	3.44
PID-2 B	23.52	2.61
PID-2 C	22.19	2.85
Average	**24.12**	**2.97**

Table C.3 Tensile strength and elongation of PID-3 pineapple fiber (Formosa Variety from Daet, Camarines Sur)

Fiber Sample	Tensile Strength (kgf/g.m.)	Elongation (%)
PID-3 A	18.85	2.77
PID-3 B	19.98	3.43
PID-3 C	24.14	3.30
Average	**20.99**	**3.17**

Table C.4 Tensile strength and elongation of PID-4 pineapple fiber (Formosa Variety from Daet, Camarines Sur)

Fiber Sample	Tensile Strength (kgf/g.m.)	Elongation (%)
PID-4 A	27.41	3.49
PID-4 B	29.34	3.27
PID-4 C	27.14	3.21
Average	**27.96**	**3.32**

Bibliography

Department of Agriculture – Philippine Fiber Industry Development Authority (PhilFIDA). (2020). Rules and regulations to govern licensing, baling, tagging, marking, inspection certification, and shipment of Philippine commercial Fibers. http://www.philfida.da.gov.ph/images/Issuances/administrative-circular/ac-no-12-s-2020-rules-and-regulations.pdf

Department of Agriculture – Philippine Fiber Industry Development Authority (PhilFIDA). (2021). Physical analysis (tensile strength and elongation) for pineapple fiber (FUTD Report No. 015-21, 016-21, 020-21, and 023-21). https://drive.google.com/file/d/10EMUFDcti8Vn-FZ3i-dLoQ4kbUnvdvXC/view

Department of Agriculture (DA)
Bureau of Agriculture and Fisheries Standards (BAFS)

Technical Working Group (TWG) for the development of the Philippine National Standard (PNS) – Pineapple Fiber – Grading and Classification

Chairperson
Ma. Jocelyn Maramag
Philippine Fiber Industry Development Authority
(PhilFIDA) – DA

Members

1 Floro Malelang
2 Joel Barquilla
3 Engr. Ramil Barcelona
4 Remedios Abgona, Ph.D.
5 Renato Amistad
6 Rene Lariosa
7 Reynaldo Mangaccat
8 Rolando Aquino
9 Victorino Dela Cruz
PhilFIDA – DA

10 Emelly Lanzon
Handicrafts of Aklan Multi-Purpose Cooperative (HAMPCO)

11 Raquel Eliserio
Raquel's Piña Cloth

12 Adolfo Tangco Jr.
T'boli Farm Growers Multi-Purpose Cooperative (TFGMPC)

BAFS Management Team
Karen Kristine Roscom
Farlash Pancho
John Gregory Aquino
Jan Paolo Umerez
Krisha Marie Mecija
Kristel Alarice Aborido
Dominique Salcedo

Advisers
Myer Mula, Ph.D.
Vivencio Mamaril, Ph.D.

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