



CLEAR TOPCOAT, UV CURABLE, ABRASION RESISTANT, TRANSPARENT PLASTIC PARTS

WSS-M80J6-A

1. SCOPE

The material defined by this specification is a clear UV stabilized, UV curable coating.

2. APPLICATION

This specification was released originally to describe properties necessary for a clear protective coating for polycarbonate headlamp lens. Prior to approval to this specification the coating will have to meet any additional requirements listed on the Engineering Drawing deemed necessary to produce quality parts, and sufficient pilot and production trials to confirm the acceptable manufacturing window defined by this specification.

3. REQUIREMENTS

3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

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

3.3 COMPOSITION

Ford Motor Company, at its option, may conduct infrared spectroscopy (IR), emission spectroscopy (ES), pyrolytic gas chromatography (PGC), and thermogravimetric analysis (TGA) of material/parts supplied to this specification. The spectra established for initial approval shall constitute the reference standard and shall be kept on file at the designated material laboratory. All samples shall produce spectra that correspond to the reference standard when tested under the same conditions as those specified on the master spectrum.

3.3.1 Coating

The coating shall not contain any commercial substance(s) known to attack polycarbonate. Consult the appropriate material supplier for published lists of these materials.

The supplier will furnish the range of humidities under which the coating can be applied and cured without any evidence of blush.

3.3.2 Specific Composition

The supplier will furnish the specific composition of the formulation upon request.

Date	Action	Revisions	Rev 03
2012 06 26	Re-Activated	Used for Exterior lighting	V. Cerato, NA
2012 05 21	N Status	No usage or replacement	N. Benical, NA
1995 12 07	Activated		J. Faunt



3.4 PHYSICAL PROPERTIES

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|-------|--|-------------------------------------|
| 3.4.1 | Viscosity, Package
(ASTM D 2196, Brookfield LVT
with UL adaptor at 60 RPM) | Initial production
batch +/- 10% |
| 3.4.2 | Non-Volatile, min
(FLTM BI 102-06) | Initial production
batch +/- 5 % |
| 3.4.3 | Volume Non-Volatile at application viscosity, min
(EPA Method 24) | |

3.5 PREPARATION OF TEST PANELS

3.5.1 Panels

Unless otherwise specified, 2.5 - 4.0 mm thick approved injection molded headlamp lens grade clear polycarbonate (except for para 3.8.1), at least 75 mm long and representative of production material. The process used to clean the polycarbonate prior to painting shall be described in detail.

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|-------|--------|--|
| 3.5.2 | Primer | If required, apply, flash, and
cure to manufacturers instructions |
|-------|--------|--|

3.5.3 Clear Topcoat

For para 3.6 and para 3.7.1 - 3.7.6, apply the coating at the conditions specified for Trial 29 in Table 1. For para 3.7.7 - 3.7.10, apply the coating at the conditions specified by the experimental design in Table 1. For para 3.8.1 - 3.8.3, apply the coating at the conditions specified by the experimental design in Table 2. A Zeiss MCS Diode Array Spectrometer is recommended to measure coating thickness. A surface profilometer or a mutually agreed upon method can be used in lieu of the Zeiss instrument.

3.6 APPEARANCE

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|-------|-----------------------------|-------------------------------------|
| 3.6.1 | Color, max
(ASTM D 1925) | Clear, Yellowness
Index, YI 1.00 |
| 3.6.2 | Gloss
(FLTM BI 110-01) | 60° |

Not more than a 10% decrease in gloss relative to the uncoated plastic.

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|-------|--------------------------|---------------------------|
| 3.6.3 | Clarity
(ASTM D 1003) | Sample three
locations |
|-------|--------------------------|---------------------------|

Haze may not increase by more than 0.5% average from the uncoated plastic. Luminous transmittance may not decrease by more than 0.5% average from the uncoated plastic.

3.6.4 General

The coating shall bake out to a presentable, serviceable film showing no craters, pinholes, seediness, abnormal roughness or excessive metallic mottling.



3.7 FILM PROPERTIES

Use the experimental design given in Table 1 for para 3.7.7 through 3.7.10, and Table 2 for para 3.8.1 through 3.8.3. The process window defined by acceptable results for para 3.7.7 through 3.7.10 will constitute the Initial Acceptable Process Window.

In reference to Table 1 for uv-curable paints, the supplier shall determine uv intensity according to the following:

- i. For paint requiring focused uv lamp conditions, use maximum (peak) intensity.
- ii For paint requiring defocused, collimated, or other uv lamp conditions, use average intensity (see Figure 1 for definition of how to calculate and report average intensity).

Record and report the following parameters (as applicable): conveyor speed, uv lamp type, uv lamp to part distance(s) and configuration(s), uv lamp focal length(s), relative humidity(ies), part (panel) temperature during cure, flash hot air temperature, flash lamp power, flash lamp to part distance(s), flash lamp configuration, dwell times and temperature(s), and a full EIT Power Puck trace for each run including uv doses, uv intensities, part temperatures, and air temperatures. For thermal cure systems, a Datapaq, or similar instrument can be used to record part and air temperatures.

Measure film builds at the same panel location(s) that the performance measurements are taken.

3.7.1	Abrasion Resistance, max (FLTM BN 108-02, Taber Abrader, CS-10 wheel, 500 g load, 300 cycles, 5 panels)	All 5 panels: 7% increase in haze
3.7.2	Adhesion (ASTM D 3359, Method B, 5 panels) Use 3M # 898 tape.	Fig. 4b or better
3.7.3	Thermal Shock Resistance (FLTM BI 107-05) The coating shall exhibit no blistering. Direct the steam blast along the entire length of each arm of the "X" in a continuous motion for the 30 sec test period.	
3.7.4	Resistance to Water and Soap Spotting (FLTM BI 113-01) Discoloration, max	None