



POLYPHENYLENE ETHER + POLYSTYRENE BLEND (PPE+PS) MOLDING COMPOUND, GENERAL PURPOSE GRADE	WSB-M4D844-A1
POLYPHENYLENE ETHER + POLYSTYRENE BLEND (PPE+PS) MOLDING COMPOUND	WSB-M4D844-A2
POLYPHENYLENE ETHER + POLYSTYRENE BLEND (PPE+PS) MOLDING COMPOUND	WSB-M4D844-A3
POLYPHENYLENE ETHER + POLYSTYRENE BLEND (PPE+PS) MOLDING COMPOUND	WSB-M4D844-A4
POLYPHENYLENE ETHER + POLYSTYRENE BLEND (PPE+PS) MOLDING COMPOUND	WSB-M4D844-A5
POLYPHENYLENE ETHER + POLYSTYRENE BLEND (PPE+PS) MOLDING COMPOUND	WSB-M4D844-A6

1. SCOPE

The materials defined by these specifications are thermoplastic compounds based on polyphenylene ether (or polyphenylene oxide) modified with high impact polystyrene and is not UV stabilized.

2. APPLICATION

WSB-M4D844-A1 was released originally for material used for painted garnish moldings and finish panels.

WSB-M4D844-A2 was released originally for material used for electrical applications including wiring connectors, corporate bulkhead connectors, lamp sockets, and painted interior trim applications.

WSB-M4D844-A3 was released originally for material used for painted interior trim applications.

WSB-M4D844-A4 was released originally for material used for the squeegee backing on an all plastic windshield wiper assembly. This material must be painted or used in non-visible applications.

WSB-M4D844-A5 was released originally for material used in the speedo housing.

WSB-M4D844-A6 was released originally for material used for electrical applications including wiring connectors, corporate bulkhead connectors and lamp sockets.

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).

3.1.1 All requirements of this specification, identified by symbol(s), shall be met with data representing 3 sigma values.

Date	Action	Revisions
2006 04 13	Revised	Inserted 3.0; Deleted 3.1, 3.2, 3.3, 3.7, 3.8 & 4
1994 11 17	Revised	NB00E10043064151 Revised 3.4.4 for A2
1992 04 08	Released	NB00I10043054179

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3.4 MOLDED TEST SPECIMEN

3.4.1 Preparation of Test Specimens

Unless otherwise specified all tests shall be carried out on injection molded one-end gated test specimens.

The following dimensions are required:

A. 150 min x 10 x 4.0 +/- 0.2 mm (Tensile Bar, ISO 3167)

B. 120 x 10 x 4.0 +/- 0.2 mm

Specimens with shorter dimensions shall be cut from the center portion of the test specimen A and/or B. The specimens shall be prepared according to ISO 294. No annealing allowed.

3.4.2 Density (A1 - A6) 1.03 - 1.18 g/cm³
(ISO 1183, Method A/ASTM D 792, Method A1)

(s) 3.4.3 Tensile Strength at Yield, MPa, min
(ISO R 527, 150 min x
10 x 4.0 +/- 0.2 mm specimen,
50 mm/min test speed)

A1	A2	A3	A4	A5	A6
43	52	52	57	55	58

(s) 3.4.3.1 Elongation at Break, %, min
(Test Method according to 3.4.3)

20	15	20	15	15	10
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(s) 3.4.4 Flexural Modulus, GPa, min
(ISO 178, 80 x 10 x 4.0 +/- 0.2 mm
specimen, 2 mm/min test speed,
64 mm support span)

2.4	2.2	2.3	2.5	2.5	2.5
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3.4.5 Shear Modulus at 23 °C, MPa
(ASTM D 4065, forced constant
amplitude, fixed frequency of 1 Hz
+/- 15%, strain level below 1%.
Specimen approx. 60 x 10 x 4.0 +/-
0.2 mm cut from the center of specimen A.
Specimen length between clamps 35-40 mm.
Soak time at each temperature interval -
3 minutes minimum).

730 – 1100	780 – 1175	750 – 1130	770 – 1155	725 – 1100	770 – 1160
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Additionally, a Shear Modulus vs. Temperature curve be plotted for -50 to +150 °C temperature range, at 5 °C minimum intervals. The plotted curve must be within tolerance range shown on page 6 (A1), page 7 (A2), page 8 (A3), page 9 (A4), page 10 (A5), page 11 (A6).

- (s) 3.4.6 Impact Strength, Izod, kJ/m², min
(ISO 180/1A, 80 x 10 x 4.0
+/- 0.2 mm specimen, 10 specimens
for each test)

3.4.6.1 At 23 +/- 2 °C

A1	A2	A3	A4	A5	A6
10	10	14	12	14	15

3.4.6.2 At -40 +/- 2 °C

3	4	8	5	8	7
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The test specimens must be conditioned for minimum of 6 h at the above specified temperature prior to impact test. Low temperature testing shall be done within the cold box, if not possible, test can be conducted outside, but within 5 s.

- (s) 3.4.7 Heat Deflection Temperature, °C, min
(ISO 75, 120 x 10 x 4.0
+/- 0.2 mm specimen, 0.32 +/-
0.01 mm deflection)

3.4.7.1 At 1.80 MPa

100	114	117	120	125	137
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3.4.7.2 At 0.45 MPa

111	124	124	131	136	148
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All specimens dry as molded. If not tested immediately after molding, specimens must be stored in a sealed, moisture-proof container filled with silica gel.

- (s) 3.4.8 Vicat Softening Temperature, °C, min
(ISO 306, 10 x 10 x 4.0 +/- 0.2 mm
specimens. Bath - silicone oil,
temperature raise 50 +/- 5 °C/h. Dial gage
reset to '0' after addition of 5 kg
weight. At 50 N load)

118	128	134	142	145	155
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All specimens dry as molded. If not tested immediately after molding, specimens must be stored in a sealed, moisture-proof container filled with silica gel.



3.4.9 Heat Aging Performance (A1 - A6)
(ISO 188/ASTM D 573, 150 +/- 50 air
changes/h, 1000 h at 100 +/- 2 °C.
Unaged property values shall be
determined at the time of the aged
properties determination)

3.4.9.1 Tensile Strength Change +/- 25%
(Test Method per para 3.4.3)

3.4.9.2 Impact Strength, Izod Change +/- 50%
(Test Method per para 3.4.6.1,
specimens to be notched before
heat aging)

3.5 FLAMMABILITY (A1 - A6) (ISO 3795)

Burn Rate, max 100 mm/minute
(Self-extinguishing)

The specimen size required for material approval is 355 x 100 x 2.5 +/- 0.1 mm with a smooth surface.

3.6 FOGGING (FLTM BO 116-03)

Fog Number, min

A1	A2	A3	A4	A5	A6
85	85	80	85	85	85

Formation of excessive amounts of clear film or droplets is cause for rejection.

5. GENERAL INFORMATION

The information given below is provided for clarification and assistance in meeting the requirements of these specifications.

5.1 COEFFICIENT OF LINEAR THERMAL EXPANSION, $^{-5}/^{\circ}\text{C}$ (ASTM D 696)

3.5 - 7.0 3.5 - 6.0 5.0 - 10.0 5.0 - 10.0 3.5 - 8.5 2.0 - 7.0

5.2 MOLD SHRINKAGE (ISO 2577, approx. 150 x 100 x 3.2 +/- 0.2 mm injection molded specimen)

5.2.1 Molding Shrinkage, %

. After 48 h at 23 +/- 2 °C