Innovations and trends in white good appliances

Challenges and solutions in Performance Tapes

White goods are at the forefront of a fast changing market full of smart technologies. Our performance tape solutions for engineers, converters and OEMs hold it all together.

AVERY DENNISON

Introduction

As our day-to-day appliances have entered a new and smarter age, so the needs and challenges of performance tapes have changed. From smart doorbells and virtual assistants to connected lighting and intelligent thermostats, smart home technologies are the foundation of an exciting and growing market. White goods are at the forefront of that market, and so are our performance tape solutions for engineers, converters and OEMs.

While the evolving market and the world of AI and IoT isn't necessarily going to change the performance of tapes as such – as one of our experts put it, there will be no demand for voice-controlled tapes –, there is a shift nonetheless. The adhesives in these appliances aren't simply sticking surface A to B, on top of that they have to adhere to the need for printed and flexible circuit boards, the laws of thermal conductivity and the growing possibilities of RFID. All important capabilities inherited by these new standards adopted by the growth of AI IoT.

You can revisit our webinar on IoT and AI in white goods and appliances here.

At Avery Dennison, we've been thinking about the emergence of new manufacturing challenges and related shifts in demand for performance tape solutions since the dawn of the smart home. As the appliance industry will change, so will the consumer experience. New business models are going to be implemented - AI will allow for an extension of product life cycles and connected devices gather a wealth of data, enabling consumers to schedule cost-saving repair and maintenance ahead of preventable downtime.

We understand that the improvement of existing products with a world of enhanced functionality gives rise to demand for innovation in tape solutions as well, which is what this brochure will focus on, offering several examples while opening the door to future possibilities.

Challenges of AI & IoT in white goods & appliances and how the impact of technology and innovation shapes new solutions in Avery Dennison Performance Tapes applications.

Performance Tape solutions in white good appliances

Avery Dennison offers tape and adhesive solutions for a wide variety of applications in the household appliance segment. Our appliance adhesives, many that are UL® recognized, provide a reliable bonding and functionality such as noise and vibration damping, heat dissipation and gasketing.

Selected from an extensive variety of material properties, finishes, colors, and adhesives to create custom applications for virtually any substrate or surface, our tapes offer the perfect adhesive solution to be used across the product life cycle, or as part of the device itself. That includes, among other purposes, assembly of membrane switches, attaching display screens, and direct mounting onto printed circuit boards (PCBs) – which the following sections will focus on.

The latter is particularly interesting when using performance tapes in modern-day home appliances like the smart refrigerator. At Avery Dennison, we've spent years researching and developing cutting-edge adhesives to ensure your appliances deliver that supreme user experience – however smart those appliances have become.

Mounting and Assembly of Membrane Switches
One of the innovations in our performance tape portfolio is a solution that allows manufacturers to assemble and mount membrane switches, a necessity for appliance control panels. Membrane switches are a type of Human-Machine Interface (HMI) characterized by being constructed from several layers of plastic films or other flexible materials. The visible top layer of a membrane switch is the graphic overlay, with printed circuitry underneath. In the fabrication of membrane switches, spacer films are used to bond these various layers together.

Our switch plate and spacer adhesive films bond the entire control panel, including those involving low surface energy materials. Avery Dennison solutions support a long lifetime of the membrane switches and very thin technology following design requirements, suitable for industrial processes. There is no discoloration of the graphical overlay, and no interaction with printed circuit inks. In the case of spacer adhesive films, the thickness of the PET carrier can be customized to the required layer thickness for spacer films in the membrane switch. All tapes are coated with cross-linked acrylic adhesives, providing a very high temperature, chemical, UV- and moisture resistance, as well as a very good resistance to stress and load.

In the same kind of application, the binding of flexible, printed circuits in touch sensitive markets ask for tapes that are flexible and match printed circuit inks.

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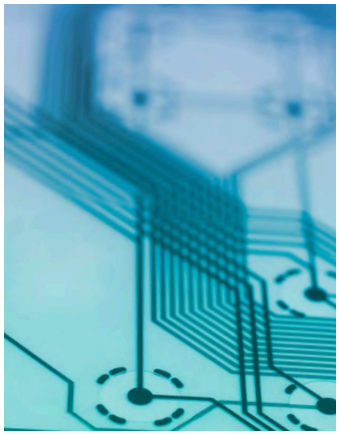

Sustainable RFID inlays
Radio Frequency Identification (RFID) is the wireless or contactless transfer of a digital ID and additional data between an RFID tag and a reader by means of electromagnetic waves. Is your brand ready to take the next step to reduce your supply chain waste?

We recognize that a growing number of our customers value environmentally friendly RFID products and are keen to use them as they can be a powerful tool to help consumer brands, retailers and industrial companies to operate more sustainably. By offering greater visibility into supply chains and inventories, RFID solutions help to avoid overproduction, reduce waste and enable better recycling as well. Our innovative SmartFaceTM Technology and Green Tag Program allow businesses to benefit from virtually plastic-free, recyclable and compostable products that use fewer materials and help to achieve a significant carbon footprint reduction.

With a growing number of antennas and sensor Integrated Circuits (ICs), our Ultra High Frequency (UHF) RAIN RFID inlays provide flexible, state-of- the-art solutions to accurately measure moisture and temperature conditions in a wide range of applications – from water leakage detection for vehicle manufacturing to moisture measurement in washing machines.

Avery Dennison is also responsible for the first UHF RFID tag to be able to withstand up to five minutes of 950-watt microwave cooking. It is designed to prevent arcing or heat build-up during microwaving while still delivering highly accurate read rates for item tracking.

Noise and vibration harshness
The reduction of noise, vibration and harshness (NVH) is a significant challenge that impacts the overall performance in many household appliances. The combination of metals and motors often results in unwanted noise and vibrations.

Using innovative solutions like foils suited for thermal expansion, vibration damping tapes and thermal barrier protection, we are able to overcome the challenges of NVH. Through a comprehensive suite of viscoelastic adhesives, we can support materials such as NVH foam to damp unwanted sound and vibrations across a variety of diverse applications. For every specific challenge there is customized adhesive solution.

Attachment of Gaskets and EPDM Seals
Almost any appliance requires temporary or permanent mounting of EPDM seals and gaskets during its assembly, transportation or use. As bonding tapes can be laminated and die-cut to the exact size of gaskets and seals, this translates to quicker and more consistent application with less waste – contributing to a higher productivity too. The lamination with these high tack adhesives makes them also easier to apply, translating into less labor. For critical applications an adhesive with high temperature resistance can be selected.

Attachment of displays
Here, tape solutions replace mechanical fasteners like screws for the mounting of display and control panels on appliances. Tapes bond to a wide range of surfaces with the ability to accommodate high levels of vibration and resist environmental conditions. As with attachment of gaskets and seals, benefits include an aesthetic assembly for a clean and smooth appearance, that is easy to apply, with no drilling or damage to the substrate providing a strong and lasting bond.

Evaporator Plate and Condenser Tube Mounting

The application of pressure-sensitive adhesive tapes in the construction of cooling and chilling appliances contributes to the energy efficiency of these appliances. Refrigerators, ice machines and freezers have evaporator plates. Traditional methods with mechanical fasteners create an imperfect seal between the plate and the fridge housing, leaving gaps into which insulating foam can penetrate and interfere with the cooling system function.

Attaching the heat exchanging condenser tubes with Avery Dennison double coated film tapes prevents any polyurethane from escaping during the foaming process and ensures the most efficient operation of the appliance. In the production process, tape can be deployed from long rolls and applied with consistent pressure through a continuous, automated process.

To improve energy efficiency, tapes require a high initial tack, a durable bond, and an excellent adhesion to Polystyrene and painted steel.

Ultra High Barrier Metallized PET Laminates for Vacuum Insulation Panels (VIPs)
The energy efficiency of household appliances such as refrigerators largely depends on the properties of the thermal insulation solution that is used. The challenge lies in how to reach top performance levels without restricting internal dimensions or changing standard sizes and production methods. Since the thermal conductivity of VIPs is 6 to 8 times smaller than bulky PU foam insulation, VIPs deliver an exceptionally efficient solution to upgrade the efficiency rating of the appliance or increase the usable internal volume. VIPs reduce energy consumption, increase internal volume and deliver effective engineering.

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Market innovation and industry-wide challenges

AI, digitization of traditional consumer goods and smart home innovation are fast-growing industries where quality assurance is critical. Rapid change in design, demand and material selection show us there are no standard practices being used. These changes in product characteristics also come with new and exciting possibilities. We can offer an understanding of how PSA tapes contribute to safety, performance, durability and manufacturability – from product requirements to the application methods. It doesn't matter if you are a converter, a supplier or an OEM, there is a focus on differentiating features for specific benefits, from dielectric strength to flame retardancy and insulation.

Whether you're looking for performance tapes to help protect delicate materials during assembly and provide dimensional stability with easy release liners, tapes that incorporate dielectric films for breakdown voltage and dielectric strength requirements, tapes that use acrylic- and silicone-based adhesives with flame-retardant properties, all of the above or anything that meets the ongoing dynamic of smart home innovation, we have you covered.

As the industry is in transition, we'd love to talk to you about developing new and smarter solutions together.We can assist in meeting these challenges from a position that is uniquely flexible. In the expanding world of the smart home and all its existing and future challenges, we have the expertise, the knowledge and the technology to offer cutting edge solutions.

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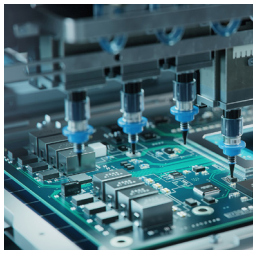

The Avery Dennison Toolbox

The Avery Dennison Performance Tape Portfolio includes a wide range of functional bonding and protection tapes, built on multiple pressure-sensitive adhesive technologies. These are engineered to make applications safer, more efficient, and easier. Our range of products can help you solve some of the most common challenges in design and construction. This may include reducing flammability, boosting dielectric strength or replacing mechanical fastening methods with tapes offering a thinner, lighter, repositionable bond.

The Avery Dennison toolbox is stocked not just with a wide range of products, but with custom tailored solutions to meet the wide variety of needs and requirements as well. We take great pride in that customization, and in the ability to find and offer the right solution. Whatever the challenge, inquiry or application, you can rely on Avery Dennison technology to offer the solution.

Backed by Avery Dennison
Avery Dennison is your partner. OEMs, engineers, converters and suppliers can be confident knowing their adhesive systems are engineered, manufactured, and supported by a global materials science leader.

Our technical support helps you choose the right product for your application with service programs in place to ensure the product is onsite when needed. With decades of experience in the industry our technical expertise provides the foundation combining local knowledge of product, production and conversion requirements with a global supply chain. We know our products, we understand the compatibility of our tapes, we can mix and match, develop, test... You might even say we hold it all together.

For more information on our white good appliances, please visit our white goods page. Our technical experts are here to show you how to work with your materials successfully during every phase of your application. You can count on us to approach any challenge with genuine curiosity and care.

Contact your Avery Dennison sales representative or visit tapes.averydennison.com

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