

The Complete Technical Guide for Adhesive Tape

In this comprehensive guide to *all things adhesive tape*, we're sharing 45 years of experience with you including:

- [What is Adhesive Tape?](#)
- [A Brief History of Tape](#)
- [How Adhesive Tape is Made](#)
- [What Makes Tape Stick](#)
- [Advantages of Pressure Sensitive Tape](#)
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- [What is Adhesion Value, Exactly?](#)
- [Tensile Force vs. Shear Force](#)
- [Release Liners: What Are They and Why Do You Need Them?](#)
- [Why Adhesive Tape is a Universal Tool](#)

Read on to find out why adhesive tape is quickly replacing glues and fasteners in manufacturing and construction, and how you can use it on your project today.

What is Adhesive Tape?

Adhesive tape (a.k.a. pressure sensitive tape, PSA tape, self-stick tape, or sticky tape) consists of a pressure-sensitive adhesive coated onto a backing material such as paper, plastic film, cloth, or metal foil.

Some tapes have removable release liners that protect the adhesive until the liner is removed. Some have layers of adhesives, primers, easy release materials, filaments, printing, etc. made for specific functions.

Pressure-sensitive adhesives (PSAs) do not require water, solvent, or heat activation to bond to materials such as paper, plastic, glass, wood, cement, and metal.

PSA tapes are tacky at room temperature in dry form, and they adhere firmly to a variety of surfaces and require only the application of a finger or hand. Technically speaking, that's a [bonding pressure](#) of 14.5 – 29 psi =[^] 10 – 20 N/cm² or greater.

Single-sided tapes allow bonding to a surface or joining of two adjacent or overlapping materials. [Double-sided tape](#) (adhesive on both sides) allows the joining of two items back-to-back.

A Brief History of Tape

The history of stickiness didn't start with tape. It's credited to the bees. Or rather, woodworkers in ancient Egypt used glue made from natural, viscous substances like beeswax and resin to hold materials together.

In modern times before tape, glues and epoxies did most of the sticky work. But they had serious drawbacks, especially in household use. Messiness, permanence, and drying to a hard finish all made traditional glues less-than-ideal.

It wasn't until 1925 that adhesive tape, as we know it today, was invented.

According to [How Stuff Works](#):

"Masking tape, as it became known, was intended to solve a very specific problem: applying two-toned paint jobs to cars. Before masking tape, auto shops were "masking off" for each color application using glue and paper. Peeling off the paper ruined countless paint jobs. Richard Drew, a young research assistant, witnessed one such ruined job and the furious cursing that followed. Drew, who had absolutely zero experience in adhesives, decided, apparently on the spot, to create an adhesive that could be removed from dry paint without peeling it off. Two years later, masking tape was introduced."

Today, adhesive tape comes in all shapes and sizes, with

varying degrees of stickiness, and for close to [45 years](#), [ECHOtape](#) has helped our customers match their specific application needs with the right pressure-sensitive tape.

And in that time, we have found that the majority of people have the same complaints and questions about tape. Here's *almost* everything you need to know about adhesive tape as an industry professional.

How is Adhesive Tape Made?

We could tell you how adhesive tape is made, but this video by The Science Channel is much more fun:

As an aside, this video is also a great example of how tape is used in splicing. But that's another topic for another time.

What Makes Tape Stick?

While the adhesive used on pressure-sensitive tapes might seem alike – they are all tacky, adhere well, and resist stresses – they are actually quite different. There are pros and cons for each tape type, be it rubber/resin, synthetic rubber, acrylic, and silicone-based adhesives.

Rubber/Resin is the oldest type of adhesive based on natural rubber, but it needs a resin to make it into an adhesive.

For many jobs, rubber/resin adhesives offer many advantages:

- It is often a less expensive adhesive.
- Has an initial high tack, as opposed to acrylic which needs time to cure.
- Sticks well to many different surfaces, including some hard-to-stick-to materials.
- Rubber-based adhesives provide highly flexible bonds and are usually based on butadiene-styrene, butyl, polyisobutylene or nitrile compounds.
- It can be formulated to adhere at colder temperatures, but there is a limit, and rubber/resin adhesives have limitations at higher temperatures in its basic form.
- Epoxy resins exhibit high strength and low shrinkage during curing and are known for their toughness and resistance to chemical and environmental damages.

When it comes to disadvantages, rubber/resin's main weakness is that both the rubber and the resin are prone to oxidation from the air. Therefore, exposure to ultraviolet light from the sun and other light sources can break down in heat.

Synthetic Rubber can be used in place of natural rubber. Offering much higher adhesion and shear resistance than natural rubber-based adhesives; as a result, it is very good for sealing packages and cartons.

Acrylic Adhesives Most of the weaknesses of rubber/resin

adhesives are overcome by a single component of pressure-sensitive adhesive based on “acrylic” chemistry. Acrylic is colorless and is stable to oxidation and exposure to ultraviolet light. The stability to oxidation can give an acrylic adhesive tape many years of protection against ultraviolet light. However, it is more expensive – about twice as much as rubber/resins; it’s not quite so good as natural rubber on harder-to-adhere surfaces, and it needs significant time to cure.

Silicone-based Adhesives give many years of service life. Like acrylics, silicone can be used against the skin, so it has many medical applications as well as uses in the electrical industry where temperature is a challenge (e.g., jet engines). Silicone adhesives and sealants have a high degree of flexibility and are resistant to very high temperatures. However, silicones are the most expensive adhesives of all, typically twice as much as acrylics.

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What are the Advantages of Pressure Sensitive Tape?

Traditional adhesives essentially transform from a liquid form into a solid one to adhere. Those processes are a function of the type of adhesive and how it is engineered to work and for

what purpose. The interesting aspect of pressure-sensitive tapes is that they are “just liquid enough” to sufficiently wet the surface the tape contacts.

Conversely, these pressure-sensitive adhesives have enough of a solid-state character to resist any forces trying to remove it. As a result, pressure-sensitive adhesive tapes deliver the ideal means of fastening and offer the following significant advantages:

- Other than ensuring that the surface is clean and dry, there is no preparation necessary.
- Compared with trying to secure something with fasteners such as screws (which can cause various issues depending on the surface to which you need to attach) adhering something with tape can take seconds.
- No special tools are needed, other than something to cut the tape (scissors or a tape dispenser). Many tapes can even be torn by hand. Compared with fasteners such as screws, this is a much easier installation option.
- It isn't messy to use – there are no brushes or application tools and there is no surplus of adhesive or waste of materials.
- Tape is extremely inexpensive compared to sealants, and provides an incredible number of uses per roll.
- Tape can be applied as a die-cut to the exact area needed, further minimizing waste.

- It is uniform in thickness, giving a precise bond.
- It is instantaneous, which means no waiting for drying or chemical reaction.
- The finished bond is stress-free. All other adhesives create stress in the joint when changing state, which can potentially weaken the bond.
- It comes in many different varieties, some of which are tailor-made to very specific applications.

Why Tape Is Better Than Glue

On a job site full of tools and equipment, *the right adhesive tapes can go further than a bucket of screws, for a lot less money.* The versatility of adhesive tape makes it a practical substitute to replace traditional fasteners.

- **Overall, the most compelling case for using tape over glue is that there's less mess, and tape takes less time to get the job done.**
- Available in a range of widths to suit multiple projects, adhesive tape is rated to support pounds per square inch while varying thicknesses and bonding properties combine to **provide construction-strength adhesion for the unique challenges of dissimilar surfaces.**
- Many adhesive tapes **feature a weather and UV-resistant**

stick for “tough to adhere to” surfaces like plastic, glass, and wood.

How To Choose the Right Tape

We get this question a lot: *How do we actually know that it's the right tape for the application and that it's going to last?* And that's totally fair.

Almost everyone we know has a tape failure story, but tape isn't the same as what you grew up with, or even what you used five years ago. Just as the cell phone in your pocket has gotten smaller, faster and smarter, adhesive technology has gotten stronger and more versatile.

On a job site full of tools and specialty equipment, tape may seem as ubiquitous as a hammer and nails. However, nothing beats tape for versatility, portability, and ease of use... that is IF you have the right tape for the job at hand. And that's the conundrum, isn't it? The sheer volume of pressure-sensitive adhesives is so overwhelming that it's hard to know where to begin.

To help, we've created an infographic as a portable field guide for builders and contractors. [You can find it here:](#)

THE SECRET TO CHOOSING THE RIGHT TAPE

A GUIDE FOR BUILDERS + CONTRACTORS



What Conditions Make Tape Fail?

When it comes to tape, you may think you can't believe everything you read. Upon review, a tape's specification sheet can indicate that its adhesive properties are good, but when you use it, the resulting adhesion is poor.

Of course, when this happens, the tape tends to get the blame. But it isn't always your tape for example that is at fault. In fact, it may be the surrounding conditions or even the surface that you are trying to stick the tape to.

If you're facing this challenge, carefully consider every condition that could affect your tape. These can include several variables:

Temperature

Carefully factor in the temperature. Are both the tape and the surface at least 18°C/65°F? The tackiness of the adhesive tape is very temperature-dependent, and **the colder the conditions, the poorer the bond will be**. If you must work at lower temperatures, then use an adhesive tape specifically designed for colder climates.

Related: [Why Tape Doesn't Stick in the Cold](#)

Surface: Is the surface clean? Traces of dust, dirt, grease, and even the slightest trace of moisture will contaminate the adhesive surface and act as a barrier between the two. To best prepare, the surface, give it a quick wash with rubbing alcohol and dry it with a clean cloth.

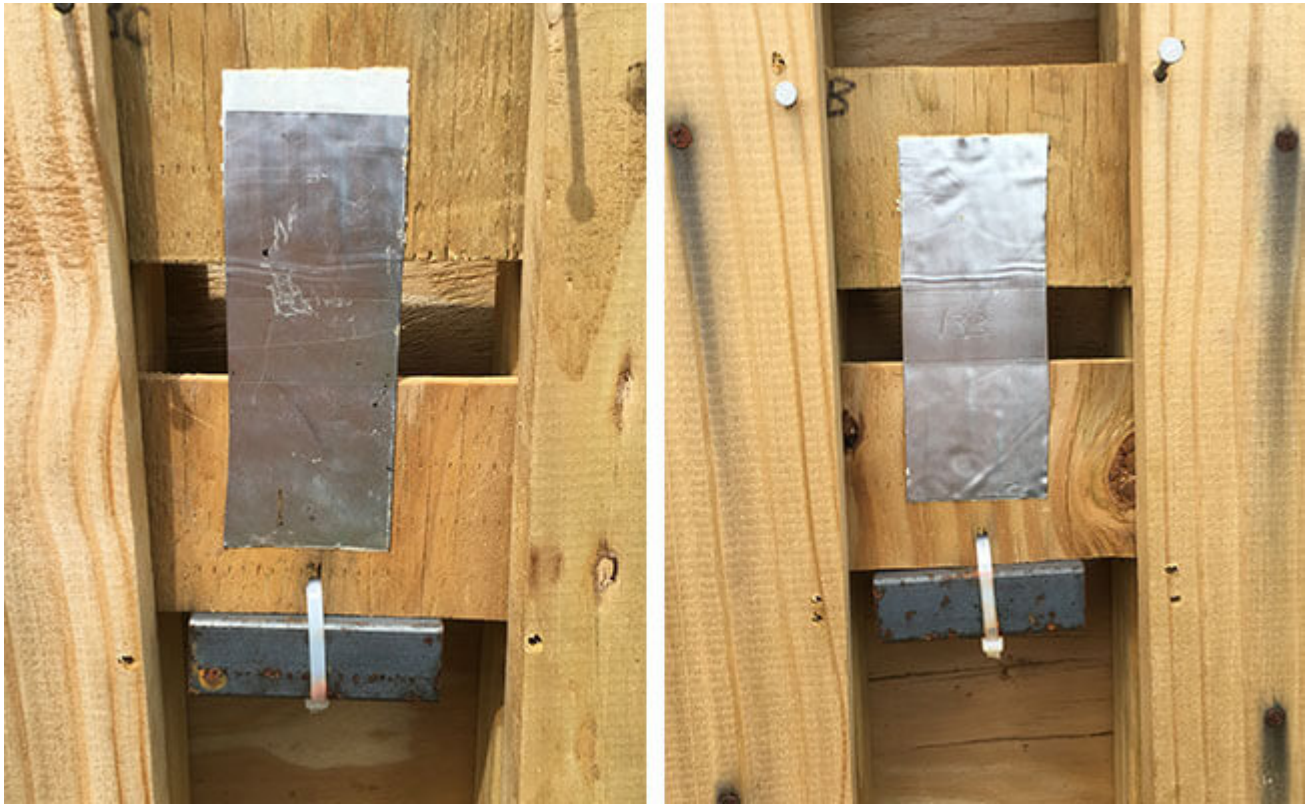
Uniformity

The typical adhesive tape has a very thin, flat smooth layer of adhesive. Is your surface also flat and smooth, so that the two can uniformly contact one another? If your surface is rough and full of micro “hills and valleys,” the tape can only make contact at the high points – which will result in a weak bond. With a moderately rough surface, you will need a tape with a much thicker adhesive that can fill these valleys, thus providing a major improvement in contact. If it is too rough, then you may need a foam tape with enough deformation to make a good bond.

Chemistry

Is the surface you are working with a plastic or other material? Is it covered with paint or another coating that has a naturally low adhesion or even release quality? Regular adhesive tape won't stick to waxed surfaces, Teflon®, or silicone, and will even have difficulty sticking to polyethylene. A very tacky tape will help, as well as tapes with an adhesive that is based on natural rubber, *but you may need to turn to an adhesive tape specifically designed for your specific surface.*

As a very last resort, you may need to change the character of your surface to get an adhesive tape to stick to it. This could mean roughening it with an abrasive or even treating it with a prime coat that is compatible with both the surface and the adhesive.



How To Test Tape

When a customer comes to us with a challenge, we actually test the tape for them and with them.

There are two ways to do this: Real-world field testing and lab testing. Ideally, we get to do both, like at [The Durability Lab](#), but the bottom line is that the real world test matters most.

What good is a lab report when your building envelope leaks like a sieve, or your flying splice failed because the

adhesive didn't stick fast enough? Not good at all.

So here we're going to walk you through the most common tape testing variables we use at ECHOtape.

Know Your Substrate

One of the most critical aspects of our application trials is to test the tape on the actual substrate which is where real-world applications come into play.

For years, lab tape testing was performed on standardized substrates, like steel, and it did not differentiate performance based on a specific material. Over the last five decades, we have learned how critical a factor this is. The tape may work on one specific substrate and fail on others. Sometimes the tape works on a substrate, but when any changes to the chemistry or condition of the substrate change, the tape could end up failing. Even a small change can have a major effect.

Take, for example, splicing tapes. In many situations, customers need a quick stick while materials are still moving (called a *flying splice*), but then the tape needs to permanently adhere for long-term performance. We first test splicing tape by hand on the substrate – paper, cardboard, flexographic materials – and then see if it pulls fibers. This is good because this shows that the tape has a quick stick.

Then, we move it to the actual machine for real-world testing. A splice can take a blink of an eye and so you need to test the tape in the manufacturing process

Permanent or Temporary Bonding?

Which one you want makes a difference in how you test tape. Here are some more behind-the-scenes insights to our application testing process.

For **temporary bonding**, we are trying to discover whether tape adheres quickly and comes off cleanly..an important field test when considering [protective film](#) or [stucco tape](#). In this scenario, we will apply the same environmental conditions to the adhesives, and see how it performs. Does it apply quickly and evenly? Does it remove easily and without residue? We can certainly duplicate this in the lab, but there's no replacement for real world testing. Which is why it's important that our clients understand that field tape testing takes time. If your issue is stucco tape isn't sticking in 90°F and 100% humidity, it doesn't do us any good to test it in the fall when it's 60°F and 20% humidity.

Permanent bonding is a different animal. Oftentimes, the tape needs to cure to assess performance, like acrylic adhesives that need 72 hours to set. There are two common real-world tests we use here:

- Shear strength. This is the force pulling down on the tape. To assess shear strength, we can hang a weight and see what happens. Does the tape slide? Where is the force trying to pull it apart? That is what you need to know when you test bonding.
- Peel Strength. Here we measure the degree of adhesion by lifting at 180-degrees, then lifting it the opposite

direction. How well does it stick? Does it delaminate, or rip off the substrate? If it delaminates, it means the tape is stronger than the substrate, something you look for when you need extreme bonding power.

Ultraviolet (UV) Exposure and Aging

UV light is a type of electromagnetic radiation, as are radio waves, infrared radiation, X-rays and gamma rays. It's invisible to the human eye, but it makes a profound effect on adhesives. With prolonged exposure to ultraviolet light, certain chemical materials, such as natural and some synthetic rubbers as well as polyethylene, can experience negative changes to their properties; resulting in them becoming hard and brittle. Absolutely *not* the qualities you want in a tape that needs to hold for any duration in a particular application. (Read our behind the scenes report on [The Durability Lab here.](#))

The good news is that you can minimize the effects of UV light by choosing the right tape. For outdoor use, it is best to stay away from adhesive tapes with a natural or synthetic rubber adhesive. Unless the adhesive has been specially treated with ultraviolet stabilizers or the backing has an ultraviolet light barrier, like a premium outdoor stucco duct tape. There are also adhesive tapes that have been specially designed for prolonged outdoor exposure typically using an acrylic adhesive.

Extreme Temperatures

We are the leaders in [cold weather tape](#) for good reason: our home offices in Canada are ground zero for sub-freezing environmental conditions.

It doesn't get any more real than that.

Still, we do also conduct lab testing. Using a temperature-controlled, environmental chamber, we bring temperatures down below -30°F and assess the outcome. Does it stick, and does it stay secure? The same is true for heat, although real-world tape testing is done in Arizona, Florida, and Texas.

How To Understand An Adhesive Tape Spec Sheet



NEW!

CL-W6064

Industrial Strength Utility Grade Duct Tape

FEATURES

- Aggressive adhesive provides superior holding power
- Excellent quick stick to a wide variety of smooth and rough surfaces
- Flexible backing conforms well to irregular surfaces
- Smooth unwind makes it easier to apply in the field
- Our fine mesh easy-tear cloth leaves a clean crisp edge when torn by hand
- Tape lays flat so there is no twisting and curling
- Smooth unwind makes it easier to apply in the field
- Our fine mesh easy-tear cloth leaves a clean crisp edge when torn by hand
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APPLICATIONS

- General purpose construction uses and repair
- Patching and seaming a wide variety of materials
- Temporary holding and bonding
- Hanging and patching polyethylene sheeting
- Sealing polyethylene waste disposal bags
- Smooth unwind makes it easier to apply in the field
- Maintenance applications in manufacturing environment
- Bundling and color coding

TECHNICAL DATA

Thickness	7.0 mils
Carrier	Polyester cloth/polyethylene film
Tensile	17 lbs./in.
Adhesive	Synthetic solvent rubber
Adhesion	65 oz./in.
Elongation	12%
Colors	Black, silver, yellow, red, blue, green, white



For engineers and general contractors, both the tape sample and the specification sheet should be closely reviewed when considering their uses. But what detail does the specification sheet provide and how can the maximum benefit be derived? Here's what you need to look for, whether it's high-bond foam tape, stucco tape or industrial-strength construction-grade duct tape:

- **Construction properties:** The specification sheet will initially provide an accurate verbal description of the tape's construction as well as a summary of its properties. By this information alone, you will know whether or not this is the kind of tape needed.
- **Versatility:** Adhesive tape is highly versatile, and any individual tape can prove to have many other uses than were intended when it was first designed. A pressure-sensitive tape consists of one or more soft amorphous broad molecular weight polymers and often contains several other chemicals. Because of this, even though it is manufactured to tight quality-control specifications, it can't be manufactured to the precision expected of an accurately machined metal part.
- **Adhesive type:** A natural rubber-based system is the general-purpose workhorse type of tape, but if you have special needs from your tape – such as long-term aging, resistance to ultraviolet light, or non-corrosive properties – you will need to look for the higher performance acrylic. *The adhesion level quoted is determined in a test environment (on a steel surface) in a very specific way, so your own end-use probably won't duplicate this. But the specifications should serve as a helpful guide to what level of adhesion you can expect when compared to the adhesion*

quotes of other tapes.

- **Tensile strength and elongation information:** The relationship between the tensile strength quoted and its elongation is far from linear, but you can get a rough estimate of the elongation expected when the typical slight application tensile force of less than a pound or two is applied to the tape. With plastic films, this stretch will be elastic and the tape will want to recover, but with paper, it will be “dead stretch” with no recovery.
 - **Temperature limits:** Where the tape is intended for a higher temperature operation, the upper temperature limit will be quoted. Note however there is no tolerance with the upper working temperature, so the tape should not be used above this quote.
 - **Resistance to shear:** The resistance to shear (minimized effect of adhesive bleed or the “oozing” of adhesive beyond the tape) will also be given when it is key to good performance.
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What is Adhesion Value, Exactly?

Tapes are often rated by adhesion value, which can be helpful **if** you know what it means. Here are a few examples:

- Looking for a removable tape? You definitely need low adhesion. A protective tape offers the lowest adhesion – at around 10 ounces per inch – while a masking tape would be around 25-35 ounces per inch.
 - A more difficult surface? You will need a higher adhesion level, perhaps even up to 45-60 ounces per inch. Additionally, if the tape is for a permanent application, it will usually call for a high adhesion value.
 - If the use is both permanent and on a porous surface, such as corrugated cardboard, then as long as the adhesive strength of the tape to the cardboard is higher than the internal strength of the cardboard (as evidenced by the tape tearing the surface of the cardboard), there is ample adhesion for the job – making adhesions of 60-100 ounces per inch totally unnecessary.
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- If the tape is for a rough surface, it means that the adhesive contact could be poor. So it may not be a high adhesion tape that is needed, but one with a thicker adhesive to better contact the surface. Similarly, a tackier tape might work better on a hard-to-adhere surface than one with a higher adhesion.
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Tensile Force vs. Shear Force

When it comes to determining if a particular tape is right for your construction project, there are two forces to consider: tensile force and shear force.

Tensile force influences the elastic property of the adhesive. Specifically, it will first stretch the adhesive before finally pulling it away from the surface. If a tensile force causes a failure, it will most likely *be in the adhesive at the surface*. Therefore, adhesion testing that measures the elastic character of the adhesive, and how much force it can take, will help you select the right tape.

A **shear force** works parallel to the surface – it is the major force at work in double-sided tapes. Shear force resistance testing – often called “Holding Power” – is an effective way to measure the internal strength of the adhesive (known as “cohesion”).

Most adhesive failures or separation occur as a combination of both tensile and shear forces, it is extremely helpful to know what forces could potentially affect your tape.

Keep in mind that if the outside force is large enough, and is continuously applied, all tapes will eventually fail. It's not a matter of “if,” but “when” – it may take an hour, a week, a year, or more, *but if a tape isn't designed to withstand the outside forces, it will eventually fail.*

Release Liners: What Are They and Why Do You Need Them?

For tape, because of how it is dispensed, the adhesive part must contact its own backing yet still be able to unwind easily. To achieve this, the backing must provide a low-adhesion release surface. In other words...not stick to itself!

- Paper tapes need a coating known as backsize, as well as a low-surface energy coating known as a release coat. Plastic films only require a release coat.
- The backing on foam tape won't allow the adhesive to come in contact with it
- For aluminum foil tapes, the act of unwinding it from its own backing will cause it to ripple and distort the foil, which will adversely affect the contact area as well as the appearance.

For all of the above, the best solution is to use a facing material with a low surface energy, usually a paper or a plastic film that has been treated with a silicone release coat. They could also be a polyethylene film that already has a low enough surface energy to work as release facing, or even a silicone-coated polyester film.





Adhesive Tape is a Universal Tool

In short, pressure-sensitive adhesive tape is the industrialist's dream come true. It is the universal tool that simply and conveniently solves many different fastening challenges. These tapes come in a wide variety of backings, each suitable for specific end-uses. This is exactly why adhesive tape use is on the rise in high-performance building and construction. If you're still using glues, sealants or even nails, consider pressure-sensitive tape.

[Contact the ECHOtape team](#) today to find the right tape for your application.

Related:

- [The Complete Guide to Duct Tape](#)
 - [8 Reasons Double Sided Tape Will Fail](#)
 - [The Durability Lab & The Value of Site Visits](#)
 - [The ECHOtape Story](#)
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The Complete Technical Guide for Double Sided Tape

In this comprehensive guide to *all things double-sided tape*, we're giving you all the information you need to know about choosing and using double-sided tape in seaming, splicing, bonding and beyond.

- [What is Double Sided Tape?](#)
 - [How is Double-Sided Tape Used?](#)
 - [Which Double Sided Tape is Best?](#)
 - [What is Acrylic Foam Tape?](#)
 - [4 Steps to Choosing the Right Double-Sided Tape](#)
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What is Double Sided Tape?

Created by applying a thin adhesive layer to each side of a carrier substrate material, **double-sided tape**, also known as *double-coated tape* or *double-faced tape*, is widely used by a vast array of industries for applications such as bonding, holding, mounting, splicing, and packaging. Obviously, it is most often used to stick two surfaces together; typically in a way not visible in the end product. This is due to it being installed “in-between” rather than “overlying upon” in use.

This specific application allows for a neater look and better craftsmanship.

Double-sided tape can be either thin (such as paper-based) or thick (such as foam-based), coated with rubber, acrylic, or a modified version of these sometimes with differential properties. Double-sided tapes with thick bonding systems are usually better able to bond to unusual, non-uniform, or highly patterned and textured surfaces. Thick bonding systems usually involve a foam carrier layer and may vary significantly in strength. Thin bonding systems are, as the name suggests, much thinner – sometimes so thin that they consist of nothing but pure adhesive on a silicone liner. And yes, much like everything else on a job site or at a manufacturing facility, choosing the right [double sided tape](#) for the specific application is paramount.

How is Double-Sided Tape Used?

Did you know that in auto manufacturing, double-sided tape has been replacing rivets and fasteners for years and is used to attach everything from dashboards to specialty car appliques? Or that RV and truck manufacturers use specialized double-coated tape to bond panels together and fasten exterior mirror glass to the mirror housing bezel? Here are just a few other applications where double-sided tape plays a major role:

House Wrap and Vapor Barrier Seaming. Use double-sided tape to overlap house wrap seams so water does not migrate behind it. To reduce labor, use a [high-performance double-sided](#) tape to attach vapor barriers to walls in crawlspaces instead of using screws for a more air-tight seal. Learn more about this [increasingly important](#) process with our [guide](#).

Acoustics and Sound. With more buildings becoming airtight, sound is becoming a big issue. Double-sided tape is often used in manufacturing to attach foam to wall panels or flooring underlayment to floors.

Graphic Arts & Signage. When it comes to bonding, double-coated tape is the go-to tool of choice for this industry. Choose from a variety of adhesion levels based on what you need to stick together.

Convention or Expo Events. Every exhibition hall that lays down temporary carpet uses a very special double-sided

carpet tape which is removable after the trade show and leaves no residue. When securing and holding (think red carpet) carpets in place for major events or trade shows, it's double-sided fabric tape to the rescue. These tapes typically feature a medium adhesion and tack, which allow for removal without residue.

Splicing and Tabbing. For paper mills and paper corrugators, double-sided tapes are paramount to virtually every core-starting, splicing, or tabbing requirement.

What is Acrylic Foam Tape and Why Is It So Popular?

Acrylic Foam Tape (a.k.a. [ECHOtape's Ultra Bond Tape](#)) is comprised of a layer of foam core that is coated with acrylic adhesive on each side, and covered by a red liner. It is stronger and will last longer, particularly in harsh conditions such as exposure to direct sunlight or extreme cold than most other tapes. Two key benefits of this adhesive tape are its strength and durability.

Indeed, acrylic foam tape has replaced screws, rivets, adhesives, and bolts in automotive, as well as other vehicles in transportation. Previously, manufacturers were forced to use metal fasteners, however, these had a number of drawbacks

including the probability of rusting over time. As an alternative, this adhesive tape, which is water-tight/air-tight and rust-free, solves two problems with one solution.

The simplicity of the design is what makes acrylic foam tapes in general so easy to handle, but actually, each component – core, adhesive, liner – is carefully selected and engineered to perform under a range of conditions.

Foam Core: Foam is at the core of the functionality; it helps distribute the load. Available in a range of thicknesses and weights, it provides bonding between dissimilar, and uneven surfaces. Keep in mind: The holding strength of the bond is determined by the surface area available for taping.

Adhesive: Here, it's the acrylic adhesive that delivers strength and durability, allowing it to meet more demanding holding requirements.

Liner: Release liners are specifically engineered to provide an easy release from the adhesion of the acrylic foam tape itself. Our red liner exists to maintain the integrity of the "stickiness" while keeping the adhesive layer protected from environmental elements during shipment, storage, and use.

While acrylic foam tapes can perform a variety of functions, it isn't the only double-sided tape on the market. And it may not be the right tape for your job. Here's how to find out:

4 Steps to Choosing the Right Double-Sided Tape



Most tape failures can be avoided by following one simple rule: [Choose the right tape for the application](#). Sounds easy enough, but we find there's a "one tape fits all" approach lurking on job sites and it's wreaking havoc with your results. Tape is a tool, just like a hammer, just like a saw.

In fact, you wouldn't choose a reciprocating saw for a project that calls for a circular saw, so why use duct tape when the project calls for outdoor double-sided tape?

Speaking of double-sided tape, there are many different options available on the market. Before you just reach for the first one you see, ask yourself these 3 questions first:

Step 1: What are the two surfaces you are bonding?

Choosing the right double-sided tape begins by evaluating the surface characteristics of the two substrates you're trying to stick together. For example, the flatter and smoother the surfaces are, i.e. glass, aluminum, PVC, the thinner the tape can be. Conversely, the rougher the surface is, i.e. wood, cement, brick, stucco, the thicker the rough surface adhesive tape needs to be to provide adequate contact.

Step 2: What is your surface energy?

All surfaces have a property known as *surface energy*, the degree of attraction or repulsion force of a material surface exerts on another material. Substrates with a high surface energy form very good surfaces for bonding, like glass, glazed tile, and bare metals. Plastics can vary from reasonably easy to very poor. For example, polypropylene and polyethylene are very hard to stick to and call for a higher adhesion and a very tacky adhesive.

Conversely, a material like silicone has such “low surface energy” that conventional adhesives won’t stick to it at all. Working with this material would, therefore, require an incredibly tacky and/or silicone adhesive.

It’s also important to take treated surfaces into consideration. For example, if a surface is coated with paint, the tape might stick well to the coating, but if there is a weak bond (low surface energy) underneath, the tape and the paint might peel off.

Step 3: What temperature resistance do you need?

Next, take your environment into consideration and choose a temperature-resistant tape. The tackiness of the adhesive tape is very temperature-dependent, and the colder the conditions, the poorer the bond will be. If you must work at lower temperatures, then use a double-sided tape specifically designed for [colder climates](#). The same holds true for extremely hot or wet conditions.

Humidity, dirt, and UV conditions all play a role. Choosing the correct [temperature-resistant tape](#) for the climate variables at hand is very important!

Step 4: What other conditions should I consider?

When choosing the best double-faced tape for your project, it's worth asking yourself these other key questions:

- How long do you need the tape to hold? Meaning, do you need a temporary or permanent solution?
- If you need to remove the tape, do you need it to be clean removal?
- What will the tape be exposed to while you are applying it, and afterward? Consider moisture, heat, cold, water, UV, and dirt.
- Does the tape need to be a certain thickness for the application to work?
- What width do you need?
- Is there any heat involved in the application process, i.e. in manufacturing?
- Are there any specifications you need or are required for the job at hand (i.e., EPA codes, UL approval, etc.)?

What it all boils down to is knowing these three things: your job, your materials, and your field conditions. Only then can you match the right adhesive with your project and decide if you need heat-resistant, extra wide, or specialty outdoor double-sided tape. By thinking about and answering these questions in regards to the adhesive, you can increase the

longevity and success of your projects.

Take a look at [ECHOtape's double-sided tape solutions here](#).

And if you still have questions about double-sided tapes and how to leverage them on your next job, please [contact us](#): here at ECHOtape, we've made it [our passion](#) for more than [40 years](#) to help professionals with their [sticky issues](#)!

The Technical Guide to Splicing with Adhesive Tape

It's impossible not to take splicing for granted because it's hidden in the smallest, most disposable objects around you. Take, for example, your favorite morning coffee. That to go coffee cup? The corrugated sleeve? Both made possible by splicing, and splicing tape. The shipping box at the post office? Spliced. Foam meat tray? Spliced.

In this guide to *splicing with adhesive tape*, we're giving you all the information you need to know about choosing and using splicing tape in manufacturing and beyond.

- [What Types of Products Are Spliced?](#)
- [How to Choose the Right Splicing Tape](#)
- [5 Reasons Why Splicing Tape Fails](#)
- [How To Prevent Splicing Tape Failures](#)

What Types of Products use Adhesive Tape for Splices

So what is a splice, exactly?

In the tape world, a splice is a process by which two rolls are combined using tape in order to create one seamless continuous roll. This is done because the roll of material is getting unwound and is going through some manufacturing or converting process to create an end-use product, like a coffee cup sleeve or an Amazon box.

In simple terms, when you have something on a roll (i.e. paper or film) and it needs to go through a converting process to make a finished product (i.e. envelopes, bags, boxes, newspapers, coffee sleeves, packaging), you need to “join” the rolls together to keep manufacturing process going. The process by which these two rolls are combined is called *splicing*. As one roll is unwound, it gets *spliced* roll to roll with tape.

- Anything that comes on a roll is spliced; for example, canvas, house-wrap, and tarps for trucks.
- Starbucks cups are spliced. First, there’s the paper to make the cup which is unwound and spliced, then converted into the cup shape. Then there’s the paper to make the sleeve by using a more expensive corrugated

paper on the inside and smooth paper on the outside, both of which have been spliced.

- Corrugated material is the stuff that boxes are made from and they splice paper to make this. But corrugate paper and cardboard are not the same things. Corrugated (or pleated) material is made up of three different layers of paper: an inside liner, an outside liner, and fluting which runs in between. Cardboard is a heavy-duty paper stock known as paperboard. It's rarely used in heavy-duty packaging. Instead, think cereal boxes and other smaller consumer goods packages.
- Fruit and vegetable trays. Rolls of foam are spliced before they are converted to the foam trays that you see in grocery stores.
- Packaging in all forms is spliced. Shipping boxes begin the same way as coffee sleeves – corrugate paper that is spliced with three different layers. Coated film for packaging, such as potato chips, plastic bags, and chocolate bars, is spliced. It all starts as a wide roll of material which is then cut to narrower or shorter widths and lengths, which then go on a converting line to become the outer packaging.
- Laminate flooring starts as a giant sheet of vinyl that needs to be spliced.

Obviously, the list goes on, but you get the idea. Splicing makes our daily lives more efficient and more enjoyable, and [splicing tape](#) is the product that makes it possible.

That said, just as not all adhesives are created equal (read

more about that in our [Complete Technical Guide to Adhesive Tape](#)), not all splices are the same, and not all splicing tapes share the same qualities. Newsprint requires a different kind of tape than Styrofoam. Corrugate paper is different than vinyl. If the tape doesn't stick properly, the machines have to be shut down and re-threaded. That can mean thousands and thousands of dollars in lost revenue. In fact, paper mills today do not stop machines at all – they run 24×7. Which is why finding the right tape for the right splice is paramount

How to Choose the Right Splicing Tape

Depending on what you are converting, the manufacturing process, and the substrate, there are all kinds of possible splices. Choosing the wrong one not only increases the risk of tearing but can slow down the converting process or stop it altogether.

Splicing tape is no different. Available in a variety of carriers with different adhesive systems, splicing tapes may be single or double-coated; have a polyester, film, or paper carriers; have high-temperature adhesives; be repulpable; the list goes on. How do you choose? Well, like much else in our industry, it's about [choosing the right tape](#) for the right application and conditions. Here's a quick primer:

Know the Application. What kind of splice is it and how will it be used?

- *Butt splice.* This is a single-sided splice. The paper is not overlapped; rather it butts up against each other and you use a single-sided tape to connect the two pieces over the seam.
- *Overlap splice.* This is a double-sided splice, where the ends are overlapped.
- *W or V splice.* Although W and V splices are being phased out, the process was most often used in newsprint and paper mills. The W or V pattern of the tape application creates more surface area, making the seam less likely to tear.

Is this a Single or Double Coated application?

- *Single-coated splicing tape* is suitable for butt splicing.
- *Double-coated splicing tapes* are suitable for use with laminators, coaters, and other converting operations. [Double-sided tapes](#) are commonly used in flying splices, manual splices, core starting, and roll finishing applications.

What Kind of substrate are you sticking too? Paper. Corrugate. Foam. Rubber. Even metal can be spliced. You must know the material, or substrate, the tape is adhering to. For example, coated paper is harder to splice. Used for specialty applications, such as produce boxes and foodservice containers, coated paper requires an aggressive splicing tape

with higher tack and quick start.

Special finishes that get laminated to wallboard, often used in anti-mold or fireproof products in commercial buildings, are also challenging. They may require an aggressive splicing tape with a very high-temperature range.

What field conditions are you dealing with?

- *Temperature.* Will the splice be subjected to heat? cold? For example, in certain manufacturing processes, flying splices may often need to go through a heat chamber and so high-temperature resistance is critical so the tape does not fail.
- *How fast or how slow?* Manual or zero speed splices happen by hand, so the roll or machine is either not moving or is moving so slowly (zero speed) that getting a good stick is easier. Flying splices, on the other hand, happen quickly. Both rolls are moving very quickly, yet the splice still needs to get made. For example, the LA Times flying splice is 1200' per minute! This type of splice requires immediate high tack because there's only one chance to stick.
- *Moisture or Humidity.* Repulpable splicing tapes dissolve in water. These splicing tapes ensure that the substrate and adhesive do not gum up the machinery and stop the production process in the production of paper, where water is used.

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5 Reasons Why Splicing Tape Fails

Even if you know your substrate and field conditions, complications may still arise. Whether splicing tape fails because of weakness (snap or tear), carelessness (installation error), or conditions (extreme heat), shutting down any production line is not only incredibly expensive but potentially catastrophic. Which is why it's so important to understand how and why splicing tape failures happen. In our experience, splicing tape failures typically occur for one of five reasons:

1. *Temperature.* Once a splice is made, many times they will get subjected to high heat down the manufacturing line. We're talking 350-degrees or higher. And as we already know, the tackiness of the adhesive tape is very temperature-dependent. Too cold and the tape won't bond. Too hot, and the bond might melt.
2. *Operator error.* It's not always roll and go. Did you put enough pressure on the tape? Did you clean the surface before applying the tape? Did you remember to remove the liner? (Yes, *that happened!*)
3. *Machine miscalibration.* Machines rely on two things to stay running properly: a skilled operator and routine calibration. If a splice bar isn't calibrated properly, the splice might fail. It appears like an adhesive failure, but a micrometer difference in pressure or angle could affect the success of the

splice.

4. *Speed*. Flying splices are called that for a reason. They are splices done at very high speeds. You not only need a high tack for a quick stick, but you need it to hold. Splicing tape failures can happen if you do not get one of these features in the tape you select.
5. *Tape release*. This one is simple... you didn't choose the right tape for the substrate.

How To Prevent Splicing Tape Failures

1. *Test, and test again*. We get it. The package label made monumental promises, but generally speaking, tape testing should always be done prior to use and in the field with real conditions. Always test the tape to make sure it delivers the performance you expect.
2. *Check the temperature*. Carefully factor in the temperature variables, everything from storage temperature, ambient temperature, and running temperature.
3. *Check the speed and stress*. How fast does the tape have to be applied? How quickly does it need to adhere? What about the stress factor? Splicing tape has to handle stress because the tape is the only thing holding one roll to another.

4. *Consider the substrate.* The correct tape for the right surface is critical. With new and improved products being made every day by manufacturers, substrates changes, and sometimes the tape for splicing needs to as well.
5. *Proper storage.* Tape storage is sometimes critical for success. When materials are bought in bulk and stored in dirty, wet, or extremely hot or cold conditions for extended periods of time, the tape adhesive could deteriorate.

The bottom line: Every splice has a unique set of variables which is why you need a unique splicing tape for the job. If you have questions or concerns about a splicing issue or tape failure, [let us help](#). We love solving tape challenges.

The Complete Technical Guide to Duct Tape

It's one of the most popular adhesives because of its versatility, but there are many misconceptions about the toolbox superhero called duct tape. This complete technical guide will cover everything you would ever want to know, including:

- [The History of Duct Tape](#)

- [How Duct Tape Works](#)
 - [The 7 Types of Duct Tape \(And How to Choose the Right One\)](#)
 - [Why Duct Tape Sometimes Fails](#)
 - [The Creation of a *Better* Duct Tape](#)
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The History of Duct Tape

In 1943, Vesta Stoudt had a job in a munitions factory where ammo cases were sealed with paper tape and melted wax. Worried the cases were too hard to open on the battlefield, Stoudt proposed a fix: Use waterproof cloth tape instead.

Johnson & Johnson adapted surgical adhesive tapes to Stoudt's specifications, and soldiers nicknamed the material **"duck tape"** in reference to its ability to repel moisture "like water off a duck's back." (They also dubbed it 100-mph tape because it could hold together a speeding jeep!)

Following World War II, duct tape began to [catch on in the U.S.](#) as a handy tool for home construction. People were using it to hold metal air ducts together, so the company rebranded the product as "duct tape" and updated it with a matching silver color made from powdered aluminum.

Thus, duck tape became duct tape.

How Does It Work?

Duct tape relies on what's known as a [pressure-sensitive adhesive](#) (PSA) for its inherent stickiness. PSAs are soft polymer blends that exploit [van der Waals forces](#) to join two objects together. The strength of the bond is due to the fact that the adhesive is hard enough and its viscoelastic properties are powerful enough to resist flow when stressed. This is not the same as the mechanics of structural adhesives like, say, Elmer's glue. Those adhesives require the evaporation of a solvent to create a chemical bond.

Interestingly, its namesake usage ("duct") is one of the few things that duct tape isn't recommended for. Lawrence Berkeley National Laboratory [conducted tests in 1998](#) to see how well different types of tape performed at sealing ducts, and, compared to the other products, duct tape was the clear loser.

Using duct tape on actual ductwork is now considered a [code violation](#) in many buildings.

Mythbusters has devoted three entire episodes to exploring some of duct tape's most extreme applications. The team was able to successfully use duct tape to patch a damaged airplane fuselage, construct a functioning cannon, build a usable bridge, and lift a 5000-pound car. Of the [18 myths](#) they tested, only one was busted (turns out you can't use duct tape to barricade a car driving at 60 mph).

7 Types of Duct Tape – Are You Using the Right One?

Duct tape's initial design was simple but effective: a strong fabric bonded to polyethylene film for sealing/waterproofing, silver-gray coloring to match metal ductwork, and a thick coating of adhesive to seal the joints and make them airtight.

But people quickly determined that this specialty tape could be used for a variety of other purposes, and the boom was on. Many new versions were manufactured – each with different qualities of fabric, polyethylene, and adhesive – for many different end-uses. As a result, manufacturers now offer a wide range of grades of polyethylene/fabric types and in a wide variety of colors.

1. General Purpose

With a low fabric count, a thin polyethylene film, and a low weight adhesive, general-purpose tapes work well enough for odd jobs where long service life isn't necessary.

2. Industrial Grade

With industrial-grade tapes, the fabric and polyethylene are upgraded, so the tape becomes more of a “workhorse” with added adhesive coating weight. One popular variation is multi-

colored industrial tape that is used to seam and hold carpets at exhibitions, where the adhesive must be removed cleanly.

3. Professional Grade

Sometimes called “contractors’ grade” these tapes offer more of an upgrade to the components of the industrial-grade tape for added strength, adhesion, and durability.

4. Gaffer’s Tape

Typically, gaffer’s tape is a matte black for minimal light reflection and is used in movies, television, and photo studios to temporarily tape cables to the floor or light fixtures to vertical posts. This type of tape needs to be able to be easily torn by hand and remove cleanly.

Read more about [Gaffer’s Tape vs. Duct Tape here.](#)

5. Stucco Tape

[Stucco tape](#) is used to attach protective polyethylene film over doors and windows during house construction prior to spraying the outside walls with stucco. Designed to be used outdoors for several days at a time, stucco duct tape must be able to resist the ultraviolet of the sun’s rays during that time – and not come apart from the vinyl window frames.

Read more about [Why Stucco Tape Really Matters here.](#)

6. True Duct Tape

This one lives up to its name – duct tape is truly intended for sealing air ducts. Duct tape must be permanent and able to withstand the prolonged heat and air pressure for the lifetime of the duct. It may even need to be flame retardant to meet some building codes. Duct tape is the true top of the line, a high tensile, hardworking tape.

7. Coated Cloth Tape

A roll of [coated cloth tape](#) has gone with every U.S. manned space launch, and is also commonly known as “Mission Tape.” This tape played an essential role in the construction of the carbon dioxide absorbers which saved the lives of the three astronauts in the ill-fated Apollo 13 mission.

With such a wide variety to choose from, start by considering exactly what you expect your tape to do. Then, evaluate the right polyethylene/fabric backing judged by tensile strength, as well as the right adhesive coating thickness, judged by adhesion level, for the best performance with the lowest cost.

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Common Adhesive Problems

Believe it or not, standard-issue duct tape is not as

versatile as you think. It has its uses—making permanent repairs on the spot—but the following is a list of surfaces that are problems for duct tape.

1. **Wet surfaces:** While duct tape is water-resistant, it should only be used for emergency leak repairs. Prolonged submersion in water will cause the adhesion to peel away.
2. **Hot surfaces:** Surfaces that reach temperatures over 140°F cause the adhesive to soften, lose its strength, and slip from the attachment.
3. **Cold surfaces:** Similarly, duct tape does not work well in extreme cold. Freezing temperatures cause the adhesive to harden which diminishes its sticking power.
4. **Surfaces with Prolonged Exposure to UV Light:** UV light can break down the tape's adhesive bond over time. If you need the tape to remain exposed to direct sunlight, it's best to use a product that's been specially treated for UV protection.
5. **Uneven Surfaces:** Duct tape has trouble sticking to rough surfaces such as concrete and stucco. Because it has a thin adhesive layer, this specialty tape is only able to make contact with the high points of a surface, which produces a weaker bond.
6. **Dirty Surfaces:** In order to achieve maximum adhesion, surfaces must be clean, dry, and dust or oil-free.
7. **Corrugated Cardboard:** Don't use duct tape to seal cardboard boxes. These porous surfaces contain many small fibers on the surface that break away and cause the adhesive bond to fail.

8. **Materials with Low Surface Energy:** Materials, like Teflon, have low surface energy, which means it prevents the adhesive from “wetting out” or spreading out to form a strong bond.
 9. **Painted Surfaces:** Applying duct tape to a surface that’s been painted or treated with another sealant means that the tape is only adhering to the surface layer and not the actual substrate.
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When Duct Tape Fails: 6 Reasons To Choose A Different Tape

[Duct tape](#) is often cited as being the top go-to, all-purpose repair tape. It can do anything from patching to joint sealing to bundling lumber. However, this versatile tape does have its limits. Here are the top six conditions where duct tape falls short and what you should be using instead.

1. Heat

Despite its name, regular off-the-shelf duct tape is not a good choice for sealing or repairing heating and ventilation ducts. The heat softens the adhesive, causes it to lose its strength and slip from the attachment. It also carries no safety certification, which means it may burn and produce toxic smoke. (For that reason duct tape is not allowed at all on ducts in states such as California.)

As an alternative, consider [All Purpose Aluminum Foil Tape](#), which works up to 248° F and is flame-retardant

2. Water

Duct tape is water resistant, *not* waterproof. It will work in a pinch until a more permanent solution can be applied, but over time the adhesion will peel away when completely submerged in water.

Consider All Leak Repair Tape instead; a permanent adhesive that forms a watertight seal and works in both extreme heat and cold.

3. Temporary Repairs

Think twice about using duct tape for temporary uses such as sealing a windowpane or hanging plastic sheeting. In certain situations, it makes an excellent stopgap until a more permanent solution can be applied. But this type of adhesive will leave behind a sticky residue when removed.

A better option would be [All Purpose Repair Tape](#), which maintains a strong grip while removing cleanly from any surface

4. Uneven Surfaces

Standard duct tape has a thin layer of adhesive so it adheres best to smooth, even surfaces. Applying it to rough or irregular surfaces means the tape will only make contact with

the high points thereby lessening the strength of its bond.

Consider [Outdoor Stucco Duct Tape](#); a thicker layer of adhesive means it's able to connect with more surface area and maintain a stronger hold.

5. Cold

If you're working in cold conditions, repairing vinyl siding or refrigeration hoses, duct tape is not the answer. Extreme cold hardens the adhesive and diminishes sticking power of existing duct tape. And if you are applying the tape under cold conditions, it may not stick at all.

We have a number of cold-weather solutions, but [All Weather Repair Tape](#) lasts in temperatures as low as -30°F!

6. UV Light

Over time exposure to sunlight will cause duct tape's adhesive to dry out and become brittle or delaminate. For outdoor projects that require tape, it's best to choose one that's been treated to resist the effects of ultraviolet light, like [Premium Grade Stucco Duct Tape](#).

A Bigger, Better Duct Tape



What started as a battlefield repair tool has truly become an iconic American fix-all, helping DIYers, professionals, and dads out of sticky situations throughout the years.

But with so many options already on the shelves, how do you make a *better* duct tape??

“The inspiration for CL-W6064 is the culmination of 40 years of experience combined with the frustrations professional contractors encounter daily on the job site,” says Risa Edelstein. “We wanted to create a material that was strong but lightweight, industrial quality without requiring industrial equipment to use and took advantage of the inherent versatility of duct tape.”

ECHOtape [CL-W6064](#) strikes a delicate balance between strength and usability, providing the maximum amount of sticking power without sacrificing ease of use. How did we make that happen? By using a new, advanced technology – a two head coating process. The first coat ensures high shear strength, and the

second coat, high initial tack. The result is a beautifully streamlined piece of tape that is lighter, yet stronger than you would imagine, and easy to unwind. Read more about [CL-W6064 here](#).

With such a wide variety to choose from, start by considering exactly what you expect your tape to do. Then, evaluate the right polyethylene/fabric backing judged by tensile strength, as well as the right adhesive coating thickness, judged by adhesion level, for the best performance with the lowest cost.

Whether you're looking for a type of duct tape or a different adhesive tape, [ECHOtape can help](#). Contact us today for help in selecting the right tape for your next job.