

PRINTED GRAPHICS PERFORMANCE,
PLASTIC AND PAINTED SUBSTRATES, INTERIOR

WSS-M2P158-A1

1. SCOPE

This specification defines the performance requirements for printed graphic coatings printed directly on resins or other surfaces. It includes printed symbols and inks which have been painted over then subsequently laser etched to become visible. This specification is not applicable to continuous surface covered coatings.

2. APPLICATION

This specification was released originally to define performance requirements for graphic printings. Typically these graphic printings are applied using pad/tampon or silkscreen printing techniques. The surface on which the printing is applied must also be validated using the appropriate Ford Engineering Material Specification. In some cases it will be possible and is recommended to test both the printing and the surrounding surface in the same test, thus fulfilling the test requirements of several specifications (see Table 1).

Table 1: Applicable specifications for surfaces on which graphic printings are applied

1	2	3	4
Application	Applicable specification for surface under or around printing	Example	Comments
Applications in which the printing is subsequently painted over, then symbols etched away exposing the pad printing	WSS-M2P188-B1/latest	Passenger airbag deactivation indicator	Tests can be carried out so that both printed areas and painted areas are tested to reduce overall test quantity.
Applications in which the printing is applied on top of an uncoated polymer	WSS-M15P4-F/latest	Steering Wheel Column Stalks	
Applications in which the printing is applied on top of a paint layer	WSS-M2P188-B1/latest	MFD Bezels	
Printing applications which are covered by a clearcoat paint	WSS-M2P188-B1/latest	As applicable	
Printing applications which are covered by the instrument cluster lens	WSS-M15P52-A/latest	Instrument cluster symbols	Specifications in column 2 cover all needed requirements for the printings. The requirements of WSS-M2P158-A1 are not applicable
Printing applications which are covered by a transparent film cover	WSS-M15P34-E/latest	Transmission Shifter Knob, Center Stack Multifunction bezels	
Printing applications which are covered by a transparent molded plastic cover	WSS-M15P4-F/latest	Transmission Shifter Knob	
Underhood pad or silkscreen print applications	WSS-M99P14-A5	As applicable	

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3. REQUIREMENTS

All parts must also meet the appropriate DVP & R and Subsystem Design Specification requirements.

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

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

3.2 SYSTEM COMPONENTS

3.2.1 Test Specimens

Tests shall be performed on actual components processed through the production process. Where this is not possible, plaques can be used as noted in the specification and approved by Materials Engineering. These shall be the same substrate as production components. See Table 3 (page 10) for testing requirements and sample size.

Product/Process Validation Testing (PV) is done on production printed parts as defined in Table 3.

When plaques are used as a substitute for actual components, this must be clearly reported on the PSW or the laboratory test report.

3.2.2 Substrate

ABS, PC, PC/ABS, PP, TPO, PA or as specified on the Engineering Document.

3.2.3 Sample Preparation

The surface to be printed shall be cleaned by an acceptable process, (e.g. power wash) to remove mold releasing agents, fingerprints, oils, dirt and moisture.

3.2.4 Primer

When necessary in order to meet the requirements of this specification, an adhesion primer, primer surfacer or sealer may be needed. Surface enhancements, such as flaming or plasma treatment that modify surface tension, surface resistivity may also be required in order to meet the requirements. This must be noted in the initial submission package and noted on the drawing.

3.2.5 Film Thickness (ASTM B487 or alternative suitable method)

Solid color ink/print systems

report in micrometers
report number of hits

Note: Film build measured during testing become minimum acceptance criteria for production parts as agreed with Ford Materials Engineering.

The film thickness shall be measured on the (grained) production part using the above requirements. Minimum film thicknesses should be achieved on both peaks and valleys on the grain texture. The film thickness of all test specimens shall be reported on the PSW and laboratory report.



3.2.6 Aging

Test panels or test specimens prepared for investigations according to this specification must be aged for at least 72 hours at 23 +/- 2 °C or 16 hours at 45 +/- 1 °C prior to testing.

3.2.7 Cure Profile

A temperature part profile curve (Time/Temp) from the production process for the part must be included in the PPAP.

3.3 APPEARANCE

Color, gloss, grain, shall match master Trim Sample and/or Master Appearance Sample as approved by Corporate Design

The coating shall exhibit no craters, pinholes, solvent popping, seediness, abnormal roughness, excessive flow or any other detrimental defect.

3.3.1 Color
(FLTM BI 109-01, Visual Assessment and/or
SAE J1545, MA58 Three-Angle CMC)

Shall match the
Master Approved Sample

3.3.2 Gloss
(FLTM BI 110-01, ASTM D523)*

As released by Engineering:

Gloss	A:	20° Glossmeter	min 92
	B:	60° Glossmeter	76 - 84
	C:	60° Glossmeter	66 - 74
	D:	60° Glossmeter	58 - 66
	E:	60° Glossmeter	47 - 53
	F:	60° Glossmeter	33 - 38
	G:	60° Glossmeter	17 - 23
	H:	60° Glossmeter	7 - 13
	J:	60° Glossmeter	4 - 6
	K:	60° Glossmeter	2 - 4
	L:	60° Glossmeter	0.5 - 2.0
	N:	60° Glossmeter	1.8 - 2.4
	R:	60° Glossmeter	1.2 - 1.6

The color, pattern and finish shall match the approved Design Center master sample, or shall be as specified on the Engineering Document.

Note: Obtaining an accurate gloss reading should be done on a smooth flat surface or non-grained part.

* If surface is too small for measurement, visual master becomes reference for visual assessment.