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UL 3600

**Outline of Investigation for Measuring and Reporting Circular Economy Aspects of
Products, Sites and Organizations**

Issue Number: 1

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Summary of Topics

The first issue of the Outline of Investigation for Measuring and Reporting Circular Economy Aspects of Products, Sites and Organizations, UL 3600, covers the methods and metrics for measuring aspects of the Circular Economy.

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1 Scope

1.1 This outline covers the methods and metrics for measuring aspects of the Circular Economy. Aspects include, but are not limited to, materials flows and the impacts of those flows. The standard is split into two major parts: measuring the material flows (measurement methods) and measuring the impacts of those flows (analytics).

1.2 The metrics and measures are focused on materials and the flow of those materials as a result of the activities of companies and from the products manufactured by those companies. In addition to the materials and flows, activities and impacts from those materials and flows in other parts of the supply chain should be included where they represent significant impact and will be used as modifier on the material flows.

2 Project Scope

2.1 The scope of an assessment can be set against one of three general supply chain boundaries:

- a) Scope 1 includes performance of directly owned and operated company assets.
- b) Scope 2 includes Tier 1 suppliers, those suppliers who supply parts or services directly to the company including contract manufacture of the company's products.
- c) Scope 3 include impacts from the full lifecycle of the products, sites and companies participating in the supply chain, delivery and use of the product.

2.2 These scopes define broad boundaries for projects. An entity may further define the scope of a project to cover a portion of its overall products or sites within the selected supply chain boundary. For example, the scope of a specific project may cover one product and one site within a Scope 1 boundary or the Scope 1 boundary may include additional products and sites.

2.3 While this standard is written in the context of producers of artifacts (i.e., cell phones, refrigerators and cars), it can apply just as well to service companies or municipalities with some modification, where the product might be consulting hours, garbage removal or pages printed.

2.4 Scope and percent of included products and/or sites is decided at initiation of project and shall be stated in the project report or with any claims based on this standard.

3 Normative References

3.1 Any undated reference to a code or standard appearing in the requirements of this outline shall be interpreted as referring to the latest edition of that code or standard.

ASTM D6866,
Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis

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ASTM D6400,
Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities

IEC TR 62635,
Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment

UL ECVP 2789,
Environmental Claim Validation Procedure for Calculation of Estimated Recyclability Rate

UL ECVP 2799,
Environmental Claim Validation Procedure for Zero Waste to Landfill

UL ECVP 2809,
Environmental Claim Validation Procedure (ECVP) for Recycled Content

UL ECVP 2990,
Environmental Claim Validation Procedure (ECVP) for By-Product Synergy

4 Terms and Definitions

4.1 For the purposes of this outline, the following terms and definitions apply.

4.2

ANAEROBIC DIGESTION WITH ENERGY RECOVERY ($m_{\text{anaerobic}}$)

Mass of materials sent for biodegradation in the absence of oxygen, producing methane which is combusted, capturing useful energy such as steam and electricity.

4.3

BIOCHEM (m_{biochem})

Mass of discarded material which has been sent for processing to extract useful biochemicals before further processing.

4.4

BIOFUELS (m_{biofuel})

Mass of materials produced from biomass being sent for manufacture of or for use directly as fuel.

4.5

COMPOSTING (m_{compost})

Mass of discarded material which has been sent for processing to create decomposed organic material that is produced when bacteria in soil break down garbage and biodegradable trash, making organic fertilizer. Making compost requires turning and mixing and exposing the materials to air. Gardeners and farmers use compost for soil enrichment.

Adapted from US EPA Vocabulary Catalog [accessed on March 10, 2017]: <http://bit.ly/2msoDGs>

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4.6

DISCARDED MATERIAL

Operational byproducts - Any material other than the product being shipped to market that leaves the facility or would leave the facility if it had not been reused or repurposed, including but not limited to domestic waste, sludge, pit cleanouts, metals, hazardous substances and cafeteria waste. Material discarded from operations or discarded material generated annually, including those materials generated from ongoing construction and demolition activities or facility maintenance. C&D major projects are calculated separately. Liquid materials (e.g., oils, lubricants, paints, etc.) which could be disposed of in a landfill are included. Additionally, the following materials are not included:

- a) Waste from natural disaster and disaster recovery such as flood, fire, tornado, hurricane or other natural disaster
- b) Major C&D projects are calculated separately from C&D generated during daily operations.
- c) Inadvertent landfill disposal less than or equal to two (2) percent of total discarded material.
- d) wastewater (black and grey water) and its associated contents.

Note: Inadvertent landfill disposal may include material sent to landfill as a result of a traffic accident, a misdirected truck, or other cause for landfill disposal where the intended disposition was not followed and the material went to a landfill.

4.7

ENTITY

The operation being evaluated to this standard based on defining factors such as location (fixed or variable), time (start and stop), and/or identifiable, discreet operating units (e.g., a fleet of delivery trucks).

4.8

MANDATED WASTE (m_{mandated})

Mass of materials that are required by law, ordinance, or regulation to be disposed of via energy recovery technology or landfill that is outside of the control of the generator and where other waste minimization options do not exist. (definition of "Flow Control" adapted from Supreme Court case No. 05–1345. Argued January 8, 2007—Decided April 30, 2007) Mandated Waste does not include wastes subject to "Flow control" where an ordinance requires trash haulers to deliver solid waste to a particular waste processing facility.

4.9

MASS LANDFILLED (m_{landfill})

Mass of material that has been disposed of in any type of landfill governed by local, regional or national government requirements. Including ADC unless considered acceptable ADC in 13.1.

4.10

MASS THERMALLY PROCESSED WITH ENERGY RECOVERY (m_{TWER})

The mass of discarded materials sent for Thermal Processing with energy recovery.

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