

To: Warden and Members of County Council

From: Director of Public Works

Single-Use Disposable Wipes

RECOMMENDATIONS

1. That County Council support the City of Kitchener and Ryerson University recommendations regarding single-use disposable wipes as attached to Report No. PW 2020-02;
2. And further, that Report No. PW 2020-02 be forwarded to all Oxford County Area Municipalities, the City of Kitchener, the Ministry of the Environment, Conservation and Parks, and Environment and Climate Change Canada as information.

REPORT HIGHLIGHTS

- The purpose of this report is to seek Council support of the City of Kitchener's resolution to bring about change to Federal regulations regarding the false labelling of single-use wipes as "flushable".
- Many municipal wastewater systems, Oxford County included, are experiencing adverse effects and maintenance issues as a result of flushable wipes which are being incorrectly labelled as such by manufacturers.
- Recent testing completed by Ryerson University showed that out of 23 wipes which have been labelled as "flushable", none were actually able to fall apart or disperse safely through the sewer system test.

Implementation Points

Following Council approval of this report, staff will update the County website in order to provide more information to the public regarding the use of flushable wipes and the issues they pose to the wastewater system.

Financial Impact

Currently, costs directly associated with this problem are not tracked, but the potential removal of flushable wipes from the wastewater system would be quite beneficial. The cost saving in reduced blockages to the County's wastewater collection and treatment systems could be substantial.

The Treasurer has reviewed this report and agrees with the financial impact information.

Risks/Implications

Materials continue to be flushed down toilets such as feminine hygiene products, dental floss, diapers and disposable wipes. These materials cause blocked sewers which can lead to backups, flooded basements and the risk of bypasses to the surface waters, all of which have increased cost and potential legal implications to municipal wastewater system operations.

Should the problems associated with the use of flushable wipes not be addressed, flushable wipes will continue to enter the market and gain market share, leading to continued and increased potential blockages to the County's wastewater collection and treatment systems.

Strategic Plan (2015-2018)

County Council adopted the County of Oxford Strategic Plan (2015-2018) at its regular meeting held May 27, 2015. The initiative contained within this report supports the Values and Strategic Directions as set out in the Strategic Plan as it pertains to the following Strategic Directions:

1. ii. **A County that Works Together** – Enhance the quality of life for all of our citizens by:
 - *Maintaining and strengthening core infrastructure*
3. iii. **A County that Thinks Ahead and Wisely Shapes the Future** - Demonstrated commitment to sustainability by:
 - *Ensuring that all significant decisions are informed by assessing all options with regard to the community, economic and environmental implications including:*
 - o *Responsible environmental leadership and stewardship*

DISCUSSION

Many disposable wipes that are currently available are marketed and labelled as being “flushable.” Disposable wipes are manufactured as non-woven sheets of natural and man-made fibers that are marketed as either flushable or non-flushable. The Association of Nonwoven Fabrics Industry and the European Disposables and Nonwoven Association developed guidelines and test methods to assess a wipe for flushability. However, it was determined that the flushable wipes are more similar to non-flushable wipes than to toilet paper.

According to the Municipal Enforcement Sewer Use Group (MESUG), work was attempted to have an International Organization for Standards (ISO) specification for flushables and was nearing completion but was halted due to a challenge from the manufacturers concerning test methods. At that time, a group of water professionals was formed called the International Water Services Flushability Group, which has developed a flushability specification comprised of three core concepts which specify that a flushable product must:

- 1) Break into small pieces;
- 2) Not be buoyant; and

- 3) Not contain plastic or regenerated cellulose, but contain materials that will readily degrade in a range of environments.

A study out of Ryerson University (March 2019), shown as Attachment 1, includes the testing of 101 single-use products of which 23 have been labeled as “flushable” by the manufacturer. Results showed that not one single wipe was able to fall apart or disperse safely through the sewer system test, which can negatively impact household plumbing, municipal sewage infrastructure and, consequently, the environment.

Products continue to be marketed and sold as flushable to consumers whilst tests indicate that these products are not, in fact, flushable. The wastewater utility industry position is that only human waste and toilet paper should be flushed.

The City of Kitchener Council has subsequently passed a resolution on August 26, 2019 (shown in Attachment 2) resolving that the City lobby the Federal Government to review regulations related to consumer packaging on single-use wipes to remove the word flushable. It is an attempt to protect their wastewater infrastructure which, like all municipal wastewater systems, was never designed for flushable wipes but only for toilet paper and human waste which breaks down.

From this, County Council received correspondence at its November 27, 2019 meeting from the Township of Zorra Council (dated November 19, 2019) requesting Oxford County to consider supporting the City of Kitchener’s resolution regarding single-use disposable wipes, and referred to staff for a report.

Comments

Oxford County currently has information on our website which indicates that any materials other than human waste and toilet paper should be disposed of responsibly either in a composter, garbage bin, recycling container or nearest special waste disposal centre, even if they are claimed to be a flushable product such as cleaning wipes.

A co-author of the Ryerson study report is Barry Orr, a City of London sewer outreach and control inspector, who estimates the associated costs of removing blockages caused by flushable wipes to be in the range of \$250 million a year across Canada. These wipes are often found throughout the system and can also get into waterways.

The local effects of these flushable wipes on the collection systems in Oxford County are as follows:

- City of Woodstock staff indicated that these wipes are exacerbating existing maintenance problems;
- County Staff at the wastewater treatment plants report that there have been pump blockages at the main lift stations and a buildup of rags within the digesters, some of which is comprised of wipes;

- County Staff responsible for the wastewater collection system have found a substantial increase in the number of issues related to pump blockages at the smaller sanitary pump stations, sewage grinder pumps as well as blockages in sanitary laterals.

Conclusions

Staff are supportive of the recommendations provided by the City of Kitchener and Ryerson University regarding single use disposal wipes. Further advocacy should be directed to Environment and Climate Change Canada in order to appropriately address the product labelling issue of “Flushable Wipes” at a national level. Doing so will address ongoing concerns related to municipal sewage infrastructure and the environment.

SIGNATURES

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ATTACHMENTS

Attachment 1: Ryerson University Study, March 31, 2019
Attachment 2: City of Kitchener Council Resolution, September 5, 2019



Defining 'Flushability' for Sewer Use

Final Report

Prepared for:

Municipal Enforcement Sewer Use Group of Canada

Prepared by:

Anum Khan, Barry Orr and Darko Joksimovic

March 31 2019

Abstract

Evolving 'flushability' definitions for consumer products have been introduced over the last decade and a half against a backdrop of a rising number of issues in municipal wastewater systems caused by products that should not be disposed via toilets. This report seeks to shed light on the characteristics of a wide range of consumers' products and guidance on their disposal. The focus is on products that, if inappropriately disposed in toilets, may cause issues ranging from clogged pumps, drainline and sewer blockages, and their untreated discharge to lakes and rivers due to combined sewer overflows (CSOs) and backups. A systematic approach was undertaken to collect data for over a hundred consumer products from ten different product categories. Consumer products were tested for toilet and drainline clearance, disintegration under the International Water Services Flushability Group (IWSFG) specification, and fibre composition. Additionally, an evaluation of product package labelling was performed to determine the degree to which the manufacturers are adhering to the Code of Practice criteria issued by the nonwoven products industry associations for labelling products that do not pass the flushability assessment. Given that most consumer products tested during this project do not sufficiently disintegrate under the IWSFG specification, this report presents a practical approach to tackling the problem around products that may misleadingly and incorrectly be labelled 'flushable'. The importance of adhering to the industry Code of Practice for package labelling and the IWSFG flushability specification is stressed, as well as the need for these to be adopted as standards rather than voluntary measures.

Acknowledgements

This project was funded by the Municipal Enforcement Sewer Use Group of Canada (MESUG). We thank MESUG for showing their support throughout the duration of this project by providing insight and expertise that greatly assisted the research. We would like to thank Canadian Water and Wastewater Association (CWWA) for facilitating the funds associated with this project.

We would also like to express our gratitude to Robin Luong, the technical staff in the Department of Civil Engineering at Ryerson University. His efforts in aiding in this project, including the construction of the slosh box and assistance with innumerable technical issues, greatly improved the outcomes.

We thank the Ryerson University Analytical Centre (RUAC) technical specialist and RUAC coordinator, Shawn McFadden, for providing access and training on the analytical laboratory instrumentation and software, enabling us to carry out additional assessments that were not initially considered in this project.

We would also like to thank all those who have visited the Water Resources Engineering Laboratory at Ryerson University while the project was in progress. Their comments and helpful suggestions resulted in improvements in the testing apparatus and project objectives. Finally, we would also like to thank MESUG and CWWA members for their valuable comments on this project.

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1. Introduction

Many consumer products are currently available that are marketed and labelled as being ‘flushable’, and more such products are continually introduced to the public (global annual growth of 5.4% is reported by ResearchAndMarkets.com, for example). In addition to providing confusing labeling to consumers, such as “flushable”, “biodegradable”, “eco-friendly” and “natural”, the composition of these products is quite diverse and not entirely disclosed to both consumers and the wastewater industry. Concurrently, sewer system operators are reporting a growing problem that involves consumer products, resulting in sewer and pump station blockages due to the lack of dispersion of these ‘flushable’ products under normal operating conditions. While the manufacturers’ associations have developed guidance for assessing both the flushability and labelling of their products (INDA and EDANA, 2018), it is not clear to what extent the manufacturers have adopted and are adhering to these recommendations. Thus, a comprehensive study of ‘flushable’ products to cover a wide range of products was required. The International Water Services Flushability Group (IWSFG), comprised of water associations, utilities, and professionals seeking to provide clear guidance on what should and should not be flushed down the toilet, has recently finalized the flushability specifications for products that are marketed as safe to flush down the toilet (IWSFG, 2018a). The IWSFG specifications are recent and many products are yet to be tested to assess their performance.

1.1 Project Objectives, Scope, and Purpose

The main objective of this project was to conduct flushability testing of many consumer products in accordance with the recently released IWSFG Publicly Available Specification (PAS) 1: 2018 (IWSFG 2018b). The project aimed to incorporate a variety of products to include toilet tissue, facial tissue, moist wipes labelled flushable and ‘Do Not Flush’, toddler wipes, baby wipes, and some other items that have been labelled flushable, such as toilet cleaning brushes, dog poop bags, and diaper liners. The IWSFG criteria are grouped into five categories: environmental protection, toilet and drain line clearance, disintegration, settling, and biodisintegration. This project focused on three of these criteria (IWSFG 2018b) due to budgetary reasons, with a view of implementing other tests in the longer term:

1. Drain line clearance – as outlined in INDA/EDANA 2013, FG501: Toilet and Drainline Clearance Test
2. Disintegration – as outlined in IWSFG 2018: PAS 3 Disintegration Test Methods – Slosh Box
3. Environmental protection – according to TAPPI/ANSI Test Method T 401, Fiber Analysis of Paper and Paperboard.

An additional objective, added during the course of the project, was to conduct an evaluation of the adherence of tested product package labelling to the INDA/EDANA voluntary guidance (INDA and EDANA, 2018).

Broader goals of the project are to: 1) raise public awareness regarding appropriate disposal methods of products that may misleadingly and incorrectly be labelled ‘flushable’, 2) provide valuable evidence to municipal wastewater system managers on the disintegration and potential environmental impacts of products following the current, international testing specifications, and 3) facilitate the continuance of evidence-based dialogue between IWSFG and manufacturers.

1.2 Methodology

The testing in this project followed the IWSFG *PAS 3: 2018 Disintegration Test Methods—Slosh Box* (IWSFG, 2018c). In the testing, the two criteria - toilet and drainline clearance and disintegration, required two fundamental steps:

- 1) Preconditioning, and
- 2) Agitation.

These fundamental steps were performed for each of the products tested. A complete test for each product required 5 samples.

A physical model consisting of a toilet (6/4.1L) and a private drain connection was set up in the Water Resources laboratory in the Department of Civil Engineering at Ryerson University. The preconditioning step consisted of flushing a product sample down the toilet and allowing it to remain at the end of the drainline in a catch basket for a 30-minute period. However, if the product sample did not clear the drainline in the first flush, additional flushes were used subsequently at 5-minute intervals until the product reached the downstream end of the drain, for a maximum of six flushes. The purpose of this fundamental step was to enable the hydraulic forces and interaction between the water and product to rinse the sample of its lotions.

Once the preconditioning step was complete, the sample was transferred from the catch basket to the slosh box. With the sample inside, the slosh box was continuously tilted at $11^{\circ} \pm 0.5^{\circ}$ on either side for a 30-minute period for each product sample. The agitation step was performed using a slosh box with specified parameters (IWSFG, 2018c). Parameters such as the tilt angle, and rotations per minute of the oscillating motor were calibrated accordingly. The variables considered in the design of the slosh box, such as Reynold's number of 20,000 and 4-litres of water at $15^{\circ}\text{C} \pm 1^{\circ}\text{C}$, were designed to be closely representative of conditions in existing municipal wastewater collection systems, as per IWSFG (2018c). Finally, a test report detailing the variables and constraints used for calculations as specified in IWSFG (2018c).

2. Product Inventory

The comprehensive list detailing all 101 products tested during this project is provided in Appendix A. The selection of products was intended to be representative of consumer products found across local stores in Southern Ontario or available online for purchase to a consumer located in Southern Ontario and may vary considerably in different geographic regions. This section of the report presents various summaries regarding product categories and subcategories, package labelling, and information about manufacturers. The universal ‘Do Not Flush (DNF)’ symbol referred to in the succeeding section of this report is shown in Figure 1.



Figure 1- Universal DNF Symbol

2.1 Products Tested

Figure 2 shows the number of products tested in each of the 10 categories displayed. Cleansing wipes represent the largest proportion of products tested, and almost half of the products tested within this category are labelled as ‘flushable’. While some product packages display a DNF statement and symbol, others display either the statement or the symbol, or neither.

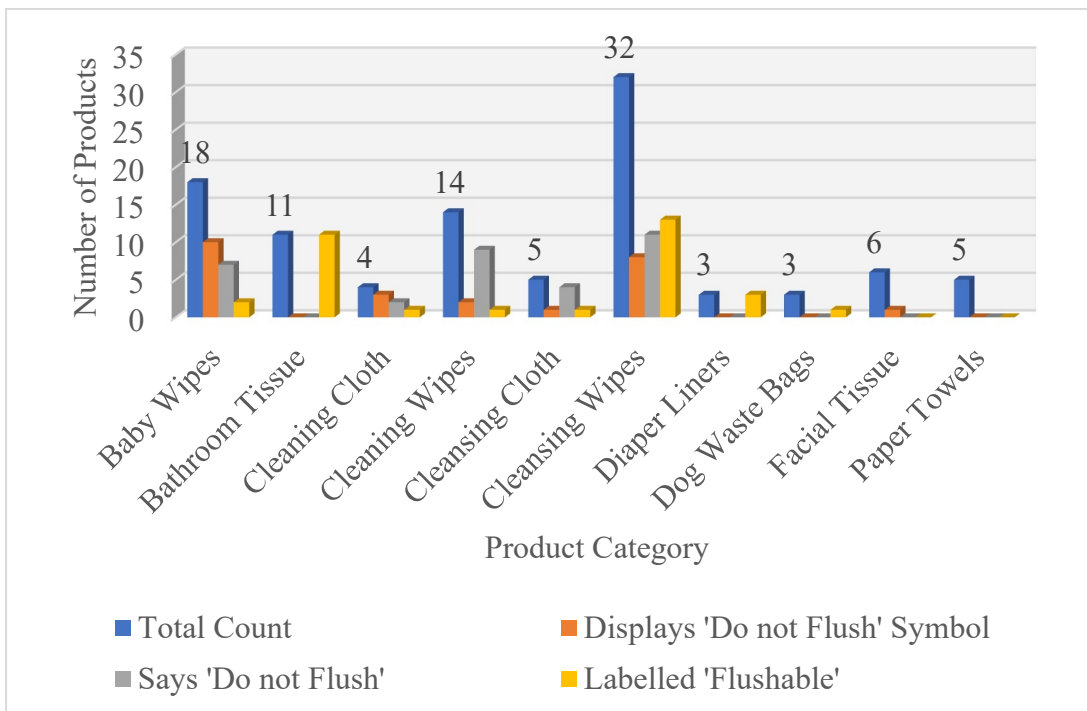


Figure 2- Overview and Labelling Summary of Products Tested within Each Category

Figure 3 summarizes the usage of the three package labelling statements— ‘flushable’, DNF, and the DNF symbol, across all products tested. Although these products appear alike visually, and may be indistinguishable to a consumer, about a third of the products are labelled ‘flushable’ while a third are labelled ‘DNF’.

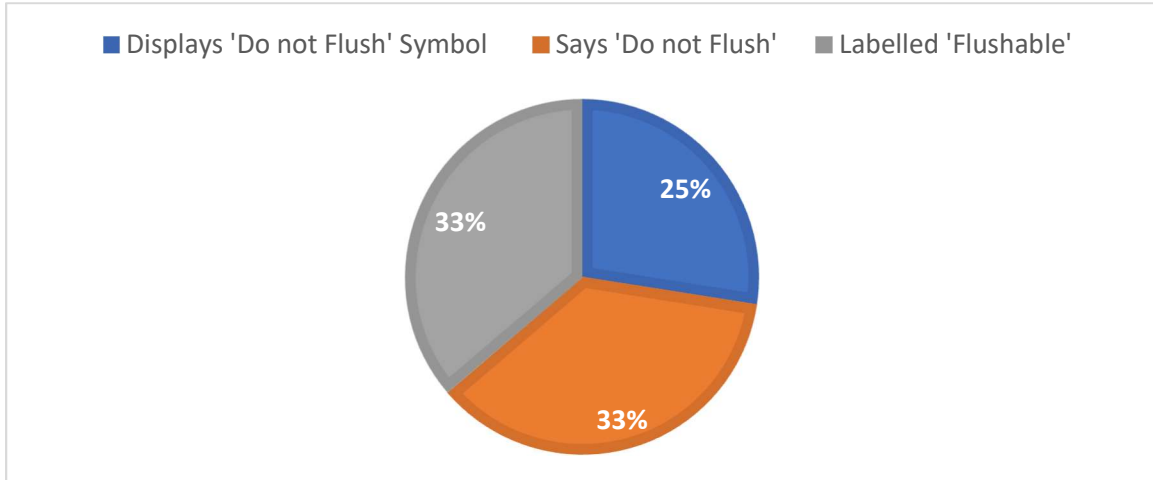


Figure 3- Graphical Representation of Package Labelling

Figure 4 is a graphical representation indicating the various manufacturing countries of the products tested in this project, which include countries across multiple continents, including Asia, Europe, and North America. As represented in Figure 4, the majority of the 101 products tested in this project were manufactured in the USA. As aforementioned, the inventory for this project was designed to be representative of consumer products found across local stores and available for purchase to a consumer in Southern Ontario.

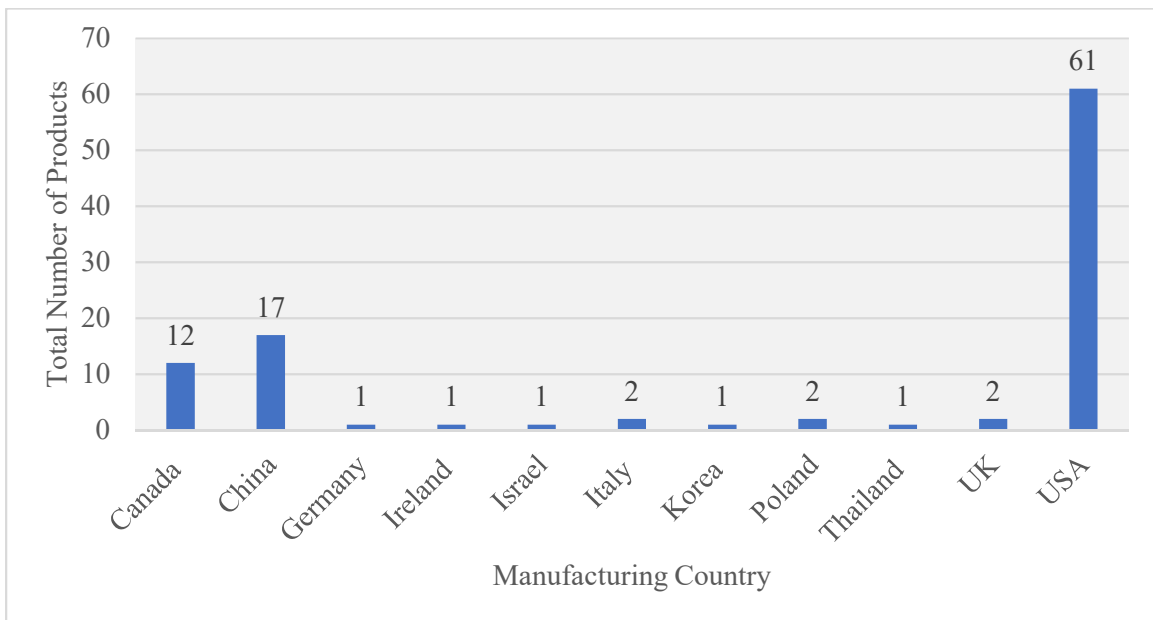


Figure 4- Manufacturing Countries of Products Tested

2.2 Statement on the Industry Code of Practice for Nonwoven Wipes

The industry Code of Practice set forth by the Association of the Nonwoven Fabrics Industry (INDA) and European Disposables and Nonwovens Association (EDANA) has been developed in collaboration with various associations, including major North American water and wastewater associations, member and staff representatives from the National Association of Clean Water Agencies (NACWA), the Water Environment Federation (WEF), the American Public Works Association (APWA), and the Canadian Water and Wastewater Association (CWWA) (INDA and EDANA, 2017). The intent of the Code of Practice (CoP) is to direct manufacturers to make it evident on product packaging to not flush products that could be problematic for wastewater systems but have the potential to be flushed down the toilet by consumers. Additionally, it was designed to direct manufacturers to clearly indicate the appropriate disposal method of the product on its packaging.

The Code of Practice is summarized in a decision tree to indicate whether a product is required to display a DNF symbol. The decision tree indicates that for a product to be ‘flushable’, it must pass an *appropriate* flushability assessment. It is pointed out that the word *appropriate* here refers to the current guidance document (GD) 4 testing criteria, which has not been accepted by wastewater professionals in North America, and may not be as robust as other wastewater industry specifications (e.g. UKWIR and IWSFG). Aside from making it evident on product packaging, the CoP directs manufacturers to perform flushability testing on all of their consumer products. Additionally, the CoP provides on-pack consumer criteria for manufacturers, which includes the location, colour, size, wording, and CoP implementation timing of the DNF symbol. The symbol to be used to indicate that the product should not be flushed is the universal DNF symbol shown previously in Figure 1.

Using the industry CoP, each of the 101 products tested during this project were systematically examined for adherence to package labelling guidance. The results and analysis of this procedure are presented in Section 3.4 of this report.

3. Results

3.1 Drainline Clearance

As per the procedure in the PAS 3 (IWSFG, 2018c), product samples were required to clear the drainline within a 30-minute period. The drainline used in the apparatus of this project was 20 metres in length and consisted of 75mm and 100mm PVC pipes with two 90-degree elbow fittings. Some products were conveyed out of the drainline within the allotted time while others remained inside the drainline. Products that did not clear the drainline within one flush were flushed subsequently every 5-minutes until they cleared the drainline, for a maximum of 6 flushes within 30-minutes. Heavier products, such as those within the product categories of baby wipes, cleaning cloth, cleaning wipes, cleansing cloth, cleansing wipes, diaper liners, and paper towel, often required multiple flushes to clear the line. Figure 5 shown below depicts the average number of flushes per product category, with cleaning cloth showing about 4 flushes on average as the maximum and bathroom tissue showing just below 2 flushes on average as the minimum between the ten product categories tested. Products with a slightly lower mass, such as those within the product categories of bathroom tissue, dog waste bags, and facial tissue, often cleared the drainline in 1-2 flushes. Products that required another flush or two would normally flow past the two elbow fittings and stop quarter-way through the drainline at about 5 metres.



Figure 5- Schematic of Average Number of Flushes per Product Category

Figure 6 indicates the percentage of products in each category that required x number of flushes. The figure shows that 100% of diaper liners and dog waste bags required 2 flushes to clear the drainline, whereas 80% of cleaning cloth products required more than 2 flushes to clear the drainline. Some baby wipes required more than 5 flushes to clear the drainline.

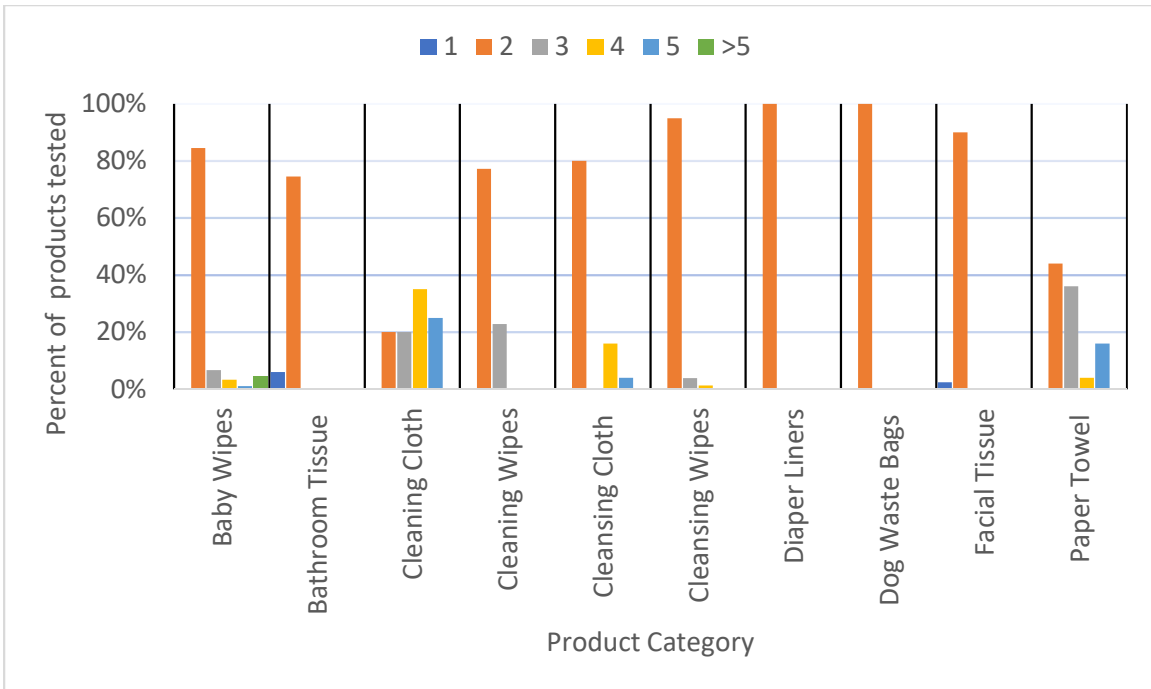


Figure 6-Distribution of Average Number of Flushes per Product Category

3.2 IWSFG Disintegration Testing

As mentioned in Section 1.2, test reports for each of the 101 products were generated using the template provided in IWSFG PAS 3: Disintegration Test Methods—Slosh Box (2018). Amendments were made to the methodology specified in the PAS 3 (IWSFG, 2018c) and are presented in the latter of this report. Each test report contains information specific to the five test samples used per product. The results from the testing performed in accordance with the PAS 3 (IWSFG, 2018c) are summarized through the figures and tables presented in this section.

Table 1 shows that only 17 out of the 101 products tested showed some visible evidence of disintegration. From these 17 products, 11 products fully disintegrated. However, all 11 of these products were from the bathroom tissue category. Other products, such as cleansing cloths, cleansing wipes, facial tissues, and paper towels partially disintegrated, whereas products from the categories of baby wipes, cleaning cloths, cleaning wipes, diaper liners, and dog waste bags did not show any evidence of disintegration.

Table 1- Summary of Product Disintegration

Product Category	Number of Evaluated Product that Fully or Partially Disintegrated	% of Products that Fully or Partially Disintegrated*
Baby Wipes	0/18	0.0
Bathroom Tissues	11/11	100.0
Cleaning Cloths	0/4	0.0
Cleaning Wipes	0/14	0.0
Cleansing Cloths	1/5	20.0
Cleansing Wipes	1/32	3.125
Diaper Liners	0/3	0.0
Dog Waste Bags	0/3	0.0
Facial Tissues	3/6	50.0
Paper Towels	1/5	20.0
Total	17	

* A summation of the % of material passing for 5 test repetitions, as per PAS3 specification.

Figure 7 shows the proportion of products labelled ‘flushable’ that disintegrated. While a total of 23 out of 101 products tested are labelled ‘flushable’, only 2 products partially disintegrate, and **none** of these 23 products fully disintegrate. Bathroom tissue is not included in this count of 23 consumer products. It should be noted that bathroom tissue is not *labelled* ‘flushable’ but is used as a comparison to show that it fully disintegrates. Moreover, from the 101 products assessed for flushability, 90 (out of 101) products were deemed as **FAIL** (see Figure 8) according to the PAS 3 (IWSFG, 2018c), as the specification states that at least 95% or more of the material must pass through a specified sieve to be classified as a **PASS** (IWSFG, 2018). As stated previously and reiterated below in Figure 8, only 11 (out of 101) products fully disintegrated and were classified as a **PASS** and all of the products that passed were toilet tissue controls.

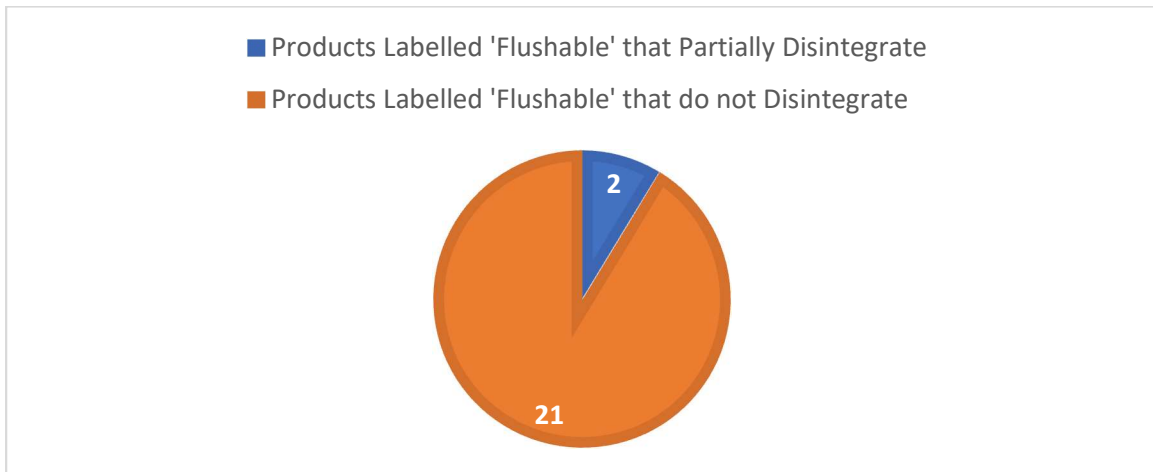


Figure 7- Graphical Representation of 'Flushable' Products' Performance

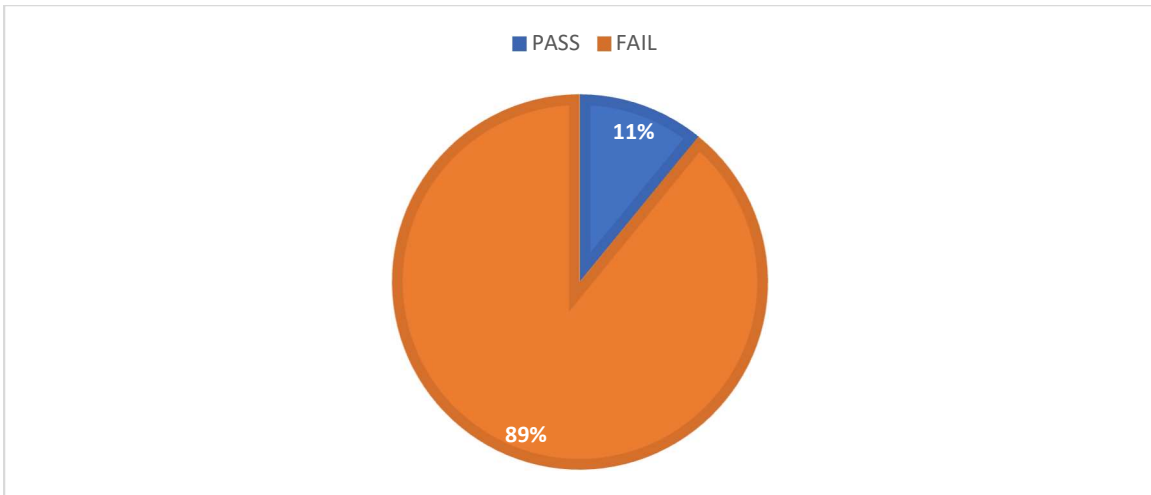


Figure 8- Graphical Representation of Products Deemed PASS or FAIL

To illustrate the degree in variance of product disintegration during the agitation period (see Section 1.2 for a brief overview of the *preconditioning* and *agitation* periods of testing), figures representing two different consumer products labelled ‘flushable’ are presented below. Figure 9 shows a cleansing wipe labelled ‘flushable’ at *the end* of the 30-minute agitation period. It is visibly evident that this cleansing wipe does not show even partial disintegration. On the other hand, figure 10 is an image of toilet tissue acquired *before* the 30-minute agitation period of the disintegration test was complete. It is visibly evident that the toilet tissue had disintegrated before starting the test. The time recorded in the slosh box for this product to fully disintegrate was 3 minutes and 24 seconds. From the products tested during this project, 89.1% of products remained fully intact after the completed disintegration test. Hence, majority of the products were classified as a **FAIL** according to the PAS 3 (IWSFG, 2018c).

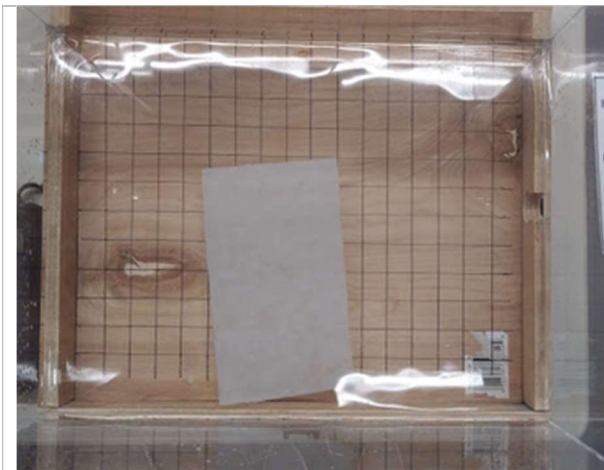


Figure 9- Example of Cleaning Wipe Disintegration After Testing



Figure 10- Example of Bathroom Tissue Disintegration After Testing

3.3 Fibre Composition

As the third objective of this project, an analysis was conducted on the fibre composition of a select number of consumer products. The complete list detailing the 20 products evaluated for fibre composition is provided in Appendix B.

Based on the testing results shown in Table 2, the most prevalent fibre type amongst the 20 products evaluated was softwood. The dominant regenerated cellulose material amongst the consumer products evaluated was rayon, whereas the recessive material used was lyocell. From additional research, an estimation of 20-35% composition of polypropylene was made for products #6 and #11, as shown in the table on the following page. Overall, 75% of the consumer products evaluated for fibre composition in this project contain at least one type of man-made material—synthetic or regenerated cellulosic material. Nonwovens' industry claims that the volume of nonwovens converted into wipes for consumer and industrial applications will rise 6.3% per year from 1.20 million tons in 2018 to 1.63 million tons in 2023 (Steed and Pira, 2018). Given this trend, manufacturers may be increasing the usage of regenerated cellulose and synthetic materials in consumer products to make them more durable.

3.4 Adherence to Package Labelling

It is important to note that the industry Code of Practice is currently a voluntary measure. However, because it is evident that manufacturers have been making flushability claims on product packaging, it is plausible to state that the Code of Practice may be followed by manufacturers. The systematic approach to determine whether the products tested adhered to the package labelling criteria utilize the decision tree, exemplified in the Code of Practice. Table 3 shows the percentages of each category where a DNF symbol was required versus the percentages of those products which met the specified criteria.

As evident from Table 3, specific categories like baby wipes, cleansing wipes, and diaper liners, required that all their products display a DNF symbol. However, **none** of the products tested adhered to the criteria for package labelling in the Code of Practice, including those which were required to display the symbol. The results indicate that there is a great deal of inconsistency with package labelling as there are varying percentage compositions that display a DNF symbol. Some product categories, such as cleansing cloths, dog waste bags, facial tissue, and paper towel displayed a DNF symbol even though the criteria do not specify that such is required. Other categories like diaper liners, where 100% of the products are required to display a DNF symbol, showed that **none** of the products displayed a DNF symbol.

Table 2-Fibre Composition of Select Product Samples

Product #	% Fibre Type						
	Natural			Man-Made			
	Softwood	Hardwood	Cotton	Regenerated		Synthetics	
				Lyocell	Rayon	Polyester	Polypropylene
1 Baby wipe (flushable)	70.5	1.1		28.4			
2 Baby wipe (flushable)	75.8	0.3		23.9			
3 Baby wipe (DNF)			24		20.8	55.2	
4 Baby wipe (DNF)					34	35.5	
5 Baby wipe (DNF)					64.5	35.5	
6 Baby wipe (DNF)							20-35 estimate
7 Baby wipe (DNF)					29	71	
8 Bathroom tissue	41.6	58.4					
9 Cleansing wipe (DNF)				100			
10 Cleansing cloth (Flush)	99	1					
11 Cleansing wipe (DNF)							20-35 estimate
12 Cleansing wipe (Flush)	61.8	0.4			37.8		
13 Cleansing cloth (Flush)	73.6	0.1		12.4	14		
14 Cleansing cloth (Flush)	59.1	0.2			40.8		
15 Cleansing cloth (Flush)	70.7	1.4		27.8			
16 Denture wipe (DNF)					87.2		12.8
17 Diaper liner (flush)					100		
18 Diaper liner (flush)	100						
19 Facial tissue (DNF)	30.1	69.9					
20 Paper towel	62.7	37.3					
Total count of product tested containing fibre type	11	10	1	5	9	4	1

Table 3- Product Adherence to Package Labelling

<i>Product Category</i>	<i>% of products that require a DNF symbol</i>	<i>% of products that display a DNF symbol</i>	<i>% of products that meet DNF symbol criteria</i>
<i>Baby Wipes</i>	100	56	0
<i>Bathroom Tissue</i>		0	
<i>Cleaning Cloths</i>	25	75	0
<i>Cleaning Wipes</i>	86	15	0
<i>Cleansing Cloths</i>		20	
<i>Cleansing Wipes</i>	100	26	0
<i>Diaper Liners</i>	100	0	0
<i>Dog Waste Bags</i>		0	
<i>Facial Tissue</i>		17	
<i>Paper Towel</i>		0	
<i>*Note</i>		Greyed out cell indicates that based on Code of Practice, product category does not require a DNF symbol or is out of scope (used for comparison only)	

The following is a statement extracted from the INDA and EDANA Code of Practice (2017): “Because of consumer confusion, it is highly recommended and strongly encouraged that Baby Wipes should not be marketed as ‘Flushable’, and all Baby Wipes are required to display the DNF symbol both on the top or front panel of the package visible to the consumer “on shelf” without the consumer having to touch the package, and also a DNF symbol reasonably visible near the point where individual wipes are taken out of their container”. From this statement, it can be gathered that regardless of how a baby wipe product performs based on a flushability assessment, it is required to display a DNF symbol. As an example, 56% of baby wipes tested in this project, as presented in the Table 3, displayed a DNF symbol. As mentioned on the previous page, the Code of Practice states specific on-pack consumer information regarding the location, colour, size, wording, and timing of the DNF symbol. For example, the symbol should not be obscured by packaging seals/folds or obscured by other package design elements (INDA and EDANA, 2017). Based on the on-pack consumer information, these baby wipes did not meet the criteria due to a lack of adherence to visual criteria, and failure to meet other specifications.

A key visual observation made during the evaluation of product adherence to package labelling was that although 19 products displayed a DNF symbol, the symbol failed the stated criteria because of several reasons. These reasons may have included the following:

- DNF symbol appears on plastic wrapper that is designed for removal prior to product usage in which case, DNF symbol is not visible to user after wrapper has been discarded
- DNF symbol is either too small or hidden
- DNF symbol is displayed under the product fold
- Symbol displayed is not the universal DNF symbol

4. Conclusions and Recommendations

4.1 Main Findings

The key conclusions are formulated based on the quantitative and qualitative data gathered, observations stated, and analyses presented throughout this report. This project included an inventory of over a hundred consumer products, representative of the variety present on store shelves in Southern Ontario and/or online, and aimed to incorporate a variety of products based on their potential to be flushed. However, there exists countless other products in the consumer market that remain untested and unaccounted for with regards to flushability assessments. The findings presented below are based on the portion of consumer products tested in this project *only*.

4.1.1 Drainline Clearance

Most of the products tested for drainline clearance did not clear the drainline in a single flush, sometimes requiring up to six 6-L flushes. Low-flush toilets consume a significantly smaller amount of water and may be utilized in various residences, including homes and residential buildings, for water efficiency. As observed during the FG501: Toilet and Drainline Clearance Test, the consumer products took several flushes to clear the drainline with a higher volume flush. There is an even higher potential for clogging with low-flow toilets. Lower water flows pose challenges such as less reliable wastewater transportation and frequent clogging in drainage systems (Shuaeb and Han, 2017). Therefore, a consumer product that is potentially incompatible with toilets and plumbing systems may cause delays and blockages in transport to larger sewage conveyance systems (INDA and EDANA, 2018). Although the data on causes of drainline blockages are scarce, these types of blockages remain as a significant cost burden on municipalities due to the need to respond to many of these calls for service by utility customers. For example, a quick review of the published City of Toronto 311 data indicates that close to 10,000 events labelled “Sewer Service Line-Blocked” were reported *annually* over the 2010-2018 period.

4.1.2 Disintegration Testing

The flushability assessment based on IWSFG PAS 3: Disintegration Test Methods—Slosh Box showed that bathroom tissue disintegrated within the test time as specified, while some products showed no visible evidence of disintegration (IWSFG, 2018c). Some of the bathroom tissue tested partially disintegrated during the *preconditioning* period of the test. All bathroom tissue tested fully disintegrated before the end of the 30-minute *agitation* period. Overall, **none** of the products labelled ‘flushable’ disintegrated within the allotted time to an extent required to pass the test.

4.1.3 Fibre Analysis

From the sample of twenty products drawn from the total of 101 products tested for other criteria and tested for fibre composition, 75% of the test products contain durable man-made material. These synthetics may be hazardous to the natural environment because of their potential to exist in local water bodies by means of combined sewer overflows (CSOs) where such sewers exist. It is important to note that as mentioned previously, the trend in increasing consumption of wet wipes and other such consumer products may result in the production of stronger and more durable versions of these products. Since synthetics may be used as binders in consumers products like wet wipes, the presence of synthetics in

evolving consumer products may be at a rise. In other words, the increasing consumption of consumer products may indicate a growing number of these products in wastewater collection systems.

4.1.4 Package Labelling

Although it is evident that efforts have been made by manufacturers to distinguish products that are 'flushable' from those that are not, it appears that there is no significant distinction in product composition based on the TAPPI/ANSI Test Method T 401, Fibre Analysis of Paper and Paperboard. The similarity in the visual aspect of these consumer products along with the inconsistency in package labelling may be a source of confusion for consumers. The confusion around which products are flushable and those which are not is a growing concern for many reasons. The lack of awareness around flushing habits may result in an inability to effectively treat the products prior to their release to the environment and result in sewer overflows that can impact public health and the environment (IWSFG, 2018a).

Currently, different versions of flushability specifications are provided by various industries and associations (e.g. UK Water Industry 2019, IWSFG 2018, INDA/EDANA 2018a), which are not consistent with each other. Although these specifications have the shared view on the importance of proper disposal of consumer products, variability between them may be a cause for variability in disintegration performance of consumer products by some manufacturers (UK Water Industry, 2019).

4.2 Amended Methodology for IWSFG PAS 3 (2018)

While this application of the PAS 3 (IWSFG, 2018c) serves to provide thorough quantitative data for consumer products labelled 'flushable', it may be worthwhile to exclude some steps of the procedure under time constraints. As an example, for 82.2% of the products tested, it was visually evident whether the sample disintegrated or not. As aforementioned, many of the products remained fully intact and this was clear through a visual speculation. Therefore, a visual observation may be enough to classify a product as a **PASS** or **FAIL**. In this case, the steps detailing the weighing process for the initial dry mass of the samples and the oven drying process for the dry mass of the samples may be eliminated.

Moreover, recording the weights of the samples can often become tedious given the number of times the masses are to be recorded. It may be best to include the weighing process only when products show evidence of disintegration. This does not cause any delays in the procedure as the masses are to be recorded after the testing has been performed. Hence, no repetition of procedure would be necessary.

Presented on the following page is a schematic detailing an amended methodology for the PAS 3 (IWSFG, 2018c). The methodology presented is mainly the same as that presented in the PAS 3 (IWSFG, 2018c) with slight modifications. The schematic outlines the procedure for one product sample. However, the procedure should be repeated for five sequential product samples to obtain the total dry mass of the retained material from the sieve and an additional five product samples to obtain the initial dry mass, where necessary.

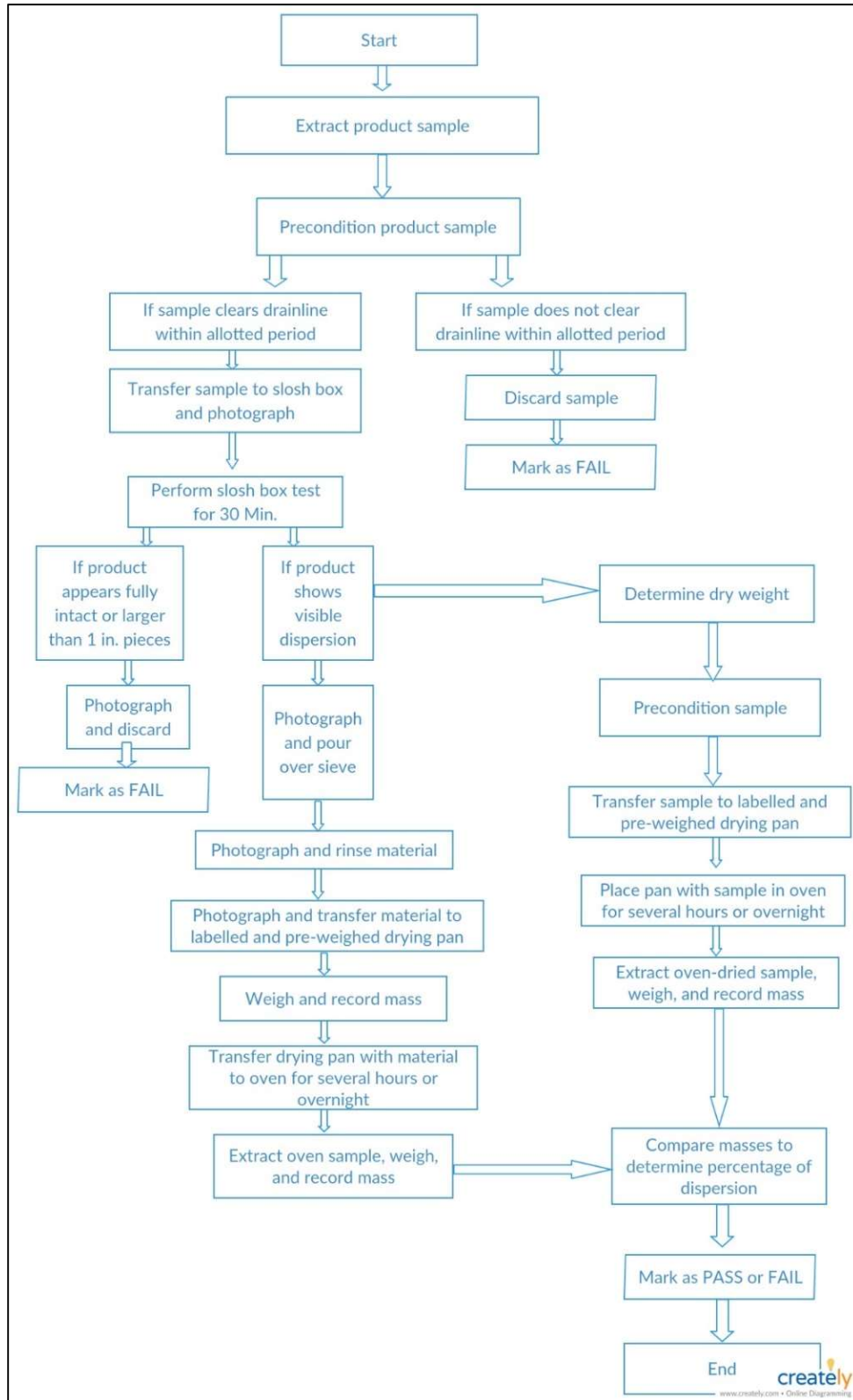


Figure 11- Schematic of Proposed Amendments to IWSFG PAS 3 (2018) Methodology

4.3 Recommendations

The following recommendations are made based on the results of the testing conducted in this project:

1. Raise public awareness around flushing habits.

Though many Canadian municipalities have spent time, money, and resources developing and delivering educational programs detailing what is and what is not flushable, the problem may be related to a lack of awareness (Orr, 2013). An increase in public awareness of appropriate disposal methods, combined with current efforts, may result in consumers taking more care when disposing these products in order to prevent blockages in their homes which result in inconvenience and expense to the homeowner.

2. Eliminate the use of the word 'flushable' on consumer products.

The use of the word 'flushable' indicates that a product is safe for wastewater collection systems. However, based on the results presented in this report, it is evident that none of the products other than bathroom tissue are 'flushable'. Therefore, eliminating the use of the word 'flushable' from consumer products can help to reduce, if not eliminate, the presence of these products in wastewater collection systems, treatment plants, and the natural environment.

3. Advocate and provide support to government bodies to include the IWSFG specification, and the INDA/EDANA Code of Practice into legislation (IWSFG, 2018c; INDA and EDANA, 2017).

Many of the consumer products tested during this project were manufactured outside of North America in countries such as China, Germany, Ireland, Israel, Italy, Korea, Poland, and Thailand. The need for a global definition of a 'flushable' product exists and it is vital that it be brought into legislation in an effort to combat misconceptions around consumer products that may exist internationally.

4. Monitor and communicate with manufacturers and their associations (e.g. INDA, EDANA) to ensure policies and guidance are followed.

As mentioned in the Introduction of this report, it is unclear to what extent manufacturers are practicing appropriate methodology in determining the flushability of consumer products as well as their labelling. Regulation of specifications in place may help to ensure that consumer products are correctly labelled with a 'Do Not Flush' statement or DNF symbol.

5. Increase efforts to collect the information on the causes of reported sewer blockages.

Studies often cited to indicate the low content of 'flushable' wipes in sewer systems are hardly representative of the potential impacts of many consumer products that are being flushed on the entire sewerage system, starting from private drains to wastewater treatment plants. Work orders completed by crews responding to sewer blockages often contain valuable information on the potential causes, and these should be collected and processed to gain further insight. In the longer term, a methodology needs to be developed to collect the information on blockage causes in a more systematic and easy way in order to better understand this issue and aid in developing effective control alternatives.

6. Continue the testing of consumer products with manufacturers' input.

The current study should be expanded to include the testing of products sold in other jurisdictions, as well as other consumer products such as feminine hygiene products, kitty litter, and dental floss. The consumer products that are of interest here undergo changes in terms of the manufacturing process and materials used, and these should be accounted for through closer communication with manufacturers and possible re-testing. In addition, the products that pass the drainline and disintegration tests should be subjected to the remaining tests under the IWSFG Publicly Available Specification (PAS) 1: 2018 (IWSFG 2018b).

References

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Appendix A - Detailed List of 101 Consumer Products Tested

Product #	Product Category	Manufacturing Country	Do Flush Logo?	Not Flush?	Says Do Not Flush?	Do Labelled Flushable?	Pass Rate	Pass/Fail
1	Baby Wipes	USA	No	No	Yes	0	Fail	
2	Baby Wipes	Poland	No	No	Yes	0	Fail	
3	Baby Wipes	China	No	No	No	0	Fail	
4	Baby Wipes	Poland	Yes	No	No	0	Fail	
5	Baby Wipes	USA	No	Yes	No	0	Fail	
6	Baby Wipes	USA	Yes	Yes	No	0	Fail	
7	Baby Wipes	China	No	No	No	0	Fail	
8	Baby Wipes	USA	Yes	No	No	0	Fail	
9	Baby Wipes	USA	Yes	Yes	No	0	Fail	
10	Baby Wipes	Israel	No	No	No	0	Fail	
11	Baby Wipes	China	Yes	No	No	0	Fail	
12	Baby Wipes	USA	Yes	No	No	0	Fail	
13	Baby Wipes	USA	No		Yes	0	Fail	
14	Baby Wipes	UK	Yes	No	No	0	Fail	
15	Baby Wipes	USA	Yes	Yes	No	0	Fail	
16	Baby Wipes	USA	Yes	Yes	No	0	Fail	
17	Baby Wipes	USA	Yes	No	No	0	Fail	
18	Baby Wipes	Ireland	Yes	Yes	No	0	Fail	
19	Bathroom Tissue	China	No	No	Yes	100	Pass	

Product #	Product Category	Manufacturing Country	Do Flush Logo?	Not Flush?	Says Do Not Flush?	Do Labelled Flushable?	Pass Rate	Pass/Fail
20	Bathroom Tissue	Canada	No	No	No	Yes	100	Pass
21	Bathroom Tissue	Canada	No	No	No	Yes	100	Pass
22	Bathroom Tissue	Canada	No	No	No	Yes	100	Pass
23	Bathroom Tissue	USA	No	No	No	Yes	100	Pass
24	Bathroom Tissue	USA	No	No	No	Yes	100	Pass
25	Bathroom Tissue	Canada	No	No	No	Yes	100	Pass
26	Bathroom Tissue	Canada	No	No	No	Yes	100	Pass
27	Bathroom Tissue	USA	No	No	No	Yes	100	Pass
28	Bathroom Tissue	Canada	No	No	No	Yes	100	Pass
29	Bathroom Tissue	Canada	No	No	No	Yes	100	Pass
30	Cleaning Cloth	China	Yes	Yes	Yes	No	0	Fail
31	Cleaning Cloth	USA	Yes	No	No	No	0	Fail
32	Cleaning Cloth	Canada	Yes	Yes	Yes	No	0	Fail
33	Cleaning Pad	Thailand	No	No	No	Yes	0	Fail
34	Cleaning Wipes	China	No	No	No	Yes	0	Fail
35	Cleaning Wipes	USA	No	Yes	No	No	0	Fail
36	Cleaning Wipes	USA	Yes	Yes	No	No	0	Fail
37	Cleaning Wipes	USA	Yes	Yes	No	No	0	Fail

Product #	Product Category	Manufacturing Country	Do Flush Logo?	Not Flush?	Says Do Flush?	Do Labelled Flushable?	Pass Rate	Pass/Fail
38	Cleaning Wipes	USA	No	Yes	No	0	Fail	
39	Cleaning Wipes	USA	No	Yes	No	0	Fail	
40	Cleaning Wipes	USA	No	No	No	0	Fail	
41	Cleaning Wipes	USA	No	No	No	0	Fail	
42	Cleaning Wipes	USA	No	Yes	No	0	Fail	
43	Cleaning Wipes	USA	No	No	No	0	Fail	
44	Cleaning Wipes	USA	No	Yes	No	0	Fail	
45	Cleaning Wipes	China	No	No	No	0	Fail	
46	Cleaning Wipes	USA	No	Yes	No	0	Fail	
47	Cleaning Wipes	USA	No	Yes	No	0	Fail	
48	Cleansing Cloth	USA	Yes	Yes	No	0	Fail	
49	Cleansing Cloth	USA	No	Yes	No	0	Fail	
50	Cleansing Cloth	USA	No	Yes	No	0	Fail	
51	Cleansing Cloth	USA	No	No	Yes	34.98	Fail	
52	Cleansing Cloth	China	No	Yes	No	0	Fail	
53	Cleansing Wipes	USA	Yes	Yes	No	0	Fail	
54	Cleansing Wipes	USA	No	Yes	No	0	Fail	
55	Cleansing Wipes	USA	Yes	No	No	0	Fail	

Product #	Product Category	Manufacturing Country	Do Flush Logo?	Not Flush?	Says Do Not Flush?	Do Labelled Flushable?	Pass Rate	Pass/Fail
56	Cleansing Wipes	USA	Yes	No	No	No	0	Fail
57	Cleansing Wipes	USA	No	No	No	Yes	48.67	Fail
58	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
59	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
60	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
61	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
62	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
63	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
64	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
65	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
66	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
67	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
68	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
69	Cleansing Wipes	USA	No	No	No	Yes	0	Fail
70	Cleansing Wipes	Italy	No	Yes	No	No	0	Fail
71	Cleansing Wipes	USA	Yes	Yes	No	No	0	Fail
72	Cleansing Wipes	USA	Yes	Yes	No	No	0	Fail
73	Cleansing Wipes	Italy	No	No	No	No	0	Fail
74	Cleansing Wipes	USA	No	yes	no	no	0	Fail

Product #	Product Category	Manufacturing Country	Do Flush Logo?	Not Flush?	Says Do Flush?	Do Labelled Flushable?	Pass Rate	Pass/Fail
75	Cleansing Wipes	China	No	Yes	No	0	Fail	
76	Cleansing Wipes	China	No	Yes	No	0	Fail	
77	Cleansing Wipes	USA	No	No	No	0	Fail	
78	Cleansing Wipes	UK	Yes	Yes	No	0	Fail	
79	Cleansing Wipes	USA	No	yes	no	0	Fail	
80	Cleansing Wipes	Germany	No	No	No	0	Fail	
81	Cleansing Wipes	USA	Yes	Yes	No	0	Fail	
82	Cleansing Wipes	Korea	Yes	No	No	0	Fail	
83	Cleansing Wipes	China	No	No	No	0	Fail	
84	Cleansing Wipes	China	No	No	No	0	Fail	
85	Diaper Liners	USA	No	No	Yes	0	Fail	
86	Diaper Liners	China	No	No	Yes	0	Fail	
87	Diaper Liners	USA	No	No	Yes	0	Fail	
88	Dog Waste Bags	China	No	No	Yes	0	Fail	
89	Dog Waste Bags	China	No	No	No	0	Fail	
90	Dog Waste Bags	USA	No	No	No	0	Fail	
91	Facial Tissue	USA	No	No	No	0	Fail	
92	Facial Tissue	China	No	No	No	68.23	Fail	

Product #	Product Category	Manufacturing Country	Do Flush Logo?	Not Flush?	Says Do Not Flush?	Do Labelled Flushable?	Pass Rate	Pass/Fail
93	Facial Tissue	Canada	No	No	No	No	0	Fail
94	Facial Tissue	Canada	No	No	No	No	0	Fail
95	Facial Tissue	USA	Yes	No	No	No	68.25	Fail
96	Facial Tissue	China	No	No	No	No	37.78	Fail
97	Paper Towels	USA	No	No	No	No	0	Fail
98	Paper Towels	Canada	No	No	No	No	37.28	Fail
99	Paper Towels	Canada	No	No	No	No	0	Fail
100	Paper Towels	USA	No	No	No	No	0	Fail
101	Paper Towels	USA	No	No	No	No	0	Fail

Appendix B - Summary of Products Evaluated for Fibre Composition

<i>ID</i>	<i>Product Type</i>	<i>Category</i>	<i>Subcategory</i>	<i>Manufacturing Country</i>
1	Nonwoven	Baby Wipes	Flushable	USA
2	Nonwoven	Baby Wipes	Flushable	Poland
4	Nonwoven	Baby Wipes		Poland
7	Nonwoven	Baby Wipes		China
10	Nonwoven	Baby Wipes		Israel
14	Nonwoven	Baby Wipes		UK
18	Nonwoven	Baby Wipes		Ireland
27	Bath/Facial Tissue	Bathroom Tissue		USA
47	Nonwoven	Cleaning Wipes		USA
51	Nonwoven	Cleansing Cloth	Flushable - Body	USA
56	Nonwoven	Cleansing Wipes	Body	USA
58	Nonwoven	Cleansing Wipes	Flushable - Body	USA
59	Nonwoven	Cleansing Wipes	Flushable - Body	USA
61	Nonwoven	Cleansing Wipes	Flushable - Body	USA
63	Nonwoven	Cleansing Wipes	Flushable - Body	USA
70	Nonwoven	Cleansing Wipes	Denture	Italy
86	Nonwoven	Diaper Liners	Flushable	China
87	Nonwoven	Diaper Liners	Flushable	USA
95	Bath/Facial Tissue	Facial Tissue		USA
97	Towel	Paper Towels		USA



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September 5, 2019

Dear Municipal Colleagues:

This is to advise that City Council, at a meeting held on August 26, 2019, passed the following resolution regarding single-use disposable wipes:

“WHEREAS in 2018 the City of Kitchener implemented a sustainable funding model Water Infrastructure Project (WIP) for the city’s water, sanitary and stormwater infrastructure to ensure the safe delivery of these valued utilities; and,

WHEREAS in 2018 a multi-year initiative approved through the WIP has already improved several key measures of water quality, and proactive maintenance has reduced the risk of flooding in high-risk areas; and,

WHEREAS in 2018 the City has already seen a number of impacts due to the implementation of the WIP including: 48% decrease in complaints related to discoloured water; Storm main repairs increased by 27 per cent; 300 metric tonnes of sediment removed from catch basins; and, 2,200 properties protected against backflow and cross-connection contamination; and,

WHEREAS Single-use wipes are a \$6-billion industry and growing, and are now being advertised as the clean alternative to toilet paper and are safe to flush; and,

WHEREAS there is no one standard for what the word “flushable” means; and,

WHEREAS Single-use wipes are in fact not safe to flush as they are buoyant; are not biodegradable; and, are unable to break down into small pieces quickly; and,

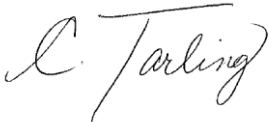
WHEREAS Single-use wipes accumulate in the sewer system and eventually clog the sanitary sewer system costing municipalities hundreds of millions of dollars in additional repairs and maintenance costs each year to municipal sewer systems across the country; and,

WHEREAS there is a lack of public awareness of the impact caused by non-flushable wipes being flushed down toilets and consumer education and outreach could play a large part in reducing the impact;

THEREFORE BE IT RESOLVED that the City of Kitchener lobby the Federal Government, to review regulations related to consumer packaging on single-use wipes to remove the word flushable; and,

BE IT FINALLY RESOLVED that this resolution be forwarded to the Right Honourable Prime Minister of Canada; the Honourable Premier of Ontario; the Minister of the Environment, Conservation and Parks; the Minister of Municipal Affairs and Housing; the Association of Municipalities of Ontario; the Local Members of Provincial Parliament; the Region of Waterloo; and, all Municipalities within the Province of Ontario.”

Yours truly,

A handwritten signature in cursive script, appearing to read "C. Tarling".

C. Tarling
Director of Legislated Services
& City Clerk