

material, screened ink on white sheeting and anti-graffiti material over screened ink. One of the pair will be the control and the other will be placed in the light exposure apparatus described in Part 2, Artificial Weathering.

PART 2. ARTIFICIAL WEATHERING

A. APPARATUS

Light-exposure apparatus (Xenon-Arc type) as described is ASTM Designation: G 155 with daylight filters. The cycle of water spray and light is described in Table X3.1, Cycle 1.

B. PROCEDURE

On the test panels prepared in Part 1 measure specular gloss, retro-reflectivity, luminance factor and color initially, then place in the light exposure apparatus. Perform the same tests at each of the following exposure intervals, 500, 1,000 and 2,000 hours.

PART 3. SPECULAR GLOSS

A. APPARATUS

1. Instrument meeting the requirements of ASTM Designation: D 523, with an 85-degree geometry.
2. Light exposure apparatus described in Part 2, Artificial Weathering.

B. PROCEDURE

1. Measure the specular gloss of the test panel according to ASTM Designation: D 523.
2. Place the 6 by 3 inch panel in the light exposure apparatus and measure the specular gloss at 500, 1,000 and 2,000 hours of exposure.
3. Record the time at which the gloss value drops below the minimum specified in ASTM Designation: D 4956.

PART 4. RETRO-REFLECTIVITY

A. APPARATUS

1. The apparatus shall conform to the requirements in ASTM Designation: E 810 and California Test 642.
2. Light exposure apparatus described in Part 2, Artificial Weathering.

B. PROCEDURE

1. Measure retro-reflectivity of each panel initially using 0.2 and 0.5 degree observation angles, and -4 and +30 degree entrance angles.
2. Place the 6 by 3 inch panel in the light exposure apparatus and measure the retro-reflectivity at 500, 1,000 and 2,000 hours of exposure.
3. Record the number of hours at which the coefficient of retro-reflection drops below the minimum specified in ASTM Designation: D 4956 for the type of sheeting used in this test. The inked colors shall meet at least 80 % of the specification requirements for integrally colored sheeting.

PART 5. LUMINANCE FACTOR AND DAYTIME COLOR

A. APPARATUS

1. Instrument that meets the requirements of ASTM Designation: D 4956, with 45/0 geometry. Use 1931 CIE 2-degree standard observer and CIE illuminant D65.
2. Light exposure apparatus described in Part 2, Artificial Weathering.

B. PROCEDURE

1. Measure the initial luminance factor, Y (%), and chromaticity in accordance with ASTM Designation: D 4956.

2. Place the 6 by 3 inch panel in the light exposure apparatus and measure the luminance factor and chromaticity at 500, 1,000 and 2,000 hours of exposure.
3. Record the number of hours at which the luminance factor falls below the specified minimum in ASTM Designation: D 4956 for the type and color of sheeting. Note the time at which the color is outside the color coordinates specified in ASTM Designation: D 4956.

PART 6. SOLVENT RESISTANCE

A. APPARATUS

1. Reagent grade methyl ethyl ketone.
2. Nonferrous electronic film thickness gauge.

B. PROCEDURE

1. Measure the film thickness of the anti-graffiti coating on the panel with the electronic film thickness gauge.
2. Perform 25 double rubs in accordance with ASTM Designation: D 5402.
3. Measure the film thickness and record the amount of film lost during the scrub test.

PART 7. GRAFFITI RESISTANCE TEST

A. APPARATUS

1. Assorted commercially available aerosol paints, various types of red marking pens and lipsticks.
2. Light exposure apparatus described in Part 2, Artificial Weathering.
3. Two identical 6 by 3 inch panels; one that has been exposed for 2,000 hours in the light exposure apparatus and one that has not.

B. PROCEDURE

1. Apply different marks on the two test panels with the assorted markers and spray paints. Allow these to cure a minimum of 72 hours at ambient temperature before removal is attempted.
2. Attempt to remove graffiti with a graffiti removal product that has been approved by Caltrans. Determine luminance factor, chromaticity coordinates, specular gloss, and retro-reflectivity on the panels after removal of the graffiti.

PART 8. SAFETY AND HEALTH

Anti-Graffiti materials shall conform to the regulations of the Occupational Safety and Health Administration, all requirements of the Environmental Protection Agency, and the requirements of the air pollution control district where the material will be applied. Refer to the Caltrans Laboratory Safety Manual and the manufacturer's datasheet on the proper use and disposal of the chemicals and solvents used in this method.

REFERENCES

**ASTM Designations: D 523, D 3363, D 4956,
D 5402, E 810 and G 155
Caltrans Laboratory Safety Manual
California Test 642**

End of Text

(California Test 684 contains 3 pages)