RESISTANCE TO COLLECTION OF DIRT - EN 13523-29

The appearance of organic coated surfaces can be altered by environmental degradation due to the combined impact of light, moisture and heat and these effects can be assessed using accelerated (EN 13523-10) & natural weathering (EN 13523-19) techniques.

Additionally, airborne dirt carried by rainwater can adhere to some painted surfaces resulting in discolouration and a "tiger stripes" appearance (dark rainwater lines). In order to assess this phenomenon, ECCA has developed an outdoor test method to evaluate dirt pick-up along with the cleanability of painted surfaces.

The T29 test can be undertaken using modified ECCA exposure racks as shown in **Fig. 1**. The area normally used to expose panels at the 5°S orientation has a grooved collector plate installed which collects dirt and rainwater and directs it onto test samples installed on the upper row of the 90oN exposure aspect.

Fig. 1 – Modified ECCA Exposure Rack for T29 Testing

Case Study: **Polyester Coated Steels**

Tests on two polyester coated strip steels (RAL 9010) demonstrate the methodology and data that can be generated. Assessments were undertaken at the Eurodes Hoek van Holland site from December 2008 – June 2009 with samples having nominal 60° gloss levels of 94 & 43 (designated "high" & "low" gloss) which were expected to retain dirt to differing degrees. Control samples (90°N / no collector plate) were also included in the exercise. Sample appearances after 6 months are shown in **Fig. 2**.

Fig. 2 - Visual Appearance of the High & Low Gloss Polyesters – 6 months at Hoek van Holland

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The exposed samples show the characteristic "tiger stripe" lines that are sometimes found on dirty urban surfaces. In this case, the high gloss product has less staining and is also more easily cleaned as evidenced by the appearance of the washed areas of the panels. The control samples indicated that testing to EN 13523-29 significantly accelerated dirt pick-up rates.

Quantitative data obtained after three and six months testing are shown in **Figs. 3&4**. There is very little change in retained gloss levels over the 6 months of weathering, so it can be concluded that the visual darkening is related to colour change rather than gloss reduction. This can be seen from **Fig. 4** in which it is evident that both low and high gloss samples show significant colour change, particularly after 6 months of exposure, which is accelerated by the EN 13523-29 test conditions and the specified collector plate, when compared against the control samples. As expected, washing the samples minimises this colour change by removing loose dirt, but in this case, the low gloss samples can be seen to retain more dirt, even after washing, as shown by the greater colour change compared to the high gloss sample.

Fig. 3 - Gloss Changes For High & Low Gloss Products

Fig. 4 - Colour Changes For High & Low Gloss Products

Conclusions

The polyester case study has shown that the EN 13523-29 test can significantly accelerate rates of surface dirt pick up and that the collector design allows the well known "tiger stripes" defect to develop.

The test is comparative and allows products to be ranked against each other for dirt retention and also cleanability. Benchmark products are recommended when developing a test matrix.

The choice of site will determine the rate of dirt pick up with the main environmental factors to consider being levels of rainfall and the concentration of airborne dust. Dirtier sites will allow comparative studies to be undertaken more quickly, but inferences may not be wholly transferable to other geographical locations, since dirt pick-up rates can be dependant on ambient humidity and temperature.

Colour and gloss measurements allow changes to be quantified. However, final surface appearances are not homogeneous therefore a visual ranking along with photographic records are required to fully characterise changes.

Normative Standards

- 13523-10, coil coated metals – test methods – part 10: resistance to fluorescent UV light & water condensation.

- EN 13523-19, coil coated metals – test methods – part 19: panel design and method of atmospheric exposure testing.

- EN 13523-29, coil coated metals – test methods – part 29: resistance to collection of dirt.

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