

Testing Methods Required for Listing on the PL

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Japan BioPlastics Association

Introduction

This document explains the testing methods required for listing on the PL in relation to the Biodegradable Plastics Positive List (PL) Formulation Standards, the Marine Biodegradable Plastics Positive List (PL) Formulation Standards and the BiomassPla Positive List (PL) Formulation Standards prescribed by the Identification Committee of the Japan BioPlastics Association (hereafter referred to as the JBPA).

1. General Provisions

- (1) The substances here are components (materials) that are used or are due to be used in Biodegradable Plastics, Marine Biodegradable Plastics and BiomassPla.
- (2) When requesting the addition of a substance to the PL, in addition to the application form indicated in the PL Formulation Standards, applicants must submit to the Chairman of the JBPA Identification Committee the test reports listed below or other relevant documents that are deemed necessary by this Committee.
- (3) The test reports listed below must clearly set forth the results of tests conducted by testing institutions approved and registered by the JBPA (listed below) or the results of tests or testing methods certified by assessors approved by the JBPA (listed below). The applicant shall take full responsibility for the content of the test report.
- (4) The applicant shall bear all costs arising from the testing. If there are any queries regarding the content of the test or the method of carrying out the test, applicants can refer these to the Identification Committee in order to obtain further guidance.

2. Biodegradability Tests

The biodegradability testing methods prescribed by this Committee are as follows. The most up-to-date list of testing methods shall be used.

- (1) OECD 301C (Modified MITI Test – Ready Biodegradability):

Chemical substances: Aerobic biodegradability testing method using activated sludge

(Note) Testing period: 28 days

- (2) JIS K 6950 (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)

(Note) Testing period: Within 6 months

- (3) JIS K 6951 (ISO 14852)

Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium

(Method by analysis of evolved carbon dioxide)

(Note) Testing period: Within 6 months

- (4) JIS K 6955 (ISO 17556)

Plastics – Determination of the ultimate aerobic biodegradability in soil by measuring the oxygen demand in a respirometer or the amount of carbon dioxide evolved

(Note) Testing period: Within 6 months

- (5) JIS K 6953 (ISO 14855)

Determination of the ultimate aerobic biodegradability and disintegration of plastic materials under controlled composting conditions

(Method by analysis of evolved carbon dioxide)

Part1:General Method

(Note) Testing period: Within 6 months

- (6) ISO 14855-2

Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions

(Method by analysis of evolved carbon dioxide)

Part2:Gravimetric measurement of carbon dioxide evolved in a laboratory-scale test)

(Note) Testing period: Within 6 months

Please refer to the relevant standard for the details of each of the abovementioned tests.

3. Marine Biodegradability Tests

The Marine biodegradability testing methods prescribed by this Committee are as follows. The most up-to-date list of testing methods shall be used.

(1) ISO 18830 :

Plastics — Determination of aerobic biodegradation of non-floating plastic materials in a seawater/sandy sediment interface — Method by measuring the oxygen demand in closed respirometer

(Note) Testing period: Within 2 years

(2) ISO 19679 :

Plastics — Determination of aerobic biodegradation of non-floating plastic materials in a seawater/sediment interface — Method by analysis of evolved carbon dioxide

(Note) Testing period: Within 2 years

(3) ISO 23977-1 :

Plastics — Determination of the aerobic biodegradation of plastic materials exposed to seawater — Part 1: Method by analysis of evolved carbon dioxide

(Note) Testing period: Within 2 years

(4) ISO 23977-2 :

Plastics — Determination of the aerobic biodegradation of plastic materials exposed to seawater — Part 2: Method by measuring the oxygen demand in closed respirometer

(Note) Testing period: Within 2 years

(5) ISO 22404 :

Plastics — Determination of the aerobic biodegradation of non-floating materials exposed to marine sediment — Method by analysis of evolved carbon dioxide

(Note) Testing period: Within 2 years

(6) ASTM D6691

Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials in the Marine Environment by a Defined Microbial Consortium or Natural Sea Water Inoculum

(Note) Testing period: Within 6 months

4. Oral Acute Toxicity Tests

The oral acute toxicity testing methods prescribed by this Committee are as follows. The most up-to-date list of testing methods shall be used.

- (1) OECD Test Guideline 420

Acute Oral Toxicity—Fixed Dose Procedure

- (2) OECD Test Guideline 423

Acute Oral Toxicity—Acute Toxic Class Method

- (3) OECD Test Guideline 425

Acute Oral Toxicity—Up-And-Down Procedure

Note: It is also permissible to use only limit confirmation tests that indicate that the LD₅₀ is in excess of 2,000mg/kg.

5. Environmental Safety Tests

The environmental safety tests prescribed by this Committee are as follows. The newest issue of the Test guidelines should be adopted for registering new materials to the Positive List.

- (1) Freshwater Alga and Cyanobacteria, Growth Inhibition Test: OECD Test Guidelines 201**

- This determines the impact on the growth of unicellular green algae of chemical substances under test conditions

- (2) Daphnia sp. acute immobilisation test : OECD Test Guidelines 202**

- This determines the impact on Daphnia species of chemical substances under test conditions

- (3) Fish, Acute Toxicity Test: OECD Test Guidelines 203**

- This determines the 50% lethal dosage of the substance being tested in fish under test conditions.

For further details concerning the tests, refer to *OECD Guidelines for Testing of Chemicals*.

[Reference: Explanation of Terms]

LD₅₀: 50% lethal dose

This is an indicator of the acute toxicity of a chemical substance and refers to the quantity administered that is estimated to result in the death of half (50%) of the animals to which it is administered; it is also referred to as the half lethal dose or 50% lethal dose.

Generally, the dose is set on the basis of a particular proportion and each dosage is administered to around 10 animals, with the death rate being measured and the LD₅₀ being calculated from the results of this.

The distinction between toxic substances, deleterious substances and normal substances in Japan is determined in accordance with the LD₅₀ value obtained from tests on mice (The foregoing is quoted from the second edition of the Tokyo Kagaku-Dojinsha Dictionary of Biochemistry).

Environmental Risk Evaluation:

Acute toxicity tests are conducted using freshwater organisms.

Normally, three types of test are conducted: alga growth inhibition tests, Daphnia acute immobilization tests, and fish acute toxicity tests.

In general, green algae are used for the alga tests, Daphnia magna are used for the Daphnia tests, and orange Oryzias latipes are used for the fish tests; toxicity in alga and Daphnia is evaluated on the basis of EC₅₀, while toxicity in fish is evaluated on the basis of LC₅₀.

EC₅₀: Median Effective Concentration

This is the concentration of the substance being tested at which it is estimated that the impact will emerge in 50% of the test organisms, compared with the control group, that is to say the test organisms that are not exposed to the substance.

Where the test organisms are algae, this is the concentration at which the cell density is reduced by half after 72 hours.

LC₅₀: Median Lethal Concentration

This is the concentration of the substance being tested at which it is estimated that 50% of the test organisms, such as fish, will die.

(The foregoing is quoted from the Ministry of the Environment website, section relating to businesses testing the ecological effects of chemical substances)

6. Degradability Tests

Degradability tests in the process of composting Biodegradable PLA products shall be conducted using one of the following testing methods.

1. ISO 16929 “Plastics -- Determination of the degree of disintegration of plastic materials under defined composting conditions in a pilot-scale test”
(Remarks: Tests using compost vessels with a capacity of at least 140 liters)
(Remarks: Tests using compost vessels with a capacity of 2-5 liters)
2. ISO 20200 “Plastics -- Determination of the degree of disintegration of plastic materials under simulated composting conditions in a laboratory-scale test”
(Remarks: Tests using compost vessels with a capacity of 5-20 liters)

7. Reproduction Inhibition Tests

- (1) These shall be conducted on the basis of OECD Chemical Guideline 208. However, with regard to plant species, at least two species from two of the three categories given in OECD 208 shall be used.
- (2) ISO 11269-2: Soil quality — Determination of the effects of pollutants on soil flora — Part 2: Effects of contaminated soil on the emergence and early growth of higher plants

8. Biomass Carbon Measurement Tests

ASTM D6866 Standard Test Methods for Determining the Biobased Content of Natural Range Materials Using Radiocarbon and Isotope Ratio Mass Spectrometry Analysis

Using the *Testing Method for Determining the Biobase Rate of Materials in the Natural Domain Using Radioactive Carbon and Isotope Ratio Gravimetric Analysis*.

9. Testing Results and Testing Institutions/Laboratories

Normal chemical analysis, biodegradability tests, oral acute toxicity tests and environmental safety tests shall conform to the following test results or be conducted by the following testing institutions.

(Accredited Test Results)

- ① Test results recognized in the Law Concerning the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. (1973 Law No.117; abbreviated to “Chemical Substances Control Law”)
- ② Test results prescribed by this Committee or accredited by assessors recognized by this Committee
- ③ Test results from a testing institution accredited by the BPI (International Biodegradable Products Institute; headquarters: New York), DIN Certco (headquarters: Berlin), BMG (Biodegradable Materials Group; headquarters: Beijing) and TÜV AUSTRIA (headquarters: Vienna)

(Accredited Testing Institutions/Laboratories)

- ④ GLP-certified testing institutions in relation to the Chemical Substances Control Law
- ⑤ Testing institutions prescribed by this Committee or accredited by assessors recognized by this Committee
- ⑥ Testing institutions accredited by the BPI in the USA, DIN Certco in Germany, BMG in China or TÜV AUSTRIA

Note 1:

The latest information concerning the abovementioned assessors and testing institutions will be published on this Committee’s website.

Note 2:

As of April, 2025, the following testing institutions have been accredited:

■JBPA – 1:

Chemicals Evaluation and Research Institute, Japan

Tokyo Laboratory

1600 Shimotakano, Sugito-machi, Kitakatsushika-gun, Saitama 345-0043, Japan

Tel: 0480-37-2601 Fax: 0480-37-2521

Focus: General chemical analysis

Biodegradability tests (OECD 301C, JIS K 6950, 6951, 6953, 6955)

Marine biodegradability (ISO18830, ISO19679, ISO23977-1, ISO23977-2, ISO22404, ASTM D6691)

Oral acute toxicity tests and environmental safety tests

■JBPA – 2:

Japan Food Research Laboratories

Tama Laboratory

〒151-0062 52-1, Motoyoyogi, Shibuya, Tokyo Japan

TEL. 03-3469-7131 FAX. 03-3469-7009

Focus: General chemical analysis

Oral acute toxicity tests and environmental safety tests

■JBPA – 3:

Organic Waste Systems n.v.

4, Dok Noord, 9000 GENT, Belgien

Tel: Bel-00 32 92 33 02 04 Fax: Bel-00 32 92 33 28 25

Focus: General chemical analysis

Biodegradability tests (ISO 14851, 14852, 14855)

Degradability Tests (ISO 16929, ASTM D 5338, ISO 20200)

Reproduction Inhibition Tests (OECD208)

Marine biodegradability tests (ISO18830, ISO19679, ISO23977-1, ISO23977-2, ISO22404, ASTM D6691)

Note: Japanese agent

DJK International Inc.

Arbus Shin-Yokohama Building, 2-6-1 Shin-Yokohama, Kohoku, Yokohama, Kanagawa 222-0033, Japan

Tel: 045-478-6824 Fax: 045-478-6835

■JBPA – 4:

Morinomiya Center, Osaka Research Institute of Industrial Science and Technology

1-6-50 Morinomiya, Joto-Ku, Osaka 536-8553, Japan

Tel: 06-6963-8065 Fax: 06-6963-8079

Focus: General chemical analysis

Biodegradability tests (OECD 301C, JIS K 6950)

■JBPA – 5:

Institute of Accelerator Analysis Ltd.

129-1 Shinmachi, Noborito, Tama-ku, Kawasaki City, Kanagawa 214-0013, Japan

Tel: 044-934-0020 Fax: 044-931-5812

Focus: Radiocarbon measurement

■JBPA – 6:

Beta Analytic, Inc

4985 S.W. 74th Court, Miami, FL, USA 33155

Tel: (01) 305-667-5167

Focus: Radiocarbon measurement

Note: Japanese agent

Chikyu Kagaku Kenkyusho

1-608 Uedahonmachi, Tenpaku-ku, Nagoya City, Aichi, 468-0007, Japan

Tel: 052-802-0703

■JBPA - 7 :

RHOMBIC CORPORATION

1000, Kawajiri-cho, Yokkaichi, Mie 510-0871

Tel : 059-345-7622 Fax : 059-345-7174

Focus : Biodegradability test JIS K6953-2 (ISO 14855-2)

■JBPA - 8 :

BOKEN Quality Evaluation Institute

Osaka Testing Center

1-6-24, Chikko, Minato-ku, Osaka, Osaka 552-0021 JAPAN

TEL : +81-6-6577-0200 FAX : +81-6-6577-0210

Focus : Biodegradability test JIS K6953-2 (ISO 14855-2)

Marine Biodegradability test (ISO19679)

■JBPA - 9 :

CHEMITOX, INC.

International Dept., Mr. Hiroaki Fujioka

E-Mail : hi-fujioka@chemitox.co.jp

Tel : 03-3727-7111

Focus : Biodegradability test (JIS K6953-2/ISO14855-2, JIS K6950/ISO14851, JIS K6951 /ISO14852)

Marine Biodegradability test (ISO 18830, ISO 19679, ISO 23977-1/-2, ISO 22404, ASTM D6691)

■JBPA - 10 :

ARCHA SRL

Via di Tegulaia 10/A, 56121, Ospedaletto (PI), ITALY

Tel : +39 (0)50 985165, FAX : +39 (0)50 6396251

Email : francesca.braca@archa.it (Ms. Francesca Braca)

archainf@archa.it

Internet : <https://www.archa.it>

Focus : General chemical analysis

Biodegradability test (ISO 14851, ISO14852, ISO14855, ISO17556)

Marine Biodegradability test (ASTM D6691)

Degradability Tests (ISO 16929, ISO 20200, ASTM D5338)

Reproduction Inhibition Tests (OECD 208)

Note: Japanese agent

CHEMITOX, INC.

International Dept., Mr. Hiroaki Fujioka

E-Mail : hi-fujioka@chemitox.co.jp

Tel : 03-3727-7111

Web : <https://www.chemitox.co.jp/>

■BPI – 1:

Advanced Materials Center, Inc

125 Swanson Street, Ottawa, IL 61350-5114, US

Tel: USA-815-422-1495 FAX: USA-815-433-1795

■BPI – 2:

Organic Waste Systems

3155 Research Bvd, Suite 104, Dayton, OH 45420, US

Tel: USA-937-253-6888 FAX: USA-937-253-3455

EMAIL: rtillinger@worldnet.att.net

■DIN Certco – 1:

Dr. U. Noack-Laboratorium für angewandte Biologie

Käthe-Paulus-Straße 1, 31157 Sarstedt, Germany

Tel: Ger-0 50 66/70 67-0 Fax: Ger-0 50 66/70 67 89

E-Mail: info@noack-lab.de

Web: www.noack-lab.de

■ **DIN Certco – 2:**

Fraunhofer-Institut für Verfahrenstechnik und Verpackung

Giggenhauser Straße 35, 85354 Freising, Germany

Tel: Ger-0 81 61 49 10 Fax: Ger-0 81 61 49 14 91

■ **DIN Certco – 3:**

Fraunhofer-Institut für Umwelt-, Sicherheits-, Energietechnik UMSICHT Lab.

Osterfelder Straße 3, 46047 Oberhausen, Germany

Tel: Ger-02 08/85 98-0 Fax: Ger-02 08/85 98-12 90

E-Mail: ute.merrettig-bruns@umsicht.fhg.de

■ **DIN Certco – 4:**

Ingenieurgesellschaft für Umweltplanung mbH Geschäftsbereich PlanCoTec

Karlsbrunnenstraße 11, 37249 Neu-Eichenberg, Germany

Tel: Ger-0 55 42/93 19-30 Fax: Ger-0 55 42/93 19-79

E-Mail : plancotec@plancotec.de

■ **DIN Certco – 5:**

ISEGA - Forschungs- und Untersuchungs-Gesellschaft mbH

Zeppelinstraße 3-5, 63741 Aschaffenburg, Germany

Tel: Ger-0 60 21/49 89-0 Fax: Ger-0 60 21/49 89-30

E-Mail: isega@t-online.de Web: www.isega.de

■ **DIN Certco – 6:**

Materialforschungs- und Prüfanstalt an der Bauhaus-Universität Weimar

Fachgebiet Umwelt

Amalienstraße 13, 99423 Weimar, Germany

Tel: Ger-0 36 43/5 64-0 Fax: Ger-0 36 43/5 64-2 01

Fax: Ger-0 36 43/5 64-2 02

■ **DIN Certco – 7:**

OrganicWaste Systems n.v.

4, Dok Noord, 9000 GENT, BELGIUM

Tel: Bel-00 32 92 33 02 04 Fax: Bel-00 32 92 33 28 25

E-Mail: mail@ows.be

■ **DIN Certco – 8:**

Universität GH Essen

Fachbereich 10, Bauwesen/Abfallwirtschaft Universitätsstraße 15, 45141 Essen, Germany

■ **DIN Certco - 9 :**

SGS Taiwan Ltd.

C&P-Textile & Footwear Service

No.115-1, Sanjun Street., Shulin District, New Taipei City, 238024, Taiwan

Tel : 886 2 26880098 ext. 60

E-Mail : climbgreat.yang@sgs.com (Climbgreat YANG)

URL: <https://www.sgs.com.tw/>

Test Method:

Biodegradability test : ISO 14855-1

Disintegration test : ISO 16929

Plant damage test : OECD 208

■BGM -1 :**China National Centre for Quality Supervision & Test of Plastics Products**

100048 11Fucheng Road, Beijing, China

Tel:010-68983956 68985371

E-Mail: ntsqp@ntsqp.org.cn

■TÜV AUSTRIA -1, BPI-3 :**CHELAB SRL, MERIEUX NutriSciences**

VIA FRATTA, 25, 31023 RESANA(TV), ITALY

Tel : +39 0423 71 77

E-Mail : packaging.italy@mxns.com

URL : www.merieuxnutrisciences.com/it/

■TÜV AUSTRIA -2, BPI-4, DIN-Certco-10 :**TÜV Rheinland (Shanghai) Co., Ltd., Kunshan Branch**

Workshop 2, Building 5, No. 38, Jingfan Road, Bacheng, Kunshan, Jiangsu, CHINA

Tel : +86 21 6108 1072

E-Mail : Env.info@chn.tuv.com

URL : www.tuv.com

■TÜV AUSTRIA -3 :**GDDCM Guangdong Detection Center of Microbiology**

66th building, No.100 Central Xian Lie Road, Guangzhou, 510070, CHINA

Tel : +86 20 8713 7527

E-Mail : meichf@gdim.cn

URL : www.gddcm.com