

DIVISIONE:  
**DIVISION:** Food Packaging Materials

LABORATORIO:  
**LABORATORY:** MATERIALS

|   |                           |
|---|---------------------------|
| <b>RAPPORTO DI PROVA</b><br>(Test Report) | Pagina 1<br>di/of         |
| N° 1591\FPM\MATs\07                       | pag. 5                    |
|   | Date: 28/03/2008<br>Date: |

IDENTIFICAZIONE E DESCRIZIONE DEL CAMPIONE:  
*SPECIMEN DESCRIPTION:*

**Lubricant for electric cables GLISS WMM**

DATI IDENTIFICATIVI DEL CLIENTE:  
*CLIENT:*

**CARIMA S.r.l.**  
Via DEI BRUGHI, 30/31  
20060 GESSATE (MI)

NORMA DI RIFERIMENTO:  
*REFERENCE STANDARD:*

Determination of Biodegradability in an aqueous environment (Sturm Test modified according to O.G. 12/07/90)

DISTRIBUZIONE ESTERNA:  
*EXTERNAL DISTRIBUTION:*

CARIMA S.r.l.  
Ing. E. PIPANI

DISTRIBUZIONE INTERNA:  
*INTERNAL DISTRIBUTION:*

ENTE DI ACCREDITAMENTO:  
*ACCREDITATION BODY:*

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## **GENERAL DATA**

- Date of receipt of samples: 13/12/2007
- Date of test starting: 04/02/2008
- Date of test ending: 25/03/2008
  
- Deviation from test methods: NO

## **IDENTIFICATION OF SPECIMEN EXAMINED**

Lubricant for electrical cables GLISS WMM

## **SAMPLING AND PROCUREMENT**

The initial sampling and procurement was carried out by the Customer of the test. For the execution of the test the samples required by the technical norms used have been taken at random from the samples delivered to the Laboratory.

## **STATEMENT**

- The test results of the test contained in this report refer exclusively to the sample tested.
- The present report can not be reproduced in part without the permission of the Managing Director of the Centre.

## **DETERMINATIONS MADE**

### **DETERMINATION OF BIODEGRADABILITY IN AQUEOUS ENVIRONMENT (Sturm Method modified – O.G. 07-12-90)**

Biodegradability test according to official method reported in the Official Gazette, 14.12.1990, "Decreto of 7 December 1990 of the Minister of the Environment, concerning the measurement of biodegradability of plastic bags in aqueous aerobic environment (Sturm method modified) through the quantification of CO<sub>2</sub> developed within 28 days.

For some phases of the test method reference is made to the method C5 DEGRADATION of the Official Journal of the European Communities of 19.09.84, N.L. 251.

**GRUPPO**  
**IMQ**



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Registro Imprese 352168/8620/18  
CF/P.I.: 11360160151 IT  
Cap. Soc. € 1.040.000

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### Principle of the test

The biotic degradation is defined as the amount of CO<sub>2</sub> produced by the substance expressed as a percentage of the theoretical CO<sub>2</sub> that it should have produced (ThCO<sub>2</sub>), calculated on the basis of the organic carbon contained in the substance.

The sample is degraded by the action of microorganisms that consume carbon of the test substance by "breathing" and turn it into CO<sub>2</sub>.

The CO<sub>2</sub> produced is captured by baryta water and precipitated in the form of barium carbonate (BaCO<sub>3</sub>).

The baryta water is periodically titrated with HCl to measure the amount of CO<sub>2</sub> produced. The microorganisms also have an endogenous production of CO<sub>2</sub> that must be subtracted from the total CO<sub>2</sub> measured to obtain that produced only by the sample.

This is achieved by preparing blank samples in which the production of CO<sub>2</sub> must be subtracted from the production of the reactors also containing the sample.

% of biodegradability of the reference product = 95% ± 3%.

Limit for the validity of the test: % of biodegradability of the reference product ≥ 60%.

### Experimental conditions

#### Reactors set up

2 reactors for reference (sodium benzoate).

2 reactors for the sample.

2 reactors for the blank.

#### Reference sample used

Solution of sodium benzoate 10,33 mg/ml in water. Two reactors were set up for the reference to which were added 10 ml of solution per reactor (103,3 mg of sodium benzoate per reactor).

#### Sample preparation

Diluted in water, 65,51 mg/ml. Two reactors set up with 10 ml of sample solution each (655,1 mg of sample per reactor).

#### Temperature range during the test

22-25°C.

#### Inoculum

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Supernatant taken from the oxidation tank of the treatment plant with activated sludge of civilian wastewater, subjected to aeration for two hours in the laboratory. Inoculum quantity for each reactor: 30 ml.

## RESULTS

### **DETERMINATION OF BIODEGRADABILITY IN AQUEOUS ENVIRONMENT (Sturm Method modified – O.G. 07-12-90)**

Initial characterization of the sample:

**Organic carbon (TOC):** 13,05% of the sample as it is

Quantity of organic carbon added to each reactor (2 reactors for each sample):

| SAMPLE                     | Organic carbon (mg) | Amount of theoretical CO <sub>2</sub> ,<br>ThCO <sub>2</sub> (mg) |
|----------------------------|---------------------|---|
| Reference, Sodium benzoate | 60,22               | 220,8   |
| GLISS WMM                  | 85,49               | 313,5   |

In the table below are reported the percentages of biodegradability calculated in relation to the quantity of total initial organic carbon contained in the samples.

| SAMPLE | Days | Cumulative CO <sub>2</sub><br>(g) | %<br>Biodegradability<br>(% ThCO <sub>2</sub> ) | %<br>Average<br>biodegradability |
|--------|------|-----------------------------------|---|----------------------------------|
|--------|------|-----------------------------------|---|----------------------------------|

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|---|----|-----------------|---------------|-------|
| <b>Reference,<br/>Sodium<br/>benzoate</b> | 50 | 0,2156 – 0,2129 | 97,62 – 96,40 | 97,01 |
| <b>GLISS WMM</b>                          | 50 | 0.2868 - 0.2836 | 91,49 – 90,40 | 90,99 |

Note: in the table are reported the results of the single tests conducted in double.

**DATE**  
Date

**28/03/2008**

**RESP. Food Packaging  
Materials**  
Division Head  
**G. Vestrucci**

**RESP. OF THE CENTRE**  
Managing Director

**P. Cau**