PERFORMANCE, PLASTIC COMPONENTS, ENGINE PRECONDITIONING **WSS-M15P50-C1**

PERFORMANCE, PLASTIC COMPONENTS, UNDERBODY, UNDERHOOD, ENGINE **WSS-M15P50-C2**

1. SCOPE

This specification addresses material durability for engine compartment and underbody plastic components that are not covered by other Ford performance specifications. This specification does not include fuel system components.

2. APPLICATION

WSS-M15P50-C1: This specification is intended for Engine Released plastic parts. These preconditioned parts will go through full DV/PV testing. (Examples: intake manifolds, air induction components, etc.). Testing must be done on parts as detailed in Table 1.0, unless specified by Ford Design and Release and Ford Materials Engineering Activities. In addition, this specification may be used when color matching is required for engine plastic components.

WSS-M15P50-C2: This specification is intended for parts that do not require preconditioning. It addresses material durability of parts, such as washer bottles, battery trays, underbody/aeroshields, belly pans, wheel arch liners, AGS/GOR/FEM/Bolster, air deflectors, etc. Testing requirements are referenced in paragraph 3.4. In addition, this specification may be used when color matching is required for underhood/underbody/engine plastic components.

Excluded from this specification are underbonnet labels (WSS-M99P41-latest), thermal and acoustic assembly (WSS-M99P32-latest), exterior lighting (WSK-M98P10-latest), painted parts (WSS-M2P180-latest, or WSS-M2P181-latest), exterior plastics (WSS-M9P13-latest), Windshield Washer Solvent Performance (WSS-M14P19-latest), and Fuel System Parts Performance (WSS-M98P14-latest) whose performance is specified separately.

3. REQUIREMENTS

Material specification requirements are to be used for initial qualification of materials.

3.1 APPROVED SOURCES

This specification is performance based and does not have approved sources

Data must be submitted to Ford Engineering upon completion of testing and before PPAP or SREA approval, see appendix A.

3.2 MATERIAL REQUIREMENTS

Data must be submitted via the Ford Materials Database (FMD) template.

3.2.1 Density
(ISO 1183, Method A) — Report Value, g/cm^3

Date	Action	Revisions	Rev. 02
2018 05 23	Revised	See Summary of revisions	H. Santos, SA
2017 06 27	Editorial	Corrected footer	A. Collins, NA
2017 01 06	Released		K. Mueller, FNA

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3.2.2	Melt Flow Rate (ISO 1133 190 °C, 21.6 kg)	Report Value, g/10 minutes

3.3 WSS-M15P50-C1: ENGINE PRE-CONDITIONING

Unless otherwise noted, the cycled part, if appearance item, shall show no color change in excess of Grey Scale rating 4 (AATCC Evaluation Procedure 1/ISO 105-A02) when compared with the original part. (A color tone shift to the yellow direction is allowed up to Grey Scale rating 4. No other tone change (e.g. pink) is allowed.) For visible and non visible parts no visible cracks, blisters, softening, dulling, or evidence of material degradation when observed with the unaided eye from a distance of 300 +/- 30 mm. Except for paragraph 3.3.5, the pass/fail criteria for this section are successfully passing the DV/PV testing. The sample size will be dependent on the DV/PV test plan. Subject the minimum number of parts (see Table 1.0) to one cycle as described below:

3.3.1 Short Term Heat, Humidity and Cold Cycle
(FLTM BQ 104-07 for conditioning guidelines)
High temperature will be dependent on location of the component. The values below are estimates, if a component is exposed to a higher temperature based on historical data, use the higher temperature. Ramp speed 1 to 5 °C per minute. Record actual ramp speed on data sheet.

High Temperature (use maximum TASE temperature).

If maximum TASE temperature is not known, use the following:

Components exposed to engine oil:	150 °C
Components exposed to engine coolant:	120 °C
Components bolted to engine (away from exhaust manifold):	150 °C
Under hood components not directly bolted to engine:	110 °C
Parts exposed to power steering fluid or transmission fluid:	135 °C

Short Term Heat, Humidity and Cold Cycle

- 30 min at 23 +/- 2 °C and 50% R.H.
- 5 h at -40 +/- 2 °C
- 30 min at 23 +/- 2 °C and 50% R.H.
- 5 h at High Temperature +/- 2 °C
- 2 h at 50 +/- 2 °C and 95 +/- 5% R.H.
- 30 min at 23 +/- 2 °C and 50% R.H.
- 5 h at -40 +/- 2 °C
- 30 min at 23 +/- 2 °C and 50% R.H.
- 5 h at High Temperature +/- 2 °C
- 30 min at 23 +/- 2 °C and 50% R.H.

3.3.2 Short Term Heat, Condensing Humidity and Cold Cycle

Substitute this test for parts that may be damaged by moisture ingression/freeze damage such as bonded or over molded parts with different coefficients of expansion. Ramp speed 1 to 5 °C per minute. This test requires 50 cycles of the following program:

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Short Term Heat, Condensing Humidity and Cold Cycle

. 30 min at 23 +/- 2 °C and 50% R.H.
. 3 h at High Temperature +/- 2 °C
. 3 h at 65 +/- 2 °C and 90 +/- 5% R.H.
. 3 h at - 30 +/- 2 °C

3.3.3 Long Term Heat Exposure

3.3.3.1 Short
7 days at 5ºC above High Temperature +/- 2 °C (as defined in 3.3.1)
(as defined in 3.3.1, except use 100 +/- 2 °C for HDPE applications)

3.3.3.2 Extended
1000 Hours at High Temperature +/- 2 °C (as defined in 3.3.1)
(as defined in 3.3.1, except use 100 +/- 2 °C for HDPE applications)

3.3.4 Long Term Resistance to Fluids (continuous use)

Test only materials that will be continuously exposed to the fluids listed below. Note the time and temperature for each fluid exposure. Samples are to be immersed in, or filled with (depending on the part environment), the fluid for the time and temperature listed. Proper safety precautions must be followed when handling hot and/or flammable fluids.

3.3.4.1 Cooling Agent Resistance
(1000 h at 125 +/- 2 °C, 50/50 % vol coolant/water, engine coolant: WSS-M97B51-A1*)

3.3.4.2 Engine Oil Resistance
(1000 h at 150 +/- 2 °C, ASTM SF 105)

3.3.4.3 Brake Fluid Resistance
(1000 h at 100 +/- 2 °C, FMVSS DOT 3 or 4*)

3.3.4.4 Windshield Washer Fluid Resistance
(1000 h at 50 +/- 2 °C, Motorcraft ZC-32 fluid, 1:1 dilution*)

3.3.4.5 Power Steering Fluid Resistance
(1000 h at 135 +/- 2 °C, WSA-M2C195-A*)

3.3.4.6 Automatic Transmission Fluid Resistance
(1000 h at 135 +/- 2 °C, WSS-M2C938-A*)

*Or currently released equivalent fluid

3.3.5 Short Term Resistance to Fluids (Splash Contact)
(FLTM BI 168-01, Expose 1 part, or section of a part, per fluid.
Exposed parts are evaluated per FLTM BI 168-01 and do not need to undergo PV/DV tests.)

Parts where liquid exposure to battery acid is likely, parts near or under battery, substitute battery acid (6% by weight H_2SO_4) with battery acid (37% by weight H_2SO_4 with a density of 1.28 g/cm^3). Paragraph 1. of procedure – warming of test specimen – shall be omitted.

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