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Grenoble, October 4, 2019

STUDY REPORT nr° 19.0711/1 EN

SUBJECT: Biodisintegration tests FG505A & FG506A - GD4

SAMPLE(S)

Designation(s):

- Macerated pulp slurry

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 agreement on quotation dated on 25.06.2019

Customer : [redacted]

Company : VERNACARE
Matrix Park, 1 Western Avenue
GB-PR7 7NB CHORLEY
UNITED KINGDOM

TESTS

Business Unit : Materials Performance - Flushability

Responsible for the tests: Laurence LEROY **Visa** [redacted]

Timetable : Tests performed on weeks 36 to 40, 2019

The copy of this report is authorised in the uncut version only.
This report is made of 6 pages (including cover) and 2 appendices.

Results are valid only for the samples considered.

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Contents

1 INTRODUCTION

The objective of this study is to evaluate a product according to test methods FG505A.R1(18) and FG506A.R1(18) described in the Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Fourth Edition, May 2018.
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:

- Macerated pulp slurry
  Determination of product dry matter content: 4.09%

3 TESTING METHODS

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

- **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.

4 RESULTS AND COMMENTS

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

4.1 FG505A.R1(18): 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: 100%

Acceptance criteria (*):

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

(*) Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Fourth Edition, May 2018

Comments:
The product biodisintegrates in aerobic conditions.

4.2 FG506A.R1(18): 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, Fourth Edition, May 2018

Comments:
The product biodisintegrates in anaerobic conditions.

5 CONCLUSION

The product **Macerated pulp slurry** has been submitted to aerobic and anaerobic biodsintegration tests as described in the Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Fourth Edition, May 2018.

- Results to FG505A (Aerobic Biodisintegration Test) show that the **Macerated pulp slurry** disintegrates in aerobic conditions.
- Results to FG506A (Anaerobic Biodisintegration Test) show that the **Macerated pulp slurry** disintegrates in anaerobic conditions.

APPENDICES

The following documents are enclosed:

- Summary sheets FG505A and FG506A

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FG505A.R1(18): AEROBIC BIODISINTEGRATION TEST

Test conducted at CTP Grenoble, France for VERNACARE

Date of the test : 04/09/2019 to 18/09/2019

Sample:

Macerated pulp slurry

Equipment setup:

5cm orbital shaker, 100 rpm, 2.8L flask containing 1L of aerobic activated sludge
Room temperature: 23°C
Number of articles per flask: approx. 1 g of pulp slurry
Positive control: cotton
Pre-rinsing procedure: no
Sieve: mesh sieve 1 mm
Sampling time: 14 days

Sludge collection:

Sludge collected at Montbonnot municipal wastewater treatment plant
pH = 7.6 (needed to be adjusted : NO)
TSS = 3 600 mg/l (needed to be adjusted : NO)

Storage at room temperature (23°C) before use

Results:

Starting dry mass:
Sample: Dry matter content of the pulp slurry :4.09%
Control (cotton): 1.7342 g

	FLASK 1	FLASK 2	FLASK 3	CONTROL
INTRODUCED	0.9367	1.0225	0.9617	1.7342
RETAINED				
Dry mass (g)	*0.0000*	*0.0000*	*0.0000*	*0.0000*
% mass	0.0%	0.0%	0.0%	0.0%
PASSED THROUGH				
% mass	**100.0%**	**100.0%**	**100.0%**	100.0%

Average percent of the initial dry mass passing through the sieve: 100.0%

Residues after residence time in aerobic sludge:

NO RESIDUE

Acceptance criteria (*):

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

(*) Guidelines for Assessing the Flushability of Disposable Nonwoven Products, Fourth Edition, May 2018

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FG506A.R1(18): ANAEROBIC DISINTEGRATION TEST

Test conducted at CTP Grenoble, France for VERNACARE

Date of the test : 04/09/2019 to 02/10/2019

Sample:

Macerated pulp slurry

Equipment setup:

2 L amber glass bottles containing 1 L of anaerobic sludge
Incubator temperature: 35°C
Number of articles per flask: approx. 1 g of pulp slurry
Positive control: cotton Blank: anaerobic sludge only
Pre-rinsing procedure: no
Sieve: mesh sieve 1 mm
Sampling time: 28 days

Sludge collection:

Sludge collected at Saint Egrève municipal wastewater treatment plant
pH = 6.3 (needed to be adjusted : NO)
TSS = 50 500 mg/l (needed to be adjusted : YES)
Adjustment of TSS by diluting
TSS after ajustment = 10 000 mg/l
Storage in hot conditionned room (30°C) before use

Results:

Starting dry mass:

Sample: Dry matter content of the pulp slurry :4.09%
Control 14J (cotton): 1.5999 g Control 28J (cotton): 1.4453 g

	After 14 days	After 28 days			
	CONTROL	FLASK 1	FLASK 2	FLASK 3	CONTROL
INTRODUCED	1.5999	1.0324	1.0759	0.9445	1.4453
RETAINED	0	0	0	0	0
Dry mass (g)	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*
% mass	0.0%	0.0%	0.0%	0.0%	0.0%
PASSED THROUGH % mass	100.0%	**100.0%**	**100.0%**	**100.0%**	100.0%

Average percent of the initial dry mass passing through the sieve after 28 days: **100.0%**

Residues after 28 days in anaerobic sludge:

NO RESIDUES

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, Fourth Edition, May 201