



January 26, 2015

To: Richard C. Rossi,  
City Manager.

From: Owen O' Riordan,  
Commissioner for Public Works.

**Re: Preparation of a list of amendments associated with the Plastic Bag Ordinance.**

Please find attached five (5) documents associated with our response to the above council order of December 15<sup>th</sup> 2014.

- (1) The original Plastic Bag Ordinance.
- (2) A redlined version of the Plastic Bag Ordinance including proposed amendments.
- (3) A list of the 13 proposed amendments to the Plastic Bag Ordinance.
- (4) Proposed regulations that will be promulgated by the Commissioner of Public Works if the various amendments proposed are approved.
- (5) Standard Specification ASTM D6400 for plastic products that can be composted in aerobic composting facilities.

In an effort to address the various changes requested by various councilors during the Ordinance Committee and City Council meetings, the Department of Public Works and the Law Department have revised the Plastic Bag Ordinance so as to better allow the City Council to deliberate the merits of the various changes that have been proposed over the past year. The second document listed above is the redlined version of the original Plastic Bag Ordinance, (Document No. 2) which incorporates all fourteen (13) proposed amendments. This document shows the exact changes that would be made to the original Ordinance if all of the various amendments were accepted by the Council.

The third document (Document No. 3) lists all of the changes included in the redlined original Plastic Bag Ordinance (Document No. 2). Depending on how Councilors vote on amendments No. 3 through 13, the Council could then vote on amendments Nos. 1 and 2 which allow for a more accurate reflection of the scope and title of a revised Ordinance.

The Department of Public Works also recommends that Amendment No. 10 be adopted. This amendment would provide for a one (1) year period before the Ordinance becomes effective, which would allow the Department of Public Works to better provide the support, publicity and outreach necessary to ensure the success of the Ordinance. This time period will also allow us to better identify any unintended consequences associated with the implementation of the Ordinance and thus be able to report back to City Council if there are any such unintended consequences and to address them before the Ordinance becomes effective.

**FIRST PUBLICATION NUMBER 3321**

**City of Cambridge**

**In the Year Two Thousand and Fourteen**

**AN ORDINANCE**

**In amendment to the Ordinance entitled "Municipal Code of the City of Cambridge"**

**Be it ordained by the City Council of the City of Cambridge**

**That Title Eight of the Municipal Code entitled "Health and Safety" is hereby amended by adding a new Chapter 8.67 entitled "Plastic Bag Reduction Ordinance" which reads as follows:**

**8.67 Plastic Bag Reduction Ordinance.**

**Section 8.67.010 Short Title.**

This Chapter may be cited as the "Plastic Bag Reduction Ordinance" of the City of Cambridge.

**Section 8.67.020 Declaration of findings and policy--Scope.**

The City Council hereby finds that the reduction in the use of plastic bags by commercial entities in the City of Cambridge (the "City") is a public purpose that protects the marine environment, advances solid waste reduction and protects waterways. This Ordinance seeks to reduce the number of plastic bags that are being used, discarded and littered, and to promote the use of reusable checkout bags by retail stores located in the City. Further, this Ordinance seeks to reduce the use of paper bags, due to their greater use of natural resources and higher cost impacts on retailers. This Ordinance also seeks to ensure that customers using reusable checkout bags are made aware of the need to keep those bags sanitized between uses in order to protect against the transmission of food-borne illnesses.

**Section 8.67.030 Definitions.**

(a) The following words shall, unless the context clearly requires otherwise, have the following meanings:

1. "Department" means the City's Department of Public Works.
2. "Commissioner" means the City's Commissioner of Public Works.
3. "Checkout Bag" means a carryout bag provided by a Retail Establishment to a customer at the point of sale. A Checkout Bag shall not include
  - a. bags, whether plastic or not, in which loose produce or products are placed by a consumer to deliver such items to the point of sale or check-out area of a Retail Establishment;
  - b. laundry or dry-cleaner bags; or
  - c. newspaper bags.
4. "Recyclable Paper Bag" means a paper bag that is 100 percent recyclable and contains at least 40% post-consumer recycled content, and displays the words "Recyclable" and "made from 40% post-consumer recycled content" in a visible manner on the outside of the bag.

5. "Reusable Bag" means a bag with handles that is specifically designed and manufactured for multiple reuse and is either polyester, polypropylene, cotton or other durable material, or durable plastic that is at least 3.0 mils in thickness.

6. "Retail Establishment" means any commercial enterprise, defined as the following, whether for or not-for profit, including, but not limited to restaurants, pharmacies, convenience and grocery stores, liquor stores, seasonal and temporary businesses, farmers' markets, jewelry stores, household goods stores, street fairs or festivals or bazaars.

**Section 8.67.040 Requirements.**

A. If a Retail Establishment provides Checkout Bags to customers, such bags shall be either a Recyclable Paper Bag or a Reusable Bag. Public information advising customers to sanitize Reusable Bags to prevent food-borne illness must be prominently displayed or communicated upon sale.

B. The Commissioner shall have the authority to promulgate regulations to accomplish any of the provisions of this Chapter.

C. Each Retail Establishment as defined in Section 8.66.030, above, shall comply with this Chapter.

**Section 8.67.050 Effective Date.**

This Chapter shall take effect one hundred and eighty (180) days from the date of enactment.

**Section 8.67.060 Exemption.**

A. The Commissioner may exempt a Retail Establishment from the requirements of this Chapter for a period of up to six (6) months, upon a finding by the Commissioner that the requirements of this Chapter would cause undue hardship to a Retail Establishment. An "undue hardship" shall only be found in:

1. Circumstances or situations unique to the particular Retail Establishment such that there are no reasonable alternatives to bags that are not Recyclable Paper Bags or Reusable Bags, or

2. Circumstances or situations unique to the Retail Establishment such that compliance with the requirements of this Chapter would deprive a person of a legally protected right, or

3. Circumstances where a Retail Establishment requires additional time in order to draw down an existing inventory of single-use plastic check out bags. Any Retail Establishment receiving an exemption shall file with the Commissioner monthly reports on inventory reduction and remaining stocks.

B. Any Retail Establishment shall apply for an exemption to the Commissioner using forms provided by the Department, and shall allow the Commissioner or his or her designee, access to all information supporting its application.

C. The Commissioner may approve the exemption request, in whole or in part, with or without conditions.

D. The Commissioner, by regulation, may establish a fee for exemption requests.

**Section 8.67.070 Enforcement.**

A. Fine. Any Retail Establishment who shall violate any provision of this Chapter shall be liable for a fine of not more than \$300 and each day's violation shall constitute a separate offense.

B. Whoever violates any provision of this Chapter may be penalized by a noncriminal disposition as provided in G.L. c. 40, §21D. For purposes of this section, the Commissioner of the Department of Public Works, the Executive Director of the License Commission, the Executive Director of the Inspectional Services Department and the Commissioner of the Health Commission, or their designees shall be enforcing persons.

**Section 8.67.080 Severability.**

It is the intention of the City Council that each separate provision of this Chapter shall be deemed independent of all other provisions herein, and it is further the intention of the City Council that if any provision of this Chapter be declared to be invalid by a court of competent jurisdiction, the remaining provisions of this Chapter shall remain valid and enforceable.

Passed to a second reading at the City Council meeting held on February 10, 2014 and on or after February 24, 2014 the question comes on passing to be ordained.

ATTEST:-

Donna P. Lopez  
City Clerk

**Section 8.67.010 Short Title.**

This Chapter may be cited as the “Plastic Bag Reduction Ordinance “Checkout Bag Ordinance” of the City of Cambridge.

**Section 8.67.020 Declaration of findings and policy—Scope.**

~~The City Council hereby finds that the reduction in the use of plastic bags by commercial entities in the City of Cambridge (the “City”) is a public purpose that protects the marine environment, advances solid waste reduction and protects waterways. This Ordinance seeks to reduce the number of plastic bags that are being used, discarded and littered, and to promote the use reusable checkout bags by retail stores located in the City. Further, this Ordinance seeks to reduce the use of plastic bags, due to their greater use of natural resources and higher cost impacts on retailers. This Ordinance also seeks to ensure that customers using reusable checkout bags are made aware of the need to keep those bags sanitized between uses in order to protect against the transmission of food-borne illnesses.~~

The City Council hereby finds that the reduction in the use of disposable checkout bags by Retail Establishments in the City of Cambridge (the “City”) is a public purpose that protects the marine environment, advances solid waste reduction, reduces greenhouse gas emissions, and protects waterways. This Ordinance seeks to reduce the number of plastic and paper bags that are being used, discarded and littered, and to promote the use of reusable checkout bags by Retail Establishments located in the City. This Ordinance seeks to ensure that customers using reusable checkout bags are made aware of the need to keep those bags sanitized between uses in order to protect against the transmission of food-borne illnesses.

**Section 8.67.030 Definitions.**

(a) The following words shall, unless the context clearly requires otherwise, have the following meanings:

1. “Department” means the City’s Department of Public Works.
2. “Commissioner” means the head of the City’s Commissioner of Public Works.
3. “Checkout Bag” means a carryout bag with handles provided by a Retail Establishment to a customer at the point of sale. A Checkout Bag shall not include
  - a. bags, whether plastic or not, in which loose produce or products are placed by a consumer to deliver such items to the point of sale or check-out area of a Retail Establishment;
  - b. laundry or dry-cleaner bags; or
  - c. newspaper bags; or
  - d. bags used to contain or wrap frozen foods, meat or fish, whether prepackaged or not to prevent or contain moisture; or
  - e. bags used to transport leftover or take-out food from restaurants.

4. "Recyclable Paper Bag" means a paper bag that is 100 percent recyclable and contains at least 40% post-consumer recycled content, and displays the words "Recyclable" and "made from 40% post-consumer recycled content" in a visible manner on the outside of the bag.

5. "Reusable Bag" means a bag with handles that is specifically designed and manufactured for multiple reuse and is either polyester, polypropylene, cotton or other durable material, or durable plastic that is at least 3.02.25 mils in thickness.

6. "Compostable Plastic Bag" means a plastic Checkout Bag that is capable of meeting the standards set forth in the test parameters of ASTM D6400 and approved by the Commissioner. Said bags must be capable of undergoing biological decomposition in a compost site such that the material breaks down into carbon dioxide, water, inorganic compounds and biomass at a rate consistent with known compostable materials.

76. "Retail Establishment" means any commercial enterprise, defined as the following, whether for or not-for profit, including but not limited to restaurants, pharmacies, convenience and grocery stores, liquor stores, seasonal and temporary businesses, farmers' markets, jewelry stores, and household goods stores, street fairs or festivals or bazaars. This does not include bazaars operated by nonprofit organizations, or religious institutions and farmers markets.

#### **Section 8.67.040 Requirements.**

A. If either a Retail Establishment provides Checkout Bags to customers, such bags shall be either a Recyclable Paper Bag or a Reusable Bag. Public information advising customers to sanitize Reusable Bags to prevent food-borne illness must be prominently displayed or communicated upon sale.

B. The Commissioner shall have the authority to promulgate regulations to accomplish any of the provisions of this Chapter.

#### C. Charges.

1. Retail Establishments which provide Recyclable Paper Bags or Compostable Plastic Bags shall charge for each such bag provided not less than an amount established by Regulations promulgated by the Commissioner. The Checkout Bag charge shall be retained by the Retail Establishment.

2. Any charge for a Checkout Bag shall be separately stated on a receipt provided to the customer at the time of sale and shall be identified as the "Checkout Bag Charge" thereon.

D. Each Retail Establishment as defined in Section 8.6667.030, above, shall comply with this Chapter.

**Section 8.67.050 Effective Date.**

This Chapter shall take effect one hundred and eighty (180) days year from the date of enactment.

**Section 8.67.060 Exemption.**

~~A. The Commissioner may exempt a Retail Establishment from the requirements of this Chapter for a period of up to six (6) months, upon a finding by the Commissioner that the requirements of this Chapter would cause undue hardship to a Retail Establishment. An "undue hardship" shall only be found in:~~ The Commissioner may exempt a Retail Establishment from the requirements of this Chapter for a period of two years upon a finding by the Commissioner that the requirements of this chapter would cause undue hardship to a Retail Establishment. Any exemption granted by the Commissioner pursuant to this section shall expire after two(2) years. A retail establishment may re-apply when the exemption expires. An "undue hardship" shall only be found in;

1. Circumstances or situations unique to the particular Retail Establishment such that there are no reasonable alternatives to bags that are not Recyclable Paper Bags or Reusable Bags, or

2. Circumstances or situations unique to the Retail Establishment such that compliance with the requirements of this Chapter would deprive a person of a legally protected right, ~~or.~~

~~B3. Circumstances where a Retail Establishment requires additional time in order to draw down an existing inventory of single-use plastic check out bags. Any Retail Establishment receiving an exemption shall file with the Commissioner monthly reports on inventory reduction and remaining stocks. The Commissioner may also exempt a Retail Establishment from the requirements of this Chapter for a period up to six (6) months, upon a finding by the Commissioner that a Retail Establishment requires additional time in order to draw down existing inventory of single-use plastic checkout bags or Checkout Bags that are not permitted by this Chapter or Regulations.~~

CB. Any Retail Establishment shall apply for an exemption to the Commissioner using forms provided by the Department, and shall allow the Commissioner, or his or her designee, access to all information supporting its application.

DC. The Commissioner may approve the exemption request, in whole or in part, with or without conditions.

ED. The Commissioner by regulation, may establish a fee for exemption requests.

**Section 8.67.070 Enforcement.**

A. Fine. Any Retail Establishment who shall violate any provision of this Chapter shall be liable for a fine of not more than \$300 and each day's violation shall constitute a separate offense.

B. Whoever violates any provision of this Chapter may be penalized by a noncriminal disposition as provided in G.L. c. 40, §21D. For purposes of this section, the Commissioner of the Department of Public Works, the Executive Director of the License Commission, the Executive Director of Inspectional Services Department and the Commissioner of the Health Commission, or their designees shall be the enforcing persons.

**Section 8.67.080 Severability.**

It is the intention of the City Council that each separate provision of this Chapter shall be deemed independent of all other provisions herein, and it is further the intention of the City Council that if any provision of this Chapter be declared to be invalid by a court of competent jurisdiction, the remaining provisions of this Chapter shall remain valid and enforceable.

## Amendments to the Original Plastic Bag Ordinance

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### **Amendment Number 1**

#### **Section 8.67.010 Short Title.**

The language "Plastic Bag Reduction" shall be deleted and "Checkout Bag" shall be inserted after the word "the" and before the word "Ordinance."

### **Amendment Number 2**

#### **Section 8.67.020 Declaration of findings and policy—Scope.**

The language in Section 8.67.020 shall be deleted in its entirety and replaced with the following language:

The City Council hereby finds that the reduction in the use of disposable checkout bags by Retail Establishments in the City of Cambridge (the "City") is a public purpose that protects the marine environment, advances solid waste reduction, reduces greenhouse gas emissions, and protects waterways. This Ordinance seeks to reduce the number of plastic and paper bags that are being used, discarded and littered, and to promote the use of reusable checkout bags by Retail Establishments located in the City. This Ordinance seeks to ensure that customers using reusable checkout bags are made aware of the need to keep those bags sanitized between uses in order to protect against the transmission of food-borne illnesses.

### **Amendment Number 3:**

**Section 8.67.030 Definitions.** The following language shall be inserted as a new subsection (a)(3)(d):

- d. bags used to contain or wrap frozen foods, meat or fish, whether prepackaged or not to prevent or contain leaks; or

**Amendment Number 4:**

**Section 8.67.030 Definitions.** The following language shall be inserted as a new subsection (a)(3)(e):

- e. bags used to transport leftover or take-out food from restaurants.

**Amendment Number 5:**

**Section 8.67.030 Definitions.** Delete the language in subsection (a)(5) which reads "3.0 mils" and insert in its place the following language: "2.25 mils".

**Amendment Number 6:**

**Section 8.67.030 Definitions.** Subsection (a)(6) shall be deleted in its entirety and the following language shall be inserted as a new subsection (a)(6):

- 6. "Compostable Plastic Bag" means a plastic Checkout Bag that is capable of meeting the standards set forth in the test parameters of ASTM D6400 and approved by the Commissioner. Said bags must be capable of undergoing biological decomposition in a compost site such that the material breaks down into carbon dioxide, water, inorganic compounds and biomass at a rate consistent with known compostable materials.

**Amendment Number 7:**

**Section 8.67.030 Definitions.** The following language shall be inserted as a new subsection (a)(7):

- 7. "Retail Establishment" means any commercial enterprise, defined as the following, whether for or not for profit, including, but not limited to restaurants, pharmacies, convenience and grocery stores, seasonal and temporary businesses, jewelry stores, and household goods stores; however, this does not include bazaars operated by nonprofit organizations or religious institutions and farmers markets.

**Amendment Number 8:**

**Section 8.67.040 Requirements.** The following language shall be inserted as a new subsection (C).

C . Charges.

1. Retail Establishments which provide Recyclable Paper Bags or Compostable Plastic Bags shall charge for each such bag provided not less than an amount established by Regulations promulgated by the Commissioner. The Checkout Bag charge shall be retained by the Retail Establishment.
2. Any charge for a Checkout Bag shall be separately stated on a receipt provided to the customer at the time of sale and shall be identified as the "Checkout Bag Charge" thereon.

**Amendment Number 9:**

**Section 8.67.040 Requirements.** The previously named subsection (C) shall be renamed subsection (D) and the number "7" shall be deleted and the number "6" shall be inserted.

**Amendment Number 10:**

**Section 8.67.050 Effective Date.**

The language "hundred and eighty (180) days" shall be deleted with the language "year" inserted after the word "one."

**Amendment Number 11:**

**Section 8.67.060 Exemptions.** The entirety of subsection (A) shall be deleted and the following language shall be inserted:

A. The Commissioner may exempt a Retail Establishment from the requirements of this Chapter for a period of two years upon a finding by the Commissioner that the requirements of this chapter would cause undue hardship to a Retail Establishment. Any exemption granted by the Commissioner pursuant to this

section shall expire after two (2) years. A retail establishment may re-apply when the exemption expires. An “undue hardship” shall only be found in;

**Amendment Number 12:**

**Section 8.67.060 Exemptions.** Subsection (A)(3) shall be deleted in its entirety and replaced with the following language as a new subsection (B).

B. The Commissioner may also exempt a Retail Establishment from the requirements of this Chapter for a period up to six (6) months, upon a finding by the Commissioner that a Retail Establishment requires additional time in order to draw down existing inventory of single-use plastic checkout bags or Checkout Bags that are not permitted by this Chapter or Regulations.

**Amendment Number 13:**

**Section 8.67.060 Exemptions.**

Subsections (B), (C) and (D) shall be renamed (C), (D) and (E), respectively.

**The City of Cambridge**  
**Department of Public Works.**  
**Checkout Bag Reduction Regulations**

The City of Cambridge Commissioner for Public Works (“The Commissioner”) hereby adopts these Checkout Bag Reduction Regulations pursuant to Cambridge Municipal Code Chapter 8:67.

1. Definitions. The following terms shall have the following meaning:

A. Compostable Plastic Bag is a plastic bag that meets the current ASTM D6400 Standard Specifications for compostability, is labeled as meeting the ASTM Standard by a third-party independent verification entity, such as the US Composting Council or the Biodegradable Products Institute. Said bags must be capable of undergoing biological decomposition in a compost site such that the material breaks down into carbon dioxide, water, inorganic compounds and biomass at a rate consistent with known compostable materials.

2. Checkout Bag Charge

A. Retail Establishments which provide Recyclable Paper Bags, Reusable Bags or Compostable Plastic Bags as checkout bags in accordance with this ordinance and regulations, shall charge not less than 10 cents for each such bag provided. This Checkout bag charge shall be retained by the Retail Establishment.







# Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities<sup>1</sup>

This standard is issued under the fixed designation D6400; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This specification covers plastics and products made from plastics that are designed to be composted under aerobic conditions in municipal and industrial aerobic composting facilities, where thermophilic conditions are achieved.

1.2 This specification is intended to establish the requirements for labeling of materials and products, including packaging made from plastics, as “compostable in aerobic municipal and industrial composting facilities.”

1.3 The properties in this specification are those required to determine if end items (including packaging), which use plastics and polymers as coatings or binders will compost satisfactorily, in large scale aerobic municipal or industrial composting facilities. Maximum throughput is a high priority to composters and the intermediate stages of plastic disintegration and biodegradation not be visible to the end user for aesthetic reasons.

1.4 The following safety hazards caveat pertains to the test methods portion of this standard: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate health and safety practices and to determine the applicability of regulatory limitations prior to use.*

NOTE 1—This test method is equivalent to ISO 17088.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

D883 Terminology Relating to Plastics

D5338 Test Method for Determining Aerobic Biodegradation of Plastic Materials Under Controlled Composting

Conditions, Incorporating Thermophilic Temperatures

### 2.2 Organization for Economic Development (OECD) Standard:<sup>3</sup>

OECD Guideline 208 Terrestrial Plant Test: Seedling Emergence and Seedling Growth Test

### 2.3 Comité Européen de Normalisation (CEN):<sup>4</sup>

EN 13432: 2000, 2000 CEN/TC 261/SC 4 N 99 Packaging—Requirements for Packaging Recoverable through Composting and Biodegradation—Test Scheme and Evaluation Criteria for the Final Acceptance of Packaging (EN 13432)

### 2.4 ISO Standard:<sup>4</sup>

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

ISO 14855-2 Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions—Method by analysis of evolved carbon dioxide—Part 2: Gravimetric measurement of carbon dioxide evolved in a laboratory-scale test

ISO 16929 Plastics—Determination of the Degree of Disintegration of Plastic Materials under Defined Composting Conditions in a Pilot-Scale Test

ISO 17088 Specifications for Compostable Plastics

ISO 20200 Determination of the degree of disintegration of plastic materials under simulated composting conditions in a laboratory-scale test

### 2.5 U.S. Government Standard:<sup>5</sup>

40 CFR Part 503.13 Standards for the Use or Disposal of Sewage Sludge

### 2.6 Canadian Government Standard:<sup>6</sup>

Trade Memorandum T-4-93 Standards for Metals in Fertilizers and Supplements

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.96 on Environmentally Degradable Plastics and Biobased Products.

Current edition approved May 15, 2012. Published May 2012. Originally approved in 1999. Last previous edition approved in 2004 as D6400-04. DOI: 10.1520/D6400-12.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from Organization for Economic Development, Director of Information, 2 rue André Pascal, 75775 Paris Cedex 16, France.

<sup>4</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036. <http://www.ansi.org>.

<sup>5</sup> *Code of Federal Regulations*, available from U.S. Government Printing Office, Washington, DC 20402.

<sup>6</sup> Available from the Canadian Food Inspections Agency, Fertilizer Section, Ottawa, Canada

\*A Summary of Changes section appears at the end of this standard

### 3. Terminology

3.1 *Definitions*: Definitions appearing in this specification are found in Terminology D883, unless otherwise noted.

3.1.1 *biodegradable plastic*—a degradable plastic in which the degradation results from the action of naturally occurring microorganisms such as bacteria, fungi, and algae.

3.1.2 *compostable plastic*—a plastic that undergoes degradation by biological processes during composting to yield CO<sup>2</sup>, water, inorganic compounds, and biomass at a rate consistent with other known compostable materials and leave no visible, distinguishable or toxic residue.

3.1.3 *composting*<sup>7</sup>—a managed process that controls the biological decomposition and transformation of biodegradable materials into a humus-like substance called compost: the aerobic mesophilic and thermophilic degradation of organic matter to make compost; the transformation of biologically decomposable material through a controlled process of biooxidation that proceed through mesophilic and thermophilic phases and results in the production of carbon dioxide, water, minerals, and stabilized organic matter (compost or humus).

3.1.4 *degradable plastic*—a plastic designed to undergo a significant change in its chemical structure under specific environmental conditions, resulting in a loss of some properties that may be measured by standard test methods appropriate to the plastic and the application in a period of time that determines its classification.

3.1.5 *plastic*—a material that contains as an essential ingredient one or more organic polymeric substances of large molecular weight, is solid in its finished state, and, at some stage in its manufacture or processing into finished articles, can be shaped by flow.

3.1.6 *polymer*—a substance consisting of molecules characterized by the repetition (neglecting ends, branch junctions, other minor irregularities) of one or more types of monomeric units.

### 4. Classification

4.1 The purpose of this specification is to establish requirements for identifying items made from plastics or polymers so that they do not interfere with their satisfactorily composting in commercial and municipal aerobic composting facilities. Products meeting the requirements outlined below be labeled as “compostable in municipal or industrial aerobic facilities” in accordance with the guidelines issued by the Federal Trade Commission<sup>8</sup> as long as proper qualifications as to the availability of such facilities are included on the label.

### 5. Basic Requirements

5.1 In order to compost satisfactorily, a product or material must demonstrate each of the characteristics found in 5.1.1-5.1.3, and which are quantified in Section 6,

5.1.1 *Disintegration During Composting*—A plastic product or material will disintegrate during composting such that any remaining plastic residuals are not readily distinguishable from the other organic materials in the finished product. Additionally, the material or product must not be found in significant quantities during screening prior to final distribution of the compost.

5.1.2 *Biodegradation*—A level of biodegradation for the plastic products shall be established by tests under controlled conditions.

5.1.3 *No Adverse Impacts on Ability of Compost to Support Plant Growth*—The tested materials shall not adversely impact on the ability of composts to support plant growth, when compared to composts derived from biowaste without any addition of tested products or reference materials. Additionally, the polymeric products or materials must not introduce unacceptable levels of regulated metals or hazardous substances into the environment, upon sample decomposition.

NOTE 2—For a better understanding of why these criteria are important, consult the *Compost Facility Operating Guide*,<sup>7</sup> and CEN/TC 261/SC 4 N 99.

### 6. Detailed Requirements

6.1 In order to be identified as compostable in municipal or industrial aerobic facilities, products must pass the requirements of 6.2, 6.3, and 6.4 using the appropriate laboratory tests, representative of the conditions found in aerobic composting facilities, which reach thermophilic temperatures. Finished articles and products shall be tested in the same form as they are intended to be used. For products that are made in multiple thicknesses or densities, such as films, containers and foams, only the thickest or most dense products need to be tested as long as the chemical composition and structure remains otherwise the same. It is assumed that thinner gages and lower densities will also compost satisfactorily. Similarly, if additives are present in test samples that pass testing, lower levels of the same additives are similarly passed.

6.2 *Disintegration During Composting*—A plastic product is considered to have demonstrated satisfactory disintegration if after twelve weeks (84 days) in a controlled composting test, no more than 10 % of its original dry weight remains after sieving on a 2.0-mm sieve. The test shall be carried out in accordance with ISO 16929 with a minimum vessel volume of 35 L, or ISO 20200 under thermophilic aerobic composting conditions.

6.3 *Biodegradation*—A plastic product must demonstrate a satisfactory rate of biodegradation by achieving the following ratio of conversion to carbon dioxide found in 6.3.1 and 6.3.1.1 within 180 days using Test Method D5338, ISO 14855-1, or ISO 14855-2.

6.3.1 Ninety percent (90 %) of the organic carbon in the whole item or for each organic constituent, which is present in the material at a concentration of more than 1 % (by dry mass), shall be converted to carbon dioxide by the end of the test period when compared to the positive control or in the absolute.

6.3.1.1 Organic constituents present at levels between 1 to 10 % shall be tested individually for compliance to 6.3.1.

<sup>7</sup> *Compost Facility Operating Guide*, Composting Council, Alexandria, VA, 1995.

<sup>8</sup> *Guidelines for the Use of Environmental Marketing Claims*, Federal Trade Commission, Washington, DC, 1992.

6.3.2 Organic constituents which are present at concentrations of less than 1 % do not need to demonstrate biodegradability. However, the sum of such unproven constituents shall not exceed 5 %.

6.3.3 Plastic product test samples shall not be subjected to conditions designed to accelerate biodegradation, prior to testing in 6.3.

**NOTE 3**—While the end points of biodegradation include incorporation into biomass or humic substances as well as carbon dioxide, no recognized standard test methods and specifications exist to quantify these outcomes. When these tests and specifications become available, this standard will be revised.

6.4 A plastic product can demonstrate satisfactory terrestrial safety if it fulfills the requirements in 6.4.1 and 6.4.2:

6.4.1 The plastic or product shall have concentrations of regulated metals less than 50 % of those prescribed for sludges or composts in the country where the product is sold. Specifically in the United States, the regulated metal concentrations are found in Table 3 of 40 CFR Part 503.13. In Canada, the regulated metals concentrations are found in Table II of the Trade Memorandum T-4-93.

6.4.2 The germination rate and the plant biomass of the sample composts shall be no less than 90% that of the

corresponding blank composts for two different plant species following OECD Guideline 208 with the modifications found in Annex E of EN 13432.

**NOTE 4**—Sample composts generated in accordance with ISO 20200 should not be used for ecotoxicity testing unless the concentration of the test items at the start of testing is in accordance with the requirements of ISO 16929.

## 7. Sampling

7.1 Sampling shall be conducted as indicated in the specified test method.

## 8. Specimen Preparation

8.1 Specimen preparation shall be in accordance with the specified test method.

## 9. Marking and Labeling

9.1 Marking and labeling shall conform to national and local regulations.

## 10. Keywords

10.1 biodegradable; compostable plastic; composting; degradable plastics; labeling

## SUMMARY OF CHANGES

Committee D20 has identified the location of selected changes to this standard since the last issue (D6400 - 04) that may impact the use of this standard. (May 15, 2012)

(1) Most of the proposed changes are designed to harmonize this specification with the wording used in the newer standard, Specification D6868 - 11 and the requirements in ISO 17088. The distinction between the required level of biodegradation

for homopolymers and other types of polymers is eliminated. Also, the language regarding the maximum number of items exempt from biodegradation testing is clarified.

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