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# Standard Terminology Relating to Flexible Barrier Packaging[1]

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## 1. Scope

1.1 This terminology covers the principal terms relating to flexible barrier packaging and its materials. This terminology contains related definitions and descriptions of terms used or likely to be used in flexible barrier packaging standards. The purpose of terminology is to promote clear understanding and interpretation of the standards in which they are used.

## 2. Referenced Documents

2.1 *ASTM Standards:*[2]

D883 Terminology Relating to Plastics
D1129 Terminology Relating to Water
F1349 Test Method for Nonvolatile Ultraviolet (UV) Absorbing Extractables from Microwave Susceptors
F1980 Guide for Accelerated Aging of Sterile Barrier Systems for Medical Devices

## 3. Terminology

**accelerated aging—**a technique to simulate the effects of time on a package by subjecting the product/package system to elevated temperatures in a controlled environment representative of controlled environment storage conditions. The equivalent time is generally estimated by assuming the degradation of packaging materials follows the kinetics described by the Arrhenius reaction rate function, more discussion of which is available in Guide F1980.

**acid foods—**foods that have a natural pH of 4.6 or below.

**adhesive transfer—**a condition occurring when an adhesive-coated material is peeled away from an opposing material to which it has been sealed and shows visible evidence of the adhesive being left on the opposing material. This evidence is in the form of an adhesive layer that remains with the opposing material, the adhesive having separated either adhesively from the coated web or cohesively within the adhesive itself.

**aseptic—**as applied to aseptic packaging, synonymous with commercially sterile.

**aseptic packaging—**filling of a commercially sterilized product into presterilized containers, followed by hermetic sealing in a commercially sterile atmosphere.

**aseptic presentation—**introduction and transfer of a sterile product using conditions and procedures that exclude microbial contamination.

**barrier—**any material limiting passage through itself of solids, liquids, semisolids, gases, vapors, or forms of energy such as ultraviolet light.

**barrier materials—**specialized porous or nonporous packaging materials that provide environmental protection to the package contents as well as protection to the environment from the package contents: (*1*) gas, vapor, humidity, liquid, microbial, or light resistant materials that control or eliminate the amount of those environmental constituents that pass into or out of a package; (*2*) a porous material preventing the passage of microorganisms that might contaminate the contents of the package.

**biological evaluation test (biotest)—**a test which involves exposure of sealed packages to biological indicators and is designed to determine the microbiological integrity of a package under the specific conditions of the test.

**burst strength—**a measure of the internal pressure necessary to rupture a package or seal.

**channel—**any unimpaired pathway across the entire width of the intended seal.

**coextrusion—***in flexible barrier materials*, (*1*) a process whereby two or more plastic streams are forced simultaneously through one or more shaping orifices to become one continuously-formed multilayered structure. (*2*) Also, the product resulting from such a process.

**commercial sterility—** *of thermally processed food*, the condition achieved by application of heat, alone or in combination with other appropriate treatments, to render the food

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

free of microorganisms capable of growing in the food at normal nonrefrigerated conditions at which the food is likely to be held during distribution and storage.

**conditioning—**the exposure of a material to the influence of a prescribed atmosphere for a stipulated period of time or until a stipulated relation is reached between material and atmosphere.

**delamination—**the separation of layers in a multilayered structure.

**dispersion coating—***in flexible barrier materials*, (*1*) a process of applying a material, suspended or dispersed in a vehicle, to a surface in such a way that a continuous, coalesced, adherent layer results when the vehicle liquid (usually water) is evaporated. (*2*) Also, the product resulting from such a process.

**dual ovenable—**terms describing a food packaging container used to prepare food in either a conventional oven or a microwave oven.

**environmentally challenging—**the process of subjecting a package to extremes of temperature and/or humidity and/or other environmental conditions, with the goal of determining sensitivities of the package to environmental stresses. In contrast to accelerated aging, environmental challenging often includes conditions, or transitions, or both, of temperature and humidity that equal or exceed those that can be encountered in a package life cycle.

**extrusion coating—***in flexible barrier materials*, (*1*) a process of extrusion whereby a molten extrudate adheres to the surface of another (solid) material, forming a continuous layer upon cooling. (*2*) Also, the product resulting from such a process.

**flexible—**easily hand-folded, flexed, twisted, and bent.

DISCUSSION—"Flexible" may be a characteristic of thin barrier materials, especially when thinner than 125 to 255 µm (5 to 10 mils), that are composed of materials that are otherwise classified as "rigid" or "semi-rigid" under the definitions concerning rigidity based on modulus of elasticity (see Terminology D883). Modulus of elasticity is an inherent property of a material which in conjunction with thickness determines flexibility.

**flexible package—**any package with at least one flexible component that can be bent back or folded back upon itself.

**fluoroptic temperature measurement—**temperature measurement based on the variation in total luminescence of a fluoroptic phosphor which has been previously calibrated versus a known temperature standard.

**food simulant—**a well-characterized substance used in place of food for investigative studies.

**functional barrier—***in food packaging,* a material that effectively restricts passage of solids, liquids, semi-solids, vapors, or forms of energy such as ultraviolet light through itself, across its borders, or interface with another material or substance.

**fusion seal—**a bond formed by combining two or more materials through melting or other means so that the joining layers become indistinguishable at the interface.

**heat seal—**the result of bonding surfaces by controlled application of heat, pressure, and dwell time.

**hermetically sealed aseptic container—**a container that is designed and intended to be secure against the entry of microorganisms and thereby to maintain the commercial sterility of its contents.

**hot tack—**the property of a heat seal to hold together when stressed while it is still hot from the sealing operation.

**laminate—**a product made by bonding together two or more layers of material or materials. (See also **multilayered structure**)

**lamination—***in flexible barrier materials*, the process of preparing a laminate which consists of two or more flexible barriers bonded together (see also **laminate**).

**leak—**any opening in a flexible package that is contrary to intention and either lets contents escape or permits substances to enter.

**load (water load)—**an amount of water used to moderate the microwave radiation absorbed by a susceptor during simulated microwave heating tests.

**low-acid food—**any food, other than alcoholic beverages, with a finished equilibrium pH greater than 4.6 and a water activity ($a_w$) greater than 0.85. Tomatoes and tomato products having a finished equilibrium pH less than 4.7 are not classed as low-acid foods.

**major package defect—**a defect that is likely to result in failure or reduce significantly the usability of the package for its intended use.

**medical device—**any instrument, apparatus, implement, machine, appliance, implant, *in vitro* reagent or calibrator, software, material, or other related article, intended by the manufacturer to be used, alone or in combination, for one of more of the specific purpose(s) of (*1*) diagnosis, prevention, monitoring, treatment, or alleviation of a disease; (*2*) diagnosis, monitoring, treatment, alleviation of or compensation for an injury; (*3*) investigation, replacement, modification or support of the anatomy or of a physiological process—supporting or sustaining life; (*4*) control of conception; (*5*) disinfection of medical devices; and (*6*) providing information for medical purposes by means of *in vitro* examination of specimens derived from the human body, and which does not achieve its primary intended action in or on the human body by pharmacological, immunological, or metabolic means, but which may be assisted in its function by such means.

**microbial barrier—**property of the sterile barrier system that prevents the ingress and/or egress of microorganisms under specified conditions.

**microbiological contamination (of packaged products)—**the entry of viable microorganisms into a finished package due to lack of or loss of package integrity.