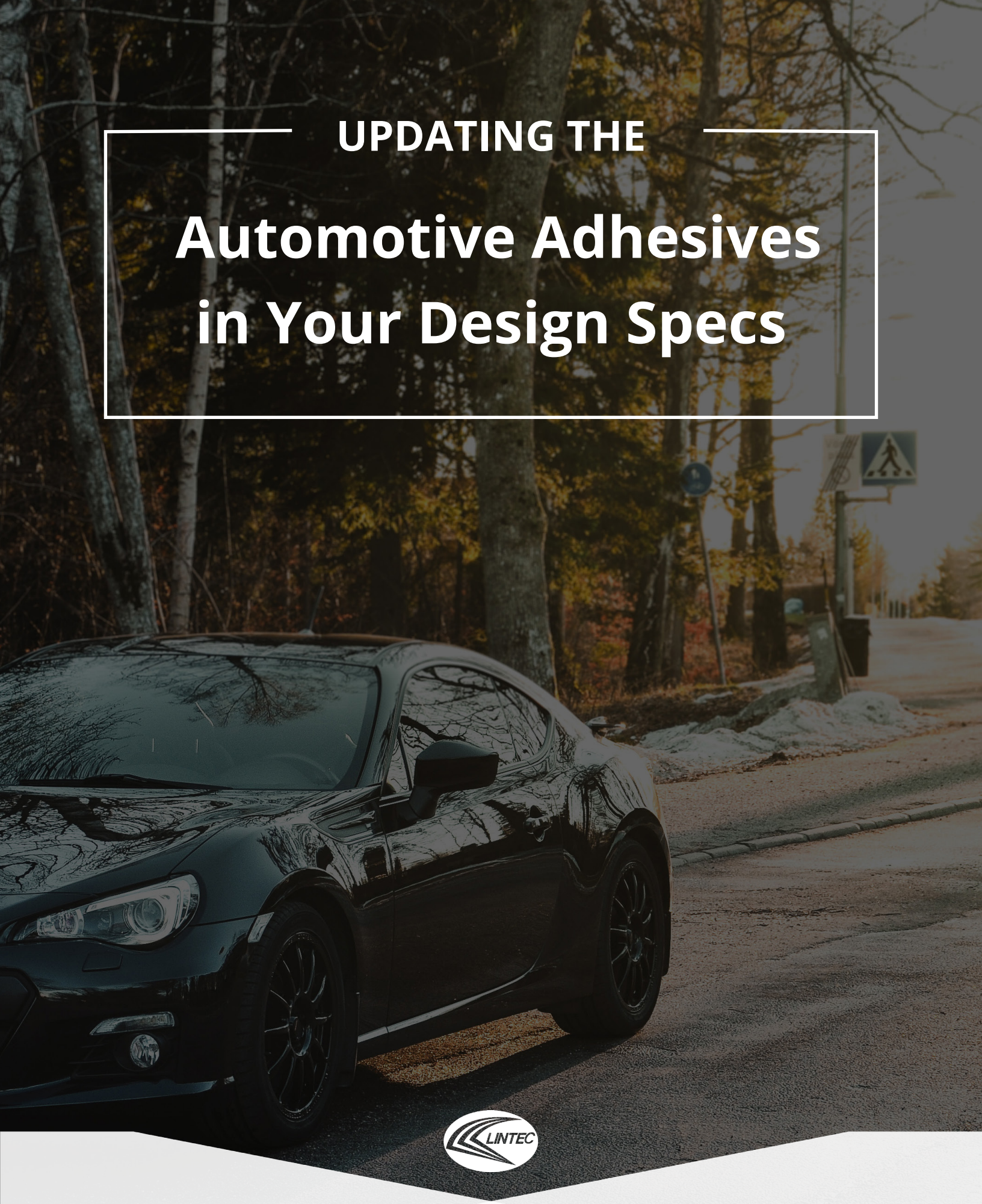
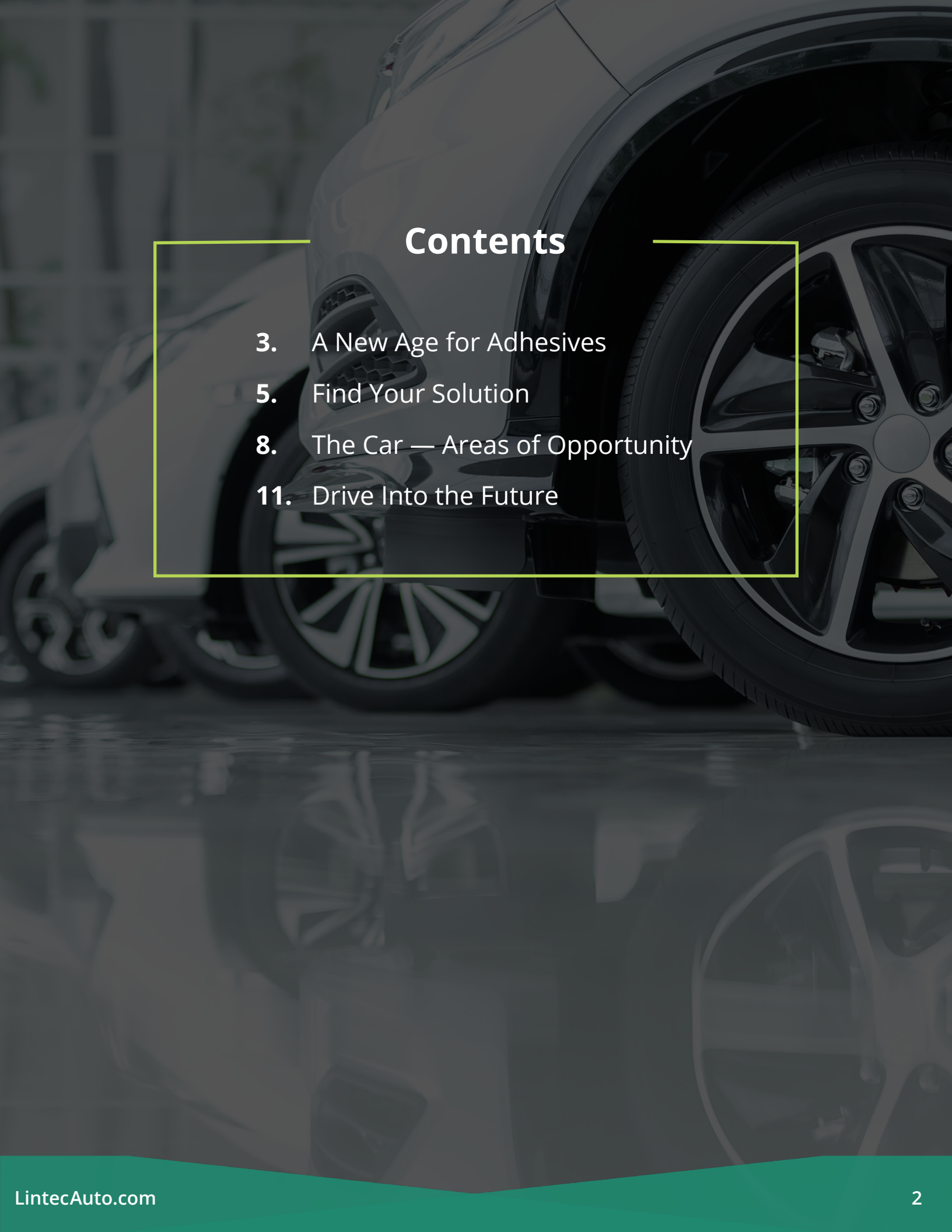
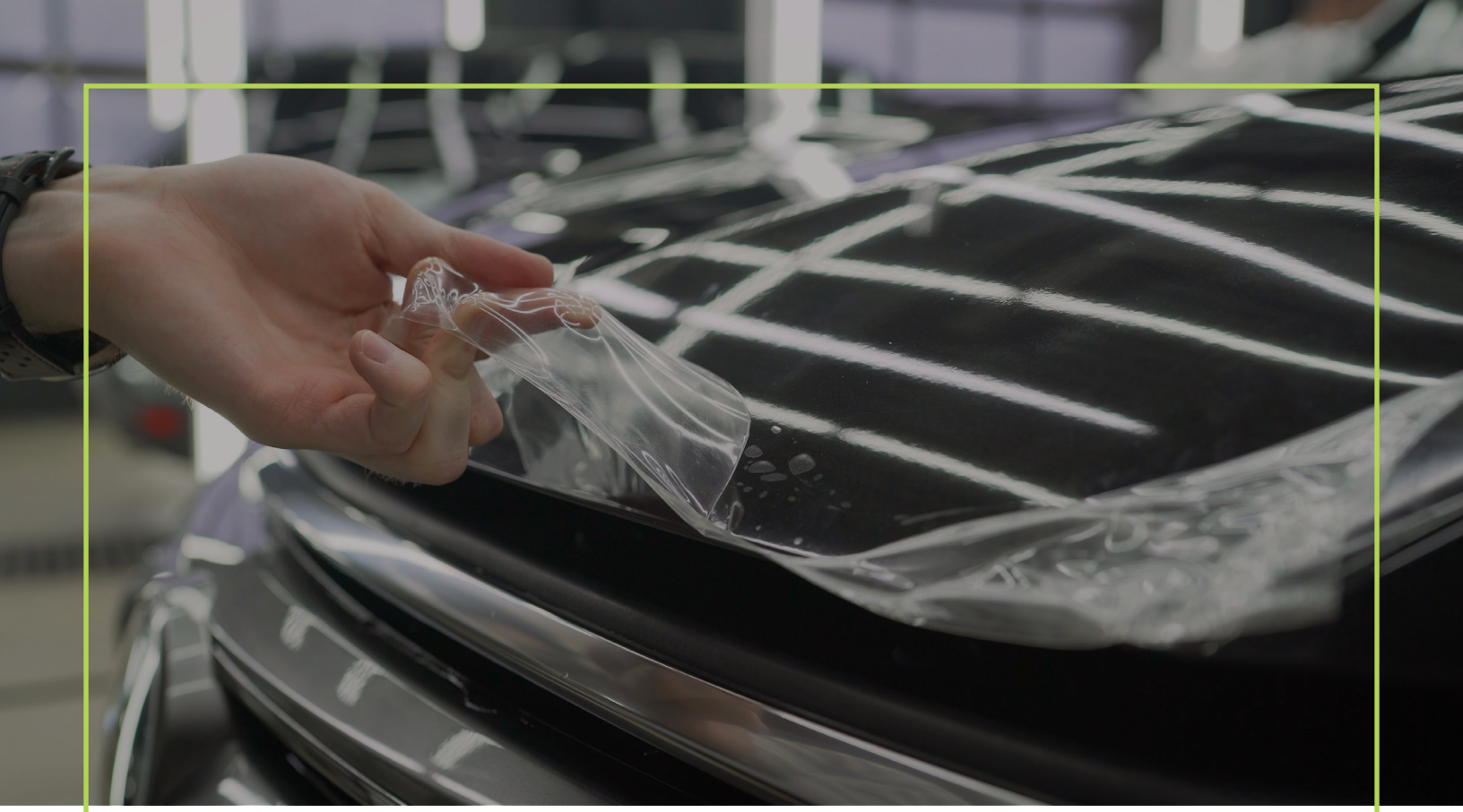


UPDATING THE Automotive Adhesives in Your Design Specs

LintecAuto.com



Contents



A New Age for Adhesives

Today's automotive adhesives are a far cry from the resins and natural gums of yore.

They're used everywhere on cars: windshields, bumpers, step guards, door panels, dashboards, sashes, trim, wheels, brake discs, under the hood—you name it. Every year, makers update their models with new adhesives in creative places to mount logos, replace paint, reduce vibrations, and cut weight.

Synthetic solutions have become so strong, so reliable, and so durable in extreme conditions—such as heat, vibrations, impacts, or exposure to harsh chemicals—that they continue to replace the cumbersome and time-consuming bolts, rivets, clips, and screws that are the bane of lightweighting.

Large body panels have had non-mechanical adhesive options for secure bonding for almost twenty years,[1] and in that time the technology has grown from a simple repair option to a manufacturing standard for certain parts and makers. In fact, the automotive and transportation industries are the major reason that the pressure-sensitive adhesive market is projected to surpass $11 billion by 2024.[2] This is as much due to efficiency as it is to practicality.

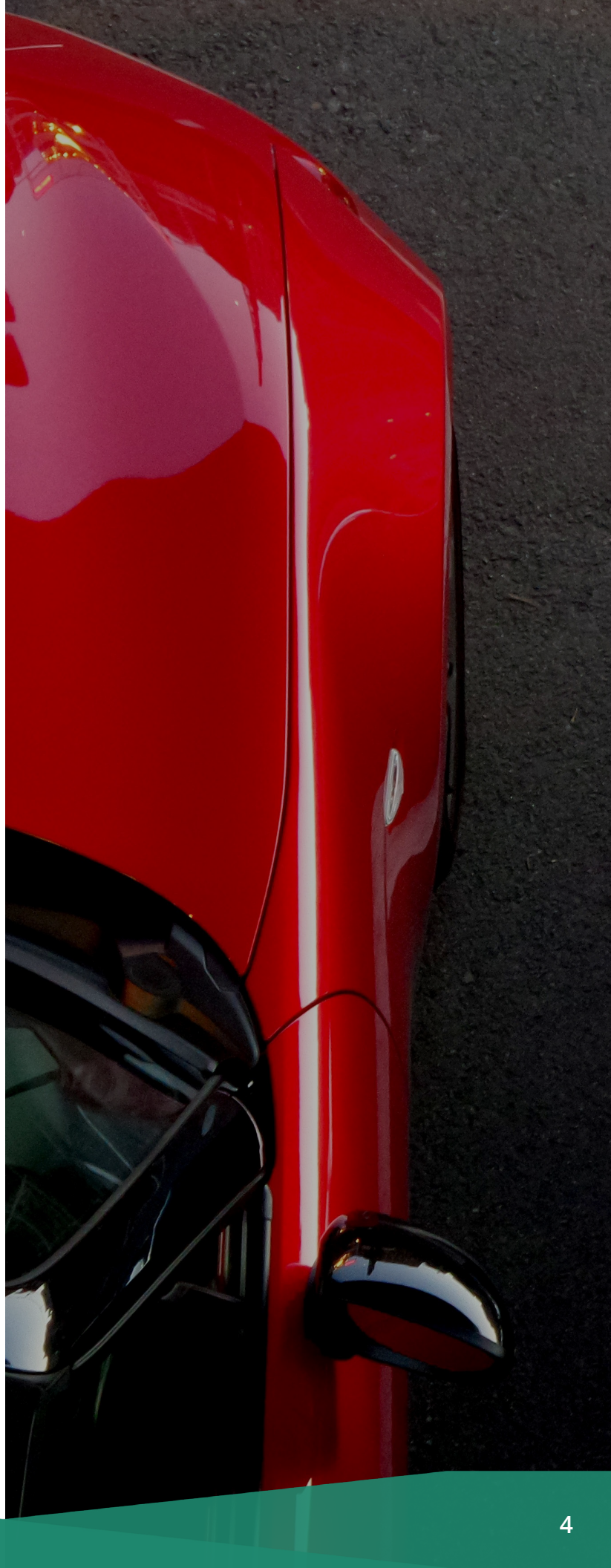
Cars aren't just made of steel anymore. Aluminum, carbon fiber, and exotic composites are on the rise in automotive design—they're lighter weight and also quite strong. This mix of materials creates a whole host of design problems:

- Galvanic corrosion
- Unweldable joints
- Suboptimal substrates for screws and bolts
- Glues that won't bond with both materials

New adhesives are a critical solution to joining incompatible materials and shielding contact points between dissimilar metals (such as steel and aluminum). A thin layer of a modern automotive film or tape adhesive can form a protective barrier that helps resist galvanic corrosion. The right adhesive can create strong bonds between materials that could not otherwise be welded together.

Dan Murad of the ChemQuest Group wrote just last year that "adhesive applications have expanded well beyond traditional uses such as brake shoes, thread lockers, headliners and for installing and repairing windshields. Now we routinely see applications involving vehicle frames, BIW, dashboards, engines, electronics and weather-stripping applications." [3]

The bottom line is that the game has changed. It's time to review the adhesives in your design specs and update them to take advantage of the newest capabilities. New and creative use of adhesives will give you greater design flexibility, freedom to mix materials, and solutions that your old adhesives couldn't provide.



Find Your Solution

Pressure-sensitive adhesives, tapes, and films have become a first-stop solution for an impressive array of challenges faced by automotive design. Today's adhesives as much about form as function, and can contribute to the appeal of your vehicle in attractive marking films, window films, and paint protection/replacement films.

STRONG BONDS, LIGHT WEIGHT

Audi, Mercedes-Benz,[4] Volkswagen, Daimler, Group PSA,[5] and more companies have updated their vehicles with adhesives that can safely support the increasing percentage of lightweight composites and aluminum in their structures. Since these materials cannot be welded, they rely on adhesives that will retain strength even at top speeds and extreme pressures.

Methacrylates and cyanoacrylates are now common in the industry because they bond at room temperatures, don't fume, can endure high temperatures, and retain strength during impacts. Better yet, options like these can bond well with plastics, metals, glass, and composites, making them ideal for joining dissimilar materials.

Ford, for example, uses methacrylates on composite hoods and roofs of heavy trucks, but structural adhesives like this can be found across the industry[6]— from school bus body panels to fiberglass extension panels on conversion vans.

Modern tapes and films provide great strength and also apply and bond more quickly than older glues and epoxies. Eliminating curing times also saves money and improves the speed and ease of assembly. Furthermore, pressure-sensitive tapes produce no harmful vapors and reduce the dangers of off-gassing in work zones.

Automotive tapes have also pushed down the number of mechanical fasteners (screws, rivets, bolts) required in a standard automotive body, and offer multiple benefits that fasteners cannot, such as the ability to:

- Distribute stress evenly across a whole bond line.
- Eliminate the need for drilled holes that weaken substrates (and invite corrosion).
- Use materials that can be thinner since they won't have to cope with fastener stress points.

Weight savings from fewer fasteners and thinner substrates can be significant for fuel economy. Grand View Research Inc. has said that a 10% reduction in vehicle weight can result in up to 7% reduction in fuel use.[7]

ENERGY CONTROL

Advances in automotive adhesives can provide you with precise control over the flow of energy in the vehicle. Impacts, vibrations, conductivity, heat, and UV radiation each have a catered adhesive solution for absorption and deflection.

On glass, adhesive films are easier and faster to apply than chemical coatings. As a result, these adhesive films are now a standard for controlling the impact that the sun's energy has on the vehicle. These films can also repel harsh UV rays and better insulate the cabin.

Structural adhesives can create bonds that are either flexible or rigid. Rigid bonds result in efficient energy transmission between parts (separate parts behave more like a single unified piece), whereas flexible bonds diffuse energy rather than transmit it.

Flexible automotive adhesives—like epoxy-based acrylic adhesives and soft foam tapes—help to dissipate vibrations and shocks so that structural integrity is unharmed. These sorts of adhesives can eliminate those pesky rattles and buzzes while also distributing force evenly through the vehicle during crash impacts so that it's the car and not the passenger that experiences the full shock.

Automotive adhesives and tapes are on the leading edge of noise dampening technology due to their ability to more evenly bond surfaces than mechanical fasteners, increase overall vehicle rigidity, and soak up vibrations. Manufacturers are using these traits to meet and exceed NVH (Noise Vibration Harshness) standards in each successive model.[8]

AESTHETIC APPEAL

The impact that adhesives have on modern automobile aesthetics is difficult to overstate. Protective laminates, marking films, mounted trims and emblems, paint replacements, wraps, and more make for an incredible portfolio of cosmetic applications.

Durable foam tapes are commonly used to mount decorative plastic and metal trim elements on vehicles. However, more automakers are using film adhesives to replace costly steel and chrome elements entirely with film-coated plastic trims that achieve the same sophistication with lower investment and less difficulty in production.

Protective adhesive films are available to safeguard a beautiful paint job during shipping and come off easily after assembly. Other “clear bra” laminates are now replacing traditional coatings to invisibly shield paint from the hazards of weather, salt, and light abrasions during many years of use.

Paint replacement films, on the other hand, are adhesives that can meet the challenges faced by paint suppliers every year—demand for new and vibrant colors, increased application speed, better durability, and minimal environmental impact—and even outperform them. Compared to automotive paints and coatings, films can be cheaper, faster, and equally beautiful.

THE IDEAL SEAL

As you work to refresh the catalog of adhesives in your automotive design, don’t overlook the versatile sealing properties of the latest automotive tapes. Between film and foam based tapes, there are options for all manner of gasketing, weather-sealing, and light/sound blocking applications.[9]

Foam anti-vibration tapes not only reduce rattle, but are also used to enhance the seal of openings that can otherwise let residual noise from wind, road, and engine sounds into the cabin. Urethane foams dampen sound well but are open-cell and less ideal for sealing moisture. Look for tapes with closed-cell polyethylene foams that conform to uneven surfaces and create excellent seals at an economical price.

Blackout tapes (often vinyl-based for resistance to heat and UV radiation) efficiently cover gaps that let light bleed through unwanted spots around windows and dash elements. Other tapes offer seals that protect your parts from acids, oils, and corrosion.

The Car — Areas of Opportunity

A recent report from Grand View Research projected an impressive 4.5% CAGR in the market for automotive tapes and adhesives from 2019 to 2025.[10] The report also commented that this growth is being driven by a combination of manufacturer sensitivity to "automobile aesthetics," increased "affinity towards lightweighting," and demand for "superior performance characteristics," among other things.

The sheer number of applications this study reviewed alone (interior, exterior, electronics, body-in-white, powertrains, wire harnessing, chassis, wheels and others) is a sign of how many opportunities there are to update your vehicle with lightweight, attractive, high-caliber adhesives. Here are a few of the places you can look for design upgrades.

WINDOW WONDERS

Glass can be a challenging surface for adhesives due to its smoothness, but there are plenty of opportunities for modern tapes and films to improve upon the seals and traits of your windshields and side windows. Glass adhesives are no longer limited to a realm of glues and epoxies that secure windshields in place.

- **Window Films** can tint, block ultraviolet rays and heat, control glare, and provide improved privacy in the vehicle.
- **Blackout Tape** on the borders and edges of windows applies more easily than paints or coatings and is equally effective.
- **Paint Replacement Films** can make your center pillars, door sashes, and other elements around the window look like they're painted black or trimmed in chrome without the hassle.

BODY BEAUTY

From strong bonds to visual designs, adhesives have become essential to modern car aesthetics and structure. They provide sleek lines, rigidity, flexibility, strength, shock absorption, and protection wherever it is needed.

- **Paint Protection Films** last longer than ever and shield a paint job from harsh environments for years. Consumers will appreciate the protection they give to resale value as well.
- **Paint Replacement Films** can now coat whole body panels or vehicles with a beautiful substitute for a traditional paint job or company-branded advertising at an affordable price.
- **Marking Films and Stripe Tape** are a handy solution to beautifully decorate the body or apply emblems without a complicated paint layering or tooling process. They can offer vivid color variations and wear-resistance at a lower expense.
- **Mounting Tapes** are replacing rivets and glues. Foam anti-vibration tapes have become common to secure nameplates, badges, emblems, trim, and more with custom die-cut convenience while resisting plucking or twisting forces.
- **Blister-Free Labels and Bumper Stripes** can use a cellular film laminate to let the substrate's out-gasses pass through without bubbling. Use it over a variety of surface bases for blisterless stripes and labels on injection-molded plastics and polycarbonate.
- **Weather Strips** adhered with reliable acrylic foam tape. This speeds up and eases the assembly process while providing a strong and consistent seal along the whole bond.
- **Structural Bonding Adhesives**, such as epoxy-modified acrylics, can help mount body panels, distribute impact stresses evenly, and reduce reliance on mechanical fasteners.

INTERIOR IMAGE

Comfort is key in the car interior. Adhesives reduce rattle by solidly bonding the complete contact area between substrates. Meticulous cosmetic elements can also be updated with attractive films, reliable mounting tapes, and invisible laminates to benefit your design in both assembly and end-user experience.

- **Adhesive Tapes** are overtaking slower-curing and fabric-permeating glues to bond headliners, consoles, upholstery, and more. Tapes also make application of decorative interior trims and logos a breeze.
- **Lumidear Interior Films** offer 256 color variations (including specialty options like wood grain) to artfully dress up the cabin and dash. Upsides include excellent three-dimensional surface followability and improved fire/contamination resistance over older cloth options.
- **Clear Laminating Adhesives** are ideal for positioning backlit instrument panel graphics with smoothness, invisibility, and reliable bonds on low-surface-energy plastics.

MECHANICAL MAGIC

Less visible mechanical parts in doors, brakes, wheels, and even inside the engine compartment also make extensive use of automotive adhesives. Review them to make sure you've invested in the best performance the industry can offer, whether it's for dynamic stresses inside the factory or on the road.

- **Door Cushioning Film** with new pressure-sensitive ionomers absorb the repeated shocks and exterior weather stresses faced by doors and hatches at better cost performance than previous urethane films.
- **Aluminum Films** protect vulnerable aluminum wheels and brake disc plates from oxidization, corrosion, and scratches. Polyethylene films can also peel off easily without leaving any marks or residue after packaging, shipping, and assembly.
- **Mud/Step Guard Films** can be made from urethane to protect the paint from chipping, absorb opening and closing shocks, and guard the substrate from abrasions (as in sliding doors)—all with excellent weather resistance.
- **Information/Caution Labels** with industrial pressure-sensitive adhesives can use their exceptional resistance to solvents and heat to survive under the hood for many years.

Drive into the Future

Carmakers who seek pathways to lighter, tougher vehicles have cutting edge adhesive technologies at the top of their shopping lists.

Updating your design specs with high-tech varieties of automotive adhesives can increase the structural rigidity of the vehicle, reduce noise, and absorb a significant portion of the shock in a crash. Simultaneously, the vehicle becomes lighter, more fuel efficient, and consequently emits less CO2 throughout its service life.

With emissions regulations growing periodically stricter for all major markets, cars must continue this march toward fuel-efficiency through lightweighting. The International Council on Clean Transportation estimated in 2016 that through efficient leveraging of lightweight materials and improved technology it would be possible to achieve a 15% reduction in weight by 2025.[11] In pursuit of those reductions, modernized automotive design specs rely on updated models with lighter mixed materials, more adhesives to bond them, and less heavy fastening hardware.

Embrace the latest advances in automotive adhesives, films, and tapes to bring your design into the future.

LINTEC OF AMERICA, INC.

About LINTEC Auto

Based on our philosophy of “customer first” and innovative new ideas, we will continue to work on developing high-value-added products we can offer to customers to meet their diverse range of needs.

We offer an extremely diverse range of products that include adhesive papers and films for seals and labels, automobile-use products, window films, semiconductor-related tapes and equipment, LCD-related products, color papers for envelopes and release papers and films.

Contact Us

800-806-8977

info@lintecauto.com

lintecauto.com

Unique Products

Variety of Uses

Exceeding Expectations

Sources

1. Adhesives & Sealants Magazine - Pressure-Sensitive Adhesives Market to Cross $11 Billion by 2024
2. Bodyshopbusiness.com - A Not-So-Sticky Subject: Adhesives
3. Adhesives.org - Adhesive Uses Expanding in Automotive OEM
4. Automotive News - Adhesives Sought For Making Cars Lighter, Tougher
5. Autoblog.com - Rush To Lightweight Cars Means Boom For Adhesive Manufacturers
6. Assembly Magazine - Adhesives and Automobiles
7. Adhesives & Sealants Magazine - Automotive Adhesives and Sealants Market to Reach 38 Billion
8. YouTube.com - Vehicle Noise and Vibration
9. Adhesives & Sealants Magazine - Pressure-Sensitive Adhesive Characteristics and their Impact on Foam Anchorage
10. Grand View Research - Automotive Adhesive Tapes Market Size, Share & Trends Analysis Report By Product (Double-sided, Specialty), By Function, By Application (Interior, Exterior), By Vehicle Type, And Segment Forecasts, 2019 - 2025
11. The International Council on Clean Transportation - Lightweighting Technology Development and Trends in U.S. Passenger Vehicles