International Wastewater Services Flushability Group

IWSFG PAS 3B: 2017 – Disintegration Test Methods – Slosh Box

PUBLIC COMMENT VERSION

Forward

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 standards 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 standards 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 standards.

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.

Contents

1 Introduction

Wastewater process systems are designed to receive, treat, and convey sanitary discharges that, after treatment, are subsequently disposed of as:

a. liquid effluents to the aquatic environments of lakes, rivers, and oceans
b. solid residuals (biosolids) for application to land for their inherent nutrient values
c. solid residuals incinerated or digested for energy recovery
d. solid residuals sent to landfill

Typical waste streams include toilet paper, human waste, food waste, detergents and cleaning agents. In recent years, new products such as moist wipes and toilet bowl cleaning products have been introduced worldwide - many of these are identified as “flushable” products. Other products such as tampons, condoms, facial tissues are commonly but inappropriately flushed. The physical adverse effects of the introduction of such products on wastewater systems (clogging and plugging) have been identified but numerous other environmental effects have not been studied systematically. For example, various flushed products may comprise materials and chemicals that can be harmful to the environment; hence, such products should not be identified as “flushable”. Accordingly, the purpose of the flushability test along with others presented in this IWSC series aims to define the qualities and characteristics of those products that may be considered as “flushable”. By adhering to these test methods and providing the appropriate advice to the product users regarding the after use disposal of such products will ultimately lead to long-term sustainability of wastewater systems and the minimization of potential problems such as pipe blockages and equipment failures in sewer networks.

The goal of the IWSC is not to ban the production and/or use of these products, but to encourage manufacturers to identify those products that do not meet the established IWSFG standards as not being “flushable” and to encourage users to dispose the products after use in a more appropriate manner.

2 Purpose

The purpose of this test is to assess the disintegration performance of a product when it is subjected to hydraulic forces typically found in continuous flow conditions in wastewater transport systems, 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 0:2017 *Terms and Definitions for Determination of Flushability*

IWSFG PAS 2A - *Toilet 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 – Drying and Weighing of Products and Product Residues
Annex 7 – Recommended Test Report Template for Wipe Disintegration Tests

5 Terms and Definitions

See: IWSFG PAS 0:2017 *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 normally found in gravity wastewater transport systems.

Note: The test is undertaken in potable water, as opposed to wastewater because:

1. It avoids health and safety issues associated with wastewater.
2. It avoids the inconsistencies that would inevitably be found between two or more samples of wastewater.

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 test articles 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 (i.e., 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 angle of rock for both directions should be confirmed by using a digital level and recorded in the test report.
b) The speed of the cam shall be 13 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 6.3 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

For products already in the market place, the testing laboratory shall select and acquire sample products from retail outlets (e.g., grocery stores or pharmacies).

For products under development as new or improved products, the testing laboratory may receive samples from their manufacturers or intended distributers.

The test report shall clearly indicate the applicable method of sample acquisition or purpose.

8.2 Number of test pieces

Five (5) specimens are required for each complete testing.[1] Specimens should be obtained at least from two distinct packages of a product. To obtain 5 specimens, the rolls of toilet paper, or bundles of wipes in their original packages should be divided into

[1] Note: in order to prepare for the possibility that the alternate dry weight test verification is needed, 5 additional specimens should be acquired.

a number of equal sections. Then, one specimen from each section will be used for testing.

For toilet papers, the starting point, as well as the end point of a toilet paper roll, should be avoided, to avoid any effect from glues.

To obtain moist tissue specimens, it is convenient to cut their packaging on its side to see the whole bundle of moist tissues. Then, package will be divided into equal sections, and a specimen will be removed from each part.

Caution is necessary not to damage delicate specimens when removing from the package. Specimens must be removed just before 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 toilet paper depending on the dimensions so that the total area is approximately 180-300 cm^2. The specimen for toilet paper shall be taken from the center of the roll, avoiding the beginning and the end of the roll to avoid the possible presence of glue.

The dry facial 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, or if the moist tissue exceeds 300 cm^2, a piece 13 cm X 20 cm or 260 cm^2 that is taken from the center of the product to use as the test specimen. The sample shall be taken directly from the packaging per Sections 8.1 and 8.2.

Moist products must be tested as soon as removed from the packaging in order to minimize the evaporation of moisturizing chemicals from the specimen. No attempt at removing the lotion should be undertaken and the removed tissue should be used immediately to prevent the evaporation of the lotion.

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 containers or a soft-plastic package.
3. In case of hard-plastic containers, the box should be closed, and then 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.

Samples should be stored in secured laboratory cabinets.

9.2 Conditioning for the test

This test requires a pre-conditioning step (see section 10.1)10 Procedures

10.1 Preconditioning for the Slosh Box Test

10.1.1 Toilet and Drain Line Method

a. Equipment
- Use a toilet and drain line with catch basket before the drain (see PAS 2A for set up).
- It is recommended to use a toilet with at least a 4.5 L flush volume.

b. Procedure
- 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 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.
- Hold the specimen for 15 minutes before placing it in the slosh box for testing.

(See Annex 2 for photographs.)

10.2 Test Set-Up

a) Allow the test water to reach room temperature (20 °C ± 3 °C).
b) 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.
c) Prior to starting a test sequence, verify that the cam is running at 13 rpm by measuring the time to complete 13 oscillations using a stopwatch and making any fine adjustments to the cam speed dial as needed and record on report.
d) Make sure the oscillation angle has been checked in the last 30 days and is within set tolerance.
e) Record on left and right angles and the calibration date on the report.

(See Annex 3 –Slosh Box Angle Calibration Procedure.)

10.3 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 and oscillate the mixture for 120 minutes, during which take pictures at 30 minute intervals, or until the product has completely disintegrated into pieces approximately 6 mm x 6 mm.
3. Record the time taken for the product to break into pieces approximately 6 mm x 6 mm;, if less than the maximum time.
4. Depending on the diameter of the drain in the slosh box.
    a. Drain the slosh box (es) and slowly pour the contents evenly on the surface of the 6.3 mm perforated plate sieve. The distance between the drain and the top surface of the sieve should be approximately 10 to 15 cm
    b. Empty the slosh box of all disintegrated material using the hand sieve with a handle and place the disintegrated material on the top surface of the perforated sieve
5. Take photographs of the upper and lower sieve surfaces.
6. Take the showerhead and 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 to 15 cm above the top surface of the sieve, gently rinse the fragments through the 6.3 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 back surface of the sieve.
10. Take photographs of the upper and lower surfaces of the sieve.
    a. If there are no residuals remaining on the sieve, the test is

complete and the product has passed.

b. 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).

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

10.4 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.

In cases where specimens contain fiber-binding chemicals that are likely to remain on the walls of the slosh boxes or the sieve surfaces, the slosh boxes and sieve surfaces shall be washed using solvents such as ethanol and methanol, or soap and water.

10.5 Test Results

The test must be repeated with 5 specimens.

a. If 4 or more of the 5 tested specimens show no residual fragments remaining on the 6.3 mm sieve after rinsing, the product will pass.

b. Record the test results for each of the 5 specimens. Collect any residual fragments that remained on the 6.3 mm sieve during each test. Quantify the dry-mass of all residual fragments from the 5 specimens by drying the fragments at 103 °C for 4 to 8 hours. For a product to pass, total dry-mass of the residual fragments (>6.3 mm) must be less than 5 % of the average initial dry mass calculated dry-mass of 5 specimens.

(See Annexes 4, 5, and 6 for the procedure to be followed for the dry mass alternative.)

10.6 Calculations

The following calculations are required for products in Section 10.3.10 a:

Record the number of specimens for which residual fragments remained on the 6.3 mm sieve after rinsing.

The following calculations are required for products in Section 10.3.10 b:

The percentage of each article's mass that disintegrated (operationally defined by the ability to pass through the 6.3 mm sieve) is calculated using the following equation:

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

(See Annexes 4 and 9)

11 Acceptance Criteria

To be acceptable:

a. The fragments from four (4) of the five (5) test specimens at the end of the 120-minute test must completely clear (100% pass through) the 6.3 mm sieve after the 1 minute rinse per Annex 5, i.e., there should be no fragments on the sieve to be observed visually; this result must be supported with visual examination and pictures of solids on the sieve.

OR:

a. If there is material left on the 6.3 mm sieve after the 1 minute rinse, the percent of the total initial dry mass (as computed in step b of section 10.5) passing through the 6.3 mm sieve for the four (4) of the five (5) test specimens after 120 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. 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. For example, complete disintegration (100%) in XX minutes. Alternative, YY % of the specimens disintegrated within the test duration (e.g., 120 minutes).
    b. The percentage of dry mass which passed through the 6.3 mm sieve after 1 minute of rinsing.
    c. A final statement indicating whether the product passed or failed the test.

A recommended Test Report for the testing of wipes is shown in Annex 7. 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, 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 13 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)

A1.1 Sources

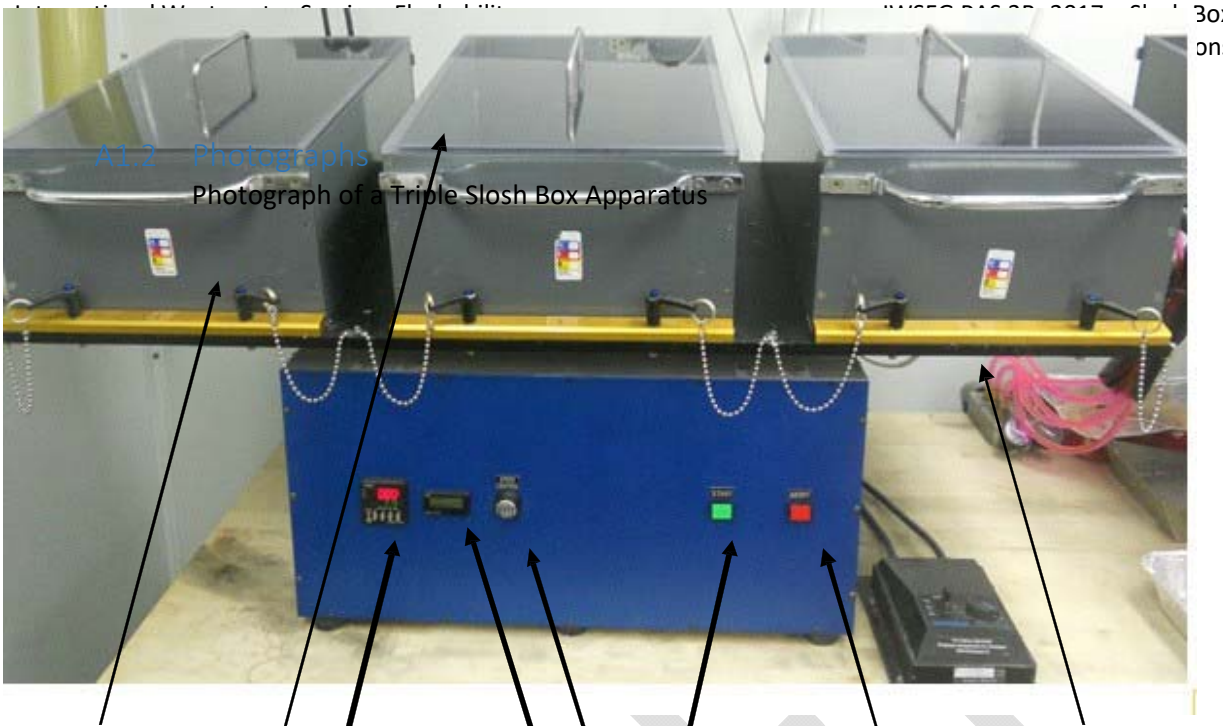
Slosh boxes are available from:

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

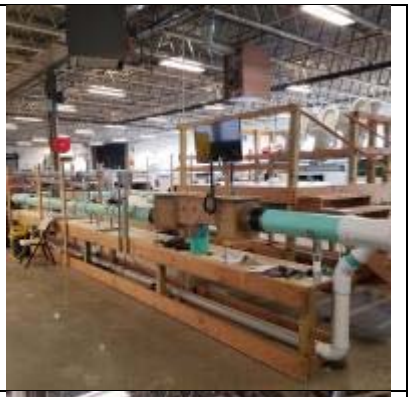
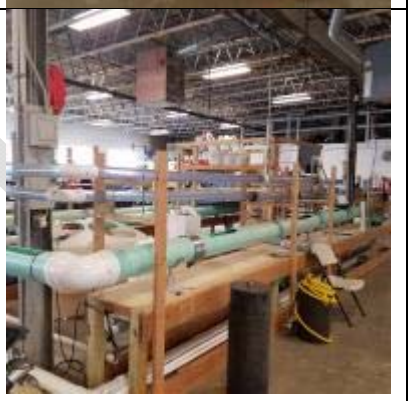
Photograph of a Triple Slosh Box Apparatus



Source: ISWFG Member

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 15 minutes before it is put in the Slosh Box (4 L @13rpm for 120 minutes).	

4	Test Apparatus for Drain Line	
5	Test Apparatus for Drain Line	

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453 Source: ISWFG 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: ISWFG 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

(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

- 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 (samples) to conduct the intended tests.
- 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.
- 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 IWSFG PAS 2A:2017, 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

- 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.
- When adding a product (e.g. hygienic 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 adding another product or flushing the toilet.
- No more than 2 wipes should be flushed at one time.
- 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.
- When necessary, use additional flushes without product to move products out of the drain line for collection.

A.4.5 Alternative Method

A.4.5.1 Equipment

- Use containers with a capacity of approximately 20 L (e.g. 5-gallon plastic buckets)

A.4.5.2 Procedure

- Fill the containers with tap water.
- Submerge the specimens in the water and swirl them for approximately 30 seconds or longer if necessary to remove any perceptible lotion or additives.
- To maintain the ratio of water to product existing in the toilet and drain line above, no more than 6 specimens should be placed together at one time in a single container with 20 L of tap water.

Annex 5 - Sieving and Recovery of Product Residues

(Informative)

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

- 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
- 4 L beaker (recommended).
    - stopwatch or other timing device
    - fine mesh hand sieve
    - forceps
    - drying pans

Source: ISWFG Member

A.5.3 Procedure

1. Turn on the faucet and adjust the regulator to a flow rate of 4 L per minute.

   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%.
2. 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.
3. 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.
4. 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.
5. Transfer these materials into labeled drying pans or tared weigh boats to determine their dry weight (see Annex 6).

Example of a Flow Regulator and Shower Head Rinse Apparatus

Source: ISWFG Member

A.5.4 Alternative Approach for Recovering and Rinsing Materials from the Slosh Box

A.5.4.1 Additional Equipment

1. strainer (see photo 1 below)
2. larger pitcher capable of holding at least 3 L of tap water
3. smaller pitcher capable of holding 0.5 L of tap water

A.5.4.2 Procedure

1. Use the start/stop buttons to position the front of the boxes downward so the contents are concentrated in the front of the boxes.
2. Fill the large pitcher with 3 L of tap water.
3. Fill the smaller pitcher with 0.5 L of tap water to be used for rinsing the strainer.
4. 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.
5. Place the strainer (upside down) over the 3 L pitcher and gently rinse any materials retained on the strainer into the pitcher using the smaller pitcher (Photo 4.
6. Quantitatively transfer the contents of the pitcher into a 12.5 mm perforated plate sieve, rinsing it as necessary (Photo 5).
7. Rinse the sieve and recover any retained residue.
8. Determine the mass of retained residue as described in Annex 4.
9. Drain the box of its contents and rinse the sides and bottom as necessary to remove any residue before testing another sample.

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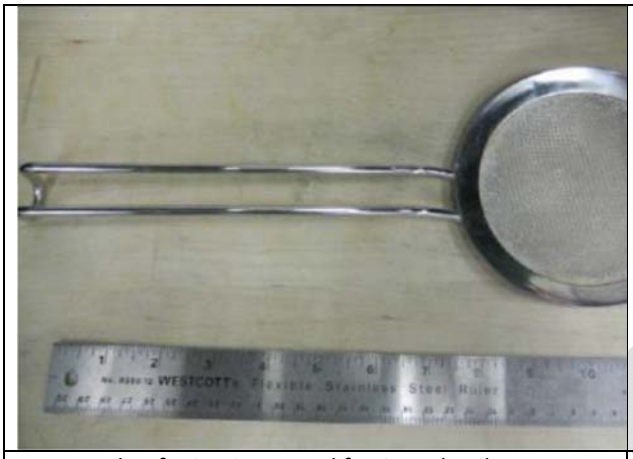

c. Example of a Strainer Used for Sample Fibre Collection.

2. Collecting Samples/Fibres from the Slosh Box.

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

	
4. Rinsing the Sample/Fibre at the End of the Collection Process	5. Pouring the Contents of the Pitcher into the 6.3 mm Sieve.

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617 Source: IWSFG Member

Annex 6 – Drying and Weighing of Products and Product Residues

(Informative)

A.6.1 Equipment

- oven capable of maintaining a constant temperature between 40° and 103°C
- weighing dishes
- forceps
- desiccator
- analytical balance (reads to 4 decimal places)
- specimens

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 specimen – this is typically 103 °C.
3. Place the specimens to be analyzed in an oven-safe weighing dish or on a piece of foil.
4. 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.
5. Dry the specimens in the oven for several hours or overnight.
6. Transfer the specimens from the oven to a desiccator and allow them to cool.
7. Weigh the specimens and record their weights.
8. Return the specimens to the oven for approximately 30 minutes and again allow them to cool in the desiccator and determine their weights.
9. Repeat this process as necessary until the specimens reach constant weights.
10. Record the total weight of residuals from tests 1-5.
11. Calculate the loss of mass using the Loss of Mass worksheet set out in Annex 6.4.

A.6.3.1 Initial Dry Mass Calculation Procedure

1. Select 10 specimens in accordance with Annex 4, Section A.4.3.
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 103 °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 6.4.

670 ### A.6.4 Example of a Loss of Mass Calculation Worksheet

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Loss of Mass Calculation Worksheet				
Sample Number	**Initial Total Dry Mass of 10 Specimens Prepared in Accordance with Annex 4**	**Dry Mass of Retained Specimens from the 6.3 mm sieve**	**Percent Disintegration**	**95% Mass Loss PASS/FAIL**

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675 # Annex 7 – Recommended Test Report Template for Wipe

676 ## Disintegration Tests

677 ### A.7.1 General Information

678

Wipe Name/Code	
Test #	
Wipe Substrate Manufacturer	
Converter	
Size	
Other Information	
Test Date/Time	
Tester	
Test Facility	
Test Procedure	IWSFG PAS 3B *Slosh Box Test for Disintegration*
Water Temp (20 C +/-3 degrees)	
Room Temp	
RPM (13)	
Rock Calibration 11.0 degrees each direction (+/-0.5 degrees)	Left: Right: Date Calibrated
Notes, e.g., any departure from normal procedure should be recorded here:	
Test Result (Pass/Fail)	
100 % through a 6.3mm sieve in 120 minutes – Visual (Pass/Fail)	
If product does not pass 100%, the percentage remaining on sieve	**%**
Initial Dry Mass (required if using percentage mass loss)	
Dry Mass of residue recovered (required if using percentage mass loss)	

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685 A.7.2 Picture Record

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	NOTES	PICTURE
Product Pictures		
Start		
After 30 Minutes		
After 60 Minutes		
After 120 Minutes		
Sieve Not Rinsed		
Sieve Rinsed - after 60 Seconds		
Other Pictures		

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Annex 8 - Alternative Approach for Recovering and Rinsing Materials from the Slosh Box

(Informative)

A.8.1 Additional Equipment

1. strainer (see photo 1 below)
2. larger pitcher capable of holding at least 3 L of tap water
3. smaller pitcher capable of holding 0.5 L of tap water

A.8.2 Procedure

1. Use the start/stop buttons to position the front of the boxes downward so the contents are concentrated in the front of the boxes.
2. Fill the large pitcher with 3 L of tap water;
3. Fill the smaller pitcher with 0.5 L of tap water to be used for rinsing the strainer.
4. 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, swirl as necessary to release the sample and fibres (Photo 3). Repeat this process until all 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.

5. Place the strainer (upside down) over the 3 L pitcher and gently rinse any materials retained on the strainer into the pitcher using the smaller pitcher (Photo 4).
6. Quantitatively transfer the contents of the pitcher into a 12.5 mm perforated plate sieve, rinsing it as necessary (Photo 5).
7. Rinse the sieve and recover any retained residue as described in Annex 5.
8. Determine the mass of retained residue as described in Annex 4.
9. Drain the box of its contents and rinse the sides and bottom as necessary to remove any residue before testing another sample.

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720 ### A.8.3 Photographs Showing the Alternative Approach for Recovering
721 and Rinsing Materials from the Slosh Box

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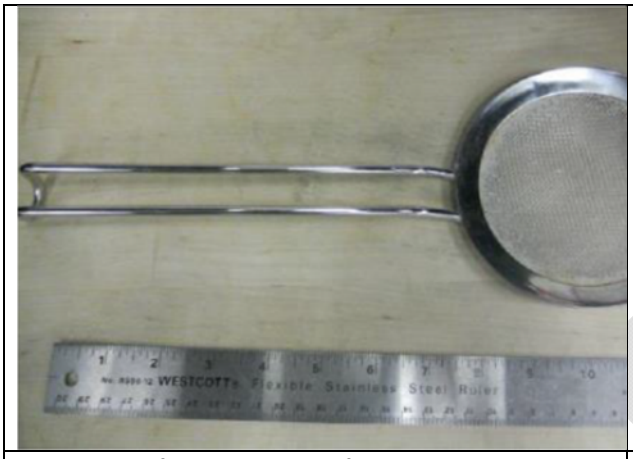

d. Example of a Strainer Used for Collecting Sample Fiibre Collection.

2. Collecting Samples/fibres from the Slosh Box.

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

	
4. Rinsing the Sample/Fibre at the End of the Collection Process	5. Pouring the Contents of the Pitcher into the 6.3 mm Sieve

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725 Source: IWSFG Member