Packaging Materials Management Definitions:

A Review of Varying Global Standards

Guidance Document

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About AMERIPEN

AMERIPEN – the American Institute for Packaging and the Environment – is a coalition of packaging producers, users and end-of-life materials managers dedicated to improving packaging and the environment. We are the only material neutral packaging association in the United States. Our membership represents the entire packaging supply chain, including materials suppliers, packaging producers, consumer packaged goods companies (CPGs) and end-of-life materials managers. We focus on scientifically developed data to define and support public policy positions that address the intersection of packaging and the environment.

Acknowledgements

This report is the result of a collaboration process involving inputs from AMERIPEN corporate members, technical advisory group members, and subject matter experts.

Project Lead: Kyla Fisher, AMERIPEN Program Manager, served as project lead, coordinating the resources needed to develop this assessment.

Legal Review: Christopher Cole & Lauren Aronson, Crowell and Moring, LLP.

Packaging Materials Management Definitions: A Review of Varying Global Standards Guidance Document

How we define packaging materials and their management processes is important. Definitions set the tone for what is protected, how we measure, and what informs an overall materials management strategy. How we define the words "recyclable," "reusable," and "compostable" also influences policy creation and the application of regulatory contexts. Likewise, terms such as "renewable" or "recycled content" affect material and design strategies as well as goal setting. Differences between definitions can create trade and marketing obstacles when one jurisdiction's definition differs from another. For example, materials deemed recyclable in one country and not in another can have a negative effect on trade and drive consumer confusion. For these reasons, it is important that the definitions related to packaging materials management be interpreted neither too widely nor too narrowly.

As packaging materials management issues become increasingly global, there is a push to harmonize practices and leverage existing legal frameworks to help manage material flows. Awareness of the different contexts influencing various definitions will bring us closer to an understanding of what common principles should define how we manage packaging materials.

Understanding the Different Frameworks for Defining Terms

International Organization for Standardization (ISO): ISO International Standards represent global consensus on a solution to a challenge or reflect a universally agreed upon practice or procedure. The ISO 18600 Series of Standards on Packaging and the Environment[1] and *ISO 14021: 2016 - Environmental Labels and Declarations*, are quite useful in establishing global harmonization around packaging material management. These standards were developed with the intent to help harmonize existing legislation related to packaging and the environment so that local regulatory frameworks are not a barrier to the introduction of new products. The ISO 18600 Series focuses on the technical aspects of packaging and the environment and the terms applied reference how systems and processes work. ISO 14021:2016 - Environmental Labels and Declarations provides guidance on labelling and other publicly made claims related to packaging and the environment. While the definitions often support one another, those identified within ISO 14021: 2016 place greater focus on access and the ability of the public to understand and interpret environmental declarations.

U.S. Federal Trade Commission (FTC): Within the United States, the *FTC's Green Guides* are another useful reference. The Green Guides include specific guidance on how companies can market and label their products within the U.S. Like *ISO 14021: 2016*, public claims are dependent upon consumer understanding and rates of access to necessary recovery

1 ISO 18601: 2013 Packaging and the Environment—General Requirements for the Use of ISO Standards in the Field of Packaging and the Environment.
ISO 18602: 2013 Packaging and the Environment—Optimization of the Packaging System.
ISO 18603: 2013 Packaging and the Environment—Reuse
ISO 18604: 2013 Packaging and the Environment—Material Recycling
ISO 18605: 2013 Packaging and the Environment—Energy Recovery
ISO 18606: 2013 Packaging and the Environment—Organic Recycling

infrastructure. Several states have codified the Green Guides under their Fair Business Practices Act and the Federal Trade Commission Act (FTC Act 15 U.S.C. 45) permits enforcement for violation of the premises enshrined with the Guides.

Other Sources: Additional definitions may have been developed by trade associations or organizations to help provide a framework through which to understand the nature of packaging attributes from their perspective.

Understanding the Legal Hierarchy for Definitions

With a wide range of agencies providing varying definitions, how does an organization decide which definition to use? If we understand definitions to provide a consistent perspective under which business can operate, then we should guide our understanding based on the influence of legal authority.

Definitions from a regulatory document should supersede any other definitions — including those from ISO standards — within the regulatory jurisdiction. In the absence of a regulatory reference, the ISO standards should be considered the defacto authority. Agency, association or organizational definitions are provided to offer context for interpreting definitions, but they have no regulatory or legal standing. They can, however, be used to amend or set a framework for ISO updates or jurisdictionally-specific regulatory standards.

Figure 1: Understanding the Legal Hierarchy of Packaging Definitions

These take precedence over all other definitions within the influence of their organizational boundaries. These are enshrined by law and carry potential enforcement associated with them.

In the absence of a regulatory definition, the ISO standards are considered the de facto authority. ISO standards are embraced by the governing process of the World Trade Organization (WTO). Signatories of the WTO are encouraged to adopt ISO standards in order to help harmonize global trade.

Technical standards offer a context behind definitions and while they do not define terms per se, they form the context under which a packaging claim can be validated.

Agency, organization or association definitions are valuable as they provide a context into how definitions impact practice. While these definitions have no legal standing, they can inform future regulatory iniatives and are considered when ISO and technical standards are under review.

In issuing this document, AMERIPEN does not seek to supersede legal definitions or place value on existing definitions. This document has been developed as a resource to help provide guidance on interpreting definitions and understanding global labelling practices related to packaging material management practices. We pay attention to how these varying definitions can inform policy environments and regulatory frameworks.

Definitions of Popular Packaging Attributes

Recyclable

Recyclable has many different connotations. For example, the European Waste Framework embraces material and organic processes but excludes energy recovery; the EPA definition also explicitly excludes energy recovery — and while it does not call out organics in its definition, in practice it is considered. As recycling technology advances, definitions of recycling are subject to interpretation and broad references to material conversion will require additional clarification[2].

Most definitions of recyclable refer to the entire system of recycling (e.g., collection, sortation, processing and end markets). Defining recyclable this way emphasizes the idea that recycling is a system of actions and all systems must work together to ensure material re-use. Recyclable is the only packaging definition that refers to a system of actions versus a single attribute. This systems perspective drives significant efforts to advocate for increased collection of acceptance of materials in public programs.

As definitions have been updated, a focus on the economics of recycling has grown in recognition. The EPA definition amended recently for the State Measurement Program has been updated to indicate an economic value is needed, as does the Association of Plastics Recyclers (APR) definition. Others imply an economic value through the assumption of re-manufacturing. The Ellen MacArthur Foundation (EMF) Global Commitment is the first to reference remanufacturing "at scale"[3], which opens up the question of how scale might be interpreted across countries and different regulatory environments. Interestingly, the APR definition specifically calls out an opportunity for legislative action in lieu of economic value. This is the first definition to suggest government intervention as access. This perspective may place the APR and EMF definitions at odds with one another.

2 *Many of these definitions are 10 years or older and are premised on the concept of physical conversion (e.g. mechanical recycling). As new technologies are providing for the ability to convert polymers back into monomers or other building blocks, the definition of recycling has been subject to interpretation and clarifications may need to be issued to provide guidance on what is considered recyclable.*

3 *The EMF Global Commitment document includes a note to define the use of the term "at-scale": "[a]t scale means that there is an existing (collection, sorting and recycling) system in place that actually recycles the packaging (its not just a theoretical possibility) and that covers significant and relevant geographical areas as measured by population size."*

Recyclable Definitions

ORGANIZATION	DEFINITION
FTC Green Guides	• A product should not be labeled as "recyclable" — even if it is technically capable of being recycled — if it is unlikely that the product will be recycled in its ordinary usage (e.g., a trash bag). If any component limits the ability to recycle of an attribute, such as shape or size, a recyclable claim would be deceptive. • A product or package should not be marketed as recyclable unless it can be collected, separated, or otherwise recovered from the waste stream through an established recycling program for reuse or use in manufacturing or assembling another item. When recycling facilities are available to a substantial majority of consumers or communities where the item is sold, marketers can make unqualified recyclable claims. The term 'substantial majority' as used in this context means at least 60 percent. If recycling facilities are not available to a 'substantial majority' of consumers or communities can add qualifications clarifying facility availability. • Marketers can make unqualified recyclable claims for a product or package if the entire product or package, excluding minor incidental components, is recyclable.
ISO 18604: 2013	Characteristic of a product, packaging, or associated component that can be diverted from the waste stream through available processes and programmes and can be collected, processed, and returned to use in the form of raw materials or products.
ISO 14021: 2016	A characteristic of a product, packaging or associated component that can be diverted from the waste stream through available processes and programs and can be collected, processed and returned to use in the form of raw materials or products. Evaluation shall be undertaken in accordance with clause 6. The information referred to in 6.5 shall include evidence of the following: • The collection, sorting and delivery systems to transfer the materials from the source to the recycling facility are conveniently available to a reasonable proportion of the purchasers, potential purchasers and users of the product. • The recycling facilities are available to accommodate the collected material. • The product for which the claim is made is being collected and recycled
US Environmental Protection Agency	*Note: Definition of recycling, not recyclable.* Refers to the series of activities by which discarded materials are collected, sorted, processed, and converted into raw material and returned to the economic mainstream by being used in the production of new products. Does not include the use of these materials as a fuel substitute or for energy production.

Recyclable Definitions – continued

European Waste Framework Directive	*Note: Definition of recycling, not recyclable.* 'Recycling' means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.
EMF New Plastic Economy Global Commitment	*Note: Definition is intended to be specific to plastic packaging.* A packaging or packaging component is recyclable if its successful post-consumer collection, sorting, and recycling is proven to work in practice and at scale.
Association of Plastics Recyclers (plastics only)	1. The product must be made with a plastic that is collected for recycling, has market value and/or is supported by a legislatively mandated program. 2. The product must be sorted and aggregated into defined streams for recycling processes. 3. The product can be processed and reclaimed/recycled with commercial recycling processes. 4. The recycled plastic becomes a raw material that is used in the production of new products.

Reusable

Reusable packaging is widely seen as an environmentally preferable outcome, ideally saving on material and processing impact by refilling or reusing packaging formats for multiple uses. In practice, however, there are few examples of reusable packaging. Regulatory issues for food contact packaging, tamper-proof packaging and other challenges, including infrastructure needed to collect, clean and refill, can create additional challenges for designers when developing packaging formats for reuse. While many transit packaging materials are reused between suppliers and vendors (i.e., corrugate containers and slip-sheets), these do not always carry the designation of reuse.

The ISO 14021: 2016 definition, which focuses on labelling, is the only definition that considers the process of collection and reuse. All definitions restrict reuse to the original process for which the package was designed. For example, the use of a coffee canister to hold pencils would not be considered reuse by these standards.

Reusable Definitions

ORGANIZATION	DEFINITION
FTC Green Guides	To make a "refillable" claim, a marketer may either provide a system for collection and refill of the package or sell a product that consumers can purchase to refill the original package.
ISO 18603: 2013	Packaging or packaging component which proves its capability of accomplishing within its lifecycle a minimum number of trips or rotations in a system for reuse

Reusable Definitions – continued

ISO 14021: 2016	A characteristic of a product or packaging that has been conceived and designed to accomplish within its lifecycle a certain number of trips, rotations or uses for the same purpose for which it was conceived. A claim that a product or packaging is reusable or refillable shall only be made where: 1. A programme exists for collecting the used product or packaging and reusing or refilling it; or 2. Facilities or products exist that allow the purchaser to reuse or refill the product or package.
European Waste Framework Directive	Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.
US Environmental Protection Agency	Refers to the use of a product or component of municipal solid waste in its original form more than once.
EMF New Plastics Economy Global Commitment	*Note: Definition is intended to be specific to plastic packaging.* Packaging which has been designed to accomplish or proves its ability to accomplish a minimum number of trips or rotations in a system for reuse.

Renewable

Renewable is a popular packaging material attribute, however application of the term to a package format is restricted as it applies to the materials used, not the package itself. Packages in and of themselves are not renewable. They tend to be made up of several different components and are not inherently regenerative. *ISO 14021: 2016* permits for use of the term in labeling, however a claim must clearly state the mass percentage of material which is renewable against those components which are not. For this reason, it is not a popular term found on-package but rather tends to be an internal goal or objective of packaging providers in identifying materials for use.

Renewable Definitions

ORGANIZATION	DEFINITION
FTC Green Guides	Marketers should avoid unqualified “made with renewable” claims unless the product or package, excluding minor, incidental components, is made entirely with renewable materials. Renewable energy claims are likely to be interpreted broadly. To minimize the risk of unintended implied claims, marketers should identify the material used and explain why the material is renewable.

Renewable Definitions – continued

ISO 14021: 2016	Material that is composed of biomass from a living source and that can be continually replenished. When claims of renewability are made for virgin materials, those materials shall come from sources that are replenished at a rate equal to or greater than the rate of depletion.
USDA Bio Preferred Program	Describes a resource that is inexhaustible and readily replaced. In the context of biobased products, renewable resources include agricultural, forestry, and marine resources such as algae, not the product itself.
EMF New Plastics Economy Global Commitment	*Note: Definition is intended to be specific to plastic packaging and specifically refers to renewable material.* Material that is composed of biomass from a living source and that can be continually replenished. When claims of renewability are made for virgin materials, those materials shall come from sources that are replenished at a rate equal to or greater than the rate of depletion.

Compostable/Degradable

Usage of the term "compostable" is focused on industrial processes and does not include degradation and/or biodegradation resulting from littering or in household composters. The term is also considered an umbrella term for many different forms of industrial organics recycling. It is important to note that compostable and biodegradation, or other forms of degradation (e.g., oxo-degradable, photo-degradable) are evaluated differently and subject to different labelling requirements. They are not the same, despite being frequently confused. Details on specific nuances between composting, anaerobic digestion and biodegradation can be found in technical guidance referencing differences between amount of material breakdown, time and end-product quality.

While compostable claims can be validated through third-party certifications and testing standards and thus be unqualified in their labelling, degradable claims must clearly state: 1) the product's ability to degrade in the environment where it is customarily disposed of; and 2) the rate and extent of degradation. Because of this confusion, states like California have regulated that claims of degradation are only permissible if they meet the qualifications necessary for compostability.

Definitions for compostability are more technical in nature. This technical focus is in direct contrast to the systems perspective we see in the recycling definitions. While many definitions for composting focus on the quality of the end product — the compost soil — collection and access are generally excluded as defining factors. The challenge with establishing a definition based on recovery systems is the nascent state of composting infrastructure designed to handle compostable packaging. Where FTC guidelines set a minimum access rate for unvalidated claims on recycling, they do not weigh in on compostable claims, instead they focus on scientific evidence of material breakdown. The recently released Global Plastics Declaration is the first definition that has attempted to provide a qualifier based on recovery access and it may be likely that more definitions will shift toward access as more infrastructure becomes available.

Compostable/Degradable Definitions

ORGANIZATION	DEFINITION
FTC Green Guides	• To claim a product/package is "compostable," a marketer must have "competent and reliable scientific evidence" that all the materials in the item will break down into or otherwise become part of usable compost in a safe and timely manner (in approximately the same time as the materials with which it is composted) in a composting facility or home compost pile/device. Compostable claims must be qualified: 1) if the item cannot be composted safely or in a timely manner in a home compost pile/device; or 2) if the claim misleads reasonable consumers as to the environmental benefit provided when the item is disposed of in a landfill. Limited availability of municipal or institutional composting facilities must be clearly and prominently qualified if they are not available to a "substantial majority" of consumers or communities where the item is sold. • To make an unqualified "degradable" claim, the marketer must have "competent and reliable scientific evidence" that the entire item will completely break down and decompose into elements found in nature within one year of customary disposal. A marketer can qualify a "degradable" claim by providing information regarding the product or package's ability to degrade in the environment where it is customarily disposed and the rate and extent of degradation.
ISO 14021: 2016	A characteristic of a product, packaging or associated component that allows it to biodegrade, generating a relatively homogeneous and stable humus-like substance. A compostability claim shall not be made for a product or packaging or a component of a product or packaging that: • Negatively affects the overall value of the compost as a soil amendment; • Releases substances in concentrations harmful to the environment at any point during decomposition or subsequent use; or • Significantly reduces the rate of composting in those systems in which the product or component is likely to be composted.
ATSM D6400-12	*Note: Refers specifically to plastics.* Compostable plastic must breakdown a minimum of 90% into CO2, water and minerals within an industrial composting setting within six months. Additionally, they must not leave any harmful residue behind.

Compostable/Degradable Definitions – continued

ISO 18606: 2013	Aerobic process designed to produce compost. *Note: Organically recoverable, compostable, or compostable packaging in municipal or industrial composting facilities or biodegradable during composting are expressions considered to be equivalent.* Packaging is considered recoverable only if all of the individual components meet the requirements. For each of the packaging components, the following four aspects must be addressed: 1. Biodegradation; 2. Disintegration during biological waste treatment (i.e., composting); 3. Negative effects on the biological process; 4. Negative effects on the quality of the resulting compost, including the presence of high levels of regulated metals and other substances hazardous to the environment.
FTC Green Guides	A marketer claiming that an item is compostable should have competent and reliable scientific evidence that all the materials in the item will break down into, or otherwise become part of, usable compost (e.g., soil-conditioning material, mulch) in a safe and timely manner (i.e., in approximately the same time as the materials with which it is composted) in an appropriate composting facility, or in a home compost pile or device.
EMF New Plastics Economy Global Commitment	*Note: Definition refers to compostable packaging.* A packaging or packaging component is compostable if it is in compliance with relevant international compostability standards, and if its successful post-consumer collection, sorting, and composting is proven to work in practice and at scale[4].

Recycled Content

To demonstrate use of recycled material, many packaging providers seek to make claims on the amount of recycled content they use in the manufacturing of their products. There are several ways these claims can be made, depending on the material and system use (i.e., percentage based or credit based[5]).

The scope of recycled content significantly varies depending on what definition is used. Nuances between what is deemed post-consumer use can lead to significant confusion for those seeking to make claims and well as for consumers trying to decipher claims. This difference creates variation in recycled content claims that are eligible between countries.

4 *Similar to their recycling definition, EMF provides a note documenting that usage of the term 'at-scale' implies: "there are significant and relevant geographical areas as measured by population size, where the package is actually composted in practice."*

5 *Most recycled content claims are percentage based, however, in programs like forestry certification, a credit system may be used to calculate the amount of recycled material vs. virgin inputs into the manufacturing. For more details on the calculation methods of these different approaches, please review SFI or FSC certification standards.*

Recycled Content Definitions

ORGANIZATION	DEFINITION
FTC Green Guides	Recycled content includes recycled raw material as well as used, reconditioned, and re-manufactured components. It is not required to differentiate between pre- and post-consumer recycled content; however, recycled content shall not include reclaimed or reprocessed manufacturing scrap. It is deceptive to represent, directly or by implication, that an item contains recycled content unless it is composed of materials that have been recovered or otherwise diverted from the waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer). If the source of recycled content includes pre-consumer material, the advertiser should have substantiation that the pre-consumer material would otherwise have entered the waste stream. For items made partially of recycled material, the marketer should qualify the claim to avoid deception about the percentage, weight or recycled content in the finished product or package.
ISO 14021: 2016	Proportion, by mass, of recycled materials in a product or packaging. Only pre-consumer and post-consumer materials shall be considered as recycled content, consistent with the following usage of terms. 1. Pre-consumer material: Materials diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it. 2. Post-consumer material: Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

Definition of Popular Packaging Processes Associated with Attributes

Recovery

Recovery is not an attribute of packaging, but it may be used as a metric for goal setting or corporate policy. Recovery is a popular term in waste management, generally referring to all processes of material reuse. Because it's so widely applied, it is subject to frequent misinterpretation.

The U.S. EPA specifically defines recovery activities while others take a broader approach that considers energy recovery and other emerging technologies (i.e., fuel or chemical conversion).

Recovery Definitions

ORGANIZATION	DEFINITION
ISO 15270: 2008	*Note: Definition within the standard applies to plastics.* Plastics material that has been separated, diverted or removed from the solid-waste stream in order to be recycled or used to substitute raw virgin materials.
US Environmental Protection Agency	Refers to the diversion of materials from the municipal solid waste stream for the purpose of recycling or composting. Excludes reuse and source reduction activities.
European Waste Framework Directive	Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

Chemical Recycling (Feedstock)

As waste management technology has advanced, a difference between physical or mechanical recycling and conversion technologies, also referred to as a chemical recycling, are emerging. Definitions regarding these terms are still relatively limited, and discussions on terminology and interpretation of existing definitions to evaluate inclusion are currently being debated.

Chemical recycling tends to refer to the end result of a variety of technologies which turn polymers back into their original monomers or other polymers for reuse. The term refers to the process of breakdown rather than to the specific technologies used, which can lead to consumer confusion about technologies (i.e., pyrolysis, gasification, etc.).

Unlike material recycling, this definition excludes a systems perspective, focusing more on the process of chemical transformation. The guidance within the technical standard ISO 15270: 2008 – Guidelines for the Recovery and Recycling of Plastic Waste, however, clearly notes a need for a process of collection, sortation and reprocessing.

Chemical Recycling (Feedstock) Definitions

ORGANIZATION	DEFINITION
ISO 15270: 2008	*Note: Definition uses the terms "feedstock recycling" and "chemical recycling" interchangeably.* Conversion to monomer or production of new raw materials by changing the chemical structure of plastics waste through cracking, gasification or depolymerization, excluding energy recovery and incineration.
ISO 18601: 2013	Process to recover valuable chemical substances by chemical treatment of used packaging by hydrolysis, glycolysis, methanolysis, catalytic reaction, thermal reaction, and other chemical processes — process to substitute used packaging for natural resources.

Chemical Recycling (Feedstock) Definitions – continued

EMF New Plastics Economy Global Commitment	Reprocessing, by means of a manufacturing process, of a used packaging material into a product, a component incorporated into a product, or a secondary (recycled) raw material; excluding energy recovery and the use of the product as a fuel. *Note: This includes both mechanical (maintaining polymer structure)* ***and chemical (breaking down polymer structure into more basic building blocks, e.g., via chemical or enzymatic processes).***

Mechanical Recycling

Mechanical recycling refers to a process of keeping the basic material intact while processing into a new end product. Mechanical recycling is the typical process most people envision when they speak of recycling and applies to a wide range of materials. It has only been in recent years with the introduction of new conversion technology for plastics that we are beginning to differentiate between mechanical and chemical recycling. As such, definitions for mechanical recycling specifically are limited and assumed to reflect the broad term — "recycling."

Mechanical Recycling Definitions

ORGANIZATION	DEFINITION
EMF New Plastics Economy Global Commitment	Reprocessing, by means of a manufacturing process, of a used packaging material into a product, a component incorporated into a product, or a secondary (recycled) raw material; excluding energy recovery and the use of the product as a fuel. *Note: This includes both mechanical (****maintaining polymer structure****) and chemical (breaking down polymer structure into more basic building blocks, e.g., via chemical or enzymatic processes).*