



**POLYCARBONATE + POLYBUTYLENE TEREPHTHALATE
BLEND (PC+PBT), MODIFIED MOLDING COMPOUND,
HIGH IMPACT PAINTABLE**

WSK-M4D762-A2

**POLYCARBONATE + POLYBUTYLENE TEREPHTHALATE
BLEND (PC+PBT), MOLDING COMPOUND, NON-VISIBLE,
RECYCLED, 35% PCR/PIR CONTENT**

WRS-M4D762-A4

1. SCOPE

The material defined by these specifications are polycarbonate and polybutylene terephthalate blended molding compounds.

2. APPLICATION

WSK-M4D762-A2 This specification was released originally for material used for painted plastic bumper.

WRS-M4D762-A4 This specification was released originally for material used for energy absorber applications and contains recycled content.

2.1 LIMITATIONS

Materials approved to WRS-M4D762-A4 are not UV stabilized and should not be used in long term exposure to direct sunlight.

3. REQUIREMENTS

3.1 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 Many 4D resin specifications prior to 2011, identified certain requirements with the symbol (s), which indicated that the mean and ± 3 sigma values were to be reported. The specification minimum, maximum or range was established using 3 sigma data. For 2011 and beyond, refer to Table 1 for number of samples required for each test.

3.1.2 WSK-M4D762-A2 is based on virgin materials.

3.1.3 WRS-M4D762-A4 must contain 35% recycled content as defined by WRS-M99P42-A1 (post-consumer and/or post industrial recyclates and repolymerised recycled materials). The remaining portion of the material can come from virgin sources.

3.1.4 The use of regrind is permitted, for economic / environmental reasons, with compliance as indicated in WSS-M99P1111-A.

3.1.5 Performance Criteria:
Parts using this specification shall meet the appropriate SDS requirements.

3.1.6 As specified in WSS-M99P1111-A, paragraph 3.2, Ford Materials Engineering may request a Control Plan and Certificate of Analysis (CoA) containing lot testing requirements which must include, but are not limited to:

Date	Action	Revisions	Rev. 4
2014 05 29	Revised	See Summary of Revisions, Released A4	A. Weatherhead, FoE
2011 04 06	Activated A2	Re-activated for use	K. Mueller, NA
1991 03 01	EP00E0108948	Released	P. Kuntze



Melt Flow Rate
Impact Strength, Notched Charpy at 23°C
Flexural Modulus

3.2 SAMPLE PREPARATION

Unless otherwise specified all tests shall be carried out on injection molded, one-end gated test specimens. The test specimens A and D shall be molded using molding conditions defined in ISO 2580-2. No annealing is allowed. See Table 1 for the number of specimens required.

Specimens shall be as follows:

Specimen A	150 minimum x 10 x 4.0 +/- 0.2 mm (ISO 527-2, Specimen Type 1A)
Specimen B	355 x 100 x 1.0 +/- 0.1 mm (ISO 3795)
Specimen C	145 x 60 x 3.2 +/- 0.2 mm
Specimen D	Center of Specimen A. 80 x 10 x 4.0 +/- 0.2 mm
Specimen E	100 mm diameter x 3.2 mm
Specimen F	80 mm diameter x 3.2 mm
Specimen G	90 mm x 200 mm
Specimen H	50 +/- 1 mm diameter x 3.2 +/- 0.2 mm
Specimen I	100 mm x 150 mm, min

3.3 MATERIAL PROPERTIES

3.3.1	Density (ISO 1183, Method A)	1.18 - 1.22 g/cm ³
3.3.2	Melt Flow Rate (ISO 1133, 250 °C, 5 kg)	11-15 g/10 minute

The material shall be dried for 2 h minimum at 120 °C in a mechanical convection oven immediately preceding the test.

3.3.3	Tensile Strength at Yield (ISO 527-1 & ISO 527-2, Specimen A, 50mm/minute test speed)	47 MPa min
3.3.3.1	Elongation at Yield (ISO 527-1 & ISO 527-2, Specimen A, 50mm/minute test speed)	3 % min
3.3.4	Flexural Modulus (ISO 178, Specimen D, 64mm support span, 2 mm/minute test speed)	1.8 GPa min



3.3.5 Impact Strength, Notched Izod
(ISO 180, Specimen D)

3.3.5.1 At 23 ± 2 °C 45 kJ/m² min

3.3.5.2 At -30 ± 2 °C 30 kJ/m² min

3.3.5.3 At -40 ± 2 °C 25 kJ/m²min

The test specimen must be conditioned for a minimum of 6 hours at the above specified temperature prior to impact test. Low temperature testing shall be done within the cold chamber, if not possible, test may be conducted outside, but within 5 seconds.

3.3.6 Heat Deflection Temperature 68 °C min
(ISO 75-1 & ISO 75-2 Specimen D, flatwise,
0.34 +/- 0.1 mm deflection at 1.80 MPa)

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.

3.3.7 Vicat Softening Temperature 117 °C min
(ISO 306, Specimen D, Bath - silicone oil,
temperature raise 50 ± 5 °C/h.
Dial gage reset to 'O' after addition
of 5 kg weight, at 50 N load)

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.

3.3.8 Heat Aging Performance
(ISO 188, except 150 ± 50 air
changes/h, 1000 h at 85 ± 2 °C.
After heat aging test specimens are
to be conditioned in a desiccator for
3 - 5 h at 23 ± 2 °C. Unaged property
values shall be determined at the time
of the aged properties determination)

3.3.8.1 Tensile Strength Change $\pm 20\%$ max
(Test method per para 3.3.3)

3.3.8.2 Impact Strength, Notched Izod Change $\pm 25\%$ max
(Test Method per para 3.3.6.1, specimens
to be notched before heat aging)

3.4 MATERIAL PROPERTIES – REPORT ONLY

Values are retained in Ford Materials Database www.fmd.ford.com.

3.4.1 Melt Volume Rate
(ISO 1133)

3.4.1.1 250 °C, 5kg Report Value, cm³/10 minutes