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Founded in 1980 by noted material scientist Dr. William R. Cuming, Cuming Microwave Corporation provides innovative materials for the electronics and microwave industry. Our microwave material manufacturing facility is located in Avon, Massachusetts, USA.

Cuming Microwave engages in extensive research and development activities to provide customers with cost-effective and innovative materials for their specific applications. Custom engineered products and solutions are our specialty.

Contact our local representative or find us on the web at www.cumingmicrowave.com.

- Absorber Manufacturing
- Chamber Design & Layout
- Absorber Installation
- Full Turn Key Solutions

Cuming Microwave Corporation
264 Blackwell Street, Avon, MA 02322
T: 508 521-6700 F: 508 584-2509
sales@cumingmicrowave.com www.cumingmicrowave.com

Anechoic Chambers and RF Pyramidal Absorbers

A full complement of matching vent absorbers: C-RAM EVA (TB 390 - 9) and walkway absorbers C-RAM SFC Walk Way (TB 390 - 14) are available.

C-RAM SFC and associated products cover the frequency range from low MHz through millimeter wave.

**C-RAM SFC Wedge – TB 390-2**

C-RAM SFC-EM – TB 390-3

The SFC-EM products are optimized for low frequency performance. C-RAM SFC are designed to handle wide angular and incident angles of radiation. Rated for use in anechoic, B1, B2, B3 and CISPR-11 chambers. Also a low cost solution for B10-14 and derivative specifications.

C-RAM FT & HFP – TB 390-5 and -6

A full product line for treatment of EMC test chambers—both for emissions testing and susceptibility testing. C-RAM FT, ceramic ferrite tiles and C-RAM HFP, hollow impedance matched hybrid absorbers for 26 MHz through 40 GHz performance, meeting all the prevailing U.S. and European specifications.

C-RAM SFC-HC – TB 390-16

A product line of pyramidal-shaped, high-power absorbers, based on a fiber-reinforced, phenolic honeycomb structure and phenolic binder of the lossy coating. Power ratings of 10 W/in² - C.W. without forced air cooling. Can handle almost a decade higher power density with adequate air cooling. Standard sizes are 4” through 24” and in standard increments matching standard SFC absorbers.

C-RAM CFC – TB 390-10

A fire-retardant, anti-static, clean room absorber ideal for clean room testing of satellites and other very-sensitive, electronic components. Six standard grades from 4” through 36” tall are available. Taller units may be supplied as custom parts.

**Product**

<table>
<thead>
<tr>
<th>Function</th>
<th>TB Number</th>
<th>Frequency Range</th>
<th>Thickness</th>
<th>Benefits</th>
<th>Relative Cost</th>
</tr>
</thead>
</table>
| High
performance<br>pyramidal<br>absorber| C-RAM SFC<br>TB 390-1 | 100 MHz & up | 2.0” to 72” | broadband, high performance pyramidal absorber | low to moderate |
| Low frequency<br>hybrid absorber | C-RAM SFC Wedge<br>TB 390-2 | 100 MHz & up | 6.0” to 24” | wedge absorber, low to moderate |
| Low frequency<br>hybrid absorber | C-RAM HFP<br>TB 390-6 | 20 MHz to 40 GHz | 12” through 48” | very broadband EMC absorber | moderate to high |
| Truncated<br>pyramidal<br>EMC absorber | C-RAM SFC-EM<br>TB 390-3 | 70 MHz and up | 12” and 36” | space saving, low profile and rugged, low cost | |
| High performance<br>convoluted<br>absorber | C-RAM FAC<br>TB 390-7 | 2 GHz & up | 0.75” to 4.0” | high performance, high frequency | low |
| Open cell<br>absorber | C-RAM EVA<br>TB 390-9 | 100 MHz & up | 2.0” to 72” | high power, ventilation applications | moderate |
| Clean room<br>absorbers | C-RAM CFC<br>TB 390-10 | 100 MHz to 30 GHz | 4.0” to 36” | clean room environment | average |
| Low frequency<br>ferrite absorber | C-RAM FT<br>TB 390-5 | 20 MHz to 1.5 GHz | 0.25” | ceramic (ferrite) tile absorber | moderate to high |

Alumina Handling:
Adhesives, bonding. Use common metalworking techniques and must not affect alumina. Handle the use of a coolant based solvent under suction for whole mounting.

Valves vacuum system: used for small absorbers (SFC-18 or less) on ceilings and walls. Allows for easy disassembly and reattachment. Can be used for wall mounting 24” and 36” absorbors.

Nail and Bolt Mounting: This is a mechanical fastening system I used for large chambers. It also allows removal and relocation of absorbent with little or no damage.

**Power Handling**

<table>
<thead>
<tr>
<th>Standard Power Handling</th>
<th>Medium Power Handling</th>
<th>High Power Handling</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8 W/in²</td>
<td>1.25 W/in²</td>
<td>3.0 W/in²</td>
</tr>
</tbody>
</table>

C-RAM SFC, FAC, and Curve Block with bonded-metal
C-RAM EVA, HPA, and HFP with silicone bonding
C-RAM FT, HFP, Phenolic Honeycomb with silicone bonding

A two-part, two-part, shock montaged, clean room absorber for clean room testing of satellites and other very-sensitive electronic components.

See standard grades from 4” through 36” tall are available. Taller units may be supplied in certain parts.

C-RAM SFC – TB 390-1

C-RAM SFC Wedge – TB 390-2

C-RAM SFC-EM – TB 390-3

C-RAM FT & HFP – TB 390-5 and -6

C-RAM SFC-HC – TB 390-16

C-RAM CFC – TB 390-10


A full complement of matching vent absorbers: C-RAM EVA (TB 390 - 9) and walkway absorbers C-RAM SFC Walk Way (TB 390 - 14) are available.

C-RAM SFC and associated products cover the frequency range from low MHz through millimeter wave.

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C-RAM FT & HFP – TB 390-5 and -6

A full product line for treatment of EMC test chambers—both for emissions testing and susceptibility testing. C-RAM FT, ceramic ferrite tiles and C-RAM HFP, hollow impedance matched hybrid absorbers for 26 MHz through 40 GHz performance, meeting all the prevailing U.S. and European specifications.

C-RAM SFC-HC – TB 390-16

A product line of pyramidal-shaped, high-power absorbers, based on a fiber-reinforced, phenolic honeycomb structure and phenolic binder of the lossy coating. Power ratings of 10 W/in² - C.W. without forced air cooling. Can handle almost a decade higher power density with adequate air cooling. Standard sizes are 4” through 24” and in standard increments matching standard SFC absorbers.

C-RAM CFC – TB 390-10

A fire-retardant, anti-static, clean room absorber ideal for clean room testing of satellites and other very-sensitive, electronic components. Six standard grades from 4” through 36” tall are available. Taller units may be supplied as custom parts.
### C-RAM SFC – TB 390-1

A high performance pyramidal absorber designed for anechoic chambers and EMC chambers. It is available in various thicknesses and can handle high power densities.

### C-RAM SFC Wedge – TB 390-2

A high performance wedge absorber. It is designed for anechoic chambers and EMC chambers and is available in different sizes.

### C-RAM SFC-EM – TB 390-3

A truncated pyramidal EMC absorber designed for low frequency performance. It is ideal for MIL SPEC 462 – C, D, and E and CISPR-25 chambers.

### C-RAM FT & HFP – TB 390-5 and -6

A full product line for the treatment of EMC test chambers—both for emissions testing and susceptibility testing. C-RAM FT ceramic ferrite tiles and C-RAM HFP hollow impedance-matched hybrid absorbers for 26 MHz through 40 GHz performance, meeting all the prevailing U.S. and European specifications.

### C-RAM SFC-HC – TB 390-16

A product line of pyramidal-shaped, high-power absorbers, based on a fiber-reinforced, phenolic honeycomb structure and phenolic binder of the lossy coating. Power ratings of 10 W/in² - C.W. without forced air cooling. Can handle almost a decade higher power density with adequate air cooling. Standard sizes are 4” through 24” and in increments matching standard SFC absorber.

### C-RAM CFC – TB 390-10

A fire-retardant, anti-static, clean room absorber ideal for clean room testing of satellites and other very-sensitive, electronic components. Six standard grades from 4” through 36” tall are available. Taller units may be supplied as custom parts.

### Table: Product Specifications

<table>
<thead>
<tr>
<th>Product</th>
<th>TB Number</th>
<th>Function</th>
<th>Operating Frequency</th>
<th>Thickness</th>
<th>Benefits</th>
<th>Relative Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-RAM SFC</td>
<td>390-1</td>
<td>High performance pyramidal absorber</td>
<td>100 MHz &amp; up</td>
<td>2.0” to 72”</td>
<td>Broadband high performance</td>
<td>Low to moderate</td>
</tr>
<tr>
<td>C-RAM SFC Wedge</td>
<td>390-2</td>
<td>High performance wedge absorber</td>
<td>100 MHz &amp; up</td>
<td>6.0” to 24”</td>
<td>Broadband wedge absorber</td>
<td>Low to moderate</td>
</tr>
<tr>
<td>C-RAM SFC-EM</td>
<td>390-3</td>
<td>Truncated pyramidal EMC absorber</td>
<td>70 MHz and up</td>
<td>12” and 36”</td>
<td>Space saving low profile and rugged</td>
<td>Low cost</td>
</tr>
<tr>
<td>C-RAM FAC</td>
<td>390-7</td>
<td>High performance convoluted absorber</td>
<td>2 GHz &amp; up</td>
<td>0.75” to 4.0”</td>
<td>High performance high frequency</td>
<td>Low</td>
</tr>
<tr>
<td>C-RAM EVA</td>
<td>390-9</td>
<td>Open cell absorber for outdoor &amp; ventilation applications</td>
<td>100 MHz &amp; up</td>
<td>2.0” to 72”</td>
<td>High power &amp; ventilation applications outdoor pyramidal</td>
<td>Moderate</td>
</tr>
<tr>
<td>C-RAM FT</td>
<td>390-5</td>
<td>Low frequency ferrite absorber</td>
<td>20 MHz to 1.5 GHz</td>
<td>0.25”</td>
<td>Ceramic (ferrite) tile absorber</td>
<td>Moderate to high</td>
</tr>
<tr>
<td>C-RAM HFP</td>
<td>390-6</td>
<td>Low frequency hybrid absorber</td>
<td>20 MHz to 40 GHz</td>
<td>12” through 48”</td>
<td>Very broadband EMC absorber</td>
<td>Moderate to high</td>
</tr>
<tr>
<td>C-RAM SFC-HC</td>
<td>390-16</td>
<td>High power absorber based on a fiber-reinforced, phenolic honeycomb structure and phenolic binder of the lossy coating</td>
<td>70 MHz and up</td>
<td>12” and 36”</td>
<td>Space saving low profile and rugged</td>
<td>Low cost</td>
</tr>
<tr>
<td>C-RAM CFC</td>
<td>390-10</td>
<td>Clean room absorbers</td>
<td>100 MHz to 30 GHz</td>
<td>4.0” to 36”</td>
<td>Clean room environment</td>
<td>Average</td>
</tr>
</tbody>
</table>

### Anechoic Chambers and EMC Chambers: Absorber Installation:

- **Adhesive Bonding:** Self-adhesive neoprene techniques are used. The use of cement based solvent resistant adhesives for reliable mounting.**

- **Velcro® Fastening System:** Ideal for small absorbers (SFC-18 or less) on ceilings and walls, allowing easy dismounting and relocation. Can be used for wall mounting 24” and 36” absorbers.**

- **Clip and Rail Mounting:** This is a mechanical fastening system ideal for large absorbers. It also allows removal and relocation of absorbers with little or no damage.

### Power Handling:

- **Standard Power Handling:** C-RAM SFC, SFC Wedge, and CFC with bonded neoprene.

- **Medium Power Handling:** 3.0 W/in² or 6.0 W/in² with absorber bonded neoprene.

- **High Power Handling:** 10.0 W/in² or 80.0 W/in² with absorber bonded neoprene.
## Anechoic Chambers and EMC Chambers

**C-RAM SFC – TB 390-1**
- High performance pyramidal absorber
- Operating Frequency: 100 MHz & up
- Thickness: 2.0" to 72"
- Benefits: Broadband, High performance
- Cost: Low to Moderate

**C-RAM SFC Wedge – TB 390-2**
- High performance wedge absorber
- Operating Frequency: 100 MHz & up
- Thickness: 6.0" to 24"
- Benefits: Broadband, wedge absorber
- Cost: Low to Moderate

**C-RAM HFP – TB 390-6**
- Low frequency hybrid absorber
- Operating Frequency: 20 MHz to 40 GHz
- Thickness: 12" through 48"
- Benefits: Very broadband, EMC absorber
- Cost: Moderate to High

**C-RAM SFC-EM – TB 390-3**
- Truncated pyramidal EMC absorber
- Operating Frequency: 70 MHz and up
- Thickness: 12" and 36"
- Benefits: Space saving, low profile and rugged
- Cost: Low

**C-RAM FAC – TB 390-7**
- High performance convoluted absorber
- Operating Frequency: 2 GHz & up
- Thickness: 0.75" to 4.0"
- Benefits: High performance, high frequency
- Cost: Low

**C-RAM EVA – TB 390-9**
- Open cell absorber for outdoor and ventilation applications
- Operating Frequency: 100 MHz & up
- Thickness: 2.0" to 72"
- Benefits: High power & ventilation applications
- Cost: Outdoors pyramidal

**C-RAM CFC – TB 390-10**
- Clean room absorbers
- Operating Frequency: 100 MHz to 30 GHz
- Thickness: 4.0" to 36"
- Benefits: Clean room environment
- Cost: Average

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### Power Handling

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<th>Standard Power Handling</th>
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</tr>
<tr>
<td>C-RAM FAC, HE and HFP with conical ventilation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Absorber Handling

**Adhesive Bonding:** Adhesive needle telescooper technique and mist cut paper technique: involves the use of solvent based adhesivecorner solutions for wholesale mounting.

**Vacuum Bagging System:** Used for small absorbers (SFC-18 or less) on ceilings and walls. Allows for easy disassembly and reassembly.

**Ceil and Wall Mounting:** This is a mechanical mounting system for large absorbers. It also allows removal and reinstallation of absorbers with little or no damage.

### Anechoic Chambers and EMC Chambers

**Adhesive Bonding:** Adhesive needle telescooper technique and mist cut paper technique: involves the use of solvent based adhesivecorner solutions for wholesale mounting.

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### Power Handling

**Standard Power Handling**
- 0.8 W/in²
- C-RAM FAC, HE and HFP with conical ventilation

**Medium Power Handling**
- 1.25 W/in²
- 3.0 W/in²
- C-RAM FAC, HE and HFP with conical ventilation

**High Power Handling**
- 80.0 W/in²
- C-RAM FAC, HE and HFP with conical ventilation

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**C-RAM SFC – TB 390-1**

**C-RAM SFC Wedge – TB 390-2**

**C-RAM HFP – TB 390-5 and -6**

**C-RAM SFC-HE – TB 390-16**

**C-RAM CFC – TB 390-10**

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**Anechoic Chambers and EMC Chambers**

### Absorber Installation:

- **Adhesive Bonding:** Adhesive needle telescooper technique and mist cut paper technique: involves the use of solvent based adhesivecorner solutions for wholesale mounting.

### Vacuum Bagging System:

Used for small absorbers (SFC-18 or less) on ceilings and walls. Allows for easy disassembly and reassembly.

### Ceiling and Wall Mounting:

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