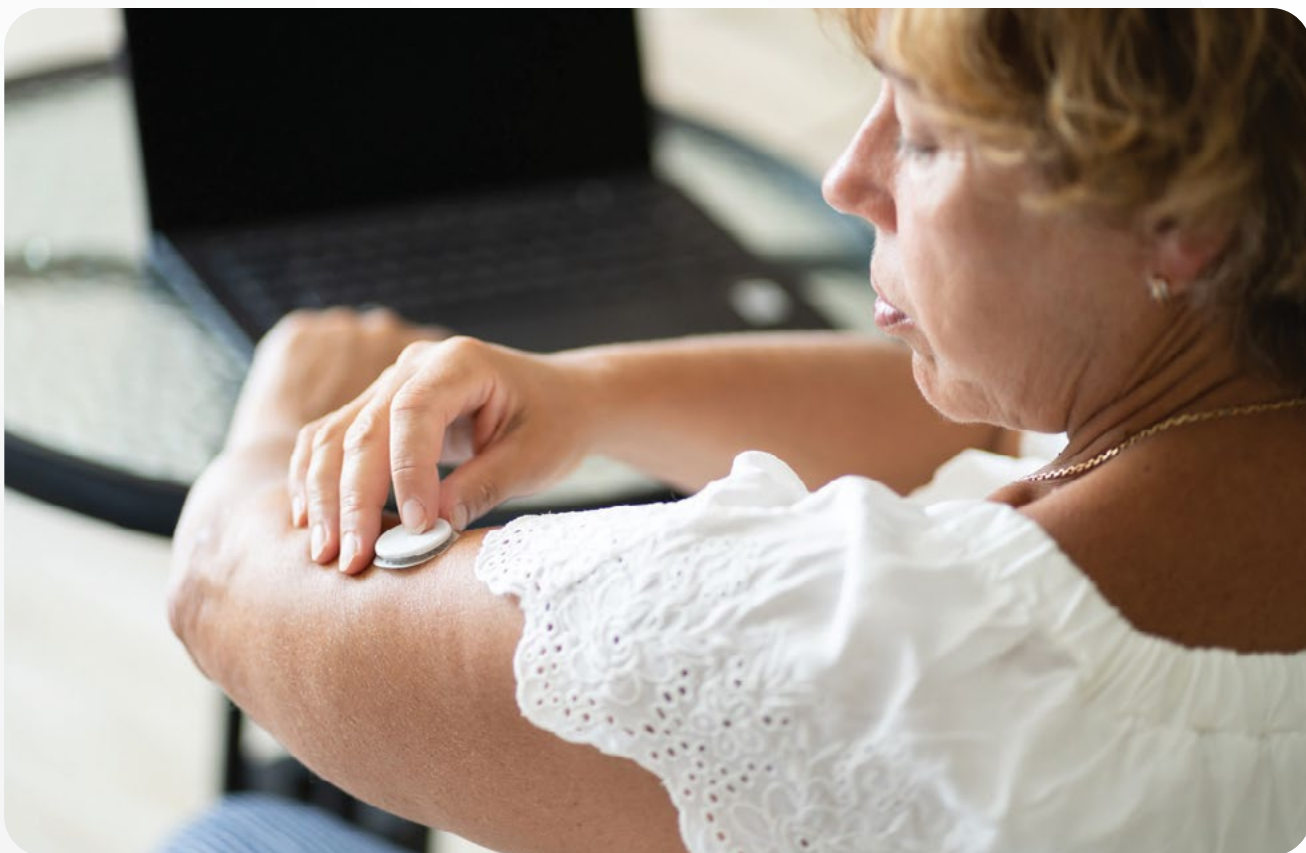
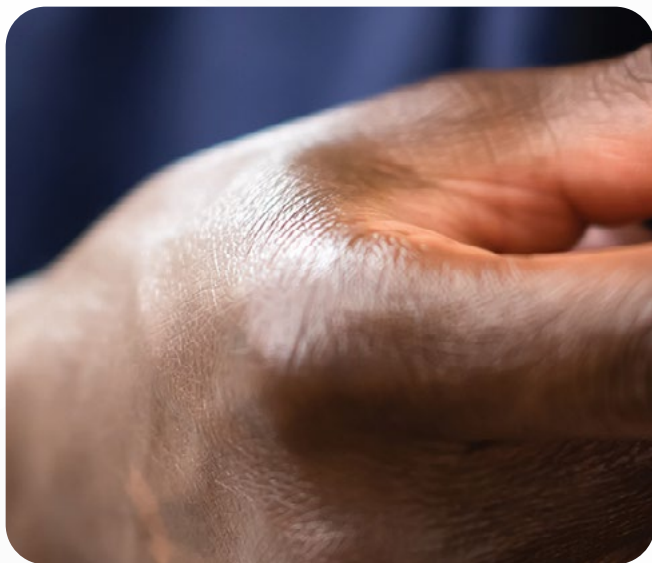


# Medical-Grade Adhesives Unmasked

WHAT MANUFACTURERS NEED TO KNOW TO GET  
MAXIMUM VALUE FROM ADHESIVE MATERIALS



***Precision  
Converting***  
A DIVISION OF HISCO



## What are medical tapes and adhesives?

Pressure-sensitive adhesive tapes and other products offer significant value to medical OEMs and component suppliers. But in this highly regulated industry where precision and contamination control are key to both product performance and patient safety, material selection is crucial.

Precision Converting has extensive experience helping medical manufacturers select, source and convert medical adhesives to meet requirements for a wide range of applications. We work with some of the top manufacturers and suppliers in the industry to develop custom solutions that exceed expectations. We created this eBook to help guide adhesive selection and simplify the go-to-market process.

### WHAT ARE MEDICAL TAPES AND ADHESIVES?

The most common types of medical adhesives are made from synthetic rubber, acrylate and silicone. Specialty materials may have unique formulations, but in general, medical-grade adhesive tapes fall into these categories:

- Adhesive transfer tapes
- Single-coated tapes
- Double-coated tapes
- Foam tapes
- Cloth tapes
- Plastic tapes
- Transdermal films and laminates
- Medical release liners
- Much more

### Biocompatibility testing and process validation

Any adhesive selected will have to pass tests for biocompatibility as outlined in the ISO 10993 standard. Precision Converting can guide adhesive material selections based on your needs to meet these requirements. Likewise, the FDA 21 CFR part 820 and ISO 13485:2016 require manufacturing processes to be validated to sustain medical devices. Manufacturing process validations involve baseline engineering studies, operational qualification performance, and test method validations to ensure the repeatability and reproducibility of measurements and device outputs. Precision Converting offers process validation services to help medical OEMs meet regulatory requirements and bring products to market faster.

### MEDICAL DEVICES AND APPLICATIONS

Precision Converting can provide custom solutions for:

- Wearable monitors
- Ultrasound equipment
- Wound care products
- Disposable products
- Diagnostic test strips
- Continuous glucose monitors
- Drug delivery devices
- EKG machines
- Much more



# Structural and component bonding for medical devices

When bonding housing assemblies or other structural elements of medical devices like ultrasound or MRI machines, adhesives provide a number of advantages compared to mechanical fasteners like screws and rivets.

## BONDING DISSIMILAR SUBSTRATES

Bonding dissimilar substrates can be a significant challenge for medical OEMs and subassembly suppliers as material compatibility is crucial for ensuring product viability. Double-coated tapes can provide an effective and economical solution. For example, low surface energy (LSE) and high surface energy (HSE) acrylic adhesives can bond to a variety of surfaces. Our Precision Converting experts can convert tape products to feature different types of adhesives on each side to match substrate material characteristics.

## SEALING

Ingress protection is critical for product longevity, particularly for sensitive electrical components. Adhesive tapes can provide effective sealing under a wide range of conditions and are flexible to contour to complex geometries. For example, 3M™ VHB tape provides very strong bonding in a thin material to minimize bond lines and improve design freedom. At Precision Converting, we can also convert gasketing materials to provide additional sealing solutions.

## DURABILITY OF MATERIALS

Many medical devices undergo regular cleaning or disinfecting, sometimes with harsh chemicals. This means adhesives need to be able to maintain their bond after repeated exposure to these chemicals. Adhesive tapes such as acrylic adhesive transfer tapes provide exceptional durability and are chemically resistant to perform well under harsh conditions.



## ADDITIONAL BENEFITS OF MEDICAL ADHESIVES

In addition to sealing and bonding applications, medical-grade adhesives offer other benefits, including:

- **Foam tapes can dampen sound and enhance noise, vibration, and harshness (NVH) solutions.**
- **Thermally and electrically insulating tapes can improve product safety and EMI/RFI shielding.**
- **Adhesive solutions featuring foam or rubber materials can enhance impact protection for sensitive components.**

# Adhesives for diagnostic products and disposables

Diagnostic test kits, including microfluidic apparatuses, require extreme precision in the manufacturing process to avoid contamination and ensure accurate results. Many pressure-sensitive adhesive tapes offer good chemical resistance, so they don't compromise results, and they are easy to work with in the manufacturing environment to streamline assembly processes.

## SEALING TO PREVENT SAMPLE CONTAMINATION

If adhesives come into contact with samples or testing reagents, they can compromise results. This is why effective sealing solutions are so important, especially for microfluidic applications where fluids flow within the test across small channels cut into specialty card stock. Precision Converting can convert adhesive materials to very thin widths to provide effective sealing in these types of applications.



## ECONOMIC AND ENVIRONMENTALLY FRIENDLY PRODUCTION OF DISPOSABLES

Swabs, diagnostic test strips, bandages, gauze, and other disposable medical products all feature adhesive materials. Biocompatibility is critical for these types of products and adhesives should be selected with this as a top concern. Our material converting services help limit waste to make disposable production more economical and environmentally friendly. We can also provide primary and secondary packaging solutions for these products to create turnkey solutions for medical manufacturers.



## Stick-to-skin adhesives

Whether the goal is to create therapeutic patches, wound care products or a wearable device that attaches to the skin like a continuous glucose monitor, the stick-to-skin adhesives used play a major role in patient comfort and product performance.

### CONSIDERATIONS FOR SELECTING AN ADHESIVE

Skin is a notoriously difficult surface to adhere to because it is constantly changing and characteristics vary from person to person. When developing an adhesive system, product developers should consider:

#### Patient comfort and autonomy

Adhesives need to be strong enough to remain attached for the intended wear time, but they can't be too aggressive, or they can cause skin irritation.

#### Skin as an application surface

Skin has varying textures, sheds, regenerates, produces moisture, and application sites may have hair, all of which can make bonding difficult. Adhesive materials should be versatile enough to reliably bond under a wide range of skin conditions.

#### Wear time

Wear times can vary widely from only a few minutes or hours up to several weeks depending on the product. Adhesives should be selected carefully so products remain attached for the intended duration while still removing easily without damaging the skin.



#### Breathability and moisture management

To prevent maceration or other skin damage, wearable products must be breathable and provide effective moisture management without compromising the bond. Adhesives play a major role in the breathability of a wearable stack up and must be compatible with mating substrates.

#### Removal

Product developers should consider whether users need to be able to remove the product themselves, or if they would require support, potentially from healthcare professionals.

### SILICONE VS ACRYLIC ADHESIVES

When it comes to stick-to-skin adhesives, the two most commonly used types are silicone and acrylic. Silicone adhesives are generally considered to be gentler on the skin and cause less irritation during wear and removal. This is why silicone adhesives are commonly used for shorter wear times, or applications involving geriatric or neonatal patients. Acrylic adhesives, on the other hand, generally create stronger bonds, which make them better suited for long-term wear.

# Converting medical tapes and adhesives

The right material converter can add significant value to adhesive products. But working with specialty medical materials takes skill, experience, and the proper equipment. Here are some things to consider when choosing a converting partner.

## CLEANROOM PROCESSING AND MEDICAL-GRADE FACILITIES

Medical manufacturing requires cleanroom capabilities to prevent contamination of final products, particularly for testing apparatuses and other diagnostic equipment. At Precision Converting, we are ISO 13485:2016 certified and FDA registered, with Class 7 (Class 10,000) cleanroom, controlled environment manufacturing and storage, and additional cleanroom capabilities. Our state-of-the-art equipment ensures the airborne cleanliness and control of humidity, static, and temperature that cleanroom applications require.

## HANDLING AND PROCESSING EXPERTISE

Specialty medical adhesives require skilled handling to ensure the material doesn't get damaged or contaminated during processing. We follow strict quality standards and process controls to provide reliable quality in every production run. We also match our process to the material to meet project requirements. For example, laser cutting can burn or damage the edge of some adhesive tapes which could introduce unwanted chemical elements into the product. So, we would instead use precision die cutting to achieve the desired dimensions without compromising product performance.

## ISLAND PLACEMENT

Island placement capabilities are crucial for creating therapeutic patches, bandages, and other wound care products. But not every converter offers this service or has the technical ability to execute at the highest level of quality. At Precision Converting, our experts have deep experience executing complicated island placement projects with tight tolerances.





## OUR MEDICAL CONVERTING CAPABILITIES

- Medical VMI solutions and RFID capabilities
- PCE ISO 13485 and FRD registration
- Dedicated medical converting facilities
- Controlled environment storage
- Medical die and laser cutting
- 23 ISO 9001:2015 stocking locations
- Three Class 7 Cleanrooms across fabrication sites
- Large distribution network throughout North America

## Why you should work with Precision Converting

Precision Converting is the best choice for medical manufacturers looking to enhance products and streamline operations. Our extensive converting capabilities and deep experience in the healthcare industry allow us to create custom solutions with tight tolerances. We offer die cutting, laser cutting, slitting, laminating, cold storage, printing, prototyping, assembly, and other value-added services. We have three converting sites that provide redundancy to mitigate risk, as we have the ability to second source ourselves if there is a supply chain disruption. We also maintain strong relationships with top materials suppliers and equipment manufacturers, creating strategic partnerships that help us solve problems for our customers.

Our experts understand the goals and challenges of medical manufacturers and take a consultative approach to provide innovative solutions. Healthcare OEMs and suppliers trust Precision Converting to deliver outstanding quality, reliability, and unsurpassed service.

### UNBEATABLE ACCESS TO TOP MATERIALS

As a division of Hisco, we are part of a vast distribution network with 23 certified ISO 9001:2015 stocking locations. This helps us shorten lead times for our customers and keep projects on schedule. We can source specialty materials and other products that are difficult to find, giving our customers a competitive edge. We are also a 3M™ Preferred Converter with access to the 3M™ medical division which produces some of the best and most highly sought-after medical adhesives on the market.

Ready to launch your next medical manufacturing project?

Connect with Precision Converting today to see how we can solve your biggest manufacturing challenges.

# ***Precision Converting***

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