



PERFORMANCE, ACOUSTICAL AND THERMAL COMPONENTS AND ASSEMBLIES FOR ENGINE, UNDERHOOD, AND TUNNEL APPLICATIONS

WSS-M99P32-E6

1. SCOPE

This specification defines the minimum durability requirements of insulators present in engine side dash, engine compartment foam gasket, tunnel, under hood, and sound absorption/insulation applications, where various materials are combined to provide assemblies having thermal, acoustical (sound absorption/barrier/insulation), and/or functional features. In addition, ultra-high temperature parts exposed to heat from turbochargers, EGR systems, exhaust pipes, fender stuffers and quarter wheelhouse insulators are included.

2. APPLICATION

This specification was released originally for materials used as engine compartment, hood, and tunnel insulators.

The following components are not in the scope for this performance specification:

- Interior/luggage compartment insulators: WSS-M99P32-E1 (or latest)
- Acoustical wheel arch/well liners: WSS-M99P32-E2/E3 (or latest)
- Acoustical underbody/engine shields: WSS-M99P32-E4/E5 (or latest)
- Foams without the primary purpose of NVH:
 - Without pressure-sensitive adhesive: WSS-M99P48-A1 (or latest)
 - With pressure-sensitive adhesive: WSS-M99P48-A3 (or latest)
 - For higher temperature applications: WSS-M99P48-A4 (or latest)

3. REQUIREMENTS

3.1 APPROVED SOURCES

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

3.2 FINISHED PART REQUIREMENTS

Detailed part construction must be submitted along with results for the testing listed in Table 1 for initial approval. Data must be submitted via the Ford Materials Database (FMD) template. Design Verification (DV) is done on the part to verify supplier feasibility and Product Verification Testing (PV) is done on production parts. DV/PV and sample sizes are defined in Table 2.

In addition to the following minimum requirements, production assemblies must withstand normal handling during shipping, installation, use, and service, without tearing, breaking, or permanently deforming.

3.3 APPEARANCE

All appearance properties of exposed materials shall meet the requirements of the relevant Engineering Department.

Date	Action	Revisions	Rev. 1
2017 07 27	Revised	See summary of revision	Z. Jatkowski, NA
2017 02 16	Released		Z. Jatkowski, NA



3.4 WEIGHT

Weight of each layer of a composite and the total composite shall be included on Engineering Drawing.

3.4.1 Weight per Unit Area (Non-Foams) Report units (g/m²)
(FLTM BN 106-01 Procedure A)

3.4.2 Net Density (Foams) Report units (kg/m³)
(FLTM BN 106-01 Procedure B)

3.5 FLAMMABILITY

Flammability is affected by the material thickness and density. Conduct testing on the full range of material thicknesses and densities on part)

3.5.1 Standard Test – required for all components
(ISO 3795)
Burn Rate SE/NBR max

The material shall not glow or smolder after the flame extinguishes.

If test specimens cannot be prepared with the proper dimensions (please refer to the test method listed above for the appropriate dimensions) using material cut from the part, properly sized/prepared specimens must be taken from material that has been molded into a blank.

Flame should be applied to the exposed side of the component, or both sides, if the A and B surfaces are exposed to high temperatures. Supplier shall document test conditions in their Control Plan (for PV).

3.5.2 Glow Wire (Only applicable when electrical wiring is
going thru or attached to the component)
(IEC 60695-2-10, Glow wire temperature: 750 °C)

Flame shall extinguish within 10 sec. after removal of the wire.

IEC 60695-2-10	Glow wire apparatus and common test procedure
IEC 60695-2-11	Glow wire flammability test method for end products
IEC 60695-2-12	Glow wire flammability index (GWFI) test method for materials
IEC 60695-2-13	Glow wire ignition temperature (GWIT) test method for materials

Flame should be applied to the heat exposed side of the component, which under certain conditions may include inner/outer surfaces. Supplier shall document test conditions in their Control Plan (for PV).

3.6 CONSTRUCTION PROPERTIES

3.6.1 Resistance to Mildew

(7 days at 98 +/- 2% relative humidity and 38 +/- 2 °C,
Specimen size 100 mm x 100 mm)

Remove the part from the cabinet and evaluate (smell the sample) immediately. The part shall exhibit no visible evidence of mildew growth and / or objectionable odor after the 7-day exposure. In addition, part must not separate layers or show any other visual deterioration.



3.6.2 Short Term Environmental Cycling
(FLTM BO 040-01, Procedure A, except cycling noted below,
maximum temperature noted below)

5 h at -40 +/- 2 °C
48 h at 38 +/- 2 °C and 95% R.H.
48 h at maximum temperature +/- 2 °C
5 h at -40 +/- 2 °C
48 h at 38 +/- 2 °C and 95% R.H.
48 h at maximum temperature +/- 2 °C

The maximum temperature of exposure 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 maximum temperature.

Maximum temperature:

Components attached to engine (away from exhaust manifold): 150 °C
Hood/engine side dash/tunnel insulators: 120 °C
Components attached to power steering or transmission components: 135 °C
Components attached to coolant components: 120 °C
Underhood components not directly attached to engine: 120 °C
Underbody components away from the engine: 90 °C

3.6.3 Long Term Environmental
(FLTM BO 040-01, Procedure B, temperature noted below)

Maximum temperature: refer to para 3.6.2
Except: Hood / engine side dash/tunnel insulators: 150 °C

Evaluation:

In addition to the post-test requirements listed in FLTM BO 040-01, insulation and covering materials shall not crack, flame, glow, smolder, degrade, develop an objectionable odor, or exhibit any exothermic reaction when tested at the maximum use temperature.

3.6.4 Resistance of Insulators to Various Test Reagents
(ASTM D896)

The finished or surrogate part shall not dissolve, exhibit tackiness or delaminate when immersed in each of the following test reagents for a 4-hour period. Use a separate specimen for each test reagent.

Test Reagents:

1. Deionized Water
2. 3% (by weight) salt (NaCl) solution in Deionized Water
3. Engine Oil in compliance with ASTM SF 105*
4. Brake Fluid FMVSS DOT 3 or 4*
5. Sulfuric Acid (2.5% by weight in Deionized Water)
6. Long Life Coolant WSS-M97B44-D* (50/50% vol. Coolant/Deionized Water)
7. Transmission/Power Steering Fluid in compliance with WSS-M2C938-A*
8. Windshield Washer in compliance with WSS-M8B16-A3*

*Or currently released equivalent fluid.

3.7 PHYSICAL PROPERTIES

3.7.1 Breaking Strength (non-foam materials only)
(ASTM D5034, exception of speed 25 mm/minute)