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# Cerakote Trim Coat Test Report

## NIC Industries Research & Development Group

**Date:** 05-17-2019

**Purpose:** To determine change in gloss and color of an unpainted automotive plastic trim substrate, coated with Cerakote Trim Coat before and after 200 wash cycles.

**Test Method:** Cerakote Modified ISO 20566 2013

**Definition of "Wash" and "Wash Cycle":** Cerakote Modified ISO 205660 2013 defines a "wash" and or "wash cycle" as 24 seconds of continuous rotating automatic car wash brush contact, combined with a constant spray of a solution containing a mixture of water and blue Dawn dish soap.

**Test Duration:** The fully cured Cerakote Trim Coat test panel was subjected to 200 consecutive wash cycles per Cerakote Modified ISO 205660 2013.

**Sample Preparation:** An unpainted automotive plastic trim substrate was prepared per the standard application instructions provided on each wipe packet. A 1" strip of the sample was masked off to divide the panel into two sections. Cerakote Trim Coat was applied to each half per the standard application instructions provided on each wipe packet. One half of the substrate was coated with Gloss Cerakote Trim Coat and the other half was coated with Satin Cerakote Trim Coat. The panel was then allowed to cure per the standard application instructions provided on each wipe packet.

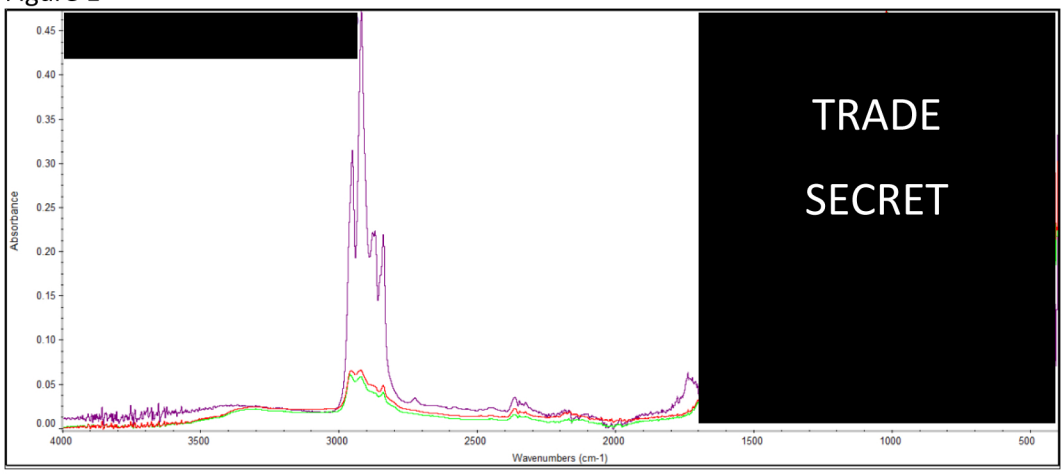
**Test Procedure:** Gloss and color values (in L, a*, b*), and Fourier Transform Infrared Spectroscopy (FTIR) were measured and recorded on both the uncoated and coated portions of the unpainted automotive plastic trim substrate. All measurements were taken in triplicate and averaged together for a single value, aside from the FTIR which is measured with 16 scans and reported in figures 1 and 2. The unpainted automotive plastic trim substrate was then fixtured in a washing test apparatus and subjected to 200 wash cycles. The test panel were then dried. Gloss and color values (in L, a*, b*), and Fourier Transform Infrared Spectroscopy (FTIR) measurements were then taken again in triplicate and reported in Table 2 and Figure 2.

**Pre-Wash Measurements:** Averages of triplicate measurements for gloss and color are displayed below in Table 1. The IR spectra figure (FTIR) is displayed below in Figure 1.

| Table 1 | Gloss (60°) | L | a* | b* |
|---|---|---|---|---|
| Uncoated | 1.8 | 27.21 | -0.11 | -0.58 |
| Cerakote Trim Coat Satin | 5.5 | 25.89 | -0.04 | -0.34 |
| Cerakote Trim Coat Gloss | 7.4 | 26.00 | -0.04 | -0.26 |

**This information is accurate to the best of our knowledge. Certain data has been redacted to protect Cerakote trade secrets.**

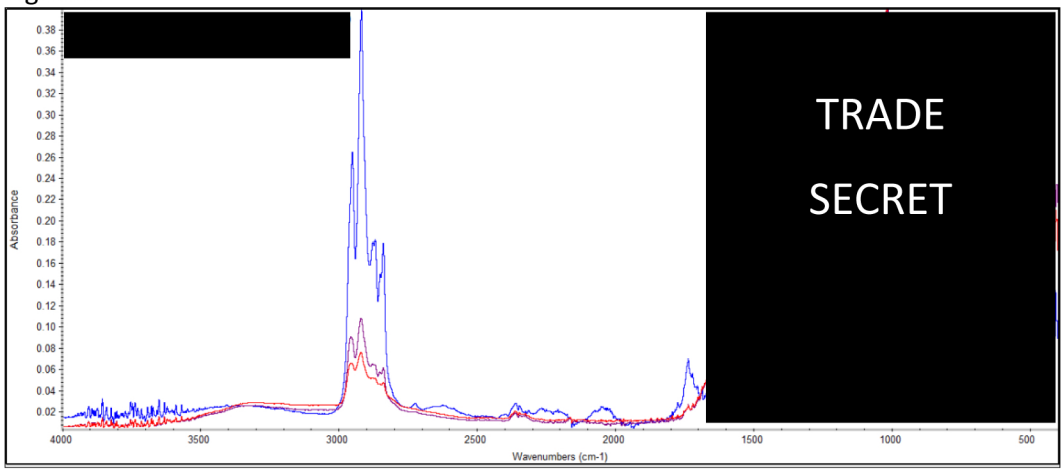
Figure 1




**Post-Wash Measurements:** Averages of triplicate measurements for gloss and color are displayed below in Table 2. The IR spectra figure (FTIR) is displayed below in Figure 2.

| Table 2 | Gloss (60°) | L | a* | b* |
|---|---|---|---|---|
| Uncoated | 2.6 | 26.95 | -0.06 | -0.34 |
| Cerakote Trim Coat Satin | 4.6 | 25.61 | 0.00 | -0.23 |
| Cerakote Trim Coat Gloss | 7.1 | 26.21 | -0.04 | -0.14 |

Figure 2




**Conclusion:**

**This information is accurate to the best of our knowledge. Certain data has been redacted to protect Cerakote trade secrets.**

- **Gloss Retention**
  - *Cerakote Trim Coat Gloss Formula:* retained ~96% of the pre-washed gloss measurement after 200 consecutive wash cycles.
  - *Cerakote Trim Coat Satin Formula*: retained ~84% of the pre-washed gloss measurement after 200 consecutive wash cycles.

- **Color values (in L, a*, b*)**
  - *Cerakote Trim Coat Gloss Formula*: retained ~98% of the pre-washed color measurement after 200 consecutive wash cycles.
  - *Cerakote Trim Coat Satin Formula*: retained ~98% of the pre-washed color measurement after 200 consecutive wash cycles.

- **Fourier Transform Infrared Spectroscopy (FTIR)**
  - After 200 wash cycles the unwashed and washed test panels were analyzed using FTIR. The peaks at [redacted] $cm^{-1}$, [redacted] $cm^{-1}$, [redacted] $cm^{-1}$, and [redacted] $cm^{-1}$ remain in the washed substrate (figure 2) when compared to the unwashed substrate (figure 1). These spectra confirm Cerakote Trim Coat is still on the panel after 200 wash cycles.