



COMPOSITE, NITRILE/PHENOLIC POLYESTER FIBERS - PTFE IMPREGNATED - STEEL BACKED - BEARING

ESA-M99D46-A

1. SCOPE

The material defined by this specification is a steel backed, polytetrafluoroethylene impregnated nitrile/phenolic and polyester fibers composite bushing.

2. APPLICATION

This specification was originally released for material used as power steering rack and pinion gear assembly, rack bearings.

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 STEEL BACKING

Cold rolled low carbon steel (0.10 - 0.20 Carbon). The outer, non-bearing surface is plated with ESF-M1P5-A, Plating, Cadmium and Zinc. The inner adhesive bonded surface is sand blasted (60 grit) prior to bonding.

3.2 COMPOSITE COMPOSITION AND THICKNESS

3.2.1 Surface Appearance

The surface, as viewed on photomicrographs, has a random orientation of polyester fibers and fiber ends in/on a resin base with edges of PTFE particles exposed.

3.2.2 Cross-Sectional Appearance

Cross-sectional photomicrographs show a fiber-rich outer section and a resin-rich inner section. Small, triangular PTFE particles are distributed across the entire section with a greater density toward the outer section.

3.2.3 Composite Thickness 0.36-0.46 mm
(Prior to broaching)

3.2.4 Polyester Fiber Matrix 50-75% of composite
Thickness Range thickness

Date	Action	Revisions
2006 11 16	Revised	Inserted 3.0; Deleted 3.5, 3.6 & 4
1984 07 26	Released	C902O-612206-C





3.2.5 Composition by Thermogravimetric Analysis (By Weight)

Polymers and other Volatiles
(weight loss in Nitrogen)

. First Step Components	51.0 - 53.0%
. Second Step Components	14.5 - 18.5%
. Decomposable Filler and/or other Volatiles	2.0 - 4.0%
. Carbonaceous and/or Oxidizable Residue (weight loss in air)	25.0 - 28.0%
. Ash, Inorganic Filler	1.0 - 2.5%

3.2.6 Differential Scanning Calorimetry

. Glass Transition Temperature Nitrile/Phenolic	182 - 187 °C
. Melt of the Polyester, peak/onset	244-250/256-258 °C
. Crystalline Melt of the PTFE peak/onset	308-310/324-326 °C

3.3 BEARING COMPOSITE CRUSHING STRENGTH, min 207 MPa

Apply a compressive load to a flat area of the bearing material. The bearing maximum change in section thickness is 3% as measured before and after loading.

3.4 BOND QUALITY No delamination or cracking

(Composite Lining to Steel Backing)

Test Method: Bend material through 180° around a 12.7 mm radius with the lining material on the outside of the bend. Delamination shall be checked by cutting across the liner with a sharp knife at the center of the bend radius and visually inspecting for separation.