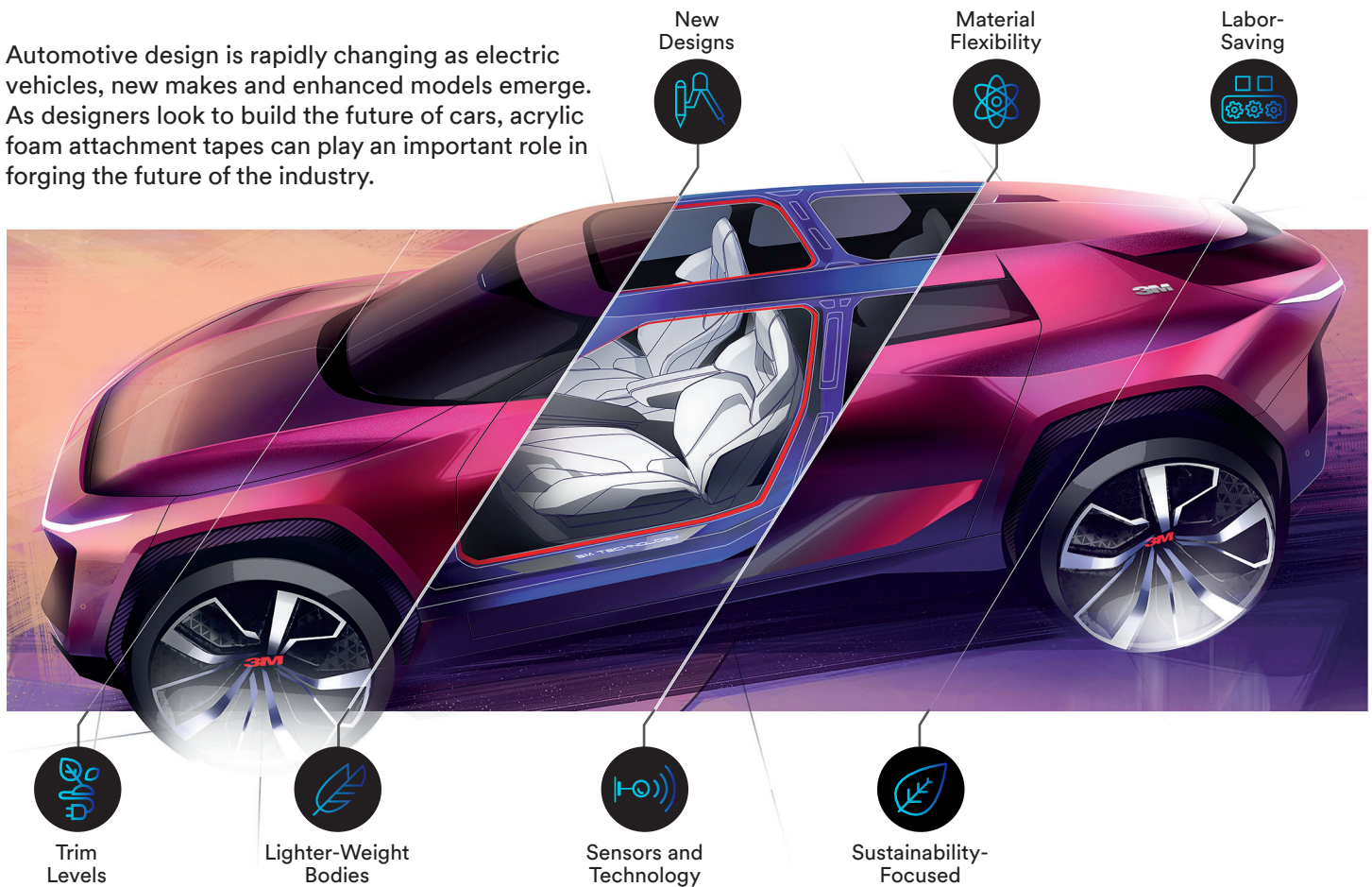


How are tapes enabling the future of vehicle design?

Automotive design is rapidly changing as electric vehicles, new makes and enhanced models emerge. As designers look to build the future of cars, acrylic foam attachment tapes can play an important role in forging the future of the industry.



Meet the accelerating pace of design changes.

Technology and new materials have disrupted automotive design. OEMs must reconsider the way they design and attach for changing needs and consumer expectations.

Able to conform to a wide variety of substrates and shapes, and attach smaller parts without impeding clean lines, acrylic foam tapes give engineers more design freedom, flexibility of material selection and variability of trim packages where other attachment methods fall short.

Lightweighting will always be a priority in design, since lighter-weight bodies mean greater fuel efficiency and extended range for vehicles. Tapes can not only eliminate metal by replacing clips, contributing to overall vehicle weight reduction, but also allow for attachment of lighter, thinner materials without the danger of read-through sometimes posed by ultrasonic welding.

Push the design envelope.

As engineers strive to capture consumer imaginations with aesthetic enhancements and meet more demanding performance expectations, they need to be able to design with looks and function in mind — not to accommodate mechanical fasteners. Modern design has no place for bulky clip towers. Engineers want to use the best materials for the design. This sometimes means attaching or sealing two parts that expand

and contract differently with temperature changes. With mechanical fasteners, punched holes can become misaligned, causing problems on the production line — and may even lead to concerns about shear force on the road when temperatures fluctuate. Tapes' viscoelastic properties provide impact and fatigue resistance to compensate for thermally induced stress, as well as stress from static and dynamic load.

Design for the bottom line.

When designing for optimized price points and profitability, everything should be on the table.

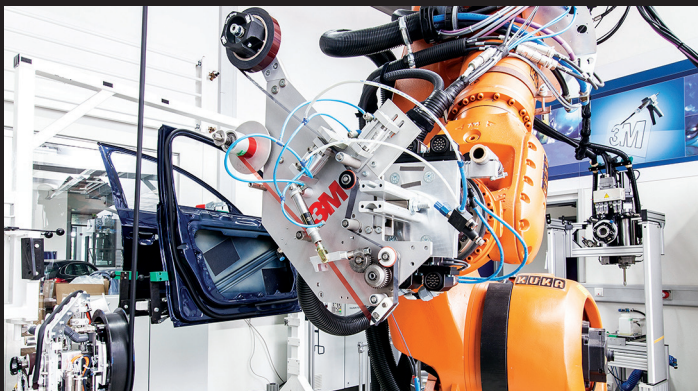
- Automating more of the production process can reduce operator error and improve productivity
- For limited-edition or lower-volume models, differentiating trim levels with tape-attached parts can be an economical option
- Tapes that work with a wider range of substrates and paint systems allow design engineers the freedom to select the materials they prefer



Work toward greater sustainability.

Minimizing their carbon footprint and promoting sustainability in their processes and products is a growing priority for many companies, including 3M. We're on the leading edge of sustainable manufacturing, continually seeking solutions to create less waste during production. Our tapes can help OEMs in their goal of increasing vehicle energy efficiency by

enabling lightweighting possibilities for both conventional and electric vehicles. In addition, for OEMs and tiers looking to minimize worker exposure to chemicals, some of our tapes are primerless, enabling adhesion without the use of solvent-based adhesion promoters.



Prepare for current and future workforce challenges.

Automation can also address another future consideration: likely worldwide labor shortages. It's expected that by 2025, every country except India will have a labor shortage.

Tapes can enable more production line automation, an invaluable capability in the face of curtailed workforces. Even when applied manually, tapes can save on labor hours by eliminating the need for drilling holes, which simplifies assembly.

Partner with a future-focused supplier.

Design trends, sustainability, workforce shortages, industry advancements and profitability: To address these issues, tape suppliers must continuously anticipate the evolution of automotive materials. At 3M, we're always looking ahead and will continue to forge the future of automotive design, along with our industry partners.



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