International Water Services Flushability Group

Publicly Available Specification (PAS) 1: 2018
Criteria for Recognition as a Flushable Product

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Foreword

The International Wastewater Services Flushability Group (IWSFG) is an international coalition of national and regional wastewater services' associations and organizations and individual wastewater services.

The work of preparing the specifications is carried out by various drafting groups comprising volunteers designated by the principal and the supporting participants of the group. They participate on a voluntary basis, without remuneration of any kind.

> *The criteria for flushability and the appropriate test methods are the product of a global consensus of the coalition members and reflect test methods and criteria to ensure a product labelled as flushable will not impact drain lines, various onsite treatment and wastewater collection and treatment systems as well as the downstream environment.*

It is acknowledged that the majority of this document is due to the long-standing work of industry experts working with wastewater representatives over many years. Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The IWSFG shall not be held responsible for identifying any or all such patent rights.

Contents

1 Introduction

The objective of wastewater service providers is to protect public health and the environment. Their principal task is to receive, collect, transport and treat sanitary and industrial discharges from the customers of the areas they serve. These customers may be domestic, institutional, commercial or industrial. Service providers routinely provide advice to residential and commercial customers, and often have permit limits on discharges of conventional and other pollutants from industrial customers. A number of these service providers may also collect, transport and treat stormwater.

Typical waste streams include toilet paper, human waste, food waste, detergents and cleaning agents. In the last 20 years, there has been growth worldwide in sales of wet wipes for surface, personal and toilet bowl cleaning which are not compatible with wastewater infrastructure - some of these wet wipe cleaning products are identified as “flushable” products. Other products such as tampons, condoms, and facial tissue are commonly but inappropriately flushed. It is important that material that is intended to be disposed to the toilet should be compatible with residential plumbing and the wastewater delivery network it should pass through, the downstream wastewater treatment system and where it is not removed through treatment, the receiving environment.

Accordingly, the purpose of these PAS documents is to define the qualities and characteristics of those products that may be considered “flushable”. Adhering to these test methods and providing the appropriate advice to the product users regarding the disposal of such products should ultimately benefit the long-term sustainability of wastewater systems and the minimization of potential problems such as pipe blockages and equipment failures in sewer networks. Material flushed down the toilet must clear the householders drain line to enter the sewer network. Material that does not clear the drain line can be a problem that requires a plumber to rectify, at cost to the householder. Once the material departs the drain line it enters either a reticulated sewer network or on-site treatment system.

The reticulated sewer network comprises of pipes of various sizes for transport. Movement is either via gravity, or under pressure produced by a pump. Once in the sewer network flushed material can cause blockages by ‘snagging’, becoming attached to protrusions within the pipe including surface irregularities and intrusions by objects such as appurtenances and tree roots, or binding together in clumps. They can also ‘rope’ or wind around pump impellers, stopping or inhibiting pump operation. Alternatively, large masses of solid material can block pumps from operating. Each of these issues can cause asset failure or release of sewage to the environment, which has the potential to create public health issues and make people ill.

In addition, some wastewater networks use screens to protect downstream infrastructure such as pumps. Materials greater than a certain size can foul screens and grills with material, resulting in an elevated load of solid waste to landfill from the wastewater treatment plant, increased maintenance or potential blockages, leading to sewer overflows and flooding.

Significant costs can be associated with the removal of blockages and failure of assets in the reticulated sewer network. These costs can be avoided provided the material that enters the sewer disintegrates and does not bind or clump. For material disposed through a toilet, a key criterion is that it disintegrates or breaks into small fragments that therefore do not ‘snag’, ‘rope’ or block up screens or grills. Binding or clumping of material can be caused by fats, oils and grease. These are most predominantly associated

with industrial and commercial inputs to the sewer, which are managed with source control programs by water service providers.

Sewage is delivered to a wastewater treatment plant through a sewer network. These plants are designed to remove materials (including chemicals and microorganisms) that could cause a negative impact on the environment or adversely affect public health. The primary mechanisms for removal of materials are collection and biodegradation of settled solids and biodegradation in the liquid stream passing through the plant. Biodegradation in the liquid stream of the plant is typically within 24 hours, due to the short processing time of the predominant mechanical wastewater treatment plants. For many materials, a critical aspect is that they become part of the settled solids, hence settling is an important characteristic.

If a material is not removed by settling, then it is important that it is biodegraded in the wastewater treatment plant and the natural environment. In addition, settled solids are typically subjected to further microbiological processes. Therefore, it is important that materials disposed to the toilet have a high degree of biodegradability.

Wastewater process systems are designed to receive, treat, and convey sanitary discharges that, after treatment, are routed to the following pathways:

1. Liquid effluents discharged to the aquatic environments of lakes, rivers, and oceans;
2. Liquid effluents routed to recycle or reuse systems such as aquifer recharge, indirect potable reuse, “purple pipe” for irrigation as non-potable uses, or direct potable reuse;
3. Solid residuals (biosolids) for application to soil for their inherent nutrient values;
4. Solid residuals incinerated or digested for energy recovery; and/or
5. Solid residuals sent to landfill sites.

2 Purpose

The purpose of this Specification is to establish the criteria for the quality and characteristics of products that may be disposed via the toilet. This Specification is designed to protect public infrastructure used for the removal and transport of sewage and treatment systems and where a product cannot or is unlikely to be removed during transport or treatment, it should not cause any significant negative environmental impact. It also outlines appropriate labelling requirements for products that meet these criteria.

The document is designed to be used in conjunction with IWSFG PAS 2: 2018 *Terms and Definitions for Determination of Flushability* and IWSFG PAS 3:2018 *Disintegration Test Methods – Slosh Box*.

3 Scope

This Specification applies to all products that:

1. A manufacturer may wish to identify as being flushable; or
2. By reason of the location of their use in the toilet or bathroom or likely contamination by human excreta are likely to be flushed through a toilet into a drain line and wastewater transport and treatment system.

Dry toilet paper is out of scope of this document.

4 Normative References

The following normative references are germane to this Specification.

IWSFG PAS 2: 2018 *Terms and Definitions for Determination of Flushability.*

IWSFG PAS 3: 2018 *Disintegration Test Methods - Slosh Box.*

TAPPI/ANSI Test Method T 401, *Fiber Analysis of Paper and Paperboard,* as amended.

INDA/EDANA 2017, Code of Practice: Communicating Appropriate Disposal Pathways for Nonwoven Products to Protect Wastewater Systems, 2nd Edition.

INDA/EDANA 2013, Guidelines for Assessing the Flushability of Disposable Nonwoven Products: a process for assessing the compatibility of disposable non-woven products with plumbing and wastewater infrastructure, 3rd Edition.

INDA/EDANA 2009, Guidelines for Assessing the Flushability of Disposable Nonwoven Products: a process for assessing the compatibility of disposable non-woven products with plumbing and wastewater infrastructure, 2nd Edition.

5 Definitions

See: IWSFG PAS 2: 2018 *Terms and Definitions for Determination of Flushability*

6 General

6.1 Criteria

This Specification sets out five criteria that need to be addressed for a product to be deemed suitable for flushing down the toilet. These criteria apply equally to toilets that are connected to a reticulated wastewater system or an on-site wastewater system.

To be recognized as suitable for flushing and to be so marked, labelled or marketed, the product shall meet all five of the criteria as set out in Section 6.2. Failure to meet any of the criteria as shown in Section 6.2 means that the product should not be recognized as flushable and shall not be disposed of (flushed) through a toilet but disposed of in another manner[1] such as solid municipal waste.

6.2 Criteria to be Met

For a product to be considered flushable, it shall meet each of the following criteria:

Criteria	**Reference Document** (with relevant acceptance criteria)
Environmental protection	TAPPI/ANSI Test Method T 401, *Fiber Analysis of Paper and Paperboard.*
Toilet and drain line clearance	As outlined in INDA/EDANA 2013, FG501: *Toilet and Drainline Clearance Test* with a modification to the acceptance criteria as noted in Section 7.2. No plunger shall be required to address blockages.
Disintegration	IWSFG 2018: PAS 3 *Disintegration Test Methods – Slosh Box.*
Settling	As outlined in INDA/EDANA 2013, FG 504: *Settling Test.*
Biodisintegration	As outlined in INDA/EDANA 2013, FG506: *Anaerobic Biodisintegration Test.*

6.3 Conformity Assessment

Testing in reference to these specifications is recommended to be undertaken by third party laboratories accredited to ISO/IEC 17025 *General requirements for the competence of testing and calibration laboratories*.

6.4 Marking and Labelling

This section outlines the labelling suggestions for products that have been tested against the requirements of Section 6.2.

6.4.1 Conforming Products

Products that successfully pass the test criteria outlined in Section 6.2 may include the term -flushable- and a flushability symbol on packaging.

[1] Alternative disposal mechanisms are offered by almost all municipal organizations.

6.4.2 Non-Conforming Products

Products that do not conform to this Specification shall be clearly identified as being ***not flushable*** in accordance with INDA/EDANA 2017, Code of Practice: Communicating Appropriate Disposal Pathways for Nonwoven Products to Protect Wastewater Systems, 2nd Edition.

7 Criteria

7.1 Criterion One: Safety in the Environment and Composition of Materials

Products shall show a testing report that conforms to TAPPI/ANSI Test method T401, Fiber Analysis of Paper and Paperboard. The report shall show the fiber type.

To be acceptable the product shall pass the following criteria:

1. If the fiber type is identified as synthetic, then the Species Principal shall be identified. If the fiber is identified as "Plastic" (PAS2, definition 5.4.4), then the percentage by weight of the synthetic fiber identified as plastic shall be 1% or below.
2. No product shall have intentional plastic fibers as an ingredient.

7.1.1 Safety in the Environment

It is the responsibility of manufacturers to comply with all relevant and current legislation.

7.1.2 Plastic Fibers

Plastics are defined in IWSFG 2018: PAS 2. Of concern to flushable products are plastic fibers [8], [9], [10], [11], [13], [14]. Plastic fibers should not be intentionally introduced into flushable products or be present in more than *de minimis* concentrations.

7.2 Criterion Two: Toilet and Drain Line Clearance

Products should be tested using the toilet and drain line clearance test set out in INDA/EDANA 2013, FG501: Toilet and Drainline Clearance Test.

To be acceptable:

Toilet Clearance:

No toilet flush containing product shall be associated with clogs that require use of a plunger to clear product and excess water from the bowl and trap.

Note: This test criterion differs from the requirements in INDA/EDANA FG501 because it is unacceptable that any product suitable for toilet flushing should require a plunger to remove it.

Drain line Clearance:

The travel distance of the Centre of Mass of the flushed material in the drain line does not consistently decrease over the course of five consecutive flushes.

7.3 Criterion Three: Disintegration

Products shall meet the requirements specified in IWSFG 2018: PAS 3 *Disintegration Test Method – Slosh Box.*

To be acceptable:

If there is material left on the 25 mm sieve after the 1-minute rinse, the percent of the total initial dry mass passing through the 25 mm sieve for the five (5) test specimens after 30 minutes of testing shall be greater than 95%. This result shall be supported with visual examination and pictures of solids on the sieve, as described in IWSFG 2018: PAS 3.

7.4 Criterion Four: Settlement

Products shall be tested using the settlement test set out in INDA/EDANA 2013, FG 504: Settling Test.

To be acceptable the following three criteria shall be met:

1. In at least 90% of the tests, the specimens should settle at an average velocity of at least 1 mm/second over the 1150 mm measuring distance, (i.e. to have settled through the 1150 mm test range within 20 minutes).
2. In tests that are regarded as successful (see 1. above), the specimen or disintegrated parts of the specimens tested should not become sufficiently buoyant to rise more than 300 mm from the bottom of the column within 24 hours. If this occurs, that particular test should be regarded as ‘failed’ test.
3. At least 90% of all specimens should pass both criteria (1.) and (2.) above.

7.5 Criterion Five: Biodisintegration

Products shall pass the biodisintegration test set out in INDA/EDANA 2013, FG506: Anaerobic Biodisintegration Tests.

To be acceptable:

If there is material left on the 1,000-micron sieve (after the 2 minute rinse), the percent of the starting dry mass passing through the 1,000 micron sieve shall be greater than 95%.

Bibliography

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[13] *Anthropogenic debris in seafood: Plastic debris and fibers from textiles in fish and bivalves sold for human consumption*, National Academy for the Advancement of Science, USA, Scientific Reports 5, Article number: 14340 (2015)

[14] UNEP (2016). *Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change*. United Nations Environment Programme, Nairobi.