

## C-RAM SFC

RoHS  
Compliant

### TECHNICAL BULLETIN 390-1

#### HIGH PERFORMANCE BROADBANDED PYRAMIDAL RF ABSORBER

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C-RAM SFC is a series of high performance broadbanded RF absorbers made from specially treated low density polyurethane foam. The product is flexible and tolerant of physical abuse. Using a steep pyramid design which provides an impedance gradient, C-RAM SFC provides premium performance in anechoic chambers at both normal and off-normal incidence angles. These products meet all of the fire retardancy requirements of NRL Specification 8093 tests 1, 2, and 3, MS-8-21 tests 1, 2, and 3, and T.I. drawing 2693066, as well as ASTM E-84-97a, Class A.

#### TYPICAL PROPERTIES

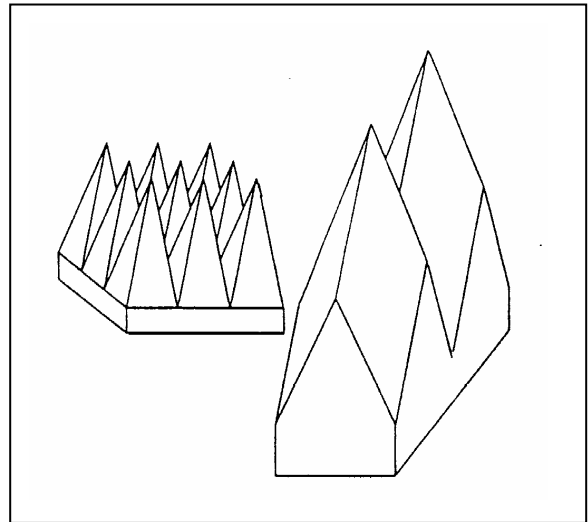
Typical weights, dimensions, and reflectivities of the various grades of C-RAM SFC are given in the tables on the reverse side.

Typically, C-RAM SFC absorbers can handle up to  $1.25 \text{ W/in}^2$  ( $2 \text{ kW/m}^2$ ) of RF energy in a temperature controlled room, but this is dependent upon frequency and application.

The product is black throughout, and generally is sprayed with a light blue surface coating, both for cleanliness and to provide better light reflection inside a chamber. The absorber can be left unpainted if requested.

#### AVAILABILITY

Standard sizes of C-RAM SFC are listed in Table 1, ranging from a 4 inch to 72 inch height. C-RAM SFC-4 up through SFC-40 are shaped as conventional pyramids and supplied as



square 24 inch (610 mm) panels. SFC-48 is available as a standard pyramid or in the twisted pyramid design with an 18x36 inch (457 x 914 mm) base dimension. Larger sizes are a "twisted pyramid" design which improves the wide angle performance and, because of the extended shoulder height, exhibits less drooping of the tips after installation.

In addition to simply supplying a bill of materials, Cuming Microwave designs and installs complete anechoic chambers. Chambers can be designed to meet your specifications, and an entire kit of materials is supplied, including factory pre-cuts of special fitting parts. We can install all materials or supply technical support to help you complete your own installation.

## METHOD OF APPLICATION

Absorber pieces are generally installed in a chamber using solvent-based neoprene contact adhesive. This technique works well for small and medium size products up through SFC-24. These small grades can also be bonded using water based adhesives; however the tack time is long, requiring supports to hold pieces in place while the adhesive dries.

Alternatively, C-RAM SFC up through the 24 inch grade can be supplied with a Velcro backing. Strips of the mating Velcro are bonded to the walls, and the piece is pressed into place, yet can be readily removed.

For large absorber grades, an installation technique using a factory-installed metal base plate and a field installed rail & clip mounting provides the fastest and most reliable installation.

**TABLE 1**  
**PHYSICAL CHARACTERISTICS AND**  
**TYPICAL REFLECTIVITY AT NORMAL INCIDENCE**

GRADE	HEIGHT In. (mm)	WEIGHT lbs. (kg)	TIPS PER PIECE	REFLECTIVITY AT FREQUENCY (GHz)												
				0.080	0.10	0.3	0.5	1.0	3.0	6.0	10	18	36*	50*		
SFC-3	3.25 (83)	2.25 (1.25)	256								26	32	39	45	50	50
SFC-4	4.3 (109)	3 (1.4)	144								30	35	42	50	50	50
SFC-6	6 (152)	3.5 (1.6)	100								32	40	45	50	50	50
SFC-8	8 (203)	4.5 (2.0)	64						30	37	45	50	50	50	50	50
SFC-12	12 (305)	6 (2.7)	36							35	40	45	50	50	50	50
SFC-18	18 (457)	12 (5.4)	16				30	37	40	45	50	50	50	50	>45	
SFC-24	24 (610)	17 (7.7)	9	-7		30	34	40	45	50	50	50	50	50	45	
SFC-36	36 (914)	24 (10.9)	4	-9	15	33	37	42	50	50	50	50	50	50	>45	
SFC-40	40 (1016)	29 (13)	4	11	16	34	38	43	50	50	50	50	50	50	50	
SFC-48T **	48 (1219)	38 (17)	2	14	21	35	39	45	50	50	50	50	50	50	>45	
SFC-48	48 (1219)	35 (16)	4	14	21	35	39	45	50	50	50	50	50	50	>45	
SFC-60	30 (1524)	43 (19.5)	1	20	26	36	40	46	50	50	50	50	50	50	50	
SFC-72T **	72 (1829)	45 (20.5)	1	27	28	38	42	48	50	50	50	50	50	50	>45	
SFC-72	72 (1829)	52 (23.5)	1	26	28	38	42	48	50	50	50	50	50	50	>45	
SFC-96	96	58 (26.5)	1	28	32	40	44	50	50	50	50	50	50	50	>45	

Notes: \* SFC has been characterized at 36 and 50 GHz, but is not routinely measured at these frequencies.

\*\* SFC-48 and -72 are generally supplied in the "twisted" configuration. The base of the SFC48T is 16 x 32" (406 x 813 mm). The SFC-72T has the standard 24" (610 mm) base.

**TABLE 2**  
**TYPICAL REFLECTIVITY (BISTATIC) AT OFF-NORMAL INCIDENCE**  
**(Multiply numbers in chart by dB values in Table 1)**

Absorber height in wavelengths	Off-normal angle (0° = normal, 90° = grazing)							
	45°	50°	55°	60°	65°	70°	75°	80°
4.0	1.00	0.95	0.86	0.75	0.70	0.60	0.51	0.43
2.0	0.90	0.82	0.74	0.66	0.58	0.49	0.42	0.34
1.0	0.72	0.65	0.58	0.50	0.44	0.37	0.31	0.25
0.5	0.48	0.43	0.37	0.31	0.25	0.20	--	--

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