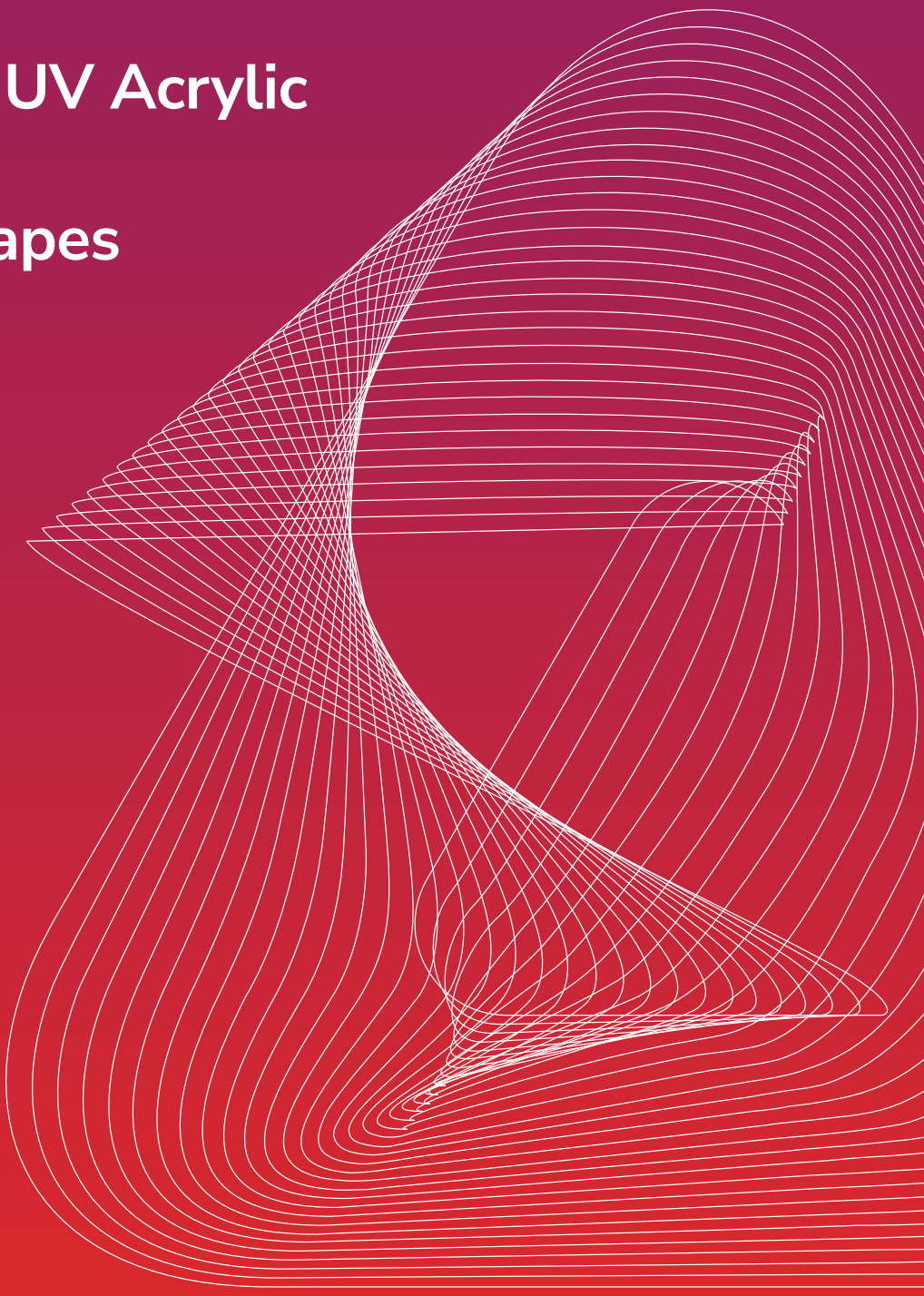
The latest, cutting-edge adhesives solutions for performance tapes, untangled by industry experts. A brief overview of the advantages of UV acrylic adhesive over the more traditional solutions for permanent, removable and recyclable tape solutions.

Advantages of UV Acrylic adhesives in Performance Tapes



AVERY DENNISON

Introduction

Avery Dennison Performance Tapes specializes in the development and production of high-quality pressure-sensitive adhesives and tapes for a wide range of applications in the automotive, appliance, electronics, building and construction, general industrial and personal care segments.

Depending on the actual application, the adhesive used in our tapes has to meet specific requirements, such as low VOC (low in volatile organic compounds), heat, chemical and moisture resistance, and of course excellent adhesion – while at the same time meeting our sustainability goals. Our special UV acrylic solution has been specifically designed for the manufacturing of high-quality adhesive tapes for automotive, building and construction, and even medical applications.

UV Acrylic hotmelt 101: the basics

In this whitepaper, we'll discuss the many benefits of a hundred percent solid pure acrylic adhesive that is coated as a warm melt and cured/crosslinked by exposure to UV light to further prepare it for specific purposes, including tapes for automotive, building and construction, and medical applications.

At Avery Dennison, we developed an acrylic adhesive that is polymerized as a warm melt, which means no solvent is used in the process. The product contains only pure solids and can be processed immediately on standard hotmelt coaters equipped with commercial UV lamps. No extra drying equipment or flash-off zones are required. Both the adhesive and its manufacturing process are patented, which in turn led us to master a wide variety of applications when used in tapes.

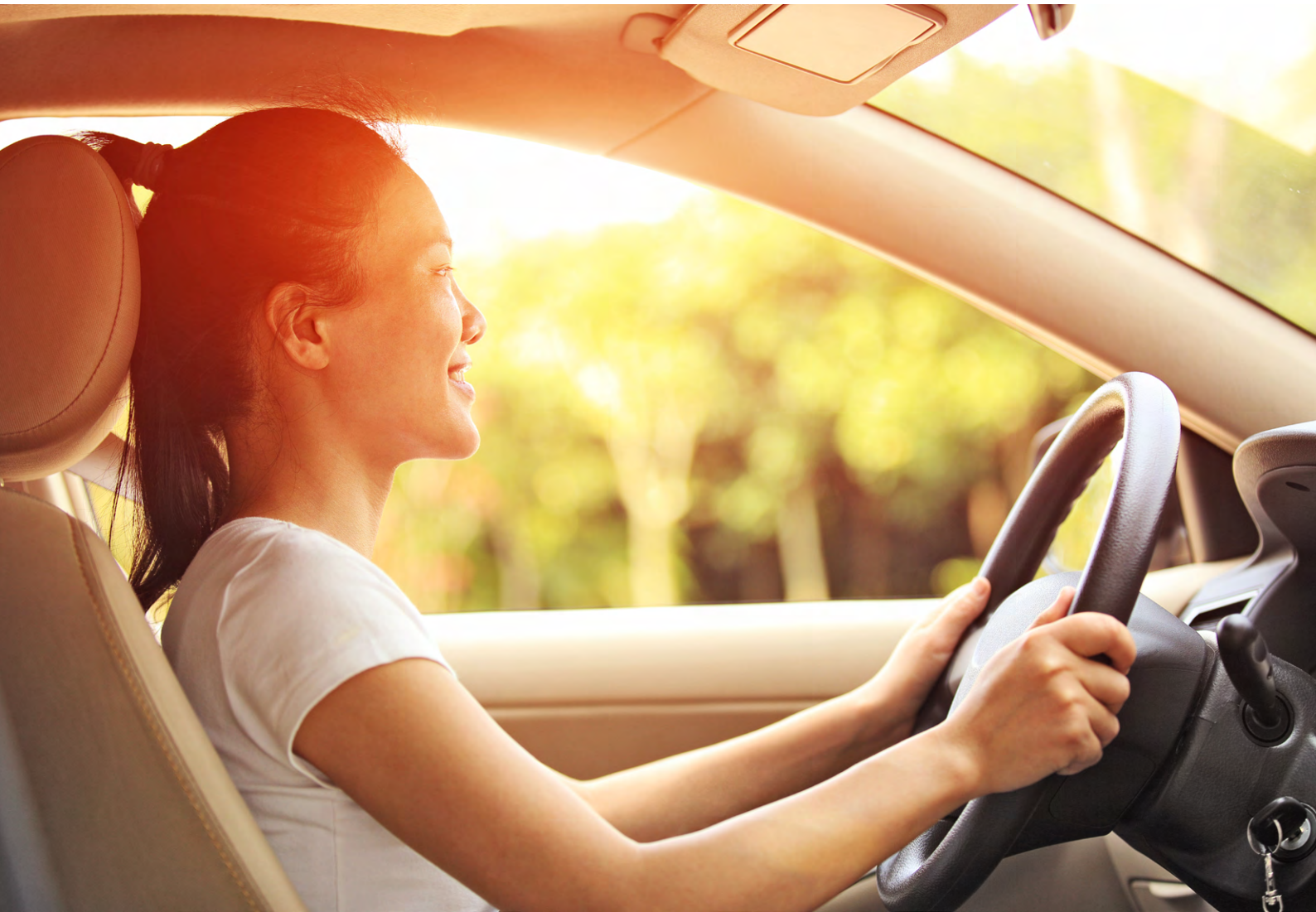
The Why and the How

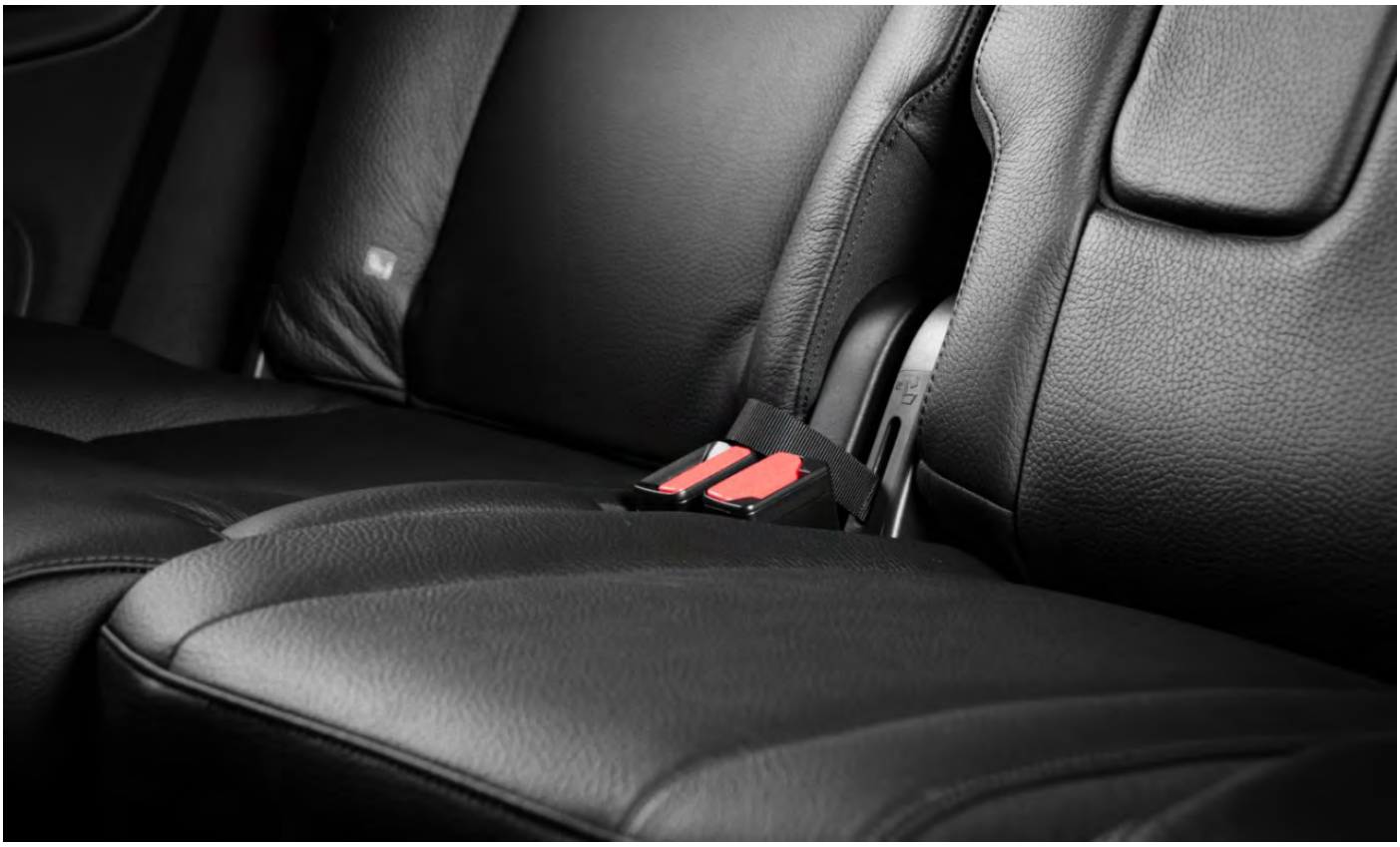
UV cured adhesives are a blend of 100 percent solid acrylic polymers that feature a low molecular weight before coating. This allows for a solvent- and water-free “warm melt” coating process. During the coating process, these adhesives are heated to a temperature between 130 to 140°C (or 266 to 284°F); a lower temperature than required for traditional hotmelt adhesives that allows for coating in a similar manner.

The UV-part refers to the process of turning the solid acrylic polymer into a usable adhesive. The process by which we coat adhesives can generally be done in three ways: using solvent (dissolving acrylate), in water, or as the topical third option: hotmelt. As the adhesive has a low molecular weight, it becomes liquid at higher temperatures. Let it cool down and you have your desired adhesive. An immediate advantage is the fact that there is less waste product and an absence of wastewater, as no water is used for cooling down.

However, simply cooling it down has the adhesive stay in a mostly liquid state, so it has to be cured – and that’s where the UV comes in. Once the adhesive has been coated, it is exposed to a specific range of UV radiation to crosslink the polymer chains and build molecular weight. Standard medium-pressure mercury vapor lamps or microwave-excited UV sources, for example, are suitable. The exposure time required for crosslinking, in other words the speed at which the coated surface passes under the UV source, depends on factors such as the power of the UV source, the quantity of material applied and the type and quantity of the additives employed.

Time exposed to the UV source determines the softness of the glue, dependent on the desired outcome; the crosslinking reaction is instantaneous, but easy to control – it stops as soon as the UV source is removed. The crosslinking builds adhesive performance and transforms the polymers into a usable, functional pressure-sensitive adhesive.





Low VOC

UV 'crosslinkable' acrylic hotmelt polymers are ideal for pressure-sensitive adhesives for permanent and/or temporary paper labels, tape and specialty applications. Free of water and solvents, these adhesives have many significant advantages over conventional adhesives in terms of processing and environmental impact. Its key features include low VOC, versatility, heat and moisture resistance and its excellent aging and converting properties for a wide variety of applications.

Low VOC refers to volatile organic compounds that are not harmful to the environment or to humans. It mostly refers to paints and other products that have a very low or zero VOC, including cleaners, sealants and of course adhesives.

In general, demand for low VOC adhesive solutions is growing, as it helps to reduce the emission of smog-forming compounds when used in construction and remodeling projects. VOC refers to organic substances that evaporate at ordinary room temperature, thus easily dispersing throughout buildings, and accumulating to much higher concentrations than outdoors. They include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors.

As a one-component system, the adhesive is very pure and contains almost no volatile substances. From seat heating and sensing systems to speaker grills and direct mounting onto printed and flexible circuit boards, low VOC acrylics offer a bonding solution that meets increasingly strict rules and regulations in, for instance, the automotive industry.

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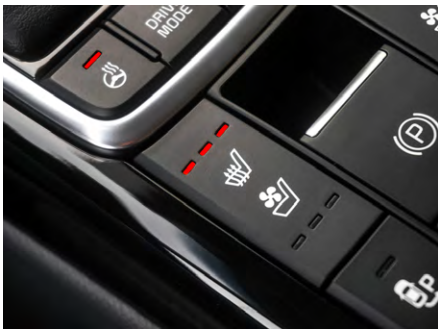
Putting the Performance in Performance Tapes

Avery Dennison UV cured acrylic tapes show superior bonding performance to a variety of foams and fibers often outperforming the benchmarks. In fact, it is a more versatile adhesive than any other industry standards. It offers excellent adhesion to a wide variety of substrates while reducing complexity for the converter and offering versatility for the end user. It is highly suitable to demanding foam bonding applications, ideal for permanent fixation and temporary holding, and offers great durability and excellent resistance to hot and moist environments. It's possible to control the soft- or hardness of the adhesive, bringing options to use softer adhesives for outdoor construction use when temperatures drop, without losing the necessary adhesion strength.

Sustainability

Sustainability isn't a thing we do – it's our focus on how we do everything. At Avery Dennison, we have pledged to deliver innovations that advance the circular economy and reduce environmental impact. We reduce that footprint by decreasing our greenhouse gas (GHG) emissions, increasing our water efficiency and protecting the forests from which our products are derived. As a leader in our industries, we engage with our suppliers, customers and value chain partners to drive change that protects our climate and ecosystems.



'The low-fogging characteristic makes it ideal for interior applications, while it offers easy removal at point of application as well.'

Spotlight: Avery Dennison FT 2150

For any industrial application, we can highly recommend Avery Dennison FT 2150, featuring our UV cured pure acrylic adhesive and a white, easy release glassine liners. FT 2150 is a best-in-class product within the range of UV acrylics that relies on an eco-friendly manufacturing process without emissions. Performance benefits include optimum initial adhesion levels on substrates such as foams and fibers, high temperature performance and chemical resistance. The low-fogging characteristic makes it ideal for interior applications, while it offers easy removal at point of application as well.

Avery Dennison produces tapes fully lined, at for example lengths of one meter, but patterns or shapes are also possible (e.g. only part of the surface, as with finger lifts). With water-based systems, it is technically far more difficult to do so, which is another advantage of the versatility of the UV acrylic solution, as the adhesive allows for more flexibility.

The Avery Dennison cured adhesives are moisture resistant and offer an excellent chemical resistance. The great shear and temperature resistance, which is the same or even slightly higher than some of our solvent alternatives, allow for a wide variety of production constructions, including transfer tape, scrim tape, double-coated PET tape and even tissues.

Please refer to **Tapes.AveryDennison.com** for complete terms and conditions, including warranty terms, relating to this product. You should periodically review the site as terms and conditions are subject to change without notice.

The information contained herein is believed to be reliable but Avery Dennison makes no representations concerning the accuracy or correctness of the data. This product, like any other, should be tested by the customer/user thoroughly using end user conditions to ensure the product meets the particular requirements. Independent results may vary.

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AVERY DENNISON | Performance Tapes

Asia Pacific
Kunshan, China,
No. 618 Nanhe Road
Kunshan Economic & Technological Zone
China 215335
Phone: +86 400 6987 555
Fax: +86 512 57155059

Europe
Tieblokkenlaan 1
B-2300 Turnhout
Belgium
Phone: +32 (0)14 40 48 11
Fax: +32 (0)14 40 48 55

North America
250 Chester Street
Painesville, Ohio
44077 USA
Phone: +1 866-462-8379
Fax: +1 888-358-4469

For more information on our bonding tapes and adhesive solutions, visit **Tapes.AveryDennison.com**