



PAINT PERFORMANCE, FLEXIBLE SUBSTRATES, EXTERIOR

WSS-M2P181-C

1. SCOPE

This specification defines the performance requirement of a painted part for all exterior body parts where best appearance, high flexibility, high durability, and impact resistance are required. This system is specified for component suppliers, covering all processes including in-department and pre-delivery repairs.

2. APPLICATION

This specification was released to define paint performance of exterior painted surfaces. It is specified for vehicle bumpers, claddings, bodyside moldings, and other parts visible after assembly.

3. REQUIREMENTS

All visible parts of the component, including terminating exterior edges visible after assembly shall conform to the full requirements of this specification.

Any localized post mold operations (Flame Treating, Sanding,) prior to painting requires the additional testing as noted in the last column of Table 1.

All areas of the component visible after assembly must be evaluated/tested, including flanges, parting lines, areas subject to post-mould treatment, styling lines and grooves.

In-department, pre-delivery and refinish paint repairs shall meet the requirements of this specification.

Parts must conform to the color requirements defined by the Ford Color Harmony Team or equivalent. Body color components shall visually match the adjacent body region for orange-peel and waviness. Instrumental measurements such as Wavescan or QMS may be used as a guide if measurement is feasible. Refer to the appearance requirements of the adjacent body region.

Note: For in process color check the preferred method is SAE J1545, three angle CMC (Color Measurement Committee).

3.1 APPROVED SOURCES

This specification is performance based and does not have approved sources.

Paint materials must be selected from the Painted Parts Strategy List using paints from suppliers on the Ford Approved Source List (ASL), unless a waiver is granted by Materials Engineering. All parts must also meet the appropriate DVP&R and Subsystem Design Specification requirements

Effective 2007 model year and beyond, all paint applicators must meet the Exterior Parts Painter Approval Process (AVP-T113-015) unless waived by Materials Engineering.

Date	Action	Revisions	Rev. 02
2016 03 08	Revised	See Summary of Revisions(5.0) for details	J.Crist/Global Paint Team
2014 03 03	Revised	See Summary of Revisions(5.0) for details	J.Crist/Global Paint Team
2007 10 29	Activated		J. Crist



3.2 SYSTEM COMPONENTS

3.2.1 Substrates

Flexible polymers and flexible polymer blends, PU, PP, TEO etc.
(ASTM D790, Method 1)

3.2.2 Substrate Condition

The surface to be coated must be cleaned by an automated process to ensure the absence of oil or alkaline residues, fingerprints, corrosion, mold release agents, dirt, moisture, and other foreign materials.

Surface energy/resistivity or chemical reaction(s) enhancements (flaming, corona discharge or plasma) and/or addition of conductive materials, necessary to meet the requirements of this specification, shall be specified on the PFMEA, Engineering Drawing and Control Plan.

3.2.3 Paint System Requirements

Substrate *	Pre-treat	Prime (Note 1)	Topcoat (Note 1)*
Thermoplastic Polymers (TPO, TPE)	As applicable to meet Process/Performance Specifications	Primer, Surfacer As applicable to meet Process/Performance Specifications (6-16 µm min Primer /Surfacer)	Basecoat/Clearcoat (2-Layer): 15-30 µm /38-50 µm Monocoat: 38-50 µm Tricoats (3-layer): 20-30µm/15-30µm /38-50 µm

* - Ford Materials Engineering approved materials (Approved Source List)

Note 1: These ranges are considered to be requirements unless otherwise supported by testing data agreed to by Materials Engineering and noted on the MCDCC.

Control Plan must specify if adhesion promoter, and/or anti-chip primer surfacer are required to meet the requirements of this specification.

3.2.4 Repairs, In-Department and Pre-delivery

Repaired areas must meet the requirements of this specification. All repair materials and processes used should be approved by the affected Product Materials Activity. Maximum film thickness and/or number of repairs for repaired parts will be specified in the mutually agreed control plan and conform to Para 3.3. All repairs must be with the identical color to the original finish unless approved by Materials Engineering.

2 in Department Repairs = 1st run part + 1 inline repair

For 2-Component systems the recoats must be applied within manufacturer recommended timeframe as noted on their Technical Data Sheets.



3.2.5 Finished Parts

Testing must be conducted on actual production parts. Where part dimensions limit equipment access and testing, representative panels run through the production processes may be substituted for production part. If regrind is used, testing at the maximum loading level is required and must meet the specification requirement.

These panels shall be processed together with parts and shall be representative of the parts with respect to substrate, primer thickness, sanding, paint thickness, and processing.

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

3.2.6 Aging

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

3.2.7 Process/Product Validation Test Requirements as listed in Table 1.

This table is only for Approved Paint Technologies as shown on Ford Approved Source List otherwise full WSS-M2P181-C specification testing is required

Design Verification Testing (DV or pre-DV) is done on plaques by the paint supplier and is covered in the applicable paint material specification.

Product/Process Validation Testing (PV) is done on production painted parts as defined in Table 1.

3.2.8 Cure Profile

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

3.3 FILM PROPERTIES

3.3.1 Color

(FLTM BI 109-01 Visual Assessment)
(SAE J1545, Three-Angle CMC)

Shall match the Master Approved Sample color panel or the initial sample as approved by Design Center.



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

Report

As released by Engineering:

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

Shall match the Master Approved Sample color panel or the initial sample as approved by Design Center.

3.3.3 Film Thickness, min (See [Table 1](#), Note 3) (ASTM B487, PELT or equivalent)

As defined in
paragraph 3.2.3

All areas of the component visible after assembly must be evaluated/tested, including flanges, parting lines, styling lines and grooves. These ranges are considered to be requirements unless otherwise supported by testing data agreed to by Materials Engineering and noted on the MCDCC.

3.3.4 Film Thickness (Repair) (ASTM B487, PELT or equivalent)

230 micrometers max

There shall be no more than 2 in-department repairs as defined in para. 3.2.4. All areas of the component visible after assembly must be evaluated/tested, including flanges, parting lines, styling lines and grooves.

3.4 RESISTANCE PROPERTIES

3.4.1 Paint Adhesion (See [Table 1](#), Note 3) (FLTM BI 106-01, Method D for flat area & Method E for curved/radius areas, knife blade) diamonds removed.

Less than 5% paint
removal of any paint
layer with no complete

All areas of the component visible after assembly must be evaluated/tested, including flanges, parting lines, areas subject to post-mould treatment, styling lines and grooves.

Lightly hand sand paint film surface (10 double rubs, moderate pressure) with P600 paper until dull, before scribe operation and checking adhesion.