IWSFG Template for reviewer comments and IWSFG secretariat observation

Document reviewed: **PAS 3**

Due date:2017//

1 Te=Technical, Ge=General, Ed=Editorial

Initial	Starting Line Number (e.g. 17)	Ending Line Number (e.g. 23)	Clause/ Subclause (e.g. 3.1)	Type of comment[1]	Comments	Proposed change	Observation of the secretariat
PG				Ge	Submitting comments on the IWSFG PAS documents in this public comment period in no way represents participation in the development process of the IWSFG PAS documents. Nor does commenting imply agreement with any content; where portions of the IWSFG documents have not been commented upon, consent with the content therein is not implied.		
PG				Ge	Revisions to PAS-3 to reduce intra-lab and inter-lab variability are necessary prior to publication. Extensive interlaboratory studies are necessary to establish the viability, reproducibility and validity of the proposed method parameters and criteria.	Conduct a set of inter-laboratory round robin experiment to establish the validity of the PAS-3 method (and/or alternative methods) prior to publication of the IWSFG documents.	

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					Both the test method and criteria proposed in IWSFG PAS-3 are appropriate for the evaluation of any products, including flushable wipes. Based on the results of an interlaboratory investigation of the PAS-3 disintegration test, three of eight toilet papers tested would not meet the proposed acceptance criteria. An additional three of the five toilet papers tested would not meet the proposed acceptable criteria if the rinse step were removed. As such, it can be concluded that the rinse step alone resulted in 50% of the materials artificially meeting the criteria (i.e., false positive results). It should be noted that the toilet papers tested have been used by consumers for many years, without any evidence of flushability concerns. As such, the results call into question the ability of PAS-3 to differentiate between materials that are compatible with wastewater infrastructure, from those that are incompatible.	Conduct a set of inter-laboratory round robin experiments to establish the validity of the PAS-3 method (and/or alternative methods) prior to publication of the IWSFG documents.	
PG				Ge	The PAS-3 disintegration test has been shown to be unreliable and unrepeatable between laboratories and thus will require significant modification and further method development before it should be considered for inclusion in an international specification.	Conduct a set of inter-laboratory round robin experiment to establish the validity of the PAS-3 method (and/or alternative methods) prior to publication of the IWSFG documents.	

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PG				Ge	The IWSFG PAS documents do not outline an approach for determining compatibility with wastewater infrastructure. The IWSFG documents lack any content or context regarding infrastructure issues currently experienced by wastewater utilities. Further, the IWSFG documents contain no data, examples or details regarding issues that can be attributed to flushable wipes. Therefore, the IWSFG documents provide no justification for stipulating qualities or characteristics for flushable products, and as such, represent arbitrary requirements that are unfounded and unrelated to issues faced by wastewater utilities.	Provide examples of infrastructure issues currently experienced by wastewater utilities specifically attributed to flushable wipes.	
PG				Ge	The IWSFG documents do not contain sufficient documentation or information to establish why the IWSFG documents have been developed, or what results the IWSFG documents seek to achieve regarding flushable wipes beyond vague and unsupported performance concepts. The IWSFG PAS documents contain no documentation of operational issues that have been experienced by IWSFG members, or the utilities they represent, that have been caused by flushable wipes. Further, no justification for how those issues would be resolved as a result of implementation of the IWSFG PASs for flushable wipes is provided. Based on the results of field testing and forensics conducted by a range of stakeholders since 2010, all available evidence continues to reinforce that flushable wipes are compatible with wastewater infrastructure.	Provide examples of infrastructure issues currently experienced by wastewater utilities specifically attributed to flushable wipes.	

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PG				Ge	The IWSFG has provided no details regarding the process utilized to establish baseline performance. Outside of photographs within an Annex, no data regarding the performance of materials in PAS-1 or PAS-3 has been included in the documents available for public review. Further, no references to supporting documentation, test results, or other relevant substantiation demonstrating how and why the proposed disintegration performance is required for infrastructure compatibility were provided for review. Without such documentation, the current IWSFG documents are a collection of unproven assumptions and untested hypotheses. As such, a thorough and complete review of the IWSFG PAS documents cannot be conducted without access to relevant test results/data utilized to establish benchmark performance in the IWSFG PAS tests, and importantly, why and how that specific level of performance is necessary to protect wastewater infrastructure.	Provide details of all testing done to establish all test parameters and criteria.	
PG				Ge	The IWSFG PAS documents do not account for all pathways a material may take in wastewater infrastructure, from the toilet through wastewater treatment. Of greatest significance is the omission of test methods for evaluating compatibility with either household or municipal pumps, and aerobic biological degradation.	Provide the rationale for why the IWSFG documents do not provide testing to evaluate compatibility with pumps, or testing to evaluate the ability to degrade biologically under aerobic conditions.	

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PG				Ge	Misuse of the word “standard,” and variations thereof, occurs in the texts. The documents assembled by the IWSFG are neither a standard, nor are they Publicly Available Specifications developed, for example, in accordance with the process set forth by the British Standards Institute (BSI). Misuse of the word “require,” and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require action.	Clarify that the documents are guidelines.	
PG				Ge	There is significant overlap of content (both verbiage and technical details) between the IWSFG documents and existing copyrighted material- in particular the work of Working Group 10, within Technical Committee 224 of the International Standards Organization- and there is no reference to consent from the copyright owners with regards to this use.	Provide acknowledgement from the ISO copyright office allowing the use of ISO content. From ISO TC224/WG10/TR 25424 WD3: "All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO’s member body in the country of the requester."	

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PG				Ge	The first draft of the IWSFG documents consisted of a Standard and associated Publicly Available Specification (PAS) documents, and the entire body of work was described as the IWSFG Flushability Guidelines (http://iwsfg.org/iwsfg-flushability-guidelines/). The second draft consists of three PAS documents and are referred to collectively as the Flushability Specification.	Provide the rationale and basis for renaming the IWSFG documents from "Guidelines" to a "Specification."	

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PG				Ge	The documents do not appear to have been developed per an established Publicly Available Specification process- for example, by the process set forth by the British Standards Institute (BSI). Revise all instances to utilize an appropriate term such as “Guideline” or equivalent. Alternatively, provide details of the national or international standards organization that is accrediting the documents as “Publicly Available Specifications.” Note to Entry: The first sentence of the British Standards Institute (BSI) definition of a standard requires agreement- not among a single organization or group of common stakeholders- but among “manufacturers, sellers, buyers, customers, trade associations, users or regulators.” The full definition reads (https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/): “In essence, a standard is an agreed way of doing something. It could be about making a product, managing a process, delivering a service or supplying materials – standards can cover a huge range of activities undertaken by organizations and used by their customers. Standards are the distilled wisdom of people with expertise in their subject matter and who know the needs of the organizations they represent – people such as manufacturers, sellers, buyers, customers, trade associations, users or regulators… They are designed for voluntary use so it’s up to you – you’re not forced to follow a set of rules that make life harder for you, you’re offered ways to do your work better. Standards are knowledge. They are powerful tools that can help drive innovation and increase productivity. They can make organizations more successful and people’s everyday lives easier, safer and healthier.”	Clarify if the IWSFG has developed the PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples). In the interest of transparency, list the stakeholders groups and organizations that participated in the development (i.e., activities other than the public comment) of the IWSFG Standard and PAS documents.	

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PG	20	24	Foreword	Te	Document appears to share common authorship with documents generated, and therefore the intellectual property of, the International Standards Organization (ISO) Technical Committee (TC) 224. While superficial changes have been made, language and concepts in IWSFG PAS-1 appear to have been developed from current and/or draft versions of the documents generated as part of the work of ISO TC224 WG10. From "ISO TR 24524: WD 3" (noted as: © ISO 2018 – All rights reserved): "This Technical Report addresses the hydraulic, mechanical and environmental conditions found in transport and treatment systems. The conditions listed in this report may be taken into account when designing and evaluating the performance of products which could potentially be flushed via the toilet... It is expected that this Technical Report and may provide the basis for wastewater services to delineate the qualities and characteristics of discharges to the wastewater system." From the IWSFG PAS-1 (noted as: Copyright 2018 IWSFG): "The criteria for flushability and the appropriate test methods... reflect the hydraulic, mechanical and environmental conditions of drain lines, various onsite treatment and wastewater collection and treatment systems... Accordingly, the purpose of the flushability test along with others presented in this IWSFG series is to define the qualities and characteristics of those products that may truly be considered as being “flushable”."	As the work of ISO TC224 WG10 pre-dates the work of the IWSFG, where necessary and appropriate, provide proper attribution and/or reference to language and concepts drawn from the draft ISO TC224 WG10 documents. Further, in the interest of transparency, identify the affiliation of the author(s) of the IWSFG PAS documents, and state if they have been, or are currently, members of ISO TC224 WG10.	

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PG	20	24	Foreword	Te	Contradicts definition of "Flushable Product" in Section 5. Definition of "Flushable Product" in Section 5 accurately and succinctly describes a flushable product, and as such, is a suitable summary of the purpose of the PAS documents. The language utilized in the Foreword mischaracterizes the PAS documents, as none of the three documents contain sufficient information to "reflect the hydraulic, mechanical and environmental conditions of drain lines, various onsite treatment and wastewater collection and treatment systems as well as the nature of the receiving waters for treatment plant effluents."	Revise Foreword to be consistent with "Flushable Product" definition in Section 5: "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 labeled as flushable** ~~the hydraulic, mechanical and environmental conditions of it~~ **will not impact** drain lines, various onsite treatment and wastewater collection and treatment systems as well as the nature of the receiving waters for treatment plant effluents."	
PG	27	27	Foreword	Te	Improperly implies that the opinions presented by the IWSFG in the Foreword are social and/or environmental sustainability metrics. This is unfounded, unreferenced and untrue as no such metrics exist. The opinions of the IWSFG cannot be utilized to measure social and/or environmental sustainability. Additionally, the language Implies that adherence to IWSFG PAS documents demonstrates social and/or environmental sustainability, or alternatively, that failure to adhere to the PAS indicates an entity either neither socially or environmental sustainable. Neither of these scenarios is true.	Delete. Inappropriately and improperly implies that the opinions presented by the IWSFG are social and/or environmental sustainability metrics.	

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PG	25	27	Foreword	Te	In the United States, wastewater treatment plants are permitted to continuously discharge known pollutants including but not limited to Total Suspended Solids (TSS), Oxygen depleting substances [typically measured as Biological Oxygen Demand (BOD)] and nutrients (defined as pollutants in the United States Environmental Protection Agency [EPA]'s Report to Congress on the Impacts and Control of CSOs and SSOs; 2004). These pollutants can and do have a negative impact on "the nature of the receiving waters for treatment plant effluents" (IWSFG PAS-1).	Describe how the risk from the discharge of pollutants (as defined by the US EPA) in the form of TSS, BOD and nutrients by wastewater treatment plants represented by IWSFG members is deemed appropriate. In particular, describe how risk and budget, as well as receiving water quality determine the extent of treatment for a WWTP.	

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PG	25	27	Foreword	Te	Sentence describing wastewater services is an oversimplification. The expectations of the IWSFG are irrelevant to the document.	**Delete the following sentence**: "Wastewater services are organizations acting for the public good as a public service. The group expects the manufacturers and distributers of their products to act in a socially responsible and environmentally sustainable manner by adhering to the established standards." If the sentence is retained, for context, provide the IWSFG's position on "blending," specifically how the practice of blending protects the public good and represents socially and environmentally sustainable operation by wastewater services. Note to entry: "The [US Environmental Protection Agency] EPA issued guidance in the mid-2000s banning a technique used by some utilities in which some wastewater is routed around the treatment process before being blended with treated flows and then discharged into areas in the receiving waters known as mixing zones. The practice is used to keep the high volumes of wastewater, such as those during storms, from overwhelming the treatment plant. The agency said blending and the use of mixing zones violate the Clean Water Act." (continued below)	

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	26	27	Foreword	Te	Proposed Change continued from above	[continued from above] (from: https://www.bna.com/wastewater-practice-mostly-n57982084593/). "Opponents argue that the blending ban raises costs for wastewater utilities." (From https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001).	

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PG	26	27	Foreword	Te	Document contains language significantly similar to that found in draft versions of the ISO TC224 WG10. **From the IWSFG PAS-1 (noted as: Copyright 2018 IWSFG)**: "The group expects the manufacturers and distributers of their products to act in a socially responsible and environmentally sustainable manner by adhering to the established specifications." **From "ISO TR 24524: WD 2 v1" (noted as: © ISO 2017 – All rights reserved):** "It is equally hoped that manufacturers and distributers of products that would be marked flushable or which by their location and use are likely to be flushed would take these conditions into account when designing and marketing such products. Thereby demonstrating their conformity with the principles of social responsibility as set out in ISO 26000 which provides guidance on how businesses and organizations can operate in a socially responsible way. This means acting in an ethical and transparent way that contributes to the health and welfare of society."	In the interest of transparency, declare if the author(s) of the IWSFG PAS documents are members of ISO TC224 WG10. Further, declare if the author(s) have participated in the development of both documents.	

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PG	104	105	1	Te	Describe how the IWSFG determined what amount of disintegration was "sufficient" to be compatible with wastewater transport systems." NB: Available literature contradicts this statement. Specifically, disintegration is not necessary to be compatible with wastewater transport systems (i.e., plumbing, drainlines, and municipal sewer systems). The idea that disintegration is required for compatibility is the opinion of the IWSFG and is refuted by multiple sources. Consider the transport mechanism for solids in small diameter piping (i.e., drainline or plumbing), which is well establishing in the literature and is referred to as a “sliding dam” where all materials in the plumbing and drainline (including toilet paper, feces and flushable wipes) form a dam at the invert of the pipe that is propelled forward by the leading edge of the wave of water behind the material. “As mentioned earlier, for many solids found in sewers, typically gross solids in combination with toilet paper, the usual mode of movement is not floating in the wave, but by contact with the invert of the pipe at all times: a sliding, leaking dam... The solid obstructs the flow down the pipe, and causes a build up of head behind it. The amount of water that flows past the solid depends on the size, shape and roughness of the flow path, and the driving head” (Continued below)...	Revise to indicate that this statement is the opinion of the IWSFG: "This document provides a description of the test method and threshold criteria for determining if a product will disintegrate sufficiently**, in the view of the IWSFG,** to be compatible with wastewater transport systems." If unrevised, provide reference to all materials utilized to establish the amount of disintegration required for compatibility with wastewater infrastructure (with references), including but not limited to: toilets, plumbing, drainlines, household pumps, septic tanks, municipal sewer systems, municipal lift station pumps, and wastewater treatment plants.	

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PG	104	105	1	Te	Continued from above: (Butler et al; 2005; A model for the movement of large solids in small sewers; Water Science & Technology; Vol. 52; Issue 5; Pg. 69-76). Regarding transport distance, Butler and Davies (Butler and Davies; 2011; Urban Drainage; 3rd Edition; Spon Press; London, UK) concluded (emphasis added): “Solids which are large compared with the flush wave and pipe diameter move with a sliding dam mechanism (Littlewood and Butler, 2003). In this case, the flush wave builds up behind the solid, which acts as a dam in the base of the pipe. When the flow’s hydrostatic head and momentum overcome the friction between solid and pipe wall, the solid begins to move along the pipe invert. The amount of movement that occurs depends on how ‘efficient’ the solid is as a dam; the higher the efficiency, the further the solid will move for the same flush wave… Photograph (a) shows toilet tissue alone in the flow and photograph (b) shows toilet tissue and an artificial faecal solid in combination. Note the pool of water forming behind the solid and propelling it along. The role of toilet tissue in forming the ‘dam’ is noteworthy. Solids tend to move furthest in the sliding dam mode.” In other words, the more intact a material is in the drainline, the farther it will be transported, due to the increased surface area against which the wave of water from the toilet flush can push, and is the mechanism by which they are transported in the plumbing and drainline. This simple fact, that intact material is more effectively transported in the drainline, contradicts fundamental principles of the IWSFG’s PAS documents, their proposed testing and criteria.	As above, revise to indicate that this statement is the opinion of the IWSFG: "This document provides a description of the test method and threshold criteria for determining if a product will disintegrate sufficiently, **in the view of the IWSFG,** to be compatible with wastewater transport systems." If unrevised, provide reference to all materials utilized to establish the amount of disintegration required for compatibility with wastewater infrastructure (with references), including but not limited to: toilets, plumbing, drainlines, household pumps, septic tanks, municipal sewer systems, municipal lift station pumps, and wastewater treatment plants.	

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PG	109	110	2	Te	Lacks sufficient details. The statement "hydraulic forces typically found in continuous flow conditions in small diameter (8 inch/200 mm) wastewater transport systems, immediately after a product is flushed: i.e. forces equivalent to a Reynolds number of 20,000" requires additional information. Define "continuous flow conditions." NB: The Reynolds Number for an 8" pipe carrying wastewater continuously can vary from ~4,600 to ~42,000 depending on the volume and characteristics of the wastewater conveyed. This does not consider temperature effects on the Reynolds Number (see below). To imply a Reynolds Number of ~20,000 is "typical" for an 8" pipe is unfounded, wholly unsubstantiated and incorrect. Flow varies in sewers continuously throughout each day, and as such, the wastewater flow in an 8" pipe can be described by a Reynold's Number of 20,000 **for less than ~15 minutes each day, or ~1% of each day- in no way can this reasonably be considered "typical."**	Revise: "The purpose of this test is to assess the disintegration performance of a material when it is subjected to **turbulence** ~~hydraulic forces~~ for a short duration. ~~typically found in continuous flow conditions in small diameter (8 inch/200 mm) wastewater transport systems, immediately after a product is flushed: i.e. forces equivalent to a Reynolds number of 20,000."~~	
PG	109	110	2	Te	The Reynolds Number varies with temperature. For example, for an 8" pipe flowing 1/3rd full carrying wastewater at a temperature of 50 degrees Fahrenheit, the Reynolds Number would equal ~15,600. The same pipe with wastewater at a temperature of 80 degrees Fahrenheit would equal ~23,800.	Provide the rationale the IWSFG utilized for choosing 20,000 as the appropriate Reynolds Number for testing disintegration in PAS-3 in terms of wastewater temperature.	

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PG	109	110	2	Te	As noted above, the Reynolds Number varies with temperature. Importantly, the Reynolds Number also varies throughout the day with the pattern of change in wastewater volume commonly referred to as diurnal flow. For the examples above, taking into account diurnal flow patterns, for the 8" pipe carrying wastewater at a temperature of 50 degrees Fahrenheit, the Reynolds Number will vary between ~6,300 to ~27,800. For the same pipe with wastewater at a temperature of 80 degrees Fahrenheit, taking into account diurnal flow patterns, the Reynolds Number would vary between ~7,800 to ~34,000. As such, for an 8" pipe that can convey wastewater with a Reynolds Number of ~20,000 under certain conditions and at certain times, **the Reynolds Number can vary between ~6,000 and ~34,000 daily**. For example, at 4:00am, flow in an 8" pipe can be described by a Reynold's Number of ~6,000, and as a result of diurnal flow, the same pipe will convey wastewater that can be described by a Reynold's Number of ~20,000 at 9:00am. This same pipe will subsequently convey wastewater that can be described by a Reynold's Number of ~26,000 at 12:00pm.	Provide the rationale the IWSFG utilized for choosing 20,000 as the appropriate Reynolds Number for testing disintegration in PAS-3 in the context of diurnal flow. NB: An 8" pipe will convey wastewater described by a Reynolds Number ranging between ~6,000 and ~20,000 **within a span of 5 hours as a result of diurnal flow.**	

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PG	111	112	2	Te	No references provided to establish correlation between the slosh box and the Reynolds Number.	Add an Annex that includes all work conducted by the IWSFG to establish correlation between the slosh box and the Reynolds Number. NB: Any correlation should account for the relationship between temperature and diurnal flow on the Reynolds Number as outlined above.	
PG	111	112	2	Te	While no correlation between the slosh box and the Reynolds Number is available (as noted above), the work of Karadağlı et. al. established a relationship between rotational speed of a shake flask and the Reynold's Number. Using the correlation provided by Karadağlı et. al., **a Reynold's Number of ~20,000 occurs at a shake flask speed of approximately 74 revolutions per minute**.	Conduct an interlab test evaluating disintegration of a range of materials using a shake flask with a rotational speed of 74 RPM to evaluate teh validity of the IWSFG's position that a material must disintegrate (with 95% passing a 25 mm sieve) after 30 minutes of exposure to conditions described by a Reynold's Number of 20,000 to be compatible with wastewater transport systems.	
PG	114	117	3	Te	Contradicts Scope of PAS-1. Scope of PAS-3 is significantly different from PAS-1, specifically with regards to toilet paper. PAS-3, by failing to exclude toilet paper (as done in PAS-1), appears to include toilet paper is in scope for PAS-3.	Revise Scope of PAS-3 and/or PAS-1 to clearly identify the products that are in Scope.	

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PG	135	136	6	Te	Vague. As noted above, the description of the Reynolds Number in Section 2 is incomplete and lacks sufficient detail to understand the conditions implied. Further, the Reynolds Number is a ratio of forces, and therefore a dimensionless number, not a measure of hydraulic force. No description of hydraulic force is included in Section 2.	Revise with appropriate description of the Reynold's Number.	
PG	153	153	7.2	Te	With a base of 18" and a specified travel of 4", the rock angle is calculated as 12.8 degrees. Given the discrepancy between the calculation and the angle prescribed, the allowable rock angle should be adjusted to include both measures.	Suggest: The platform should rock to both sides at ~~11~~ **10.5 - 13** degrees from the vertical. If retained, revise the vertical travel to produce a rock angle of ~11 degrees.	
PG	188	194	8.3.1	Te	Per PAS-1, toilet paper is not in scope.	Delete.	
PG	224	224	10.1	Te	No justification for conducting the test at 16 RPM is provided. It can be inferred that this speed is meant to mimic a Reynold's Number of 20,000, though no supporting information is provided to establish the validity of this relationship.	1. Provide the rationale for changing the speed of the slosh box from 13 RPM to 16 RPM. 2. Further, state whether 4L @ 13RPM (as stated in the first draft of the IWSFG PAS documents- IWSFG-PAS-3B-Slosh-Box-Test-2017-07-21) or 4L @ 16RPM represents a Reynolds Number of 20,000. NB: Both speeds cannot replicate an Re of 20,000.	

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PG	224	225	10.1	Te	No justification for the 30 minute test duration is provided. Specifically, no information detailing why disintegration to the extent proposed in this document within 30 minutes is necessary for compatibility with wastewater transport systems. Laboratory and field testing have repeatedly demonstrated that 1., materials that are compatible with wastewater transport systems remain intact longer than 30 minutes, and 2., intact, weakened, and/or partially disintegrated materials are compatible with the toilet, drainline, household pumps, septic tanks, municipal wastewater transport systems, and municipal lift station pumps.	1. Provide the rationale for changing the duration of the test from 120 minutes to 30 minutes. 2. Further, state whether 4L @ 13RPM for 2 hours (as stipulated in IWSFG-PAS-3B-Slosh-Box-Test-2017-07-21), or 4L @ 16RPM for 30 minutes represents a Reynolds Number of 20,000. NB: Both combinations cannot replicate an Re of 20,000.	
PG	272	272	10.4	Ed	Term "quantitatively" appears to be misplaced.	Delete. If retained, provide a rate to qualify the term "slowly."	

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Document reviewed: **PAS 3**

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PG	288	288	10.4	Te	Regarding Step 7: "Do not force the passage of any material through the sieve." Interlab testing utilizing PAS-3 demonstrates that the rinse procedure outlined in Section 10.4 is of such force and duration that it results in disintegration of material initially retained on the sieve, which is subsequently forced through the sieve, in violation of the method. Given the IWSFG positions on toilet paper outlined in Lines 147-150 of PAS-1, a range of toilet paper from three continents were tested to evaluate the resolution of PAS-3 with respect to toilet paper. In summary, the results demonstrated that the proposed PAS-3 is not suited for evaluating different toilet papers, let alone a range of different materials. Of eight toilet papers tested using the PAS-3 method, five reached 95% passing the 25mm sieve, while three toilet papers tested did not achieve 95% passing the 25mm sieve (per PAS-3: fail the disintegration test). Further, and importantly, of the eight toilet papers, only two reached 95% passing the 25mm sieve without the one-minute rinse. As such, it is concluded that the rinsing and sieving end-point is unsuitable for testing toilet paper (as the results contradict the statement in Lines 149-150 of PAS-1). **Test results demonstrate that 50% of the materials tested reached the pass criteria of PAS-3 solely** as a result of the rinsing procedure.	1. Remove or revise rinsing step. 2. If rinse step is retained, provide justification for the inclusion of the step, citing inter-lab test results that establish that a., the rinse step is not a source of variability, and b., the rinse step is not a cause of false-positive errors. 3. Conduct round-robin laboratory experiments to understand sources and extent of variability and the rate of occurrences of false-positive results.	
PG	293	293	10.4	Te	Regarding Step 10a: visual observation is qualitative.	Replace "quantitative" with "qualitative"	

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PG	303	307	10.6	Te	Language states that percentage calculation is based on individual mass of product- contradicts language in Lines 306-307 stating total mass from 5 tests.	Rectify difference.	
PG	311	314	11	Te	No justification provided for proposed criteria: 95% passing 25mm sieve in 30 minutes.	Provide an Annex that describes in detail how the IWSFG determined that this performance is necessary for compatibility with infrastructure. Include all calculations, references to sewer design, or similar.	
PG	330	332	12	Te	Regarding Step 11a.: Irrelevant. 100% of the specimens tests may have disintegrated, but to an extent (ex. 94% average passing the sieve) that does not meet the criteria outlined in PAS-3. The test result is recorded in Step 11b.	Delete.	
PG	339	345	13	Te	Precision section does not describe precision but rather variability. Further, variability of materials, slosh box angle and speed are covered in other sections.	Delete. If retained, rename "Variability." If retained as "Precision," add definition for precision to PAS-2.	

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PG	399	399	Annex 2	Te	Steps 3 and 4: What is the rationale for holding the product being tested in a quasi-dry state for 30 minutes?	Provide the rationale, and all data used, to support the inclusion of a step where the product being tested is held in a quasi-dry state for 30 minutes. If this step is meant to mimic retention in plumbing or a drainline, provide the data that states the percentage of products that are retained in a drainline globally, and the range of retention times globally. Is 30 minutes a minimum, a maximum or an average? For specific countries represented by the IWSFG or globally?	
PG	570	570	A.7.4	Te	Table header incorrectly denotes column as "% Disintegration."	Revise to read the actual values of the column: "% Passing 25 mm sieve"	
PG	574	574	Annex 8	Te	Test Result: Pass	Reconcile difference with Table A.7.4.	
PG	574	574	Annex 8	Te	Table states "percentage of product remaining" but provides % passing 25mm sieve.	Reconcile difference.	
PG	576	576	A.8.2	Te	Brand X, based on the results shown, appears to provide an opportunity to establish a laboratory control for PAS-3.	Provide access to Brand X to all stakeholders for testing to verify consistent interlaboratory results for PAS-3.	

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PG	576	576	A.8.2	Te	Were additional replicates conducted? Testing using PAS-3, in conjunction with the rinsing technique required, resulted in significant variability for materials that disintegrate to the extent of Brand X. In addition, variability between laboratories was also noted for PAS-3, as written. Was testing conducted at multiple labs to verify that each lab obtained equivalent results to the IWSFG?	1. Provide the number of replicates of Brand X that were conducted in total by the IWSFG and all relevant statistical measures, including but not limited to the standard deviation. 2. Provide the number of laboratories that tested Brand X using PAS-3. Were the results equal to the results shared in Annex 8? Provide all raw data. 3. State whether any of the replicates reached 95% for any of the labs.	
PG	576	576	A.8.2	Te	Brand X demonstrated significant potential for disintegration during sewer transit based on the photographic record provided. Despite this, the IWSFG has determined that this degree of disintegration still renders Brand X incompatible with wastewater transport systems, yet no explanation is provided to support this opinion.	Section 1 of PAS-3 reads that the test is for: "determining if a product will disintegrate sufficiently to be compatible with wastewater transport systems." 1. Provide the basis for determining that the disintegration demonstrated by Brand X is insufficient. 2. Specifically, detail the wastewater transport system elements with which Brand X is incompatible using available data regarding system operations and maintenance.	

end