

International Water Services Flushability Group

Publicly Available Specification (PAS) 3: 2018
Disintegration Test Methods – Slosh Box



June 5, 2018



IWSFG.org

International Wastewater Services Flushability Group
IWSFG PAS 3: 2018 – Disintegration Test Methods – Slosh Box

Copyright 2018

Copyright Notice

This document is copyright-protected by the International Wastewater Services Flushability Group (IWSFG). Neither this document nor any extract from it may be reproduced, stored or transmitted in any form for any other purpose without prior written permission from the IWSFG.

The IWSFG permits downloading and use of the documents without charge for the purposes of determining whether or not a product is likely to be considered flushable and so identified. Such purpose includes the development of guidelines, standards and regulations.

Foreword

The International Wastewater Services Flushability Group (IWSFG) is an international coalition of national and regional wastewater services' associations and organizations and individual wastewater services.

The work of preparing the specifications is carried out by various drafting groups comprising volunteers designated by the principal and the supporting participants of the group. They participate on a voluntary basis, without remuneration of any kind.

The criteria for flushability and the appropriate test methods are the product of a global consensus of the coalition members and reflect test methods and criteria to ensure a product labelled as flushable will not impact drain lines, various onsite treatment and wastewater collection and treatment systems as well as the downstream environment.

It is acknowledged that the majority of this document is due to the long-standing work of industry experts working with wastewater representatives over many years. Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The IWSFG shall not be held responsible for identifying any or all such patent rights.

The PAS 3 2018 Slosh Box test and several of the annexes for it are based substantially on the INDA/EDANA Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition for Determining Flushability -3rd Edition, FG502 – Slosh Box Test for Disintegration and its associated Supplemental Guidance Documents. INDA has granted the IWSFG written permission to use these materials.

The Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition including the Supplemental Guidance Documents, Test Methods, Guidelines, and the Code of Practice are owned by INDA and EDANA and used by Permission. © 2013 INDA and EDANA. All Rights Reserved.

Contents

1	Introduction	4
2	Purpose	5
3	Scope	5
4	References	5
4.1	Normative References	5
4.2	Informative References or Annexes	5
5	Terms and Definitions	5
6	Principles	6
7	Apparatus	6
7.1	Slosh Box Design Parameters	6
7.2	Functional parameters	6
7.3	Other equipment	6
8	Preparation	6
8.1	Sample acquisition	6
8.2	Number of test pieces	7
8.3	Sample preparation and Unit Dose	7
8.3.1	Moist tissues	7
8.3.2	Other products	7
9	Storage and conditioning	8
9.1	Storage of samples	8
9.2	Conditioning for the test	8
10	Procedures	8
10.1	Summary	8
10.2	Preconditioning for the Slosh Box Test	9
10.2.1	Toilet and Drain Line Method	9
10.3	Test Set-Up	9
10.4	Test Procedures	9
10.5	Test Termination	10
11	Acceptance Criteria	11
12	Test Report	11
13	Variability	12

Bibliography	12
Annex 1– Sources of Apparatus and Pictures of a Typical Installation	13
A1.1 Sources	13
A1.2 Photographs	14
Annex 2 - Preconditioning Procedure for Slosh Box Disintegration Test.....	15
Annex 3 – Slosh Box Angle Measurement Procedure.....	17
A.3.1 Illustrated Procedure	17
A.3.2 Slosh Box Angle Measurement Worksheet	18
Annex 4 - Procedure for Pre-rinsing Test Products for Determining Initial Dry Mass	19
A.4.1 Introduction.....	19
A.4.2 Test Product Selection.....	19
A.4.3 Toilet and Drain Line Method.....	19
A.4.3.1 Equipment.....	19
A.4.3.2 Procedure.....	19
Annex 5 - Sieving and Recovery of Product Residues.....	20
A.5.1 Introduction.....	20
A.5.2 Equipment	20
A.5.3 Procedure	20
Annex 6 – Drying and Weighing of Products and Product Residues	23
A.6.1 Equipment	23
A.6.2 Procedure	23
A.6.2.1 Loss of Mass Calculation Procedure	23
A.6.2.2 Initial Dry Mass Calculation Procedure.....	23
Annex 7 – Sample Recommended Test Report Template for Slosh Box Disintegration Test.....	25
A.7.1 General Information	25
A.7.2 Loss of Mass Calculation Data Input Sheet.....	26
A.7.3 Picture Record	27
A.7.4 Photography Hints.....	28

1 Introduction

This document provides a description of the test method and threshold criteria for determining if a product will disintegrate sufficiently to be compatible with wastewater transport systems. The document

is designed to be used in conjunction with IWSFG PAS1: 2018 *Criteria for Recognition as a Flushable Product* and IWSFG PAS2: 2018 *Terms and Definitions for Determination of Flushability*.

2 Purpose

The purpose of this test is to assess the disintegration performance of a material when it is subjected to hydraulic forces typically found in continuous flow conditions in small diameter (8 inch/200 mm) wastewater transport systems, after a product is flushed: i.e., ratio of forces equivalent to a Reynolds number of 20,000.

3 Scope

This Specification applies to all products that:

1. A manufacturer may wish to identify as being flushable; or
2. Because of the location of their use in the toilet or bathroom or likely contamination by human excreta are likely to be flushed through a toilet into a drain line and wastewater transport and treatment system.

Dry toilet paper is out of scope of this document.

4 References

4.1 Normative References

IWSFG PAS 2:2018 *Terms and Definitions for Determination of Flushability*

INDA/EDANA Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition
FG501 Toilet and Drainline Clearance Test [1]

4.2 Informative References or Annexes

Annex 1 – Sources of Apparatus and Pictures of a Typical Installation

Annex 2 – Preconditioning Procedure Slosh Box Disintegration Test

Annex 3 – Slosh Box Angle Measurement Procedure

Annex 4 – Procedure for Pre-Rinsing Test Products for Determining Initial Dry Mass

Annex 5 – Sieving and Recovery of Product Residues

Annex 6 – Drying and Weighing of Products and Product Residues

Annex 7 – Sample Recommended Test Report Template for Slosh Box Disintegration Test

5 Terms and Definitions

All relevant terms and definitions are in IWSFG PAS 2:2018 *Terms and Definitions for Determination of Flushability*

6 Principles

The test is used to demonstrate a product's potential to disintegrate in water when subjected to the hydraulic forces described in Section 2.

7 Apparatus

7.1 Slosh Box Design Parameters

The design parameters for the slosh box are:

1. The slosh box test apparatus comprises one or more (typically 3) plastic testing boxes having inside dimensions of: L: 18" (45.72cm) x W: 12" (30.48cm) x H: 6.5 -12" (16.51-30.48cm), secured to a horizontal surface.
2. The horizontal surface shall be capable of being oscillated (i.e., rocked forward and backward) by a rotating cam and lever mechanism.
3. The testing boxes may be equipped with a drain for emptying and a clear lid to control any splashing and to allow observation of articles in the box during the test.

The slosh box apparatus shall be secured to a mounting bench or shall be sufficiently stable so that movement during the oscillating function is minimized.

(See Annex 1 and A.1.2 for photographs.)

7.2 Functional parameters

The functional parameters for the slosh box are:

1. The platform should rock to both sides at 11 ° (+/- 0.5°) from the horizontal. The horizontal angle of rock for both directions should be confirmed using a digital level and recorded in the test report.
2. The speed of the cam shall be 18 rpm using the adjustable speed controller and recorded in the test report.

7.3 Other equipment

1. Equipment to fill and measure the volume of tap water in the boxes and to receive the liquid drained from the boxes.
2. A perforated plate screen with round holes, compliant with ISO 3310-2 with apertures of 25 mm.
3. A thermometer or other device for measuring water temperature.
4. A stopwatch or other suitable timing device.

8 Preparation

8.1 Sample acquisition

1. When conducting a test to support a flushable claim, the products used for testing shall be the same as those offered in the intended market. Obtain a sufficient number of products (specimens)

to conduct the intended tests. The testing laboratory may receive samples from their manufacturers or intended distributors.

2. The test report shall clearly indicate the method of sample acquisition.

8.2 Number of test pieces

Five products are required for each complete test of five sequences. An additional five products are needed for the Initial dry mass calculation. For the testing and the Initial dry mass calculation it is recommended that, where possible, products should be obtained at least from two distinct packages or rolls of a product. The products removed from the packages should alternately be allocated to the testing and the Initial dry mass calculation for a total of five from each package. Test articles should be randomly obtained from different sections of the packages to ensure that they are broadly representative. This is particularly important for products such as wipes, which occur in a roll or stack.

Caution is necessary not to damage delicate products when removing from the package. Products should be removed just before the start of the pre-conditioning step of the testing.

8.3 Sample preparation and Unit Dose

The following requirements apply to products to be tested.

8.3.1 Moist tissues

The specimen shall be one sheet.

8.3.2 Other products

For other products, it is one specimen taken directly from the package.

9 Storage and conditioning

9.1 Storage of samples

Samples shall be stored under ambient laboratory conditions in the manufacturer's original packaging. When possible, it is recommended to use fresh samples for each new test. If the samples have been removed from the manufacturer's original packaging, the samples shall be identified and stored for archival purposes as follows:

1. Dry products should be returned to their packaging and should be placed in resealable plastic bags.
2. Moist products should be returned to their packages, e.g. hard-plastic container or soft-plastic package.
3. In case of hard-plastic containers, the box should be closed and then the box should be placed in resealable plastic bags to minimize any exposure to ambient air.
4. Soft-plastic packages should be closed tightly while squeezing air out of the package, and then should be placed in resealable plastic bags to minimize potential exposure to ambient air.

9.2 Conditioning for the test

This test requires a pre-conditioning step (see Section 10.2 and Annex 2)

10 Procedures

10.1 Summary

The test consists of five agitation sequences (one agitation sequence equals a single product per box – if a triplex slosh box is being used it is considered three agitation sequences at one product per box). The agitation step is preceded by a preconditioning step as described in Section 10.2. After each agitation, observations are made and quantitative analysis undertaken to determine whether the product has met the test requirement for disintegration. Test products are placed in the slosh box containing 4L of water, which will be rotated at the designated speed (18rpm) for the designated duration (30 minutes). The slosh box is emptied onto a 25 mm perforated sieve and the upper surface of the sieve is rinsed at the designated flow and duration. The top and underside surfaces of the sieve are examined visually for snagged residuals and photographs of both pre- and post-rinse top surfaces are taken. Quantitative analysis of the retained residuals from the five (5) test samples is performed to see if the total pass through rate of 95% of the Total initial dry mass is met.

10.2 Preconditioning for the Slosh Box Test

10.2.1 Toilet and Drain Line Method

1. Equipment
 - a) Use a toilet and drain line with catch basket before the drain (see FG501 for set up – see Normative Reference Section 4.1 for document information).
 - b) It is recommended to use a toilet with a flush volume of 3 L to 6 L.
2. Procedure (See Annex 2 for photographs)
 - a) Prior to adding any materials to the toilet bowl or initiating a flush, ensure that the toilet has stopped running and that the water in the bowl is at a normal level.
 - b) When adding a product (e.g., a wipe), place it in the center of the toilet bowl and allow sufficient time, typically 15 seconds, for it to become fully saturated with water before flushing the toilet.
 - c) Retrieve the products from the drainline, or before they enter the basket or as soon as practically possible to prevent any disintegration by water flowing out of the pipe.
 - d) When necessary, use additional flushes without products to move the products out of the drain line for collection.
 - e) Allow the water to drain, and then hold the product, either in the drainline or in a dry container for 30 minutes before placing it in the slosh box for testing. If holding the product in the drainline, do not flush again or add water during the 30-minute hold time.

10.3 Test Set-Up

1. Allow the test water to reach $15^{\circ}\text{C} \pm 1^{\circ}\text{C}$.
2. With power to the unit securely off, verify the attachment of the slosh box(es) to the oscillating table. Fill each box with 4 L of tap water.
3. Prior to starting a test sequence, verify that the cam is running at 18 rpm by measuring the time to complete 18 oscillations using a stopwatch and making any fine adjustments to the cam speed dial as needed. Record on report.
4. Make sure the oscillation angle has been checked in the last 30 days and is within the prescribed tolerance.
 - a) If the last angle measurement check is within the last 30 days, record the angle measurements for both the left and right oscillations from the last check and the date on the report.
 - b) If the last angle measurement is more than 30 days old, check the angles using the procedure in Annex 3 – Slosh Box Angle Measurement Procedure. If the measurement is not within the specified tolerance in Section 7.2, adjust the machinery per the manufacturers specifications, or do not use for testing.

10.4 Test Procedures

1. Measure the temperature of the test water and room and record on the test report. Prior to starting an agitation sequence, make sure the water temperature is within the $15^{\circ}\text{C} \pm 1^{\circ}\text{C}$ tolerance. *NOTE: if the test is run at a typical room temperature of 20°C , starting the tests at 14°C will keep the temperature in the $14\text{-}16^{\circ}\text{C}$ range for the entire 30-minute test period).*

2. Place a single preconditioned test product into each box, place lids on the boxes (optional) and oscillate the mixture for 30 minutes.
3. After the 30-minute agitation sequence, stop the oscillations and measure and record the water temperature of each test box.
4. Remove each box from the oscillating platform and slowly pour the contents onto a 25 mm perforated plate sieve [2]. The distance between the box and the sieve plate should be 10 cm.
5. Rinse the box as necessary to remove all of its contents.
6. Take a photograph of the unrinsed top sieve surface.
7. Take the showerhead. Turn on the faucet and adjust the regulator to a flow rate of 4 L per minute (See Annex 5).
8. With the handheld showerhead spray nozzle held 10 cm above the top surface of the sieve, gently rinse the fragments through the 25 mm sieve. Constantly move the spray over the entire surface for 1 minute (60 seconds) without concentrating the spray on any specific areas. Do not force the passage of any material through the sieve.
9. Stop the rinsing after 1 minute.
10. Observe if there are remains of the product on the top surface of the sieve.
11. Take photographs of the upper surface of the sieve.
 - a) If there are residuals remaining, visually and qualitatively recover all the retained materials from both sides of the sieve using forceps or by backwashing the material into a smaller sieve and then using forceps. (See Annex 5).
 - b) Transfer these materials into labeled drying pans or tared weigh boats to determine their dry weight (See Annex 6).

10.5 Test Termination

Upon completion of each agitation sequence, or multiple agitation sequences in the case of a triplex slosh box, the box(es) shall be drained and cleared of any residues from the test articles.

10.6 Calculations

The percentage of mass that disintegrated (operationally defined by the ability to pass through the 25 mm sieve) is calculated using the following equation:

$$\% \text{ Disintegration} = \left[1 - \frac{\text{total dry mass of retained fraction in sieve (g)}}{\text{total initial dry mass of sample (g)}} \right] \times 100$$

- Where the **Total dry mass of the retained fraction in sieve** equals the sum of the dried retained product in grams from the five tests
- Where **Total initial dry mass of the sample** equals the sum of five dried products where the lotion has been removed in accordance with Annex 4.

Example:

Individual Test dry mass of the retained fraction on the sieve: test1 = 0.78 g; test2 = 0.81 g; test3 = 0.77 g; test4 = 0.80 g; test5 = 0.79 g

Total dry mass of the retained fraction on the sieve = 0.78 g + 0.81 g + 0.77 g + 0.80 g + 0.79 g

Total dry mass of the retained fraction on the sieve = 3.95 g

Where **Total initial dry mass of the sample** equals the sum of 5 (five) dried products where the lotion has been removed in accordance with Annex 4.

Example:

Individual product initial dry mass of the sample: product1 = 1.47 g; product2 = 1.46 g; product3 = 1.48 g; product4 = 1.45 g; product5 = 1.49 g

Total initial dry mass of the sample = 1.47 g + 1.46 g + 1.48 g + 1.45 g + 1.49 g

Total initial dry mass of the sample = 7.35 g

11 Acceptance Criteria

To be acceptable:

The percentage of the **Total initial dry mass of the sample** (as computed in Section 10.6) passing through the 25 mm sieve for the five test products after 30 minutes of testing shall be greater than 95%. This result shall be supported with visual examination and pictures of solids on the sieve.

Example (using the example data from Section 10.6):

% Disintegration = [1 - (Total dry mass of the retained fraction on the sieve / Total initial dry mass of the sample)] x 100

% Disintegration = [1 - (3.95 g / 7.35 g)] x 100 = 46.26%

12 Test Report

The test report should include the following information:

1. A reference to this test procedure
2. The date and location of testing
3. Name of tester
4. The complete identification of the tested product

5. The original dimensions and Total initial dry mass of five (5) products
6. The initial and ending water temperature
7. The initial and ending room temperatures
8. The RPM and Rock Angle Measurement data
9. Any departure from the procedure and any circumstances
10. Copies of photographs taken during the procedure
11. The test results, including:
 - a) The percentage of dry mass which passed through the 25 mm sieve after 1 minute of rinsing.
 - b) A final statement indicating whether the product passed or failed the test.

A recommended Sample Test Report for the testing of wipes is shown in Annex 7. A template in Microsoft Word and Excel can be downloaded from www.iwsfg.org.

13 Variability

There may be some variation in the quality of the products being tested, which is why five separate products shall be acquired and tested, according to Sections 8.1 and 8.2.

The oscillating cam should be checked every 30 days for correct operation. If necessary, adjustments should be made to assure an oscillation of 11° (± 0.5 degrees).

The operating speed of the oscillating cam should be checked before each test session for the correct operating speed of 18 rpm. If necessary, adjustments should be made to assure that condition.

The temperature of the test water should be checked prior to, and after, each agitation sequence to make sure it falls within the $15^{\circ}\text{C} \pm 1^{\circ}\text{C}$ tolerance.

Bibliography

1. *Guidelines for Assessing the Flushability of Disposable Nonwoven Products. A Process for Assessing the Compatibility of Disposable Nonwoven Products with Plumbing and Wastewater Infrastructure.* FG501, INDA, 3rd Edition, June 2013.
2. ISO 3310-2:2013 *Test sieves -- Technical requirements and testing -- Part 2: Test sieves of perforated metal plate*

Annex 1– Sources of Apparatus and Pictures of a Typical Installation

(Informative)

Substantially based on INDA GD3 FG502 Appendix I and Used by Permission of INDA

The Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition including the Supplemental Guidance Documents, Test Methods, Guidelines, and the Code of Practice are owned by INDA and EDANA and used by Permission. © 2013 INDA and EDANA. All Rights Reserved

A1.1 Sources

Slosh boxes are available from:

- Techpap SAS - BP 251 - 38044 Grenoble CEDEX 9 – France (see: <http://www.techpap.com/slosh-box,lab-device,36.html>)
- Lenzing Instruments GmbH & Co. KG, A-4851 Gampern, Austria. (See: <http://www.lenzing-instruments.com/produkt.infos/slosh-box-100.pdf>)
- Tri-County Machining, W4719 County Rd O, Appleton, WI 54913
- Phone: 001 (920) 954-1800 <https://tricountymachining.com/>
- Item #1051612 for the 3 tank unit
- Item #1020816 for the 1 tank unit

A1.2 Photographs

Photograph of a Triple Slosh Box Apparatus



Plastic Box

Clear Plastic Lid

Automatic Timer

Start Button

Stop Button

Oscillating Table

Speed Control Knob

Speed Readout (RPM)

Picture used by permission of INDA

Annex 2 - Preconditioning Procedure for Slosh Box Disintegration Test

NOTE: A wipe is used for example purposes only

1	Preconditioning Step – Wipe placed in Toilet and Let Sit for 15 Seconds before Flushing (3-6.0 L)	
2	Wipe Transiting through Drain Line	
3	Wipe at the End of the Pipe – Leave the wipe in the pipe 30 minutes before it is put in the Slosh Box (4 L @18rpm for 30 minutes). Do not flush again or add additional water during the 30-minute hold time.	
4	<p>Alternative Hold Method – remove wipe from drainline and hold in a dry container for 30 minutes before it is put in the Slosh Box (4 L @18rpm for 30 minutes)</p> <p>Footnote: in the drainline method the water runs away from the wipe and essentially creates a dry container where no additional water is added for 30 minutes. This alternative allows for the wipe to be removed so the drainline can be used for other testing.</p>	

5	Test Apparatus for Drain Line	
6	Test Apparatus for Drain Line	

Source: ISWFG Member

Annex 3 – Slosh Box Angle Measurement Procedure

(Normative)

A.3.1 Illustrated Procedure

Step #	Description	Picture
1	Turn speed down to the minimum that will keep it moving. This prevents bounce at the end of each cycle that can skew the reading.	
2	Place a small digital level capable of reading degrees to the tenth (0.1) centered on the rocking table.	
3	Allow the table to go all the way to the right and record the angle of tilt in degrees indicated on the level.	

4	Allow the table to go all the way to the left and record the angle of tilt in degrees indicated on the level.	
5	Close up of level.	
6	Record the date of the measurement and degrees for both the right and left tilts. Make sure the Slosh Box is within the tolerance 11.0 degrees +/- 0.5 degrees (10.5 to 11.5 degrees). If the measurement is not within the specified tolerance, adjust the machinery per the manufacturers specifications, or do not use for testing.	See Example Worksheet below

Source: ISWFG Member

A.3.2 Slosh Box Angle Measurement Worksheet

Date	04/10/2017
Name of Person performing measurement	Joe Smith
Slosh Box ID	1234
Left Tilt Angle (to the 0.1 degree)	11.2
Right Tilt Angle (to the 0.1 degree)	11.3
Were any adjustments required? If "Yes" please note what they were.	No

Annex 4 - Procedure for Pre-rinsing Test Products for Determining Initial Dry Mass

(Informative)

Substantially Based on INDA GD3 SG001 and Used by Permission of INDA

The Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition including the Supplemental Guidance Documents, Test Methods, Guidelines, and the Code of Practice are owned by INDA and EDANA and used by Permission. © 2013 INDA and EDANA. All Rights Reserved

A.4.1 Introduction

This annex describes the approach for pre-rinsing test products to remove water soluble lotions or other additives from products ***before using them in the determination of initial dry mass***. The method involves flushing the products down a toilet and through a drain line using tap water. This approach simulates the actual rinsing process that occurs when a product is flushed on its way to a wastewater transport system.

A.4.2 Test Product Selection

Select products in accordance with Sections 8.1 and 8.2

A.4.3 Toilet and Drain Line Method

A.4.3.1 Equipment

Use toilet and drain line per Annex 2 or FG501 (see Normative Reference Section 4.1 for document information), with catch basket before the drain. (It is recommended to use a toilet with a 3-6 L flush volume.)

A.4.3.2 Procedure

1. Prior to adding any materials to the toilet bowl or initiating a flush, ensure that the toilet has stopped running and the water in the bowl is at a normal level.
2. When adding a product (e.g., a hygienic wipe), place it in the centre of the toilet bowl and allow sufficient time (typically 15 seconds) for it to become fully saturated with water before adding another product or flushing the toilet.
3. No more than 2 wipes should be flushed at one time.
4. Retrieve the products before they enter the basket or as soon as practically possible to prevent any disintegration by water flowing out of the pipe
5. When necessary, use additional flushes without additional products to move used products out of the drain line for collection.

Annex 5 - Sieving and Recovery of Product Residues

(Informative)

Substantially based on INDA GD3 SG004 and used by permission of INDA.

The Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition including the Supplemental Guidance Documents, Test Methods, Guidelines, and the Code of Practice are owned by INDA and EDANA and used by Permission. © 2013 INDA and EDANA. All Rights Reserved.

A.5.1 Introduction

This Annex describes the sieving, rinsing and recovery of product residues from the various disintegration tests. Once samples are transferred to a sieve in these tests, these procedures are used to rinse small materials through the sieve and recover the residues for gravimetric analysis.

A.5.2 Equipment

1. Peerless shower head Model 76114WH with hose assembly (pictured at right), or similar, attached to a faucet (tap) with a graduated flow regulator adjusted to deliver 4L per minute
2. 4 L beaker (recommended)
3. Stopwatch or other timing device
4. Fine mesh hand sieve
5. Forceps
6. Drying pans

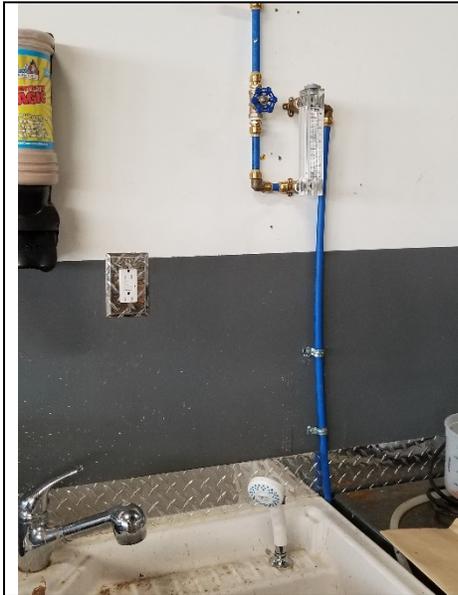
Photo Source: INDA



A.5.3 Procedure

1. Turn on the faucet and adjust the regulator to a flow rate of 4 L per minute.
2. The flow rate can be determined by measuring the volume delivered to a suitable container with graduations after a specified time period. For example, it should take exactly 60 seconds to deliver 4 L of water to the 4 L mark on a beaker. Once the flow is adjusted, this measurement should be repeated at least three times and should vary less than 5%.
3. When transferring the contents from a disintegration test to the sieve, pour the contents of the test vessels slowly while distributing them over the complete surface of the sieve.
4. With the handheld showerhead spray nozzle held 10 cm (4") above the top surface, gently rinse smaller materials through the sieve. Constantly move the spray over the entire surface without concentrating the spray on any specific areas. Do not force the passage of any material through the sieve.
5. After 1 minutes of rinsing, quantitatively recover all the retained materials from both sides of the sieve using forceps or by backwashing the material into a smaller sieve and then using forceps.

6. Transfer these materials into labelled drying pans or tared weigh boats to determine their dry weight (see Annex 6).



Example of a Flow Regulator and Shower Head Rinse Apparatus



Close-up of the flow regulator



Close-up of Showerhead



Rinsing Sieve - 10 cm distance between sieve and showerhead



Picture of forceps being used to remove retained product from sieve



Recovered material in a pre-weighed pan

Source: ISWFG Member

Annex 6 – Drying and Weighing of Products and Product Residues

(Informative)

Substantially based on INDA GD3 SG002 and Used by Permission of INDA

The Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition including the Supplemental Guidance Documents, Test Methods, Guidelines, and the Code of Practice are owned by INDA and EDANA and used by Permission. © 2013 INDA and EDANA. All Rights Reserved

A.6.1 Equipment

1. Oven capable of maintaining a constant temperature between 40° and 105°C
2. Weighing dishes
3. Forceps
4. Desiccator
5. Analytical balance (reads to 2 decimal places)
6. Products

A.6.2 Procedure

A.6.2.1 Loss of Mass Calculation Procedure

1. If there are residual fragments at the end of any of the 5 tests, collect them using the procedures described in Annex 5 prior to determining their dry weight.
2. Set the oven to a temperature appropriate for the chemical and physical properties of the product – this is typically 105 °C.
3. Place the products to be analysed in a pre-weighed (tared) aluminium weigh boat.
4. Dry the products in the oven for several hours or overnight.
5. Transfer the products from the oven to a desiccator and allow them to cool.
6. Weigh the products and record their weights.
7. Return the products to the oven for approximately 30 minutes and again allow them to cool in the desiccator and determine their weights.
8. Repeat this process as necessary until the products reach constant weights.
9. Record the total weight of residuals from tests 1-5.
10. Calculate the loss of mass using the Loss of Mass worksheet set out in Annex 7.2.

A.6.2.2 Initial Dry Mass Calculation Procedure

1. Select five products in accordance with Annex 4, Section A.4.2.
2. Products with water soluble lotions or additives should be pre-rinsed using the procedures described in Annex 4 prior to determining their dry weight.
3. Set the oven to a temperature appropriate for the chemical and physical properties of the product – this is typically 105 °C.
4. Place the products to be analysed in an oven-safe weighing dish.
5. In the case of difficult to handle product residues, it may be appropriate to place the residues in a pre-weighed (tared) aluminium weigh boat.

6. Dry the products in the oven for several hours or overnight.
7. Transfer the products from the oven to a desiccator and allow them to cool.
8. Weigh the products and record the weights.
9. Return the products to the oven for approximately 30 minutes and again allow them to cool in the desiccator and determine their weights.
10. Repeat this process as necessary until the products reach constant weights.
11. Record the initial total weight of the five products in the Loss of Mass Worksheet set out in section A.7.2

Annex 7 – Sample Recommended Test Report Template for Slosh Box Disintegration Test

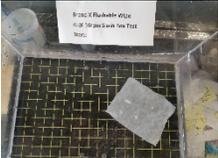
A.7.1 General Information

Data Input Sheet								
Total Dry Mass of Retained fraction from the 25 mm sieve from 5 Individual tests								
Product #	Pan Tare (g)	Pan Tare + Dry Mass of Retained fraction from the 25 mm sieve	Net Dry Mass of Retained fraction from the 25 mm sieve		Starting Water Temp (°C) Start	Ending Water Temp (°C)	Lab Temp (°C) - Start	Lab Temp (°C) - End
1	1.92	2.7	0.78		14.0	15.5	21.4	21.4
2	1.92	2.73	0.81		14.0	15.5	21.4	21.4
3	1.92	2.69	0.77		14.0	15.5	21.4	21.4
4	1.92	2.72	0.8		14.1	15.7	21.4	21.4
5	1.92	2.71	0.79		14.1	15.7	21.4	21.4
Total (g)			3.95					
Initial Dry Mass of 5 Individual Products Prepared in Accordance with Annex 4								
Product #	Initial Dry Mass							
1	1.47							
2	1.46							
3	1.48							
4	1.45							
5	1.49							
Total (g)	7.35							

A.7.2 Loss of Mass Calculation Data Input Sheet

IWSFG PAS 3 Slosh Box Test for Disintegration Report	
Product Information	
Product Name	Brand X Flushable Wipe
Manufacturer	Brand X Manufacturing
Size L x W (cm)	17.8 cm X 12.7 cm
Product Supplied By	Brand X Manufacturing
Facility Information	
Test Facility Name	JKL Test Laboratory
Test Date	21-May-18
Test Time	11:25 AM
Technician Name	Joe Smith
Rock Angle Measurement Information	
Date of Last Measurement	17-May-18
Measurement in degrees to the right	11.2
Measurement in degrees to the right	11.3
Test Information	
RPM	18
Water Volume	4 Liters
Time	30 Minutes
Test Results	
Total Dry Mass of Retained fraction from the 25 mm sieve from 5 Individual tests	3.95
Initial Dry Mass of 5 Individual Products Prepared in Accordance with Annex 4	7.35
Percentage Passing through the 25mm sieve	46.26%
Test Result (PASS/FAIL)	FAIL

A.7.3 Picture Record

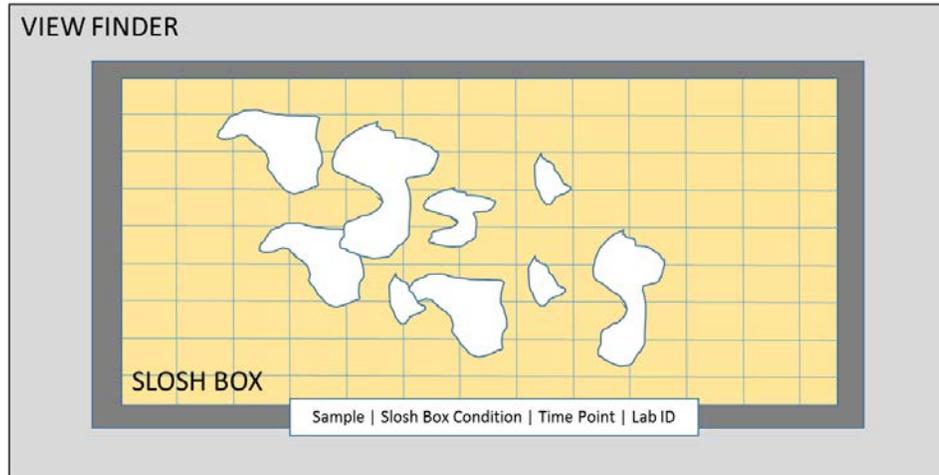
	NOTES	PICTURES SAMPLE 1	PICTURES SAMPLE 2	PICTURES SAMPLE 3	PICTURES SAMPLE 4	PICTURES SAMPLE 5
Product Pictures	NOTE: A wipe is used for example purposes only					
Start						
After 30 Minutes	Very little disintegration					
Sieve Not Rinsed						
Sieve Rinsed Top - after 60 Seconds	Residual left on sieve					

A.7.4 Photography Hints

Photography

A. Photograph samples at the specified time points for comparison of results across laboratories. Some tips for taking good photos of samples:

- Move the slosh mechanism so that the base of the box is in the horizontal plane before taking photograph.
- Carefully and gently spread any sample pieces to distribute pieces across the full base of the box, this will make for easier visual identification.
- The camera should be located at the same place for every shot, but not every camera is the same (so it may not be possible to indicate where each lab should take the shot). The best would be to position the camera at a point above the center of the box where the entire box is in the field of view of the camera – this may depend on the type of camera being used. It is also important to have the sample ID in the image. Preferably, the box in the viewfinder would look like this:



In addition, it is imperative that the image is in good focus. It is recommended to shoot the image with adequate lighting using an f/stop that allows a good depth of focus. In essence, if the wipes are floating above the grid, you want to be sure the wipes and grid are sharp in the image – shooting at a higher f/stop allows an increased depth of focus but it also requires more light to expose the image. Different cameras will require different lighting and different f/stops. It is recommended to shoot several materials to get an adequate image before starting on the experiment.

Image quality is also important. Please insure the image is at least 300 dpi and shot at the highest resolution setting for the camera.

B. Install 1” reference grid.

To insure all materials are observed in the photographs with the same reference point, it has been decided that in the bottom of each box BEFORE SAMPLES ARE RUN a 1” grid should be inserted or permanently placed. The grid should be visible in the photograph and should not

affect the flow of liquid in the box. For example, a 1” wire grid should not be used. Using a permanent marker to draw the grid on the floor of the Slosh Box is acceptable. A yellow paint pen provides excellent contrast on a dark colored box and good contrast against the product color.