

**CERAMIC COATING PERFORMANCE REQUIREMENTS, FLOAT  
LAMINATED GLASS FOR WINDSHIELD.**

▽ WSS-M99P6-C1

**CERAMIC COATING PERFORMANCE REQUIREMENTS, TEMPERED,  
BODY GLASS**

▽ WSS-M99P6-C2

**1. SCOPE**

These specifications define the performance requirements of decorative windows.

**2. APPLICATION**

These performance requirements were released originally for styling effects and/or ultra violet shielding of fixed and movable glass. Decorative materials utilized to attain the desired effects may include paints, ceramics, metal inserts or other materials either alone or in combination.

**3. REQUIREMENTS****3.1 APPROVED SOURCES**

This specification requires the use of approved sources. Only the sources identified on the Ford Approved Source List (ASL) can be used when this specification is listed on the drawing, CAD file, or other documents. The list of approved sources is located within Ford at [www.mats.ford.com](http://www.mats.ford.com) or available externally through a Ford Materials Engineer.

**3.2 ENGINEERING REQUIREMENTS FOR DECORATIVE CERAMIC COATING****3.2.1 Appearance**

Appearance shall be judged as seen looking through the glass, and as specified on the print.

The decorative material shall exhibit a 3 or better AATCC rating (ASTM D 2616, gray scale) after exposure to the environments listed in para 3.2.6.

**3.2.2 Opacity - Decorative with Trademark**

Total visible light transmission through the ceramic band shall not exceed 0.1%. The measurement shall be made using a transmission black and white densitometer e.g. "Tobias Model TBX", in direct contact with the ceramic band surface.

**3.2.3 Adhesion of Decorative Material to Glass**

Test Method: Scribe the painted area with a sharp blade held at 90° to the glass surface. Determine adhesion of the decorative material initially and after exposure to the environmental conditions listed in paragraph 3.2.6 and 3.3.

Remove the samples from the test environment and immerse in water per FLTM BI 104-01 for 24 h. Dry the test area, using a paper towel, cloth or air pressure and immediately apply fiber reinforced tape (per FLTM BI 106-01) to the scratched area with firm thumb pressure. Remove the tape by pulling at a 90° angle with moderate

| Date       | Action    | Revisions             | Rev 02         |
|------------|-----------|-----------------------|----------------|
| 2018 04 13 | Editorial | Corrected FLTM Method | P. Konopka, NA |
| 2017 11 16 | Released  |                       | P. Konopka, NA |
| 2005 01 11 | Activated |                       | M. Mehandru    |





speed. Any removal of decorative materials more than 1.6 mm from the scribe line (excluding glass chips) or evidence of blistering shall be basis for rejection. Note: Laminated samples may be evaluated prior to laminating.

### 3.2.4 Abrasion Resistance (excluding coating on the second / third surface for laminated glass)

(Test Number 18 ANSI Standard Z26.1, most current version)

Test Method:

- Abrade the painted sample following test number 18 stated above.
- Compare the abraded track to the unabraded portion of the sample viewing the sample through the glass.
- There shall be no visible change in the ceramic coating appearance when viewed through the glass and the total light transmission through the abraded area shall not exceed 0.1%. (Reference para 4.1).

### 3.2.5 Compatibility of Decorative Material with PVB (WSS-M99P6-C1), When Coating is applied to the Second / Third Surface (Figure 1)

No more than 2 mm delamination of the decorative material to polyvinyl butyral (PVB) is permitted after exposure to the environments listed in paragraph 3.2.6.

### 3.2.6 Exposure Conditions

Appearance evaluations per 3.2.1 to be performed after each condition below AATCC 3 min.

Adhesion evaluations per 3.2.3 to be performed before and after each condition below, no blistering or removal of ceramic more than 1.6 mm from the scribe line.

|         |                                       |                                                                               |
|---------|---------------------------------------|-------------------------------------------------------------------------------|
| 3.2.6.1 | Heat Aging for 2 weeks at 90 +/- 2 °C | AATCC 3 min;<br>no blistering or<br>removal of ceramic<br>>1.6 mm from scribe |
|---------|---------------------------------------|-------------------------------------------------------------------------------|

|         |                                             |
|---------|---------------------------------------------|
| 3.2.6.2 | Water Resistance<br>(FLTM BI 104-01, 240 h) |
|---------|---------------------------------------------|

|         |                                                                                         |
|---------|-----------------------------------------------------------------------------------------|
| 3.2.6.3 | Humidity Resistance<br>(2 weeks humidity age at 98% relative humidity, and 50 +/- 2 °C) |
|---------|-----------------------------------------------------------------------------------------|

|         |                                                                                                       |
|---------|-------------------------------------------------------------------------------------------------------|
| 3.2.6.4 | Thermal Cycle - 4 Cycles<br>Test a minimum of three samples.<br>Each cycle consists of the following: |
|---------|-------------------------------------------------------------------------------------------------------|

- 4 h at 88 +/- 2 °C
- 4 h at 50 +/- 2 °C >90% RH
- 4 h minimum at -40 +/- 2 °C

- Specimens may be kept at -40 °C overnight as necessary.

After 4 cycles, condition 16 hours (minimum) at 23 +/- 2 °C and 50% +/- 5% RH then test to paragraphs 3.2.1 Appearance and 3.2.3 Adhesion.



3.2.6.5 Xenon Arc Weathering  
(FLTM BO 116-01, 3609.6 kJ/m<sup>2</sup> exposure  
75mm x 150mm min. sample size, ceramic frit faces light source)

3.2.6.6 Florida Exposure  
(SAE J1976, procedure A) evaluate at 12 and  
rate at 24 months

All glass exposed 45° facing south

Core Glass Engineering and Materials Engineering has the option to accept accelerated weathering results and a work plan/timing for Florida testing for initial material release. In the event of differences in test results between accelerated and Florida weathering, results of the Florida exposure shall govern.

3.2.7 Compatibility of Decorative Material with Adhesive (WSS-M99P6-C1/C2),  
When coating is applied to the Bonding Surface (Figure 2)

The Tier 1 supplier is responsible for conformance to all Ford Requirements. Adhesion testing may be conducted by the adhesive supplier(s) and must be performed for each direct glazing system in each region of use.

3.2.7.1 Must conform to the adhesion requirements listed in the current direct glazing specification(s), as identified on the appropriate Subsystem design specification (See para 4.2 and 4.3).

3.2.7.2 Must conform to all Materials, Engineering and SDS requirements.

3.2.7.3 Must conform to the adhesion requirements listed in the applicable encapsulation/mechanical retention performance specification or as identified on the appropriate Subsystem design specification (See para 4.5).

### 3.3 CHEMICAL RESISTANCE (When Coating is applied to the Bonding Surface (Figure 2))

3.2.1 Appearance and 3.2.3 Adhesion evaluations to be performed after each condition below.

3.3.1 Acid Resistance,  
(The ceramic shall be exposed to both  
Citric Acid and Hydrochloric Acid  
specified in ASTM C 724) Rating 4 max  
No removal of  
as decorative coating

3.3.2 Alkali Resistance  
(ASTM C 724) Rating 4 max  
No removal of  
decorative coating

Test Method: Immerse a 100 X 100 x 5.6 mm coated glass sample in a 5% Sodium Hydroxide by wt and water solution at 23 +/- 2 °C for 15 minutes, remove samples and examine.

Note: "Chemicals, materials, parts, and equipment referenced in this document must be used and handled properly. Each party is responsible for determining proper use and handling in its facilities."

