## SUBJECT: Evaluation of Coated Test Panels after Accelerated Weathering Exposure; KTA-Tator Inc. Project No. 66077381

In accordance with KTA-Tator, Inc. (KTA) Proposal Number QN5160 dated February 27, 2025, KTA has performed laboratory accelerated weathering exposures and testing of six submitted coated test. This report contains descriptions of the testing procedures employed and the results of the testing performed.

### SAMPLES

Six approximately 6 in. x 3 in. coated test panels, three aluminum and three copper, coated both sides, were received from SIMIX on February 24, 2025. Table 1, “Sample Identification,” lists the details of the samples received, along with the KTA identification code assigned to each sample.

**The prepearation of the samples: Spray coated with SIMIX Multi-Surface Ceramic Clearcoat, SMX-8800 diluted 4 parts distilled water, 1 part SIMIX concentrate. Applied 4 coats per sample, both sides.**

**Table 1 – Sample Identification**

| KTA ID | Panel Type | Description |
|---|---|---|
| 66077381-1 | Aluminum | Approximately 6 in. x 3 in. aluminum Q-panel, coated on both sides with a clear coating |
| 66077381-2 | Aluminum | Approximately 6 in. x 3 in. aluminum Q-panel, coated on both sides with a clear coating |
| 66077381-3 | Aluminum | Approximately 6 in. x 3 in. aluminum Q-panel, coated on both sides with a clear coating |
| 66077381-4 | Copper | Approximately 6 in. x 3 in copper test panel, coated on both sides with a clear coating |
| 66077381-5 | Copper | Approximately 6 in. x 3 in copper test panel, coated on both sides with a clear coating |
| 66077381-6 | Copper | Approximately 6 in. x 3 in copper test panel, coated on both sides with a clear coating |

### LABORATORY INVESTIGATION

The laboratory testing consisted of exposing the test panels to a cycle accelerated weathering environment for 1008 hours (6 weeks) as described in ASTM D5894-21, “Standard Practice for Cycle Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet). ” After the exposure, the test panels were visually inspected of any blistering, rusting, coating delamination, and coating discoloration.

Aluminum

1 Front after 1008 hrs
ASTM D5894

2 Front after 1008 hrs
ASTM D5894

3 Back after 1008 hrs
ASTM D5894

3 Front after 1008 hrs
ASTM D5894

Copper

4 Front after 1008 hrs
ASTM D5894

5 Front after 1008 hrs
ASTM D5894

6 Back after 1008 hrs
ASTM D5894

6 Front after 1008 hrs
ASTM D5894

## Cyclical Weathering Exposure

All of the received samples were placed into KTA's QUV cabinet #9 (QUV Accelerated Weathering Tester, Model QUV/se, manufactured by the Q-Lab Corporation of Westlake, Ohio). Ultraviolet light and condensing humidity exposure was conducted on one face of the test panels in accordance with ASTM D5894, consisting of four hours of exposure to ultraviolet light emitted by UVA-340 lamps with a controlled irradiance of 0.89 Watts per square meter ($W/m^2$) and a set temperature of 60°C, followed by four hours of condensing humidity at a set temperature of 50°C. This alternating exposure was repeated continuously for 168 hours (1 week). The test panels were held in place using aluminum panel racks. An uninsulated black panel thermocouple was mounted on a solid surface at the center position of the panel racks on one side of the cabinet. The average bulb-to-specimen distance for the cabinet was 52 mm. There are two banks of lamps in the cabinet, each containing four lamps. There are two radiometers for each bank of lamps, providing feedback control to maintain the set irradiance level. The lamps are changed out yearly, earlier if the cabinet cannot maintain the set irradiance level before then.

After 168 hours of QUV exposure, the test panels were transferred to a Q-Fog Cyclic Corrosion Tester, Model CCT 600, also manufactured by the Q-Lab Corporation. This exposure consisted of repeated cycles of exposure to 1 hour of dilute salt fog followed by 1 hour of elevated temperature dry-off (commonly referred to as "Prohesion" cycling). The fog was the ambient room temperature vapor of a dilute electrolyte solution consisting of 0.05% sodium chloride and 0.35% ammonium sulfate, prepared in deionized and reverse osmosis-filtered (DI/RO) water, conforming to ASTM D1193-24 Type IV, "Standard Specification for Reagent Water", and adjusted to a pH of 5.0 – 5.4. The dry-off portion of the cycling was conducted at 35°C. This alternating exposure was repeated continuously for 168 hours (1 week) before moving the test panels back to the QUV cabinet for continued exposure.

This cycling between UV/condensation exposure in the QUV cabinet and the dilute salt fog/dry-off exposure in the Q-Fog cabinet was repeated for a total of 1008 hours (6 weeks). Interruptions in the exposures were minimal except for interruptions for daily cabinet maintenance and transference of the test panels from one cabinet to the other. All coated samples were exposed concurrently and in the same two testers. Daily records of the cabinet conditions were maintained and are available upon request.

Following 1008 hours (6 weeks) of cyclic weathering exposure, the samples were rinsed with DI/RO water, removed from the Q-Fog cabinet, allowed to dry at room conditions, photographed, and visually evaluated for any evidence of blistering, rustings, coating delamination, and coating discoloration.

## Blistering, Rusting, Coating Delamination, and Coating Discoloration Evaluations

After the 1008 hours of exposure, the latest test panels were digitally photographed and visually evaluated for the degree of blistering per ASTM D714-25, "Standard Test Method for Evaluating Degree of Blistering of Paints." Blister size was rated on a 0 – 10 scale with the top grade of 10 indicating no blistering and progressively lower grades indicating progressively larger blisters. The frequency (amount) of blistering was rated as either none (no rating), few (F), medium (M), medium dense (MD) or dense (D) as compared to pictorial standards.

The degree of rusting of each exposed test panel was also evaluated per ASTM D610-08(19), "Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces." The degree of rusting was rated using a 0 — 10 scale based on the percentage of visible surface rust where a low grade of 0 indicated greater the 50% of the surface was rusted and a top range of 10 indicated less than 0.001% of the surface was rusted (see "Rust Grading Scale" below); the samples were also compared to pictorial standards. The distribution of rusting was classified as pinpoint, spot, or general rusting, designated as either P, S, or G respectively.

**Rust Grading Scale – Percentage of Surface Rusted (from ASTM D610-08(19))**

*Grade 10 - less than or up to 0.01%*
*Grade 9 > 0.01% and up to 0.03%*
*Grade 8 > 0.03% and up to 0.1%*
*Grade 7 > 0.1% and up to 0.3%*
*Grade 6 > 0.3% and up to 1.0%*
*Grade 5 > 1.0% and up to 3.0%*
*Grade 4 > 3.0% and up to 10.0%*
*Grade 3 > 10.0% and up to 16.0%*
*Grade 2 > 16.0% and up to 33.0%*
*Grade 1 > 33.0% and up to 50%*
*Grade 0 > 50%*

Additionally, after exposure the test panels were inspected visually for any coating delamination from the substrate, and any discoloration or change in appearance from when initially received. The results of all of the visible evaluations are presented in Table 2, "Results of Visible Evaluation of Test Panels after 1008 Hours Cyclical Weathering Exposre."

**Table 2 – Results of Visual Evaluation of Test Panels after 1008 Hours Cyclic Weathering Exposure**

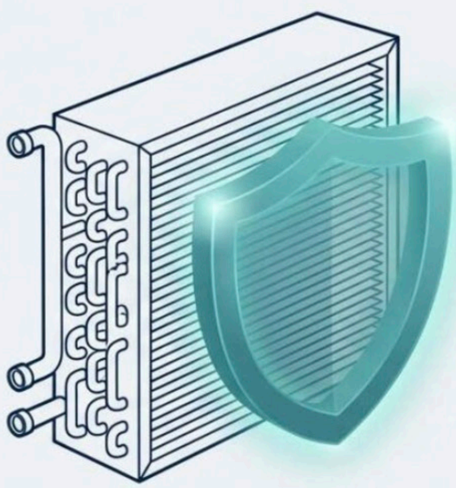
| KTA ID # | Panel Type | ASTM D714 Blistering Rating | ASTM D610 Rusting Rating | Coating Delamination Observations | Coating Discoloration Observations |
|---|---|---|---|---|---|
| 66077381-1 | Aluminum | 10 | 10 | Delamination along top edge where panel rested against panel rack in QUV cabinet, and along side edges. | Coating became opaque and beige in color on upper half of panel, fading back to clear in lower half. |
| 66077381-2 | Aluminum | 10 | 10 | Delamination along top edge where panel rested against panel rack in QUV cabinet, and along side edges. | Coating became opaque and beige in color on upper half of panel, fading back to clear in lower half. |
| 66077381-3 | Aluminum | 10 | 10 | Delamination along top edge where panel rested against panel rack in QUV cabinet, and along side edges. | Coating became opaque and beige in color on upper half of panel, fading back to clear in lower half, with several darker spots. |
| 66077381-4 | Copper | 10 | 10 | Delaminated spots near top and along side edges. | Coating became opaque and beige, slightly darker in color on upper half of panel. Green oxidation evident at top edge. Delaminated spots were dark in color. |
| 66077381-5 | Copper | 10 | 10 | Delaminated spots near top and along side edges. | Coating became opaque and beige, slightly darker in color on upper half of panel. Green oxidation evident at top edge and strip running down right side. Delaminated spots were dark in color. |
| 66077381-6 | Copper | 10 | 10 | Delaminated spots near top and along side edges. | Coating became opaque and beige, slightly darker in color on upper half of panel. Green oxidation evident at top edge and strip running down left side. Delaminated spots were dark in color. |


# HVAC Energy Reduction System and Anti-Corrosion Coating

SIMIX Multi-Surface Ceramic Clearcoat is a non film-forming, hygroscopic, super-hard liquid glass that will never yellow, chip, peel or crack. Just like in glass, the primary ingredient in SIMIX is silica (sand). That is mixed with potassium and lithium, which are very conductive. SIMIX conducts heat. It is not an insulator, like all other coil coating products on the market today.

## Certified for Maximum Corrosion Resistance

Third-party laboratory testing confirms unmatched equipment protection.



Testing Authority: **KTA-Tator Inc. (Project No. 66077381)**

**Test Method:** Test panels were subjected to 1008 hours (6 weeks) of cyclic accelerated weathering, salt fog, and UV exposure per ASTM D5894-21.

The Result: **Achieved the highest Blistering and Rusting grades available.**

We know of no other coating worldwide that has achieved these results. SIMIX adds years of life to any HVAC system, heat pump, or refrigeration unit.

The constant cycle of expansion, contraction, and exposure to corrosive elements degrades HVAC efficiency from day one. To learn more about corrosion prevention and energy optimization scan here.

## A New Standard in Efficiency, Protection, and Air Quality

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