



**POLYCARBONATE (PC) COPOLYMER, HIGH
HEAT RESISTANCE**

WSS-M4D1053-A1

**POLYCARBONATE (PC) COPOLYMER, HIGH
HEAT RESISTANCE, HIGH HDT**

WSS-M4D1053-A2

1. SCOPE

The materials defined by these specifications are thermoplastic injection molded compounds based on a high heat polycarbonate copolymer. These specifications include 2 classifications which are defined by the heat deflection temperature. These are non UV-stable materials.

2. APPLICATION

These specifications were released originally for materials used for exterior lighting components that require high heat performance and that are behind a UV coated lens.

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 All requirements of this specification, identified by symbol(s), shall be met with data representing 3 sigma values using latest ISO test methods.

3.1.2 This specification is based on virgin materials, however materials with recycled content as defined by WSS-M99P42-A (post-consumer and/or post industrial recyclates and repolymerised recycled materials) should be used whenever technically feasible and following all materials and PV testing required by Ford Materials Engineering. The use of regrind is permitted, for economic / environmental reasons, with compliance as indicated in WSS-M99P1111-A.

3.2 MOLDED TEST SPECIMEN

3.2.1 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 minimum x 10 x 4.0 +/- 0.2 mm (ISO 527-2, specimen type 1A)

B. 355 x 100 x 1.0 +/-0.1 mm (ISO 3795)

Test specimen A shall be molded using molding conditions defined in). Specimens with shorter dimensions shall be cut from the center of the specimen A. No annealing allowed.

3.2.2 Density 1.12– 1.23g/cm³
(ISO 1183, Method A)

Date	Action	Revisions	Rev. 1
2014 01 21	Editorial	Added PC to titles	L. Soriede, NA
2010 04 22	Activated	C. McComb, G. Eaton, Global Materials Team	



(s)	3.2.3	Tensile Strength at yield, min (ISO 527-1 & ISO 527-2, 150 minimum x 10 x 4.0 +/- 0.2 mm specimen A, test speed: 50 mm/minute as noted below)	62 MPa	
(s)	3.2.3.1	Elongation at yield, min (Test Method according to para 3.2.3)	5%	
(s)	3.2.4	Tensile Modulus, min (ISO 527-1 & ISO 527-2, 150 minimum x 10 x 4.0 +/- 0.2 mm specimen A test speed: 1 mm/min)	2.2 GPa	
(s)	3.2.5	Flexural Modulus, min (ISO 178, 80 x 10 x 4.0 +/- 0.2 mm specimen [use center section of specimen A], 2 mm/min test speed, 64 mm support span)	2.0 GPa	
	3.2.6	Impact Strength, Izod, notched, min (ISO 180/1A, 80 x 10 x 4.0 +/- 0.2 mm specimen [use center section of specimen A], 10 specimens for each test)		
(s)	3.2.6.1	At 23 +/- 2 °C	4 kJ/m ²	
(s)	3.2.6.2	At - 40 +/- 2 °C	2 kJ/m ²	
		The test specimen must be conditioned for 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.		
(s)	3.2.6	Heat Deflection Temperature, min °C (ISO 75-1 & ISO 75-2, 80 x 10 x 4.0 +/- 0.2 mm specimen [use center section of specimen A], flatwise, 0.34 +/- 0.1 mm deflection. At 1.80 MPa)	A1 138 °C	A2 146 °C
		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)	3.2.7	Vicat Softening Temperature, min (ISO 306, 10 x 10 x 4.0 +/- 0.2 mm specimens [use center section of specimen A]. Bath - silicone oil, temperature raise 50 +/- 5 °C/h. Dial gage reset to 'O' after addition of 5 kg weight. At 50 N load)	A1 155 °C	A2 166 °C

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.