TAPE, DECORATIVE, PRESSURE SENSITIVE, EXTERIOR, LOW UV, VERTICAL APPLICATIONS (Below Greenhouse) — **WSK-M3G178-B1**

TAPE, DECORATIVE, PRESSURE SENSITIVE, EXTERIOR, LOW UV, CHIP RESISTANT, VERITICAL APPLICATIONS (Below Greenhouse) — **WSK-M3G178-B2**

TAPE, DECORATIVE, PRESSURE SENSITIVE, EXTERIOR, HIGH UV, HORIZONTAL, GREENHOUSE APPLICATIONS — **WSK-M3G178-B3**

TAPE, DECORATIVE, PRESSURE SENSITIVE, EXTERIOR, HIGH UV, CHIP RESISTANT, HORIZONTAL, GREENHOUSE APPLICATIONS — **WSK-M3G178-B4**

1. SCOPE

The materials defined by these specifications are decorative tapes used for exterior applications, transparent or pigmented, which may be printed on the face side and may be covered with a durable clear protective coating and backed with a pressure sensitive adhesive which is protected by a release paper.

Note: To differentiate between locations requiring chip resistant testing, a CAE model or equivalent will be used to determine chip performance based on vehicle design. Ford engineers will determine areas of high and low chip probability.

2. APPLICATION

These specifications were released originally for material used for exterior decorative applications.

3. REQUIREMENTS

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.1.1 Materials supplied to this specification must conform to all current Ford Motor Company System Design Specifications for Tape, Decorative, Pressure Sensitive and Exterior Applications.

3.1.2 Supplier shall define the process window for materials by performing a Design of Experiment (DOE) that must include the variables of minimum application temperature, application method and post application conditioning. Responses to D.O.E. must, as a minimum, include all the adhesion requirements of this specification and any other tests in this specification designated by Ford Materials Engineering.

3.1.3 All testing to be done on finished production parts (i.e., film to be used to design intent and application on production substrate/paint).

Date	Action	Revisions	Rev. 1
2012 11 08	Update	See Summary of Revisions	M. Jones, FOE
2003 08 07	Activated		L.A. Schmalz, NA

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3.1.4 New technologies to be approved using multiple tape colors as determined by Ford material engineers.

3.2 FILM PROPERTIES

No blistering, permanent stain, change of color or gloss. In addition, no visible stain or change in surface appearance produced on the painted panel beyond the boundaries of the test specimen.

3.2.1 Appearance
(FLTM BI 109-01)

The color and surface finish shall match the approved Design Center master sample, or shall be as specified on the engineering drawing.

3.2.2	Thickness (ASTM D1000)	0.09 +/- 0.02 or as specified on engineering drawing
3.2.3	Width (ASTM D1000)	As specified on engineering drawing
3.2.4	Gloss (FLTM BI 110-01, 60° glossmeter)	As specified on engineering drawing
	Tolerances	
	Low gloss (< 30% reading)	+/- 5 units
	High gloss (> 30% reading)	+/- 7 units

3.2.5 Print/Coating Adhesion
(FLTM BI 106-01, Method C)

There shall be no separation of printed colors/coatings from the base film.

3.2.6	Tensile Strength (ASTM D 882, Method A, 25 x 150 mm specimen, bench marks distance - 50 mm, jaw separation - 100 mm, 50 mm/minute test speed)	7.0 MPa min
3.2.6.1	Elongation	35% min

3.2.7 180° Peel Adhesion
(ASTM D 1000, except determine adhesion to current production exterior paint systems, evaluate plot according to ISO 6133 Figure 1)

Note: Assemblies shall be conditioned for 24 h at standard conditions prior to exposure. Testing shall be conducted 1 h after removal from the conditioning environment; after water immersion, 4 h recovery is permitted. (3.2.7.3 - 3.2.7.4)

3.2.7.1	After 20 minutes at 23 °C and 50% RH	450 N/m min
3.2.7.2	After 48 h at RT	700 N/m min

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3.2.7.3 Aged

Test Method: Expose two samples to each of the following conditions:

• 168 h at 80 +/- 2 °C.	700 N/m min
• 240 h water immersion (FLTM BI 104-01)	550 N/m min
• After 24 h reconditioning	700 N/m min
• Cycle Exposure 4 h at 80 +/- 2 °C 4 h at 38 +/- 2 °C and 95 - 100% RH, 16 h at - 30 +/- 2 °C.	4 cycles 700 N/m
• Heat Resistance	700 N/m

Shall withstand a simulated paint repair bake (30 minutes at 120 +/- 2 °C) after 2 h conditioning without evidence of blistering, checking, cracking, or shrinkage.

3.2.7.4 Cold Adhesion (ASTM D 1000, except use a test fixture capable of maintaining a 90° peel during the test.) — 210 N/m min

Test Method: Apply samples to substrate/paint and condition 20 minutes at 23 +/- 2 °C. Expose assembly at 10 °C for 10 minutes. Conduct peel adhesion at 10 °C.

Note: No value shall be below 150 N/m at any data point, (no zipping).

3.2.8 Shrinkage — 0.5% max

No evidence of cracking or color change after exposure in a mechanical convection oven for 30 minutes at 120 +/- 2 °C. The test shall be conducted 2 h after application of a 25 x 250 mm strip of the material to a test panel. This test shall be conducted in both machine and cross-machine directions.

3.3 RESISTANCE PROPERTIES

3.3.1 Preparation of Test Panels

Except where otherwise noted, resistance property tests shall be conducted using steel panels 75 x 150 mm minimum freshly painted with current production enamels per FLTM BI 103-02, Method C. The test panels shall be wiped with 50/50 volume percent of isopropanol/water and dry wiped prior to applying the film. Peel off the release paper from the film in a smooth, continuous motion (do not pull the film from the paper) and apply to the test panel.

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