



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

CODIGO	LAB-F01.8
VERSION	2
FECHA ELAB:	Mayo 2017
FECHA REV:	Octubre 2017
ELABORO	Ing. Martha Castillo
APROBO	Ing. Claudio Fernández
PAGINA	1 de 4

## TEST REPORT

### General information

Date: September 18, 2019

Number of report: Q-300718F317  
Client: SJ Tadeu  
Address: Brazil  
Analysis period: 20-08-2019/11-09-2019  
Test Description: Determine the endpoint of degradation

### I.- Sample Description:

M1. PS Sheets  
with P-Life additive at 1%  
SMC 2360 - PS

### 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 D3826-98 (2013).

### III.- Equipo de Laboratorio:

- a) Accelerated weathering tester "QUV"  
Cycle C. Continuous cycle of UV at 50°C. Irradiation de 0.89 W/(m<sup>2</sup> · nm) a 340 nm.
- b) Universal Testing Machine "TESTER 1"  
Grip for Stress Testing in plastic films 2 / in. Speed:300 mm/min.



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PAGINA	2 de 4

### IV.- Process:

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

*Dimensions of the test piece*

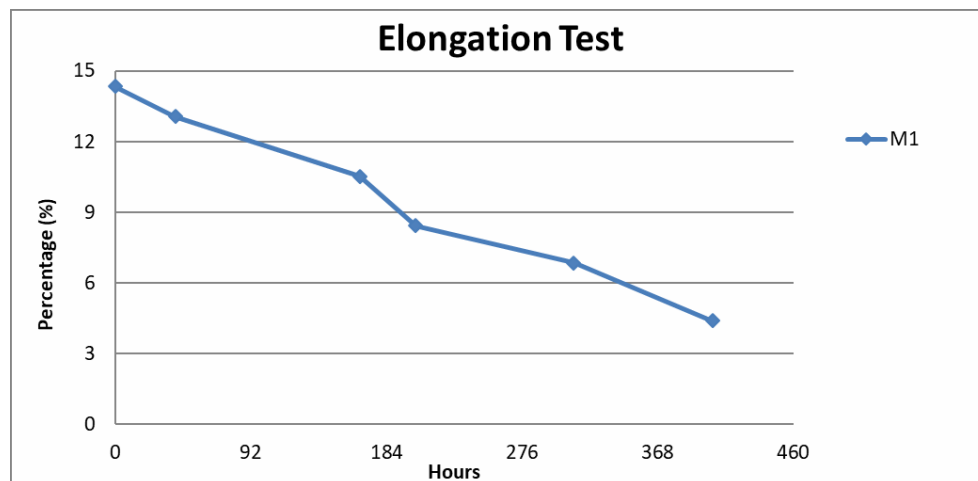
*Width: 26 mm*

*Length: 106 mm*

### V.- Results:

In the following table are shown the values obtained during the evaluation of the elongation for each sample. Importantly, these results are specifically for these samples.

Exposition hours	TABLE 1. ELONGATION PERCENT (%)	
	M1.	
0	14.34	
41	13.06	
166	10.52	
204	8.43	
311	6.85	
405	4.4	
ENVIRONMENTAL CONDITIONS	Temperature: 24°C	Relative humidity: 22%



**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% elongation, the average value is recorded in table 1.



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PAGINA	3 de 4

### **VI.- Conclusions:**

After exposing the sample to the accelerated aging process, the change in mechanical and physical properties were observed due to the lines presented in the sample the breakage was easier.

Based on the ASTM D3826-98 standard, it is considered that the sample has reached its degradation when 75% or more of the samples recorded an elongation of less than 5%, which happened after 405 hours.

It is considered that the period of useful life ends by losing more than 50% of the initial tensile, that took place after 186 hours of exposure. Therefore, it is determined that a **shelf life** of Sample is **1 year with 10 months** under 30°C warehouse environment.

Based on the ASTM D3826-98 standard, it is considered that the sample has reached its degradation when 75% or more of the samples recorded a tensile of less than 5 MPa, which happened after 456 hours, therefore we concluded that this sample has a **degradation time of 3 years with 11 months.**

*Please be advised that 1 day of study shall be converted into 2.5 months under 30°C environment. The conversion rate is calculated based on Arrhenius Activation Energy. Please be also advised that the determination of shelf life time as 50% retained property is based on our long-term experiences, we have been conducting a degradation test for a number of customers throughout the worldwide region.*

**Perform by**  
**Ing. Karla Angelica Ventura Ramos**  
**Ingeniero de Calidad.**

**Approved by**  
**Ing. Martha Castillo Cruz**  
**Directora de Operaciones**

*-End of report-*



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PAGINA	4 de 4

## ANNEX IMAGE



Illustration 1. Laboratory equipment