

1 **International Wastewater Services Flushability Group**

2 **IWSFG PAS 1: 2018 - Criteria for Recognition as a Flushable Product**

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10 permission from the IWSFG.

11 Once finalized, IWSFG will permit downloading and use of the documents without charge for the  
12 purposes of determining whether or not a product is likely to be considered flushable and so identified.  
13 Such purpose includes the development of guidelines and standards.  
14

15 **Foreword**

16 The International Wastewater Services Flushability Group (IWSFG) is a worldwide coalition of national and  
17 regional wastewater services 'associations and organizations and individual wastewater services.

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

21 *The criteria for flushability and the appropriate test methods are the product of a global*  
22 *consensus of the coalition members and reflect the hydraulic, mechanical and environmental*  
23 *conditions of drain lines, various onsite treatment and wastewater collection and treatment*  
24 *systems as well as the nature of the receiving waters for treatment plant effluents.*

25 The task of the group was to prepare specifications reflecting the above purpose.

26 Wastewater services are organizations acting for the public good as a public service. The group expects  
27 the manufacturers and distributors of their products to act in a socially responsible and environmentally  
28 sustainable manner by adhering to the established specifications.

29 Attention is drawn to the possibility that some of the elements of this document may be the subject of  
30 patent rights. The IWSFG shall not be held responsible for identifying any or all such patent rights.

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## 57 1 Introduction

58 The objective of wastewater service providers is to protect public health and the environment. Their  
59 principal task is to receive, collect, transport and treat sanitary and industrial discharges from the  
60 customers of the areas they serve. These residents may be domestic, institutional, commercial or  
61 industrial. Service providers routinely provide advice to their customers regarding the nature of  
62 products or wastes not to be discharged, particularly from residential and commercial customers. A  
63 number of these service providers may also collect, transport and treat stormwater.

64 Typical waste streams include toilet paper, human waste, food waste, detergents and cleaning agents.  
65 In recent years, new products such as moist wipes and toilet bowl cleaning products have been  
66 introduced worldwide - many of these are identified as “flushable” products. Other products such as  
67 tampons, condoms, and facial tissue are commonly but inappropriately flushed. It is important that  
68 material that is intended to be disposed to the toilet should be compatible with not only the residential  
69 plumbing it should pass through, but also the wastewater delivery network, downstream wastewater  
70 treatment system and where it is not removed through treatment, the receiving environment.

71 The physically adverse effects of the introduction of such products to wastewater systems (clogging and  
72 plugging) have already been identified but numerous other environmental effects have not been studied  
73 systematically. For example, various flushed products may comprise materials and chemicals that can  
74 be harmful to the environment; hence, such products should not be identified as “flushable”. The goal  
75 of the IWSFG is not to ban the production and/or use of these products, but to encourage  
76 manufacturers to clearly and prominently identify those products that do not meet the established  
77 IWSFG specifications as not being “flushable” and to encourage users to dispose of such products after  
78 use in a more appropriate manner.

79 Accordingly, the purpose of the flushability test along with others presented in this IWSFG series is to  
80 define the qualities and characteristics of those products that may truly be considered as being  
81 “flushable”. By adhering to these test methods and providing the appropriate advice to the product  
82 users regarding the after use disposal of such products will ultimately lead to the long-term protection  
83 of wastewater systems and the minimization of potential problems such as pipe blockages and  
84 equipment failures in sewer networks. Material flushed down the toilet must clear the householders  
85 drain line to enter the sewer network. Material that does not clear the drain line can be a problem that  
86 requires a plumber to rectify, at cost to the householder. Once the material departs the drain line it  
87 either enters a reticulated sewer network or on-site disposal system.

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

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

100 Significant costs can be associated with the removal of blockages and failure of assets in the reticulated  
101 sewer network. These costs can be avoided provided the material that enters the sewer disintegrates  
102 and does not bind or clump. For material disposed through a toilet the key criterion is that it  
103 disintegrates or breaks into small fragments that therefore don't 'snag', 'rope' or block up screens or  
104 grills. Binding or clumping of material is typically caused by fats, oils and grease. These are most  
105 predominantly associated with industrial and commercial inputs to the sewer, which are managed with  
106 source control programs by water service providers.

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

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

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

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

126 Note that in some instances, by agreement with a commercial or industrial client, a wastewater utility  
127 may agree to accept discharges containing chemicals or other contaminants not normally found in  
128 sanitary discharges. Acceptance is by specific agreement that such chemicals or contaminants can be  
129 safely treated within treatment processes of the wastewater utility. Otherwise pre-treatment by the  
130 commercial or industrial organization is required to bring the discharge into conformity with the  
131 established acceptable quality.

## 132 2 Purpose

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

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

## 141 3 Scope

142 This specification applies to all products that:

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

147 Toilet paper is out of scope of this document because it is intended to be covered by a separate paper  
148 manufacturing standard being developed by the International Standards Organization working group ISO  
149 TC6 SC2 WG27. However, in the absence of an international standard on toilet paper disintegration, the  
150 IWSFG suggests that toilet paper could be assessed against the IWSFG PAS documents.

## 151 4 Normative References

152 The following normative references are germane to this specification

153 ISO/IEC Guide 41, *Packaging — Recommendations for addressing consumer needs*

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

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

156 TAPPI/ANSI Test Method T 401 om-15, *Fiber Analysis of Paper and Paperboard*, as amended

157 INDA/EDANA 2017, Code of Practice: Communicating Appropriate Disposal Pathways for Nonwoven  
158 Products to Protect Wastewater Systems 2<sup>nd</sup> Edition

159 INDA/EDANA 2013, Guidelines for Assessing the Flushability of Disposable Nonwoven Products: a  
160 process for assessing the compatibility of disposable non-woven products with Plumbing and  
161 Wastewater Infrastructure, 3<sup>rd</sup> Edition.

162 INDA/EDANA 2009, Guidelines for Assessing the Flushability of Disposable Nonwoven Products: a  
163 process for assessing the compatibility of disposable non-woven products with Plumbing and  
164 Wastewater Infrastructure, 2<sup>nd</sup> Edition.

## 165 5 Definitions

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

## 167 6 General

### 168 6.1 Critical criteria

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

172 The five critical criteria are:

- 173 1. Environmental and public health protection
- 174 2. Toilet and drain line clearance
- 175 3. Disintegration
- 176 4. Settling
- 177 5. Biodisintegration

178 To be recognized as suitable for flushing and to be so marked, labelled or marketed, the product should  
179 meet all 5 of the critical criteria as set out in section 6.2. Failure to meet any of the critical criteria as  
180 shown in section 6.2 means that the product should not be recognized as flushable, and should not be  
181 disposed of (flushed) through a toilet, but disposed of in another manner<sup>1</sup> such as solid municipal waste.

### 182 6.2 Critical criteria to be met

183 To be considered a flushable product, products should meet each of the following acceptance criteria:

Critical characteristic	Relevant Reference Document (with relevant acceptance criteria)
Environmental and health protection	TAPPI/ANSI Test Method T 401 om-15, <i>Fiber Analysis of Paper and Paperboard</i> .
Toilet and drain line clearance	As outlined in INDA/EDANA 2013, FG501: <i>Toilet and Drainline Clearance Test</i> with a modification to the acceptance criteria as noted. Essentially that no plunger should be required to address blockages.
Disintegration	IWSFG 2018: PAS 3 <i>Disintegration Test Methods – Slosh Box</i> .
Settling	As outlined in INDA/EDANA 2013, FG 504: <i>Settling Test</i> .
Biodisintegration	As outlined in INDA/EDANA 2013, FG506: <i>Anaerobic Biodisintegration Test</i> .

<sup>1</sup> Alternative disposal mechanisms are offered by almost all municipal organizations.

## 184 6.3 Conformity Assessment

185 Conformity assessment and certification of flushable products is recommended to be undertaken by  
186 third party processes, by organizations accredited to ISO/IEC 17025:2005 *General requirements for the*  
187 *competence of testing and calibration laboratories.*

## 188 6.4 Marking and Labelling

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

### 191 6.4.1 Conforming Products

192 Products that successfully pass the test criteria outlined in Section 6.2 should be labelled in accordance  
193 with INDA/EDANA 2017, Pages 5 and 6, On-Pack Consumer Information.

### 194 6.4.2 Non-Conforming Products

195 Products that do not conform to this specification shall be clearly identified as being **not flushable** in  
196 accordance with INDA/EDANA 2017, Pages 5 and 6, *On-Pack Consumer Information.*

## 197 7 Criteria

### 198 7.1 Criterion One: Safety in the environment and human health and composition of 199 materials

#### 200 7.1.1 Safety in the environment and human health

201 It is the responsibility of manufacturers to comply with all relevant and current legislation for  
202 environmental and human health for the countries where they sell.

#### 203 7.1.2 Plastics

204 Plastics are defined in IWSFG 2018: PAS 2. Of concern to flushable products are plastic fibers [7], [8], [9],  
205 [10]. Plastic fibres should not be present in flushable products.

#### 206 7.1.3 Regenerated cellulose fibers

207 There are strong concerns about the impact of regenerated cellulose in the environment. [11], [12], [13],  
208 [14]. Further work is currently underway to confirm whether there is a need to restrict products that  
209 contain regenerated cellulose from toilet disposal.

## 210 7.2 Criterion Two: Toilet and Drain Line Clearance

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

213 To be acceptable:

### 214 **Toilet Clearance:**

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

217 Note: this test criteria differs from the requirements in INDA/EDANA FG501 because the IWSFG does not  
218 believe it acceptable that any product flushed down the toilet should require a plunger to remove it if  
219 appropriately used and the product is suitable for toilet disposal.

### 220 **Drain line Clearance:**

221 The travel distance of the Centre of Mass of the flushed material in the drain line does not consistently  
222 decrease over the course of 5 consecutive flushes.

## 223 7.3 Criterion Three: Disintegration

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

226 To be acceptable:

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

## 231 7.4 Criterion Four: Settlement

232 Products should pass the settlement test set out in INDA/EDANA 2013, FG 504: Settling Test

233 To be acceptable the following three criteria must be met:

- 234 1. In at least 90% of the tests, the specimens should settle at an average velocity of at least 1  
235 mm/second over the 1200 mm measuring distance, (i.e. to have settled through the 1200  
236 mm test range within 20 minutes).
- 237 2. In tests that are regarded as successful (see 1. above), the specimen or disintegrated parts  
238 of the specimens tested should not become sufficiently buoyant to rise more than 300 mm  
239 from the stop mark of the column within 24 hours. If this occurs, that particular test should  
240 be regarded as 'failed' test.
- 241 3. At least 90% of all specimens should pass both criteria (1.) and (2.) above.



## 242 7.5 Criterion Five: Biodisintegration

243 Products should pass the anaerobic biodisintegration test set out in INDA/EDANA 2013, FG506:  
244 Anaerobic Biodisintegration Tests.

### 245 7.5.2 Anaerobic Biodisintegration

246 To be acceptable: if there is material left on the 1,000-micron sieve (after the 1 minute rinse), the  
247 percent of the starting dry mass passing through the 1,000 micron sieve should be greater than 95%.  
248 This result should be supported with visual examination and pictures of solids on the sieve, consistent  
249 with the methodology in FG506.

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