NUMBER EB-040

TECHNICAL BULLETIN

ECCOSORB* LS

LOSSY FLEXIBLE FOAM SHEET

Description :

ECCOSORB LS is a series of low-density, high-loss, flexible foam sheet materials. They are used to absorb electromagnetic energy in a variety of applications. Any given sheet of ECCOSORB LS is uniform in characteristics from point to point across the sheet and from front to back.

ECCOSORB LS is a foam in structure, black in colour. Weight is about 0.08 g/cc. It can be cut readily with a knife or scissors. It can be cemented in place by the use of ECCOSTOCK Adhesive 13111 (Technical Bulletin EK-190) or can be supplied with a pressure-sensitive adhesive. One sheet of ECCOSORB LS can be cemented on top of another sheet using ECCOSTOCK Adhesive 13111 in order to build up thickness. In this way, a graded absorber can be made.

Availability :

ECCOSORB LS is available in nine (9) types, making available a wide range of dielectric properties. The change in dielectric properties from type to type is accomplished by adjusting the carbon loading in the foam.
In order of increasing carbon loading, the material designations are :

ECCOSORB LS-14
ECCOSORB LS-16
ECCOSORB LS-18
ECCOSORB LS-20
ECCOSORB LS-22
ECCOSORB LS-24
ECCOSORB LS-26
ECCOSORB LS-28
ECCOSORB LS 30

Standard sheet size is 610 mm x 610 mm (24" x 24"). Standard thicknesses are 3.2 mm (1/8"), 6.4 mm (1/4"), 9.5 mm (3/8"), 12.7 mm (1/2") and 19.1 mm (3/4").

The material can also be supplied in other sizes, custom shapes, with reflective backing, with peel-and-stick pressure-sensitive adhesive. For applications requiring low outgassing, low dusting or high fire retardancy, please refer to ECCOSORB QR (Technical Bulletin EB-042).

EMERSON & CUMING MICROWAVE PRODUCTS

Suggested end Use :

ECCOSORB LS products are used to lower cavity Qs in RF amplifiers, oscillators, cabinets containing microwave devices, computer housings and LNBs (low noise blocks). ECCOSORB LS products are also used to reduce surface currents on radiating elements and outer groundplane type surfaces. ECCOSORB LS can be put into wedges or tapered pieces and used inside waveguides to make attenuators or loads. It should find applications in situations where resistive cloth has been used. It has also been used as an anti-static material.

ECCOSORB LS is not a free-space absorbing material. It should not be confused with the many free-space absorbers offered by EMERSON & CUMING MICROWAVE PRODUCTS N.V. for lining anechoic enclosures and antenna nacelles. ECCOSORB LS physically resembles ECCOSORB AN. Electrically, however, it is entirely different. ECCOSORB AN is a graded absorber, being made from 2 or more layers of dissipative foam. It should be pointed out, however, that the reflectivity of an object (metal or otherwise) can be reduced somewhat by applying one or more layers of ECCOSORB LS to its surface.

Properties :

Standard Colour	Black
Service Temperature	-70°C to 90°C
Fire Retardancy	ISO 3582

Some useful application properties are listed in the following table but more detailed properties such as dielectric constant values can be obtained on special request.

		Frequency (GHz)		
	0.1	**1**	**3**	**10**
LS-16				
Attenuation (dB/cm)	0	0.31	1.5	2.3
1 in Insertion Loss (dB)	0.52	1.8	3.8	2.2
LS-20				
Attenuation (dB/cm)	0.01	0.58	3.0	5.0
1 in Insertion Loss (dB)	1.3	4.4	7.8	13
LS-22				
Attenuation (dB/cm)	0.01	0.91	4.0	6.3
1 in Insertion Loss (dB)	1.7	5.3	10	16
LS-24				
Attenuation (dB/cm)	0.05	3.5	11	24
1 in Insertion Loss (dB)	2.3	14	32	61
LS-26				
Attenuation (dB/cm)	0.07	4.9	16	34
1 in Insertion Loss (dB)	3.0	19	46	89

By Attenuation is meant, the per-unit-length attenuation of a wave traveling through the material. It is expressed in dB/cm and only represents the intrinsic material losses.
By 1 in Insertion Loss expressed in dB is meant, the total decibel attenuation of the wave transmitted through a sheet of 1 inch thick compared to the incident wave. So this quantity includes also surface reflection effects.
More information about the calculation of various useful engineering properties can be found in our Technical Note 120 entitled "Energy Propagation in Dielectric and Magnetic Materials".

It is very important to realize that the values listed in the table are nominal values, and should not be used in the writing of procurement specifications. If specifications are needed, the customer should consult with the EMERSON & CUMING MICROWAVE PRODUCTS N.V. Sales Department, who can specify appropriate tolerances for any member of the series at any frequency or within a range of frequencies.
The customer should also consult with our Sales Department for any non-standard requirement such as self-adhesive die-cutted pieces etc.

Safety Considerations :

It is recommended to consult the EMERSON & CUMING MICROWAVE PRODUCTS N.V. product literature, including material safety data sheets, prior to use EMERSON & CUMING MICROWAVE PRODUCTS N.V. products. These may be obtained from your local sales office.

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Warranty :

We hope the information given here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the user's consideration, investigation and verification; but we do not warrant the results to be obtained.
Please read all statements, recommendations or suggestions in conjunction with our conditions of sale **INCLUDING THOSE LIMITING WARRANTIES AND REMEDIES** which apply to all goods supplied by us. We assume no responsibility for the use of these statements, recommendations or suggestions, nor do we intend to use them as a recommendation for any use which would violate statutory obligations or infringe any patent or copyright.