



Advanced Electromagnetics Dielectric Material AES/AEPF Series

Advanced ElectroMagnetics, Inc.

1320 Air Wing Road, Suite 101
San Diego, CA 92154
Phone: +1 (619) 449-9492
Fax: +1 (619) 449-1553
www.mvg-world.com/en

SECTION 1: introduction

Advanced ElectroMagnetics, Inc., has developed a series of dielectric foams providing a lossy medium to microwave energy. The AES Series materials are ideally suited for electronic enclosures, radar systems and for other component applications where low levels of RF absorption is desired. The AEPF version of this material is used in anechoic chambers for treatment to wall to wall, or ceiling to wall intersections.

This material provides additional lossy foam in areas and is used instead of miter cut materials. The AES/AEPF materials are highly fire retardant and can be provided in standard sheet sizes or in custom fabricated shapes. The following specification describes the properties of the AES Series lossy dielectric slab materials.

SECTION 2: related documents

- ① NRL Flammability Standard 8093 tests 1, 2, & 3.
- ② Advanced ElectroMagnetics Quality Manual
- ③ AEMI Drawing and Planner Number AES/AEPF
- ④ AEMI Procedures #4 #6 #20 # 24

SECTION 3: mechanical properties

3.1. Thickness

The AES Series material can be provided in any thickness up to 4". Thicker materials are glued with a non-flammable adhesive. The tolerances that can be achieved in cutting are typically plus or minus 1/16". Upon request, closer tolerances can be achieved with the use of additional tooling.

3.2. Planar Dimensions

The AES Series material is provided in standard 24" x 24" sheets. Larger sheets are available up to 30" x 48"

3.3. Density

Material density will depend on the loading and may vary from 3 to 5 lb/cu.ft.

3.4. Homogeneity

The properties of the carbon impregnation mix will provide even dielectric properties throughout the planar area of the absorber. The product will be smooth and homogeneous in texture throughout its bulk.

3.5. Foam characteristics

The base foam has a predominately open cell structure and is a polyurethane foam. Its basic flammable character is modified by the addition of a number of chemicals and it passes NRL 8093 tests 1, 2, & 3.

3.6. Material Use

The customer application will define the supply shape. It can be readily cut by scissors in thin layers and with a small bandsaw or similar when thicker. Small pieces can be straight forwardly cut using a shape blade.

SECTION 4: electrical properties

This material exhibits a variable insertion loss when measured at 1.5 GHz using appropriate antennas. The designation of the carbon loading (active lossy ingredient) is as denoted with the insertion loss in dB for a 1/2 inch thickness tabulated. Other thickness values change in direct proportion to thickness.:

DESIG	AES-14	AES-20	AES-22	AES-24	AES-26
Insertion Loss @ 1.5 GHz	1 dB +/- .5	4 dB +/- .5	8 dB +/- 1.0	15 dB +/- 2.0	20 dB +/- 3.0

The insertion loss remains constant over a range 1 to 8 GHz. Special requirements for thickness and insertion loss can be provided on request. Similarly, data on dielectric constant can be provided for specific versions of this material. The permittivity of the different versions of this material will vary.

SECTION 5: application

These materials can be used where a lossy microwave filler material is needed.

SECTION 6: bonding

AEMI type AES/AEPF can be readily cut to shape and bonded using most types of contact adhesives.

SECTION 7: bond strength and tensile strength

Measurements have been made bonding with AEMI adhesive AEA-175 and a bond strength of 8 PSI was found consistent in all samples. The tensile strength of the foam product is 15 PSI.

SECTION 8: flammability

These materials have several chemical additives to make the product highly flame retardant. The material will meet the requirement of NRL 8093 tests 1, 2, & 3.

SECTION 9: proprietary notice

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