

# 3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01

## Product Description

- **3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01**
  - .001" thick adhesive
  - Dual film liner
  - Low outgassing and ionics
  - Typical temperature range for good damping: 0-65°C

**Notes:** 1) 3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01 may be used in some applications outside its suggested damping temperature range with acceptable damping performance, as determined by the user. 2) The typical temperature range for good damping noted above is not a limit for 3M polymer 242NR01 in the product's long term temperature exposures or short term higher temperature excursions. It is the temperature range where the polymer typically has good damping performance. The damper's construction and application to a substrate will determine the long and short term performance in a given application and environment.

## Construction

|                               |  |
|-------------------------------|--|
| <b>Adhesive Type:</b>         | Acylic Polymer   |
| <b>Primary Liner:</b>         | VC 332 Polyethylene (PE) non-coated liner (white)  |
| <b>Secondary Liner:</b>       | 3M™ Release Liner 5932 Polyester (PET) single side coated, tin free non-silicone liner (clear) |
| <b>Approximate Thickness:</b> |  |
| <b>Primary Liner</b>          | 0.004 in.  |
| <b>Adhesive</b>               | 0.001 in.  |
| <b>Secondary Liner</b>        | 0.002 in   |

## Application Ideas

- 3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01 offers good thermal performance for long term applications at moderate temperatures. Also for use in applications that experience short high temperature excursions.
- Suitable for applications in: automotive, aerospace, electronics, manufacturing, as well as general industry where outgassing is a concern.
- Applications include: cover dampers, damped laminate constructions, suspension dampers, isolators, panel dampers, space craft applications, etc.
- Use in damping applications as part of free-layer damper, constrained layer damper or damped laminate designs.
- Provides robust damping performance in applications that require low outgassing and ionic levels and still provide robust damping performance.
- Typical damping performance for Loss Factor and Storage Modulus falls between the 3M™ Viscoelastic Damping Polymers 112 and 130.
- Use in vibration and shock isolation designs.



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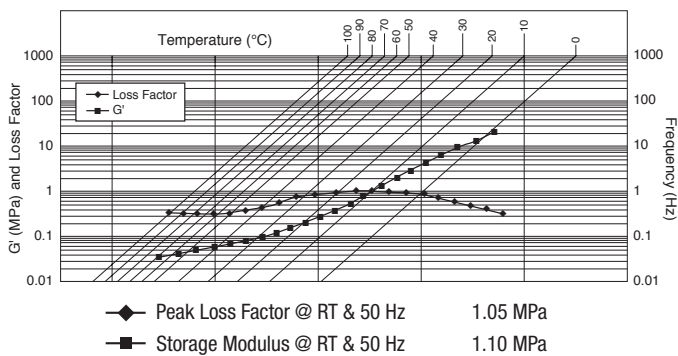
## Nomograph

The 3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01 damping properties are shown in the “reduced temperature format” nomograph. The nomograph shows the Viscoelastic Damping Polymer’s Loss Factor and Storage Modulus for various frequencies and temperatures in a single graph. The Shear (Storage) Modulus and Loss Factor are intrinsic properties of the Viscoelastic Damping Polymer.

The Loss Factor and Storage Modulus are the key measurement parameters that determine the level of potential damping capability that exists in 3M polymer 242NR01 at a specific temperature and frequency.

The Loss Factor and Storage Modulus for this polymer are found by selecting the frequency desired of an application and extending a horizontal line from that frequency until the desired application temperature isotherm is intersected. Extend a vertical line from this first intersection point of the desired frequency and temperature isotherm so that it intersects the Loss Factor and Storage Modulus curves. The Loss Factor and Storage Modulus values are found on the left hand scale by extending a line horizontally from these second intersection points on the Loss Factor and Storage Modulus performance curves.

**3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01 Nomograph**



- Typical damping performance for Loss Factor and Storage Modulus falls between the 3M™ Viscoelastic Damping Polymers 112 and 130.

## Outgassing

Typical Total Outgas Material by GC/MS (Modified ASTM 4526)

- 3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01 - < 1.8  $\mu\text{g}/\text{cm}^2$  (Hydrocarbons, Organic acids, Esters, Alcohols, Phenols)

## Ionics

Typical Total Ionics by Ion Chromatograph

- 3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01 - < 0.15  $\mu\text{g}/\text{cm}^2$  (Chloride, Nitrate, Sulfate)

## Adhesion

Typical adhesion data with 2 mil aluminum backing and a 90-degree peel test at 12"/min (ounce / inch width) ASTM D-3330 modified for 90-degree peel.

| Substrate @ dwell conditions | 3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01 (3M™ Release Liner 5932 removed) | 3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01 (VC 332 Liner removed) |
|------------------------------|--|--|
| SS @ 15 min RT               | 36   | 36   |

## Liner Release

Typical Liner Release Values (180 degree Liner removal)

- 3M™ Release Liner 5932, PET Liner - 4 g/inch width
- VC 332, PE Liner - 44 g/inch width

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## Application Instructions

In many applications 3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01 requires only pressure to provide adequate bonding to a constraining layer or substrate at room temperature (21°C).

For high strain applications and/or some surface types or geometries, the damping polymer may require an additional surface attachment means, such as a surface primer or epoxy bonding material to provide an adequate bond to a surface.

### • Surface Preparation

For acceptable bonding of this damping polymer to a surface, it is necessary for surfaces to be dry and free of any wax, grease, dust, dirt, oil, scale or any other contaminants or loose or weakly attached surface finishes or coatings. The importance of contamination free surfaces cannot be over emphasized. Typical cleaning solvents like isopropyl alcohol or heptane can be used. More aggressive solvents may be needed for difficult to remove contaminants.

**Note:** Carefully read and follow manufacturer's precautions and directions for use when using cleaning solvents.

Extremely contaminated surfaces may require special attention. Sanding or grinding will remove heavy contamination. Follow with a solvent wipe as indicated above. Sandblasting and grinding to finish should be done ONLY on surfaces completely free of oil, grease, wax, silicone-based materials or other organic residues. Sandblasting and grinding can drive or push oils and other residual materials into the substrate surface leading to adhesion reduction or bond failure of the polymer after an initial bond is made. Sandblasting and grinding should be done with materials that do not leave a residue or grit remaining on or in the surface.

**Note:** Wear appropriate personal protective equipment for sandblasting and grinding operations.

### • Surface Type:

3M polymer 242NR01 will form good bonds when properly applied to many high surface energy materials. Materials with a surface energy below 100 dynes/cm<sup>2</sup> should be tested to determine if a suitable development of an adequate bond for a given end use application will occur.

### • Application

3M polymer 242NR01 is tacky at room temperature (21°C). Apply pressure by rolling or squeegeeing methods to form an adequate bond to a contamination free surface. Air entrapment should be avoided to ensure a good bond.

First attach one edge of the damping polymer with the liner intact (or a previously laminated damper with it's liner removed) to the substrate, then gradually lower the damper or damping polymer onto the surface at an angle (30-90°) while continually applying uniform pressure to the damper or damping polymer of 10-15 psi (6.9-10.3 x 10<sup>4</sup> pascals). A squeegee or wood/rubber roller will help maintain uniform pressure across a wide area. Every effort must be made to avoid air entrapment while placing the damping polymer and/or damper on to a substrate.

The 3M™ Ultra-Pure Viscoelastic Damping Polymer 242NR01 bond will typically build with time or exposure to higher temperature.

Lamination pressures above 50 psi (3.45 x 10<sup>4</sup> pascals) and temperatures above 121°C should be avoided. The liner does not remain with a final damper when applied in an end-use application or when this damping polymer is laminated between substrates for a laminate construction.

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

## Shelf Life

24 months from manufacture of material when properly stored at 60-80°F (16-27°C) and 40-50% RH and kept in original package.

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## Certification/Recognition

**MSDS:** 3M has not prepared a MSDS for this product which is not subject to the MSDS requirements of the Occupational Safety and Health Administration's Hazard Communication Standard, 29 C.F.R. 1910.1200(b)(6)(v). When used under reasonable conditions or in accordance with the 3M directions for use, the product should not present a health and safety hazard. However, use or processing of the product in a manner not in accordance with the directions for use may affect its performance and present potential health and safety hazards.

**TSCA:** This product is defined as an article under the Toxic Substances Control Act and therefore, it is exempt from inventory listing requirements.

## For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-251-8634. Address correspondence to: 3M, Electronics Markets Materials Division, 3M Center, Building 225-3S-06, St. Paul, MN 55144-1000. Our fax number is 651-778-4244 or 1-877-369-2923.

In Canada, phone: 1-800-364-3577.

In Puerto Rico, phone: 1-787-750-3000.

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