Green Label Product
Biodegradable Plastics
(TGL-44-R1-21)

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1. Background

Plastic is an easily molded material, low density, strong, durable, customizable features and inexpensive to produce. Many industries have widely applied plastics in various functions, such as packaging materials, consumer goods, textiles, device components and structures etc. Since plastics are low-cost materials, they are commonly used in single-use packaging such as plastic bags, glass, food boxes etc. However, most plastics are difficult to decompose naturally, some plastics take hundreds of years to decompose[1]. Improper disposal of plastic waste may cause waste and environmental problems. Therefore, there is a campaign to use biodegradable and compostable plastic products and packaging to help reduce pollution in the environment.

Therefore, developing the Green Label criteria for biodegradable plastics products would create an alternative to reduce the environmental impact. With the green production process and consumption according to the green label guidelines, these products must be compostable, reduce the charge of disposal and have no harmful substances residue to the environment.

2. Scope

Biodegradable plastics cover biodegradable plastic and compostable plastic not including OXO degradable plastic and bio-based plastic.

3. Definitions

3.1 Products refer to finished products in which every part of products are within the scope of biodegradable plastic and compostable plastic but not including OXO degradable plastic and bio-based plastic.

3.2 Biodegradable plastic refers to degradable through biological processes plastic.

3.3 Compostable plastic refers to composted through biological processes and broken down to carbon dioxide, water, organic compounds and bio-mass and must not leave toxic substances that are visible and/or invasion matter residue. In addition, the decomposition process must have a degradation rate comparable to cellulose.

3.4 Composting refer to aerobic and anaerobic fermentation processes.

3.5 Disposable plastics products or single-use[2] refer to products designed for the purpose of one-time usage.

1 Bunrak Kanjanaworanit, National Metal and Materials Technology Center, Knowledge and Bio-plastic research of MTEC, 2010

2 Eco mark product category No.118, plastic products version 2.4: 2008

3.6 **Letter for declaration of compliance** refers to a certification document issued by the applicant or the manufacturer that it meets special requirements specified in the Green Label requirements for the applied product.

3.7 **Certificate** refers to documents issued by the certification body, which the accreditation body must be accredited by the accreditation body that listed in the IAF (international accreditation forum).

3.8 **Legally Authorized person** refer to the person authorized to sign under Civil and Commerce Law.

4. General requirements

4.1 Biodegradable plastics products must be certified with Thailand Industrial Standard (TIS) for the relevant product **or** tested by Thailand Industrial Standard (TIS) or International Standard (ISO) **or** National Standard such as ASTM, JIS, DIN, EN.

TIS 2744	Single-use compostable plastic straw for food
TIS 2793	Compostable plastic bag for waste
TIS 2884	Single-use compostable plastic packages and utensils for food Part 1 poly (lactic acid)
TIS 2995	Compostable plastic bags
TIS 2996	Biodegradable plastics nursery bags
TIS 2997	Biodegradable plastics mulch films for agriculture use

Verification Method

Applicant must present certified document by Thailand Industrial Standard (TIS) or test results by TIS or certified document by International Standard (ISO) or National Standard such as ASTM, JIS, DIN, EN.

4.2 In case the container, packing or products contacted with foods must be complied with quality standards or standards of plastic containers according to Notification of the Ministry of Public Health (No. 295) Re: Qualities or standard for container made from plastic.

Verification Method

Applicant must present certified document with quality standard or standards of plastic containers by Food and Drug Administration **and** attach testing result that passed according to Notification of the Ministry of Public Health (No. 295) Re: Qualities or standard for container made from plastic.

4.3 Production process, transportation and disposal must comply with law and government rules and regulations **or** ISO 14001[3] certified.

Verification Method

The applicant must submit one of the following evidence;

1. Permits or evidence that the production, transportation and waste disposal from the production process accordance with the government laws and regulations.
2. ISO 14001 environmental management system certificate of the manufacturer's factory.

Note: In the case of imported products, the manufacturer's factory must have a certified ISO 14001 environmental management system.

5. Environmental requirements

3 ISO 14001: Environmental Management System

5.1 The product must be certified or passed the determination standard according to the specified standards of any one of the following:

Table 1 Test Standard: Biodegradable plastic products

	Standard Code	Standard
Anaerobic Biodegradation	ISO 15985	Plastic – Determination of the ultimate anaerobic biodegradation and disintegration under high-solids anaerobic digestion conditions – method by analysis of released biogas
	ASTM D5511	Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic-Digestion Conditions
	ASTM D5526	Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under Accelerated Landfill Conditions
	ASTM D7475	Standard Test Method for Determining the Aerobic Degradation and Anaerobic Biodegradation of Plastic Materials under Accelerated Bioreactor Landfill Conditions
Industrial Composting	ASTM D6400	Standard Specification for Compostable Plastics
	AS 4736	Biodegradable Plastic-Biodegradable Plastics Suitable for Composting and other Microbial Treatment
	EN 13432	Packaging - Requirements for packaging recoverable through composting and biodegradation - Test scheme and evaluation criteria for the final acceptance of packaging
	TIS 17088	Specifications for compostable plastics
	ISO 17088	Specifications for compostable plastics
Home composting	AS 5810	Biodegradable plastics - Biodegradable plastics suitable for home composting
	EN 17427	Packaging - Requirements and test scheme for carrier bags suitable for treatment in well-managed home composting installations
Biodegradation in Marine	ASTM D 6691	Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials in the Marine Environment by A Defined Microbial Consortium or Natural Sea Water Inoculum
	ISO 18830	Plastic - Determination of aerobic biodegradation of non-floating plastic materials in a seawater/ sandy sediment interface - Method by measuring the oxygen demand in closed respirometer
	ISO 19679	Determination of aerobic biodegradation of non-floating plastic materials in a seawater/sediment interface – Method by analysis of evolved carbon dioxide
Biodegradation in Water/ Aqueous	ISO 14851	Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium - Method by measuring the oxygen demand in a closed respirometer

	Standard Code	Standard
	ISO 14852	Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium - Method by analysis of evolved carbon dioxide
	ISO 14853	Determination of the ultimate anaerobic biodegradation of plastic materials in an aqueous system - Method by measurement of biogas production
Biodegradation in soil	TIS 2251	Plastics - Determination of the ultimate aerobic biodegradability in soil by measuring the oxygen demand in a respirometer or the amount of carbon dioxide evolved
	ISO 17556	Plastic- Determination of the ultimate aerobic biodegradability in soil by measure the oxygen demand in a respirometer or the amount of carbon dioxide evolved
	ASTM D5988-18	Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials in Soil
Biodegradation in compost	ISO 14855-1	Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions - Method by analysis of evolved carbon dioxide - Part 1: General method
	TIS 2510 Part 1	Determination of the ultimate aerobic biodegrability of plastics under controlled composting conditions-method by analysis of evolved carbon dioxide part 1: general method

Verification Method

The applicant must submit certificate or the testing result of biodegradable as specific in 5.1

5.2 Additives must not be used in the manufacture of the product, including in the pigments used in the product as following:

5.2.1 Heavy metal such as arsenic, copper, lead, mercury, cadmium and hexavalent chromium.

5.2.2 Halogenated organic substances and halogenated organic solvents such as fluoropolymer additives, CFC, HCFC, HFC, Methylene Chloride

5.2.3 Phthalates substance such as

1) Bis(2-ethylhexyl) phthalate (DEHP)
2) Butyl benzyl phthalate (BBP)
3) Dibutyl phthalate (DBP)
4) Diisobutyl phthalate (DIBP)

5.2.4 Flame retardant

1) Polybrominated biphenyls (PBB)
2) Polybrominated diphenyl ethers (PBDE)
3) Chloroparaffins carbon chain length into 10-13 and chlorine content more than 50 by weight

5.2.5 Substances defined by Regulation (EC) No 1272/2008[4] as follows:

1) H 310 (very toxic in contact with skin)
2) H 351 (limited evidence of a carcinogenic effect)
3) H 350 (may cause cancer)
4) H 340 (may cause genetic defects)
5) H 372 (causes damage to organs through prolonged or repeated exposure)
6) H 373 (may cause damage to organs through prolonged or repeated exposure)
7) H 360 (may damage the unborn child)
8) H 361d (suspected of damaging the unborn child)
9) H 341 (suspected of causing genetic defects)

5.2.6 Carcinogen substance specified by International Agency for Research on Cancer- IARC) such as substance in Group 1, 2A and Group 2B[5]

Verification Method

[4] REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

[5] Korea Eco label Standards EL 724 Biodegradable Resin Products

The applicant must submit certificate to ensure that additives would not be used as specific in 5.2

5.3 Product Packaging

5.3.1 Plastic packaging must be complied with one of criteria as following:

1) Green Label certified of Plastic Packaging Product (TGL-105) or

2) Plastic packaging shall have a type of plastic symbol in accordance with Industrial Standards number TIS 1310 or a plastic abbreviation according to ISO 1043 or ISO 11469, except in case stretch film packing do not need to show a type of plastic symbol.

Verification Method

The applicant must submit one of the following evidences

1. Green Label Certificate of Plastic Packaging Product (TGL-105) or
2. Letter of declaration a type of plastic symbol in accordance with Industrial Standards number TIS 1310 or ISO 1043[6] or ISO 11469[7]. The letter must stamped company seal and signed by the authorized person of packaging manufacturer with the sample picture of packaging that show a type of plastic symbol.

5.3.2 Paper packaging must meet one of the following criteria:

1) Green Label certified of Paper Packaging Product (TGL-104) or

2) Paper packaging made from recycled pulp as specific in 5.1 of Paper Packaging Product (TGL-104) as following:

Table 2 Quantity of recycle pulp and/or agricultural residues pulp

[6] ISO 1043: Plastics - Symbols and abbreviated terms - Part 1: Basic polymers and their special characteristics.
[7] ISO 11469: Plastics - Generic identification and marking of plastics products

Type of product	Recycle pulp and/or agricultural residues pulp (percentage by weight)
Cushioning Material	≥ 70
Tray	≥ 75
Cardboard Box	≥ 70
Corrugated box	≥ 60
Envelop	≥ 20
Kraft envelop	≥ 50
Moulded pulp containers	≥ 90
Other paper packaging	≥ 40

Verification Method

The applicant must submit one of the following evidences

1. Green Label Certificate of Paper Packaging Product (TGL-104) or
2. Letter of declaration to ensure that paper packaging made from recycled pulp as specific in 5.1 of Paper Packaging Product (TGL-104), that letter must stamped company seal and signed by the authorized person of paper packaging manufacturer

5.3.3 Ink, paint or pigments used for printed on packaging or labeling on packaging prohibited heavy metals substances. If contaminate, the quantity of heavy metals such as mercury, lead, cadmium and hexavalent chromium must not be more than 0.01 (≤100 mg/kg) percent by weight.

Note In case the packaging product or plastic packaging product certified by Green Label. The applicant are not required to submit the evidence as specific in 5.3.3

Verification Method

The applicant must submit one of the following evidences

1. Certificate and the quantity testing of mercury, lead, cadmium and hexavalent chromium issue by paint manufacturer according to IEC 62321 test method
2. Quantity testing of mercury, lead, cadmium and hexavalent chromium
   ink, paint or pigments used for printed on packaging or labeling on packaging according to test methods defined in IEC 62321 or other equivalent test methods of mercury, lead, cadmium and hexavalent by certified ISO 17025 laboratory or a laboratory registered with Green Label only

6. Testing and Certificate

6.1 Testing

6.1.1 Laboratory with the competence of testing and calibration by TIS 17025[8] Standard or ISO/IEC 17025[9] or a laboratory registered with Green Label only

6.1.2 Testing result

6.1.2.1 The testing report that the method specified in the green label requirements.

6.1.2.2 In case, the applicant submits the testing report with according to other test methods equivalent to the method specified in the green label requirements, the applicant shall submit the document as follow;

1) The certified signature document of the apply product from the laboratory that equivalent with test method standard specified in the green label requirements

2) The method validation document of the product specified in the green label requirements.

3) The test report must not be more than 1 years up to the date of application for green label certification

6.2 Certificate of compliance with green label requirements

6.2.1 The certificate shall not exceed 1-year duration since the apply date

6.2.2 The certificate signed by legally authorized person and stamped with the company hallmark (if any)

6.3 The certificate must be issued by an agency recognized by the Green Label.

6.4 The text under the green label symbol shall indicate the statement corresponding to the test method as specific in 5.1 as figure1. In this regard, the pattern of the green label mark and the text under the green label mark to be in accordance with the rules and conditions for using the green label certification mark

8 TIS 17025: General requirements for the competence of testing and calibration laboratories
9 ISO/IEC 17025: General Requirements for the Competence of Testing and Calibration Laboratories

Figure 1 The pattern of the green label mark and the text under the green label mark (example)

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