Tapes and Adhesives for Low Surface Energy Applications

3M™ LSE PRODUCT SELECTION GUIDE

- BOND PLASTIC AND OTHER HARD-TO-BOND MATERIALS
- REDUCE RELIANCE ON MECHANICAL FASTENERS
- ELIMINATE THE NEED FOR PRIMERS AND SURFACE TREATING

Our team at JBC Technologies and our partners at 3M™ are here to help guide you through the tape selection process. If you have any questions, feel free to reach out at ***sales@jbc-tech.com*** or ***440-327-4522***.

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CHOOSING AN ADHESIVE

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THE BASICS

When choosing an adhesive, there are multiple factors to consider. First, you must know the basic properties (including the surface energy) of the substrates you wish to bond. To form a secure bond, the surface energy of the substrate must be higher than that of the adhesive. This can be achieved by either raising the surface energy of the substrate or using a low surface energy adhesive such as those introduced in this guide.

If you are unclear on the surface energy properties of the materials you are trying to bond to, use the chart below as a guide.

FOR MORE INFORMATION, PLEASE READ JBC'S EGUIDE:

5 Reasons Pressure Sensitive Adhesives Fail, A Guide to Preventing Pressure Sensitive Adhesive Failure

Metal Surfaces (High Surface Energy)

High Surface Energy Plastics (HSE)

Low Surface Energy Plastics (LSE)

Metals	Surface Energy (Dynes/cm)
Copper	1103
Aluminum	840
Zinc	753
Tin	526
Lead	543

High Surface Energy (HSE) Plastics	Surface Energy (Dynes/cm)
Polyimide	50
Phenolic	47
Nylon®	46
Alkyd Enamel	45
Polyester	43
Epoxy Paint	43
Polyurethane	43

High Surface Energy (HSE) Plastics	Surface Energy (Dynes/cm)
ABS	42
Polycarbonate	42
PVC	39
Modified PPE Resin	38
Acrylic	38
Polane® Paint	38

Low Surface Energy (LSE) Plastics	Surface Energy (Dynes/cm)
PVA	37
Polystyrene	36
Acetal	36
EVA	33
Polyethylene	31
Polypropylene	29
PVF	28
PTFE	18
Powder Coatings	Broad Range

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Next, think about **how the product will be assembled.** Does your assembly process require an adhesive with immediate bond strength or is it important to be able to remove or reposition the product?

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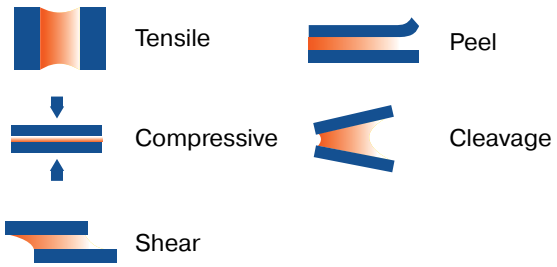
Finally, consider **where and how the product will be used.** This will provide insight into how the adhesive needs to perform. Be sure to consider the type of stress and environmental conditions that the adhesive will be subject to, as well as how long you need the adhesive to last.

Types of Stress



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CHOOSING AN ADHESIVE

TAPE CONSTRUCTION

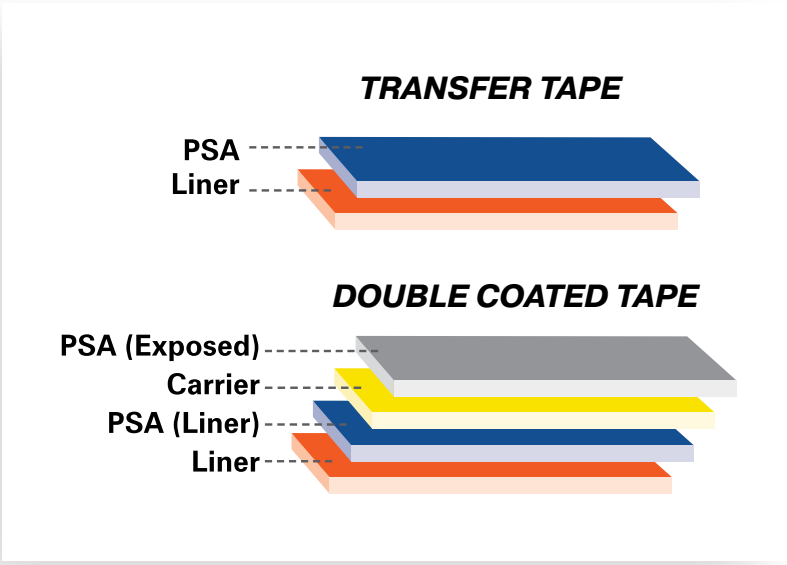
Different applications require different types of tape. Here is a quick overview of terms you'll find further on in this guide.

- **Adhesive Transfer Tapes -** Transfer tapes have no carrier. The adhesive is coated onto a removable release liner, typically made of film or paper. Transfer tapes are typically thinner and more conformable due to the absence of a carrier. These are available with single or double liners. *Applications range from electronic components and displays to membrane switches, and more.*

- **Double Coated Tapes -** Double coated, also know as double sided, tapes are constructed of a liner (one or both sides); an adhesive, a carrier, a second adhesive, and another liner. *Applications include permanent and temporary bonding, mounting, vibration damping, sealing, gap filling, spacing, and more.*

- **Differential Double Coated Tapes -** Differential coated tapes feature one adhesive formulation on one side of the carrier, and a second adhesive on the other. These tapes are helpful for bonding two materials that are vastly different. They are also useful when you need a permanent adhesive on one side and a removable adhesive on the other.

- **VHB™ Tapes -** VHB tapes are a subset of double sided tapes that are constructed with a foam carrier, offer high viscoelasticity that enables them to absorb energy, relax stress, accommodate sheer, tensile, and compression loading and provide a 100% surface bond.



JBC's sales and technical teams have well over a century of combined experience helping OEMs and tier suppliers identify the right material for their application.

We'll help you:

- Find the right tape to meet your substrate and application needs
- Mix and match materials and adhesives
- Create custom constructions that achieve your specific objective
- Identify and implement automated assembly and custom part presentations to optimize productivity at your plant

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ADHESIVES

300 LSE

300LSE Acrylic Adhesive provides a thin, clean bond-line with excellent anti-lifting resistance on everything from oily metals to powder coated paints. Seal out water, dust, and chemicals with vibration damping, immediate handling strength, and short-term heat resistance up to 400ºF (149ºC). 300LSE Acrylic Adhesive offers a 180º peel strength (N/cm) at room temperature (72-hour dwell at 70ºC)

Adhesive Family	Adhesive Properties				Adhesion to:			Environmental Performance Resistance to:				Temperature °F (°C)		
	Peel		Shear											
	Initial	Ultimate	Room Temp.	150 °F	Metal	HSE Plastic	LSE Plastic	Chemical	Ultra Violet	Plasti-cizers	Hu-midity	Minimum Application	Service Low †	Service High †
Acrylic Adhesives														
300LSE	7	9	8	8	9	9	10	8	7	4	9	50 (10)	-40 (-40)	300 (149)

VALUES: 1 = LOWEST PERFORMANCE; 10 = HIGHEST PERFORMANCE
Rankings are a general guide. Adhesives should be tested with actual components to ensure acceptable performance.

LINERS

REFERENCE CHART

3M offers paper and film release liners with a range of constructions and weights to meet various process requirements.

- **Paper Liners** include densified kraft (DK) for rotary processing, as well as to reduce the edge burr on metal plates. Select tapes offer extended DK liners (XL) and polycoated kraft (PCK), which maintain moisture stability and resist wrinkling and curling.
- **Film Liners** add strength across both high-speed and clean room processing. They also offer high clarity for graphic inspection.

PAPER LINERS

Basis Weight	Caliper Mils	Liner Type	Description	High Tensile Strength	Humidity Resistance	Rotary Processing	Kiss Cutting	Steel Rule
58#	4.2	Polycoated Kraft (PCK)	Moisture stable, Flat-bed die-cutting.		■			■
58#	4.2	Polycoated Kraft (PCK) Lay-flat	Excellent moisture stability for lay-flat processing.		■	■		■
83#	6.2	Polycoated Kraft (PCK)	Excellent moisture stability for lay-flat pro-cessing. Thicker caliper for kiss-cutting and steel rule die-cutting.		■		■	■

FILM LINERS

-	2.0	Clear Polyester (PET)	High strength reduces breakage during die-cutting and dispensing.	■	■	■	■	■
-	3.0							

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300 LSE TAPES

Adhesive Transfer Tapes

Adhesive Family	Product	Description/ Application Ideas	Adhesive Caliper (mils)	Liner		Master Size	Specs	Adhesion				Chem. Resist.	Temperature	
				Type	Caliper (mils)			Metal	HSE Plastic	LSE Plastic	Foam		Low °F (°C)	Low °F (°C)
300LSE Low Surface Energy Acrylic	9453FL	Film lined version of 9453LE for rotary processing.	3.5	PET	2.0	54" x 180 yd	UL	9	9	10	1	8	-40 (-40)	300 (149)
	9453LE	A 3.5 mil version of 9471LE for appli-cation to rough surfaces.	3.5	58# PCK	4.2	54" x 180 yd	UL							
	9471FL	Film lined version of 9471LE for rotary processing.	2	PET	2.0	54" x 180 yd	UL							
	9471LE	Bonds graphics to powder coatings, LSE plastics and oily materials.	2	58# PCK	4.2	54" x 180 yd	UL							
	9472FL	A 5 mil version of 9471LE with film liner for textured surfaces.	5	PET	2.0	54" x 180 yd	UL							
	9472LE	Thicker adhesive for textured LSE plastics and powder coatings.	5	58# PCK	4.2	54" x 180 yd	UL							
	9653LE	Heavy lined 9453LE for easy handling and lay-flat properties.	3.5	83# PCK	6.2	54" x 180 yd	UL							
	9671LE	Heavy lined 9471LE for easy handling and lay-flat properties.	2	83# PCK	6.2	54" x 180 yd	UL							
	9672LE	Heavy lined 9472LE for easy handling and lay-flat properties.	5	83# PCK	6.2	54" x 360 yd	UL							

Double Linered Adhesive Transfer Tapes

Adhesive Family	Product	Description/ Application Ideas	Adhesive Caliper	Liner		Master Size	Specs	Adhesion				Chem. Resist.	Temperature	
				Type	Caliper			Metal	HSE Plastic	LSE Plastic	Foam		Low ° F (° C)	High ° F (° C)
300LSE Low Surface Energy Acrylic	8132LE	Double linered laminating adhesive 9471LE. For selective die-cutting. Application to smooth surfaces.	2	58# PCK	4.2	48" x 360 yd	UL	9	10	10	1	7	-40 (-40)	350 (149)
				83# PCK	6.2	48" x 36"								
	8153LE	Double linered laminating adhesive 9453LE. For selective die-cutting. Application to rough surfaces.	3.5	58# PCK	4.2	48" x 360 yd	UL							
				83# PCK	6.2	48" x 36"								

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300 LSE TAPES

Double Coated Tapes

Adhesive Family	Product	Description/ Application Ideas	Tape Cal. (mils)	Carrier Type	Liner Type	Liner Caliper (mils)	Master Size	Specs	Adhesion Metal	Adhesion HSE Plastic	Adhesion LSE Plastic	Adhesion Foam	Chem. Resist.	Temperature Low °F (°C)	Temperature High °F (°C)
300LSE Low Surface Energy Acrylic	93005LE	Very thin double coated polyester tape with good anti-lifting properties.	2.0	PET	58# PCK/ 83# PCK	4.2/ 6.2	54" X 360 yd*	UL	9	9	10	1	8	-40 (-40)	300 (149)
	93010LE	Extremely smooth adhesive for excellent graphic appearances. Good chemical and humidity resistance.	3.9	PET	58# PCK	4.2	54" X 180 yd	UL							
	93015LE		5.9	PET	58# PCK	4.2	54" X 180 yd	UL							
	93020LE		7.9	PET	58# PCK	4.2	54" X 180 yd	UL							
	9495LE		5.9	PET	58# PCK	4.2	54" X 180 yd	UL							

Differential Double Coated Tapes

Adhesive Family	Product	Description/ Application Ideas	Tape Cal. (mils)	Carrier Type	Liner Carrier Type	Liner Caliper	Master Size	Specs	Adhesion Metal	Adhesion HSE Plastic	Adhesion LSE Plastic	Adhesion Foam	Chem. Resist.	Temperature Low °F (°C)	Temperature High °F (°C)
200MP/ 300LSE	9496LE	Adhesive 200MP provides excellent bond strength to a variety of high surface energy subtrates. 300LSE bonds to powder coated metals, oily metals and LSE plastics.	6.7	PET	58#/ 58#	4.2/ 4.2*	48" x 540 yd	–	10	9	1	3	9	-40 (-40)	250 (121)
									9	10	10	1	7		

VHB LSE TAPES

Developed specifically for LSE substrates such as polypropylene (PP), thermoplastic elastomers (TPE) and thermoplastic olefins (TPO).

VHB LSE Tapes

Product Number	Tape Thickness w/o Liner mils (mm)	Liner Type	Temp. Resistance °F (°C) Minutes Hours	Temp. Resistance °F (°C) Days Weeks	Solvent Resistance	Relative Adhesion HSE	Relative Adhesion LSE	Spec	Application Ideas
LSE-060WF	25 (0.6)	5 mil Red Printed Polyethylene Film	300 (150)	200 (93)	High	High	High	–	■ Made to live outdoors. ■ Resists hot, cold and cycling temperature, UV light, moisture and solvents. ■ Seals against environmental conditions. ■ Low temperature bonding with high initial tack at low temperatures on frost-free surfaces down to 0°C.
LSE-110WF	45 (1.10)								
LSE-160WF	62 (1.6)								

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About JBC Technologies

At JBC Technologies we convert flexible materials into die-cut parts that help manufacturers solve problems – whether that be bonding to low surface energy plastics and powder coated metals, shielding against radio frequency or electromagnetic interference, reducing buzz, squeak and rattle, sealing out air, moisture, or chemicals, or simply finding a better solution to integrate our part into your process. ***Need a quick trial run? Just let us know. We do prototypes too.***

CONVERTING CAPABILITIES

- **Flatbed, rotary, and matched metal die cutting**
- **Automated assembly**
- **Ultrasonic welding**
- **Cold laminating**
- **Corona treating**
- **Embossing**
- **Hot roll laminating**
- **Micro-perforating**
- **Rapid prototyping**
- **Slitting**
- **Sheeting**

APPLICATIONS

- **Assembly adhesive patches**
- **Bonding**
- **Cushioning**
- **Diagnostics**
- **EMI/RFI shielding**
- **Fastening and Joining**
- **Gasketing**
- **Heat shielding**
- **Masking**
- **Noise reduction**
- **NVH/ BSR**
- **Packaging**
- **Sealing**
- **Sound deadening**
- **Vibration dampening**
- **More**

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