



POLYAMIDE (PA) 66, 25% GLASS FIBER / MINERAL REINFORCED, HEAT STABILIZED, 100% POST INDUSTRIAL NYLON

WSS-M4D366-B2

1. SCOPE

The materials defined by this specification is a 10% glass fiber and 15% mineral reinforced polyamide 66 molding compound containing 100% post consumer recycle.

2. APPLICATIONS

This specification was released originally for material used for engine cooling fan and fan shroud.

2.1 LIMITATIONS

- This material absorbs and retains moisture. Part design and tolerances must accommodate changes in part dimensions and physical properties due to moisture absorption or loss in the service/assembly environment.
- This material is manufactured using post industrial nylon, it should not be used in applications requiring color mastering.
- This material does not contain UV stabilizers, long term exposure to direct sunlight will cause chalking and loss of properties.

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.

3.2 MOLDING COMPOUND

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|-----|-------|--|--------------|
| (s) | 3.2.1 | Glass Fiber/Mineral Content
(ISO 3451-1), test temperature 600 +/-
25 °C, test portion 1g) | 22 –28% |
| (s) | 3.2.2 | Melt Temperature
(ISO 3146) | 251 – 269 °C |

The material shall be dried for 2 h minimum at 80 °C in a mechanical convection oven immediately preceding the test.

3.3 MOLDED TEST SPECIMEN

3.3.1 Preparation of Test Specimens

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

Date	Action	Revisions
2007 09 25	Revised	Updated the graph on page 5
2007 08 31	Activated	



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The following dimensions are required:

- A. 150 minimum x 10 x 4.0 +/- 0.2 mm (Tensile Bar, ISO 3167)
- B. 120 x 10 x 4.0 +/- 0.2 mm

Test specimen 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.

	3.3.2	Density (ISO 1183, Method A/ASTM D 792, Method A1)	1.32 – 1.38 g/cm ³
(s)	3.3.3	Tensile Strength at Max Load, min (ISO 527/ASTM D 638 Specimen A, test speed: 50 mm/minute or 5 mm/minute)	95 MPa
	3.3.4	Tensile Stress/Strain Curves (ISO 527-1, 527-2, ISO 11403-1; specimen A). Test speed shall be 5 mm/minute for all materials. Provide a curve of tensile stress versus strain using one specimen per lot at each of the following temperatures: -40 °C, 23 °C and 150 °C (high temp is dependent on material type). For ductile materials, the curve shall cover strain through yield point.	
(s)	3.3.5	Tensile Modulus, min (ISO 527-1 & ISO 527-2, specimen A test speed: 1 mm/min)	6300 MPa
	3.3.6	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)	6.1 GPa
(s)	3.3.7	Charpy, notched, min (ISO 179/1eA, 80 x 10 x 4.0 +/- 0.2 mm specimen [use center section of specimen A], 10 specimens	
	3.3.7.1	At 23 +/- 2 °C	4.0 kJ/m ²
	3.3.7.2	At -40 +/- 2 °C	3.0 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.	
	3.3.8	Heat Deflection Temperature, min (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)	210 °C