



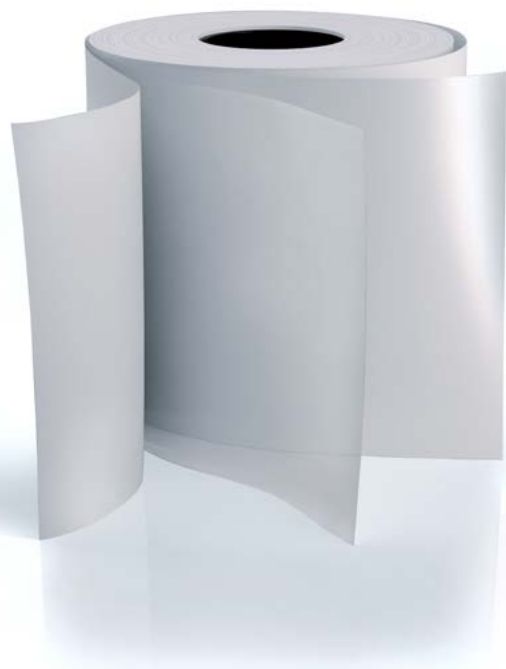
# Great Performance, Delivered.

The Avery Dennison Guidebook to Hotmelt Adhesives



# Pressure-Sensitive Adhesives

Pressure-Sensitive Adhesives have a broad range of performance capabilities - from ultra-removables to ultra-high adhesion. Avery Dennison's range of products are ideal for demanding applications in the electronics, medical, industrial, graphics, construction, and consumer goods industries. There are four types of pressure-sensitive adhesives:



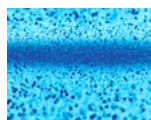
## Hotmelts

Hotmelts are 100% solids and based on block copolymers. They have very good moisture resistance, cold temperature performance and high adhesion to difficult Low Surface Energy (LSE) and textured substrates.



## Solvents

Solvents are acrylic polymers in petroleum-based solutions. They have outstanding shear, chemical resistance and long term durability.



## Emulsions

Emulsions are water-based acrylic polymers, with wide service temperature range and can bind to many substrates as well.



## Ultraviolet

These adhesives have the characteristic of being a light-cured acrylic adhesive (thermoset).

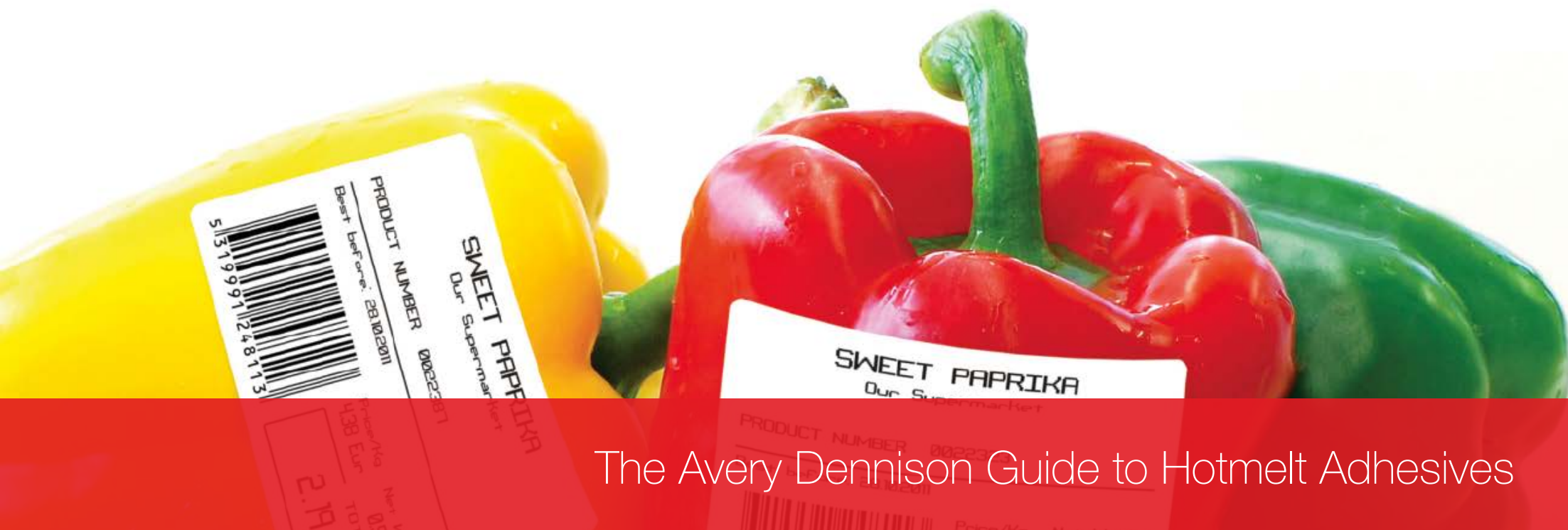


## Did you know?

Pressure-sensitive adhesives can also be further classified based on the chemical composition of the adhesive, either *rubber-based*, *acrylic* or *solvent-based*. The chemical makeup is a major contributor to the performance of the product.

Hotmelts	Rubber-based
Solvents	Rubber-based, Acrylic
Emulsions	Acrylic
Ultraviolets	Acrylic

<sup>1</sup>Global Industry Analysts, "Migration Away from the Use of Solvent-Based Adhesives in Production Lines Drives Demand for Hot Melt Adhesives", May 2016. <http://www.strategyr.com/pressMCP-1794.asp>



## The Avery Dennison Guide to Hotmelt Adhesives

**Hotmelt adhesives have been used in the label industry for more than 20 years. Hotmelts deliver broad application temperatures and strong adhesion. The Avery Dennison Hotmelt portfolio offers solutions for low temperatures, rough or difficult to label surfaces, or even difficult label shapes, bringing benefits to both the Converter and End Users.**

Like all Avery Dennison products, our hotmelt adhesives come with strict compliance to global regulations coupled with comprehensive technical support for any conversion, printing or application inquiries you might have.

Learn more in this eBook.

# Hotmelt Adhesive Solutions Guide

Label adhesives are expected to stay in place and remain intact regardless of the substrates and the extremities of conditions they are subjected to. This puts great demands on the adhesives products and the label converters. Here is a solutions guide to hotmelt adhesives offered in this region, providing insights to selecting the right solution for your application needs.

Adhesive	Application	Min. Application Temp (°C)	Min. Service Temp (°C)	Max Service Temp (°C)	Substrate				Compliance	Region
					Rough	Cardboard	LSE Plastics	Converting		
NEW S2025N	Good initial tack and adhesion, suitable for wide range of substrates and applications. Excellent converting performance comparable to emulsion adhesives, allowing for increased productivity particularly with difficult die shapes	5°C	-40°C	70°C	++	++	+++	++++	FDA 175.105	ANZ/ASEAN
S2045	Global adhesive with excellent adhesion to a wide variety of substrates including apolar, slightly rough and curved surfaces. Provides moisture resistance after application on a dry surface.	0°C	-40°C	70°C	++	+	+++	+++	FDA 175.105	ANZ
S2045N	Excellent initial tack on a wide range of substrates. Suitable for slightly difficult to label surfaces such as recycled corrugated cardboard. Good cold temperature performance provides moisture resistance after application on a dry surface	0°C	-40°C	70°C	++	++	+++	+++	FDA 175.105	ANZ/ASEAN/ South Africa
S2049	Adhesive performance designed for difficult substrates. Ideal for textured, HDPE as well as recycled corrugated cardboard. Suitable for use under chilled temperatures and provides moisture resistance after application on a dry surface	0°C	-40°C	70°C	+++	+++	++++	+++	FDA 175.105	ANZ
S2060	Excellent tack on wide variety of substrates. Designed specifically for application at room temperature. Excellent converting performance and resistance to bleed, making it ideal for difficult die shapes or warmer climates	5°C	-40°C	70°C	+++	+++	++++	+++	FDA 175.105	ASEAN/ South Africa
C2075	Excellent for freezer and chiller application. Good adhesion performance can be achieved on slightly frosted surfaces	-20°C	-50°C	70°C	++	+	+++	+++	FDA 175.105	ANZ/ASEAN/ South Africa
S2059	Extremely high initial tack and adhesion designed for irregular or rough surfaces, such as carpets and textiles	0°C	-40°C	70°C	++++	++++	++++	+	FDA 175.105	ANZ/ASEAN
TS79	High tack, rubber-based adhesives specially designed to meet the performance requirements of automotive tyre labelling	0°C	-40°C	70°C	++++	++++	++++	+	FDA 175.105	ANZ/ASEAN

++++ Best    +++ Better    ++ Good    + Trial Recommended

Note: The guide are based on the condition of applications and serves as a reference only. It is recommended to conduct relevant tests to determine its suitability of use.

## Hotmelt Adhesive Solutions Guide



**NEW S2025N** is a hotmelt adhesive with emulsion-like converting which has good initial tack and ultimate adhesion. Has good resistance to bleed giving excellent die-cutting and stripping performance. Ideal for applications that require good adhesion but have difficult die shapes or used in hot/humid environments.

**S2045** is a global adhesive that exhibits good tack and adhesive performance suitable for use under standard environmental conditions. Provides moisture resistance after application on a dry surface. Suitable for a wide variety of substrates including apolar, slightly rough and curved surfaces.

**S2045N** provides excellent adhesive performance, good cold temperature and adhesion to apolar, slightly rough and curved surfaces such as recycled corrugated cardboard. Provides moisture resistance after application on a dry surface.

**S2049** with excellent adhesive performance, is ideal for textured, HDPE, recycled corrugated cardboard, and difficult substrates.

**S2059** with excellent adhesive performance, is designed for extremely demanding applications, with difficult to label substrates. Suitable for compound curved and extremely irregular surfaces such as those in the textile or carpet industries.

**S2060** provides excellent tack and adhesion on a wide variety of substrates, including textured HDPE and other apolar substrates. This adhesive is designed specifically for application at room temperature. Has good resistance to bleed giving excellent die-cutting and stripping performance.

**C2075** is a freezer grade adhesive with excellent cold temperature performance. Good adhesion on slightly frosted surfaces and resistant to moisture during thawing. Suitable for a wide variety of packaging materials, in particular flexible films, making it ideal for frozen food packaging.

**TS79** A special purpose permanent, rubber-based adhesive designed for demanding applications, including rough and textured surfaces such as those in the tyre and textile industries.

# The Best Applications of Hotmelts

The chemical characteristics of Hotmelts make them an excellent adhesive choice for particular applications. Here are the application conditions hotmelts work best in.



## ✓ Hotmelt is great for

- Recycled carton board
- Low tension surfaces ie. HDPE
- Rough or difficult to adhere to substrates
- Chiller or freezer performance

## ✗ Hotmelt is not suitable for applications involving

- Heat exposure above 70°C
- Incidental solvent exposure
- UV exposure



## More Hot Tips:

- Press speeds are largely dependent on label shape and size, and the efficiency of die cutting through the adhesive
- Make sure the die has the right blade angle and tolerance
- Have a generous corner radius (1 mm at the minimum)

## 3 Biggest Hotmelt Assumptions

### ✘ Assumptions

### ✔ Facts

- 1 Hotmelt adhesive has a bad odour.
- 2 Die cutting hotmelt product is very difficult.
- 3 Edge ooze and adhesive bleed will be an issue.

Hotmelt's odour is different from acrylic due to the rubber component but it is not more intense.

Hotmelt adhesives do have a higher visco-elastic property than emulsions. However, optimisation of the die type and angle, and the matrix removal process will result in good die cutting/matrix stripping. So always take note of the blade angle and tolerance.

This happens when the storage, roll tension, press tensions and die tooling/setup are not optimum, such as tight winding or adhesive whip-up. The good news is these issues can be minimised by ensuring roll and winding tensions are correct.

# Considerations During Adhesive Selection

Amid the vast plethora of adhesive formulas for labels out there, finding the right adhesive that is the most suitable for your particular material and business need can be daunting and time-consuming. That's why we've created this list of key factors to help you decide.



## 1. Does the label need to be permanent or removable?

- A permanent label cannot be removed from the substrate without damage to the label or the substrate
- A removable label can be removed without damaging it or the substrate

## 2. What are the application requirements?

- Is the application done automatically or manually by hand?
- How fast will the label be applied?
- Is repositionability required and if so, for how long?

## 3. What conditions are present during application?

- Is it on moist and humid environment?
- Does application take place in a very dusty, dirty or hot room?
- Will there be other contamination such as product overflow, grease, or gas outflow?

## 4. Are there any special application or exposure conditions the label must withstand?

- Extreme temperatures: For example, if the label will be exposed to temperatures above 70°C for an extended period, an acrylic adhesive combined with film or foil may be required.
- Outdoor weather: If the label is exposed to large amounts of moisture, a moisture-resistant facestock should be selected.
- UV light exposure: Long term exposure to UV light deteriorates rubber based adhesives and can also affect the graphics on the label.
- Sterilisation processes

## 5. What is the composition of the substrate?

- It is important to identify the exact composition of the substrate because it does affect the ultimate bond strength.
- For example, saying "plastic" is not a sufficient description since the level of adhesion varies with the type of plastic involved, whether it is PET or PVC.



## Considerations During Adhesive Selection



### 6. What is the surface energy of the substrate?

- What you want is for the adhesive to “wet out” nicely over the surface of a material.
- High surface energy materials have excellent wet out and provide best adhesion.
- Low surface energy materials prohibit wet out, and the result will resemble water beads on a freshly waxed car.
- Rubber based adhesives generally offer better adhesion to low surface energy substrates.

### 7. What is the texture of the substrate’s surface?

- Adhesion to any substrate is achieved by the adhesive flowing into all areas of the substrate and bonding with them.
- Textured materials do not allow 100% contact of adhesive. So, less contact means a smaller bonding area.
- A rough surface may require a stronger bonding adhesive to achieve acceptable adhesion.

### 8. What is the shape of the substrate?

- The shape of the substrate along with the size and stiffness of the label must be considered to ensure proper end-use performance.
- Curved surfaces (less than 25mm in diameter) will require an aggressive adhesive with thinner face

### 9. Is the application surface clean or contaminated?

- The cleanliness of the surface affects the ultimate adhesion and success of application.
- Contaminated surfaces prevent the adhesive from touching the actual surface, which is one reason why an adhesive fails to perform as expected.
- Typical contaminants include oil, grease, dust, dirt, moisture, ice, and even fingerprints. Mold release agents are another typical contaminate.

### 10. Are there plasticisers present in the substrate?

- Materials containing plasticisers will degrade the adhesive bond strength and may render the label useless.
- Pre-testing is always advisable by accelerated aging when the existence of plasticisers is suspected.

DISCLAIMER - All Avery Dennison statements, technical information and recommendations are based on tests believed to be reliable but do not constitute a guarantee or warranty. All Avery Dennison products are sold with the understanding that purchaser has independently determined the suitability of such products for its purposes.

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