Grenoble, March 19th, 2018

STUDY REPORT
nr° 18.0022/1 EN

SUBJECT: Technical Flushability Assessment

SAMPLE(S)

Designation(s):

- WEPA liquify Facial Tissues

The above samples designation, also mentioned in this report, comes from information provided by the customer. It is not the responsibility of the CTP.
Samples have been taken and dispatched by the customer.
The remains of samples are kept during 3 months at least.

ORDER

V/ Re : Your order 21750995 - 000 - OJ dated on 17/01/2018

Customer : M. Matthias POST

Company : WEPA Professional GmbH
Ronkhauser Strasse 26
DE-59757 ARNSBERG-MUSCHEDE
GERMANY

TESTS

Business Unit : Materials Performance - Flushability

Responsible for the tests: Laurence LEROY **Visa**

Timetable : Tests performed on weeks 04 to 10, 2018

The copy of this report is authorised in the uncut version only.
This report is made of 13 pages (including cover) and 8 appendices.

Results are valid only for the samples considered.

Contents

1 INTRODUCTION

The objective of this study is to evaluate the compatibility of the tested product with plumbing fixtures and drainlines, on-site treatment, municipal wastewater conveyance according to the Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition, June 2013.
This document is published by the nonwovens and related industries associations, INDA in the US and EDANA in Europe, as industry guidelines for assessing the flushability of disposable nonwoven products.

2 MATERIAL REFERENCE

The following product has been tested:

- WEPA liquify Facial Tissues

3 TESTING METHODS

A summary description of the test is given below.
Additional technical information is reported on the summary sheet result.

- **FG501: TOILET AND DRAINLINE CLEARANCE TEST**

The purpose of the test is to determine the likelihood that a product will successfully clear toilet and drainage pipe systems.
The proposed test system consists of toilets and drainlines representative of those found in Western Europe (wash-down type, flush volume 4.5 L, pipe diameter 100 mm, pipe slope 2%).
Each test consists of 35 toilet flushes using a specified loading sequence of product based on the habits and practices of a family of four using moist toilet tissue. This sequence includes empty flushes, product with dry toilet tissue, and product with simulated fecal matter and dry toilet tissue.

- **FG 502: SLOSH BOX DISINTEGRATION TEST**

The purpose of the test is to assess the potential for a product to disintegrate when it is subjected to mechanical agitation in water or wastewater.
The product is placed in an oscillating box containing 2.0 liters of tap water. After 3 hours of oscillation, the contents of the box are passed through a 12.5 mm perforated plate sieve, recovered and analyzed gravimetrically.
6 replicates are performed.

- **FG503: HOUSEHOLD PUMP TEST**

The purpose of the test is to assess the compatibility of a product with household sewage ejector pump systems by ensuring that the product does not clog, accumulate or otherwise interfere with normal system operation under high usage conditions.
The test equipment comprises a toilet and drainline, through which the product is flushed into a household sewage ejector pump assembly, comprising a basin and submersible pump which discharges through a check valve into a vertical outlet pipe.
The test uses an accelerated loading protocol run over 6 days, including empty flushes, flushes with product. For products which are buoyant in tap water, simulated fecal matter may be introduced in the flush sequence to simulate suspended solids in a residential system.

- **FG504: SETTLING TEST**

The purpose of the test is to assess whether a product settles in septic tanks, onsite aerobic systems and settling chambers that are associated with municipal wastewater treatment plants.
The test product is cut into 100mm x 100mm squares, flushed through a test drainline before adding into a beaker with 1 liter of tap water and introduced in a column filled with tap water.
For products which float in tap water, it is required that following pre-rinsing, the product is swirled gently in a bucket of wastewater for 30 seconds to allow absorption of solids.

- **FG505A: AEROBIC BIODISINTEGRATION TEST**

The purpose of the test is to assess the potential for a product to biologically disintegrate under aerobic conditions typically found in sewers as well as onsite and municipal wastewater treatment systems.
This test measures the total mass of a product retained on a 1mm sieve after being incubated with activated sludge for 14 days at ambient laboratory temperature.

- **FG506A: ANAEROBIC BIODISINTEGRATION TEST**

The purpose of the test is to assess the potential for a product to biologically disintegrate under anaerobic conditions typically found in sewers as well as onsite and municipal wastewater treatment systems.
This test measures the total mass of a product retained on a 1mm sieve after being incubated in anaerobic sludge for 28 days at 35°C +/- 2 °C.

- **FG507: MUNICIPAL SEWAGE PUMP TEST**

The purpose of the test is to assess the compatibility of products with municipal sewage pumping systems.
The test system consists in a recirculating tank where an ITT Flygt pump, model C-3085.183 is continuously running. A flow rate corresponding to the 100% efficiency point is established. After five minutes of steady state flow, a product is introduced every ten seconds for ten minutes (total of 60 pieces) at the pump inlet. At the end of the sample introduction the system remains running for an additional five minutes. No adjustments to flow, gate valve positioning, or pump adjustments are made after establishing the baseline flow rate.
The pump power consumption and flow rate on the outlet are continuously monitored and recorded during each test.
The average % power increase for each run of 60 wipes calculated as well as the percentage of data points for which power increase is above 10%.
5 replicates are performed.

4 RESULTS AND COMMENTS

Sheets results corresponding are given in Appendix.
Additional comments are given hereafter.

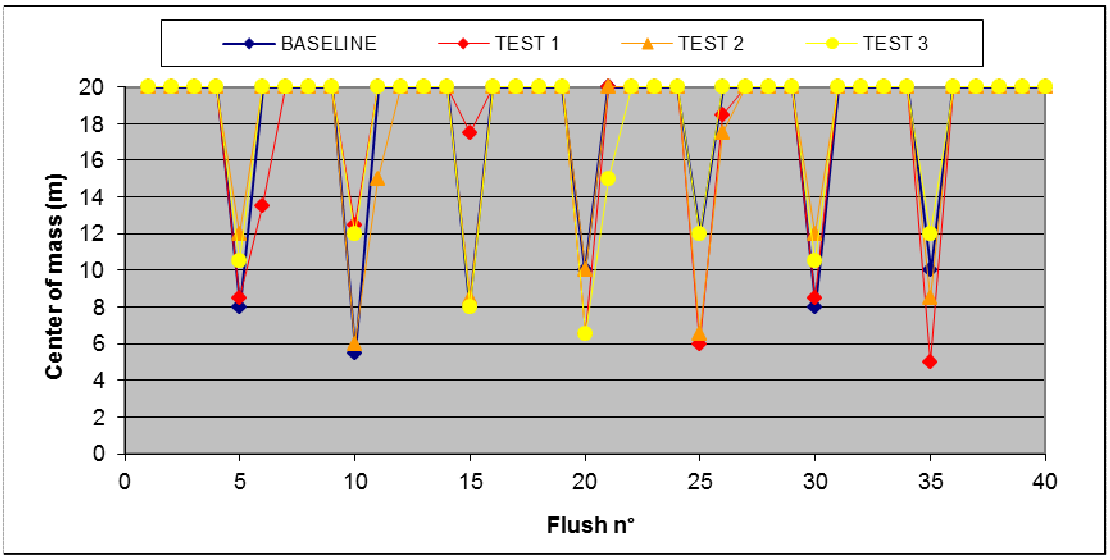
4.1 FG501: TOILET AND DRAINLINE CLEARANCE TEST

Flush volume used for the test: 4.5 litres
Use of SFM and dry toilet tissue in the loading sequence.

Results:

- Evacuation from the toilet bowl: no product remaining in the toilet bowl or trap after none of the 105 flushes.

- Distance of the centre of mass of the flushed material from the toilet:
  Base line: flush sequence run without product (only dry toilet tissue and SFM)



Acceptance criteria (*):

· No more than 5% of the flushes containing product (3 flushes for hygienic wipes) should be associated with clogs that require use of a plunger to clear product and excess water from the bowl and trap	**PASSED**
· The travel distance of the centre of mass of the flushed material in the drain-line does not consistently decrease over the course of 5 consecutive flushes.	**PASSED**

(*) Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition, June 2013

Comments:
The product fulfils the acceptance criteria for this test. It is evacuated properly from the toilet bowl and it clears the drainline without accumulation or blockage of material in the drainline.

4.2 FG502: SLOSH BOX DISINTEGRATION TEST

Results:
Percentage of material passing through the 12.5 mm sieve after 90 minutes:

After 90 min	REPL 1	REPL 2	REPL 3	REPL 4	REPL 5	REPL 6
RETAINED						
Dry mass (g)	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*
% mass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PASSED THROUGH						
% mass	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

The material is in the form of fibres at the end of the test. 100% of the material is passing through the 12.5 mm sieve after 90 minutes of agitation in water.

The percentage of the replicate articles tested for which the percentage of the article's initial dry mass passes through the 12.5 mm sieve after 90 minutes is greater than 25% is 100%.

Product after 90 min of agitation in slosh box

Note: With 100% of individual replicates having a percentage of the starting dry mass passing through the 12.5 mm perforated sieve after 90 minutes greater than 60%, the product fulfils the acceptance criteria of Draft GD4.

Acceptance criteria (*):

· The percent of the starting dry mass passing through the 12.5mm perforated sieve after 3 hours must be greater than 25% for at least 80% of the individual replicates tested.	**PASSED**

(*) Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition, June 2013

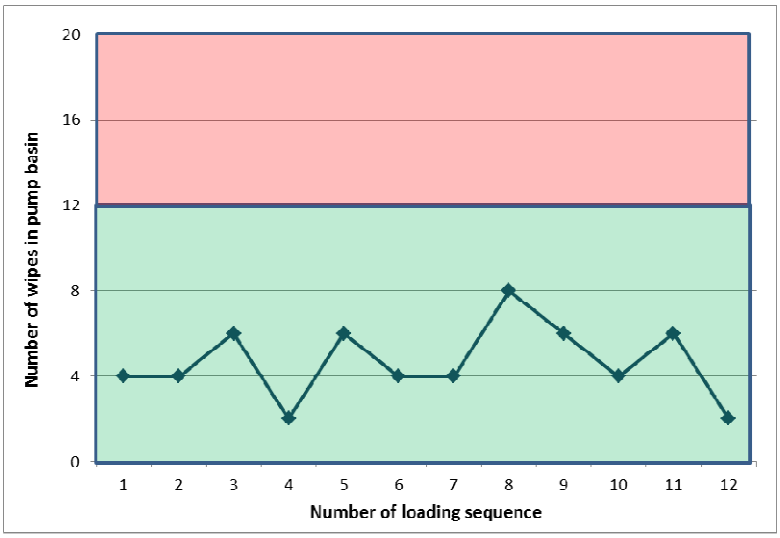
Comments:
The product disintegrates into fibres after 3 hours of agitation.

4.3 FG503: HOUSEHOLD PUMP TEST

Pump model: Liberty Pumps LE51A, ½ HP, discharge ∅ 2”
Pre-screening test for buoyancy in tap water: Positive => no use of SFM in the loading sequence.

Results:

- Amount of product in the pump basin at the end of each loading sequence:




After sequence day 1


After sequence day 2


After sequence day 3


After sequence day 4


After sequence day 5


After sequence day 6

- Product in the collection basin at the end of the test:

Acceptance criteria (*):

· The product must not cause the system to stop functioning at any point during the test	**PASSED**
· The average number of articles present in the basin at the end of days 2 through 6 must not exceed the number of articles loaded on a daily basis	**PASSED**

(*) Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition, June 2013

Comments:

The system did function without any problem during the whole test duration. There was no material in the pump at the end of the test and no material in the check valve nor in the drainline.

All the material that passed through the pump was in the form of fibres and most of them passed through the 6 mm screen.

The average number of products present in the basin at the end of days 2 through 6 is 4.0 articles and this does not exceed the number of product loaded per day (24 articles).

Consequently, the product completely fulfils the acceptance criteria for this test.

4.4 FG504: SETTLING TEST

Pre-screening test for buoyancy in tap water: Positive => no raw waste water used for swirling prior to the introduction at the top of the column.

Results:

- Average settling velocity: 2.08 cm/s
- The product stays at the bottom of the column after 24 hours.

Acceptance criteria (*):

· The average settling velocity for the articles that settle must exceed 0.1 cm/sec and at least 95% of the total articles tested must settle	**PASSED**
· At least 95% of the articles tested must not become sufficiently buoyant to rise more than 30 cm from the bottom within 24 hrs	**PASSED**

(*) Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition, June 2013

Comments:
The product settles in tap water and does not refloat after 24 hours.

4.5 FG505: AEROBIC BIODISINTEGRATION TEST

The product is introduced in aerobic sludge collected in a municipal treatment plant and gently agitated during 14 days at room temperature (23°C). The percentage of mass retained on a 1mm sieve after agitation is determined.

Results:

- Average percent of the initial dry mass passing through the sieve after 14 days: 100%

Acceptance criteria (*):

· The average percent of initial dry mass passing through the 1 mm sieve after 14 days should exceed 95%	**PASSED**

(*) Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition, June 2013

Comments:
The product biodisintegrates in aerobic conditions.

4.6 FG506: ANAEROBIC BIODISINTEGRATION TEST

The product is introduced in anaerobic sludge collected in a municipal treatment plant and incubated during 28 days at 35°C. The percentage of mass retained on a 1mm sieve after being incubated is determined.

Results:

- Average percent of the initial dry mass passing through the sieve after 28 days: 100%

Acceptance criteria (*):

· The average percent of initial dry mass passing through the 1 mm sieve after 28 days should exceed 95%	**PASSED**

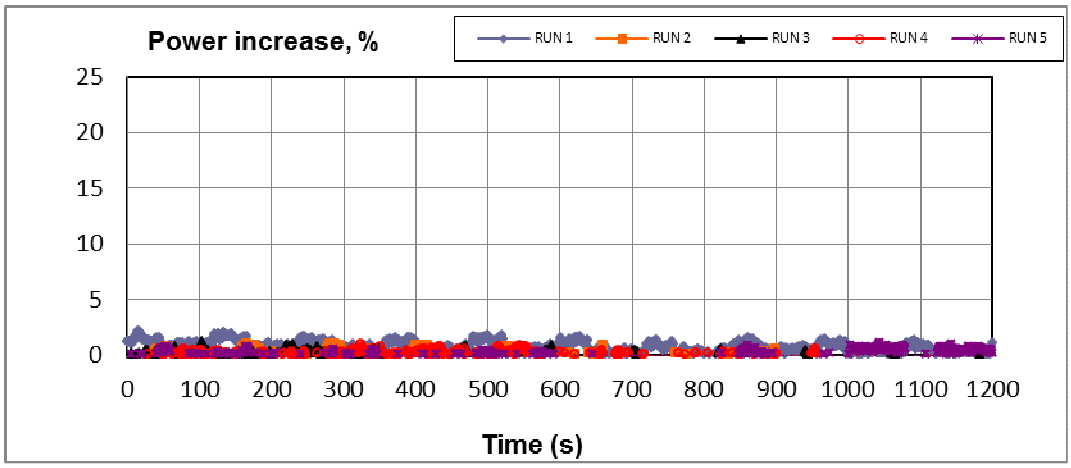
(*) Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition, June 2013

Comments:
The product biodisintegrates in anaerobic conditions.

4.7 FG507: MUNICIPAL PUMP TEST

Pump model: ITT Flygt pump model C-3085.183
Flow rate at test start: 21.2 l/s (100% BEP)

Results:
Average power increase during the test:



Average % power increase over baseline	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	Grand average
	0.62	0.39	1.44	0.09	0.27	**0.56**

Acceptance criteria (*):

· Based upon integration of the power curves, the average percent power increase over baseline for the 5 runs must not exceed 15%	**PASSED**

(*) Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition, June 2013

Comments:
No product articles were found in the pump impeller at the end of the test. The material that passed through the pump was collected on the screen was in the form of fibres and is shown on the next picture.

Note 1: With an average percent power increase of 0.56%, which is below than 5%, the product fulfils the unformal criteria of GD4.

Note 2:
Percentage of data points with power increase higher than 10% during effective test run: 0 %

% of the individual data points exceeding a 10% power increase over the baseline	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	**Mean**
	0.00	0.00	0.00	0.00	0.00	**0.00**

Acceptance criteria for the Nederlands (*):

· No more than 10% of the individual data points recorded during the 5 runs can exceed a 10% power increase over the baseline	**PASSED**

(*) Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition, June 2013

Comments:
The product fulfils the acceptance criteria to be acceptable in the Nederlands.

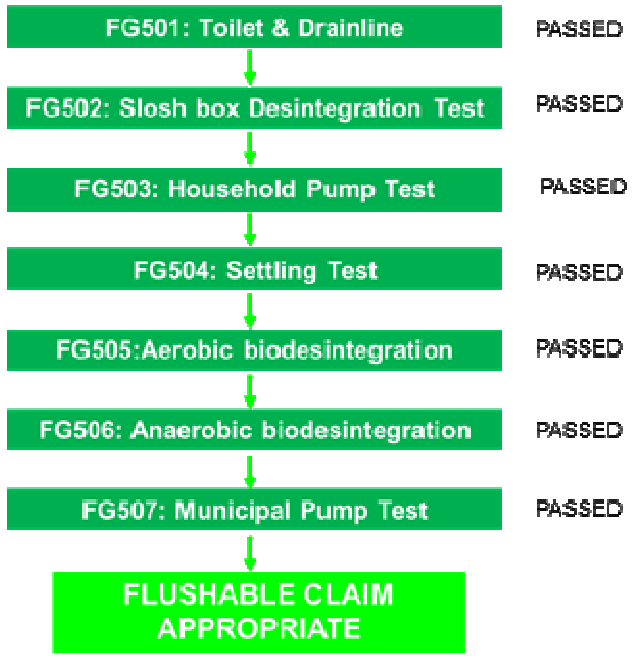
5 CONCLUSION

The product **WEPA liquify Facial Tissues** has been submitted to the Technical Flushability Assessment as described in the Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Third Edition, June 2013.

- Results to FG501 (Toilet and Drainline Clearance Test) show that product **WEPA liquify Facial Tissues** clears the toilet and the building's lateral drainline and that it transports through the sewer pipe.
- Results to FG502 (Slosh Box Disintegration Test) show that product **WEPA liquify Facial Tissues** has the potential to disintegrate.
- Results to FG503 (Household Pump Test) show that product **WEPA liquify Facial Tissues** is compatible with household sewage ejector pumps.
- Results to FG504 (Settling Test) show that product **WEPA liquify Facial Tissues** will sink.
- Results to FG505 (Aerobic Biodisintegration Test) show that product **WEPA liquify Facial Tissues** disintegrates in aerobic conditions.
- Results to FG506 (Anaerobic Biodisintegration Test) show that product **WEPA liquify Facial Tissues** disintegrates in anaerobic conditions.
- Results to FG507 (Municipal Sewage Pump Test) show that product **WEPA liquify Facial Tissues** is compatible with a municipal sewer pump, included in the Nederlands.

Consequently, the 7 tests have been passed successfully as indicated in the flow chart below.

WEPA liquify Facial Tissues passes the Technical Flushability Assessment and is qualified to support a flushable claim.



APPENDICES

The following documents are enclosed:

- One summary sheet per test and per product