



## Complete Materials Solutions

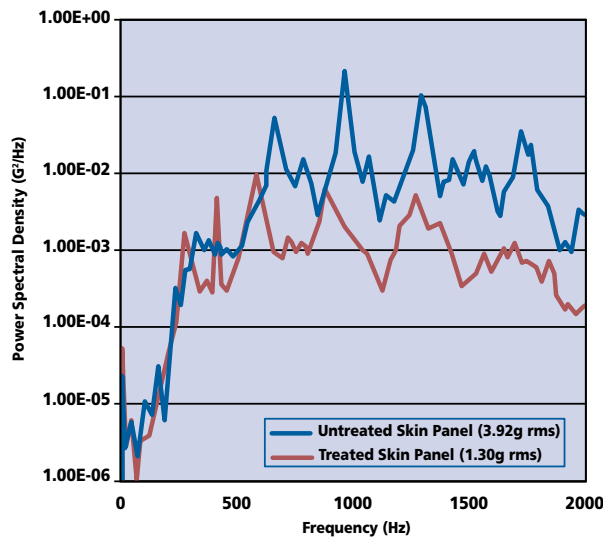
E-A-R Specialty Composites' family of Aircraft Damping Composites are engineered to meet the unique set of environmental and performance requirements encountered in aircraft operation. They meet the latest FAR flame spread standards as well.

E-A-R pioneered weight-efficient, high performance aircraft soundproofing nearly 20 years ago when the company developed treatments that incorporate high performance noise and vibration control materials into an aircraft's existing structure and decorative components. Today the company produces a wide variety of different proprietary materials that it sells to airframe manufacturers and modification shops throughout the world.

## Structural Damping

The purpose of *structural damping* is to dissipate vibrational energy in a structure, thereby reducing the amount of radiated and transmitted sound. A damping treatment consists of any material or combination of materials applied to a component, aircraft skin or interior trim surface, for example, to increase its ability to dissipate mechanical energy.

Although all materials exhibit a certain amount of damping, many, such as aluminum, have so little internal damping that their resonant behavior makes them effective sound radiators and sound transmitters. By applying highly damped, dynamically stiff materials to aluminum, it is possible to control its resonances.

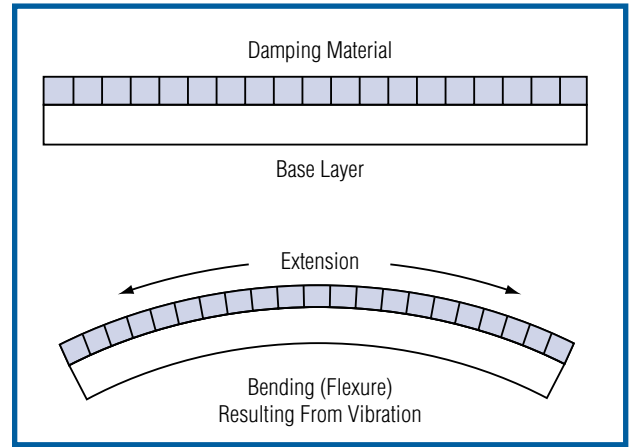


Of the common damping materials in use, many are viscoelastic; that is, they are capable of storing strain energy when deformed, while dissipating a portion of this energy through hysteresis (heat loss). Several types are available in sheet form. Some are adhesive in nature and others are similar to enamel.

## Extensional Damping

One of the simplest energy control applications, *extensional damping* involves attaching a material with a strong adhesive to the surface of a structure. Energy is dissipated as a result of extension and compression of the damping material under flexural stress from the base structure, as shown in the illustration. Damping performance increases with damping layer thickness.

To optimize the system level damping, the damping layer must be as rigid as possible. Ideally, the rigidity of the damping layer would match the rigidity of the substrate. Unfortunately, materials with high levels of damping, such as elastomers, plastics and adhesives, typically are significantly less stiff than the substrates to which they're attached, i.e., aluminum fuselage.

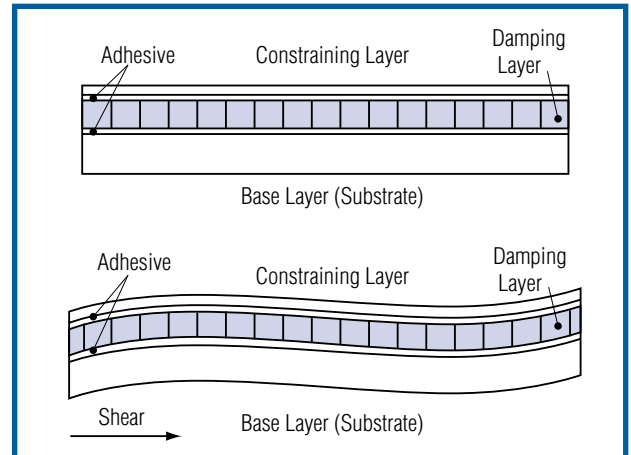


## Constrained-Layer Damping

Constrained-layer damping systems are usually used for very stiff structures or when a lightweight damping treatment is required. A “sandwich” is formed by laminating the base layer to the damping layer and adding a third constraining layer.

When the system flexes during the vibration, shear strains develop in the damping layer. Energy is lost through shear deformation, rather than extension, of the material.

Constrained damping treatments are employed on the skin of the aircraft, and on the decorative and structural interior trim panels.



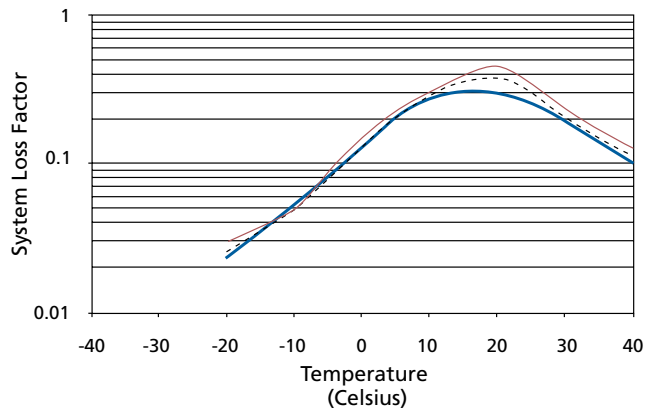
# Damping Composites

## ADC-005

**Trim and bulkhead damping material** composed of 0.04-inch-thick damping sheet and backed with a pressure-sensitive adhesive.

Nominal weight (psf): 0.37  
 Nominal sheet size (inches): 54 x 48

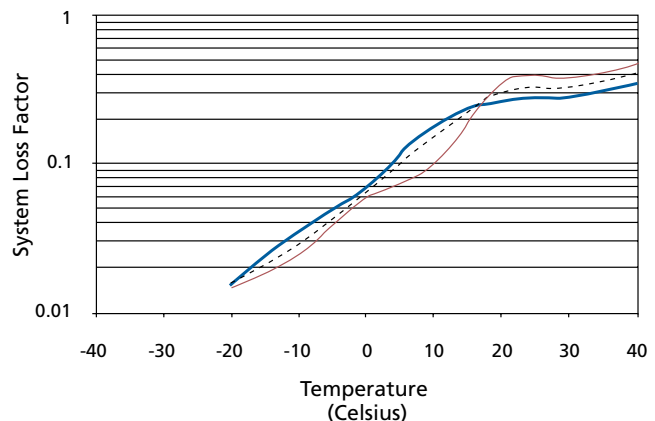
System Loss Factor vs Temperature\*



## ADC-006

**Trim and bulkhead high performance damping composite** composed of 0.04-inch-thick damping sheet faced with 0.005-inch-thick aluminum foil and backed with pressure-sensitive adhesive.

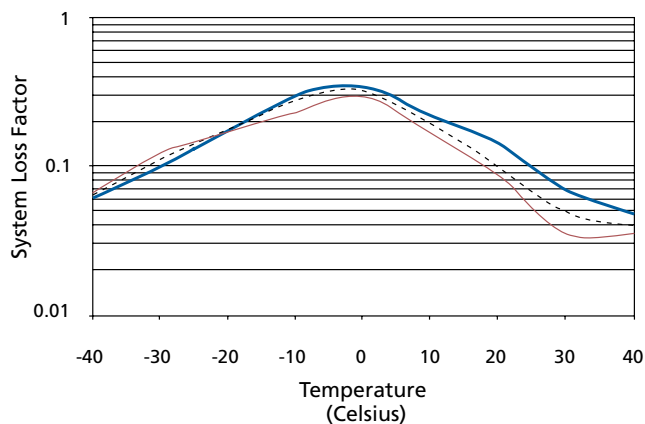
Nominal weight (psf): 0.44  
 Nominal sheet size (inches): 27 x 48



## ADC-124

**Low-temperature skin damping composite** composed of 0.25-inch-thick damping foam faced with 0.005-inch-thick aluminum and backed with pressure-sensitive adhesive.

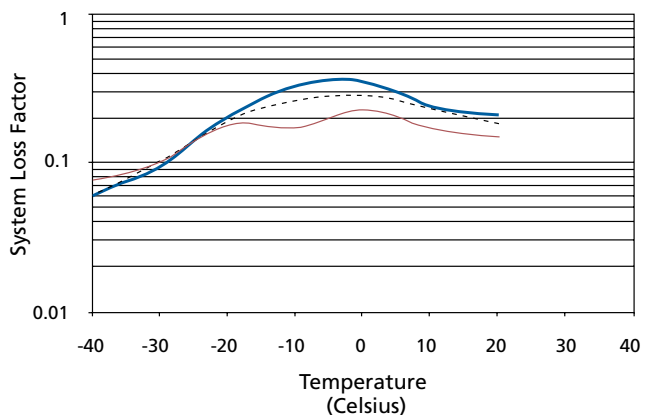
Nominal weight (psf): 0.22  
 Nominal sheet size (inches): 27 x 48



## ADC-126

**High-performance, low-temperature skin damping composite** composed of 0.25-inch-thick damping foam combined with a 0.04-inch-thick damping sheet faced with 0.005-inch-thick aluminum and backed with pressure-sensitive adhesive.

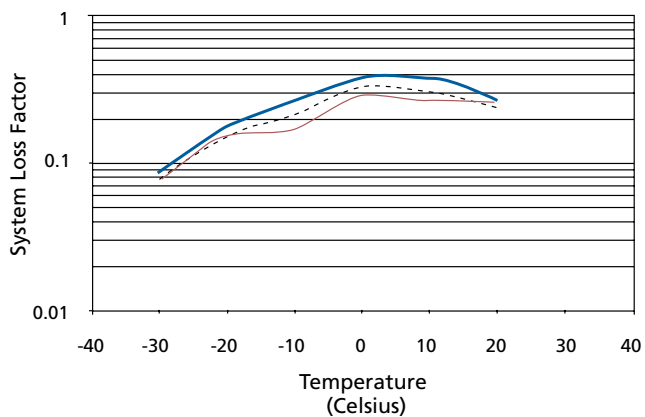
Nominal weight (psf): 0.59  
 Nominal sheet size (inches): 27 x 48



## ADC-156

**High performance, low-temperature skin damping composite** composed of 0.50-inch-thick damping foam combined with a 0.04-inch-thick damping sheet faced with 0.005-inch-thick aluminum and backed with pressure-sensitive adhesive.

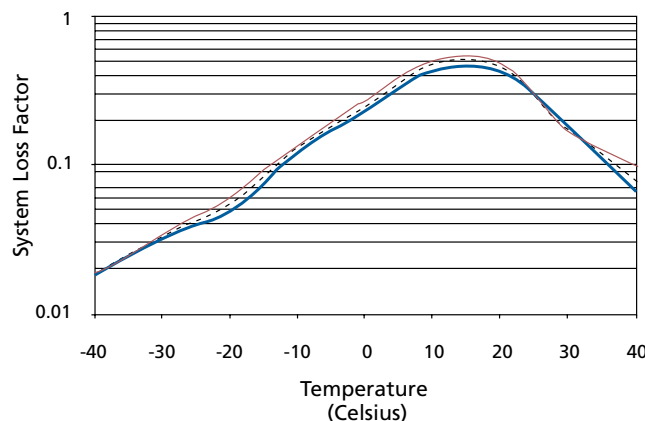
Nominal weight (psf): 0.72  
 Nominal sheet size (inches): 27 x 48



## ADC-224

**Mid-temperature skin damping composite** composed of 0.25-inch-thick damping foam faced with 0.005-inch-thick aluminum and backed with pressure-sensitive adhesive.

Nominal weight (psf): 0.22  
 Nominal sheet size (inches): 27 x 48



\* All composites applied to 40-mil aluminum.

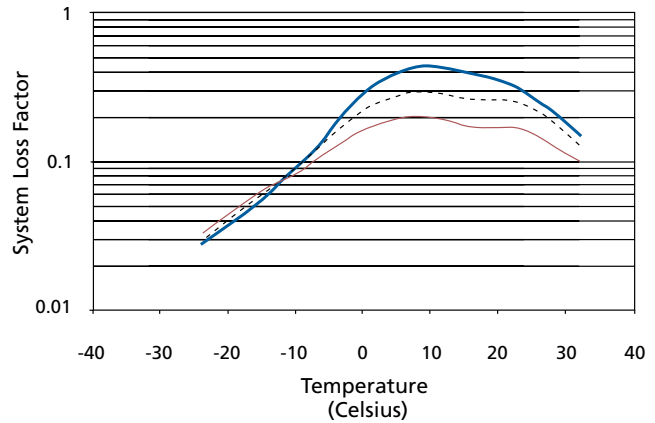
The data listed in this data sheet are typical or average values based on tests conducted by independent laboratories or by the manufacturer. They are indicative only of the results obtained in such tests and should not be considered as guaranteed maximums or minimums. Materials must be tested under actual service to determine their suitability of a particular purpose.

Legend	
250 Hertz	— (Solid Blue Line)
500 Hertz	- - - (Dashed Black Line)
1,000 Hertz	— (Solid Red Line)

# ADC-226

**High-performance, mid-temperature skin damping composite** composed of 0.25-inch-thick damping foam combined with a 0.04-inch-thick damping sheet faced with 0.005-inch-thick aluminum and backed with pressure-sensitive adhesive.

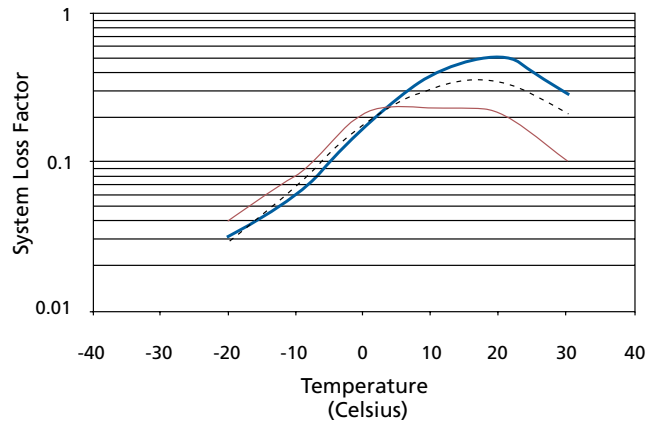
Nominal weight (psf): 0.59  
 Nominal sheet size (inches): 27 x 48



# ADC-324

**Cabin-temperature damping composite** composed of 0.25-inch-thick damping foam faced with 0.005-inch-thick aluminum and backed with pressure-sensitive adhesive.

Nominal weight (psf): 0.25  
 Nominal sheet size (inches): 27 x 48



ADC Composites	Composite Description	Weight (psf)	Dimensions (inches)
ADC-005	Trim and bulkhead damping sheet of 0.04" thick damping sheet backed with pressure-sensitive adhesive.	0.37	54 x 48
ADC-006	Trim and bulkhead high performance damping composite of 0.04" thick damping sheet faced with 0.005" thick aluminum foil and backed with pressure-sensitive adhesive.	0.44	27 x 48
ADC-124	Low-temperature skin damping composite of 0.25" thick damping foam faced with 0.005" thick aluminum foil and backed with pressure-sensitive adhesive.	0.22	27 x 48
ADC-126	High performance, low-temperature skin damping composite of 0.25" thick damping foam combined with 0.04" thick damping sheet faced with 0.005" thick aluminum foil and backed with pressure-sensitive adhesive.	0.59	27 x 48
ADC-156	High performance, low-temperature skin damping composite of 0.5" thick damping foam combined with 0.04" thick damping sheet and faced with 0.005" thick aluminum foil and backed with pressure-sensitive adhesive.	0.72	27 x 48
ADC-224	Mid-temperature skin damping composite of 0.25" thick damping foam faced with 0.005" thick aluminum foil and backed with pressure-sensitive adhesive.	0.22	27 x 48
ADC-226	High performance, mid-temperature skin damping composite of 0.25" thick damping foam combined with 0.04" thick damping sheet faced with 0.005" thick aluminum foil and backed with pressure-sensitive adhesive.	0.59	27 x 48
ADC-324	Cabin-temperature damping composite of 0.25" thick damping foam faced with 0.005" thick aluminum foil and backed with pressure-sensitive adhesive.	0.25	27 x 48

NOTE: Custom composites can be engineered to meet your specific requirements.

**Part Nomenclature:**

ADC-XXX

**E-A-R Damping Foam**

- 1 = C-3201
- 2 = C-3202
- 3 = C-3002

**Thickness of E-A-R Damping Foam**

- 2 = .25 inches
- 5 = .50 inches

**E-A-R Damping Sheet**

- 4 = Aluminum with Adhesive
- 5 = SD-40 Damping Sheet
- 6 = SD-40ALPSA (with Aluminum)

The first digit of the part number defines the type of **E-A-R damping foam** used in the composite. The second digit defines the **thickness** of damping foam used, and the third digit defines the type of **E-A-R damping sheet**.