

Subject 2799

February 1, 2013

SUMMARY OF TOPICS

The following is proposed for preliminary review and comment only:

1. For Preliminary Review Only: Standard for Waste Minimization Reporting and Assessment of Zero Waste Operations, UL 2799

COMMENTS DUE: APRIL 2, 2013

This proposal is for review and comment only (no ballot at this time). Please note that comments on a preliminary review document will not receive a response from the proposal author through CSDS. The preliminary review process is an informal mechanism that provides authors with the opportunity to refine their proposals before they advance to the next stage in UL's standards development process.

In some cases, the author of the proposal may choose to discontinue the proposal. In this case, the author need not do anything after preliminary review has ended. Normally, the next step in the process is the more formal STP ballot and stakeholder review process. Only comments posted during the STP ballot and stakeholder review process will be provided with a response in CSDS.

1. For Preliminary Review Only: Standard for Waste Minimization Reporting and Assessment of Zero Waste Operations, UL 2799

RATIONALE

Proposal submitted by: Bill Hoffman, UL

Interest in zero waste and zero waste facilities has grown over the last few years. Many organizations are making claims of zero waste or zero waste to landfill in product literature and marketing. There are several organizations with different definitions of zero waste which vary from 90 to 100% diversion. In some cases as much as 50% of that diversion was waste to energy through incineration. Many times the definition describes the ideology of zero waste, however it does not provide any sort of quantitative or normative references by which one can evaluate a company or facility. The lack of standard definition or verifiable criteria makes it difficult for companies to manage zero waste initiatives and the consumer doesn't know what zero waste or even a diversion rate really means. This standard has been developed to normalize methods, terminology and level of transparency when making zero waste related claims. There are two key aspects that require standardization, determination of the discarded material used as a basis for the diversion calculation and acceptable diversion methods.

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Table 1
Zero waste claims and stated waste diversion rate

Zero Waste Claim	Stated Waste Diversion Rate	Incineration
Zero waste to landfill at 9 facilities around the world	Over 90%	Not quantified but is mentioned
76 zero waste manufacturing facilities and 10 zero waste non-manufacturing sites around the world	90% of total waste reuse and recycle	2% of total waste incinerated
Zero waste to landfill at aerospace assembly plant	100%	Mentioned but not quantified
Zero waste to landfill at 2 stores, 40 more planned	Over 90%	
Zero waste to landfill at 10 North American plants; Virtually zero waste at remaining 4 plants	99.5% Not stated	<5% sent for energy recovery
Zero waste to landfill at 9 manufacturing plants around the world	100%	40% energy recovery

The first question in calculating waste diversion percentages is determining the volume of material that is eligible for diversion and appropriate routes for the diversion. This step is critical since the denominator in any percentage or ratio is the amount of material that is eligible for diversion. The discarded materials or waste is a complicated concept and, depending on one's definition of waste, can be expanded or narrowed to include virtually everything or nothing. In practice everything that enters the facility that doesn't become part of a product is discarded for the purposes of zero waste. Using Lean and Green thinking that also includes wastes used in ancillary processes to main production. Table 2 below is form a report from the US EPA on lean manufacturing and how that paradigm can lead to environmental improvements.

Table 2
Environmental Impacts Linked with Manufacturing Waste^[1]

Waste Type	Examples	Environmental Impact
Defects	Scrap, rework, replacement production, inspection	• Raw materials consumed in making defective products • Defective components require recycling or disposal • More space required for rework and repair, increasing energy use for heating, cooling, and lighting
Waiting	Stock-outs, lot processing delays, equipment downtime, capacity bottlenecks	• Potential material spoilage or component damage causing waste • Wasted energy from heating, cooling, and lighting during production downtime
Overproduction	Manufacturing items for which there are no orders	• More raw materials consumed in making the unneeded products • Extra products may spoil or become obsolete requiring disposal

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Table 2 Continued

Waste Type	Examples	Environmental Impact
Movement	Human motions that are unnecessary or straining, carrying work in process (WIP) long distances, transport	• More energy use for transport • Emissions from transport • More space required for WIP movement, increasing lighting, heating, and cooling demand and energy consumption • More packaging required to protect components during movement
Inventory	Excess raw material, WIP, or finished goods	• More packaging to store work-in-process • Waste from deterioration or damage to stored WIP • More materials needed to replace damaged WIP • More energy used to heat, cool, and light inventory space
Complexity	More parts, process steps, or time than necessary to meet customer needs	• More parts and raw materials consumed per unit of production • Unnecessary processing increases wastes, energy use, and emissions
Unused creativity	Lost time, ideas, skills, improvements, and suggestions from employees	• Fewer suggestions of P2 and waste minimization opportunities
Work Cited ^[1] US EPA, "Lean Manufacturing and the Environment," US EPA, Washington DC, 2003.		

The difficulty is deciding what types of waste to include. As can be seen from Table 2 an all-encompassing protocol for measuring zero waste can include many aspects not considered in most zero waste programs. In the proposal we have decided to focus on discarded solid and liquid materials which inherently means waste going to landfills. Water waste going to waste water treatment centers before discharge into waterways or emissions to air are not included in this proposal.

The second major question addresses acceptable forms of diversion from landfill. From a life-cycle assessment perspective, which attempts to assess all the environmental impacts of a given process or set of processes, incineration without energy recovery is the only waste management option that is undeniably worse than landfilling waste. The greenhouse gas emissions resulting from this incineration provide no value other than converting materials to ash. In this way, incineration without energy recovery is more a volume-reduction method than waste management solution. Even in most landfills, biogas created from decomposing waste is collected and burned to generate electricity, yielding a net reduction in total emissions. But incineration without energy recovery is burning for burning's sake. Incineration without energy recovery is not an acceptable diversion option in this proposed standard.

Acceptable forms of diversion vary considerably and are left to the organizations to find and use. Companies can dispose of their materials in a variety of ways depending on the materials and their condition. For very common materials like metals and plastics, recycling is typically the simplest and most straightforward option. For organic materials like food waste or plant biomass, composting is an easy alternative in most cases. In other cases, like when a facility uses large amounts of feedstock energy, waste to energy may be the better choice. Waste to energy may be especially useful when anaerobic digestion with cogeneration of electricity and steam is used. This process not only reduces waste, it also produces three useful products, electricity, steam and compost. Oftentimes, companies are already doing this to some extent and only need to expand upon their efforts. For more exotic materials, more creative solutions may be required. It is not uncommon for beer manufacturers to turn

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spent grain into cattle feed – or for ash from incineration to be used at local cement factories. Given enough motivation, companies will find that there are very few materials that cannot be reused or recycled somehow. The intent of this standard is to set limits or boundaries on which diversion activities should be included in zero waste measurements and which should not.

The intention of defining two different levels of compliance and disclosing some of the diversion methods is to provide greater clarity for the public. When companies label themselves as zero waste without going into greater depth, as many have done, consumers tend to believe that all claims are equal. While one company may be diverting 100% of its waste, another may only divert 90%. Yet, they still get the same designation as zero waste, and the public does not perceive any substantive difference between the two. By distinguishing virtually zero waste from zero waste we are able to communicate significant achievement by companies without insinuating that absolutely no waste is landfilled. Those companies who decide to go all the way to 100% waste diversion or greater will be able to enjoy an even more exclusive status as truly zero waste.

Finally the standard sets allowable ways to communicate the results of the assessment and minimum levels of transparency for communication of the results. Primarily this is used to assure the consumer is aware of how much certain waste to energy technologies are used to divert waste from landfill.

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