Description:

Eccosorb SF is a series of thin, flexible, flat-sheet, resonant absorbers which reflect -20 dB or less of normally incident microwave energy at the design frequency in the range of 0.7 to 40 GHz. It concerns magnetically loaded silicone rubber sheets which are designed to be bonded to flat or curved metallic surfaces to reduce the reflectivity in a narrow band of frequencies. Silicone absorbers have high service temperature capability (165°C continuous) and allow short exposures to higher temperatures. The product offers advantages for high power and low outgassing applications and can be subjected to outdoor environments and high altitudes, including space, with no adverse effects. However, in corrosive environments its dielectrically loaded counterparts Eccosorb DSF and DSF-U are recommended. If a self-adhesive backing is required, the urethane version Eccosorb SF-U is recommended.

Application:

Eccosorb SF is suited for applications requiring absorption at a specific frequency or in a narrow frequency band, including:

- lining radar nacelles, particularly where high power is present
- attaching to masts of ships, walls, etc. to reduce reflections and echoes from nearby antennas
- attaching to vehicles to reduce radar signature.
- lining magnetron housings to prevent detuning.
- fabricating into tapered shapes for impedance matching in waveguide or microstrip applications.
- suppressing reflections, surface currents and cavity resonances inside microwave modules.
- lining of cavity backed and shrouded telecommunication antennas where narrowband performance is required e.g. waveguide feeds.

For module interference, cavity resonance and surface current problems where no specular reflectivity performance is required, Eccosorb GDS, Eccosorb MCS, Eccosorb BSR and Eccosorb FGM-40 are recommended due to their high magnetic loss properties.
### Physical Properties:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>grey</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>305x305</td>
</tr>
<tr>
<td>Thickness range (mm)</td>
<td>0.7 to 7.0</td>
</tr>
<tr>
<td>Surface density range (kg/m²)</td>
<td>2.2 to 31.0</td>
</tr>
<tr>
<td>Density range (g/cm³)</td>
<td>2.3 to 5.1</td>
</tr>
<tr>
<td>Tensile strength (MPa)</td>
<td>1.0 to 6.0</td>
</tr>
<tr>
<td>Elongation at break (%)</td>
<td>20 to 100</td>
</tr>
<tr>
<td>Tear strength (N/mm)</td>
<td>1.1 to 2.0</td>
</tr>
<tr>
<td>Hardness (Shore A)</td>
<td>73</td>
</tr>
<tr>
<td>Maximum service temperature (°C)</td>
<td>165</td>
</tr>
</tbody>
</table>

SF-D is standard SF but post cured for 16 hours at 180°C (to meet NASA outgassing specifications)
Electromagnetic properties:

Typical reflectivity at various angles of incidence
ECCOSORB SF-10
Perpendicular polarization

Reflectivity in dB

Frequency in GHz

0° 30° 45° 60°

Typical reflectivity at various angles of incidence
ECCOSORB SF-10
Parallel polarization

Reflectivity in dB

Frequency in GHz

0° 30° 45° 60°
<table>
<thead>
<tr>
<th>SF and SF-D</th>
<th>Emerson &amp; Cuming Specification Thickness (mm)</th>
<th>Emerson &amp; Cuming Specification Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>min</td>
<td>max</td>
</tr>
<tr>
<td></td>
<td>nom.</td>
<td>nom.</td>
</tr>
</tbody>
</table>
Eccosorb SF-XX-D

**Outgassing-Important Note**

Eccosorb SF-XX-D to indicates that the material has undergone a post cure of 16 hours at 180°C.

This treatment leaves the material surface discoloured although there is no measured change in the electromagnetic properties.

Be advised that Laird / Emerson & Cuming Microwave Products have no facilities for testing this improved outgassing.

Therefore-for a material to be used in a spacecraft, or where outgassing is an important criteria the Eccosorb SF type ordered should clearly indicate the type of SF as SF-XX-D to ensure correct post cure treatment.
EB-300

**ECCOSORB®SF and SF-D**

**THIN, FLEXIBLE, RESONANT, MICROWAVE ABSORBER**

**Availability:**

Eccosorb SF is available in square sheets of 305 mm x 305 mm with varying thickness according to the desired resonant frequency.

Grades are designated by a suffix corresponding to the resonant frequency.

For example, Eccosorb SF-10.0 will be resonant at 10 GHz.

Eccosorb SF is produced for a specific frequency with a max. bandwidth of 500 MHz

On special order the material can also be supplied in customized shapes.

**Instructions for use:**

Eccosorb SF is designed to function directly in front of a metallic surface.

If this is not the case, a metallic foil should first be bonded to the object.

As it is a homogeneous material, there is no distinction between its front and back face.

To obtain a strong bond of the absorber to the object, the metallic surface should be first thoroughly cleaned with a degreasing solvent.

The material can be bonded by use of an RTV silicone based adhesive in conjunction with a suitable primer.

Eccosorb SF can be readily cut with a sharp knife and template.

It is a very flexible material and will conform to mild curvatures.

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