



Laboratorio Plásticos y Derivados Country S. de R.L. de C.V.

Vicente Guerrero #320 Col. El Mante. Zapopan, Jalisco.
Teléfono: (33) 12570620

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|----------|------------|
| CÓDIGO | LAB-F01.8i |
| VERSIÓN | 4 |
| F. ELAB: | 05/2017 |
| F. REV: | 01/2019 |
| ELABORÓ | Ing. MC |
| APROBÓ | Ing. CF |
| PÁGINA | 1 de 5 |

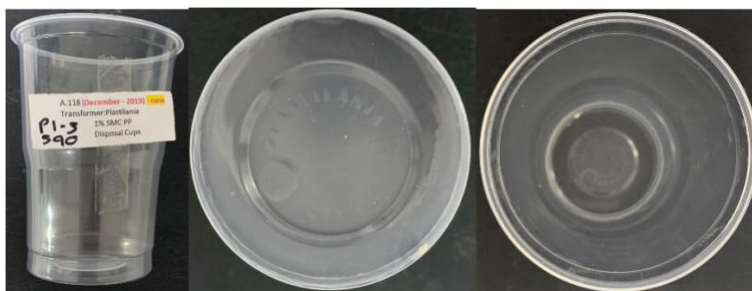
TEST REPORT

General information

Date: May 11th, 2020

Number of report: Q-201219F590
Client: PLASTILANIA-Eco ventures Brasil.
Address: Brasil.
Analysis period: 22-04-2020/11-05-2020
Test Description: Determine the endpoint of degradation.
Study conducted in: Vicente Guerrero #320 Col. El Mante. Zapopan, Jalisco.

I.- Sample Description:



M1. Single use PP cups with P-Life additive at 1%.

II.- Identification of the Method:

LAB-M001 "Standard practice for fluorescent ultraviolet exposure of photodegradable plastics"
ASTM D5208-14. LAB-M002 "Standard practice for determining degradation end point in
degradable polyethylene and polypropylene using a tensile test" ASTM D3826-18.

III.- Equipo de Laboratorio:

a) Accelerated weathering tester "QUV"

Cycle C. Continuous cycle of UV at 50°C. Irradiation de 0.89 W/(m² · nm) a 340 nm.

b) Universal Testing Machine "TESTER 1"

Grip for Stress Testing in plastic films 2 / in. Speed:300 mm/min

IV.- Process:

The preparation of the test pieces is carried out as established in the instructions LAB-I002.

Dimensions of the test piece

Thickness: 0.145 mm

Width: 26 mm

Length: 106 mm



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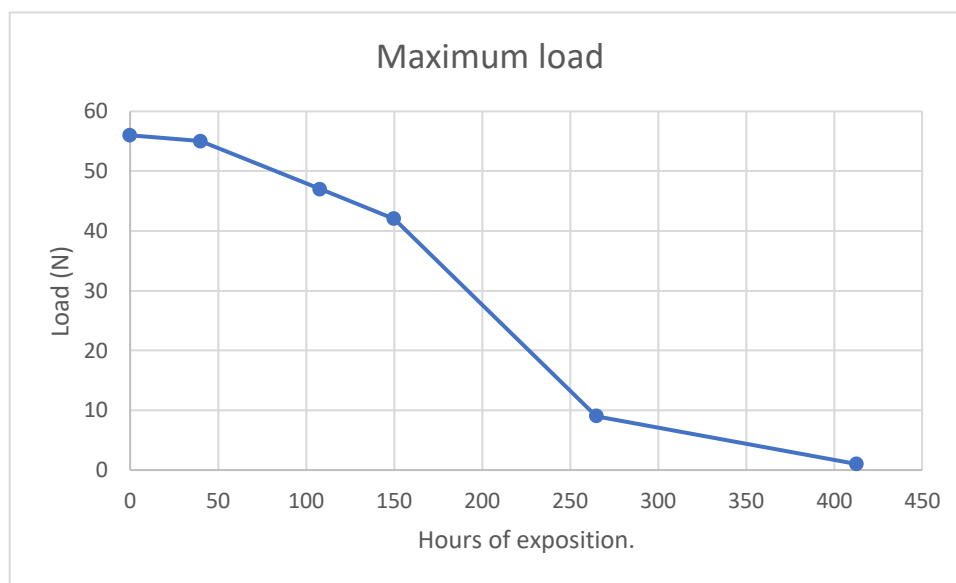
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V.- Results:

In the following table are shown the values obtained during the evaluation for each sample. Importantly, these results are specifically for these samples with the conditions given by the client.

| Hours of exposition. | Table 1.- Maximum load (N) |
|--------------------------|----------------------------|
| | M1 |
| 0 | 56 |
| 40 | 55 |
| 108 | 47 |
| 150 | 42 |
| 265 | 9 |
| 413 | 1 |
| Environmental conditions | |
| Temperature | 23°C |
| Relative humidity | 24% |



Note:

1. The separation between the grips at the start of the tests was 4 cm in each specimen.
2. In this test, 4 specimens were evaluated to determine their end point of degradation and more than 75% recorded less than 5 N of load, the average value is recorded in table 1.



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VI.- Conclusions:

Sample 1.- Single use PP cups with P-Life additive at 1%.

After exposing the sample to the accelerated aging process, the change in mechanical and physical properties were also clearly observed.

The utility period of the sample finishes as the 50% of the initial load is lost which occurred after 200 hours of exposition thus, the **Shelf life** for this part of the sample is of **1 year and 9 months**.

Based on the ASTM D3826-18 standard, it is considered that the sample has reached its degradation when 75% or more of the samples recorded a load of less than 5 N, which happened after 413 hours. The degradation time for this sample is of **3 years and 7 months**

Realizó

*Ing. Karla Angélica Ventura Ramos.
Ingeniero de Calidad*

Aprobó

*Ing. Martha Castillo Cruz
Directora de Operaciones*

-End of the report-

NOTE:

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Annex 1. Samples during the degradation process.

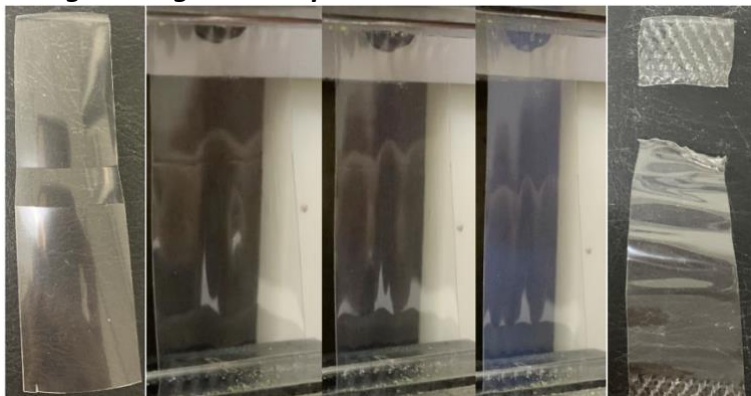


Image 1.- Initial load test for M1



Image 2.- M1 at 40 hours of exposition.



Image 3.- Sample 1 at 150 hours.



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Image 4. Sample 1 at 265 hours of exposition.

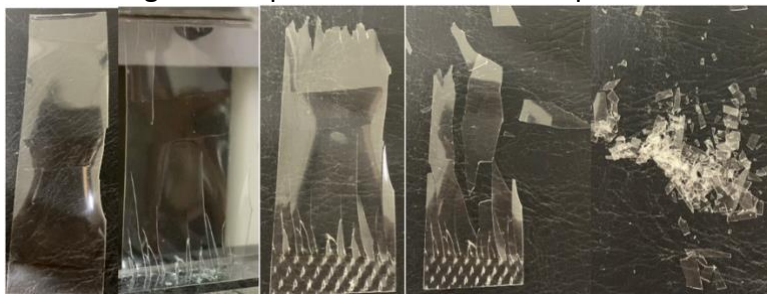


Image 5. Sample 1 at 413 hours.