
Dear International Wastewater Services Flushability Group,

Suominen applauds your efforts for this undertaking. As a participant in the writing of INDA's Nonwoven Flushable Guidance Document, which required over 9 years of effort to come to what we believed was the best possible form in the 3rd edition, we understand that developing a guideline for flushability takes considerable time and resources.

We have additional comments which could not be addressed in the templates provided:

1. **Lack of scientific basis.** In many of the methods, there is no scientific basis for why a certain criteria is set. For instance, the sieve requested in the biodegradation tests is requested be 0.6mm, which appears to be arbitrarily chosen as tighter than the 1mm sieve with years of comparative records
2. **Sample acquisition places undue burden on 3rd party laboratories.** Requirements by the IWSFG guidelines place the burden on the laboratories to collect samples at local retailers. Many of the products that are requested for testing would not be available locally to the 3rd party lab, and differences in seasonal availability make this an extremely difficult requirement to adhere to.
3. **No evidence that tests are reproducible and repeatable.** We have concern on the reproducibility and repeatability of the suggested test methods since information on such has not been provided nor have 3rd party labs been identified who are already familiar with conducting the test methods provided in the IWSFG document. For instance, the use of the shaker flask (IWSFG PAS 3C) had been removed from the nonwoven flushable guidance because of repeatability issues. Additionally, multiple 3rd party labs need to be consulted since there are some tests which in their description are unfeasible to reproduce. i.e. drain line snagging test.
4. **Inconsistencies throughout documents.** For instance, the total use volume of dry toilet tissue varies amongst test methods from 1 sheet to 6 sheets when it is clear that the typical user does not limit to 1 sheet of toilet paper for typical use.
5. **Confusion.** It can create confusion in the present guideline, where four disintegration test methods are proposed. However, if the sample gets fully dispersed in the IWSFG's most representative method it is unclear why there should be time spent on further testing.
6. There should be one universal test method for dispersibility, which currently seems to be tested across multiple PAS. **Lack of clarity on the critical characteristic of interest.** For instance, there is no need for a combination effort such as seen in PAS 2C, combining toilet, drainline and disintegration demands into one test method.
7. **Unwarranted attack on cellulose fibers for use in flushable products.** Regenerated cellulose fibers are what we believe to be one of the best options available with respect to both consumers and to the environment. Regenerated cellulose fibers (i.e. viscose) have been shown to have higher biodegradation rates compared to natural fibers (i.e. cotton) because they are close to 100% cellulosic content, and the commentary within the IWSFG guideline states that viscose is likely not guilty for marine textile emission.

We thank you for allowing us to review and to provide our feedback this criteria for recognition as a flushable product. We look forward to collaborating with wastewater community as you develop these methods further. [Please note that you have our permission to share our comments for public view.]

Sincerely,
Suominen Corporation

Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
SUO	93-96	7.1		Ge	If a component is banned, it cannot be used in any product flushable or not flushable.	Remove section	
SUO	103-117	7.2.2		Te	<p>There is no scientific reason which regenerated cellulose use in a flushable nonwoven should be limited when it is even noted in the document that many of the microfibers of concern are synthetic fibers from washing clothing for which there is no regulation.</p> <p>There is no data provided which links regenerated cellulose type fibers found in the marine environment to nonwoven wipe based substrates. Contrary, there is evidence that regenerated cellulose fibers will decompose in biodegradation tests in wastewater sludge. In addition, the evidence in reference 2 actually points to the fact that cellulose based materials degrade readily in the gastrointestinal tract of most marine species. Cellulose is a natural chemistry that is found in all plant based life in the ocean.</p>	Remove section	
SUO	132-168	7.4, 7.5			These sections add no value to the document	Remove setion	

1 Adapted from the ISO/IEC Commenting template. 2 Te = Technical, Ge = General, Ed=Editorial

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Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
SUO	138	7		Ge	Why must toilet test be conducted having a flush capacity of 4.5L+/- 0.4 L? Toilet characteristics should be based on region where product is marketed. For instance in US, most toilets use 6L of water per flush.	Test toilet should be allowed which represents the toilet choice in the region which the product is marketed	
SUO	152-154	8.1		Ge	Testing laboratory may not be in the city, region, country where the flushable product is sold. Thus, making it difficult and/or impossible to acquire the product.	Flushable product should be provided by the organization requesting to third party facility. This is common practice for laboratory submissions	
SUO	158-159	8.1		Ge	Method of sample acquisition is not necessary	Test report should indicate "product " name and entity who provided the product	
SUO	160-164	8.2		Ge	When making roll goods for moist wiping products, it is common in wipe converting that the entire wiping product comes sister slit rolls from the same master roll. There is very little differences in properties in this master roll	Remove 162-164. Keep sampling as 10 specimens from a package without distinction of the location of sample in the package comes from	
SUO	167-169	8.2		Ge	See above comments from lines 160-164	Remove lines 167-169	
SUO	247-250	10.2		Te	If the acceptance criteria prescribes that no test sequence can have more than 3 flushes to clear the bowl, then it is unnecessary to allow up to 5 flushes	Maximum flushes should be 3 to coordinate with the acceptance criteria	
SUO	247-250	10.2		Te	Toilet fill rates are different,	Operator should be instructed to allow the toilet to refill with no time limit specified.	
SUO	262-264	10.2		Ge	Notes do not coordinate with acceptance criteria	If any specimen requires more than 3 flushes to clear the toilet bowl, the failure should be noted in test report	
SUO	259-268	10.2		Ge	Meaning of flush sequence and test sequence for this test needs to be clearly defined	Define what a flush sequence is and what a test sequence is such that it is clear to the test operator	
SUO	303	12e		ED	As shared in earlier comments for lines 158-159	Test report should indicate "product " name and entity who provided the product	

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SUO	131	7		Ge	Toilet characteristics should be based on region where product is marketed. For instance in US, most toilets use 6L of water per flush.	Test toilet should be allowed which represents the toilet choice in the region which the product is marketed	
SUO	148-149	8.1		Ge	Testing laboratory may not be in the city, region, country where the flushable product is sold. Thus, making it difficult and/or impossible to acquire the product.	Flushable product should be provided by the organization requesting to third party facility. This is common practice for laboratory submissions	
SUO	153-154	8.1		Ge	Method of sample acquisition is not necessary	Test report should indicate "product " name and entity who provided the product	
SUO	157-160	8.2		Te	When making roll goods for moist wiping products, it is common in wipe converting that the entire wiping product comes sister slit rolls from the same master roll. There is very little differences in properties in this master roll	Remove 157-160. Keep sampling as 10 specimens from a package without distinction of the location of sample in the package comes from	
SUO	163-165	8.2		Te	See above comments from lines 157-160	Remove lines 163-165	
SUO	248-269	10.2		Ed	Written test procedure is confusing	Rewrite such that 10.2 is as clear as Table 1	

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IWSFG Template for Reviewer comments and IWSFG secretariat observations¹

Document reviewed: PAS 2B: 2017-Toilet Clearance

Due Date: 2017-09-01

Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment²	Comments	Proposed change	Observations of the secretariat

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IWSFG Template for Reviewer comments and IWSFG secretariat observations¹

Document reviewed: 3A: 2017 - Accelerated Bench Top Disintegration

Due Date: 2017-09-01

Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
SUO	184	8.3.1		Te	It was said that the specimen size shall be either one or two sheets of toilet paper but in reality and actual use its more than 2 sheets of toilet tissue.	Instead of two sheet of toilet tissue, use 6 sheets of toilet tissue irrespective of the type and mass of toilet tissue.	
SUO	204 & 208	8.3.3		Te	Please mention what is other product means. The volume and mass may not matched to the test requirement.	The sample size should be based on 8.3.2 requirements if it is moist tissue.	
SUO	256	10.2	Step 7	Te	The agitation time of 2 min is too short for full dispersion and is not realistic as the product is subjected to various hydraulic forces.	The dispersibility test measurement of wipes in such confined spaces (beaker size) for short time of 2 min questions the validity of the tests. The test should either be removed or modified based on scientific accuracy.	

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Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat

International Wastewater Services Flushability Group (IWSFG) had put efforts for the criteria for flushability and the test methods with the assumption of reflecting the real hydraulic, mechanical and environmental conditions of drain lines, various onsite treatment wastewater collection and treatment systems.

IWSFG had put three different test methods (3A, 3B, and 3C) just to measure dispersibility as against to current single method (F502- Slosch box). There should be one universal method to measure the dispersibility which should reflect the real hydraulic forces and both 3A and 3C test methods doesn't reflect those conditions and hence should be removed from proposed IWSFG plan.

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Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
SUO	120	2		Te	It is mentioned that the hydraulic forces typically found in continuous flow conditions in wastewater transport systems is equivalent to Reynolds number of 20,000. Please provide a reference to this point.	Please provide a relevant reference to the comment.	
SUO	157	7.1.a		Te	The slosh box test apparatus size differs from the test apparatus which nearly all 3 rd party labs and industry labs have- L 18" (45.72cm) x W 12" (30.38cm) x H 12" (30.48cm) --- Instead of L 17" (43cm) x W 13" (33cm) x H 12" (30cm)	Keep the current slosh box test apparatus of same size as most of the manufactures and testing laboratories are having	
SUO	173	7.2.b		Te	The speed of the cam mentioned in the document is 13 rpm. Is this rpm equivalent to Reynolds number of 20,000?	The speed of the cam should be 26rpm as it correlates to the conditions in wastewater.	
SUO	181	7.3.c		Te	The perforated plate screen with round holes size of 6.3 mm should be 12.5 mm as the test measures the dispersibility of the wipe/tissue by hydraulic forces.	The slosh box measures the dispersibility of the wipes as the wipes breaks down into smaller pieces which are supposed to pass through 12.5 mm sieve. Please provide a reference point on why 6.5 sieve should be used for dispersibility test.	
SUO	207	8.3.1		Te	It was said that the specimen size shall be either one or two sheets of toilet paper but in reality and actual use its more than 2 sheets of toilet tissue.	Instead of two sheet of toilet tissue, 6 sheets of toilet tissue should be used irrespective of the type and mass of toilet tissue as relates to realistic scenario.	
SUO	275	10.2		Te	It is mentioned that the slosh box should be filled with 4L of water. Does 13 rpm of cam rod and 4 L water equivalent to Reynolds number of 20,000?	The test measures the overall breaking down of wipes/tissue in water with certain hydraulic forces. Please provide a reference on how 13 rpm of cam speed and 4L of water provides hydraulic forces which can be found similar in wastewater and treatment system. Again, it is highly doubtful that with these conditions, the normal toilet tissue will breakup.	
SUO	373	11.a		Te	It is mentioned that the passing criteria for test product should be greater than 95% in 120 mins. The passing percent and duration of test doesn't correlates with the purpose of test.	The overall purpose of the slosh box test method is to measure the disintegration performance of a product found in flow conditions in wastewater transport system. Therefore, the slosh box test duration should be increased to 180 min instead of	

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IWSFG Template for Reviewer comments and IWSFG secretariat observations¹

Document reviewed: 3B: 2017 - Disintegration Test Methods – Slosh Box	Due Date: 2017-09-01
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Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
						120 mins and the passing percentage should be kept more than 50% as the test measures the disintegration of wipes in small pieces.	

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IWSFG Template for Reviewer comments and IWSFG secretariat observations¹

Document reviewed: 3C: 2017 - Flask and Shaker Table

Due Date: 2017-09-01

Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
SUO	168	8.3.1		Te	It was said that the specimen size shall be either one or two sheets of toilet paper but in reality and actual use its more than 2 sheets of toilet tissue.	Instead of two sheet of toilet tissue, use 6 sheets of toilet tissue irrespective of the type and mass of toilet tissue.	
SUO	219	9.2		Te	It is mentioned that preconditioning of the sample is not required. However, the preconditioning is required to remove any lotion from the wipes as the wipes are subjected to such small quantity of water (1L) for the testing.	Preconditioning of sample is required according to drainline test method.	
SUO	235	10.2		Te	The test mentions the rotation speed should be 100 rpm. However, considering the amount of water (1L) and the volume of flask were not going to give ideal condition for dispersion test.	This test method doesn't represent the real condition of how the wipes will be affected by hydraulic forces. It is highly doubtful whether the normal toilet tissues will pass this test. Hence, Flash and Shaker table should be removed from IWSFG.	

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IWSFG Template for Reviewer comments and IWSFG secretariat observations¹

Document reviewed: 3C: 2017 - Flask and Shaker Table

Due Date: 2017-09-01

Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat

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SUO	183-184	8.1.2			Testing laboratory may not be in the city, region, country where the flushable product is sold. Thus, making it difficult and/or impossible to acquire the product.	Flushable product should be provided by the organization requesting to third party facility. This is common practice for laboratory submissions	
SUO	187-188	8.1.2			Method of sample acquisition is not necessary	Test report should indicate “product “ name and entity who provided the product	
SUO	191-194	8.2			When making roll goods for moist wiping products, it is common in wipe converting that the entire wiping product comes sister slit rolls from the same master roll. There is very little differences in properties in this master roll	Remove 191-194. Keep sampling as 10 specimens from a package without distinction of the location of sample in the package comes from	
SUO	197-199	8.2			See above comments from lines 191-194	Remove lines 197-199	
SUO	322	11c			11a and 11b are clear; no need for 11c	Remove 11c	

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SUO	85-88	1.0	Introduction	Ge	“physically adverse effects of such products” language is unclear and confusing, and does not cite any study or finding in conflating non-flushables (ie condoms) with marked flushables (ie flushable wipes)	Distinguish the impact of products not intended to be flushed from the impact of products intended to be flushed, citing studies	
SUO	122	5.2	Terms and Definitions	Ge	Unit Size – Toilet Paper is inconsistent with use. In practice consumers use 6 tissues to any 1 moist toilet tissue	Keep constant sizing requirements – 6 squares of toilet paper to every 1 sheet moist toilet tissue	
SUO	125	5.3	Terms and Definitions	Ge	Here testing lab is instructed to remove a wipe from the center of the stack, in 8.2 (line 164) lab is instructed to divide the stack into thirds and take a wipe from each third. Both instructions cannot be true at the same time.	Amend line 125 to reflect line 164	
SUO	139	7b	Apparatus	Te	This test pulls heavily from INDA’s FG505A test but substitutes the 1mm sieve with 600 microns without citing any learnings in favor of smaller size	Revert to the #18 testing sieve described in FG505A	
SUO	154	8.1	Preparation	Ge	Requiring the testing lab to acquire sample products is an unnecessary burden and does not account for regional variants in availability of product	Place the burden of sample delivery on the party purchasing the test	
SUO	186	8.3.3	Other Products	Ge	Volume requirement for the product seems superfluous, weight is sufficient	Remove the volume range	
SUO	191	8.3.4	Test Mixture	Ge	Text Mixture characteristics testing point undefined	Specify when the liquid aerobic sludge will be tested to conform	
SUO	225	9.1	Conditioning for the test	Ge	Moist products called out to be “gently agitated” in test prep – this is vague and should be clarified	Employ clear language, such as rinsing, or by providing a procedure, or by referring to an annex.	
SUO	235	10.2	Test Procedure	Te	There is no mention of a control to ensure there is no errors in set up or execution of the test.	Add a control such as cotton to the test procedure	
SUO	257	10.2	Test Procedure	Te	Residue rinsing directions unclear, but title of Annex 3 implies it should be followed here. If so, please direct attention to Annex 3.	Correction needed to procedure.	

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SUO	256, 259, 269	10.2	Test Procedure	Ed	Steps 12, 14 and 15 all involve taking photographs of the sieve. Before and after pictures are good practice, but the purpose of the pictures is unclear, and step 12 seems redundant to step 14.	Clarify.	
SUO	292	11	Acceptance Criteria	Ed	Section 11 labeled "1"	Correct to "11"	
SUO	295- 296	11	Acceptance Criteria	Ge	Acceptance criteria 1 is a subset of acceptance criteria 1. All material passing 2 will pass 1, so remove 1.	Remove Acceptance criteria 1.	
SUO	479	A3.3	Procedure	Ed	Photo is unclear as to equipment setup. Pictures of more stages within A3.3.	Publish photos that more clearly demonstrate the intended equipment and procedures	
SUO	512	A4.3.2	Initial dry mass calculation procedure	Ed	Annex 2 Section A.2.3 does not describe how to select specimens.	Correct to A2.2	

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SUO	69-71		Table of Contents	Ed	Annex 5 listed as Error! Bookmark not defined instead of page number.	Correct with page number	
SUO	85-88	1.0	Introduction	Ge	“physically adverse effects of such products” language is unclear and confusing, and does not cite any study or finding in conflating non-flushables (ie condoms) with marked flushables (ie flushable wipes)	Distinguish the impact of products not intended to be flushed from the impact of products intended to be flushed, citing studies	
SUO	122	5.2	Terms and Definitions	Ge	Unit Size – Toilet Paper is inconsistent with use. In practice consumers use 6 tissues to any 1 moist toilet tissue	Keep constant sizing requirements – 6 squares of toilet paper to every 1 sheet moist toilet tissue	
SUO	125	5.3	Terms and Definitions	Ge	Here testing lab is instructed to remove a wipe from the center of the stack, in 8.2 (line 164) lab is instructed to divide the stack into thirds and take a wipe from each third. Both instructions cannot be true at the same time.	Amend line 125 to reflect line 164	
SUO	148	7g	Apparatus	Te	This test pulls heavily from INDA’s FG506A test but substitutes the 1mm sieve with 600 microns without citing any learnings in favor of smaller size	Revert to the #18 testing sieve described in INDA’s FG506A	
SUO	154	8.1	Preparation	Ge	Requiring the testing lab to acquire sample products is an unnecessary burden and does not account for regional variants in availability of product	Place the burden of sample delivery on the party purchasing the test	
SUO	186	8.3.3	Other Products	Ge	Volume requirement for the product seems superfluous, weight is sufficient	Remove the volume range	
SUO	191	8.3.4	Test Mixture	Ge	Text Mixture characteristics testing point undefined	Specify when the liquid aerobic sludge will be tested to conform	
SUO	225	9.1	Conditioning for the test	Ge	Moist products called out to be “gently agitated” in test prep – this is vague and should be clarified	Employ clear language, such as rinsing, or by providing a procedure in Annex	
SUO	193	8.3.4	Test Mixture	Te	The referenced method FG506A (although in the bibliography IWSFG references FG505A) utilizes a sludge with 8,000 – 10,000 mg/L TSS. What is the basis for utilizing so much less?	Provide clarity on the justification for modifying existing test methods	

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SUO	192-193	8.3.4	Test Mixture	Te	Clarify test methods to determine Total Solids and Total Suspended Solids	Identify test methods and add in Annex if not publicly available	
SUO	237	10.2	Test Procedure	Te	Add clarity on cotton control specimens and add them to the test preparation.	Clarify with additional information in section 8.2 and 8.3 as appropriate	
SUO	262	10.2	Test Procedure	Te	Residue rinsing directions unclear, but title of Annex 3 implies it should be followed here. If so, please direct attention to Annex 3.	Correction needed to procedure.	
SUO	264, 274	10.2	Test Procedure	Ed	Steps 12, 14 and 15 all involve taking photographs of the sieve. Before and after pictures are good practice, but the purpose of the pictures is unclear, and step 12 seems redundant to step 14.	Clarify.	
SUO	304-305	11	Acceptance Criteria	Ge	Acceptance criteria a. is a subset of acceptance criteria b. All material passing b. will pass a., so remove a.	Remove Acceptance criteria a.	
SUO	304, 309	11	Acceptance Criteria	Ed	In 5A these were labeled 1 and 2, here they are a. and b.	Settle on a naming convention and amend.	
SUO	336-337	13	Precision	Te	Unclear how to measure length of time during which samples are not generating gas. Will testing labs be required to video record the samples?	Clarify and modify procedure as needed.	
SUO	337	13	Precision	Te	No mention of control in acceptance standards or precision section. Some controls will fail to decompose if the sludge is not active, so procedure for documenting this failure needs to be clarified.	Add procedure to identify inactive sludge by the control sample performance.	
SUO	343		Bibliography	Ed	INDA citation should be FG506	Amend	
SUO	487	A3.3	Procedure	Ed	Photo is unclear as to equipment setup. Pictures of more stages within A3.3.	Publish photos that more clearly demonstrate the intended equipment and procedures	
SUO	566	A4.3.2	Initial dry mass	Ed	Annex 2 Section A.2.3 does not describe	Correct to A2.2	

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IWSFG Template for Reviewer comments and IWSFG secretariat observations¹

Document reviewed: PAS 5B

Due Date: 2017-09-01

Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
			calculation procedure		how to select specimens.		

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