

Initials	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment <sup>2</sup>	Comments	Proposed change	Observations of the secretariat
PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	Per the BSI definition of the term "standard" ( <a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a> ) that the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify if a national or international standardization body has certified, or will certify, the IWSFG documents.	
PG				Ge	The goal of the IWSFG, as contained in IWSFG Standard 1 is to (emphasis added): “...identify those products that do not meet these <b>test standards</b> ,” implying that the PAS documents are “test standards.”	Clarify the nature of the PAS documents as “test standards” or as “Publicly Available Specifications.”	
PG				Ge	The “goal of the IWSFG” as described in the IWSFG Standard 1 document (“to identify those products that do not meet these test standards,”), differs from the “goal of the IWSFG” as stated in all the PAS documents:  <ol style="list-style-type: none"> <li>1. PAS-0, PAS-1, PAS-2C, PAS-3A, PAS-5A, PAS-3B, PAS-3C, PAS-4, PAS-5B: “...established IWSFG standards”</li> <li>2. PAS-2A: “...these tests”</li> <li>3. PAS-2B: “...the IWSFG’s standards”</li> </ol>	Clarify and rectify inconsistencies. Specifically, whether the PAS are “test standards” “established IWSFG standards” “tests” or “IWSFG’s standard.”  If deemed “standards,” clarify the national or international standards body that has accredited the PASs. Provide all documentation supporting the establishment of the PASs as standards.	
PG				Ge	The IWSFG Standard or 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 Standard and PASs	Delete all content that if based on opinion of what is acceptable to individuals without any supporting data, test results or justification of any kind beyond anecdote.  Provide documentation of operational issues that have been experienced by IWSFG members, or	

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					<p>for flushable wipes is provided.</p> <p>The IWSFG Standard clearly states that the purpose and intent of the standard is “to establish for the manufacturers the limits of what is acceptable to wastewater services for discharge via toilets into the wastewater transport and treatment systems.” It is critical to note that this statement from the IWSFG does not outline specific product attributes or performance that are required for products to be compatible with wastewater infrastructure, which would be the appropriate approach for setting limits. The IWSFG Standard therefore represents an opinion on what is acceptable to certain individuals without any justification beyond anecdote. This is an unscientific process and is an unsuitable basis for establishing what is intended to be an international standard.</p> <p>Note to Entry:</p> <p>Consider Maximum Occupancy requirements as set out in state or local fire codes. For example, appended below is the Certificate of Operation for Place of Assembly in a building in New York City with a placeholder for the “Number of Persons” that are lawfully allowed to occupy the place of assembly:</p>	<p>the utilities they represent, that have been caused by flushable wipes.</p> <p>Clarify how those issues would be resolved as a result of implementation of the IWSFG Standard and PASs for flushable wipes.</p>	

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					 <p>(From: <a href="https://www1.nyc.gov/site/buildings/business/place-of-assembly.page">https://www1.nyc.gov/site/buildings/business/place-of-assembly.page</a>)</p> <p>Per the NYC Department of Buildings:                      “•A Place of Assembly (PA) Certificate of Operation is required for premises where 75 or more members of the public gather indoors or 200 or more gather outdoors, for religious, recreational, educational, political, or social purposes, or to consume food or</p>		

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					<p>drink.</p> <ul style="list-style-type: none"> <li>•In order to have a legal Place of Assembly, certain Fire and Building Code requirements must be fulfilled."</li> </ul> <p>By way of example, for a place of assembly where the "Number of Persons" has been established at 100 persons per Fire and Building Code requirements for the New York City Department of Buildings, the entity responsible for the place of assembly could arbitrarily decide to set the "Number of Persons" at a number less than the value on the Certificate of Operation, for example determining that the "Number of Persons" that they will allow to occupy the room at 80 persons, or 20 less than the number permitted. It is possible that the entity responsible for the place of assembly could have based this lower number on the premise that the lower number (80 persons) was safer, based on their opinion regarding the number of individuals they wish to have occupy the place of assembly at any one point in time. This, however, does not make the number set in accordance with the NYC Fire &amp; Property Maintenance Codes (100 persons) incorrect or unsafe. Establishing a value lower than a threshold value without evidence supporting the change in no way invalidates or alters the original value.</p> <p>Note to Entry:</p> <p>For example, consider the height requirements of Commercial Motor Vehicles (CMVs) in the United States. Were the Federal Department of Transportation (DOT) to utilize the same approach for setting height restrictions for CMVs that the</p>		

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					<p>IWSFG has attempted for flushable products, the height limit for CMVs would be set at the height of the lowest bridge or other overhead crossing found globally. Clearly this approach would be inappropriate. Note that the Federal DOT in the United States doesn't even set a height requirement, instead ceding that responsibility to the States: "There is no Federal vehicle height requirement for CMVs. Thus, States may set their own height restrictions. Most height limits range from 13 feet, 6 inches (4.11 meters) to 14 feet (4.27 meters), with exceptions granted for lower clearance on particular roads." (From: <a href="https://ops.fhwa.dot.gov/freight/publications/size_regs_final_rpt/">https://ops.fhwa.dot.gov/freight/publications/size_regs_final_rpt/</a>). First, note that there is no national height requirement in the United States for CMVs, due to the variability in infrastructure found throughout the continental United States. Second, and importantly, note that the height limits are not based on what is acceptable to the Federal DOT. Rather, these limits are set based on compatibility with infrastructure at the State level. Last, note that the worst-case scenario (for example 13 feet, 6 inches, or even lower for specific routes with lower overhead clearance) is not utilized to set CMV height nationally.</p> <p>Note to Entry:</p> <p>Similarly, consider the weight requirements of CMVs. "The bridge formula was introduced in 1975 to reduce the risk of damage to highway bridges by requiring more axles, or a longer wheelbase, to compensate for increased vehicle weight. The formula may require a lower gross vehicle weight, depending on the number and spacing of the axles in the combination vehicle." From (<a href="https://ops.fhwa.dot.gov/FREIGHT/sw/overview/ind">https://ops.fhwa.dot.gov/FREIGHT/sw/overview/ind</a></p>		

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					ex.htm). As with CMV height limits, weight limits are set based on compatibility with infrastructure (in this example to reduce the risk of damage to highway bridges) not based on what is acceptable to the Federal DOT. Further, note that there exist State exemptions and variations: "In addition to the general standards described here, federal law includes provisions, exemptions, and variations applicable to particular states, routes, vehicles, or operations." Again, as with height limits, it is acknowledged that given the variability in infrastructure that exceptions and/or variations to the limits are necessary for specific instances. Further, and importantly, these exceptions have not utilized to set worst-case limits on weight limits for CMVs nationally.		
PG				Ge	<p>The IWSFG has provided no details regarding the process utilized to establish baseline performance. Specifically, no data regarding the performance of toilet paper in the PAS tests 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 toilet paper performance is required for infrastructure compatibility were provided for review. Without such documentation, IWSFG Standard 1 is a collection of unproven assumptions and untested hypotheses. As such, a thorough and complete review of the IWSFG Standard 1 cannot be conducted without access to relevant test results/data utilized to establish toilet paper as the benchmark in the IWSFG PAS tests.</p> <p>Note to Entry: Specifically with regards to the performance of toilet paper, the anecdotal performance of toilet paper is insufficient information for establishing a benchmark for testing. The assertion that "Since toilet papers historically</p>	<p>Clarify the process utilized to establish baseline performance for the IWSFG standard and PASs.</p> <p>Provide reference to information that details how toilet paper performance, as measured via the PAS tests and correlated to operations and maintenance data for wastewater systems, is necessary, and represents an upper limit of, compatibility with wastewater infrastructure.</p>	

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					<p>have not caused clogging, or plugging, problems in wastewater systems” is vague and unsupported by any scientific data or reference, and therefore in unacceptable as the basis for establishing a benchmark for performance. Data establishing how toilet paper performance relates to infrastructure compatibility has not been provided, and as such, there is no evidence available to place toilet paper performance in context.</p> <p>Note to Entry: Provide details of benchmarking conducted, specifically the methodology utilized. See definition from ISO 17258:2015(E) Statistical methods — Six Sigma — Basic criteria underlying benchmarking for Six Sigma in organisations; First edition; 2015-01-15</p> <p>“Benchmarking is frequently used in various domains in connection with business activities. The Six Sigma methodology requires an evaluation step using a benchmarking process. In other words, a method for the comparison of levels of quality, performance, and productivity with the state-of-the-art is required. This International Standard establishes what to compare and develops a methodology to conduct a correct comparison between an organization’s levels of quality, performance, and productivity.</p> <p>The numbers given by the benchmarking can be integrated into any improvement programme to quantify any progress. They can also be used by other assessment processes in the organization such as regulation compliancy or financial performance evaluation.</p>		

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					<p>Benchmarking is the whole process of collecting and processing data and information and comparing the results. The benchmark is the reference point for comparison.</p> <p>The main point of this benchmarking methodology, based on transparency and the universal principle of evaluation, is to give confidence to its calculating procedures and the results, so that comparisons between organizations are accepted by all parties.”</p>		
PG				Ge	<p>In a letter dated June 22, 2017, the Chief Executive Officer (CEO) of the National Association of Clean Water Agencies (NACWA) wrote the following regarding the IWSFG:</p> <p>“The International Water[sic] Services Flushability Group (IWSFG), made up of wastewater utilities from around the world, has developed draft flushability standards that will ensure flushable wipes are in fact safe for sewer systems. The draft standards will be published soon for public comment. Many wipes manufactured in Japan will pass these draft standards...”</p> <p>NACWA, a member of the IWSFG, appears to indicate in this letter that, in addition to toilet paper, benchmarking was done using Japanese wipes.</p> <p>Note to Entry:</p> <p>Similarly, a “Letter to the Editor” of the Northwest Current was published in December of 2016, jointly authored by the CEO of NACWA, and the General Manager of DC Water, and included the following: “While wipes sold in the U.S. would likely not meet standards set by D.C., Japanese and Spanish manufacturers produce wipes that are truly flushable, breaking down quickly after entering the</p>	<p>Revise all text referencing benchmarks to provide details of all benchmarking activities conducted for establishing IWSFG Standard 1.</p> <p>Provide the results of all testing of Japanese wipes conducted by the IWSFG in establishing IWSFG Standard 1 and associated PASs.</p> <p>Provide the list of all ISO-accredited laboratories that conducted the testing utilizing the IWSFG PAS tests on behalf of the IWSFG to which NACWA refers in the June 22, 2017 letter.</p> <p>Provide the results of all testing of Japanese and Spanish wipes conducted by the IWSFG in establishing IWSFG Standard 1 and associated PASs prior to December 2016.</p> <p>Provide the list of all ISO-accredited laboratories that conducted the testing utilizing the IWSFG PAS tests on behalf of the IWSFG to which NACWA and DC Water prior to December 2016.</p>	

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					sewer.” This implies that as early as December of 2016 that benchmark testing of wipes from Japan and Spain was being conducted.		
PG				Ge	The IWSFG Standard and associated PAS documents do not account for all pathways in wastewater infrastructure. Significant omissions include the lack pump testing, and the inclusion of only passing references to septic tanks, and only where septic tanks are described as a source of discharges to wastewater treatment plants. This is a significant oversight by the IWSFG.	Revise the IWSFG Standard 1 and associated PAS documents to demonstrate how the IWSFG documents account for compatibility with all relevant wastewater pathways including pumps (including household pumps where materials will commonly enter the pump intact) and septic tanks (as wholly self-contained treatment units, not as precursors to municipal wastewater treatment).	
PG				Ge	Variations of the IWSFG and PAS documents can be developed by the IWSFG members, but no process is identified for how those would be available for review.	Provide details on the process for public commenting on alternate versions of PAS methods.  Provide access on the IWSFG website to any country-specific alternate versions of PAS methods that currently exist but have not been made available for public comment.	
PG				Ge	There is significant overlap of content (both verbiage and technical details) between the IWSFG documents and the current draft of the Technical Report being developed by Working Group 10 (WG10) of Technical Committee 224 (TC224) within the International Standards Organization (ISO).  For example: the “Purpose” provided in the “Forward[sic]” of each PAS (“the hydraulic, mechanical and environmental conditions of drain lines, various onsite treatment and wastewater collection and treatment systems as well as the receiving waters for treatment plant effluents”), bears a strong resemblance to the Title (“...the hydraulic, mechanical and environmental conditions generally found in wastewater transport systems from toilets through to wastewater treatment plants, and the related context.”) and Scope of the draft ISO TC224 WG10 Technical Report (“...the broad	Provide a background section including details on the authors and review committee with respect to the drafting and review processes for the IWSFG documents.  Provide copies of any relevant communication with ISO stakeholders where the use of draft versions of intellectual property being developed as part of a multi-stakeholder process in TC224 WG10 by the IWSFG is licensed or otherwise allowed or condoned.  Provide an explanation for how the IWSFG documents contain nearly identical language with the current draft of the Technical Report being drafted in ISO TC224 WG10.  Provide an explanation for how specific technical details, including test durations, endpoints and acceptance criteria, are identical in both the	

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					<p>hydraulic, mechanical and environmental conditions found globally in wastewater transport and treatment systems and their components...")</p> <p>Further, note the similarities between the Introductions of the ISO TC224 WG10 Technical Report ("provide the basis for wastewater services to delineate the qualities and characteristics of discharges to the wastewater system.") the Purpose of the IWSFG Standard ("criteria for the quality and characteristics of product that may be disposed via the toilet.")</p> <p>Further note there exist common technical details between the ISO TR ("The current practice of using 6 mm perforated plate screens appears to have optimized the mechanical condition of screening inlet works at treatment plants") and the IWSFG documents ("Then the content of the beaker is poured onto a 6.3 mm perforated sieve to confirm its disintegration."). Further examples exist of identical technical details in both the ISO TR ("the Technical Report recommends that designs for grill or pump encounters under continuously flowing conditions should be 2 hours.") and with corresponding language from the IWSFG documents ("Place a single preconditioned test specimen into each box, place lids on the boxes and oscillate the mixture for 120 minutes.").</p> <p>Copyright issues notwithstanding, note that the work of the ISO group is in draft form, and the process has not resulted in consensus agreement among the participating experts.</p>	<p>IWSFG and ISO documents.</p> <p>Provide copies of any relevant communication with external (non-IWSFG) stakeholders, where content of the IWSFG Standard and PAS tests is licensed or otherwise allowed or condoned.</p>	
PG	4		Paragraph	Ge	<p>Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to "a wide range of stakeholders." From BSI</p>	<p>In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.</p>	

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					( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders."		
PG	4			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	6-7		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner."	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	
PG	16		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO	

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					the Scope of the ISO TC224 WG10 TR.	are the rightful copyright owners.	
PG	16		Forward [sic]	Ge	<p>Sentence describing wastewater services is hyperbole.</p> <p>Expectations of the IWSFG are irrelevant to the document.</p>	<p>Delete the following sentence: "Wastewater services are organizations acting for the public good as a public service. The group expects the manufacturers and distributors of their products to act in a socially responsible and environmentally sustainable manner by adhering to the established standards."</p> <p>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 environmentally sustainable operation by wastewater services.</p> <p>Note to entry:</p> <p>"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." (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a>). "Opponents argue that the blending ban raises costs for wastewater utilities." (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a>)</p>	
PG	82-85	1	Introduction	Ge	Hyperbole. Wastewater services operate wastewater infrastructure. As noted in comments regarding Line 16, wastewater services also undertake actions that have economic drivers that are neither for the public good, nor to protect the	Revise to read: "Wastewater services operate wastewater infrastructure."	

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					environment. Wastewater services operate wastewater infrastructure within budgetary and technological, not ideological, frameworks.		
PG	89-92	1	Introduction	Te	Example is vague and only tangentially related to the issues currently faced by wastewater utilities.	Delete and replace with an estimate of annual costs associated with maintenance, rehabilitation and replacement of wastewater infrastructure (i.e., an actual sewer system and wastewater treatment plant).  If retained, provide a reference to the source of the data for the calculation(s) utilized for determining the replacement value.	
PG	89-92	1	Introduction	Te	IWSFG Standard contains no details or evidence of impacts to wastewater infrastructure caused by flushable wipes.  Note to Entry. An independent collection study conducted on behalf of the New York City Department of Environmental Protection and the New York City Law Department determined that less than 2% of materials recovered from the sewer were determined to be flushable wipes.  Note to Entry. The collection study was conducted by independent consultants utilizing a procedure developed by the National Association of Clean Water Agencies (NACWA). Despite the use of NACWA protocol, the CEO of NACWA disparaged the study in a June 22, 2017 letter, providing no evidence for his derision, writing that “this study is an unreliable representation of the situation in sewer systems in D.C. and nationwide... The study consisted of an analysis of only two 5-gallon buckets of materials.” It is emphasized that this criticism from NACWA is puzzling, as it is directed at a study conducted in accordance with a protocol developed by NACWA.  Note to Entry. The letter goes on to state that the	Members of the IWSFG have claimed in testimony that damages resulting from wipes cost utilities of up to \$1 billion dollars annually.  Provide a detailed cost analysis of this estimate, including all sources of values utilized in calculations. Further, based on forensics and associated data, provide the costs specifically attributable to flushable wipes.	

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					<p>study was “conducted after two days of heavy rainfall, which likely washed additional trash into [the] system.” This is an incorrect, and unscientific interpretation of how trash is transported during rainfall events in general, and the precipitation leading up to the collection study, in particular. First, heavy rainfall would <i>clear</i> the sewer of trash, due to a phenomenon referred to as a “first flush.” Were the rainfall to have been heavy, as described in the letter, a significant majority of the trash and other materials in the sewer would have been transported to the Wards Island pumping stations (or discharged to a receiving water body via a combined sewer overflow) well in advance of the collection study. Importantly, the precipitation in the two days preceding the collection was not “heavy.” In fact, evaluation of the rainfall in the days leading up to the collection study reveals that the storms were low-intensity- all having return frequencies of less than one-year (i.e., typical, not heavy precipitation). Precipitation in New York City on February 16<sup>th</sup> ended at approximately 4PM, or 14 hours before the Collection Study began on February 17<sup>th</sup>. Therefore, based on comparison to historic records, it can be concluded that flow would have returned to baseline levels during the evening hours of February 16<sup>th</sup>, well before the Collection Study. As a result, the materials collected, including trash on February 17<sup>th</sup>, represents typical loading to the New York City sewer system, unaffected by the precipitation. Further, it should be emphasized that the amount of trash in the sewer would in no way impact the number of flushable wipes present or recovered.</p> <p>Note to entry: The following table provides a comparison of the rainfall intensity on February 16, 2016 (the day before the Collection Study) to National Oceanic</p>		

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					<p>and Atmospheric Administration storm return frequencies (i.e., 100-year storm). As shown, the rainfall was of low intensity when compared to 5-minute, 1-hour and 2-hour maximum intensities:</p> <table border="1"> <thead> <tr> <th>Rainfall Intensity (in)</th> <th>February 16, 2016*</th> <th>1-year storm<sup>@</sup></th> <th>2-year storm<sup>@</sup></th> </tr> </thead> <tbody> <tr> <td>5-minute maximum (in)</td> <td>0.15**</td> <td>0.354</td> <td>0.424</td> </tr> <tr> <td>1-hour maximum (in)</td> <td>0.58</td> <td>1.07</td> <td>1.28</td> </tr> <tr> <td>2-hour maximum (in)</td> <td>0.86</td> <td>1.43</td> <td>1.69</td> </tr> </tbody> </table> <p>* - Weather History for KNYC- February, 2016; <a href="https://www.wunderground.com/history/airport/KNYC">https://www.wunderground.com/history/airport/KNYC</a>  ** - Weather History for KLGA- February, 2016; <a href="https://www.wunderground.com/history/airport/KLGA">https://www.wunderground.com/history/airport/KLGA</a>  <sup>@</sup> - National Oceanic and Atmospheric Administration – National Weather Service; Hydrometeorological Design Studies Center; Precipitation Frequency Data Server; NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: NY</p> <p>Note to Entry:  Further evaluation of the rainfall on February 16, 2016 is possible through comparison to previously recorded rainfall in New York City- specifically, use of data from a rainfall event recorded on June 2, 1996 at the Manhattan Pump Station (available in the <i>Landside Modeling Report, Volume 6; Newtown Creek WPCP; Final</i>; The City of New York, Department of Environmental Protection, Bureau of Engineering Design &amp; Construction; October 2007;</p>	Rainfall Intensity (in)	February 16, 2016*	1-year storm <sup>@</sup>	2-year storm <sup>@</sup>	5-minute maximum (in)	0.15**	0.354	0.424	1-hour maximum (in)	0.58	1.07	1.28	2-hour maximum (in)	0.86	1.43	1.69		
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					<p>Page 4-49). Note that on June 2, 1996, despite a rainfall event that was three-times larger than the rainfall on February 16, 2016, baseline flow resumed after 8 hours. <b>Therefore, it can be concluded that flow during the February 17, 2016 collection study was at or near baseline conditions.</b> This is confirmed by the information provided by NYCDEP, which determined that flow during the collection study was nominally higher (~7%) versus flow recorded the previous week.</p> <table border="1"> <thead> <tr> <th>Metric</th> <th>June 2, 1996</th> <th>February 16, 2016</th> </tr> </thead> <tbody> <tr> <td>Rainfall Total (in)</td> <td>3.1</td> <td>1.02</td> </tr> <tr> <td>Rainfall Duration (hr)</td> <td>11</td> <td>2</td> </tr> <tr> <td>Peak Rainfall (in/hr)</td> <td>0.43</td> <td>0.58</td> </tr> <tr> <td>Rainfall Average (in/hr)</td> <td>0.12</td> <td>0.4</td> </tr> </tbody> </table>	Metric	June 2, 1996	February 16, 2016	Rainfall Total (in)	3.1	1.02	Rainfall Duration (hr)	11	2	Peak Rainfall (in/hr)	0.43	0.58	Rainfall Average (in/hr)	0.12	0.4		
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PG	89-92	1	Introduction	Te	<p>Example is vague and only tangentially related to the issues currently faced by wastewater utilities.</p> <p>All available evidence from collection studies and system monitoring has demonstrated that flushable wipes are compatible with infrastructure.</p>	<p>Provide data detailing impacts to wastewater infrastructure caused by flushable wipes.</p> <p>Alternatively, provide references to available collection studies and/or operations and maintenance costs over a period of 15 years (the relevant timeframe as noted in Line 94) that demonstrates impact known to have resulted from flushable wipes.</p>																
PG	93-96	1	Introduction	Te	Vague	Provide data regarding the hygiene products market on which this statement is based.																
PG	97-98	1	Introduction	Te	Incorrect. The toilet is a disposal unit. The issue to be addressed is the improper disposal of products neither designed, marketed or intended to be	Delete.																

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					flushed.		
PG	99-101	1	Introduction	Te	Hyperbole. Sewers are designed to transport solids along with wastewater. This language in Lines 99-101 appears to attempt to claim that sewers are incapable of processing and treating any “additional” products, thereby implying that sewers have a design limit for the quantity of products they can convey- this is incorrect and not supported by standard sewer design.  Sewers and treatment plants are limited in their hydraulic capacity, and treatment plants are further limited with respect to loading of organic material.	Provide references to sewer design and/or studies that establishes the upper limit of solids a sewer is designed to convey, and additionally supports the claim that wastewater infrastructure is not “capable of handling these additional “flushed” products.”	
PG	107-110	1	Introduction	Te	Assertions are vague, unreferenced and unsupported. Anecdotal.	Provide reference to data supporting the implication of impacts to the aquatic environment and biosolids directly attributable to flushable wipes.  Further, provide reference to data supporting the compatibility of cellulose with the aquatic environment and biosolids.	
PG	107-110	1	Introduction	Te	Lacks appropriate details and references.	Provide references to sources/data containing the rate of the breakdown of “natural cellulose products” in wastewater treatment plants and various receiving environments.	
PG	107-110	1	Introduction	Te	Clarification necessary.	Confirm that the IWSFG has determined that “natural cellulose products, chemicals, fragrances and bonding agents” do not impact collection and treatment systems, and do not adversely affect either the aquatic environment, or land to which biosolids are applied.  Provide all data and references on which these determinations are based. Note if these are risk-based determinations.	
PG	114-115	2	Purpose	Te	Overlap of language between IWSFG Standard and ISO TC224 WG10 Technical Report.	Provide an explanation for the similarities between the language in the IWSFG standard 1 and the	

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						ISO TC224 WG10 Technical Report documents seeking to establish “criteria for the quality and characteristics of products.”  Further, declare IWSFG’s understanding if that phrase is the intellectual property of ISO or the IWSFG.	
PG	119	2	Purpose	Te	Vague. As defined, wastewater services refers to “services provided by wastewater utilities acting for the public good as a public service.” This implies acceptability to an entity or persons, and it is noted that the concept of what is acceptable to a person or group of persons can change over time or be biased by any number of factors, and is therefore an unscientific and inappropriate metric for establishing a testing framework.  Note to Entry: Lines 200-201 provide a relevant example, where “what is acceptable to wastewater services” has changed with regard to flushability. In 2013, wastewater stakeholders, including members of the IWSFG, actively sought to prevent the use of the word “disintegration” in industry guidelines, instead actively lobbying for the inclusion of the term “dispersibility.” Yet, despite this previous position, IWSFG standard 1 contains the following language: “Note: The International Wastewater Services Flushability Group does not recognize euphemisms such as “dispersible.” This shift in what is “acceptable to wastewater services” clearly demonstrates why defining acceptability based on the opinion of a collective of individuals is inappropriate, as positions and opinions change over time.	Provide specific data and related analyses describing how the “limits of what is acceptable to wastewater services” relate to compatibility with wastewater infrastructure.	
PG	119	2	Purpose	Te	Vague.  Note to Entry: The IWSFG has provided no details regarding the process utilized to establish baseline performance. Specifically, no data regarding the	Remove reference to “wastewater services.”  Revise to read: “limits of what is compatible with the wastewater system.”	

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					<p>performance of toilet paper in the PAS tests 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 toilet paper performance is required for infrastructure compatibility were provided for review. Provide reference to information that details how toilet paper performance, as measured via the PAS tests and correlated to operations and maintenance data for wastewater systems, is required to ensure compatibility with wastewater infrastructure. Without such documentation, IWSFG Standard 1 is a collection of unproven assumptions and untested hypotheses. As such, a thorough and complete review of the IWSFG Standard 1 cannot be conducted without access to relevant test results/data utilized to establish toilet paper as the benchmark in the IWSFG PAS tests.</p> <p>Note to Entry: Specifically with regards to the performance of toilet paper, the anecdotal performance of toilet paper is insufficient information for establishing a benchmark for testing. The assertion that “Since toilet papers historically have not caused clogging, or plugging, problems in wastewater systems” is vague and unsupported by any scientific data or reference, and therefore is unacceptable as the basis for establishing a benchmark for performance. Data establishing how toilet paper performance relates to infrastructure compatibility has not been provided, and as such, there is no evidence available to place toilet paper performance in context.</p> <p>Note to Entry: Provide details of benchmarking conducted, specifically the methodology utilized. See definition from <i>ISO 17258:2015(E) Statistical methods — Six Sigma — Basic criteria underlying</i></p>	<p>Provide the scientific basis for the establishment of the “limits of what is acceptable” to wastewater infrastructure (the wastewater system, as defined in the IWSFG documents) based on laboratory results of the benchmark materials using the IWSFG PAS tests.</p>	

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					<p><i>benchmarking for Six Sigma in organisations</i>; First edition; 2015-01-15 (emphasis added):</p> <p>“Benchmarking is frequently used in various domains in connection with business activities. The Six Sigma methodology requires an evaluation step using a benchmarking process. In other words, a method for the comparison of levels of quality, performance, and productivity with the state-of-the-art is required. This International Standard establishes what to compare and develops a methodology to conduct a correct comparison between an organization’s levels of quality, performance, and productivity.</p> <p>The numbers given by the benchmarking can be integrated into any improvement programme to quantify any progress. They can also be used by other assessment processes in the organization such as regulation compliancy or financial performance evaluation.</p> <p><b>Benchmarking is the whole process of collecting and processing data and information and comparing the results. The benchmark is the reference point for comparison.</b></p> <p><b>The main point of this benchmarking methodology, based on transparency and the universal principle of evaluation, is to give confidence to its calculating procedures and the results, so that comparisons between organizations are accepted by all parties.”</b></p>		
PG	121	2	Purpose	Te	The goal and/or purpose of the IWSFG, as contained in IWSFG Standard 1 is to (emphasis added): “...identify those products that do not meet these <b>test standards</b> ,” implying that the PAS documents are “test standards.”	Clarify the nature of the PAS documents as “test standards” or as “Publicly Available Specifications.”	
PG	123-124	2	Purpose	Te	This document is not a “Standard”	Revise to “guideline” or similar.	

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PG	131-133	3	Scope	Te	Vague.	Clarify if toilet paper is included in the Scope	
PG	134-135	3	Scope	Te	Incomplete. Vague.	Provide a list of all third-party ISO-accredited laboratories currently conducting the PAS tests.	
PG	134-135	3	Scope	Te	Incomplete. Vague.	Provide a list of all third-party ISO-accredited laboratories that participated in the development of IWSFG Standard 1.  Share summaries of relevant results from laboratory tests used to establish benchmark performance for the IWSFG Standard 1.  Share testing to establish benchmarks for toilet paper, Japanese wipes and Spanish wipes.	
PG	146	4	Normative References	Te	Incomplete. Vague.	Provide a list of all third-party ISO-accredited laboratories that participated in the development of IWSFG Standard 1.  Share summaries of relevant results from laboratory tests used to establish benchmark performance for the IWSFG Standard 1; in particular, testing to establish benchmarks for toilet paper, Japanese wipes and Spanish wipes.	
PG	146	4	Normative References	Te	Incomplete. Vague.	Clarify if a second PAS-2A, entitled PAS-2A(UK) exists.  If so, provide the document for public comment.	
PG	160-161	6.1	Critical Criteria	Te	Vague. Insufficient details regarding use of toilet paper for establishing benchmark performance as noted in Lines 105-107 of PAS-3A: "...the IWSFG has benchmarked its tests for flushability to toilet paper performance..."	Revise the language in Lines 160-161 to clearly describe the process undertaken to benchmark the tests using toilet paper.  Clarify if the purpose of the IWSFG Standard and associated PASs is to establish test methods for the evaluation of toilet paper.	
PG	161	6.1	Critical Criteria	Te	Vague. As defined, "wastewater services" refers to "services provided by wastewater utilities acting for the public good as a public service."	Revise paragraph to focus on compatibility with wastewater infrastructure, or the "wastewater system" not "wastewater services."	

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PG	168	6.1	Critical Criteria	Te	Vague. The IWSFG has neither the expertise nor the authority to set global criteria for the protection of human health.	Clarify if the term "health" refers to human health.  Clarify by what means the IWSFG has the expertise or the authority to set global criteria for the protection of human health.	
PG	168	6.1	Critical Criteria	Te	The IWSFG has neither the expertise nor the authority to set global criteria for environmental protection.  Note that wastewater services are regulated by various authorities (the United States Environmental Protection Agency, for example) that set criteria for environmental protection. This is confirmed by the statement from the Lines 227-231, which reads: "Any product including any components thereof or substances (such as bonding agents and lotions) used within or on the product that are banned for environmental and human health reasons by the national legislation of a country where the product is to be marketed, is NOT FLUSHABLE by this standard."	Delete  Related, delete PAS-1.  If Lines 168 and PAS-2 are retained, clarify by what means the IWSFG has the expertise or the authority to set global criteria for the protection of the environment.	
PG	175-176	6.1	Critical Criteria	Te	Contradictory. Section 6.2 states that only one of the disintegration tests must be passed. As such, the statement, "Failure to meet any of the critical criteria as shown in section 6.2 means that the product will not be recognized by wastewater services as being flushable..." is incorrect and misleading.	Revise to state that a product can fail to meet the critical criteria for two IWSFG PAS tests and still be recognized as flushable by IWSFG.	
PG	184-187	6.3	Conformity Assessment	Te	Clarify. IWSFG Standard 1 contains the following: "The conformity assessment and certification of flushable products shall be undertaken only by third party processes, provided by organizations accredited to ISO/IEC 17025:2005 <i>General requirements for the competence of testing and calibration laboratories.</i> "	Confirm that all testing conducted for the development of IWSFG Standard 1 was done by laboratories accredited to ISO/IEC 17025:2005.	
PG	184-187	6.3	Conformity Assessment	Te	Clarify. IWSFG Standard 1 contains the following: "The conformity assessment and certification of flushable products shall be undertaken only by third	Provide the results of all testing conducted for development of benchmarks for IWSFG Standard 1 done by laboratories accredited to ISO/IEC	

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			t		party processes, provided by organizations accredited to ISO/IEC 17025:2005 <i>General requirements for the competence of testing and calibration laboratories.</i> "	17025:2005. Provide all details of all experiments to allow for independent verification of the benchmarking tests. This will facilitate testing to verify the reproducibility and reliability of the tests for evaluating toilet paper as a benchmark.	
PG	200-201	6.4.1	Conforming Products	Te	Vague.	Confirm that all members of the IWSFG consider the term "disintegrate" to be the appropriate term to describe the process by which products break apart in a sewer, and do not recognize the term "disperse."	
PG	203-204	6.4.2	Non-Conforming Products	Te	The IWSFG document is not a Standard, as the documents (IWSFG Standard 1 and the PASs) were not developed as part of a standards development process. As such, there is no conformance requirements, nor labeling requirements.	Delete "shall" and similar language. Revise to indicate that these are suggestions.	
PG	233	7.1.2	Plastics	Te	Vague and undefined.	Define "plastic material"	
PG	233	7.1.2	Plastics	Te	Contradictory. IWSFG standard 1 provides no provisions for a product that contains a "plastic" the meets the critical criteria (Section 6.2) for all IWSFG tests.  Note to Entry: From <i>PLA and PHA Biodegradation in the Marine Environment</i> ; California Department of Resources Recycling and Recovery; March 2012 (emphasis added):  "The California Department of Toxic Substances Control and California Department of Resources Recycling and Recovery (CalRecycle) initiated a research study with the California State University Chico Research Foundation to understand the biodegradation of polylactic acid (PLA) and polyhydroxyalkanoate (PHA) in the marine	Provide the rationale for declaring that a product that contains any "plastic" would not be suitable for flushing even if it meets the critical criteria for all IWSFG tests.  Further, provide the rationale for not allowing any "plastic" that biodegrades at a rate equal to cellulose.	

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					<p>environment and to study any chemical intermediates that might be released during biodegradation.</p> <p>The research goals were to determine the fate and persistence of PLA and PHA bioplastics during biodegradation in the marine environment. Tests were conducted per American Society of Testing and Materials (ASTM) standards for biodegradation specification and test method in the marine environment. In this study, we evaluated the biodegradation of PHA and PLA plastic samples in a simulated marine environment and conducted several tests to identify any stable hazardous byproducts of biodegradation.</p> <p>ASTM standards require testing of plastic samples in a simulated marine environment for six months while at 30C. The specified temperature in the ASTM test method is warmer than representative ocean temperatures along the California coast. After six months of testing, results showed that 38 percent and 45 percent, respectively, of two PHA samples and 38 percent of cellulose sample (positive control) biodegraded into carbon dioxide. Only 3 percent of the PLA sample and 3 percent of polyethylene plastic bag (negative control) biodegraded into carbon dioxide.</p> <p>Although not required by ASTM, the biodegradation testing was extended from six months to 12 months in this study so we could understand the behavior of PHA and PLA after extended periods in ocean water. After 12 months, the biodegradation results show that 52 percent and 82 percent of two PHA samples and 52 percent of cellulose sample (positive control) biodegraded into carbon dioxide. Also, after 12 months of testing, 8 percent of the PLA sample and 6 percent of the low density</p>		

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					<p>polyethylene (LDPE) plastic bag (negative control) biodegraded into carbon dioxide. Neither PLA nor polyethylene claim to biodegrade in the marine environment. These two plastics were used for comparison with PHA marine biodegradable plastics.</p> <p><b>Thus, PHA samples biodegraded in a similar manner as cellulose in the marine environment and at a higher rate than PLA.”</b></p> <p>Note to Entry. It is acknowledged by the authors of the report that the temperature of the ASTM method exceeds that of ocean water in Southern California. This does not make the test or test result invalid. On the contrary, it is noted that all materials were tested at the same temperature, so that direct comparison of PLA and PHA to cellulose is possible despite the higher temperature.</p>		
PG	233-234	7.1.2	Plastics	Te	Incomplete.	Provide an accepted amount of plastic that is not intentionally added to the product, recognizing the likelihood of contamination during sample acquisition and testing. Provide appropriate references.	
PG	232-257	7.1.2 – 7.1.4	Plastics, Regenerate d Cellulose, and Other Materials	Te	The language contained in lines 227-231 represents the extent to which the IWSFG can address Safety in the Environment and Human Health; specifically, the IWSFG can point to existing national regulations.	<p>Refer to any other information provided by the IWSFG regarding safety in the environment and human health as IWSFG's opinion or recommendation.</p> <p>If language is retained provide references. See comments below regarding Lines 238-254 regarding current references.</p>	
PG	235-254	7.1.3	Regenerate d Cellulose	Te	Unsupported. Laboratory test results (using both the INDA/EDANA FG-505A and OECD 301B tests) and field testing results for substrates containing regenerated cellulose have consistently demonstrated that regenerated cellulose degrades biologically at a rate similar to, and at times	<p>Delete.</p> <p>If retained, provide the results of laboratory testing conducted by, or on behalf of the IWSFG that shows regenerated cellulose does not degrade biologically.</p>	

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					<p>exceeding, the rate of the degradation of pulp fibers. This is further supported by references in the literature to the biological degradation of regenerated cellulose under various conditions. This evidence contradicts the entire premise of the IWSFG position on regenerated cellulose.</p> <p>Note to Entry: The presence of fibers assumed to be regenerated cellulose from field samples is not evidence that regenerated cellulose cannot be degraded biologically. Insufficient information regarding the fibers observed is available to make such a determination. Note that nearly all of the fibers recovered in published studies have been dyed various colors, indicating that the fibers, regardless of their composition, likely originated from clothing, and not from wipes of any kind.</p> <p>Note to Entry: There is no evidence that regenerated cellulose “is of increasing concern due to their potential take-up in the food chain” as noted in PAS-0. In fact, the Reference (#2) cited in PAS-0 to prove this point contains the exact opposite conclusions. Specifically, the following conclusions were reached by the authors of Reference #2 (and Reference #53 within Reference #2):</p> <ol style="list-style-type: none"> <li>1. <b>The [viscose] fibers are quickly evacuated through normal digestion processes by the invertebrates.</b></li> <li>2. <b>The viscose fibers are not transmitted from lower to higher trophic levels.</b></li> <li>3. <b>Viscose fibers are digestible and degradable. This favors nonaccumulation or transmission</b></li> <li>4. <b>Viscose fibers have been shown to biodegrade under a range of tests and conditions.</b></li> </ol>		

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					5. <b>Rayon fibers, which have a low crystallinity and a low degree of orientation, showed the highest biodegradability in most cases, compared to cotton, including in an activated sewage sludge test.</b>		
PG	256	7.1.4	Other materials	Te	Contradictory	Provide IWSFG's position on the use of minerals (including clay) in cosmetics and cleansers that go down the drain via the sink.	
PG	261-270	7.2	Criteria Two: Toilet and Drain Line Clearance	Te	Contradictory	The acceptance criteria is contradicted in multiple locations within both PAS-2A and PAS-2B.	
PG	278-288	7.2.3	Drain Line clearance – Snagging	Te	PAS-2C was deemed inadequate for inclusion in IWSFG Standard 1.	Delete. If Lines 278-288 are retained, change the phrase from "To be acceptable" to "It is suggested."	
PG	293-294	7.3	Criterion Three: Disintegration	Te	Contradicts Lines 175-177 from Section 6.1	Revise to read "a flushable product can fail two of the three disintegration tests and still qualify as a flushable product per the IWSFG."	
PG	290-354	7.3	Criterion Three: Disintegration	Te	Eliminate duplicate criteria for disintegration tests.	For all disintegration methods, select a single pass criteria.	
PG	290-354	7.3	Criterion Three: Disintegration	Te	Proposed criteria lack appropriate justification and are unsupported.	Delete.	
PG	292-294	7.3	Criterion Three: Disintegration	Te	The PAS-3 series tests do not "set out... maximum fragment size." Clarify the maximum fragment size proposed by IWSFG for disintegration.  Attached below is a photograph of a one-ply toilet	Clarify or delete. If no maximum fragment size is provided, delete Lines 292-294.  If this "maximum fragment size" differs from the 6.3mm endpoint required in the PAS test methods, provide an explanation, including the results of	

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					<p>paper after 30 minutes in the PAS-3B slosh box test.</p> <p>Per PAS-3B, this sample was pre-conditioned and as such this photograph represents the condition of the toilet paper after being flushed through a toilet, transit through a 24-meter drainline, sitting in room temperature tap water for 15 minutes, and 30 minutes of agitation in room temperature tap water in the slosh box.</p>  <p>Note that based on the 1" x 1" grid drawn on the bottom of the slosh box there are a number of pieces of the substrate that have dimensions larger than 1" and are larger than 1" x 1" square.</p> <p>After 2 hours, the average percentage (n=3) of the</p>	<p>laboratory testing that were used to establish the relationship between "maximum fragment size" and the 6.3mm endpoint of the PAS-3 series tests.</p> <p>Provide the results of laboratory testing for all materials (including but not limited to toilet paper, wipes labeled as flushable and baby wipes) that were used to establish the relationship between "maximum fragment size" and the 6.3mm endpoint of the PAS-3 series tests.</p> <p>Based on testing using the PAS-3 series tests, the methods and the currently proposed acceptance criteria are inappropriate and require revision.</p> <p>Conduct an appropriate interlab testing program utilizing a range of products.</p> <p>Once complete, establish relationships between laboratory test method results and infrastructure compatibility issues experienced based on field studies and documented issues to determine appropriate test conditions and acceptance criteria.</p>	

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					<p>initial dry weight of the sample passing the 6.3 millimeter sieve specified by PAS-3B was 79%.</p> <p><b>Therefore, based on the proposed PAS-3B acceptance criteria, this substrate (again, a single-ply toilet paper) would not be considered flushable in accordance with the IWSFG.</b></p> <p><b>In conclusion, based on the results of testing to evaluate the applicability of PAS-3B, the PAS-3B test should be withdrawn and critically reviewed before publishing for use.</b></p>		
PG	292-294	7.3	Criterion Three: Disintegration	Te	<p>Independent laboratory testing of multiple toilet paper samples was conducted at three laboratories to evaluate interlab variability of the proposed PAS-3 series tests.</p> <p>Five toilet papers were tested using the three PAS-3 series tests.</p> <p><b>Results:</b></p> <ol style="list-style-type: none"> <li><b>Three of five toilet papers tested did not meet the acceptance criteria for all three PAS-3 series disintegration tests.</b></li> <li>Two of the three samples tested failed to meet the proposed acceptance criteria across all three laboratories, but did meet the acceptance criteria at one laboratory in one test. <b>In summary, two substrates that failed to meet the proposed acceptance criteria for eight of nine tests conducted across three laboratories would, according to Section 7.3, be flushable.</b> Put another way, two substrates that failed to meet the proposed acceptance criteria in 89% of tests conducted would meet the IWSFG criteria for dispersibility.</li> </ol>	<p>Based on an inter-lab evaluation of the PAS-3 series disintegration tests, the tests give inconsistent results across laboratories, and therefore are not suitable for publication as written- both the methods and the currently proposed acceptance criteria must be revised.</p> <p>Conduct an appropriate interlab testing program utilizing a range of products.</p> <p>Once complete, establish relationships between laboratory test method results and infrastructure compatibility issues experienced based on field studies and documented issues to determine appropriate test conditions and acceptance criteria.</p>	

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PG	387-419	7.5.1 7.5.2	Aerobic Biodisintegr ation  Anaerobic Biodisintegr ation	Te	No evidence provided supporting replacement of the 1mm sieve with a 600-micron sieve for PAS-5A and PAS-5B for evaluation of products, in particular for establishing benchmark performance of toilet paper.	Provide reference to laboratory testing conducted by an ISO-accredited laboratory on behalf of the IWSFG, demonstrating evidence supporting selection of a 600-micron sieve.	
PG	424-426		Bibliograph y	Te	<p>Contradictory. Reference 2 of the Bibliography (When Microplastic is Not Plastic: The Ingestion of Artificial Cellulose Fibres by Macrofauna Living in Seagrass Macrophytodebris, Environmental Science and Technology, 2015, 49, 11158-11166, American Chemical Society) contains the following conclusions, contradicting the IWSFG position on regenerated cellulose:</p> <ol style="list-style-type: none"> <li><b>The fibers are quickly evacuated through normal digestion processes by the invertebrates.</b> "Vagile P. oceanica litter macroinvertebrates show no significant seasonal, spatial, or color trends in the ingestion of viscose fibers. Even though 27% of sampled organisms contained 1 or more artificial fibers, the average amount of artificial fibers in each individual digestive tract was small (1.38 fiber) which is relatively low and could therefore indicate the small retention time of these fibers in the guts of the sampled invertebrates."</li> <li><b>The viscose fibers are not transmitted from lower to higher trophic levels.</b> "It has recently been demonstrated by in vitro studies that microplastics can be transferred in invertebrates from one trophic level to another.<sup>50,51</sup> Plastics can be translocated to consumer tissues and then be transmitted to the predator or directly be transmitted from the</li> </ol>	<p>Delete reference.</p> <p>If retained, modify text to reflect conclusions drawn in Reference #2 and associated references therein.</p>	

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					<p>consumer's digestive tract to the predator's digestive tract.<sup>51</sup> The observed viscose fibers thus do not seem to be transmitted from lower to higher trophic levels via predation.”</p> <p>3. <b>Viscose fibers are digestible and degradable. This favors nonaccuulation or transmission.</b> “One of the main possible explanations could be related to the lower retention time of the nonplastic observed fibers here in the gut. Indeed, cellulose, even of artificial origin like viscose, is more digestible and degradable<sup>52</sup> than plastic. Some marine invertebrates are known to be able to digest cellulose, and this could explain both the faster digestive transit of the fibers<sup>45–47</sup> and the absence of accumulation. The small average amount of AFs found in the invertebrates' gut contents also seems to favor this nonaccumulation or transmission.”</p> <p>4. <b>Viscose fibers have been shown to biodegrade under a range of tests and conditions.</b> “In addition, viscose fibers are known to degrade more rapidly (100% in 8 weeks) than cotton fibers, both by sunlight or in soil when buried.<sup>52–54</sup>”</p> <p>Lines 424-426. Contradictory. Further, Reference #53 (Park, C. H.; Kang, Y. K.; Im, S. S. Biodegradability of cellulose fabrics. J. Appl. Polym. Sci. 2004, 94, 248–253), which is referenced within Reference 2 of the Bibliography (When Microplastic is Not Plastic: The Ingestion of Artificial Cellulose Fibres by Macrofauna Living in Seagrass Macrophytodetritus, Environmental Science and Technology, 2015, 49, 11158-11166, American</p>		

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					<p>Chemical Society) contains the following conclusions, contradicting the IWSFG position on regenerated cellulose:</p> <ol style="list-style-type: none"> <li>1. <b>Conclusion: “Rayon fibers, which have a low crystallinity and a low degree of orientation, showed the highest biodegradability in most cases” compared to cotton, including in an activated sewage sludge test.</b></li> </ol> <p>“ABSTRACT: Biodegradability of cellulose fabrics was evaluated by use of a soil burial test, an activated sewage sludge test, and an enzyme hydrolysis. Surface changes after biodegradation were observed by optical microscopy. From X-ray diffraction analysis (XRD), changes in the crystallinities and the internal structures as a result of degradation were also investigated. It was shown that biodegradability decreased in the following order: rayon &gt; cotton &gt;&gt; acetate. Rayon fibers, which have a low crystallinity and a low degree of orientation, showed the highest biodegradability in most cases. However, in spite of its low crystallinity, acetate fibers exhibited very low biodegradability, probably because of the presence of hydrophobic groups in its structure. On the other hand, linen showed an inconsistent behavior in that it had the highest biodegradability in the soil burial test, but a lower biodegradability than that of cotton in the activated sewage sludge test. XRD analysis revealed that there was a slight increase in the crystallinity of linen, cotton, and rayon fabrics at the initial</p>		

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**IWSFG Template for Reviewer comments and IWSFG secretariat observations<sup>1</sup>**

**Document reviewed:** IWSFG Standard 1: 2017 - Criteria for recognition as a flushable product.

**Due Date:** 2017-09-01

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					stage, but a continuous decrease thereafter. From the correlation analysis, it was revealed that the biodegradability of cellulose fabrics was closely related to the moisture regain of the fibers, which reflects the hydrophilicity and internal structure of the fibers at the same time.”		
PG	436-440		Bibliography	Ge	References not cited in the document.	Delete.  If the references are retained, provide proper citations within the text.	

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PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	Per the BSI definition of the term "standard" ( <a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a> ) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify if a national or international standardization body has certified, or will certify, the IWSFG documents.	
PG	4		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	4		Paragraph	Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	6-7		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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					BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner."		
PG	13		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	13		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG	75-102	1	Introduction	Ge	Duplicate language. The Introduction is available in multiple PAS documents, and none of the content is relevant to PAS-0.	Delete.	
PG	77-78	1	Introduction	Te	Incomplete. List does not account for all subsequent pathways for wastewater treatment plant effluent. Examples indirect potable reuse and aquifer recharge.	Revise to include common pathways for wastewater treatment plant effluent	
PG	84-88	1	Introduction	Te	The statement: “The physically adverse effects of the introduction of such products to wastewater systems (clogging and plugging) have already been identified” is incorrect and misleading. No such identification of physically adverse effects from flushable wipes has been demonstrated.	Delete.  If retained, provide the results of studies demonstrating physical adverse effects (i.e., impacts to wastewater infrastructure) from flushable wipes.	
PG	84-88	1	Introduction	Te	The statement “...environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as “flushable.” is entirely speculative and anecdotal.	Delete.  If retained, provide the results of studies demonstrating environmental effects that are attributable to flushable wipes.  Note to Entry:  The conclusions of studies regarding regenerated cellulose referenced in the IWSFG documents refute the IWSFG’s position on regenerated	

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						cellulose and are not appropriate substantiation for the IWSFG's standard, PASs or positions.  If retained, modify text to reflect conclusions drawn in Reference #2 and associated references therein.	
PG	88-94	1	Introduction	Ge	<p>Significant similarities exist between ISO TC224 WG10 Technical Report and the IWSFG documents.</p> <p>For example, the introduction of ISO TC224 WG 10 TR contains: "the qualities and characteristics of discharges to the wastewater system. This should minimize disruption to their collection, transport and treatment systems..."</p> <p>IWSFG PAS-0 contains: "the qualities and characteristics of those products that may truly be considered as being "flushable"... will ultimately lead to the long-term sustainability of wastewater systems and the minimization of potential problems such as pipe blockages and equipment failures in sewer networks."</p> <p>This language appears to share a common authorship and intent.</p>	<p>Clarify the author(s) of PAS-0 and note whether this author(s) participated in the development of the ISO TC224 WG10 TR.</p> <p>Provide documentation of consent from ISO acknowledging and allowing the content of the Technical Report from ISO TC224 WG10 to be utilized as part the IWSFG documents.</p>	
PG	96	1	Introduction	Ge	<p>Contradictory. "The goal of the IWSFG is... identify those products that do not meet the established IWSFG standards." Here, the reference to "established IWSFG standards" appears to imply that the PAS documents are "standards" and not "Publicly Available Specifications."</p>	<p>Clarify if the PAS documents are "Publicly Available Specifications" or "established IWSFG standards."</p>	
PG	96	1	Introduction	Ge	<p>Vague.</p>	<p>If the PAS documents are standards, identify the national or international standards body that has certified or accredited the documents.</p> <p>If the PAS documents are Specifications, clarify if</p>	

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						the PAS were developed in conjunction with ISO or BSI.	
PG	106	1	Introduction	Ge	Contradictory use of the phrase “Publicly Available Standard.”	Clarify whether the documents are “Publicly Available Specifications” or “Publicly Available Standards.”  If the PAS documents are standards, identify the national or international standards body that has certified or accredited the documents.  If the PAS documents are Specifications, clarify if the PAS were developed in conjunction with ISO or BSI.	
PG	116-117	1	Introduction	Ge	Significant similarities exist between ISO TC224 WG10 Technical Report and the IWSFG documents.  For example, the Introduction of ISO TC224 WG 10 TR contains: “This Technical Report addresses the hydraulic, mechanical and environmental conditions found in transport and treatment systems...”  The introduction of IWSFG PAS-0 contains: “the definitions of the hydraulic, mechanical and environmental conditions within wastewater conveyance and treatment systems.”  This language appears to share a common authorship and intent.	Clarify the author(s) of PAS-0 and note whether this author(s) participated in the development of the ISO TC224 WG10 TR.  Provide documentation of consent from ISO acknowledging and allowing the content of the Technical Report from ISO TC224 WG10 to be utilized as part the IWSFG documents.	
PG	127-354	5	Definitions	Ge	Unreferenced definitions, or definitions from sources unrelated sources.	Provide appropriate, relevant references for all definitions.	
PG	127-354	5	Definitions	Te	Frequent incorrect use of the term “conditions.”  Note to Entry:  By way of example: the temperature and humidity could be used to describe the condition of the	Provide appropriate headers for defintions, noting the difference between, for example, conditions and processes.	

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					ambient air in a room. However, air conditioning and dehumidification are not “conditions” and defining them as a condition is incorrect. Similarly, the presence of microbes is an environmental condition of wastewater, while “biodisintegration” is not a “condition” but rather a process that occurs in wastewater.		
PG	194-196	5.2	Definitions	Te	Incomplete.	Define “biodegradation”	
PG	221	5.2.4	Residues	Te	Vague. It is unclear what is being defined here. Sand would be a residue from the erosion of rock, for example.	Revise with a definition and an appropriate reference.	
PG	235-238	5.3.2	Dry Tissues	Te	Reference refers to lumber	Revise with relevant reference	
PG	241-242	5.3.3	Excreta	Te	Unreferenced.	Provide reference.	
PG	245-247	5.3.4	Flushable Product	Te	Unreferenced use of definition from dictionary ( <a href="https://www.merriam-webster.com/dictionary/flushable">https://www.merriam-webster.com/dictionary/flushable</a> ).  Note appropriate definitions are included in both: Guidelines Document for Assessing the Flushability of Nonwoven Disposable Products, INDA/EDANA Editions 1, 2 and 3, 2008, 2009 and 2013 respectively; and, Protocols to Assess the Breakdown of Flushable Consumer Products, Procter & Gamble Company, Winton Hill Technical Centre, Water Environment Foundation (Co-published with IWA Publishing), 2003.	Delete “is considered suitable for disposal via a toilet and drain line to an on-site treatment system or to a wastewater collection system and a wastewater treatment system because it”.  Utilize an appropriate resource for the definition.	
PG	245-257	5.3.4	Flushable Product	Te	Vague and contradictory definitions.  Alternate definitions of the word “suitable” presented here are IWSFG’s misappropriation of the term, not actual meanings of the word, and should be noted as such.	Revise and clarify definition of “suitable.”	
PG	252-255	5.3.4	Flushable	Te	Vague and contradictory definitions.	Revise and clarify definition of “suitable.”	

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			Product		<p>Redefining the word “suitable” by IWSFG twice with such divergent language is misleading.</p> <p>“Suitable” does not mean a product that meets the criteria in IWSFG Standard 1, according to the IWSFG document, the word “Flushable” does.</p> <p>Per this definition, the word “Suitable” would be put on the labels of flushable products, not the word “flushable.”</p>		
PG	255	5.3.4	Flushable Product	Te	Contradictory. Implies that “suitable” products are any product that is contaminated with excreta. If so, then any product that is simply contaminated with excreta would be flushable, if shown to not materially adversely impact systems, and be unrecognizable in effluent, as defined herein.	Revise and clarify definition of “suitable.”	
PG	312-313	5.4.1	Acquisition	Ge	Confirm that the testing laboratory is responsible for obtaining all samples to test.	Clarify and provide guidance for how a laboratory located in North America can acquire a sample from Asia, for example.	
PG	339	5.4.6	Regenerated Cellulose	Ge	Vague and inappropriate reference.	Revise with relevant reference specific to definition.	

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PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	<p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.</p>	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify	
PG	3		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	3			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	5-12		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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PG	14		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	14		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG	36-62	1	Introduction	Ge	Duplicate language. The Introduction is available in multiple PAS documents, and none of the content is relevant to PAS-1.	Delete	
PG	37	1	Introduction	Te	Undefined term: “wastewater process systems”	Define	
PG	37	1	Introduction	Te	Vague. The statement (and Footnote 1) implies that some level of chemicals and contaminants are allowed to be discharged into the sewer but no details are provided.	Describe the process that wastewater services utilize to determine if industrial discharges “can be safely treated.”  Provide a detailed explanation of the risk-based approaches utilized globally for assessing the safety of these discharges.	
PG	39-42	1	Introduction	Te	Incomplete. The list of post-treatment pathways has significant omissions. Revise to include all relevant pathways, particularly for liquid effluent from WWTPs (indirect potable reuse, for example).	Revise.	
PG	45-50	1	Introduction	Te	The statement: “The physically adverse effects of the introduction of such products to wastewater systems (clogging and plugging) have already been identified” is incorrect and misleading. No such identification of physically adverse effects from flushable wipes has been demonstrated.	Delete.  If retained, provide the results of studies demonstrating physical adverse effects (i.e., impacts to wastewater infrastructure) from flushable wipes.	

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PG	45-50	1	Introduction	Te	The statement "...environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as "flushable"." is entirely speculative and anecdotal.	Delete.  If retained, provide the results of studies demonstrating environmental effects that are attributable to flushable wipes.  Note to Entry:  The conclusions of studies regarding regenerated cellulose referenced in the IWSFG documents refute the IWSFG's position on regenerated cellulose and are not appropriate substantiation for the IWSFG's standard, PASs or positions.  If retained, modify text to reflect conclusions drawn in Reference #2 and associated references therein.	
PG	56-59	1	Introduction	Te	Vague.	Clarify if the PAS documents are "Publicly Available Specifications" or "established IWSFG standards."	
PG	60	1	Introduction	Te	Vague.	Define "harmful" in terms of an environmental risk assessment as typically required by regulations.  Cite studies that have demonstrated harm, as defined above, to the environment as a result of regenerated cellulose.	
PG	60	1	Introduction	Te	Reference 2 contradicts the IWSFG position on regenerated cellulose in PAS-1 and throughout the IWSFG documents.	Revise utilizing the conclusions from Reference 2 (see comment to Line 61 below)	
PG	61	1	Introduction	Te	Reference 2 does not support IWSFG position. Note that Reference 2 contains conclusions that contradict the IWSFG position on regenerated cellulose.  From Reference 2 of the Bibliography (When Microplastic is Not Plastic: The Ingestion of Artificial Cellulose Fibres by Macrofauna Living in Seagrass Macrophytodebris, Environmental Science and Technology, 2015, 49, 11158-11166, American	Revise IWSFG position on regenerated cellulose utilizing the conclusions of Reference 2.	

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					<p>Chemical Society) contains the following conclusions:</p> <ol style="list-style-type: none"> <li>1. <b>The fibers are quickly evacuated through normal digestion processes by the invertebrates.</b> "Even though 27% of sampled organisms contained 1 or more artificial fibers, the average amount of artificial fibers in each individual digestive tract was small (1.38 fiber) which is relatively low and could therefore indicate the small retention time of these fibers in the guts of the sampled invertebrates."</li> <li>2. <b>The viscose fibers are not transmitted from lower to higher trophic levels.</b> "The observed viscose fibers thus do not seem to be transmitted from lower to higher trophic levels via predation."</li> <li>3. <b>Viscose fibers are digestible and degradable. This favors nonaccuulation or transmission.</b> "One of the main possible explanations could be related to the lower retention time of the nonplastic observed fibers here in the gut. Indeed, cellulose, even of artificial origin like viscose, is more digestible and degradable<sup>52</sup> than plastic. Some marine invertebrates are known to be able to digest cellulose, and this could explain both the faster digestive transit of the fibers<sup>45-47</sup> and the absence of accumulation. The small average amount of AFs found in the invertebrates' gut contents also seems to favor this nonaccumulation or transmission."</li> <li>4. <b>Viscose fibers have been shown to biodegrade under a range of tests and conditions.</b> "In addition, viscose fibers are known to degrade more rapidly (100% in 8 weeks) than cotton fibers, both by</li> </ol>		

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PG	61	1	Introduction	Te	<p>sunlight or in soil when buried.52-54”</p> <p>Reference within Reference 2 does not support IWSFG position, and contains conclusions that contradict the IWSFG position on regenerated cellulose.</p> <p>Reference #53 (Park, C. H.; Kang, Y. K.; Im, S. S. Biodegradability of cellulose fabrics. J. Appl. Polym. Sci. 2004, 94, 248-253) within Reference 2 of the Bibliography (When Microplastic is Not Plastic: The Ingestion of Artificial Cellulose Fibres by Macrofauna Living in Seagrass Macrophytodebris, Environmental Science and Technology, 2015, 49, 11158-11166, American Chemical Society) contains the following conclusions:</p> <ol style="list-style-type: none"> <li><b>Conclusion: “Rayon fibers, which have a low crystallinity and a low degree of orientation, showed the highest biodegradability in most cases” compared to cotton, including in an activated sewage sludge test.</b></li> </ol> <p>“ABSTRACT: Biodegradability of cellulose fabrics was evaluated by use of a soil burial test, an activated sewage sludge test, and an enzyme hydrolysis. Surface changes after biodegradation were observed by optical microscopy. From X-ray diffraction analysis (XRD), changes in the crystallinities and the internal structures as a result of degradation were also investigated. It was shown that biodegradability decreased in the following order: rayon &gt; cotton &gt;&gt; acetate. Rayon fibers, which have a low crystallinity and a low degree of orientation, showed the highest biodegradability in most cases. However, in spite of its low crystallinity,</p>	Revise IWSFG position on regenerated cellulose utilizing the conclusions of Reference 53 within Reference 2.	

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					acetate fibers exhibited very low biodegradability, probably because of the presence of hydrophobic groups in its structure. On the other hand, linen showed an inconsistent behavior in that it had the highest biodegradability in the soil burial test, but a lower biodegradability than that of cotton in the activated sewage sludge test. XRD analysis revealed that there was a slight increase in the crystallinity of linen, cotton, and rayon fabrics at the initial stage, but a continuous decrease thereafter. From the correlation analysis, it was revealed that the biodegradability of cellulose fabrics was closely related to the moisture regain of the fibers, which reflects the hydrophilicity and internal structure of the fibers at the same time."		
PG	64-65	2	Purpose	Te	The IWSFG has neither the expertise nor the authority to set standards for human health or the environment.  Note to Entry:  Per the EPA ( <a href="https://www.epa.gov/hw/defining-hazardous-waste-listed-characteristic-and-mixed-radiological-wastes">https://www.epa.gov/hw/defining-hazardous-waste-listed-characteristic-and-mixed-radiological-wastes</a> ), a waste is classified as having "characteristic" hazard(s) if it "exhibit[s] any one or more of the following characteristic properties: ignitability, corrosivity, reactivity or toxicity."	Provide details of the risk assessment procedure utilized by the IWSFG to determine materials that are harmful to the environment and human health.  Clarify if the IWSFG is utilizing these characteristics to determine whether a product is "harmful."	
PG	87-88	6	Principles	Te	Vague. Confirm that the intent of PAS-1 is to "reduce a product's potential to create environmental health and safety risks..."	Describe and define how the PAS reduces risk.	
PG	89-90	6	Principles	Te	IWSFG expectations are irrelevant.  The IWSFG has neither the expertise nor the	Revise to read that products should comply with all relevant environmental and health and safety standards in the country and/or region in which	

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					authority to dictate requirements in this area.	they are sold.	
PG	94-98	7.1	Applied Substances	Te	Incomplete and vague. List is incomplete, and providing a list of substances, informative or not, that “may be prohibited” is inappropriate.	Delete 97-98 and Annex 1.  Reference all relevant environmental and health and safety standards.	
PG	101-102	7.2.1	Plastic	Te	Vague.	Define plastic	
PG	101-102	7.2.1	Plastic	Te	<p>Contradictory. No provisions for a “plastic” that meets all the criteria within the IWSFG documents.</p> <p>Note to Entry:</p> <p>See example below based on testing conducted by the State of California which concluded “Thus, PHA samples biodegraded in a similar manner as cellulose in the marine environment and at a higher rate than PLA.”:</p> <p><i>From PLA and PHA Biodegradation in the Marine Environment; California Department of Resources Recycling and Recovery; March 2012 (emphasis added):</i></p> <p>“The California Department of Toxic Substances Control and California Department of Resources Recycling and Recovery (CalRecycle) initiated a research study with the California State University Chico Research Foundation to understand the biodegradation of polylactic acid (PLA) and polyhydroxyalkanoate (PHA) in the marine environment and to study any chemical intermediates that might be released during biodegradation.</p> <p>The research goals were to determine the fate and persistence of PLA and PHA bioplastics during biodegradation in the marine environment. Tests were conducted per American Society of Testing and Materials (ASTM) standards for biodegradation specification and test method in the marine</p>	<p>Provide the rationale for declaring that a product that contains any “plastic” would not be suitable for flushing even if it meets the critical criteria for all IWSFG tests.</p> <p>Provide the rationale for not allowing any “plastic” that biodegrades at a rate equal to cellulose.</p> <p>Provide a response to the study and conclusion in the Comments column.</p>	

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					<p>environment. In this study, we evaluated the biodegradation of PHA and PLA plastic samples in a simulated marine environment and conducted several tests to identify any stable hazardous byproducts of biodegradation.</p> <p>ASTM standards require testing of plastic samples in a simulated marine environment for six months while at 30C. The specified temperature in the ASTM test method is warmer than representative ocean temperatures along the California coast. After six months of testing, results showed that 38 percent and 45 percent, respectively, of two PHA samples and 38 percent of cellulose sample (positive control) biodegraded into carbon dioxide. Only 3 percent of the PLA sample and 3 percent of polyethylene plastic bag (negative control) biodegraded into carbon dioxide.</p> <p>Although not required by ASTM, the biodegradation testing was extended from six months to 12 months in this study so we could understand the behavior of PHA and PLA after extended periods in ocean water. After 12 months, the biodegradation results show that 52 percent and 82 percent of two PHA samples and 52 percent of cellulose sample (positive control) biodegraded into carbon dioxide. Also, after 12 months of testing, 8 percent of the PLA sample and 6 percent of the low density polyethylene (LDPE) plastic bag (negative control) biodegraded into carbon dioxide. Neither PLA nor polyethylene claim to biodegrade in the marine environment. These two plastics were used for comparison with PHA marine biodegradable plastics.</p> <p><b>Thus, PHA samples biodegraded in a similar manner as cellulose in the marine environment and at a higher rate than PLA."</b></p>		

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					Note to Entry. It is acknowledged by the authors of the report that the temperature of the ASTM method exceeds that of ocean water in Southern California. This does not make the test or test result invalid. On the contrary, it is noted that all materials were tested at the same temperature, so that direct comparison of PLA and PHA to cellulose is possible despite the higher temperature.		
PG	101-102	7.2.1	Plastic	Te	Vague.	Provide IWSFG's guidance on the allowable amount of plastic that is not intentionally added to the product, recognizing the potential for contamination during sample testing, as well as the limitations of proposed testing for quantitatively determining presence of materials.	
PG	106-107	7.2.2	Regenerated Cellulose Fibers	Te	<p>The following statement is unreferenced and contradicted in the literature: "The presence of microfibres in aquatic environments, which are largely believed to originate from wastewater treatment plant effluent discharges..."</p> <p>Note to entry: Recent work has concluded that wastewater treatment plant effluent is not the primary source of microfibers to the environment. For example, from: Carr, SA (San Jose Creek Water Quality Control Laboratory, Sanitation Districts of Los Angeles County, Whittier, California, USA) <i>Sources and Dispersive Modes of Micro-Fibers in the Environment</i>; Integrated Environmental Assessment and Management — Volume 13, Number 3—pp. 466–469–2017: "It was also thought that synthetic fibers and particles having dimensions &lt;5mm easily bypassed filtration and other solid separation processes at wastewater treatment plants (WWTPs) and entered oceans and surface waters. A more thorough assessment of WWTP effluent discharges indicates, however, that fiber and particulate counts do not support the belief that plants are the primary</p>	<p>Delete.</p> <p>Provide a response to each of the references cited in the Comments column.</p> <p>Alternatively, if the sentence is retained, provide appropriate references to publications that support this statement.</p>	

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					<p>vectors for fibers entering the environment.” Further, “A recent Great Lakes study has revealed that the estimate for fibers in the aquatic environments was disproportionately higher than were the concentrations found in wastewater effluent (Baldwin et al. 2016).”</p> <p>Similarly, “Synthetic clothing and textiles are known to shed MFs. An earlier study by Browne et al. (2011) found that &gt;1900 MFs were produced in wash water from a domestic washing machine in a single wash cycle. When these fiber counts were extrapolated to estimate gross discharge, the numbers did not correlate with fiber counts in WWTP final effluents. The most recent study of MF counts recovered during conventional washing of new and aged garments by Hartline et al. (2016) further supports a conclusion that other transport modes and deposition pathways for fibrous waste entering the environment are likely.” And critically (emphasis added), “There is little doubt that fibers can escape wastewater treatment. The question that warrants debate is how much of a relative impact recent plant discharge counts had or can have on existing environmental fiber loads. <b>Recent studies appear to suggest that plants may be acting more as effective sinks for fibers than as conduits. This may provide only fleeting comfort to utilities, because it is likely that concerns related to fiber disposal will be shifted from effluents to terrestrially applied biosolids, and to the containment risks of plant-isolated fibers.</b>”</p> <p>Note to Entry: Biosolids have been demonstrated to contain fibers, both natural and synthetic. These fibers are removed with a very high efficiency through traditional wastewater treatment processes and incorporated into biosolids. Those biosolids</p>		

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					<p>that are land applied then become a source of fibers to surface waters:</p> <p>Synthetic microplastics and microfibers removed from wastewater are incorporated into biosolids – this has been known since at least 1998: “The partitioning of MPs [microplastics] through the settlement processes of wastewater treatment results in the majority becoming entrained in the sewage sludge.” (from Mahon, et al.; ES&amp;T; 2016). “Synthetic fibers are abundant in sludge, sludge products, and sewage treatment plant effluents. The fibers evidently are introduced from clotheswashing machines and survive the sewage treatment process.” (from: Habib, et al.; Water, Air, and Soil Pollution; 1998)</p> <p>It is further noted that biosolids have been deemed protective of human health and the environment by the United States National Academy of Science: “the use of these materials in the production of crops for human consumption, when practiced in accordance with existing federal guidelines and regulations, presents negligible risk to the consumer, to crop production and to the environment.”</p> <p>Therefore, the presence of fibers, both natural and synthetic, cannot be unsafe, unless biosolids are unsafe. Or, natural and synthetic fibers must present negligible risk to the consumer, to crop production and to the environment, because they have said qualities in biosolids.</p>		
PG	107-108	7.2.2	Regenerated Cellulose Fibers	Te	<p>Anecdote that is contradicted by reference material.</p> <p>There is no evidence that regenerated cellulose “is of increasing concern due to their potential take-up in the food chain.” In fact, the Reference (#2) cited to prove this point contains the exact opposite</p>	<p>Delete.</p> <p>If retained, provided references supporting IWSFG position. Note that conclusions from Reference #2 refute the IWSFG position.</p>	

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					<p>conclusions. As noted above in comments for Line 61, the following conclusions were reached by the authors of Reference #2 (and Reference #53 within Reference #2):</p> <ol style="list-style-type: none"> <li>1. <b>The fibers are quickly evacuated through normal digestion processes by the invertebrates.</b></li> <li>2. <b>The viscose fibers are not transmitted from lower to higher trophic levels.</b></li> <li>3. <b>Viscose fibers are digestible and degradable. This favors nonaccumulation or transmission</b></li> <li>4. <b>Viscose fibers have been shown to biodegrade under a range of tests and conditions.</b></li> <li>5. <b>Rayon fibers, which have a low crystallinity and a low degree of orientation, showed the highest biodegradability in most cases, compared to cotton, including in an activated sewage sludge test.</b></li> </ol>		
PG	109-111	7.2.2	Regenerated Cellulose Fibers	Te	<p>Speculation and conjecture. The following statement is anecdotal and opinion: “here is apparently no reason why flushable products cannot be produced with satisfactory qualities for use and with reduced levels of this material” and beyond the reach and expertise of the IWSFG</p>	<p>Delete.</p> <p>Alternatively, if the sentence is retained, provide appropriate references to publications that support this statement.</p>	
PG	112	7.2.2	Regenerated Cellulose Fibers	Te	<p>Vague and unreferenced. It is unclear how the IWSFG determined that 20% was safe for inclusion, and the justification for the removal schedule.</p> <p>Further, it is unclear how was the rate of a 5% reduction every two years was determined.</p>	<p>Provide details of, and results from, the risk assessment conducted by the IWSFG that determined that 20% regenerated cellulose was safe for use currently.</p> <p>Provide details of, and results from, the risk assessment conducted by the IWSFG demonstrating the 5% reduction every two years is: 1. Safe, and 2. Necessary to protect the environment and human health. Note that Reference 2 contains conclusions that do not</p>	

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						support the IWSFG's position on regenerated cellulose.	
PG	124	7.2.3	Test Method	Te	Contradictory. Test is not required. Further, text implies that any product identified via the TAPPI test as "synthetic" is not flushable. This statement is mirrored in no other IWSFG documents (neither the IWSFG Standard 1, nor the PASs include any language regarding "synthetic" materials).	Delete.	
PG	122-126	7.2.3	Test Method	Te	<p>Test is not required.</p> <p>Further, text is a misinterpretation of test results. The logic utilized in this section is fundamentally flawed. TAPPI T401 does not measure a materials ability to degrade biologically. Therefore, the test report for TAPPI T401 is not a reliable source for understanding details regarding the fiber, beyond it being characterized as "synthetic."</p> <p>The term merely distinguishes between a fiber identified as "natural" (i.e., found in nature) from one that is "synthetic" (i.e., synthesized via a process).</p> <p>While regenerated cellulose is the result of a synthesis, and therefore can be described as a "synthetic," this in no way implies that regenerated cellulose's biological degradation would differ from natural cellulose, or be similar to "plastic."</p> <p>For example, glucose is "synthetic," in that it is synthesized by a plant utilizing raw materials (carbon dioxide and water). This in no way implies anything regarding glucose's inherent properties, but rather describes how it was made.</p>	Delete.	
PG	129-130	7.3	Other materials	Te	Contradictory. Note that these products are often disposed down the sink or enter the sewer pipe through natural means in vast quantities as a result of infiltration and inflow through soil and bedding materials.	<p>Provide IWSFG's position on the use of minerals (including clay) in cosmetics and cleansers. Contradictory.</p> <p>Provide IWSFG's position on the installation of sewer pipes in soil that is predominantly clay,</p>	

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						including providing details of additional safety measures taken during installation to prevent harm resulting from infiltration of clay into the sewer.  Similarly, provide IWSFG's position on the use of sand as backfill for sewer pipes, including providing details of additional safety measures taken during installation to prevent harm resulting from infiltration of sand into the sewer.	
PG	133-135	7.4	Excreta	Te	Vague.	Delete.  Alternately, provide additional details regarding how hygiene products are "considered."	
PG	137-167	7.5	Health-care Wastes	Te	Lines 137-167. Irrelevant. All categories listed in Section 7.5 are related to health care facilities and as such are irrelevant to the IWSFG documents, which per the IWSFG standard 1 are intended for manufacturers of products.  Note to entry: Regarding Section 7.5 of PAS-1 (in the context of Health-care Wastes), the categories listed below are identified as being unsuitable for discharge into wastewater infrastructure: <ol style="list-style-type: none"> <li>1. "cultures... of infectious agents."</li> <li>2. chemicals</li> <li>3. pharmaceuticals</li> <li>4. metals</li> </ol> It is noted that biosolids have been shown to contain significant quantities of all four categories expressly prohibited by Section 7.5.	Delete.  Provide the rationale utilized by IWSFG for determining that infections agents, chemicals, pharmaceuticals and metals are unsafe for disposal into wastewater infrastructure, yet are safe for the environment and human health when land-applied as biosolids.	
PG	436-440		Bibliograph y	Ge	References not cited in the document.	Delete.  If the references are retained, provide proper citations within the text.	

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**IWSFG Template for Reviewer comments and IWSFG secretariat observations<sup>1</sup>**

**Document reviewed:** IWSFG-PAS-1-Environmental-Health-and-Safety-Requirements

**Due Date:** 2017-09-01

<b>Initials</b>	<b>Line number</b> (e.g. 17)	<b>Clause/ Subclause</b> (e.g. 3.1)	<b>Paragraph/ Figure/ Table/ Table 1)</b> (e.g. Table 1)	<b>Type of comment<sup>2</sup></b>	<b>Comments</b>	<b>Proposed change</b>	<b>Observations of the secretariat</b>
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PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	<p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.</p>	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify	
PG	4		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	4			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	6-7		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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					BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner."		
PG	12		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	12		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG				Te	It is unclear from PAS-2A description if the test was designed as a real-world test.	Clarify if the PAS-2A test is a real-world test.	
PG				Te	It is unclear from PAS-2A description if the test is conducted to simulated real-world conditions.	Specify if the testing predicts real-world conditions, specifically the performance expected in consumer’s toilets and drainlines, or if PAS-2A represents a laboratory test for differentiating products based on performance under specific conditions.	
PG	52-75	1	Introduction	Ge	Duplicate language. The Introduction is available in multiple PAS documents, and none of the content is relevant to PAS-2A.	Delete	
PG	53	1	Introduction	Te	Undefined term: “wastewater process systems”	Define	
PG	53	1	Introduction	Te	Vague. The statement (and Footnote 1) implies that some level of chemicals and contaminants are allowed to be discharged into the sewer but no details are provided.	Describe the process that wastewater services utilize to determine if industrial discharges “can be safely treated.”  Provide a detailed explanation of the risk-based approaches utilized globally for assessing the safety of these discharges.	
PG	55-58	1	Introduction	Te	Incomplete. The list of post-treatment pathways has significant omissions. Revise to include all relevant pathways, particularly for liquid effluent	Revise.	

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					from WWTPs (indirect potable reuse, for example).		
PG	61-66	1	Introduction	Te	The statement: "The physically adverse effects of the introduction of such products to wastewater systems (clogging and plugging) have already been identified" is incorrect and misleading. No such identification of physically adverse effects from flushable wipes has been demonstrated.	Delete. If retained, provide the results of studies demonstrating physical adverse effects (i.e., impacts to wastewater infrastructure) from flushable wipes.	
PG	61-66	1	Introduction	Te	The statement "...environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as "flushable"." is entirely speculative and anecdotal.	Delete. If retained, provide the results of studies demonstrating environmental effects that are attributable to flushable wipes. Note to Entry: The conclusions of studies regarding regenerated cellulose referenced in the IWSFG documents refute the IWSFG's position on regenerated cellulose and are not appropriate substantiation for the IWSFG's standard, PASs or positions.	
PG	72-75	1	Introduction	Te	"The goal of the IWSFG is... identify those products that do not meet these tests." Here, the reference to "tests" contradicts the description of the PAS documents as "established IWSFG standards" in other PAS documents.	Clarify whether the PAS documents are "tests," "established IWSFG standards" or "Publicly Available Specifications."	
PG	79	2	Purpose	Te	Vague. It is unclear what mechanical forces are present within a toilet. Noting that hydraulic forces are separate from mechanical forces.	Describe the mechanism acting on the product in a toilet. Describe the force applied to the product as a result of this mechanism. Provide the units of the mechanical force.	
PG	81	2	Purpose	Te	Vague and undefined.	Define "excessive flushing"	
PG	82-83	2	Purpose	Te	Vague. It is unclear from the text of PAS-2A what percentage of typical consumer use this scenario (i.e., toileting without the use of toilet paper and/or fecal material, but the use of a product) represents.	Provide results of consumer testing has been done to justify testing of materials in the absence of toilet paper and fecal matter. Clarify if is this a rare occurrence or a common	

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						occurrence, based on available data.	
PG	84	2	Purpose	Te	Vague. This statement contradicts the Purpose of the Test, as noted in Lines 78-80, which identifies conditions that the test is meant to recreate: specifically, hydraulic and mechanical forces when a product is flushed through a toilet.	Provide an explanation for how the test is "proposed for general application globally."	
PG	86	3	Scope	Te	Contradictory use of the phrases "Publicly Available Specification" and "standard." From Line 96 of PAS-1: "The goal of the IWSFG is... identify those products that do not meet the established IWSFG standards." Here, the reference to "IWSFG standards" appears to imply that the PAS documents are "IWSFG standards."	Clarify that the IWSFG has developed a Standard (IWSFG Standard 1:2017) that is a collection of "Publicly Available Specification" test method documents, or a collection of "Standards."  Further, clarify the Standards organization that will certify the IWSFG Standard 1 once finalized.	
PG	85-89	3	Scope	Te	Vague.	Clarify if toilet paper is within the Scope of the PAS	
PG	90	4	References	Te	Incomplete. The content of the test bears significant resemblance to existing copyrighted methods.	Provide appropriate reference and acknowledgement in this Section and throughout the document where both verbatim and paraphrased materials are utilized. Otherwise, delete content from unreferenced sources.	
PG	121	6	Principles	Te	Redundant. Restatement of Section 2 (Purpose).	Delete either	
PG	128-130	6	Principles	Te	Vague and undefined phrase "ready for transport."  Drainline transport is irrelevant to PAS-2A.	Delete.  Provide test results demonstrating the correlation between clearing the toilet and "ready for transport through a private drain line within 5 of toilet flushes."	
PG	131-134	6	Principles	Te	Contradictory.  First, the prohibition on use of wastewater represents a lack of recognition by the IWSFG of the use of wastewater (specifically "gray water") for non-potable uses in households in the United States and is a significant omission regarding current infrastructure trends. This choice by the	Delete prohibition on use of wastewater for testing.	

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					<p>IWSFG shows a lack of awareness of relevant expertise in an area in which the IWSFG is attempting to establish international standards.</p> <p>Note to Entry: the IWSFG should investigate the use of non-potable water for toilet flushing in other developed countries to ensure the PAS is suitable for “general application globally.”</p> <p>Further, and importantly, it demonstrates a missed opportunity by the IWSFG to advocate for sustainable water practices by not recognizing the increasing use of grey water from other domestic appliances for non-potable scenarios, such as toilet flushing.</p>		
PG	131-134	6	Principles	Te	Clarify IWSFG position.	If the prohibition on the use of non-potable water is retained, provide the IWSFG position on the use of “grey water” for toilet flushing.	
PG	131-134	6	Principles	Te	Clarify IWSFG position.	If the prohibition on the use of non-potable water is removed, provide the IWSFG position on the characteristics of non-potable “gray water” suitable for flushing through the toilet, including but not limited to the IWSFG position on, but not limited to, the presence of fibers from clothes washing in grey water, for example.	
PG	133-134	6	Principles	Te	Clarify. The characteristics of tap water will vary by location, and within a location by time of year, depending on the water source. The IWSFG should provide guidance on acceptable characteristics of tap water for testing.	<p>Given that the IWSFG is concerned about “inconsistency” related to wastewater, provide specific ranges of “inconsistency” between potable water aliquots that are acceptable to the IWSFG with regards to potable water for testing.</p> <p>Specifically, provide ranges of parameters, including but not limited to, pH, hardness, and temperature, deemed levels of “inconsistency” that are acceptable to IWSFG.</p>	
PG	138	7	Apparatus	Te	Clarify. Contradictory details regarding the toilet proposed for PAS-2A are included in the document.	Revise Line 138 to read that the IWSFG <b>recommends</b> using a siphonic toilet with a flush volume between 4.1L and 4.9L for this test.	

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					Line 138: "a siphonic toilet having a flushing capacity of 4.5 L ± 0.4 L"  Line 353: "It is recommended that toilets used should be certified as to conforming to the applicable national standards."	Further, revise Line 138 to note that toilets with flush volumes that fall outside of this range are still suitable for use so long as they conform to a national standard per Lines 353-354:	
PG	140	7	Apparatus	Te	Collection of the flushed material is not required by the method.	Clarify or delete.	
PG	143	7	Apparatus	Te	See comments regarding Line 131-134 with regards to water supply sources.	Clarify	
PG	153	8.1	Sample Acquisition	Te	Process for obtaining a sample is confusing.	Clarify acceptable sample acquisition processes.  For example, clarify the process a laboratory located in North America would follow for obtaining a sample from Asia.	
PG	206-221	9	Storage and Conditioning	Te	Contradictory. The test method requires samples to be utilized immediately (Line 171: "Also specimens must be removed immediately before the testing starts.").	Delete storage requirements.  If storage requirements are retained, provide an acceptable quantity of moisture absorption (for dry samples) or evaporation (for moist samples) with appropriate references for establishing threshold values for these parameters.	
PG	233-235	10.1	Summary	Te	Ancillary. Requires nominal observations of drainline locations that are not part of the requirements of the method.	Delete.	
PG	249-250	10.2	Test procedure	Te	Ancillary. Location in the drainline is irrelevant to the method and Acceptance Criteria.	Delete.	
PG	252-254	10.2	Test procedure	Te	Contradictory test details.  PAS-2A requires a 3-minute interval between toilet flushes. Note 1 of section 10.2 allows the interval to be extended to 5 minutes.	Provide the rationale for the difference in time between flushes whether the toilet is attached to a drainline or not.  Determine if a specimen that clears the toilet utilizing 5-minute periods between flushes allowed in "Note 1" but fails to clear the toilet utilizing the 3-minute periods required in the PAS-2A method meets the criteria of PAS-2A.	

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						Clarify if benchmark testing was conducted using a three-minute or a five-minute interval between flushes.	
PG	253	10.2	Test procedure	Te	Method "IWSFG 2B (UK): 2017" referenced in "Note 1" is not available on the IWSFG website, and does not appear to be available for public comment.	If Method "IWSFG 2B (UK): 2017" exists, provide a copy of the method on the IWSFG website for public comment.	
PG	262-264	10.2	Test procedure	Te	<p>Contradictory pass criteria are presented in PAS-2A. Three distinct pass criteria are included in PAS-2A.</p> <p>Note to Entry:</p> <p><b>Five Flushes</b> Lines 128-129 read in part: "The test provides evidence that the product will clear the toilet ready for transport through a private drain line within 5 of toilet flushes." This is further confirmed in lines 247-248 which read in part: "6. If any test specimen has not cleared the toilet, wait 3 minutes and repeat further empty flushes 3 minutes apart to a maximum of 5 until specimen has cleared the toilet."</p> <p><b>Two Flushes</b> The criteria of a maximum of 5 flushes is contradicted by Line 262-264 which reads in part: "If any specimen requires more than 2 flushes to clear the toilet bowl, the failure of that particular test should be noted in the test report."</p> <p><b>Three Flushes</b> Both the "5 flushes" and "2 flushes" Acceptance Criteria contradict the Acceptance Criteria provided in Section 11, which reads in part (Line 291): "a. No test sequence can require more than 3 flushes for the test specimen to clear the bowl." This requirement of "no more than 3 flushes" is repeated</p>	<p>Clarify whether 2, 3 or 5 flushes is the Acceptance Criterion for PAS-2A.</p> <p>Provide reference to all benchmarking tests done utilized to establish these Acceptance criteria.</p> <p>Further, provide the rationale for why the two Acceptance Criteria not chosen, are invalid and appropriate criteria.</p>	

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PG	273	10.2	Test procedure	Te	<p>again in Lines 287, 312 and 318.</p> <p>Note that both Lines 83 and 127 contain language that reads that the water in the toilet must not “reach or overtop the toilet rim during the process” or per Line 293 “The toilet bowl water is not surcharged up to its rim.” in order for the specimen under testing to fail the replicate.</p> <p>However, Line 273 reads that for a test where the “[s]pecimen still remains in the bowl or trap following a 3rd flush. Visual evidence of clogging (e.g. rise in water level) with insufficient capacity in the bowl to accommodate a further flush.” then “1. The specific flush test has failed.”</p>	<p>Clarify and reconcile inherent contradictions throughout PAS regarding criteria related to flushing with specimen in the toilet bowl or trap.</p> <p>Notwithstanding the contradictory Acceptance Criteria in these sections, clarify whether the water in the bowl must reach the rim in order for the test to be determined to be a failure, or if it is the responsibility of the technician to qualitatively and subjectively determine visually if there is sufficient capacity within the bowl to accommodate an additional flush that will ultimately determine if the test is a failure.</p> <p>Note to Entry: Further complicating the latter subjective procedure is the issue that it is not sufficient for the technician to merely estimate the volume of space available in the bowl, but they must also attempt to estimate the volume of water capable of exiting the toilet via the trap, and thereby reduce their estimate of the overall volume necessary in the bowl to accommodate an additional flush. Clarify.</p>	
PG	273	10.3	Test termination	Te	<p>Contradictory. PAS-2A requires that after testing “specimens contain[ing] fiber-binding chemicals” that “the surfaces shall be washed using solvents such as ethanol and methanol.”</p> <p>Note that this requirement contradicts the requirements of IWSFG PAS-1 (Environmental Health and Safety Requirements), which contains the following language in Section 7.5: lines 151-153 “chemicals: for example, solvents used for laboratory preparations...” and related: lines 162-164 “Note: None of these waste types can be flushed through toilets into the wastewater infrastructure; instead, they must be handled according to the relevant policies and regulations.”</p>	<p>Clarify the IWSFG position on use of solvents for PAS tests and disposal of solvents.</p> <p>Provide an explanation of what solvents, in what forms, and under what circumstances those solvents, are suitable for disposal into the drainline of a building according to the IWSFG.</p>	

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					<p>Per Lines 162-164 of PAS-1 (Environmental Health and Safety Requirements), solvents are not suitable for disposal into the drainlines of buildings. Or, alternatively, the IWSFG condones the disposal of solvents through a sink into the drainline of a building, however, were those solvents to be applied to a surface-cleaning wipe, for example, that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) such that it was appropriately labeled as flushable and suitable for disposal via the toilet, <b><i>the solvent would not be suitable for disposal into the drainline due to its presence on a surface-cleaning wipe.</i></b></p> <p>Further, for example, consider chlorine: "Chlorine reacts with water in and out of the body to form hydrochloric acid and hypochlorous acid. Both are extremely poisonous."  <a href="https://medlineplus.gov/ency/article/002772.htm">https://medlineplus.gov/ency/article/002772.htm</a></p> <p>Given its widespread use, the disposal of this chemical through sinks and laundry machines into drainlines is very common. Provide IWSFG's opinion whether a surface-cleaning wipe that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) but contains chlorine can be labelled as flushable. Note that such a wipe would, under many usage conditions, likely become contaminated with bodily fluids, such as typical bathroom cleaning and therefore fall within the Scope of the IWSFG Standard 1: 2017.</p>		
PG	291	11	Acceptance Criteria	Te	Contradictory. See comment to Lines 262-264 above regarding acceptance criteria.	Provide single acceptance criteria.  Provide results of benchmarking tests to establish acceptance criteria for toilet paper, or any other materials utilized in establishing PAS-2A.	

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PG	308	12	Test Report	Te	Contradictory. Test report requirement contradicts procedure details (Lines 193-202), which does not require an end-of-test confirmation of flush volume.	Revise test method.	
PG	309	12	Test Report	Te	Contradictory. No photographs required.	Delete.	
PG	315	12	Test Report	Te	Contradictory. No record keeping requirements regarding water level are specified in the method.	Delete.	
PG	345-347		Bibliography	Te	Vague	Clarify whether the Note refers only to Bibliography entry #9 or PAS-2A.	
PG	345-347		Bibliography	Te	<p>The protocol provided in PAS-2A contains significant contradictions with reference materials available on the Maximum Performance Testing website (<a href="http://www.map-testing.com/">http://www.map-testing.com/</a>) including:</p> <ol style="list-style-type: none"> <li>1. <a href="http://www.map-testing.com/assets/reports/WaterSense_Drainline_Testing_Results_07-02-20.pdf">http://www.map-testing.com/assets/reports/WaterSense_Drainline_Testing_Results_07-02-20.pdf</a> <ol style="list-style-type: none"> <li>a. Relevant excerpt regarding appropriate protocols for toilet and drainline testing:</li> </ol> </li> </ol> <p>“After reviewing the WaterSense Toilet Testing Protocol, Dr. Larry Galowin (a guest researcher with NIST), commented that he was very pleased the EPA had decided to use a realistic test media (extruded soybean paste and toilet paper) for evaluating toilet flushing performance and that the testing protocol called for a complete evacuation of the media from the fixture in a single flush. Dr. Galowin has several criticisms of current ASME A112.19.2 certification requirements that he would like to see addressed by the EPA’s WaterSense program, including:</p> <ol style="list-style-type: none"> <li>1. ASME requires toilets to evacuate only 79 percent of test media (sponges and paper wads) to pass, whereas consumers want</li> </ol>	Revise PAS-2A to align with the test design recommendations from Dr. Galowin, as quoted from reference materials available on the Maximum Performance Testing website. In particular note the focus on the use of realistic test media.	

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					<p>and expect toilets to evacuate virtually 100 percent of the waste. As such, a toilet model that leaves 20 percent of the waste behind may pass existing certification requirements but would certainly fail to meet consumer expectations.</p> <ol style="list-style-type: none"> <li>2. Flushing performance testing is completed using sponges and paper wads; drainline carry testing is completed using three-quarter-inch plastic balls. Neither test media is even vaguely realistic (i.e., similar to human feces and toilet paper) and therefore test results may not be indicative of what would be expected in the field.</li> <li>3. Totally different test media is used to evaluate flushing performance and drainline carry performance. His contention is that in the “real world” the same “media” is both flushed out of the toilet and transported through the drainline.</li> <li>4. Flushing performance testing and drainline carry testing are completed as separate tests (and with different test media). His contention is that in the “real world” waste is evacuated from the bowl <u>and</u> transported down the drainline as part of the same event. Dr. Galwin proposes that to more accurately reflect “real world” conditions toilet fixtures be connected to a length of drainline via a floor flange and turning fitting, and a passing score require a minimum mass of test media to be evacuated from the toilet <u>and</u> transported a minimum distance through the drainline.”</li> </ol>		
PG	353-354		Bibliography	Te	Contradictory. Line 138 states that the toilet required for testing is a siphonic 4.5L ± 0.4L toilet. However, per Lines 353-354 “It is recommended that toilets used should be certified as to conforming to the applicable national	<p>Confirm that toilets conforming to existing national standards are suitable for use in PAS-2A.</p> <p>Specifically, confirm that any toilet that meets any national standard is suitable for use in PAS-2A,</p>	

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**IWSFG Template for Reviewer comments and IWSFG secretariat observations<sup>1</sup>**

Document reviewed: IWSFG-PAS-2A-Toilet-Clearance-Test

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 <sup>2</sup>	Comments	Proposed change	Observations of the secretariat
					354 standards.”	regardless of flush volume. As such, the flush volume of 4.5L ± 0.4L in Line 138 is a suggestion and should be revised as such.	

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PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	<p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.</p>	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify	
PG	4		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	4			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	6-7		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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					BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner."		
PG	14		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	14		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG				Te	The testing lacks realism. It is unclear from the text of PAS-2B if the test is intended as a real-world test.	Clarify if the PAS-2B has been designed and is conducted as a real-world test.	
PG				Te	The testing lacks realism. It is unclear from the text of PAS-2B if the testing is predictive of performance of products in a consumer’s drainline.	Clarify whether, and if, the testing predicts performance expected in consumer’s toilets and drainlines, or if PAS-2B represents a laboratory test for differentiating products based on performance under specific laboratory conditions.	
PG				Te	The testing lacks realism exacerbated by the lack of inclusion of media and a realistic flushing sequence.	Provide IWSFG’s reasoning for not including test media (simulated fecal matter, for example) other than the product under testing in PAS-2B, thereby significantly reducing the realism of the test.  Further, clarify why flushing sequences that are more representative of typical usage in a household were not utilized.	
PG				Te	Additional details required.	Provide the results of all testing conducted to establish benchmarks for PAS-2B. Specifically the results of tests conducted using toilet paper to establish benchmark performance in PAS-2B.  Provide test results and associated interpretation of data demonstrating the establishment of	

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						<p>benchmarks for PAS-2B. Specifically the results of tests conducted that demonstrates the ability of PAS-2B to be utilized to differentiate between different types of toilet paper, toilet paper and flushable wipes, toilet paper and baby wipes, toilet paper and surface cleaning wipes, and any other comparison testing done in the development of PAS-2B.</p> <p>For the benchmark testing, specify if testing was conducted using PAS-2B as a stand-alone test, or if PAS-2A and PAS-2B were conducted simultaneously.</p>	
PG				Ge	Additional information required.	Provide test results from ISO-accredited laboratories that conducted test PAS-2B or PAS-2B(UK) using the drainline configuration described in PAS-2B.	
PG				Ge	Regarding Line 253 of PAS-2A, which contains the following details: "IWSFG 2B (UK): 2017" referenced in "Note 1" is not available on the IWSFG website, and does not appear to be available for public comment.	<p>If Method "IWSFG 2B (UK): 2017 exists, provide a copy of the method on the IWSFG website for public comment.</p> <p>Alternatively, provide details of differences between IWSFG 2B and IWSFG 2B (UK).</p> <p>Provide the rationale for having alternate methods. Specifically, provide the rationale for having PAS-2B and PAS-2B(UK).</p>	
PG				Ge	It's unclear to the user how to manage multiple versions of the same method.	Provide IWSFG's interpretation of a product that passes one version of IWSFG PAS-2B but not the alternate version.	
PG	53-75	1	Introduction	Ge	Duplicate language. The Introduction is available in multiple PAS documents, and none of the content is relevant to PAS-2B.	Delete	
PG	54	1	Introduction	Te	Undefined term: "wastewater process systems"	Define	
PG	54	1	Introduction	Te	Vague. The statement (and Footnote 1) implies that some level of chemicals and contaminants are	Describe the process that wastewater services utilize to determine if industrial discharges "can be	

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					allowed to be discharged into the sewer but no details are provided.	safely treated.” Provide a detailed explanation of the risk-based approaches utilized globally for assessing the safety of these discharges.	
PG	56-59	1	Introduction	Te	Incomplete. The list of post-treatment pathways has significant omissions. Revise to include all relevant pathways, particularly for liquid effluent from WWTPs (indirect potable reuse, for example).	Revise.	
PG	63-67	1	Introduction	Te	The statement: “The physically adverse effects of the introduction of such products to wastewater systems (clogging and plugging) have already been identified” is incorrect and misleading. No such identification of physically adverse effects from flushable wipes has been demonstrated.	Delete. If retained, provide the results of studies demonstrating physical adverse effects (i.e., impacts to wastewater infrastructure) from flushable wipes.	
PG	63-67	1	Introduction	Te	The statement “...environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as “flushable.” is entirely speculative and anecdotal.	Delete. If retained, provide the results of studies demonstrating environmental effects that are attributable to flushable wipes. Note to Entry: The conclusions of studies regarding regenerated cellulose referenced in the IWSFG documents refute the IWSFG’s position on regenerated cellulose and are not appropriate substantiation for the IWSFG’s standard, PASs or positions.	
PG	74	1	Introduction	Te	Vague and contradictory. Interchanging terms: “test” “IWSFG standard” and “Publicly Available Specification”	Clarify if the PAS documents are “tests,” “Publicly Available Specifications” or “established IWSFG standards.”  Clarify if a national or international standards body has certified, and thereby established the “established IWSFG standards” or the IWSFG “Publicly Available Specifications.”	
PG	79	2	Purpose	Te	Vague – lacks details of the wastewater system evaluated via conducting the PAS-2B test.	Clarify the specific portion of wastewater transport systems under evaluation in PAS-2B, and provide	

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						relevant technical details and specifications for said portions.	
PG	83	2	Purpose	Te	Vague- unclear if this test is proposed globally.	Confirm that, per Line 83, PAS-2B only applies to the United Kingdom.	
PG	83	2	Purpose	Te	Vague- unclear if this test is proposed globally.	Share test results and associated interpretation of data demonstrating the establishment of benchmarks for PAS-2B (UK).  Specifically the results of toilet paper utilized to establish benchmark performance in PAS-2B (UK).  Further, provide details for how the results of PAS-2B and PAS-2B are related.	
PG	122-123	6	Principles	Te	Methods PAS-2A and PAS-2B have contradictory test method procedures.  If a material under testing does not leave the toilet bowl and an additional flush or flushes is required, the recommendation that “toilet bowl clearance test and drain line clearance test be evaluated simultaneously” would result in an invalidation of either the PAS-2A or PAS-2B tests due to the different required times between flushes required for each method.	Clarify the appropriate method to follow if PAS-2A and PAS-2B are conducted simultaneously.  Clarify if benchmark testing was conducted using PAS-2A and PAS-2B simultaneously or separately.	
PG	124-127	6	Principles	Te	First, the prohibition on use of wastewater represents a lack of recognition by the IWSFG of the use of wastewater (specifically “gray water”) for non-potable uses in households in the United States and is a significant omission regarding current infrastructure trends. This choice by the IWSFG shows a lack of awareness of relevant expertise in an area in which the IWSFG is attempting to establish international standards.  Note to Entry: the IWSFG should investigate the use of non-potable water for toilet flushing in other developed countries to ensure the PAS is suitable	Delete prohibition on use of wastewater for testing.	

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					for “general application globally.” Further, and importantly, it demonstrates a missed opportunity by the IWSFG to advocate for sustainable water practices by not recognizing the increasing use of grey water from other domestic appliances for non-potable scenarios, such as toilet flushing.		
PG	124-127	6	Principles	Te	Clarify IWSFG position.	If the prohibition on the use of non-potable water is retained, provide the IWSFG position on the use of “grey water” for toilet flushing.	
PG	124-127	6	Principles	Te	Clarify IWSFG position.	If the prohibition on the use of non-potable water is removed, provide the IWSFG position on the characteristics of non-potable “gray water” suitable for flushing through the toilet, including but not limited to the IWSFG position on, but not limited to, the presence of fibers from clothes washing in grey water, for example.	
PG	124-127	6	Principles	Te	Clarify. The characteristics of tap water will vary by location, and within a location by time of year, depending on the water source. The IWSFG should provide guidance on acceptable characteristics of tap water for testing.	Given that the IWSFG is concerned about “inconsistency” related to wastewater, provide specific ranges of “inconsistency” between potable water aliquots that are acceptable to the IWSFG with regards to potable water for testing.  Specifically, provide ranges of parameters, including but not limited to, pH, hardness, and temperature, deemed levels of “inconsistency” that are acceptable to IWSFG.	
PG	131-136	7	Apparatus	Te	Clarify contradictions between PAS-2A and PAS-2B.	Revise Line 131, per the necessary revision of Line 138 of PAS-2A to read that the IWSFG <b>recommends</b> using a siphonic toilet with a flush volume between 4.1L and 4.9L for this test.  The recommendation notwithstanding, toilets with flush volumes that fall outside of this range are suitable for use in PAS-2A so long as they conform to a national standard per PAS-2A Lines 353-354: “It is recommended that toilets used	

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						should be certified as to conforming to the applicable national standards.”	
PG	131-136	7	Apparatus	Te	Clarify contradictions between PAS-2A and PAS-2B.	Revise Lines 132-36 of PAS-2B to read that the IWSFG <b>recommends</b> using piping of the sizes and configuration in Lines 132-136.  The recommendation notwithstanding, drainlines with configurations other than those described in Lines 132-136 are suitable for use in PAS-2B so long as they conform to a national standard per PAS-2B lines 345-346: “It is recommended that all the drain lines used should be certified as conforming to the applicable national standards.”	
PG	131-136	7	Apparatus	Te	Additional details required.	Provide a list of all ISO 17025:2005 certified labs that currently have a drainline configured per PAS-2B.  Provide test results and associated interpretation of data demonstrating the establishment of benchmarks for PAS-2B. Specifically the results of toilet paper utilized to establish benchmark performance in PAS-2B.	
PG	132-136	7	Apparatus	Te	Vague. Additional details required.	Provide the rationale for the inclusion of two ninety-degree bends, including reference to any local, state, provincial, regional and/or national plumbing codes utilized for establishing this configuration.	
PG	132	7	Apparatus	Te	Omission of material.	Provide the rationale for the exclusion of PVC as an appropriate material for the 3” portion of the drainline.	
PG	136	7	Apparatus	Te	Vague.	Define “head end.”	
PG	137	7	Apparatus	Te	Incomplete	Annex A does not contain details of the proposed test system description in Lines 132-136.	
PG	140-141	7	Apparatus	Te	Vague.	Provide additional details regarding the “transfer of	

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						the transfer the test material from the toilet used for the Toilet Clearance Test to the drain line.”  Specifically, provide the PAS Test where this procedure is utilized.	
PG	148-149	8.1	Sample Acquisition	Te	Process for obtaining a sample is confusing.	Clarify acceptable sample acquisition processes.  For example, clarify the process a laboratory located in North America would follow for obtaining a sample from Asia.	
PG	190-191	8.4	Apparatus	Te	Arbitrary value.	Provide details from appropriate references (for example, Plumbing Codes) that justify establishing a maximum vertical distance of 40cm.	
PG	202-203	8.4	Apparatus	Te	Collection of the sample at the completion of the test is neither a requirement nor necessary.	Delete.	
PG	205	8.4	Apparatus	Te	Reference to snags is incorrect.	Delete reference to snags.	
PG	207	8.4	Apparatus	Ed	Reference incorrect.	Fix or delete.	
PG	217-232	9.1	Storage of Samples	Te	Contradictory. The test method requires samples to be utilized immediately (Line 167-168: “Specimens must be removed just before the start of testing.”).	Remove storage requirements.  As an alternative, if storage requirements remain, provide the quantity of moisture absorption (for dry samples) or evaporation (for moist samples), with appropriate references for establishing threshold values for these parameters.	
PG	236-237	9.2	Conditioning for the Test	Te	Contradictory. This statement appears to indicate that conducting PAS-2A is a prerequisite for PAS-2B. This is incorrect, as PAS-2A (Lines 252-254) contains: “If the test is being carried out in association with a drain line flow test (IWSFG PAS 2B: 2017 or a IWSFG 2B (UK): 2017), the time between the flushes should be extended to 5 minutes.”	Remove statement requiring PAS-2A as a conditioning step.	
PG	242-243	10.1	Summary	Te	Contradictory. Conducting test with loading levels in accordance with manufacturer’s instructions contradicts “Unit Size” requirements in Section 5.	Address contradictions with specified appropriate loading levels.  Specify whether benchmark testing for PAS-2B	

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						was conducted using the “Unit Size” requirements or via manufacturer’s instructions.	
PG	253-254	10.2	Test procedure	Te	Contradictory. The following statement regarding the PAS-2B test protocol “With the drain line connected to the toilet used in the IWSFG PAS 2A Toilet Clearance Test, simply flush the toilet in conformity with that test.” contradicts the requirements of PAS-2A, which contains the following language (Lines 252-254): 1. If the test is being carried out in association with a drain line flow test (IWSFG PAS 2B: 2017 or a IWSFG 2B (UK): 2017), the time between the flushes should be extended to 5 minutes.”).	Revise either PAS-2A or PAS-2B to harmonize the methods.  Specify whether benchmark testing was conducted utilizing the test procedure outlined in PAS-2A or PAS-2B.	
PG	258-260	10.2	Test procedure	Te	Contradictory. The citation in PAS-2A: “252 1. If the test is being carried out in association with a drain line flow test (IWSFG PAS 2B: 2017 or a IWSFG 2B (UK): 2017), the time between the flushes should be 254 extended to 5 minutes.” contradicts Section 10 of PAS-2B, which requires 3 minute intervals. Provide the rationale for either requiring a 3 minute or 5 minute interstitial periods.	Revise either PAS-2A or PAS-2B to harmonize the methods.  Specify whether benchmark testing was conducted utilizing the test procedure outlined in PAS-2A or PAS-2B.	
PG	249-269	10.2	Test procedure	Te	Incomplete. Procedure requires significant modification to account for all possible testing outcomes, specifically related to toilet bowl clearance.  Neither the procedure nor the accompanying table include observations of the bowl, or provide direction or guidance to the operator of the test to manage variations in flushing (i.e., bowl clearance) performance	Revise method to include provisions for testing outcomes where material remains in the toilet bowl.	
PG	282	10.3	Test Termination	Te	Not relevant. PAS-2B requires that after testing “specimens contain[ing] fiber-binding chemicals” on the walls of the flasks or sieves. No sieves or flasks are utilized in PAS-2B.	Delete.	
PG	282	10.3	Test termination	Te	Contradictory. PAS-2B requires that after testing “specimens contain[ing] fiber-binding chemicals” that “the surfaces shall be washed using solvents	Clarify the IWSFG position on use of solvents for PAS tests and disposal of solvents.	

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					<p>such as ethanol and methanol.”</p> <p>Note that this requirement contradicts the requirements of IWSFG PAS-1 (Environmental Health and Safety Requirements), which contains the following language in Section 7.5: lines 151-153 “chemicals: for example, solvents used for laboratory preparations...” and related: lines 162-164 “Note: None of these waste types can be flushed through toilets into the wastewater infrastructure; instead, they must be handled according to the relevant policies and regulations.”</p> <p>Per Lines 162-164 of PAS-1 (Environmental Health and Safety Requirements), solvents are not suitable for disposal into the drainlines of buildings. Or, alternatively, the IWSFG condones the disposal of solvents through a sink into the drainline of a building, however, were those solvents to be applied to a surface-cleaning wipe, for example, that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) such that it was appropriately labeled as flushable and suitable for disposal via the toilet, <b>the solvent would not be suitable for disposal into the drainline due to its presence on a surface-cleaning wipe.</b></p> <p>Further, for example, consider chlorine: “Chlorine reacts with water in and out of the body to form hydrochloric acid and hypochlorous acid. Both are extremely poisonous.”  <a href="https://medlineplus.gov/ency/article/002772.htm">https://medlineplus.gov/ency/article/002772.htm</a></p> <p>Given its widespread use, the disposal of this chemical through sinks and laundry machines into drainlines is very common. Provide IWSFG’s opinion whether a surface-cleaning wipe that meets all the requirements of IWSFG Standard 1: 2017</p>	<p>Provide an explanation of what solvents, in what forms, and under what circumstances those solvents, are suitable for disposal into the drainline of a building according to the IWSFG.</p>	

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					(Section 6.2- Critical Criteria to be Met) but contains chlorine can be labelled as flushable. Note that such a wipe would, under many usage conditions, likely become contaminated with bodily fluids, such as typical bathroom cleaning and therefore fall within the Scope of the IWSFG Standard 1: 2017.		
PG	288	10.4	Calculations	Te	Vague. It is unclear if the method intends for the counting of flushes to begin only after the product under testing has left the toilet bowl (entered the drainline), or if all flushes are counted.	Clarify which procedure was utilized in testing conducted by IWSFG in the development of the IWSFG Standard and this PAS, specifically whether counting of flushes is related to passage of the sample through the toilet.	
PG	298	11	Acceptance Criteria	Te	Acceptance criteria appears arbitrary.	Provide references that were utilized to determine that 3 flushes represents the maximum number of flushes where a product can remain "stranded" in an arbitrarily designed drainline, after which unacceptable impact to the drainline has resulted.	
PG	298	11	Acceptance Criteria	Te	Unreferenced value proposed as criteria.	Provide the results of benchmarking tests of toilet paper that were used to establish 3 flushes as the maximum allowable number of flushes for a product "stranded" during drainline testing.	
PG	299-300	11	Acceptance Criteria	Te	Unreferenced value proposed as criteria.	Provide the results of benchmarking tests of toilet paper that were used to establish 5 flushes as the maximum allowable number of flushes for a product to transit a drainline during drainline testing in order to protect infrastructure.	
PG	312	12	Test Report	Te	PAS-2B does not require the flush actions to be counted or documented.	Delete.	
PG	313	12	Test Report	Te	PAS-2B does not require photographs.	Delete.	
PG	327	13	Precision	Te	Slope incorrect.	Ensure consistent slope utilized throughout method.	
PG	328-329	13	Precision	Te	Details regarding samples is not relevant in Section 13, entitled "Precision (On-going Maintenance of the Toilet and Drain Line)"	Delete. If retained, provide details of acceptable variation with regards to products being tested.	

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						Further, if retained, provide details of statistical analysis completed on a range of products that demonstrates that 10 “separate specimens” is an appropriate number of replicates to eliminate variability within a single product.	
PG	333-339		Bibliography	Te	Uncited references.	Utilize proper citations in the text where the reference material is utilized; otherwise delete.	
PG	338-339		Bibliography	Te	<p>Method PAS-2B contains significant contradictions with available reference materials (for example: <a href="http://www.map-testing.com/assets/reports/WaterSense_Drainline_Testing_Results_07-02-20.pdf">http://www.map-testing.com/assets/reports/WaterSense_Drainline_Testing_Results_07-02-20.pdf</a>)</p> <p>a. Relevant excerpt regarding appropriate protocols for toilet and drainline testing:</p> <p>“After reviewing the WaterSense Toilet Testing Protocol, Dr. Larry Galowin (a guest researcher with NIST), commented that he was very pleased the EPA had decided to use a realistic test media (extruded soybean paste and toilet paper) for evaluating toilet flushing performance and that the testing protocol called for a complete evacuation of the media from the fixture in a single flush. Dr. Galowin has several criticisms of current ASME A112.19.2 certification requirements that he would like to see addressed by the EPA’s WaterSense program, including:</p> <p>1. ASME requires toilets to evacuate only 79 percent of test media (sponges and paper wads) to pass, whereas consumers want and expect toilets to evacuate virtually 100 percent of the waste. As such, a toilet model that leaves 20 percent of the waste behind may pass existing certification</p>	Revise PAS-2B to align with the test design recommendations from Dr. Galowin, as quoted from reference materials available on the Maximum Performance Testing website. In particular note the focus on the use of realistic test media and combining toilet clearance and drainline clearance testing.	

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					<p>requirements but would certainly fail to meet consumer expectations.</p> <ol style="list-style-type: none"> <li>2. Flushing performance testing is completed using sponges and paper wads; drainline carry testing is completed using three-quarter-inch plastic balls. Neither test media is even vaguely realistic (i.e., similar to human feces and toilet paper) and therefore test results may not be indicative of what would be expected in the field.</li> <li>3. Totally different test media is used to evaluate flushing performance and drainline carry performance. His contention is that in the “real world” the same “media” is both flushed out of the toilet and transported through the drainline.</li> <li>4. Flushing performance testing and drainline carry testing are completed as separate tests (and with different test media). His contention is that in the “real world” waste is evacuated from the bowl <u>and</u> transported down the drainline as part of the same event. Dr. Galowin proposes that to more accurately reflect “real world” conditions toilet fixtures be connected to a length of drainline via a floor flange and turning fitting, and a passing score require a minimum mass of test media to be evacuated from the toilet <u>and</u> transported a minimum distance through the drainline.”</li> </ol>		
PG	90	4	References	Te	Incomplete. The content of the test bears significant resemblance to existing copyrighted methods.	Provide appropriate reference and acknowledgement in this Section and throughout the document where both verbatim and paraphrased materials are utilized. Otherwise, delete content from unreferenced sources.	

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**IWSFG Template for Reviewer comments and IWSFG secretariat observations<sup>1</sup>**

Document reviewed: IWSFG-PAS-2B-Drain-Line-Clearance-Settling-Test

Due Date: 2017-09-01

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PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	<p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.</p>	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify	
PG	4		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	4			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	6-7		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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					BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner."		
PG	12		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	12		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG				Ge	As noted in IWSFG-Standard-1: “PAS 2C is included as a recommended PAS but not at this time, a mandatory PAS.”	The issue of the use of the word “mandatory” notwithstanding (all PAS are discretionary as none are mandatory), provide the rationale including PAS-2C as a recommended but not mandatory PAS, specifically deficiencies in PAS-2C that render it unacceptable for inclusion.	
PG				Ge	Clarify process for public commenting on PAS-2C	Given that PAS-2C was not deemed appropriate for inclusion as a mandatory PAS, PAS-2C should be resubmitted for public comment if it is included in IWSFG-Standard-1 as a “mandatory PAS” in the future.	
PG				Ge	Clarify test design details.	Clarify if PAS-2C has been designed and is conducted as a real-world test.	
PG				Ge	Clarify if the test is predictive of performance in typical residential plumbing.	Clarify whether, and if, the testing predicts performance expected in consumer’s toilets and drainlines, or if PAS-2C represents a laboratory test for differentiating products based on performance under specific laboratory conditions.	
PG				Ge	Test method lacks realism.	Provide IWSFG’s reasoning for failing to include test media (simulated fecal matter, for example) other than the product under testing in PAS-2C.	

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						Further, provide IWSFG's reasoning for failing to include flushing sequences that are more representative of typical usage in a household.	
PG				Ge	Clarify benchmark testing conducted to establish PAS-2C.	Provide test results for all testing conducting to establish benchmarks for PAS-2C.  For the benchmark testing, specify if testing was conducted using PAS-2C as a stand-alone test, or if PAS-2A and PAS-2C were conducted simultaneously.	
PG				Ge	Clarify laboratory capabilities.	Provide a list of ISO-accredited laboratories that have the apparatus required to conduct PAS-2C and have conducted the PAS-2C test as written.  Provide for review, all test results from ISO-accredited laboratories that conducted PAS-2C.	
PG				Ge	PAS-2C lacks realism and requires conditions that violate plumbing codes.	Provide reference to plumbing codes utilized in the development of PAS-2C. Specifically, provide specific references regarding pipe imperfections that are allowable under the Plumbing Code utilized in the development of PAS-2C.	

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PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	<p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.</p>	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify	
PG	4		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	4			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	6-7		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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					BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner."		
PG	12		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	12		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG				Te	Language regarding the “significant hydraulic forces” of PAS-3A indicates that the test does not replicate conditions found in sewers.	Clarify if PAS-3A is a real-world test.  Specifically clarify if the test is designed to mimic real hydraulic conditions typically found in sewers globally.	
PG				Te	The testing lacks realism. It is unclear from the text of PAS-3A if the testing is predictive of performance of products in a sewer.	Clarify if whether, and if, PAS-3A predicts performance expected in drainlines or sewers. Specify the infrastructure in which PAS-3A predicts disintegration performance of products-household plumbing, small-diameter sewer pipes, or large-diameter sewer pipes. Provide results of field testing confirming this link between PAS-3A and field performance.  Clarify if PAS-3A represents a laboratory test for differentiating products based on performance under specific laboratory conditions.	
PG				Te	Additional details regarding benchmark testing is necessary to verify that the benchmarks were set appropriately for the protection of infrastructure.	Provide all test results and associated interpretation of data demonstrating the establishment of benchmarks for PAS-3A.  Provide the results of tests conducted using toilet paper to establish benchmark performance in PAS-3A.	

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						Provide the results of tests conducted that demonstrates the ability of PAS-3A to be utilized using the proposed Acceptance Criteria to differentiate between different types of toilet paper, toilet paper and flushable wipes, toilet paper and baby wipes, toilet paper and surface cleaning wipes, and any other comparison testing done in the development of PAS-3A.	
PG				Te	Method lacks details of available laboratories with experience conducting PAS-3A	Provide a list of all ISO 17025:2005 accredited labs that have conducted testing using PAS-3A as written.	
PG				Te	Method lacks details linkages to other PAS-3 series test.	Provide the rationale for the use of alternate disintegration test methods: PAS-3A, PAS-3B and PAS-3C.	
PG				Te	Clarify that a product that passes one version of the IWSFG PAS-3 series but fails two alternate versions is flushable.	Clarify.	
PG	76-99	1	Introduction	Ge	Duplicate language. The Introduction is available in multiple PAS documents, and none of the content is relevant to PAS-3A.	Delete	
PG	76	1	Introduction	Te	Undefined term: "wastewater process systems"	Define	
PG	76	1	Introduction	Te	Vague. The statement (and Footnote 1) implies that some level of chemicals and contaminants are allowed to be discharged into the sewer but no details are provided.	Describe the process that wastewater services utilize to determine if industrial discharges "can be safely treated."  Provide a detailed explanation of the risk-based approaches utilized globally for assessing the safety of these discharges.	
PG	79-82	1	Introduction	Te	Incomplete. The list of post-treatment pathways has significant omissions. Revise to include all relevant pathways, particularly for liquid effluent from WWTPs (indirect potable reuse, for example).	Revise.	

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PG	85-90	1	Introduction	Te	The statement: "The physically adverse effects of the introduction of such products to wastewater systems (clogging and plugging) have already been identified" is incorrect and misleading. No such identification of physically adverse effects from flushable wipes has been demonstrated.	Delete.  If retained, provide the results of studies demonstrating physical adverse effects (i.e., impacts to wastewater infrastructure) from flushable wipes.	
PG	85-90	1	Introduction	Te	The statement "...environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as "flushable"." is entirely speculative and anecdotal.	Delete.  If retained, provide the results of studies demonstrating environmental effects that are attributable to flushable wipes.  Note to Entry:  The conclusions of studies regarding regenerated cellulose referenced in the IWSFG documents refute the IWSFG's position on regenerated cellulose and are not appropriate substantiation for the IWSFG's standard, PASs or positions.	
PG	97	1	Introduction	Te	Vague and contradictory. Interchanging terms: "test" "IWSFG standard" and "Publicly Available Specification"	"The goal of the IWSFG is... identify those products that do not meet the established IWSFG standards." Here, the reference to "established IWSFG standards" appears to imply that the PAS documents are "established IWSFG standards" and not "Publicly Available Specifications." Clarify if the PAS documents are "Publicly Available Specifications" or "established IWSFG standards."	
PG	97	1	Introduction	Te	Confirm details of accreditation of IWSFG standards.	Confirm the national or international standards body that has certified, thereby establishing the "established IWSFG standards" or the IWSFG "Publicly Available Specifications."	
PG	101-102	2	Purpose	Te	Vague description of "hydraulic forces."	Clarify the specific portion of wastewater transport systems under evaluation in PAS-3A, and provide relevant technical details and specifications for said portions. Specifically, whether PAS-3A evaluates performance of products in household (residential) plumbing, small-diameter pipes, or large-diameter pipes found in municipal sewer	

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						systems.	
PG	104	4	Purpose	Te	<p>Reference 2 not cited in PAS-3A. No concept or technical aspect of Reference 2 is utilized in PAS-3A.</p> <p>PAS-3A, while similar to AFNOR - NF Q34-020, bears no resemblance whatsoever to JIS P 4501:1993/AMENDMENT 1:2006. The JIS test employs a different stirring mechanism and utilizes significantly different metrics for evaluation.</p>	Remove all references to Reference 2, JIS P 4501:1993/AMENDMENT 1:2006.	
PG	104-107	2	Purpose	Te	<p>Vague, qualitative description of “performance” of toilet paper.</p> <p>Note to Entry: General. The IWSFG has provided no details regarding the process utilized to establish baseline performance. Specifically, no data regarding the performance of toilet paper in the PAS tests 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 toilet paper performance is required for infrastructure compatibility were provided for review. Provide reference to information that details how toilet paper performance, as measured via the PAS tests and correlated to operations and maintenance data for wastewater systems, is required to ensure compatibility with wastewater infrastructure. Without such documentation, IWSFG Standard 1 and PAS-3A is a collection of unproven assumptions and untested hypotheses. As such, a thorough and complete review of the IWSFG Standard 1 and PAS-3A cannot be conducted without access to relevant test results/data utilized to establish toilet paper as the benchmark in the IWSFG PAS tests.</p> <p>Note to Entry: Specifically with regards to the performance of toilet paper, the anecdotal</p>	Provide additional details regarding the performance of toilet paper, specifically test results demonstrating the disintegration of toilet paper in household drainlines and small-diameter sewers, based on laboratory testing using PAS-3A as well as field testing conducted by the IWSFG.	

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					<p>performance of toilet paper is insufficient information for establishing a benchmark for testing. The assertion that “Since toilet papers historically have not caused clogging, or plugging, problems in wastewater systems” is vague and unsupported by any scientific data or reference, and therefore is unacceptable as the basis for establishing a benchmark for performance. Data establishing how toilet paper performance relates to infrastructure compatibility has not been provided, and as such, there is no evidence available to place toilet paper performance in context.</p> <p>Note to Entry: Provide details of benchmarking conducted, specifically the methodology utilized. See definition from <i>ISO 17258:2015(E) Statistical methods — Six Sigma — Basic criteria underlying benchmarking for Six Sigma in organisations</i>; First edition; 2015-01-15 (emphasis added)</p> <p>“Benchmarking is frequently used in various domains in connection with business activities. The Six Sigma methodology requires an evaluation step using a benchmarking process. In other words, a method for the comparison of levels of quality, performance, and productivity with the state-of-the-art is required. This International Standard establishes what to compare and develops a methodology to conduct a correct comparison between an organization’s levels of quality, performance, and productivity.</p> <p>The numbers given by the benchmarking can be integrated into any improvement programme to quantify any progress. They can also be used by other assessment processes in the organization such as regulation compliancy or financial performance evaluation.</p>		

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					<p><b>Benchmarking is the whole process of collecting and processing data and information and comparing the results. The benchmark is the reference point for comparison.</b></p> <p><b>The main point of this benchmarking methodology, based on transparency and the universal principle of evaluation, is to give confidence to its calculating procedures and the results, so that comparisons between organizations are accepted by all parties.”</b></p>		
PG	115	4	References	Te	Incomplete. The content of the test bears significant resemblance to existing copyrighted methods.	Provide appropriate reference and acknowledgement in this Section and throughout the document where both verbatim and paraphrased materials are utilized. Otherwise, delete content from unreferenced sources.	
PG	130-132	6	Principles	Te	Vague phrase requires additional details.	<p>Define the phrase “significant hydraulic forces” quantitatively.</p> <p>Clarify where in sewer systems forces are found in wastewater systems globally. Specifically, in household plumbing, small-diameter sewer pipes or large-diameter sewer pipes.</p>	
PG	139-142	6	Principles	Te	<p>Contradictory.</p> <p>Significant concern regarding the hydraulic force is evident from the content of PAS-3A, which appears to indicate an interest in establishing a test that has real-world conditions as a primary concern. As such, prohibiting the use of wastewater for disintegration tests in the PAS-3 series tests renders the tests unrealistic and therefore not representative of real-world conditions.</p>	<p>Revise method to allow for the inclusion of wastewater.</p> <p>Provide a list of preventative actions that are utilized by IWSFG (for example, personal protective equipment) to address health and safety concerns with working with wastewater.</p> <p>Provide ranges of typical wastewater characteristics (for example, Total Suspended Solids and Carbonaceous Oxygen Demand) appropriate for aliquots of wastewater to be used in testing.</p>	
PG	139-142	6	Principles	Te	Contradictory.	Revise method to allow for the inclusion of wastewater.	

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					Note the use of sludge in the PAS-5 series tests. The same health and safety and consistency concerns are present in the PAS-5 series tests, yet real media is utilized for those tests.	Revise PAS-3A to utilize the same procedures and strategies employed in the PAS-5 series tests to ensure safety and consistency of PAS-3A.  If the prohibition on the use of wastewater is maintained, given that the IWSFG is concerned about "inconsistency" related to wastewater, provide specific ranges of "inconsistency" between potable water aliquots that are acceptable to the IWSFG with regards to potable water for testing. For example, the characteristics of tap water will vary by location, and within a location by time of year, depending on the water source. Provide ranges of parameters, including but not limited to, pH, hardness, and temperature, deemed levels of "inconsistency" that are acceptable to IWSFG.	
PG	183-192	8.3.1	Dry Tissues	Te	Arbitrary change to the AFNOR method on which PAS-3A was based. AFNOR method requires the use of a length of sample of 25cm ± 0.2cm.	Provide the rationale for changing the length of dry toilet paper sample from the AFNOR test.  Provide laboratory testing results verifying that altering the length of sample under testing does not impact the test results when compared to the AFNOR method.	
PG	183-192	8.3.1	Dry Tissues	Te	Results from independent testing using the PAS-3A method indicates that the results of PAS-3A are significantly altered by samples that are 180 square centimeters versus 300 square centimeters.	Provide laboratory testing results verifying that the PAS-3A test generates statistically equivalent results for toilet paper with sizes of 180 square centimeters and 300 square centimeters.	
PG	214-235	9.1	Storage of samples	Te	Contradictory storage details.  The test method requires samples to be utilized immediately (Line 177-178: "Specimens must also be removed just before testing starts to prevent their contamination by particles in the ambient air").	Remove storage requirements.  If storage requirements remain, provide the quantity of moisture absorption (for dry samples) or evaporation (for moist samples) with appropriate references for establishing threshold values for these parameters.  Further, provide a quantity of ambient air particulate contamination acceptable for samples to accumulate during storage.	

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PG	248-249	10.2	Test procedure	Te	Vague. It is unclear from the method why a 10mm range (20%) in impeller height is necessary or acceptable.	Provide test results conducted by IWSFG that demonstrate that running the test with the impeller at heights of 45mm and 55mm from the bottom of the beaker is acceptable- i.e., that those impeller locations do not generate unacceptable variability in the test results.  Further, share test results that demonstrate that heights of the impeller above the bottom of the beaker of 45mm, 50mm and 55mm produce the same results for multiple replicates of the same sample, thereby justifying the 10mm allowable variation in impeller height.	
PG	252-253	10.2	Test procedure	Te	Additional details necessary regarding concern of excessive force experienced by the sample during pouring.  Vague language- perturbation.	Provide a quantitative comparison of the amount of force experience by the sample as a result of rotation adjacent to an impeller rotating at 800 rpm, versus the amount of force the tissue experiences during 5 seconds of water pouring into the beaker.  Define "perturbation" in quantitative terms.  Provide an acceptable amount of perturbation (as number of seconds between 1 and 5) before the test is invalid.	
PG	252-253	10.2	Test procedure	Te	Incomplete method details.	Provide guidance for a sample that is not "driven under the screw-impeller."  Specifically, provide the length of time that a sample can remain not "driven under the screw-impeller" that renders the test invalid.	
PG	267-268	10.2	Test procedure	Te	Contradictory and unsupported by test results.  Note to Entry: The results of independent laboratory tests using the PAS-3A procedure demonstrates that for multiple toilet paper types, the 1 minute rinse step results in the forced passage of significant	Provide test results that demonstrate that the "1-minute rinse does not force the passage of material through the sieve."  Specifically, share the results of benchmark testing where PAS-3A tests were conducted on toilet paper samples, and the 1 minute rinse did not result in the forced passage of material	

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					<p>percentages of the sample initially retained through the 6.3mm sieve. The 1 minute rinse step can force as much as 50% of the mass of the original sample through the sieve.</p> <p>As such, the rinse step for method PAS-3A method is invalid for toilet paper and should be withdrawn until the error introduced via the proposed sample processing is addressed.</p>	<p>through the sieve. Specifically, results of benchmark tests where the amount passing the 6.3mm sieve was statistically indistinguishable between samples that were no rinsed and samples that were rinsed for 1 minute per the PAS-3A method.</p>	
PG	287-289	10.3	Test Termination	Te	<p>Contradictory. PAS-3A requires that after testing “specimens contain[ing] fiber-binding chemicals” that “the surfaces shall be washed using solvents such as ethanol and methanol.”</p> <p>Note that this requirement contradicts the requirements of IWSFG PAS-1 (Environmental Health and Safety Requirements), which contains the following language in Section 7.5: lines 151-153 “chemicals: for example, solvents used for laboratory preparations...” and related: lines 162-164 “Note: None of these waste types can be flushed through toilets into the wastewater infrastructure; instead, they must be handled according to the relevant policies and regulations.”</p> <p>Per Lines 162-164 of PAS-1 (Environmental Health and Safety Requirements), solvents are not suitable for disposal into the drainlines of buildings. Or, alternatively, the IWSFG condones the disposal of solvents through a sink into the drainline of a building, however, were those solvents to be applied to a surface-cleaning wipe, for example, that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) such that it was appropriately labeled as flushable and suitable for disposal via the toilet, <b><i>the solvent would not be suitable for disposal into the drainline due to its presence on a surface-</i></b></p>	<p>Clarify the IWSFG position on use of solvents for PAS tests and disposal of solvents.</p> <p>Provide an explanation of what solvents, in what forms, and under what circumstances those solvents, are suitable for disposal into the drainline of a building according to the IWSFG.</p>	

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					<p><i>cleaning wipe.</i></p> <p>Further, for example, consider chlorine: “Chlorine reacts with water in and out of the body to form hydrochloric acid and hypochlorous acid. Both are extremely poisonous.”  <a href="https://medlineplus.gov/ency/article/002772.htm">https://medlineplus.gov/ency/article/002772.htm</a></p> <p>Given its widespread use, the disposal of this chemical through sinks and laundry machines into drainlines is very common. Provide IWSFG’s opinion whether a surface-cleaning wipe that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) but contains chlorine can be labelled as flushable. Note that such a wipe would, under many usage conditions, likely become contaminated with bodily fluids, such as typical bathroom cleaning and therefore fall within the Scope of the IWSFG Standard 1: 2017.</p>		
PG	316-327	11	Acceptance Criteria	Te	<p>Independent laboratory testing of multiple toilet paper samples was conducted at three laboratories to evaluate interlab variability of the proposed PAS-3 series tests.</p> <p>Five toilet papers were tested using the three PAS-3 series tests.</p> <p><b>Results:</b></p> <ol style="list-style-type: none"> <li><b>Three of five toilet papers tested did not meet the acceptance criteria for all three PAS-3 series disintegration tests.</b></li> <li>Two of the three samples tested failed to meet the proposed acceptance criteria across all three laboratories, but did meet the acceptance criteria at one laboratory in one test. <b>In summary, two substrates that failed to meet the proposed acceptance criteria for eight of nine</b></li> </ol>	<p>Based on an inter-lab evaluation of the PAS-3 series disintegration tests, the tests give inconsistent results across laboratories, and therefore are not suitable for publication as written- both the methods and the currently proposed acceptance criteria must be revised.</p> <p>Conduct an appropriate interlab testing program utilizing a range of products.</p> <p>Once complete, establish relationships between laboratory test method results and infrastructure compatibility issues experienced based on field studies and documented issues to determine appropriate test conditions and acceptance criteria.</p>	

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					<b>tests conducted across three laboratories would, according to Section 7.3 (IWSFG Standard 1), be flushable.</b> Put another way, two substrates that failed to meet the proposed acceptance criteria in 89% of tests conducted would meet the IWSFG criteria for dispersibility.		
PG	316-327	11	Acceptance Criteria	Te	Additional details regarding criteria required.	Provide a statistical analysis of PAS-3A that demonstrates the accuracy, reproducibility and repeatability (both intra-lab and inter-lab) of the method.  Demonstrate through statistical analysis of results of various substrates, including toilet paper, that the method has sufficient resolution to distinguish between substrates at the 95% acceptance criteria level.	
PG	316-327	11	Acceptance Criteria	Te	PAS-3A contains two pass criteria: the method requires that a sample either attain: 100% passing the sieve or 95% passing the sieve.	Revise to provide a single pass criteria.  Alternatively, provide test results demonstrating the ability of laboratory technicians to visually determine, with an accuracy greater than 5%, the amount of material present on a sieve.	
PG	348-349	13	Precision	Te	Rationale regarding number of samples relating to variability is unfounded and unnecessary.	Delete.  If retained, provide details of statistical analysis completed on a range of products that demonstrates that 5 "separate specimens" is an appropriate number of replicates to eliminate variability within a single product.	
PG	348-349	13	Precision	Te	Contradictory. Rationale regarding number of samples relating to variability contradicts other IWSFG PAS methods.	Provide the rationale and data supporting why in PAS-3A, 5 "separate specimens" is an appropriate number of samples to eliminate variability, whereas in PAS-2B, for example, 10 "separate specimens" are necessary to eliminate variability.  Provide the statistical analysis for PAS-3A and	

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**IWSFG Template for Reviewer comments and IWSFG secretariat observations<sup>1</sup>**

Document reviewed: IWSFG-PAS-3A-Accelerated-Bench-Top-Disintegration-Test	Due Date: 2017-09-01
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						PAS-2B that justifies the different in requisite "separate specimens."	
PG	355-356		Bibliography	Ge	Reference 2 not cited in the document.	Delete.	

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PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	<p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.</p>	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify	
PG	4		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	4			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	6-7		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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					BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner.”		
PG	15		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The “purpose” included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	15		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG				Ge	Provide appropriate citations for sources of information throughout text.	Confirm this test is based on the INDA/EDANA FG-502 Slosh Box Disintegration Test.	
PG				Te	Additional details regarding test design are necessary.	Clarify whether the PAS-3B is a real-world test.  Provide reference to existing sources or field testing results where 2 hours of transit under the hydraulic conditions utilized in PAS-3B are cited.	
PG				Te	Additional details regarding test design are necessary.	Clarify whether the water utilized for testing in the PAS-3B slosh box test contains “wave action.” Specifically, provide a description of the required flow of liquid in the slosh box.  In particular, describe whether the water flows continuously (like a lazy river, for example) or whether flow is intermittent, where the water experiences stoppages with each oscillation as the water collides with the end of the box, resulting in the generation of waves (crashing like waves on a shore break, for example).	
PG				Te	Additional details regarding test design are necessary.	Clarify if PAS-3B predicts performance expected in household drainlines, small-diameter sewers, or large-diameter sewers after two hours of transit, or if PAS-3B represents a laboratory test for differentiating products based on performance	

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						under specific laboratory conditions.	
PG				Te	Additional details regarding establishment of benchmarks is necessary to understand the relevance of PAS-3B to infrastructure compatibility.	Provide the results of all testing conducting to establish benchmarks for PAS-3B. Provide a list of, and all results from, ISO-accredited laboratories that conducted test PAS-3B for establishing benchmarks using PAS-3B as written.	
PG				Te	Additional details required to understand the establishment of toilet paper as a benchmark for performance, and how this benchmark is necessary for infrastructure compatibility.	Provide all test results and associated interpretation of data demonstrating the establishment of benchmarks for PAS-3B. Specifically provide the results of tests conducted using toilet paper to establish benchmark performance in PAS-3B. Specifically provide the results of tests conducted that demonstrates the ability of PAS-3B to be utilized, using the proposed Acceptance Criteria, to differentiate between different types of toilet paper, toilet paper and flushable wipes, toilet paper and baby wipes, toilet paper and surface cleaning wipes, and any other comparison testing done in the development of PAS-3B.	
PG				Te	Additional details regarding the PAS-3 series disintegration tests is necessary. It is unclear from the text why three tests are proposed or necessary.	Provide the rationale for allowing the use of alternate methods. Specifically, provide the rationale for having three disintegration tests: PAS-3A, PAS-3B and PAS-3C.	
PG				Te	Clarification regarding acceptable test performance is necessary.	Clarify that a product that passes one version of the IWSFG PAS-3 series but fails two alternate versions is flushable.	
PG				Te	It is unclear if alternative, country-specific versions of PAS-3B have been developed.	Provide access on the IWSFG website to any country-specific alternate PAS-3B methods that currently exist but have not been made available for public comment.	
PG				Te	Provide list of accredited labs.	Provide a list of all ISO 17025:2005 accredited	

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						labs that have conducted testing using PAS-3B.	
PG	93	1	Introduction	Te	Undefined term: “wastewater process systems”	Define	
PG	95-98	1	Introduction	Te	Incomplete. The list of post-treatment pathways has significant omissions. Revise to include all relevant pathways, particularly for liquid effluent from WWTPs (indirect potable reuse, for example).	Revise.	
PG	101-106	1	Introduction	Te	The statement: “The physically adverse effects of the introduction of such products to wastewater systems (clogging and plugging) have already been identified” is incorrect and misleading. No such identification of physically adverse effects from flushable wipes has been demonstrated.	Delete.  If retained, provide the results of studies demonstrating physical adverse effects (i.e., impacts to wastewater infrastructure) from flushable wipes.	
PG	101-106	1	Introduction	Te	The statement “...environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as “flushable.” is entirely speculative and anecdotal.	Delete.  If retained, provide the results of studies demonstrating environmental effects that are attributable to flushable wipes.  Note to Entry:  The conclusions of studies regarding regenerated cellulose referenced in the IWSFG documents refute the IWSFG’s position on regenerated cellulose and are not appropriate substantiation for the IWSFG’s standard, PASs or positions.	
PG	112-115	1	Introduction	Te	“The goal of the IWSFG is... identify those products that do not meet the IWSFG’s standards.” Here, the reference to “the IWSFG’s standards” appears to imply that the PAS documents are “standards” and not “Publicly Available Specifications.”	Clarify if the PAS documents are “tests,” “Publicly Available Specifications” or “established IWSFG standards.”	
PG	112-115	1	Introduction	Te	Clarify.	Confirm the national or international standards body that has certified, thereby establishing the “established IWSFG standards” or the IWSFG “Publicly Available Specifications.”	
PG	118-120	2	Purpose	Te	Vague. Lacks supporting details, references and calculations.	Clarify the specific portion of wastewater transport systems under evaluation in PAS-3B, and provide relevant technical details and specifications for	

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						<p>said portions.</p> <p>Specifically, provide a detailed explanation, with appropriate reference to design manuals or similar, of where continuous flow conditions are found for a duration of 2 hours in wastewater transport systems with flow conditions described by a Reynolds Number of 20,000.</p>	
PG	128	4	References	Te	Incomplete. The content of the test bears significant resemblance to existing copyrighted methods.	Provide appropriate reference and acknowledgement in this Section and throughout the document where both verbatim and paraphrased materials are utilized. Otherwise, delete content from unreferenced sources.	
PG	145	6	Principles	Te	Vague. Lacks supporting details, references and calculations.	<p>Define “normally.”</p> <p>Specifically, provide a reference to sewer design and/or other literature sources that identify a Reynolds Number of 20,000 as “normal” or typical for a wastewater transport system.</p> <p>Further, provide the percentage of flows this Reynolds Number represents globally with breakdown by country based on the research conducted by the IWSFG.</p> <p>Also, relate the Reynolds Number of 20,000 to pipe flow.</p>	
PG	145	6	Principles	Te	Vague. Lacks supporting details, references and calculations.	<p>Provide the results of modeling where a Reynolds Number of 20,000 has been determined for the Slosh Box operated under the conditions shown in PAS-3B.</p> <p>If available, also provide modeling results that demonstrate whether the Reynolds Number of 20,000 represents an average value or maximum value.</p> <p>If an average value, provide the minimum and maximum Reynolds Number values produced</p>	

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						during each oscillation of the slosh box.  If a maximum value, provide the time-weighted average calculation that results in a Reynolds Number of 20,000.	
PG	147-150	6	Principles	Te	Contradictory. Significant concern regarding the amount of hydraulic force present in the test is evident from the content of PAS-3B, which appears to indicate an interest in establishing a test that has real-world conditions as a primary concern.  As such, prohibiting the use of wastewater for disintegration tests in the PAS-3 series tests significantly reduces realism in the test and makes the test not representative of real-world conditions.	Revise PAS-3B to allow for the inclusion of wastewater.  Provide a list of preventative actions that are utilized by IWSFG (for example, personal protective equipment) to address health and safety concerns, as well as ranges of wastewater characteristics (for example, Total Suspended Solids and Carbonaceous Oxygen Demand) typical to wastewater based on IWSFG data, to address concerns related to inconsistency.	
PG	147-150	6	Principles	Te	Contradictory. The same health and safety and consistency concerns are present in the PAS-5 series tests, yet real media is utilized for those tests.	Revise PAS-3B to allow the use of wastewater, and utilize the same procedures and strategies employed in the PAS-5 series tests in the PAS-3 series tests to ensure safety and consistency.	
PG	147-150	6	Principles	Te	Clarify.	If the prohibition on the use of wastewater is maintained, given that the IWSFG is concerned about "inconsistency" related to wastewater, provide specific ranges of "inconsistency" between potable water aliquots for testing. For example, the characteristics of tap water will vary by location, and within a location by time of year, depending on the water source.  Provide ranges of parameters, including but not limited to, pH, hardness, and temperature, deemed levels of "inconsistency" that are acceptable.	
PG	247-270	10.1	Preconditioning	Te	Contradictory pre-conditioning requirements for PAS-3 series test.  The implication of the PAS-3 series, given that a product must only pass one test, is that they are	Provide an explanation for why preconditioning is required for PAS-3B, but not PAS-3A or PAS-3C, given that all three tests are intended to evaluate the same property.	

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					equivalent. However, PAS-3B is the only PAS-3 series test that requires pre-conditioning.	Given that all three tests can be used interchangeably, in order to ensure consistency between methods, the preconditioning step should be deleted.  Alternatively, add preconditioning steps to PAS-3A and PAS-3C.	
PG	228	9	Storage and Conditioning	Te	Contradictory. The test method requires samples to be utilized immediately (Line 204: "Specimens must be removed just before testing starts.").	Remove storage requirements  If storage requirements remain, provide the quantity of moisture absorption (for dry samples) or evaporation (for moist samples), with appropriate references for establishing threshold values for these parameters.	
PG	310	10.3	Test Procedures	Te	Contradictory. The test procedure prohibits the rinse step from forcing material through the sieve, however, the rinse has been demonstrated to force material through the sieve.  Note to Entry: The results of independent laboratory tests using the PAS-3B procedure demonstrate that for multiple toilet paper types, the 1 minute rinse step results in the forced passage of significant percentages of the sample initially retained through the 6.3mm sieve.  For example, for a single ply toilet paper, 79% of the initial dry weight of the sample passes through the 6.3mm sieve after a 1 minute rinse (n=3). For the same single ply toilet paper, only 50.6% of the initial dry weight of the sample passes through the 6.3mm sieve without a rinse (n=3). This pattern was observed for all toilet paper substrates tested (one-ply, two-ply, and three-ply).  As such, the rinse step for method PAS-3B method is invalid for toilet paper and should be withdrawn until the error introduced via the proposed sample processing is addressed.	Provide test results that demonstrate that the 1-minute rinse "do[es] not force the passage of any material through the sieve."  Specifically, share the results of benchmark testing where PAS-3B tests were conducted on toilet paper samples, and the 1 minute rinse was shown to not result in the forced passage of material through the sieve.	

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PG	329-330	10.4	Test termination	Te	<p>Contradictory. PAS-3B requires that after testing “specimens contain[ing] fiber-binding chemicals” that “the surfaces shall be washed using solvents such as ethanol and methanol.”</p> <p>Note that this requirement contradicts the requirements of IWSFG PAS-1 (Environmental Health and Safety Requirements), which contains the following language in Section 7.5: lines 151-153 “chemicals: for example, solvents used for laboratory preparations...” and related: lines 162-164 “Note: None of these waste types can be flushed through toilets into the wastewater infrastructure; instead, they must be handled according to the relevant policies and regulations.”</p> <p>Per Lines 162-164 of PAS-1 (Environmental Health and Safety Requirements), solvents are not suitable for disposal into the drainlines of buildings. Or, alternatively, the IWSFG condones the disposal of solvents through a sink into the drainline of a building, however, were those solvents to be applied to a surface-cleaning wipe, for example, that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) such that it was appropriately labeled as flushable and suitable for disposal via the toilet, <b><i>the solvent would not be suitable for disposal into the drainline due to its presence on a surface-cleaning wipe.</i></b></p> <p>Further, for example, consider chlorine: “Chlorine reacts with water in and out of the body to form hydrochloric acid and hypochlorous acid. Both are extremely poisonous.”  <a href="https://medlineplus.gov/ency/article/002772.htm">https://medlineplus.gov/ency/article/002772.htm</a></p> <p>Given its widespread use, the disposal of this chemical through sinks and laundry machines into</p>	<p>Clarify the IWSFG position on use of solvents for PAS tests and disposal of solvents.</p> <p>Provide an explanation of what solvents, in what forms, and under what circumstances those solvents, are suitable for disposal into the drainline of a building.</p>	

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					drainlines is very common. Provide IWSFG's opinion whether a surface-cleaning wipe that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) but contains chlorine can be labelled as flushable. Note that such a wipe would, under many usage conditions, likely become contaminated with bodily fluids, such as typical bathroom cleaning and therefore fall within the Scope of the IWSFG Standard 1: 2017.		
PG	363-373	11	Acceptance Criteria	Te	Proposed acceptance criteria lacks sufficient detail regarding protection of infrastructure and test reliability.	Provide evidence that acceptance criteria is necessary for the protection of infrastructure.	
PG	363-373	11	Acceptance Criteria	Te	<p>Independent laboratory testing of multiple toilet paper samples was conducted at three laboratories to evaluate interlab variability of the proposed PAS-3 series tests.</p> <p>Five toilet papers were tested using the three PAS-3 series tests.</p> <p><b>Results:</b></p> <ol style="list-style-type: none"> <li><b>Three of five toilet papers tested did not meet the acceptance criteria for all three PAS-3 series disintegration tests.</b></li> <li>Two of the three samples tested failed to meet the proposed acceptance criteria across all three laboratories, but did meet the acceptance criteria at one laboratory in one test. <b>In summary, two substrates that failed to meet the proposed acceptance criteria for eight of nine tests conducted across three laboratories would, according to Section 7.3 (IWSFG Standard 1), be flushable.</b> Put another way, two substrates that failed to meet the proposed acceptance criteria in 89% of tests conducted would meet the IWSFG criteria</li> </ol>	<p>Based on an inter-lab evaluation of the PAS-3 series disintegration tests, the tests give inconsistent results across laboratories, and therefore are not suitable for publication as written- both the methods and the currently proposed acceptance criteria must be revised.</p> <p>Conduct an appropriate interlab testing program utilizing a range of products.</p> <p>Once complete, establish relationships between laboratory test method results and infrastructure compatibility issues experienced based on field studies and documented issues to determine appropriate test conditions and acceptance criteria.</p>	

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					for dispersibility.		
PG	363-373	11	Acceptance Criteria	Te	Proposed acceptance criteria lacks sufficient detail regarding test reliability and reproducibility.	Provide a statistical analysis of PAS-3B that demonstrates the accuracy, reproducibility and repeatability (both intra-lab and inter-lab) of the method.  Demonstrate through statistical analysis of results of various substrates, including toilet paper, that the method has sufficient resolution to distinguish between substrates at the 95% acceptance criteria level.	
PG	363-373	11	Acceptance Criteria	Te	Contradictory and vague. PAS-3B contains two pass criteria: the method requires that a sample either attain: 100% passing the sieve or 95% passing the sieve.	Establish a single pass criteria.  Alternatively, provide test results demonstrating the ability of laboratory technicians to visually determine, with an accuracy greater than 5%, the amount of material present on a sieve.	
PG	363-373	11	Acceptance Criteria	Te	Attached below is a photograph of a one-ply toilet paper after 30 minutes in the PAS-3B slosh box test.  Per PAS-3B, this sample was pre-conditioned and as such this photograph represents the condition of the toilet paper after being flushed through a toilet, transit through a 24-meter drainline, sitting in room temperature tap water for 15 minutes, and 30 minutes of agitation in room temperature tap water in the slosh box.	Based on testing using the PAS-3 series tests, the methods and the currently proposed acceptance criteria are inappropriate and required revision.  Conduct an appropriate interlab testing program utilizing a range of products.  Once complete, establish relationships between laboratory test method results and infrastructure compatibility issues experienced based on field studies and documented issues to determine appropriate test conditions and acceptance criteria.	

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					 <p>Note that based on the 1" x 1" grid drawn on the bottom of the slosh box there are a number of pieces of the substrate that have dimensions larger than 1" and are larger than 1" x 1" square.</p> <p>After 2 hours, the average percentage (n=3) of the initial dry weight of the sample passing the 6.3 millimeter sieve specified by PAS-3B was 79%.</p> <p><b>Therefore, based on the proposed PAS-3B acceptance criteria, this substrate (again, a single-ply toilet paper) would not be considered flushable in accordance with the IWSFG.</b></p> <p><b>In conclusion, based on the results of testing to evaluate the applicability of PAS-3B, the PAS-3B test should be withdrawn and critically reviewed</b></p>		

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					<b>before publishing for use.</b>		
PG	398-399	13	Precision	Te	Remove as unnecessary and unrelated to Precision. Precision of test equipment is wholly distinct from sample precision.	Delete.  If retained, provide details of statistical analysis completed on a range of products that demonstrates that 5 “separate specimens” is an appropriate number of replicates to eliminate variability within a single product.	
PG	398-399	13	Precision	Te	Proposed precision text contradicts precision requirements in other PASs.	Provide the rationale and data supporting why in PAS-3B, 5 “separate specimens” is an appropriate number of samples to eliminate variability, whereas in PAS-2B, for example, 10 “separate specimens” are necessary to eliminate variability.  Provide the statistical analysis for PAS-3B and PAS-2B that justifies the different in requisite “separate specimens.”	
PG	436-440		Bibliography	Ge	References not cited in the document.	Delete.  If the references are retained, provide proper citations within the text.	

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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 <sup>2</sup>	Comments	Proposed change	Observations of the secretariat
PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	<p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.</p>	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	



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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify	
PG	4		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	4			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	6-7		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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					BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner."		
PG	14		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	14		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG				Ge	Based on the references provided, PAS-3C appears based on existing work conducted using shake flasks with three baffles inserted into the side of the shake flask; however, PAS-3C requires the use of shake flasks with three baffles inserted into the bottom of the shake flask.	Confirm the source of this test method.  Provide appropriate citations for sources of information throughout text.  Specifically, provide citations to sources utilizing bottom-baffled shake flasks, not shake flasks with baffles in the curved transition between the base and sides of the flask.	
PG				Te	Based on the references provided, PAS-3C appears based on existing work conducted using shake flasks with three baffles inserted into the side of the shake flask; however, PAS-3C requires the use of shake flasks with three baffles inserted into the bottom of the shake flask.	Provide test results from the IWSFG demonstrating the relationship between the different shake flasks, noting whether the different shake flasks provide the same results.	
PG				Te	Modifications to existing shake flasks tests have been proposed.	Provide the rationale for reducing the speed of the rotation, and the duration of the test, providing appropriate references and/or data related to infrastructure compatibility to support the modifications to the method.	
PG				Te	Additional details regarding test design are necessary.	Clarify whether the PAS-3C is a real-world test.  Provide reference to existing sources or field testing results where 2 hours of transit under the	

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						hydraulic conditions utilized in PAS-3C are cited.	
PG				Te	Additional details regarding test design are necessary.	Clarify if PAS-3C predicts performance expected in household drainlines, small-diameter sewers, or large-diameter sewers after two hours of transit, or if PAS-3C represents a laboratory test for differentiating products based on performance under specific laboratory conditions.	
PG				Te	Additional details regarding establishment of benchmarks is necessary to understand the relevance of PAS-3C to infrastructure compatibility.	Provide the results of all testing conducting to establish benchmarks for PAS-3C. Provide a list of, and all results from, ISO-accredited laboratories that conducted test PAS-3C for establishing benchmarks using PAS-3C as written (in particular, using bottom-baffled flasks).	
PG				Te	Additional details required to understand the establishment of toilet paper as a benchmark for performance, and how this benchmark is necessary for infrastructure compatibility.	Provide all test results and associated interpretation of data demonstrating the establishment of benchmarks for PAS-3C. Specifically provide the results of tests conducted using toilet paper to establish benchmark performance in PAS-3C. Specifically provide the results of tests conducted that demonstrates the ability of PAS-3C to be utilized, using the proposed Acceptance Criteria, to differentiate between different types of toilet paper, toilet paper and flushable wipes, toilet paper and baby wipes, toilet paper and surface cleaning wipes, and any other comparison testing done in the development of PAS-3C.	
PG				Te	Additional details regarding the PAS-3 series disintegration tests is necessary. It is unclear from the text why three tests are proposed or necessary.	Provide the rationale for allowing the use of alternate methods. Specifically, provide the rationale for having three disintegration tests: PAS-3A, PAS-3B and PAS-3C.	
PG				Te	Clarification regarding acceptable test performance is necessary.	Clarify that a product that passes one version of the IWSFG PAS-3 series but fails two alternate	

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						versions is flushable.	
PG				Te	It is unclear if alternative, country-specific versions of PAS-3C have been developed.	Provide access on the IWSFG website to any country-specific alternate PAS-3C methods that currently exist but have not been made available for public comment.	
PG				Te	Provide list of accredited labs.	Provide a list of all ISO 17025:2005 accredited labs that have conducted testing using PAS-3C.	
PG	76	1	Introduction	Te	Undefined term: "wastewater process systems"	Define	
PG	78-81	1	Introduction	Te	Incomplete. The list of post-treatment pathways has significant omissions. Revise to include all relevant pathways, particularly for liquid effluent from WWTPs (indirect potable reuse, for example).	Revise.	
PG	84-88	1	Introduction	Te	The statement: "The physically adverse effects of the introduction of such products to wastewater systems (clogging and plugging) have already been identified" is incorrect and misleading. No such identification of physically adverse effects from flushable wipes has been demonstrated.	Delete.  If retained, provide the results of studies demonstrating physical adverse effects (i.e., impacts to wastewater infrastructure) from flushable wipes.	
PG	84-88	1	Introduction	Te	The statement "...environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as "flushable"." is entirely speculative and anecdotal.	Delete.  If retained, provide the results of studies demonstrating environmental effects that are attributable to flushable wipes.  Note to Entry:  The conclusions of studies regarding regenerated cellulose referenced in the IWSFG documents refute the IWSFG's position on regenerated cellulose and are not appropriate substantiation for the IWSFG's standard, PASs or positions.	
PG	95-98	1	Introduction	Te	"The goal of the IWSFG is... identify those products that do not meet the IWSFG's standards." Here, the reference to "the IWSFG's standards" appears to imply that the PAS documents are "standards" and not "Publicly Available Specifications."	Clarify if the PAS documents are "tests," "Publicly Available Specifications" or "established IWSFG standards."	

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PG	95-98	1	Introduction	Te	Clarify.	Confirm the national or international standards body that has certified, thereby establishing the “established IWSFG standards” or the IWSFG “Publicly Available Specifications.”	
PG	101-103	2	Purpose	Te	Vague. Lacks supporting details, references and calculations.	Clarify the specific portion of wastewater transport systems under evaluation in PAS-3C, and provide relevant technical details and specifications for said portions.  Specifically, provide a detailed explanation, with appropriate reference to design manuals or similar, of where continuous flow conditions are found for a duration of 2 hours in wastewater transport systems with flow conditions described by a Reynolds Number of 20,000.	
PG	110	4	References	Te	Incomplete. The content of the test bears significant resemblance to existing copyrighted methods.	Provide appropriate reference and acknowledgement in this Section and throughout the document where both verbatim and paraphrased materials are utilized. Otherwise, delete content from unreferenced sources.	
PG	101-103	6	Principles	Te	Vague. Lacks supporting details, references and calculations.	Define “typically” with respect to hydraulic force.  Specifically, provide a reference to sewer design and/or other literature sources that identify a Reynolds Number of 20,000 as “typical” for a wastewater transport system.  Further, provide the percentage of flows this Reynolds Number represents globally with breakdown by country based on the research conducted by the IWSFG.  Also, relate the Reynolds Number of 20,000 to pipe flow.  Note to Entry: The references cited in Lines 348-353 are not suitable for establishing the Reynolds	

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						Number for the Shake Flask. The modelling work in those references was conducted using flasks that are different from the flasks than those specified in PAS-3C, and therefore the amount of turbulence is not equivalent.	
PG	101-103	6	Principles	Te	Vague. Lacks supporting details, references and calculations.	<p>Provide the results of modeling where a Reynolds Number of 20,000 has been determined for the Shake Flask operated under the conditions shown in PAS-3C- in particular, utilizing shake flasks with bottom baffles.</p> <p>If available, also provide modeling results that demonstrate whether the Reynolds Number of 20,000 represents an average value or maximum value.</p> <p>If an average value, provide the minimum and maximum Reynolds Number values produced during each rotation of the shake flask.</p> <p>If a maximum value, provide the time-weighted average calculation that results in a Reynolds Number of 20,000.</p> <p>Note to Entry: The references cited in Lines 348-353 are not suitable for establishing the Reynolds Number for the Shake Flask. The modelling work in those references was conducted using flasks that are different from the flasks than those specified in PAS-3C, and therefore the amount of turbulence is not equivalent.</p>	
PG	125	6	Principles	Te	Vague and poorly defined phrase: “hydraulic forces normally found...”	See comments regarding “typical” above. Provide all requested information regarding “typical” for “normally found” hydraulic forces.	
PG	127-130	6	Principles	Te	Contradictory. Significant concern regarding the amount of hydraulic force present in the test is evident from the content of PAS-3C, which appears to indicate an interest in establishing a test that has real-world conditions as a primary concern.	<p>Revise PAS-3C to allow for the inclusion of wastewater.</p> <p>Provide a list of preventative actions that are utilized by IWSFG (for example, personal protective equipment) to address health and</p>	

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					As such, prohibiting the use of wastewater for disintegration tests in the PAS-3 series tests significantly reduces realism in the test and makes the test not representative of real-world conditions.	safety concerns, as well as ranges of wastewater characteristics (for example, Total Suspended Solids and Carbonaceous Oxygen Demand) typical to wastewater based on IWSFG data, to address concerns related to inconsistency.	
PG	127-130	6	Principles	Te	Contradictory. The same health and safety and consistency concerns are present in the PAS-5A test, yet real media is utilized for that tests. Further, the same equipment (shaker table and flasks) are common to both.	Revise PAS-3C to allow the use of wastewater, and utilize the same procedures and strategies employed in the PAS-5A tests in the PAS-3C test to ensure safety and consistency.	
PG	127-130	6	Principles	Te	Clarify.	If the prohibition on the use of wastewater is maintained, given that the IWSFG is concerned about "inconsistency" related to wastewater, provide specific ranges of "inconsistency" between potable water aliquots for testing. For example, the characteristics of tap water will vary by location, and within a location by time of year, depending on the water source.  Provide ranges of parameters, including but not limited to, pH, hardness, and temperature, deemed levels of "inconsistency" that are acceptable.	
PG	201	9.1	Storage of samples	Te	Contradictory. The test method requires samples to be utilized immediately (Line 162-163: "Specimens must be removed from their packaging just before the testing starts.").	Remove storage requirements.  If storage requirements remain, provide the quantity of moisture absorption (for dry samples) or evaporation (for moist samples) with appropriate references for establishing threshold values for these parameters.	
PG	219-220	9.2	Conditioning for the Test	Te	Unclear why no conditioning step exists for PAS-3C.	Provide an explanation for why preconditioning is not required for PAS-3C, but is required for PAS-3B, given that both tests are intended to evaluate the same property.  Given that all PAS-3 series tests can be used interchangeably, in order to ensure consistency between methods, the preconditioning step should	

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						be added to PAS-3C, or deleted from PAS-3B.	
PG	250-251	10.2	Test Procedures	Te	<p>Contradictory. The test procedure prohibits the rinse step from forcing material through the sieve, however, the rinse has been demonstrated to force material through the sieve.</p> <p>Note to Entry: The results of independent laboratory tests using the PAS-3C procedure demonstrate that for multiple toilet paper types, the 1 minute rinse step results in the forced passage of significant percentages of the sample initially retained through the 6.3mm sieve.</p> <p>As such, the rinse step for method PAS-3C method is invalid for toilet paper and should be withdrawn until the error introduced via the proposed sample processing is addressed.</p>	<p>Provide test results that demonstrate that the 1-minute rinse “do[es] not force the passage of any material through the sieve.”</p> <p>Specifically, share the results of benchmark testing where PAS-3B tests were conducted on toilet paper samples, and the 1 minute rinse was shown to not result in the forced passage of material through the sieve.</p>	
PG	270-272	10.3	Test termination	Te	<p>Contradictory. PAS-3C requires that after testing “specimens contain[ing] fiber-binding chemicals” that “the surfaces shall be washed using solvents such as ethanol and methanol.”</p> <p>Note that this requirement contradicts the requirements of IWSFG PAS-1 (Environmental Health and Safety Requirements), which contains the following language in Section 7.5: lines 151-153 “chemicals: for example, solvents used for laboratory preparations...” and related: lines 162-164 “Note: None of these waste types can be flushed through toilets into the wastewater infrastructure; instead, they must be handled according to the relevant policies and regulations.”</p> <p>Per Lines 162-164 of PAS-1 (Environmental Health and Safety Requirements), solvents are not suitable for disposal into the drainlines of buildings. Or, alternatively, the IWSFG condones the disposal of solvents through a sink into the drainline of a building, however, were those solvents to be</p>	<p>Clarify the IWSFG position on use of solvents for PAS tests and disposal of solvents.</p> <p>Provide an explanation of what solvents, in what forms, and under what circumstances those solvents, are suitable for disposal into the drainline of a building.</p>	

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					<p>applied to a surface-cleaning wipe, for example, that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) such that it was appropriately labeled as flushable and suitable for disposal via the toilet, <b>the solvent would not be suitable for disposal into the drainline due to its presence on a surface-cleaning wipe.</b></p> <p>Further, for example, consider chlorine: "Chlorine reacts with water in and out of the body to form hydrochloric acid and hypochlorous acid. Both are extremely poisonous."  <a href="https://medlineplus.gov/ency/article/002772.htm">https://medlineplus.gov/ency/article/002772.htm</a></p> <p>Given its widespread use, the disposal of this chemical through sinks and laundry machines into drainlines is very common. Provide IWSFG's opinion whether a surface-cleaning wipe that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) but contains chlorine can be labelled as flushable. Note that such a wipe would, under many usage conditions, likely become contaminated with bodily fluids, such as typical bathroom cleaning and therefore fall within the Scope of the IWSFG Standard 1: 2017.</p>		
PG	307-320	11	Acceptance Criteria	Te	<p>Independent laboratory testing of multiple toilet paper samples was conducted at three laboratories to evaluate interlab variability of the proposed PAS-3 series tests.</p> <p>Five toilet papers were tested using the three PAS-3 series tests.</p> <p><b>Results:</b></p> <ol style="list-style-type: none"> <li><b>Three of five toilet papers tested did not meet the acceptance criteria for all three PAS-3 series disintegration tests.</b></li> </ol>	<p>Based on an inter-lab evaluation of the PAS-3 series disintegration tests, the tests give inconsistent results across laboratories, and therefore are not suitable for publication as written- both the methods and the currently proposed acceptance criteria must be revised.</p> <p>Conduct an appropriate interlab testing program utilizing a range of products.</p> <p>Once complete, establish relationships between laboratory test method results and infrastructure compatibility issues experienced based on field studies and documented issues to determine</p>	

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					2. Two of the three samples tested failed to meet the proposed acceptance criteria across all three laboratories, but did meet the acceptance criteria at one laboratory in one test. <b>In summary, two substrates that failed to meet the proposed acceptance criteria for eight of nine tests conducted across three laboratories would, according to Section 7.3 (IWSFG Standard 1), be flushable.</b> Put another way, two substrates that failed to meet the proposed acceptance criteria in 89% of tests conducted would meet the IWSFG criteria for dispersibility.	appropriate test conditions and acceptance criteria.	
PG	307-320	11	Acceptance Criteria	Te	Proposed acceptance criteria lacks sufficient detail regarding protection of infrastructure and test reliability.	Provide evidence that acceptance criteria is necessary for the protection of infrastructure.	
PG	307-320	11	Acceptance Criteria	Te	Proposed acceptance criteria lacks sufficient detail regarding test reliability and reproducibility.	Provide a statistical analysis of PAS-3C that demonstrates the accuracy, reproducibility and repeatability (both intra-lab and inter-lab) of the method.  Demonstrate through statistical analysis of results of various substrates, including toilet paper, that the method has sufficient resolution to distinguish between substrates at the 95% acceptance criteria level.	
PG	307-320	11	Acceptance Criteria	Te	Contradictory and vague. PAS-3C contains two pass criteria: the method requires that a sample either attain: 100% passing the sieve or 95% passing the sieve.	Establish a single pass criteria.  Alternatively, provide test results demonstrating the ability of laboratory technicians to visually determine, with an accuracy greater than 5%, the amount of material present on a sieve.	
PG	307-320	13	Precision	Te	Remove as unnecessary and unrelated to Precision. Precision of test equipment is wholly distinct from sample precision.	Delete.  If retained, provide details of statistical analysis	

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						completed on a range of products that demonstrates that 5 “separate specimens” is an appropriate number of replicates to eliminate variability within a single product.	
PG	398-399	13	Precision	Te	Proposed precision text contradicts precision requirements in other PASs.	Provide the rationale and data supporting why in PAS-3B, 5 “separate specimens” is an appropriate number of samples to eliminate variability, whereas in PAS-2B, for example, 10 “separate specimens” are necessary to eliminate variability.  Provide the statistical analysis for PAS-3B and PAS-2B that justifies the different in requisite “separate specimens.”	
PG	348-353		Bibliography	Ge	References not cited in the document.	Delete.  If the references are retained, provide proper citations within the text.  Note to Entry:  The references cited in Lines 348-353 are not suitable for establishing the Reynolds Number for the Shake Flask. <b>The modelling work in those references was conducted using flasks that are different from the flasks than those specified in PAS-3C, and therefore the amount of turbulence is not equivalent.</b>	

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PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	<p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.</p>	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify	
PG	5		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	5			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	6-7		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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					BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner."		
PG	15		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	15		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG				Te	Provide appropriate citations for sources of information.	Specifically note in the text where this test is based on the INDA/EDANA FG-504 Column Settling test.	
PG				Te	PAS-4 contains an incorrect description of infrastructure context of settlement test. Specifically, it is unclear from the text the wastewater treatment unit processes that PAS-4 is meant to mimic, and therefore predict performance in.	Revise. Provide reference to information/experiments/testing conducted to establish the settling performance in wastewater infrastructure.	
PG				Te	Insufficient information provided to understand how benchmark performance was established.	Provide the results of all testing conducting to establish benchmarks for PAS-4.  Specifically, provide results of tests conducted that demonstrates the ability of PAS-4 to be utilized, using the proposed Acceptance Criteria, to differentiate between different types of toilet paper, toilet paper and flushable wipes, toilet paper and baby wipes, toilet paper and surface cleaning wipes, and any other comparison testing done in the development of PAS-4.	
PG				Te	Note participation of ISO-accredited labs in the establishment of PAS-4	Provide all results from ISO-accredited laboratories that conducted test PAS-4 on behalf of the IWSFG for establishing benchmarks.	

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						Provide a list of all ISO 17025:2005 accredited labs that have conducted testing using PAS-4 as written.	
PG	62	1	Introduction	Te	Undefined term: "wastewater process systems"	Define	
PG	63	1	Introduction	Te	Vague. The statement (and Footnote 1) implies that some level of chemicals and contaminants are allowed to be discharged into the sewer but no details are provided.	Describe the process that wastewater services utilize to determine if industrial discharges "can be safely treated."  Provide a detailed explanation of the risk-based approaches utilized globally for assessing the safety of these discharges.	
PG	62-84	1	Introduction	Te	Incomplete. The list of post-treatment pathways has significant omissions. Revise to include all relevant pathways, particularly for liquid effluent from WWTPs (indirect potable reuse, for example).	Revise.	
PG	71-75	1	Introduction	Te	The statement: "The physically adverse effects of the introduction of such products to wastewater systems (clogging and plugging) have already been identified" is incorrect and misleading. No such identification of physically adverse effects from flushable wipes has been demonstrated.	Delete.  If retained, provide the results of studies demonstrating physical adverse effects (i.e., impacts to wastewater infrastructure) from flushable wipes.	
PG	71-75	1	Introduction	Te	The statement "...environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as "flushable"." is entirely speculative and anecdotal.	Delete.  If retained, provide the results of studies demonstrating environmental effects that are attributable to flushable wipes.  Note to Entry:  The conclusions of studies regarding regenerated cellulose referenced in the IWSFG documents refute the IWSFG's position on regenerated cellulose and are not appropriate substantiation for the IWSFG's standard, PASs or positions.	
PG	81-84	1	Introduction	Te	Vague and contradictory. Interchanging terms: "test" "established IWSFG standard" and "Publicly Available Specification"	Clarify if the PAS documents are "established IWSFG standards," "Publicly Available	

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						Specifications” or “standards.”  Confirm the national or international standards body that has certified, thereby establishing the “established IWSFG standards” or the IWSFG “Publicly Available Specifications.”	
PG	87-88	2	Purpose	Te	Vague. Significant omissions and gaps. Incomplete.  Note to Entry:  Significant portions of wastewater infrastructure that require settlement of solids for operation and compatibility are not “typically found in the treatment plants of wastewater systems.”	Provide details of the specific portion(s) of wastewater transport systems under evaluation in PAS-4, and provide relevant technical details and specifications for said portions. Include all relevant wastewater infrastructure where settlement is necessary for compatibility, both within a WWTP and elsewhere.	
PG	90	4	References	Te	Incomplete. The content of the test bears significant resemblance to existing copyrighted methods.	Provide appropriate reference and acknowledgement in this Section and throughout the document where both verbatim and paraphrased materials are utilized. Otherwise, delete content from unreferenced sources.	
PG	120-121	5.6	Unit Side – toilet paper	Te	Contradictory definition of Unit Size. Here, Unit Size (or Unit Dose) is based on mass, where as in other PASs (PAS-3 series), Unit Size (or Unit Dose) is based on square area or number of sheets of toilet paper.	Normalize the definition of the “Unit Size” or “Unit Dose” across all PAS test methods.  Alternatively provide the results of consumer research or field testing that supports the use of a different “Unit Size” or “Unit Dose” in the various PAS tests.  Further, “Unit Size” or “Unit Dose” for a PAS should logically follow the “Unit Size” or “Unit Dose” of precursor PAS tests and the associated subsequent wastewater infrastructure they are meant to represent.	
PG	120-121	5.6	Unit Side – toilet paper	Te	Consistent Unit Dose or Unit Size should be applied in all PAS test methods.	Establish uniform Unit Dose or Unit Size for toilet paper for all PAS methods.  Rerun all benchmark testing where the “unit size” or “unit dose” is modified to ensure that the	

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						benchmark performance does not change.	
PG	140-145	6	Principles	Te	Contradictory. Prohibiting the option to use wastewater in PAS-4 series tests eliminates the ability of the use to add real-world conditions to the test method.	Revise PAS-4 to allow for the inclusion of wastewater.  Provide a list of preventative actions that are utilized by IWSFG (for example, personal protective equipment) to address health and safety concerns, as well as ranges of wastewater characteristics (for example, Total Suspended Solids and Carbonaceous Oxygen Demand) typical to wastewater based on IWSFG data, to address concerns related to inconsistency.	
PG	140-145	6	Principles	Te	Contradictory. The same health and safety and consistency concerns are present in the PAS-5A test, yet real media is utilized for that tests.	Revise PAS-4 to allow the use of wastewater, and utilize the same procedures and strategies employed in the PAS-5A tests in the PAS-4 test to ensure safety and consistency.	
PG	140-145	6	Principles	Te	Clarify.	If the prohibition on the use of wastewater is maintained, given that the IWSFG is concerned about "inconsistency" related to wastewater, provide specific ranges of "inconsistency" between potable water aliquots for testing. For example, the characteristics of tap water will vary by location, and within a location by time of year, depending on the water source.  Provide ranges of parameters, including but not limited to, pH, hardness, and temperature, deemed levels of "inconsistency" that are acceptable.	
PG	176-179	8.1.1	Preferred acquisition method	Te	Contradiction. The text implies a preference for obtaining samples for PAS-4 from PAS-2B. The text implies collection of samples for PAS-4 from a combined test of PAS-2A and PAS-2B.	Clarify.	
PG	180-181	8.1.1	Preferred acquisition method	Te	Vague. Insufficient details provided regarding acceptable storage of samples prior to testing.	Delete or modify with additional details	

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PG	215-217	8.3.2	Moist Tissues	Te	<p>Contradictory requirements.</p> <p>Lines 215-217 contain the following language: “Moist tissues shall be tested as removed from the package. No attempt to remove the lotion should be made and the removed moist tissue should not be left for any time, to reduce the evaporation of the moisture.”</p> <p>However, Lines 262-264 contain the following language: “If the specimens tested are acquired through the alternative acquisition method (section 8.1.2), then the specimens should be immersed for 30 seconds in water, and if moistened should additionally be gently agitated to remove coatings.”</p>	<p>Rectify the contradictory language.</p> <p>Clarify which method was followed during testing conducted by IWSFG in establishing the PAS-4 test procedure.</p> <p>Clarify which method the ISO-accredited lab followed during the establishment of the PAS-4 test procedure.</p>	
PG	237-253	9.1	Storage of Samples	Te	<p>Contradictory. The test method requires samples to be utilized immediately (Line 201: “Specimens must be removed from their packaging just before the testing starts.”). However, procedures regarding the storage of samples from PAS-2B contradict this statement.</p>	<p>Remove storage requirements.</p> <p>Ensure consistency of all requirements regarding sample conditioning and storage.</p> <p>As an alternative, if storage requirements remain, provide the quantity of moisture absorption (for dry samples) or evaporation (for moist samples) with appropriate references for establishing threshold values for these parameters</p>	
PG	291-293	10.3	Test Termination	Te	<p>Contradictory. PAS-4 requires that after testing “specimens contain[ing] fiber-binding chemicals” that “the surfaces shall be washed using solvents such as ethanol and methanol.”</p> <p>Note that this requirement contradicts the requirements of IWSFG PAS-1 (Environmental Health and Safety Requirements), which contains the following language in Section 7.5: lines 151-153 “chemicals: for example, solvents used for laboratory preparations...” and related: lines 162-164 “Note: None of these waste types can be flushed through toilets into the wastewater infrastructure; instead, they must be handled</p>	<p>Clarify the IWSFG position on use of solvents for PAS tests and disposal of solvents.</p> <p>Provide an explanation of what solvents, in what forms, and under what circumstances those solvents, are suitable for disposal into the drainline of a building according to the IWSFG.</p>	

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					<p>according to the relevant policies and regulations.”</p> <p>Per Lines 162-164 of PAS-1 (Environmental Health and Safety Requirements), solvents are not suitable for disposal into the drainlines of buildings. Or, alternatively, the IWSFG condones the disposal of solvents through a sink into the drainline of a building, however, were those solvents to be applied to a surface-cleaning wipe, for example, that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) such that it was appropriately labeled as flushable and suitable for disposal via the toilet, <b><i>the solvent would not be suitable for disposal into the drainline due to its presence on a surface-cleaning wipe.</i></b></p> <p>Further, for example, consider chlorine: “Chlorine reacts with water in and out of the body to form hydrochloric acid and hypochlorous acid. Both are extremely poisonous.”  <a href="https://medlineplus.gov/ency/article/002772.htm">https://medlineplus.gov/ency/article/002772.htm</a></p> <p>Given its widespread use, the disposal of this chemical through sinks and laundry machines into drainlines is very common. Provide IWSFG’s opinion whether a surface-cleaning wipe that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) but contains chlorine can be labelled as flushable. Note that such a wipe would, under many usage conditions, likely become contaminated with bodily fluids, such as typical bathroom cleaning and therefore fall within the Scope of the IWSFG Standard 1: 2017.</p>		
PG	358-359	13	Precision	Te	Remove as unnecessary and unrelated to Precision. Precision of test equipment is wholly distinct from sample precision.	Delete.  If retained, provide details of statistical analysis completed on a range of products that demonstrates that 10 “separate specimens” is an	

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						appropriate number of replicates to eliminate variability within a single product.	
PG	358-359	13	Precision	Te	Proposed precision text contradicts precision requirements in other PASs.	Provide the rationale and data supporting why in PAS-4, 10 “separate specimens” is an appropriate number of samples to eliminate variability, whereas in PAS-3C, for example, 5 “separate specimens” are necessary to eliminate variability.  Provide the statistical analysis for PAS-4 and PAS-3C that justifies the different in requisite “separate specimens.”	
PG	363-364	13	Precision	Te	Vague undefined term.	Define “stabilize”	
PG	374-375		Bibliography	Ge	References not cited in the document.	Delete.  If the references are retained, provide proper citations within the text.	

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PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	<p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.</p>	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify	
PG	4		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	4			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	5		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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					BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner."		
PG	14		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	14		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG				Te	Provide appropriate citations for sources of information.	Confirm this test is based on the INDA/EDANA FG-505A Aerobic Biodisintegration Test.	
PG				Te	Provide appropriate citations for sources of information.	Confirm the sieving process in Annex 3 is based on INDA/EDANA SG002 protocol.  If so, provide the results of laboratory tests conducted by IWSFG, or on behalf of IWSFG by an ISO-accredited laboratory, utilized to justify modification of the sieve size.  Further, provide the results of tests that demonstrate how this modification was necessary for establishing toilet paper as the benchmark for PAS-5A.	
PG				Te	Unsupported and unnecessary modifications to existing test method are proposed in PAS-5A.  Note to Entry. Independent laboratory testing conducted as part of ISO TC224 WG10 demonstrated that modification to the sieve size did not result in any improvement to the resolution of the INDA/EDANA FG505A test. In short, it was concluded based on the test results that modification of the sieve size was unnecessary.	Provide a list of modifications to the INDA/EDANA FG-505A Aerobic Biodisintegration Test.  Provide all results for tests conducted by the IWSFG utilized to justify the modifications to the INDA/EDANA FG-505A test.	

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PG				Te	Provide additional details on the establishment of benchmark materials and performance.	<p>Provide the results of all testing conducting to establish benchmarks for PAS-5A.</p> <p>Provide all results from ISO-accredited laboratories that conducted testing to establishing benchmarks for PAS-5A, utilizing PAS-5A as written.</p> <p>Provide all test results and associated interpretation of data demonstrating the establishment of benchmarks for PAS-5A. Specifically the results of tests conducted using toilet paper to establish benchmark performance in PAS-5A.</p> <p>Provide all test results and associated interpretation of data demonstrating the establishment of benchmarks for PAS-5A. Specifically the results of tests conducted that demonstrates the ability of PAS-5A to be utilized, using the proposed Acceptance Criteria, to differentiate between different types of toilet paper, toilet paper and flushable wipes, toilet paper and baby wipes, toilet paper and surface cleaning wipes, and any other comparison testing done in the development of PAS-5A.</p>	
PG				Te	Significant omission from method- method and/or procedure lacks any details for obtaining test media.	Revise with details regarding obtaining test media.	
PG				Te	Method incomplete. Method PAS-5A contains no requirement for a laboratory blank.	Provide IWSFG's rationale for omitting a laboratory blank.	
PG				Te	<p>Significant omission from method- method and/or procedure lacks details for how test operator and/or laboratory determines if the test is valid.</p> <p>There is no description of a control sample. This is a serious omission, and goes against standard laboratory method protocols rendering the entire</p>	Revise PAS-5A test method and/or procedure to establish guidelines for determining test validity, including but not limited to establishing protocols for laboratory controls.	

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					PAS-5A method invalid.		
PG				Te	Method incomplete. Additional details regarding test validity required.	Regarding laboratory controls, given the variability common in aerobic sludges, provide guidance for interpretation of a test where the laboratory control does not achieve the Acceptance Criteria.	
PG	75	1	Introduction	Te	Undefined term: "wastewater process systems"	Define	
PG	77-80	1	Introduction	Te	Incomplete. The list of post-treatment pathways has significant omissions. Revise to include all relevant pathways, particularly for liquid effluent from WWTPs (indirect potable reuse, for example).	Revise.	
PG	83-88	1	Introduction	Te	The statement: "The physically adverse effects of the introduction of such products to wastewater systems (clogging and plugging) have already been identified" is incorrect and misleading. No such identification of physically adverse effects from flushable wipes has been demonstrated.	Delete.  If retained, provide the results of studies demonstrating physical adverse effects (i.e., impacts to wastewater infrastructure) from flushable wipes.	
PG	83-88	1	Introduction	Te	The statement "...environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as "flushable"." is entirely speculative and anecdotal.	Delete.  If retained, provide the results of studies demonstrating environmental effects that are attributable to flushable wipes.  Note to Entry:  The conclusions of studies regarding regenerated cellulose referenced in the IWSFG documents refute the IWSFG's position on regenerated cellulose and are not appropriate substantiation for the IWSFG's standard, PASs or positions.	
PG	94-97	1	Introduction	Te	Vague and contradictory. Interchanging terms: "test" "established IWSFG standard" and "Publicly Available Specification"	Clarify if the PAS documents are "tests," "Publicly Available Specifications" or "established IWSFG standards."	
PG	100-101	2	Purpose	Te	Vague.	Provide details of the specific portion(s) of wastewater systems under evaluation in PAS-5A, and provide relevant technical details and specifications for said portions.	

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PG	109	4	References	Te	Incomplete. The content of the test bears significant resemblance to existing copyrighted methods.	Provide appropriate reference and acknowledgement in this Section and throughout the document where both verbatim and paraphrased materials are utilized. Otherwise, delete content from unreferenced sources.	
PG	123-124	5	Unit Side – Toilet Paper	Te	Contradictory. Unit Dose or Unit Size of sample in biodisintegration testing should logically follow preceding tests, for example settlement. Note that the Unit Dose or Unit Side of the sample in the Settlement test (PAS-4) is mass based and significantly different from the Unit Dose or Unit Side of PAS-5A.	Normalize the definition of the “Unit Size” or “Unit Dose”, alternatively provide the results of consumer research or field testing that supports the use of a different “unit size” or “unit dose” in the various PAS tests. “Unit Size” or “Unit Dose” for a PAS should logically follow the “Unit Size” or “Unit Dose” of precursor PAS tests and the associated wastewater infrastructure they are meant to represent.	
PG	123-124	5	Unit Side – Toilet Paper	Te	Contradictory definition of “Unit Size” for toilet paper.	Rerun all testing using a relevant “unit size” or “unit dose” to ensure that the benchmark performance does not change.	
PG	133	6	Principles	Te	Vague.	Define the “digesters” PAS-5A is meant to represent or model.	
PG	190	8.3.4	Test Mixture	Te	Vague.	Define “liquid wastewater” in the context of PAS-5A.	
PG	190-197	8.3.4	Test Mixture	Te	Contradictory. Concerns regarding the health and safety risks associated with using wastewater resulted in the prohibition of the use of wastewater in other PAS test methods.	Provide all relevant health and safety procedures and protocols utilized to mitigate the risks associated with, and allow use of, “liquid wastewater from an aeration basin” in PAS-5A.	
PG	190-197	8.3.4	Test Mixture	Te	Contradictory requirements between PAS methods.	Provide an explanation for the difference in the health and safety risks between PAS-5A and PAS-3C, whereby wastewater is suitable for use in PAS-5A, but not in PAS-3C, despite identical lab materials and equipment being utilized in both.	
PG	190-197	8.3.4	Test Mixture	Te	Vague.	Provide the rationale and data to support the ranges of characteristics of “liquid wastewater	

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						from an aeration basin.”  Specifically, describe how this variability is acceptable for PAS-5A and does not impact the results of tests, based on testing conducted by IWSFG in establishing benchmark performance for PAS-5A.	
PG	194	8.3.4	Test Mixture	Te	Range of TSS is vague.	If the TSS is less than, or greater than, the range specified, provide guidance on diluting or concentrating the sludge.	
PG	205-220	9.1	Storage of Samples	Te	Contradictory. The test method requires samples to be utilized immediately (Line 172: “Specimens must be removed just before testing starts.”).	Remove storage requirements.  As an alternative, if storage requirements remain, provide the quantity of moisture absorption (for dry samples) or evaporation (for moist samples) acceptable for a sample with appropriate references for establishing threshold values for these parameters.	
PG	230-231	10.1	Summary	Te	Contradicts established method on which PAS-5A is based.	Provide the results of all laboratory testing conducted by an ISO-accredited laboratory utilizing PAS-5A that demonstrates the necessity of using a timeframe of 21 days, or alternatively, how use of a timeframe of 14 days is inappropriate.  Provide reference to a standard wastewater treatment plant operations manual where residence time in activated sludge is cited as 21 days.	
PG	237	10.2	Test Procedure	Te	Contradicts established method on which PAS-5A is based.	Provide the results of all laboratory testing conducted by an ISO-accredited laboratory utilizing PAS-5A that demonstrates the necessity of using 750mL of sludge, or alternatively, how use of 1L of sludge is inappropriate.	
PG	237-251	10.2	Test Procedure	Te	Incomplete. Method cannot be conducted as written.	Revise.	
PG	243	10.2	Test Procedure	Te	Vague and incomplete.	Provide an allowed deviation from the required temperature.	

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						For example, provide the length of time the temperature is allowed to exceed or drop below the temperature before the test is rendered invalid.	
PG	244-247	10.2	Test Procedure	Te	Vague and incomplete.	The language appears to imply that the foam stopper is intended to form an air-tight seal. Confirm that the purpose of the stopper, specifically if the stopper is to prevent air from entering the flask.	
PG	244-247	10.2	Test Procedure	Te	Vague and incomplete.	Clarify the procedure for a test in which, despite having removed the foam stopper, the dissolved oxygen level remains below 2 mg/L.  Provide the amount of time that the dissolved oxygen can remain below 2 mg/L before the test becomes invalid, with reference to standard wastewater operational procedures regarding dissolved oxygen concentrations in activated sludge unit processes.	
PG	244-247	10.2	Test Procedure	Te	Vague and incomplete.	Provide reference to wastewater treatment plant design and operation manuals that cite 2 mg/L as a minimum value, as well as the results of testing conducted by IWSFG that demonstrates that dissolved oxygen concentrations below 2 mg/L negatively impact degradation processes in the PAS-5A test.  Numerous sources are available that cite dissolved oxygen ranges below 2 mg/L. Conduct a thorough review of available resources and revise PAS-5A accordingly.	
PG	244-247	10.2	Test Procedure	Te	Vague and incomplete.	Provide the results of toilet paper benchmarking tests where the issue of low dissolved oxygen resulted in an invalid PAS-5A test.	
PG	244-247	10.2	Test Procedure	Te	Inaccurate dissolved oxygen threshold value.  Note that operation of activated sludge can occur at a dissolved oxygen concentration as low 1 mg/L.	Numerous sources are available that cite dissolved oxygen ranges below 2 mg/L. Conduct a thorough review of available resources and revise PAS-5A accordingly.	

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					<p>Note to Entry:  <a href="https://www.michigan.gov/documents/deg/wrd-ot-activated-sludge-manual_460007_7.pdf">https://www.michigan.gov/documents/deg/wrd-ot-activated-sludge-manual_460007_7.pdf</a> "Aeration must also provide oxygen to the huge population of aerobic and facultative bacteria and other organisms in the mixed liquor. Operators typically control the aeration rate to assure a concentration of 2 – 3 mg/L of dissolved oxygen (D.O.) at the discharge end of the aeration tank. Higher D.O. concentrations waste power, while low D.O. (&lt;1 mg/L) may encourage the growth of filamentous bacteria."</p> <p>Note to Entry:  <a href="http://files.dep.state.pa.us/Water/BSDW/OperatorCertification/TrainingModules/ww16_sludge_2_ak.pdf">http://files.dep.state.pa.us/Water/BSDW/OperatorCertification/TrainingModules/ww16_sludge_2_ak.pdf</a> ) "As the mass of organisms in an aeration tank increase in number, the amount of oxygen needed to support them also increases. High concentrations of BOD in the influent or a higher influent flow will increase the activity of the organisms and thus increase the demand for oxygen. Sufficient oxygen must always be maintained in the aeration tank to ensure complete waste stabilization.</p> <p>"This means that the level of oxygen in the aeration tank is also one of the critical controls available to the operator. A minimum dissolved oxygen (D.O.) level of 1.0 mg/L is recommended in the aeration tank for most basic types of activated sludge processes. Maintaining &gt; 1.0 mg/L of D.O. contributes to establishing a favorable environment for the organisms, which produces the desired type of organism and the desired level of activity. If the D.O. in the aeration tank is allowed to drop too low for long periods, undesirable organisms, such as filamentous type bacteria may develop and overtake the process. Conversely, D.O. levels that</p>		

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					<p>are allowed to climb too high can cause problems such as floc particles being floated to the surface of the secondary clarifiers. This problem is particularly common during cold weather. For these reasons it is important that the proper dissolved oxygen levels be maintained in the aeration basin.”</p> <p>Note to Entry:  <a href="https://www.env.nm.gov/swqb/FOT/WastewaterStudyManual/10.pdf">https://www.env.nm.gov/swqb/FOT/WastewaterStudyManual/10.pdf</a> “Some system run at less than 1.0 mg/L of D.O. and yet operate well because they are still operating within an acceptable F:M range. Some highly loaded systems need much more than 1.0 mg/L of D.O. just to get by. Remember that it is easier to dissolve oxygen into cold water than into warm water. Therefore cold weather increases aeration system performance, although the microorganism activity is reduced.”</p>		
PG	244-247	10.2	Test Procedure	Te	Unreferenced.	<p>Provide references for the dissolved oxygen ranges specified, specifically their relationship to the rate of biological degradation.</p> <p>Provide the acceptable timeframe for how long the dissolved oxygen level can remain below 2 mg/L before the test becomes invalid.</p>	
PG	248-249	10.2	Test Procedure	Te	Vague. Additional details regarding diffuser necessary.	<p>Provide guidance on whether the sample can contact the diffuser or associated tubing.</p> <p>If so, provide a threshold value for the percentage of the test that the test material can remain in contact with the diffuser before the test is invalid.</p>	
PG	275-277	10.3	Test termination	Te	<p>Contradictory. PAS-5A requires that after testing “specimens contain[ing] fiber-binding chemicals” that “the surfaces shall be washed using solvents such as ethanol and methanol.”</p> <p>Note that this requirement contradicts the requirements of IWSFG PAS-1 (Environmental Health and Safety Requirements), which contains</p>	<p>Clarify the IWSFG position on use of solvents for PAS tests and disposal of solvents.</p> <p>Provide an explanation of what solvents, in what forms, and under what circumstances those solvents, are suitable for disposal into the drainline of a building according to the IWSFG.</p>	

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					<p>the following language in Section 7.5: lines 151-153 “chemicals: for example, solvents used for laboratory preparations...” and related: lines 162-164 “Note: None of these waste types can be flushed through toilets into the wastewater infrastructure; instead, they must be handled according to the relevant policies and regulations.”</p> <p>Per Lines 162-164 of PAS-1 (Environmental Health and Safety Requirements), solvents are not suitable for disposal into the drainlines of buildings. Or, alternatively, the IWSFG condones the disposal of solvents through a sink into the drainline of a building, however, were those solvents to be applied to a surface-cleaning wipe, for example, that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) such that it was appropriately labeled as flushable and suitable for disposal via the toilet, <b><i>the solvent would not be suitable for disposal into the drainline due to its presence on a surface-cleaning wipe.</i></b></p> <p>Further, for example, consider chlorine: “Chlorine reacts with water in and out of the body to form hydrochloric acid and hypochlorous acid. Both are extremely poisonous.”  <a href="https://medlineplus.gov/ency/article/002772.htm">https://medlineplus.gov/ency/article/002772.htm</a></p> <p>Given its widespread use, the disposal of this chemical through sinks and laundry machines into drainlines is very common. Provide IWSFG’s opinion whether a surface-cleaning wipe that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) but contains chlorine can be labelled as flushable. Note that such a wipe would, under many usage conditions, likely become contaminated with bodily fluids, such as typical bathroom cleaning and therefore fall</p>		

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					within the Scope of the IWSFG Standard 1: 2017.		
PG	292-303	1[sic]	Acceptance Criteria	Te	Contradictory. PAS-5A contains two pass criteria: the method requires that a sample either attain: 100% passing the sieve or 95% passing the sieve.	Select a single method and pass criteria.  Alternatively, provide test results demonstrating the ability of laboratory technicians to visually determine, with an accuracy greater than 5%, the amount of material present on a sieve.	
PG	325-326	13	Precision	Te	Vague.	Define an acceptable range of dissolution in water for chemicals from binders for the PAS-5A test.  Provide an explanation for how this is relevant to "precision" of the PAS-5A test.	
PG	327-329	13	Precision	Te	Unreferenced and unsupported in the literature.	Provide references for the dissolved oxygen ranges specified, specifically their relationship to the rate of biological degradation.	
PG	328	13	Precision	Te	Vague description.	Quantify the term "frequently"  Note that this frequency should match the frequency that the ISO-accredited laboratory that was utilized to establish PAS-5A measured the dissolved oxygen level.	
PG	327-329	13	Precision	Te	Additional details required.	Provide guidance for a test where, despite the reactive measures prescribed in PAS-5A (removal of foam stopper and introduction of air) the dissolved oxygen level remains below 2 mg/L.  Provide the acceptable timeframe for how long the dissolved oxygen level is allowed to remain below 2 mg/L before the test becomes invalid.	
PG	327-329	13	Precision	Te	Vague.	Define the procedure for how a flask should be scraped and/or topped up.	
PG	335-336	13	Precision	Te	Remove as unnecessary and unrelated to Precision. Precision of test equipment is wholly distinct from sample precision.	Delete.  If retained, provide details of statistical analysis completed on a range of products that demonstrates that 10 "separate specimens" is an appropriate number of replicates to eliminate	

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PG	335-336	13	Precision	Te	Proposed precision text contradicts precision requirements in other PASs.	<p>variability within a single product.</p> <p>Provide the rationale and data supporting why in PAS-3C, 5 "separate specimens" is an appropriate number of samples to eliminate variability, whereas in PAS-5A, for example, 10 "separate specimens" are necessary to eliminate variability.</p> <p>Provide the statistical analysis for PAS-3C and PAS-5A that justifies the different in requisite "separate specimens."</p>	
PG	340-350		Bibliography	Ge	References not cited in the document.	<p>Delete.</p> <p>If the references are retained, provide proper citations within the text.</p>	

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PG				Ge	Submitting comments on the International Wastewater Services Flushability Group (IWSFG) Standard in this public comment period in no way represents participation in the development process of the IWSFG Standard or PAS test 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	The IWSFG Standard and the associated Publicly Available Specification (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 the proposed requirements for flushable products, and as such, the IWSFG Standard represent arbitrary performance requirements that are unfounded and unrelated to issues faced by wastewater utilities. 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 performance concepts.	Provide written justification for the IWSFG Standard, including reference to all data and examples of infrastructure issues attributable to flushable wipes.	
PG				Ge	Based on the results of field testing and forensics conducted by a range of stakeholders, all available evidence continues to reinforce the fact that flushable wipes are compatible with wastewater infrastructure.	Provide evidence of impact to wastewater infrastructure that has been demonstrated to be the result of flushable wipes.  Note to Entry: Recovery of intact wipes from field studies is insufficient evidence. This testing	

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						<p>contradicts the premise of the IWSFG Standard, specifically because the testing demonstrates the ability of flushable wipes to move with solids, which is the critical aspect for compatibility with wastewater infrastructure.</p> <p>From Section 19.14 "Flow in Gravity Sewers" in <i>Water-Resources Engineering</i> (4<sup>th</sup> Edition, McGraw-Hill, pg. 693):</p> <p>"To prevent the settlement of wastewater solids, the velocity in a sewer flowing full should be not less than about 2 ft/sec (0.6 m/sec). Such a sewer flowing one-sixth full will have a velocity of 1 ft/sec (0.3 m/sec), which is reasonably adequate. This is especially important in sanitary sewers, for decomposition of settled wastes results in undesirable conditions."</p>	
PG				Ge	The IWSFG documents specify that toilet paper was utilized for benchmarking the acceptance criteria of the PASs. No details regarding the processes that were followed in developing the benchmarks have been provided in association with the IWSFG documents. Reference to the historical performance of toilet paper is insufficient justification for establishing benchmark performance, and is particularly imprecise given the wide range of types and characteristics of toilet paper found globally.	Provide details of all benchmark testing conducted by the IWSFG to allow for independent validation and verification of the reproducibility of laboratory tests and acceptable criteria proposed by the IWSFG.	
PG				Ge	The IWSFG documents lack technical details linking the performance of any product (including toilet paper utilized as a benchmark) in any of the IWSFG PAS test methods, and the compatibility of that product with any portions of wastewater infrastructure.	Provide details of all testing (laboratory and field) where the established benchmarks were verified as appropriate and necessary for the protection of infrastructure.	
PG				Ge	The IWSFG documents contain multiple technical errors that render the documents unfit for publication or use as laboratory test methods	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods.	

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					without significant revision. For example, IWSFG-PAS-5A-Aerobic-Biodisintegration-Test-2017 contains no laboratory controls for evaluating if the test results are acceptable- this is critical error and omission, and renders the method unusable as written.		
PG				Ge	Given the extent of the revisions necessary, the IWSFG Standard and associated PASs should be resubmitted for a second public comment period once all errors and omissions have been rectified.	Fix contradictions, error and omission of all Publicly Available Specification (PAS) test methods and resubmit for a second public comment period.	
PG				Ge	The IWSFG documents contain no details regarding the processes that were followed in developing the IWSFG Standard and Publicly Available Specification (PAS), or the processes that will be followed for inclusion of public comments. Transparency regarding the processes that the IWSFG are following, including how the input of a range of stakeholders will be included, is necessary to understand whether the IWSFG standard has been developed appropriately.	Provide details of all test method and document development and approval processes being followed by the IWSFG.	
PG				Ge	The International Standards Organization (ISO) provides the following information regarding a Publicly Available Specification: "Publicly Available Specifications have a maximum life of six years, after which they can be transformed into an International Standard or withdrawn." <a href="https://www.iso.org/deliverables-all.html#TR">https://www.iso.org/deliverables-all.html#TR</a> .	Clarify if the IWSFG documents were developed in accordance with an ISO process, or if not, if they were developed using an ISO framework.  Provide the life cycle of the IWSFG PAS documents, including the maximum life of the IWSFG PASs.	
PG				Ge	While the Draft status of the IWSFG Standard and PAS documents is acknowledged, significant editing of both general and scientific content of the documents is required. The lack of editorial and scientific rigor of the documents makes commenting ineffective at this stage of development.	The IWSFG Standard and PAS documents should be recalled, revised then resubmitted for a second public comment period; the documents are not in a condition suitable for public review.	
PG				Ge	The IWSFG Standard and each of the IWSFG PAS test methods contain numerous errors, as well as inter-method and intra-method contradictions	Revise all PAS test methods.	

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					regarding critical technical details, that render the methods incapable of interpretation, let alone use as written. A laboratory, whether they were ISO-accredited or not, would be incapable of conducting the PAS tests as currently written.		
PG				Ge	The PASs contain numerous instances where different and contradictory "Acceptance Criteria" are provided, rendering the PAS unusable as currently written.	Revise PASs to eliminate contradictory procedures and "acceptance criteria".	
PG				Ge	<p>Misuse of the word "standard," and variations thereof, occurs frequently throughout 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). 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 "standards" or as "Publicly Available Specifications." This is a critical element for understanding how the standard and associated PASs have been developed.</p> <p>Note to Entry:</p> <p>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 (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "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</p>	<p>Clarify if the IWSFG has developed Standard 1 and the associated PAS documents in accordance with a standard process in accordance with a third-party certification body (ISO or BSI, as examples).</p> <p>In the interest of transparency, clarify the stakeholders groups and organizations that participated in the development of the IWSFG Standard and PAS documents.</p>	

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					<p>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."</p> <p>Note to entry: use of the word, or quotation of the word "Standard" or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.</p>		
PG				Ge	<p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>) the IWSFG Standard and PAS documents are voluntary, and that the IWSFG neither possesses, nor is chartered to develop, mechanisms for enforcing these documents.</p>	Clarify.	
PG				Ge	<p>Misuse of the word "require," and variations thereof, occurs frequently throughout the texts. The IWSFG documents can in no way require any action.</p> <p>Per the BSI definition of the term "standard" (<a href="https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/">https://www.bsigroup.com/en-GB/standards/Information-about-standards/what-is-a-standard/</a>): "They are designed for voluntary use..."</p>	Revise to "recommend" or similar.	

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					Note to entry:  Use of the word, or quotation of the word “requirement” or similar in comments does not imply agreement with the use of the term in the IWSFG Standard 1 or PAS tests.		
PG				Ge	Contradictory use of words and phrases “test standards” “established IWSFG standard” or “Publicly Available Specification.”	Clarify the proper terminology to describe the documents the IWSFG has produced.	
PG				Ge	It is unclear from the documents if a national or international standardization body has certified, or will certify, the “established IWSFG standard.”	Clarify	
PG	4		Paragraph	Ge	Per the British Standards Institute (BSI) definition of the Publicly Available Specification (PAS) process, the public comments must be addressed to ensure that the content is satisfactory to “a wide range of stakeholders.” From BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): “Final consensus and publication: Comments arising from the public consultation are discussed by the steering group, with the aim of achieving a document underpinned by consensus (see 4.6)...In common with all BSI standardization documents, publication is subject to approval by the Director of Standards who will seek evidence that the final text of the document commands support from a wide range of stakeholders.”	In keeping with the designation of these documents as PAS, confirm the IWSFG will modify the Standard and associated PASs to the satisfaction of a wide range of stakeholders.	
PG	4			Ge	The PAS process is intended to be transparent.	Given that the PAS process is intended to be transparent, provide details regarding the process the IWSFG will follow for revising the documents.	
PG	6-7		Copyright Notice	Ge	IWSFG has attempted to copyright material that is currently under copyright protection.  For example, consider the following definition from	Provide evidence of consent/license on the IWSFG for all copyrighted content the IWSFG has utilized that was not developed by the IWSFG.	

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					BSI ( <a href="https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf">https://www.bsigroup.com/LocalFiles/en-GB/PAS/The%20PAS%20Process/BSI-PAS-0-2012-Principles-of-PAS-standardization-UK-EN.pdf</a> ): "2.2 essential intellectual property rights (essential IPR) intellectual property rights that have been included within a PAS such that it would be impossible to implement the PAS without making use of those rights, and the only way to avoid an infringement of the rights in respect of implementation of the PAS is therefore to request a licence from the owner."		
PG	15		Forward [sic]	Ge	General and technical content in the IWSFG Standard and associated PASs, and the current Draft Technical Report (TR) from TC224 WG10, share a common source.  The "purpose" included in the forward[sic] of the IWSFG Standard 1 contains language identical to the Scope of the ISO TC224 WG10 TR.	Describe how the membership of the IWSFG differs from the wastewater stakeholders in International Standards Organization (ISO) Technical Committee (TC) 224 Working Group 10 (WG10).  Declare for all common details between the IWSFG and ISO documents, if the IWSFG or ISO are the rightful copyright owners.	
PG	15		Forward [sic]	Ge	Sentence describing wastewater services is hyperbole.  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 distributors 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 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	

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						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.” (from: <a href="https://www.bna.com/wastewater-practice-mostly-n57982084593/">https://www.bna.com/wastewater-practice-mostly-n57982084593/</a> ). “Opponents argue that the blending ban raises costs for wastewater utilities.” (From <a href="https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001">https://www.wateronline.com/doc/epa-s-wet-weather-policies-debated-in-court-0001</a> )	
PG				Te	Provide appropriate citations for sources of information.	Confirm this test is based on the INDA/EDANA FG-505B Anaerobic Biodisintegration Test.	
PG				Te	Provide appropriate citations for sources of information.	Confirm the sieving process in Annex 3 is based on the INDA/EDANA SG002 protocol.  If so, provide the results of tests conducted by IWSFG utilized to justify modification of the sieve size. Further, provide the results of tests that demonstrate how this modification was utilized for establishing the toilet paper benchmark for PAS-5B.	
PG				Te	Method lacks description of modifications to existing methods.	Provide a list of modifications to the INDA/EDANA FG-505B Anaerobic Biodisintegration Test.  Provide all results for tests conducted by the IWSFG utilized to justify the modifications to the INDA/EDANA FG-505B test.	
PG				Te	Method lacks details of benchmarking tests conducted in the development of PAS-5A	Provide the results of all testing conducted to establish benchmarks for PAS-5B.  Provide all results from ISO-accredited laboratories that conducted test PAS-5B for establishing benchmarks.	

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						<p>Provide all test results and associated interpretation of data demonstrating the establishment of benchmarks for PAS-5B. Specifically the results of tests conducted using toilet paper to establish benchmark performance in PAS-5B.</p> <p>Provide all test results and associated interpretation of data verifying that the establishment of benchmarks for PAS-5B is valid. Specifically the results of tests conducted that demonstrates the ability of PAS-5B to be utilized, using the proposed Acceptance Criteria, to differentiate between different types of toilet paper, toilet paper and flushable wipes, toilet paper and baby wipes, toilet paper and surface cleaning wipes, and any other comparison testing done in the development of PAS-5B.</p>	
PG				Te	Provide details of ISO-accredited laboratories	Provide a list of all ISO 17025:2005 accredited labs that have conducted testing using PAS-5B as written.	
PG				Te	Method lacks sufficient details for obtaining test media.	Provide additional details regarding obtaining test media.	
PG	75	1	Introduction	Te	Undefined term: "wastewater process systems"	Define	
PG	75	1	Introduction	Te	Vague. The statement (and Footnote 1) implies that some level of chemicals and contaminants are allowed to be discharged into the sewer but no details are provided.	<p>Describe the process that wastewater services utilize to determine if industrial discharges "can be safely treated."</p> <p>Provide a detailed explanation of the risk-based approaches utilized globally for assessing the safety of these discharges.</p>	
PG	78-81	1	Introduction	Te	Incomplete. The list of post-treatment pathways has significant omissions. Revise to include all relevant pathways, particularly for liquid effluent from WWTPs (indirect potable reuse, for example).	Revise.	

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PG	84-89	1	Introduction	Te	The statement: "The physically adverse effects of the introduction of such products to wastewater systems (clogging and plugging) have already been identified" is incorrect and misleading. No such identification of physically adverse effects from flushable wipes has been demonstrated.	Delete.  If retained, provide the results of studies demonstrating physical adverse effects (i.e., impacts to wastewater infrastructure) from flushable wipes.	
PG	84-89	1	Introduction	Te	The statement "...environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as "flushable"." is entirely speculative and anecdotal.	Delete.  If retained, provide the results of studies demonstrating environmental effects that are attributable to flushable wipes.  Note to Entry:  The conclusions of studies regarding regenerated cellulose referenced in the IWSFG documents refute the IWSFG's position on regenerated cellulose and are not appropriate substantiation for the IWSFG's standard, PASs or positions.	
PG	95-98	1	Introduction	Te	Vague and contradictory. Interchanging terms: "test" "IWSFG standard" and "Publicly Available Specification"	Clarify if the PAS documents are "tests," "Publicly Available Specifications" or "established IWSFG standards."	
PG	95-98	1	Introduction	Te	Vague and contradictory.	Confirm the national or international standards body that has certified, thereby establishing the "established IWSFG standards" or the IWSFG "Publicly Available Specifications."	
PG	100-101	2	Purpose	Te	Vague and incomplete description of applicability of method.	Provide details of the specific portion(s) of all wastewater systems under evaluation in PAS-5B, and provide relevant technical details and specifications for said portions. This should include wastewater treatment not located at wastewater treatment plants (ex. septic tank).	
PG	112	4	References	Te	Incomplete. The content of the test bears significant resemblance to existing copyrighted methods.	Provide appropriate reference and acknowledgement in this Section and throughout the document where both verbatim and paraphrased materials are utilized. Otherwise, delete content from unreferenced sources.	

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PG	126-127	5	Unit Side – Toilet Paper	Te	Contradictory. Unit Dose or Unit Size of sample in biodisintegration testing should logically follow preceding tests, for example settlement. Note that the Unit Dose or Unit Side of the sample in the Settlement test (PAS-4) is mass based and significantly different from the Unit Dose or Unit Side of PAS-5A.	Normalize the definition of the “Unit Size” or “Unit Dose”, alternatively provide the results of consumer research or field testing that supports the use of a different “unit size” or “unit dose” in the various PAS tests. “Unit Size” or “Unit Dose” for a PAS should logically follow the “Unit Size” or “Unit Dose” of precursor PAS tests and the associated wastewater infrastructure they are meant to represent.  Of particular relevance to PAS-5B is “Unit Size” or “Unit Dose” for toilet and drainline testing as precursors to settling, which is a precursor to subsequent anaerobic biodisintegration.	
PG	126-127	5	Unit Side – Toilet Paper	Te	Contradictory definition of “Unit Size” for toilet paper.	Rerun all testing using a relevant “unit size” or “unit dose” to ensure that the benchmark performance does not change.	
PG	132-134	6	Principles	Te	Incomplete. Despite widespread prevalence in the Unites States, septic tanks are not referenced herein. This is a significant omission and must be addressed prior to finalizing PAS-5B.	Revise PAS-5B to account for all pathways globally that involve anaerobic biodisintegration, including, but not limited to, septic tanks.	
PG	189	8.3.4	Test mixture	Te	Test media incorrectly identified as “liquid wastewater.”	Revise using appropriate terminology for contents of digester and septic tanks.	
PG	189-197	8.3.4	Test mixture	Te	Use of “liquid wastewater” in PAS-5B contradicts prohibition on use of wastewater in other PAS methods.	Given concerns regarding the health and safety risks associated with using wastewater, and the related prohibition of the use of wastewater in other PAS test methods, provide all relevant health and safety procedures utilized to mitigate the risks associated with use of “liquid wastewater” in PAS-5B.	
PG	189-197	8.3.4	Test mixture	Te	Clarify acceptable variability with respect to “liquid wastewater” in PAS-5B.	Provide the rationale and data to support the ranges of characteristics of anaerobic sludge.  Specifically, describe how this variability is acceptable for PAS-5B and does not impact the results of tests, based on testing conducted by	

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						IWSFG in establishing benchmark performance for PAS-5B.  Further, clarify, citing appropriate references, how the variability that is acceptable for "liquid wastewater" in PAS-5B differs from the unacceptable variability for wastewater noted in other IWSFG PAS test methods (the PAS-3 series tests, for example).	
PG	189-197	8.3.4	Test mixture	Te	Remove duplicate requirements for solids.	If solids are less than, or greater than, the range specified, provide procedure for diluting or concentrating the media.	
PG	204-219	9.1	Storage of samples	Te	Contradictory. The test method requires samples to be utilized immediately (Line 170: "Specimens must be removed immediately before testing starts.").	Remove storage requirements.  If storage requirements remain, provide the quantity of moisture absorption (for dry samples) or evaporation (for moist samples) that is acceptable to the IWSFG, with appropriate references for establishing threshold values for these parameters.	
PG	230	10.1	Summary	Te	Unreferenced test parameter.	Provide reference to a standard wastewater treatment plant operations manual where residence time in an anaerobic digester is cited as 21 days.	
PG	237-238	10.2	Test Procedure	Te	Incomplete information regarding the control.	Regarding the use of a cotton control: clarify if the test is valid if the control does not achieve the Acceptance Criteria.  Alternatively, clarify how the laboratory determines if the test is valid.	
PG	280-282	10.3	Test termination	Te	Contradictory. PAS-5A requires that after testing "specimens contain[ing] fiber-binding chemicals" that "the surfaces shall be washed using solvents such as ethanol and methanol."  Note that this requirement contradicts the requirements of IWSFG PAS-1 (Environmental Health and Safety Requirements), which contains	Clarify the IWSFG position on use of solvents for PAS tests and disposal of solvents.  Provide an explanation of what solvents, in what forms, and under what circumstances those solvents, are suitable for disposal into the drainline of a building according to the IWSFG.	

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					<p>the following language in Section 7.5: lines 151-153 “chemicals: for example, solvents used for laboratory preparations...” and related: lines 162-164 “Note: None of these waste types can be flushed through toilets into the wastewater infrastructure; instead, they must be handled according to the relevant policies and regulations.”</p> <p>Per Lines 162-164 of PAS-1 (Environmental Health and Safety Requirements), solvents are not suitable for disposal into the drainlines of buildings. Or, alternatively, the IWSFG condones the disposal of solvents through a sink into the drainline of a building, however, were those solvents to be applied to a surface-cleaning wipe, for example, that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) such that it was appropriately labeled as flushable and suitable for disposal via the toilet, <b><i>the solvent would not be suitable for disposal into the drainline due to its presence on a surface-cleaning wipe.</i></b></p> <p>Further, for example, consider chlorine: “Chlorine reacts with water in and out of the body to form hydrochloric acid and hypochlorous acid. Both are extremely poisonous.”  <a href="https://medlineplus.gov/ency/article/002772.htm">https://medlineplus.gov/ency/article/002772.htm</a></p> <p>Given its widespread use, the disposal of this chemical through sinks and laundry machines into drainlines is very common. Provide IWSFG’s opinion whether a surface-cleaning wipe that meets all the requirements of IWSFG Standard 1: 2017 (Section 6.2- Critical Criteria to be Met) but contains chlorine can be labelled as flushable. Note that such a wipe would, under many usage conditions, likely become contaminated with bodily fluids, such as typical bathroom cleaning and therefore fall</p>		

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					within the Scope of the IWSFG Standard 1: 2017.		
PG	304-312	11	Acceptance Criteria	Te	Contradictory. PAS-5B contains two pass criteria: the method requires that a sample either attain: 100% passing the sieve or 95% passing the sieve.	Select a single pass criteria.  Alternatively, provide test results demonstrating the ability of laboratory technicians to visually determine, with an accuracy greater than 5%, the amount of material present on a sieve.	
PG	334-335	13	Precision	Te	Vague. Additional details required.	Define an acceptable range of dissolution in water for chemicals from binders for the PAS-5B test.  Provide an explanation for how this is relevant to "precision" of the PAS-5B test.	
PG	336-337	13	Precision	Te	Vague. Additional details required.	Define an acceptable range of time for a sample vessel to not produce air bubbles.  Define the length of time where no bubbles are observed that would render the test invalid.	
PG	338-339	13	Precision	Te	Remove as unnecessary and unrelated to Precision. Precision of test equipment is wholly distinct from sample precision.	Delete.  If retained, provide details of statistical analysis completed on a range of products that demonstrates that 3 "separate specimens" is an appropriate number of replicates to eliminate variability within a single product.	
PG	338-339	13	Precision	Te	Proposed precision text contradicts precision requirements in other PASs.	Provide the rationale and data supporting why in PAS-5B, 3 "separate specimens" is an appropriate number of samples to eliminate variability, whereas in PAS-5A, for example, 10 "separate specimens" are necessary to eliminate variability.  Provide the statistical analysis for PAS-5B and PAS-5A that justifies the different in requisite "separate specimens."	
PG	341-353		Bibliograph y	Ge	References not cited in the document.	Delete.  If the references are retained, provide proper citations within the text.	

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**IWSFG Template for Reviewer comments and IWSFG secretariat observations<sup>1</sup>**

Document reviewed: IWSFG-PAS-5B-Anaerobic-Biodistintegration-Test

Due Date: 2017-09-01

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