



# Damping Aluminum Foam Sheet 4014

## Technical Data

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### Product Description

3M™ Damping Aluminum Foam Sheet 4014 is an open-cell polyurethane foam with an aluminum constraining layer on one side and a pressure sensitive adhesive on the opposite side to facilitate attachment to the surface of the vibrating panel. The adhesive is protected by an easy-release liner.

#### How it works:

Strain energy from the vibrating panel is introduced into the viscoelastic foam. The strain in the foam is in shear as a result of the aluminum constraining layer. The viscous portion of the response of viscoelastic foam results in mechanical energy being dissipated to negligible heat. This energy dissipation results in (1) attenuated amplitudes of vibration when systems are being continuously excited at frequencies which match their natural frequencies, or (2) more rapid decay in systems that are freely oscillating at their natural frequencies as a result of a momentary excitation such as an impact.

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### Features

- Excellent damping per pound of material used and installed cost ratio.
- Easy to apply – only hand pressure required.
- Good thermal insulator and heat reflector.
- Excellent moisture resistance, aging properties and fatigue resistance.
- Meets Federal Air Regulation Flammability Specifications for acoustical insulation materials (F.A.R. Section 25.853, Paragraph B).

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## Product Construction and Typical Physical Properties

**Note:** The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

<b>Caliper:</b>	0.25 in. (6.35 mm)
<b>Weight:</b>	0.27 lbs./ft. <sup>2</sup> (1.32 kg/m <sup>2</sup> )
<b>Thermal Conductivity:</b>	0.48 BTU•in./hr./ft. <sup>2</sup> /°F (0.069 Watts/m•°C)
<b>Moisture Resistance:</b>	Less than 0.2% weight gain (When conditioned at 150°F/67°C and 100% RH for one week).

## 3M™ Damping Aluminum Foam Sheet 4014 F.A.R. (Federal Air Regulation) Section 25.853 Compartment Interiors

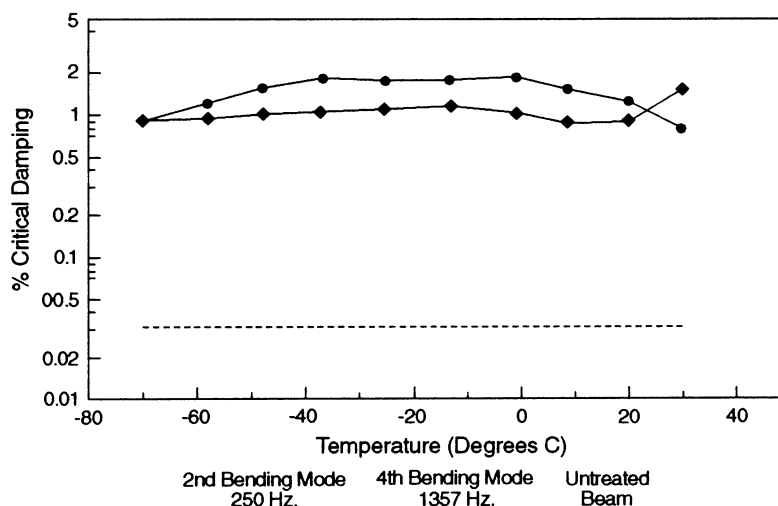
We have classified our 3M damping aluminum foam sheet 4014 construction within paragraph (B) of the subject F.A.R. Section as it is included in the class of acoustical insulation materials. As such, it must be self extinguishing when tested vertically in accordance with the applicable portions of Appendix F (Acceptable Test Procedure for showing compliance 25.853).

Specimen samples of 3M damping aluminum foam sheet 4014 were prepared in accordance with paragraph (B) of Appendix F. "Materials must be tested either as a section cut from a fabricated part as installed in the airplane or as a specimen simulating a cut section." Samples of 3M damping aluminum foam sheet 4014 (3 in. x 12 in.) were applied to 20-mil aluminum panels of the same size to meet this requirement. The apparatus used to conduct this testing was as specified in Paragraph (C) of Appendix F.

## Damping Example

The figure below illustrates the damping measured on 2 of the bending modes of a stainless steel cantilever beam when 3M damping aluminum foam sheet 4014 is attached to the surface of the beam. The damping is measured as a function of temperature and is compared to an untreated beam. This damping was determined by the half power band width technique on frequency response functions measured with a Fast Fourier Transform Analyzer.

**3M™ Damping Aluminum Foam Sheet 4014**  
**Test on 7 in. x 1/2 in. x 0.060 in. Stainless Steel Beam**



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## Application Techniques

3M™ Damping Aluminum Foam Sheet 4014 contains an aggressive pressure sensitive adhesive to facilitate bonding to the surface of the structure. Best results are obtained when applied at temperatures above 50°F (10°C) on a clean, dry surface (free of oil, wax, dust, rust, etc.) and the bond is continuous (void-free) throughout the interface between 3M damping aluminum foam sheet 4014 and the structure.

For best results apply as follows:

1. Clean metal surface of structure with appropriate solvent for removing any surface contaminants such as processing oils or waxes.

**Note:** When using solvents, be sure to extinguish ignitions sources and follow the manufacturer's precautions and directions for use when handling such materials.

2. Wipe the clean surface of the structure to complete dryness with a clean, dry lint free cloth.

**Note:** Steps 1 and 2 should be repeated until the used drying cloth is clean (no more residue appears on the cloth after wiping).

3. Remove the protection liner.
4. Place one edge on the surface of the structure and press into place with finger pressure. Lower the rest of the foam piece into place while applying finger pressure on the bond line as it progresses across the surface of the structure. This method of application will minimize voids in the pressure sensitive bond.

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## Application Ideas

- Reduce resonant noise, vibration and fatigue in metal, plastic panels and support structures.
- Almost anywhere plastic or metal contact with materials that can result in potentially damaging vibration.

# 3M™ Damping Aluminum Foam Sheet

## 4014

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### Product Use

All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application.

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**ISO 9001:2000**

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This Industrial Adhesives and Tapes Division product was manufactured under a 3M quality system registered to ISO 9001:2000 standards.



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