International Wastewater Services Flushability Group

IWSFG PAS 3: 2018 – Disintegration Test Methods – Slosh Box

PUBLIC COMMENT VERSION

Foreword

The International Wastewater Services Flushability Group (IWSFG) is a worldwide 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 the hydraulic, mechanical and environmental conditions of drain lines, various onsite treatment and wastewater collection and treatment systems as well as the nature of the receiving waters for treatment plant effluents.

The task of the group was to prepare specifications reflecting the above purpose.

Wastewater services are organizations acting for the public good as a public service. The group expects the manufacturers and distributers of their products to act in a socially responsible and environmentally sustainable manner by adhering to the established specifications.

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.

Contents

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, immediately after a product is flushed: i.e. forces equivalent to a Reynolds number of 20,000.

3 Scope

The scope of this PAS includes all products that a manufacturer or distributer may wish to identify as flushable, and all products which by the location of their use and likely contamination by human excreta, are likely to be flushed through a toilet into a drain line and wastewater conveyance and treatment system.

4 References

4.1 Normative References

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

INDA/EDANA FG 501 Toilet and Drainline Clearance Test

4.2 Informative References or Relevant 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 Calibration Procedure
Annex 4 – Procedure for Pre-Rinsing Test Products for Determining Initial Dry Mass
Annex 5 – Sieving and Recovery of Product Residues
Annex 6 – Alternate Approach for Recovering and Rinsing Materials from the Slosh Box
Annex 7 –Drying and Weighing of Products and Product Residues
Annex 8 – 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:

a. 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: 12" (30.48cm), secured to a horizontal surface.
b. The horizontal surface shall be capable of being oscillated i.e. rocked forward and backward by a rotating cam and lever mechanism.
c. 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:

a) The platform should rock to both sides at 11 degrees (+/- 0.5 degrees) from the vertical. With a vertical travel of 10 cm from top of stroke to bottom of stroke as measured from the bottom edge of the test tank's base platform. The horizontal angle of rock for both directions should be confirmed using a digital level and recorded in the test report.
b) The speed of the cam shall be 16 rpm using the adjustable speed controller and recorded in the test report.

7.3 Other equipment

a) Equipment to fill and measure the volume of tap water in the boxes and to receive the liquid drained from the boxes
b) A fine sieve or strainer with a handle
c) A perforated plate screen with round holes, compliant with ISO 3310-2 with apertures of 25 mm
d) A thermometer or other device for measuring water temperature
e) A stopwatch or other suitable timing device

8 Preparation

8.1 Sample acquisition

a) When conducting a test to support a flushable claim, the products used for testing must be the same as those offered in the intended market. Obtain a sufficient number of products (articles) to conduct the intended tests. The testing laboratory may receive samples from their manufacturers or intended distributers.
b) The test report shall clearly indicate the method of sample acquisition.

8.2 Number of test pieces

Five (5) specimens are required for each complete testing. It is recommended that, where possible, specimens should be obtained at least from two distinct packages or rolls of a product (3 from one and 2 from the other). Test articles should be randomly obtained from different sections of one or more 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 specimens when removing from the package. Specimens should be removed just before the pre-conditioning step of the testing starts.

8.3 Sample preparation and Unit Dose

The following requirements apply to products to be tested.

8.3.1 Dry tissues:

The specimen size shall be either one (1) or two (2) sheets of dry tissue depending on the dimensions so that the total area is approximately 180-300 cm^2. The specimen for dry tissue shall be taken avoiding the beginning and the end of the roll to avoid the possible presence of glue.

The dry tissue shall be taken from the package and the specimen shall be one sheet.

8.3.2 Moist tissues

The specimen shall be one sheet.

8.3.3 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.

If the samples have been removed from the manufacturer's original packaging, the samples shall be identified and stored as follows:

1. Dry products should be returned to their packaging and should be double-bagged with 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 double-bagged with plastic 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 double-bagged with resealable plastic bags to minimize potential exposure to ambient air.

Where possible, samples should be stored in secured laboratory cabinets.

9.2 Conditioning for the test

This test requires a pre-conditioning step (see section 10.2)

10 Procedures

10.1 Summary

The test consists of five (5) agitation sequences (one Agitation Sequence equals a single wipe per box). After each agitation, observations are made and quantitative analysis undertaken to determine whether the specimen has met the test requirement for disintegration. Test specimens are placed in the slosh box containing 4L of water, which will be rotated at the designated speed (16rpm) 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 surfaces are taken. Quantitative analysis of the retained residuals is performed to see if the average pass through rate of 95% is met for the average results of the five (5) test samples.

10.2 Preconditioning for the Slosh Box Test

10.2.1 Toilet and Drain Line Method

1. Equipment
   - Use a toilet and drain line with catch basket before the drain (see FG501 for set up).
   - It is recommended to use a toilet with a 4.5 L +/- 0.4L flush volume.
2. Procedure (See Annex 2 for photographs)
   - 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.
   - 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.
   - Retrieve the specimens 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.
   - When necessary, use additional flushes without specimens to move the specimens out of the drain line for collection
   - Allow the water to drain, and then hold the specimen, either in the drainline or a dry container for 30 minutes before placing it in the slosh box for testing.

10.3 Test Set-Up

1. Allow the test water to reach room temperature (20 °C ± 3 °C).
2. With power to the unit securely off, verify the attachment of the slosh box(es) to the oscillating table. Close the drain taps on each and fill each box with 4 L of tap water.
3. Prior to starting a test sequence, verify that the cam is running at 16 rpm by measuring the time to complete 16 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 set tolerance.
5. Record on left and right angles and the calibration date on the report. (See Annex 3 – Slosh Box Angle Calibration Procedure).

10.4 Test Procedures

1. Measure and record the temperature of the test water and room and record on report.
2. Place a single preconditioned test specimen into each box, place lids on the boxes (optional) and oscillate the mixture for 30 minutes.
3. For all the following methods:

- The distance between the drain, or pitcher and the top surface of the sieve should be approximately 10 cm
- Rinse the box as necessary to remove all its contents

4. Quantitatively, slowly transfer the contents of each box into a 25mm perforated plate sieve using one of the following methods:
    a. Remove each box from the oscillating platform and slowly pour the contents into the sieve.
    b. If the boxes are equipped with a drain, drain the slosh box(es) and slowly pour the contents evenly on the surface of the sieve.
    c. Empty the slosh box of all disintegrated material using the hand sieve method (see Annex 5) and pour the disintegrated material in the pitcher on the top surface of the 25 mm perforated sieve plate.
5. Take a photograph of the top sieve surface.
6. Take the showerhead, turn on the faucet and adjust the regulator to a flow rate of 4 L per minute (See Annex 4).
7. With the handheld showerhead spray nozzle held approximately 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.
8. Stop the rinsing after 1 minute.
9. Observe if there are remains of the product on the top and underside surface of the sieve.
10. Take photographs of the upper and underside surfaces of the sieve.
    a. If there are residuals remaining visually and 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. (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 a round of testing, the slosh box(es) shall be drained and cleared of any residues from the test articles.

10.6 Calculations

The percentage of each article's 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 on the sieve equals the sum of the dried retained product in grams from the 5 tests

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.

11 Acceptance Criteria

To be acceptable:

If there is material left on the 25 mm sieve after the 1 minute rinse, the percent of the total initial dry mass (as computed in section 10.6) passing through the 25 mm sieve for the five (5) test specimens after 30 minutes of testing must be greater than 95%. This result must be supported with visual examination and pictures of solids on the sieve.

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. A statement as to the acquisition process followed and purpose of testing
6. The original dimensions and mass (if performing loss of mass) of each specimen
7. The water and room temperatures
8. The RPM and rock Angle Calibration Data
9. Any departure from the procedure and any circumstances that may have affected the results along with an explanation
10. Copies of photographs taken during the procedure
11. The test results, including:
    a. The outcome of each test must be clearly stated in terms of disintegration. YY % of the specimens disintegrated within the test duration (e.g., 30 minutes).
    b. The percentage of dry mass which passed through the 25 mm sieve after 1 minute of rinsing.
    c. 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 8. A template in Microsoft Word can be downloaded from www.iwsfg.org.

13 Precision

There may be some variation in the quality of the products being tested, which is why five (5) separate specimens 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 16 rpm. If necessary adjustments should be made to assure that condition.

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*. FG 502, 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

A1.1 Sources

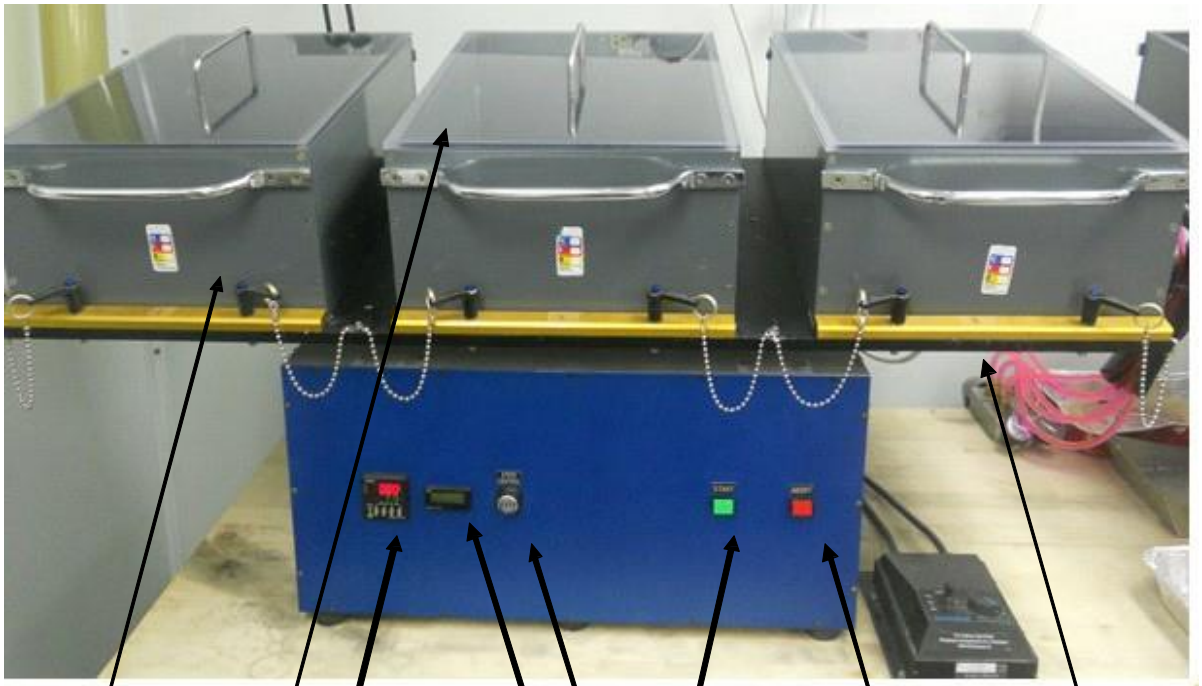
Slosh boxes are available from:

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)

A1.2 Photographs

Photograph of a Triple Slosh Box Apparatus



Plastic Box

Clear Plastic Lid

Automatic Timer

Speed Control Knob

Speed Readout (RPM)

Start Button

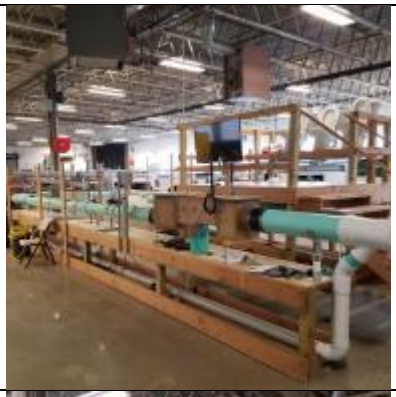
Stop Button

Oscillating Table

Picture used by permission of INDA

Annex 2 - Preconditioning Procedure for Slosh Box Disintegration Test

1	Preconditioning Step – Wipe placed in toilet and let sit for 15 seconds before flushing	
2	Wipe transiting through drain line	
3	Wipe at the end of the pipe – Remove the wipe and hold the wipe wet for 30 minutes before it is put in the Slosh Box (4 L @16rpm for 30 minutes).	
4	Alternative hold method – remove wipe from drainline and hold wet in a dry container for 30 minutes	

5	Test apparatus for drain line	
6	Test apparatus for drain line	

Source: IWSFG Member

Annex 3 – Slosh Box Angle Calibration 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 degrees on the level.	

4	Allow the table to go all the way to the left and record the degrees on the level.	
5	Close up of level.	
6	Record the date of calibration 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)	See Example Worksheet below

Source: IWSFG Member

A.3.2 Slosh Box Angle Calibration Worksheet

Date	04/10/2017
Name of Person performing calibration	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

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

(Informative)

A.4.1 Introduction

This annex describes two approaches 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 first method, which is recommended, 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 conveyance system. When a toilet and drain line are not available, an alternative method can be used that involves swirling products in a container of tap water.

A.4.2 Test Product Selection

1. When conducting a test to support a flushable claim, the products used for testing must be the same as those offered in the intended market.
2. Obtain a sufficient number of products (samples) to conduct the intended tests.
3. If there is a need to determine the average dry weight for the product, at least five more samples will be needed, and when samples exhibit high variability in their weight, more may be needed.
4. Test specimens should be randomly obtained from different sections of one or more packages to ensure that they are broadly representative. This is particularly important for products such as wipes, which occur in a roll or stack.

A.4.4 Toilet and Drain Line Method

A.4.4.1 Equipment

Use toilet and drain line as per Annex 2 or FG501, with catch basket before the drain. (It is recommended to use a toilet with at least a 4.5 L ± 0.4 L flush volume.)

A.4.4.2 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. 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 product to move products out of the drain line for collection.

Annex 5 - Sieving and Recovery of Product Residues

(Informative)

Substantially Based on INDA GD3 SG0004 and used by permission of INDA

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

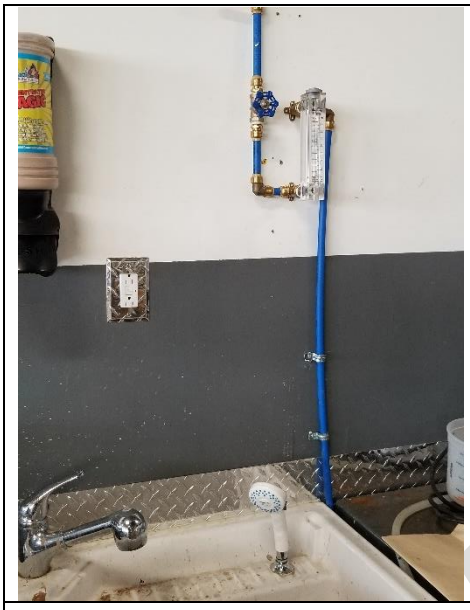
1. Peerless shower head Model 76114WH with hose assembly (pictured at right), or similar, attached to a faucet (tap) with a graduated flow regulator adjusted to deliver 4L per minute
2. 4 L beaker (recommended)
3. Stopwatch or other timing device
4. Fine mesh hand sieve
5. Forceps
6. Drying pans

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 approximately 10 to 15cm (4 to 6”) 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 7).

	
Example of a Flow Regulator and Shower Head Rinse Apparatus	Close-up of the flow regulator

	
Close-up of Showerhead	Rinsing Sieve

Source: IWSFG Member

Annex 6 – Alternative Approach for Recovering and Rinsing Materials from the Slosh Box

(Informative)

Substantially Based on INDA GD3 FG 502 Appendix IIa and used by permission of INDA

A.6.1 Additional Equipment

1. Strainer (see photo 1 below)
2. Larger pitcher capable of holding at least 4 L of tap water
3. Smaller pitcher capable of holding 0.5 L of tap water

A.6.2 Procedure

4. Use the start/stop buttons to position the front of the boxes downward so the contents are concentrated in the front of the boxes.
5. Fill the large pitcher with 3 L of tap water.
6. Fill the smaller pitcher with 0.5 L of tap water to be used for rinsing the strainer.
7. Use a strainer (Photo 1) to recover the sample and large fibres from the box (Photo 2). Dip the strainer and transfer its contents into the pitcher containing 3 L of water, swirling as necessary to release the sample and fibres (Photo 3). Repeat this process until all of the recoverable materials have been removed from the box.
   Note: There may be some small residual fibres remaining in the box that can't be recovered using the strainer. These fibres can be discarded when rinsing the box prior to testing another replicate.
8. Place the strainer (upside down) over the 4 L pitcher and gently rinse any materials retained on the strainer into the pitcher using the smaller pitcher (Photo 4.)
9. Add additional water to the 4L pitcher to bring the total volume to 4L.
10. Quantitatively transfer the contents of the pitcher onto a 25 mm perforated plate sieve, rinsing it as necessary (Photo 5).
11. Rinse the sieve for 60 seconds at a flow rate of 4L/minute according to Annex 5 and recover any retained residue.
12. Determine the mass of retained residue as described in Annex 7.
13. Drain the box of its contents and rinse the sides and bottom as necessary to remove any residue before testing another sample.

1. Example of a Strainer Used for Sample Fibre Collection.

2. Collecting Samples/Fibres from the Slosh Box.

3. Transferring Samples/Fibres from Strainer to 4 L Pitcher.

	
4. Rinsing the Sample/Fibre at the End of the Collection Process	5. Pouring the Contents of the Pitcher into the 25 mm Sieve

Source: INDA

Annex 7 – Drying and Weighing of Products and Product Residues

(Informative)

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

A.7.1 Equipment

1. Oven capable of maintaining a constant temperature between 40° and 103°C
2. Weighing dishes
3. Forceps
4. Desiccator
5. Analytical balance (reads to 4 decimal places)
6. Specimens

A.7.2 Procedure

A.7.2.1 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 specimen – this is typically 105 °C.
3. Place the specimens to be analyzed in a pre-weighed (tared) aluminum weigh boat.
4. Dry the specimens in the oven for several hours or overnight.
5. Transfer the specimens from the oven to a desiccator and allow them to cool.
6. Weigh the specimens and record their weights.
7. Return the specimens 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 specimens 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 6.4.

A.7.2.2 Initial Dry Mass Calculation Procedure

1. Select 5 specimens in accordance with Annex 4, Section A.4.2
2. Specimens 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 specimen – this is typically 105 °C.

4. Place the specimens to be analyzed in an oven-safe weighing dish or on a piece of foil.
5. In the case of difficult to handle specimen residues, it may be appropriate to place the residues in a pre-weighed (tared) aluminum weigh boat.
6. Dry the specimens in the oven for several hours or overnight.
7. Transfer the specimens from the oven to a desiccator and allow them to cool.
8. Weigh the specimens and record the weights.
9. Return the specimens 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 specimens reach constant weights.
11. Record the initial total weight of the five (5) specimens.
12. Calculate the loss of mass using the Loss of Mass Worksheet set out in Annex 7.4.

A.7.4 Examples of a Loss of Mass Calculation Worksheets

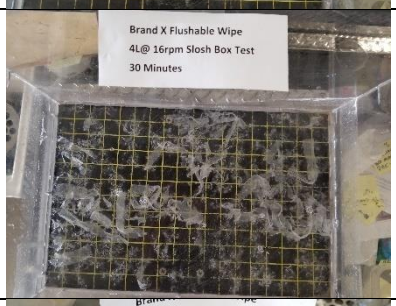
Loss of Mass Calculation Worksheet **Sum of 5 Samples**				
Sample Number	**Initial Total Dry Mass of 5 Specimens Prepared in Accordance with Annex 4**	**Total Dry Mass of Retained Specimens from the 25 mm sieve from 5 tests**	**Percent Disintegration**	**95% Mass Loss PASS/FAIL**
1-5	7.3775	1.1142	84.90	Fail
Loss of Mass Calculation Worksheet **Average of 5 Individual Samples**				
Sample Number	**Initial Dry Mass of 5 Individual Specimens Prepared in Accordance with Annex 4**	**Total Dry Mass of Retained Specimens from the 25 mm sieve from 5 Individual tests**	**Percent Disintegration**	**95% Mass Loss PASS/FAIL**
1	1.4755	0.2558	82.66	
2	1.4755	0.2687	81.79	
3	1.4755	0.1895	87.16	
4	1.4755	0.2015	86.35	
5	1.4755	0.1987	86.53	
Average	1.4755	0.2228	84.90	Fail

Annex 8 – Sample Recommended Test Report Template for Slosh Box Disintegration Test

A.8.1 General Information

Wipe Name/Code	Brand X Flushable Wipe
Test #	1 of 5
Wipe Substrate Manufacturer	Brand X Manufacturing
Converter	ABC Corp
Size	17.8 cm x 12.7 cm
Other Information	
Test Date/Time	January 1, 2018
Tester	Joe Smith
Test Facility	JKL Test Laboratories
Test Procedure	IWSFG PAS 3 *Slosh Box Test for Disintegration*
Water Temp (22 C +/-3 degrees)	22.5
Room Temp	21.1
RPM (16)	16
Rock Calibration 11.0 degrees each direction (+/-0.5 degrees)	Left: 11.3 Right: 11.2 Date Calibrated December 20, 2017
Notes, e.g., any departure from normal procedure should be recorded here:	
Test Result (Pass/Fail)	**Pass**
The percentage of product remaining on sieve	84.90 %
Initial Dry Mass (required if using percentage mass loss)	7.3775g
Dry Mass of residue recovered (required if using percentage mass loss)	1.1142g

A.8.2 Picture Record

	NOTES	PICTURE
Product Pictures		
Start		
After 30 Minutes		
Sieve Not Rinsed		
Sieve Rinsed Top - after 60 Seconds	***Residual left on sieve***	

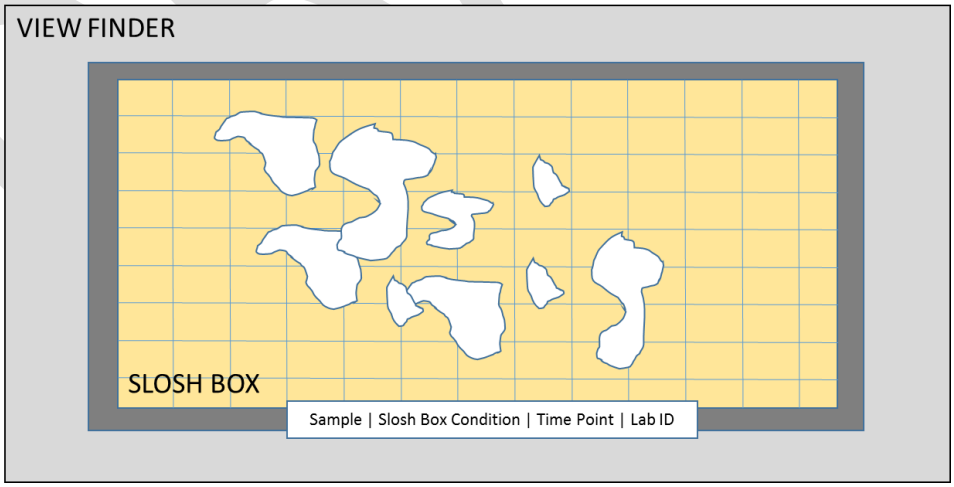
Sieve Rinsed Underside - after 60 Seconds	***Residual left on sieve***	
Other Pictures		

I. Photography

A. Photograph samples at the specified time points for comparison of results across laboratories and substrates

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 option 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.

In order 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. 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 substrate color.