

Bet You Didn't Know Your Baby Wipes are Plastic?

BY ROBERT A. VILLÉE

Since the introduction of flushable wipes, wastewater professionals have been communicating – and continue to communicate – to purchasers of all disposable wipes the message that they are a maintenance problem for the wastewater industry and to stop flushing them. Manufacturers have long blamed consumers for flushing products that were not designed to be flushed as the cause of the problems they create for wastewater systems. What is lost in this dialogue is that the manufacturers are aware that they have not followed their own Code of Practice for labeling non-flushable products – and that they continue to do so. Manufacturers have also not addressed the fact that the baby wipes they point to as the real problem are being purchased by adult consumers for their own personal hygiene use and being flushed. The issue is part of the bigger problem of plastics in the marine environment. Few people are aware that disposable wipes, especially those in the baby wipes category, are primarily made from plastics or regenerated cellulose fibers like rayon. This paper will shed light on these issues and suggest that our industry portray wipes as the single-use plastic items they are.

Bet you didn't know your baby wipes are plastic? The answer from most people would be one of surprise that their soft-feeling disposable wipes, especially their coveted baby wipes, actually contain plastics. In almost every case, they consist of plastics made from petrochemicals or modified cellulose like rayon or viscose, which provide a surprisingly cloth-like feel.

Are disposable wipes single-use plastics? The answer is mostly that yes, they are! A small subcategory of flushable wipes that are made of 100% wood pulp or cellulose that are not single-use plastics. However, most disposable wipes are made with synthetic fibers.

Wipes come in two broad categories: the ones manufacturers don't design to be flushed, like baby wipes, feminine hygiene wipes, and cleaning wipes, and the ones the manufacturers claim are flushable.

The first category, the wipes not designed to be flushed, is pretty clear-cut: they contain plastic – sometimes they are entirely made up of plastic. There are two primary manufacturing processes. The dry laid process, or the "meltblown" method, is used to make non-woven fabrics from plastic resins. In this method, plastic pellets are melted and then

extruded, or forced through tiny holes, by air pressure. As the stream of fibers cools, it condenses to form a sheet. Hot metal rollers are used to flatten the fibers and bond them together.

There is little debate that if plastic resins like polyester, polyethylene, and propylene are used to manufacture wipes, these products are not biodegradable and should not be introduced into a marine environment. Yet they are, since manufacturers do not list the materials used to make the substrate or base sheet. You would be surprised to learn that a lot of synthetic fibers are used to make these wipes, even the ones labeled as flushable. To compound the problem, manufacturers do not make it clear that these products are not designed to be flushed.

The absence of any information seems like a deliberate effort to hide the fact that most of these products are petrochemical-based. After all, it is hard to call yourself an environmentally friendly company when you know that your customers are flushing plastic down into sewers. This is not to say the information isn't available; it is. But to find out what these wipes are made of,

you need to Google it and then you can find the information the companies' website. Examples from Procter & Gamble and Kimberly-Clark are reproduced below:

"The foundation of a Pampers Baby Wipe is a fiber-blend material specifically chosen for its softness and flexibility. Made from **modified cellulose** and **polypropylene**, each fiber adds a unique property to generate a cloth-like feel." (Procter & Gamble, 2019, emphasis mine)

"Q. What are Huggies Baby Wipes made from?

- A. A stretchy non-woven fabric called Coform.
Coform is made by combining microscopic and continuous plastic fibres with wood pulp (cellulose) fibres that provide gentle care to baby's skin." (Kimberly-Clark, 2017)

In regards to the "do not flush" labeling, it has long been recognized by both the manufacturers and the wastewater industry that baby wipes and other wipes not designed be flushed are a much bigger issue to wastewater systems than flushable wipes. However, the manufacturers have been lax in their efforts to communicate to consumers that these wipes are not designed to be flushed.

In 2009, the International Nonwovens and Disposables Association (INDA) and the European Disposables and



Nonwovens Association (EDANA) – respectively, the North American and European trade associations for non-woven fabric products – issued a Code of Practice for labeling that stated that any "do not flush" label should be clearly and prominently displayed on the packaging (INDA & EDANA, 2017). To the best of my knowledge, no labeling took place until Kimberly-Clark placed a small (half-inch in diameter) "do not flush" symbol on the back of its packaging in 2012. Even when INDA and EDANA updated their Code of Practice in 2013 as part of the third edition of the Guidelines for Assessing the Flushability of Disposable Nonwoven Products, the "do not flush" symbol was only required to be a half-inch in

diameter and placed on the back of the packaging next to the UPC barcode. Although the major manufacturers of wipes more or less complied with this Code of Practice, there was no educational component associated with it to inform consumers that these wipes were not designed to be flushed. There was also discussion of the fact that the placement on the back of the package did not meet the intent of the clear and prominent language. Furthermore, many store or national brands did not display any "do not flush" symbols or text at all.

In April 2017, INDA came to an agreement with the American Water Works Association and the Canadian Water and Wastewater Association on a revised Code



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of Practice on labeling. It was included in the fourth revision of the INDA/EDANA Guidelines for Assessing the Flushability of Disposable Nonwoven Products and went into effect on November 1, 2018. Some of the key points were:

1. Location: Must be prominent, permanently affixed, and reasonably visible near the point where

individual wipes are taken out of the container holding and dispensing the wipes.

2. Color: Symbol artwork should have sufficiently high contrast with the background to be highly readable.
3. Size: Depends on the package size, but for a standard-sized wipe package, it is 15 mm or six inches.

4. Wording: Use of the written instruction "do not flush" with the DNF symbol is optional. Any on-pack instruction for product disposal needs to be clear and explicit. (INDA & EDANA, 2018).

The hope with this most recent Code of Practice was that the manufacturers would step up and clearly convey that these products weren't to be flushed down the toilet as a means of disposal. Very disappointingly, the manufacturers have not, even though their own research indicates that approximately half of all the buyers of baby wipes are purchasing them for other uses than cleaning babies. This includes personal hygiene use and flushing them down the toilet. None of the packages contained the optional do-not-flush instructions, and almost universally the DNF symbols do not meet the requirements for size, placement, or, most egregiously, color contrast. Instead of making the DNF symbol "clear and prominent," the trend seems to be to make them disappear into the package artwork. A Canadian report titled *Nonwoven Fabric Product Analysis Summary Report* concluded that none of the 25 non-flushable products met the Code of Practice requirements for labeling (Hooda et al., 2019).

In the past, the dry laid process was the preferred manufacturing technique for a variety of reasons, including cost, strength, and production machinery speed. Recently, in response to concerns about the lingering effects of plastics in the environment, manufacturing has moved to a blended construction using the wet laid process, which is typically used for softer cloths that use cotton or blends, like diaper wipes. In this wet process, the fibers are made into liquid slurries with water and other chemicals. The resultant paste is pressed into flat sheets by rollers and then dried to form long rolls of fabric.

The trend in the industry is to move away from the 100% plastic resin-based baby wipes into blends that use more environmentally safe-sounding "plant-based fibers." Some manufacturers are now using a mixture of wood pulp and plastics, although the exact ratio of fibers is unclear. However, most are moving toward a blend of regenerated cellulose and plastic or, in some cases, 100% regenerated cellulose. It is these 100% regenerated cellulose baby wipes that have led to the "greenwashing" of these wipes with the use of marketing terms like "eco-friendly," "environmentally sustainably sourced," "100% plant-based," "made with naturally derived ingredients," or "biodegradable." These are all terms for modified or regenerated cellulose fibers like rayon, viscose, lyocell, Tencel, and others. These terms can be confusing and can lead a consumer to assume wipes are an

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environmentally friendly choice. Worse, the lack of consumer understanding between "biodegradable" and "flushable" can lead to the flushing of wipes not designed to be flushed precisely because of the "biodegradable" tag.

Flushable wipes, with the exception of one brand, are also made with this wet laid process. In the past, they have included plastic fibers for strength. Those plastic fibers have since been removed, but a typical wipe contains about 20% regenerated cellulose; the remainder is wood pulp.

There are a few flushable wipes that claim to be biodegradable, but you need to understand the tests that are being used to make that claim. One wipe manufacturer is at least honest enough to list the tests "will biodegrade and compost in municipal/industrial facilities according to ASTM D5338 & OECD 311 standards." One of the keywords here is "composting": the ASTM D5338 – Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials Under Controlled Composting Conditions, Incorporating Thermophilic Temperatures deals with

composting in soil, not the marine environment. OECD Test 311 for Anaerobic Biodegradability of Organic Compounds in Digested Sludge: By Measurement of Gas Production is for chemicals and not solids, lasts 56 days, and the passing grade is 70%, meaning that a product could contain 30% plastics and still pass the test. Also, while the wipe manufacturers and brand owners are not making claims of biodegradability, the manufacturers that provide the regenerated cellulose fibers are. What they don't tell you is that these tests for marine biodegradability are done in water temperatures of 30° C (86° F). Additionally, the tests provide high levels of microorganisms, which aid biodegradation. It is fair to say that these tests – structured with high heat and high microorganism levels – are not representative of marine environments. The absence of a universally accepted test for marine biodegradability is an acknowledged issue, as are concerns over plastics, including rayon, in the marine environment. Short of full disclosure of the tests the manufacturers use to make

the claims of biodegradability, this will continue to be an area of contention.

Another Canadian report, *Defining "Flushability" for Sewer Use*, drew this conclusion: "75% of the test products contain durable man-made material. These synthetics may be hazardous to the natural environment" (Khan et al., 2019).

So, how do we move forward? In the world of flushable wipes, 2018 had a lot of action. Lawsuits were a big issue: some manufacturers settled, while a few kept fighting. In March 2018, the International Standards Organization (ISO) met to hammer out the final negotiations for a Technical Report on the hydraulic, mechanical, and environmental conditions generally found in wastewater transport systems, from toilets through to wastewater treatment plants, and the related context (TR 24524). In May 2018, INDA and EDANA unilaterally issued the fourth edition of the Guidelines for Assessing the Flushability of Disposable Nonwoven Products after negotiations with the wastewater industry were terminated. At the same time, the International Water Services Flushability Group (IWSFG), an international group of wastewater professionals from Japan, Australia, New Zealand, Canada, Spain, Turkey, and the United States, issued publicly available international Flushability Specification Documents (ISWFG, 2018). In December 2018, the UK issued its own Water Industry Specifications (UK Water Industry, 2019).

All these specifications or guidelines share a great deal of commonality (Table 1). Drainline, settlement, and anaerobic biodegradation tests are similar, if not the same. One of the big areas of disagreement is disintegration, where wastewater organizations' tests use a lot less force than manufacturers' tests. The IWSFG Flushability Specification Documents and the INDA/EDANA Guidelines use the same apparatus. The force in the IWSFG is equivalent to an eight-inch sewer line with 2.5 inches of flow, and the time is half that of the INDA/EDANA Guidelines. The passing criteria is being able to pass through a one-inch/25-mm sieve. Testing on the INDA/EDANA Guidelines pump test shows that one-inch pieces do not increase the power draw, so this is probably enough disintegration in that time period. To identify synthetic fibers, the IWSFG also uses a fiber analysis test, TAPPI/ANSI Test Method T 401 om-15, that can identify plastics, regenerated cellulose, and hardwood or softwood fibers.

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TABLE 1: Test comparison chart of the IWSFG Flushability Specification Documents, the INDA/EDANA Guidelines (4th ed.), and the UK Water Industry Specifications.

	INDA/EDANA Guidelines (4th ed.)	IWSFG Flushability Specification Documents	UK Water Industry Specifications
HOME			
Toilet and drainline	FG50.R1(18) – Toilet Bowland Drainline Clearance Test	FG50.R1(18) – Toilet Bowl and Drainline Clearance Test	WC Bowl Clearance Test and Drainline Clearance Test
Drainline snagging	No test	No test	Snagging in the Drainline Test
Drainline disintegration	No test	No test	Disintegration in the Drainline Test
Household pump	FG503.R1(18) – Household Pump Test	No test	No test
MUNICIPAL SEWER			
Disintegration	FG502.R1(18) – Slosh Box Disintegration Test	PAS3 – Disintegration Test Methods – Slosh Box	Disintegration in the Sewer Test
Settling	FG504.R1(18) – Settling Test	FG504.R1(18) – Settling Test	Settling Test
Municipal pump	FG50.R1(18)7 –Municipal Pump Test	No test	No test
MUNICIPAL TREATMENT AND ENVIRONMENT			
Aerobic bio-disintegration	FG505.R1(18) – Aerobic Bio-disintegration Test or OECD301B Aerobic Biodegradation Test	No test	No test
Anaerobic bio-disintegration	FG-506.R1(18) – Anaerobic Bio-disintegration Test or OECD 311 Anaerobic Biodegradation Test	FG-506.R1(18) – Anaerobic Bio-disintegration Test- Part "A"	No test
Fiber analysis	No test	TAPPI/ANSI Test Method T 401 – Fiber Analysis of Paper and Paperboard	MONS Test

When you compare the competing specifications, the IWSFG specifications are the ones that are most consistent with the ISO Technical Report and the International Water Industry Position Statement on Non-flushable and "Flushable" Labelled Products, which was signed by 30 countries and over 250 water organizations worldwide (International, 2017). The criteria are that they 1) break into small pieces quickly, 2) not be buoyant, and 3) not contain plastic or regenerated cellulose, but only contain materials that will readily degrade in a range of natural environments.

The IWSFG has gained traction since its introduction in June 2018. The disintegration test was used by New York City when it tested wipes for breakdown. Washington, D.C. used a slightly modified disintegration test in its rule-making for its legislation on wipes; California is using the entire IWSFG Flushability Specifications for its proposed wipes legislation. Australia and Canada are using it to develop national flushability standards.

One look at the agenda for the 2019 World of Wipes International Conference will let you know that the manufacturers are concerned. The afternoon session on Day 2 is titled Sustainability Challenge: Throwing Plastics Away When There is

No Away and includes presentations titled "Flushability: Current State of Play & Nonwovens Next Challenge: Plastics in the Environment" and "Wiping Responsibly," which talks about "the challenges associated with post-consumer waste and single-use plastics with a focus on delivering a preferred consumer experience for products, such as baby wipes and flushable wipes" (World of Wipes, 2019).

The report Defining "Flushability" for Sewer Use drew these conclusions:

- 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." (original emphasis)
- "75% of the test products contain durable man-made material. These synthetics may be hazardous to the natural environment."

(Khan et al., 2019)

Conclusion

The tide is turning, finally. Flushable wipes have made great strides since the days when they were no more than cut-down plastic baby wipes. While most manufacturers still need to significantly improve, there are a handful of products

worldwide that are now acceptable from a technical perspective and which don't contain any synthetic fibers (plastics and regenerated cellulose). The big issue will be to engage these manufacturers as partners – and we are beginning to see that.

Baby wipes will still be a concern for the wastewater industry. Details about flushability and product composition are often only found deeply buried on manufacturers' websites. The labeling of products as "do not flush" is abysmal. The manufacturers clearly do not want to convey that their baby wipes should not be flushed. The lack of transparency from the manufacturers on what their products are made of (i.e., plastics) is an area that can be exploited. The single-use plastics movement is something to which we should be hitching our wagon. It is an issue that consumers can get behind, so we should be talking about wipes as single-use plastics that can harm the marine environment every chance we get.

We are seeing a renewed legislative effort and lawsuit settlements codifying both the technical specifications for flushables and labeling requirements. This would remove the problematic voluntary compliance we see from manufacturers under the current system. Our professional associations like WEF, the National Association of Clean Water

Agencies, and the American Public Works Association should provide boilerplate language to facilitate this.

It took far longer than anticipated to make it happen, but the dedicated work of wastewater professionals is making a difference.

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