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Aschaffenburg, 06 September 2012

From: Mr. Köttner
Kö/ma

REPORT

Order No.: 3601/18 **Page 1 of 3 pages**

Client: Cartiera del Chiese S.p.A.
Via Tito Speri, 61
25018 Montichiari (Brescia) / Italy

Date of order: 22 March 2012

Receipt of sample material: 28 March 2012

Origin of sample material: From the client

Purpose: Analysis of a paper grade for compostability according to
EN 13432

(Dr. Derra)

(Köttner)
Geo-ecologist
Manager
Environment

Sample Material

For analysis the following sample material was in hand:

Sample 1 **Kraft Avana Liscia Estensibile**

Carrying out of the Tests

Examination period: 04 April 2012 to 26 August 2012

The characterization of the material, the test for disintegration and the test for compost quality have been carried out according to the EN 13432 "Packaging. Requirements for packaging recoverable through composting and biodegradation".

1. Material characterization

| Parameter | Method | Sample 1 | Limit | |
|-------------------------------|-----------------|-----------------|--------------|------------------|
| Grammage * | DIN EN 536 | 70.8 | — | g/m ² |
| Dry content * | DIN 38 414 – S2 | 93.8 | — | % |
| Residue on ignition (550 °C)* | DIN 38 414 – S3 | 2.43 | 50 | % |
| pH value * | ISO 6588 | 7.42 | — | |
| Salt content * | VdLUFA | 0.56 | — | % |
| Nitrogen * | DIN ISO 11261 | 0.068 | — | % |
| Ammonium * | DIN 38 406 – E5 | 0.0050 | — | % |
| Calcium * | DIN ISO 11885 | 2.240 | — | mg/kg |
| Potassium * | DIN ISO 11885 | 55 | — | mg/kg |
| Magnesium * | DIN ISO 11885 | 456 | — | mg/kg |
| Phosphorus * | DIN ISO 11885 | 85 | — | mg/kg |
| org. Halogen Compds. (OX)* | ISO 11480 | 122 | — | mg/kg |
| Fluorine * | DIN ISO 10304 | < 50 | 100 | mg/kg |
| Zinc * | DIN ISO 11885 | 13.4 | 150 | mg/kg |
| Copper * | DIN ISO 11885 | 21.5 | 50 | mg/kg |
| Nickel * | DIN ISO 11885 | < 2 | 25 | mg/kg |
| Cadmium * | DIN ISO 11885 | < 0.2 | 0,5 | mg/kg |
| Lead * | DIN ISO 11885 | < 5 | 50 | mg/kg |
| Mercury * | DIN EN 1483 | < 0.25 | 0,5 | mg/kg |
| Chromium * | DIN ISO 11885 | < 1 | 50 | mg/kg |
| Molybdenum * | DIN ISO 11885 | 0.80 | 1 | mg/kg |
| Selenium * | DIN ISO 11885 | < 0.2 | 0,75 | mg/kg |
| Arsenic * | DIN EN 11969 | < 3 | 5 | mg/kg |

2. Compostability test (Disintegration)

The disintegration test had been carried out under practice-relevant conditions in an indoor test composting site (Pilot-scale test). The sample material was put into an insulated composting box filled with fresh compost and green waste according to SOP 168.850 by analogy with ISO 16929. Samples were taken in regular time intervals. The temperature surveyed composting process was documented with photographs which are presented in the annex.

| Week of composting | Retain on screen mesh 2 mm, [% weight] |
|--------------------|--|
| | Sample 1 Kraft Avana Liscia Estensibile |
| 1 | 29.8 |
| 2 | 3.2 |
| 3 | < 0.1 |
| 4 | < 0.1 |
| 5 | < 0.1 |
| 6 | < 0.1 |
| 7 | < 0.1 |
| 8 | < 0.1 |
| 9 | < 0.1 |
| 10 | --- |
| 11 | --- |
| 12 | --- |

According to EN 13432 the maximum admissible retain on a sieve with 2 mm screen mesh size after 12 weeks of composting is 10 %.

3.) Overall Evaluation

According to the test results and to the compostability criteria in the European standard EN 13432, the tested sample is evaluated as follows:

The Sample **Kraft Avana Liscia Estensibile** fulfils the criteria for compostability according to EN 13432 with regard to the chemical characterisation and practical compostability (disintegration).

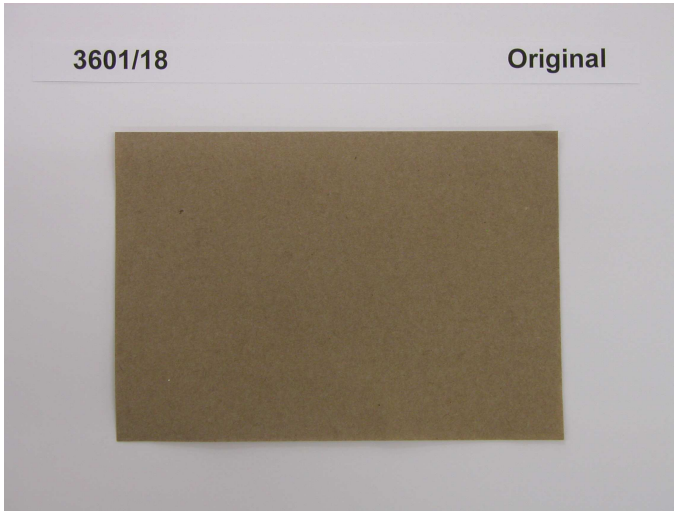
Annex

Photographic Documentation

Test Set-up data for disintegration test

Photographic Documentation

Sample 1: Kraft Avana Liscia Estensibile



Original



After 7 days



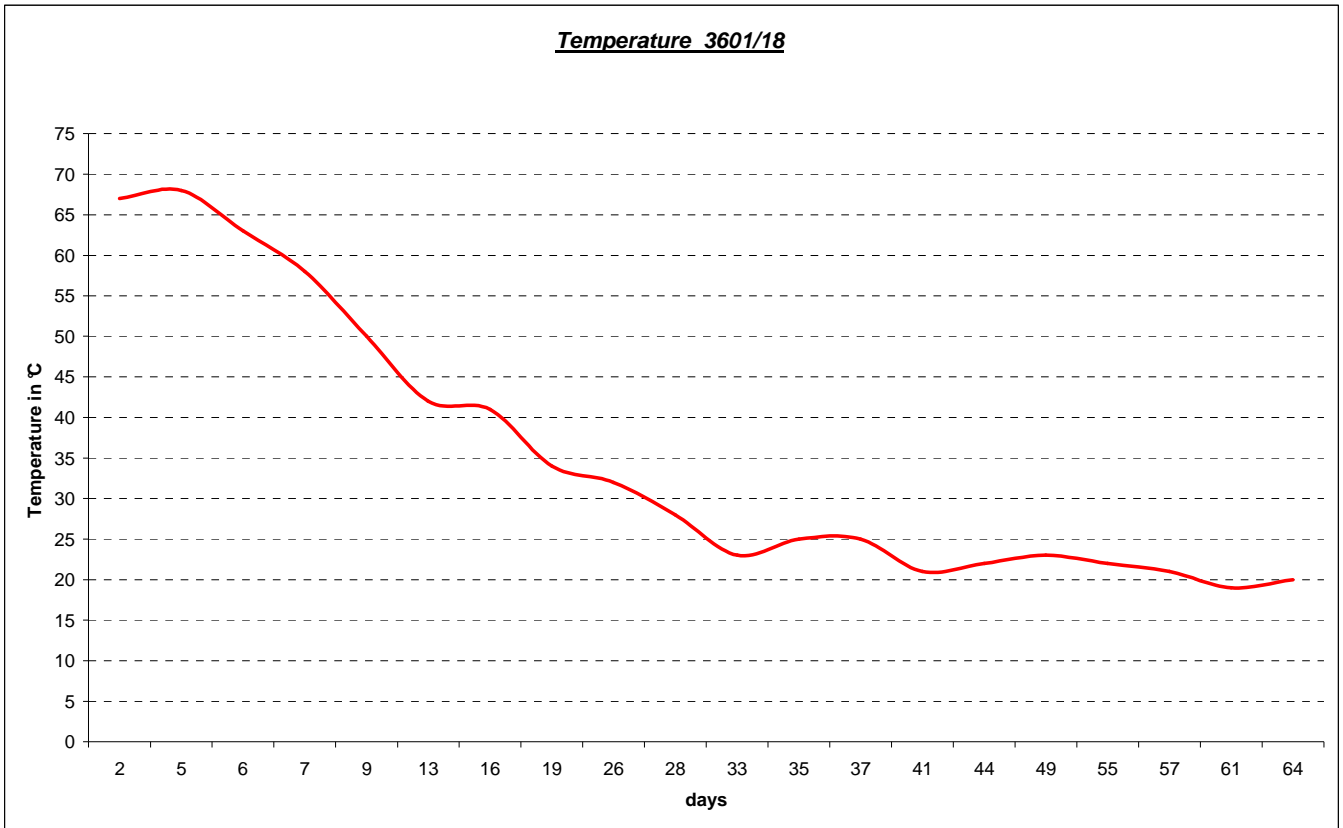
After 14 days



After 21 days

Test set-up data of the disintegration test

1.) Temperature profile in the test composter



2.) Rottegrad (compost maturity) in the test compost after the end of the test (9 Weeks)

| Parameter | Method | Result |
|-----------|----------------------|--------|
| Rottegrad | Methodenbuch Kompost | V |

3.) Oxygen content, humidity and pH-values in the test composter

| Parameter | Method | Week 1 | Week 4 | Week 8 | |
|-----------|----------------------|--------|--------|--------|------|
| Oxygen | test sensor | 16,3 | 19,5 | 19,9 | %Vol |
| Humidity | gravimetric | 74,4 | 67,3 | 58,8 | %wt |
| pH-value | Methodenbuch Kompost | 5,69 | 7,25 | 7,77 | |

The accreditation applies to the methods marked with * in the test report (Register no. D-PL-14160-01-00).

End of report