PAINT COATINGS
ARTIFICIAL AGEING TO ULTRAVIOLET LIGHT

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1. OBJECT AND FIELD OF APPLICATION

The object of this method is to define the conditions to observe to determine the resistance of a material to the action of an artificial UV B light source in defined temperature and hygrometric conditions. Its aim is to reproduce rapid ageing of paint coatings exposed to light and elements.

It supplements test method D27 1389, which however, in case of dispute, remains the reference test for ageing of paint coatings to light.

It applies to paint coatings on metallic and plastic substrates.

2. PRINCIPLE

PROCEDURE A

The test consists of subjecting one or more test specimens coated with the paint to be tested to an UV B light ageing cycle in defined temperature and hygrometric conditions.

PROCEDURE B

The test consists of subjecting one or more test specimens coated with the paint to be tested to the successive action of an UV B light ageing cycle in defined temperature and hygrometric conditions and climatic cycle.

In each case, the deterioration is assessed by the change in the characteristics defined in standard documents.

3. EQUIPMENT

3.1. CHAMBER WITH FLUORESCENT TUBES

Conforms to ISO norme 4892 – Part 3

Supplier : ATLAS.

Light source : Germicide tubes UV B 313 (40W) - Reference ATLAS : 12.5735.01 FS40 T12

A black standard thermometer BST installed at the location provided for this purpose shall indicate the temperature inside the equipment.

The equipment must be installed in a clean air conditioned room with a temperature between 15 and 25 °C and including an efficient venting to the outside.

3.2.CLIMATIC CHAMBER

with an automatic control of the temperature and humidity, capable of reproducing the climatic conditions defined in paragraph 5.2.1.2.

3.3. COLD CHAMBER OR FREEZER

capable of cooling the temperature down to –18 °C ± 2 °C.

4. TEST SPECIMENS

The dimensions of the test specimens must be such that they fit to the supports of the chamber (3.1.).

The type of substrate, its surface preparation, the application and drying conditions of coatings must be those corresponding to the use of the products to be examined and must be stated in the test report.

The coating thickness must be known with a precision equal to ± 10 % or ± 5 µm depending on the lowest of these values.

4.1. AGEING AND CONDITIONING

The test specimens may, if applicable, undergo any type of ageing specified in the documents before this test.

5. METHOD OF OPERATION

5.1. PROCEDURE A

5.1.1. TEST CONDITIONS

5.1.1.1. UV B ageing cycle

Total cycle duration : 12 hours.

- Period of sun exposure UV B : 8 hours at a temperature of 50 ± 1 °C on the black standard thermometer.
- Period of condensation without UV B : 4 hours at a temperature of 40 ± 1 °C on the black standard thermometer.

5.1.2. TEST PROCEDURE

Place the test specimens on the test specimen holders in the chamber (3.1.).

Fill, if necessary the unoccupied places with fictitious test specimens ensuring that the black standard thermometer is placed at the location provided.

Program the UV ageing cycle (5.1.1.) as per the instructions given by the supplier of the equipment.

Note the number of hours on the counter and start the equipment.

The total test duration : 21 cycles (252 hours) or 42 cycles (504 hours) is defined in the standard documents.

Carry out the tests defined in the standard documents according to the operating modes in the specified methods observing the pre-conditioning conditions of the test specimens before the test.

5.2. PROCEDURE B

5.2.1.TEST CONDITIONS

5.2.1.1. UV B ageing cycle

Total cycle duration : 12 hours.

- Period of sun exposure UV B : 8 hours at a temperature of 50 ± 1 °C on the black standard thermometer.
- Period of condensation without UV B : 4 hours at a temperature of 40 ± 1 °C on the black standard thermometer.

5.2.1.2. thermal ageing cycle

Total cycle duration : 48 hours.

- Humid ageing : 24 hours at a temperature of 40 ± 1 °C and 100 % relative humidity in the climatic chamber (3.2.).
- Thermal impact : 20 hours at –18 ± 2 °C in the cold chamber (3.3.).
- 4 hours at 23 °C, ambient hygrometry.

5.3. TEST PROCEDURE

Place the test specimens on the test specimen holders in the chamber (3.1.).

Fill, if necessary, the unoccupied places with fictitious test specimens ensuring that the black standard thermometer is placed in the middle of one of the test specimen holders.

Program the UV ageing cycle (5.1.1.) as per the instructions given by the supplier of the equipment.

Note the number of hours on the counter and start the equipment.

To carry out an AGEING MODULE, complete :	
1 module :	21 UV ageing cycles of (252 hours) (5.2.1.1.) then 4 thermal ageing cycles of (192 hours) (5.2.1.2.)

The number of MODULES to be carried out is stated in norme B15 5050.

Carry out the tests defined in the standard documents according to the operating mode in the specified methods observing the pre-conditioning conditions of the test specimens before the test.

6. EXPRESSION OF RESULTS

6.1.SPECIFIC PROCEDURE A

Express the change in colour :

- By recording the colorimetric variations before and after lustring or brushing,
- By allocating the nearest contrast between the exposed and not exposed material, from the grey scale before and after lustring and brushing.

6.2.COMMON PROCEDURE A AND B

- Record the loss of gloss in UV B,
- Record any other variation in appearance (Surface defect, cracking, …),
- Record the variations in mechanical and/or physical characteristics retained as ageing criteria and specified in the technical specifications.

7. TEST REPORT

As well as the results obtained, the test report must state :

- the reference to this method,
- the description of the coating or of each of protection system layers,
- the type of substrate and its surface preparation,
- the coating thickness and the number of layers,
- the test conditions should these differ from those set in the method,
- the operating details not specified in the method as well as any possible incidents likely to have affected the results.

8. RECORDS AND REFERENCE DOCUMENTS

8.1.RECORDS

8.1.1.CREATION

- OR : 17/12/1998 – CREATION OF THE NORME

8.1.2.SUBJECT OF THE MODIFICATION

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8.2.REFERENCE DOCUMENTS

8.2.1.PSA DOCUMENTS :

8.2.1.1.Normes :

D27 1389

8.2.1.2.Others :

8.2.2.EXTERNAL DOCUMENTS :

ISO4892- Part 3

8.3.EQUIVALENT TO :

8.4.CONFORMS TO :

8.5.KEY WORDS

CARROSSERIE, VEHICULES, LAQUE
(Body, Vehicles, Lacquer)