

UVA RETENTION IN CLEARCOATS
Application

This test method determines the amount of ultraviolet light absorbers (UVA) in clearcoat enamels. UVAs are lost as a function of weathering and can be monitored as a function of exposure time in a weatherometer or Florida. This information provides a way to evaluate the durability of coatings based on the rate of UVA loss, and should be used as a comparison tool for modifications to a coating and across coating families.

Required Test Equipment

Quartz Slides - 10 mm wide to fit standard UV-VIS spectrophotometer sample compartment, approximately 37 mm long X 1-2 mm thick

Glass Capillary Tubes - for coating quartz slides with clearcoat

Laboratory Oven - capable of curing coating

Soft Foam Pad - for cleaning exposure panels

Compressed Air Source - for drying panels after washing

Single Edged Razor Blades - for scraping clearcoat off of panels

Volumetric Flasks - 25 mL with ground glass joints

Glass Stoppers - to fit 25 mL volumetric flask

Analytical Balance - capable of measuring to 0.001g

Pipettes - 1-2 mL disposable glass

Filtering Media - Kimwipes EX-L from Kimberly-Clark or equivalent

UV Quartz Cuvettes - 10 mm X 10 mm

UV-VIS Spectrophotometer System - capable of measuring 250-400 nm

Materials and Solutions Required

Methylene Chloride - certified ACS grade or equivalent

Mild Soap Solution - for washing Florida panels

Date	Action	Revisions
2000 08 07		Editorial – no technical change A. Cockman
1995 02 14		

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Method A: - UVA Retention of Clearcoats on Quartz Slides

This method is used for determining UVA retention of clearcoat films on quartz slides after weathering. A sufficient number of quartz slides shall be prepared for weathering to satisfy the applicable Engineering Specification.

I. Preparation of Coatings on Quartz Slides

1. Collect a UV baseline on the quartz slides prior to coating with clearcoat.
2. Using a capillary tube, coat a quartz slide with clearcoat paint containing a UVA.
3. Allow the paint solvent to evaporate.

NOTE: The quartz slide must be anchored in the sample compartment in the same orientation each time a measurement is made in order to get consistent results.
4. Observe the UV spectrum of the clearcoat from 450nm to 250nm.
 - a. If the maximum absorbance is in the range specified in the relevant material specification, cure the clearcoat paint on the quartz slide using the recommended temperature and time or as indicated by the applicable engineering specification.
 - b. If the maximum absorbance is not in the desired range specified in the relevant material specification, remove the uncured clearcoat from the quartz slide by rinsing with methylene chloride. Repeat steps 2 - 4 until the absorbance is in the recommended range.
5. Observe the UV spectrum of the clearcoat after cure.
 - a. If the maximum absorbance is still in the desired range, obtain a UV spectrum of the clearcoat from 450 to 250nm before weathering has occurred.
 - b. If the maximum absorbance has dropped below the minimum of the desired range, the UVA present in the clearcoat is volatile. The coating and curing process must be repeated until a maximum absorbance in the desired range after cure has been obtained. It is possible to estimate the degree of volatility from the first preparation and compensate accordingly.
6. Record the absorbance of the baseline. (It may be zero.)
7. Record both the wavelength and the absorbance of all the maxima observed.
8. If necessary, subtract the baseline absorbance from the absorbance of the maxima to get the corrected absorbance values. These will be called the "time 0" values. It is necessary to record a "time 0" spectrum for each sample.