

UL CERTIFICATION DEMYSTIFIED:

**YOUR GUIDE TO UL CERTIFICATION &
CUSTOM DIE-CUT COMPONENTS**



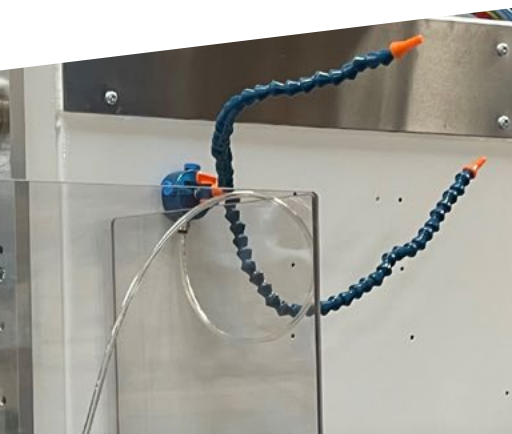
INTRODUCTION

UL CERTIFICATION AND CUSTOM DIE-CUT COMPONENTS

Does UL certification matter for custom die-cut parts? The short answer is—it depends.

UL certification of custom die-cut parts depends on many factors, including the application, the market, and regulatory requirements, all of which can play a role in helping to determine the importance and relevance of UL certification for the die-cut parts themselves.

In this whitepaper we'll look at UL certification, what it is, what it means for custom die-cut parts, and the many benefits of obtaining UL certification. We'll also discuss how JBC Technologies can help you navigate the UL certification process should we decide that it applies to your custom parts.



But, before we dive into how UL certification relates to converted flexible materials and die cut components, let us take a step back and look at some definitions.



SECTION 1:

UL BASICS

UL Certification Defined

UL certification is a rating awarded by an independent safety certification company called **UL Solutions** (formerly Underwriters Laboratories), that offers assurances that the safety and performance claims behind a finished product or component have been adequately verified by a third party.

The UL certification process begins when a manufacturer submits a representative sample to UL Solutions or a UL-approved testing laboratory. The sample is then assigned to a specific category based on its intended use.

From there, the testing team defines the appropriate UL test standards the product must meet to become UL certified and commences the rest of the certification process.

UL Standards vs. UL Certification

For the uninitiated, UL certification can be overwhelming. It is easy to become confused by all the different terms and definitions, especially when speaking about UL standards and UL certification. To clear things up:

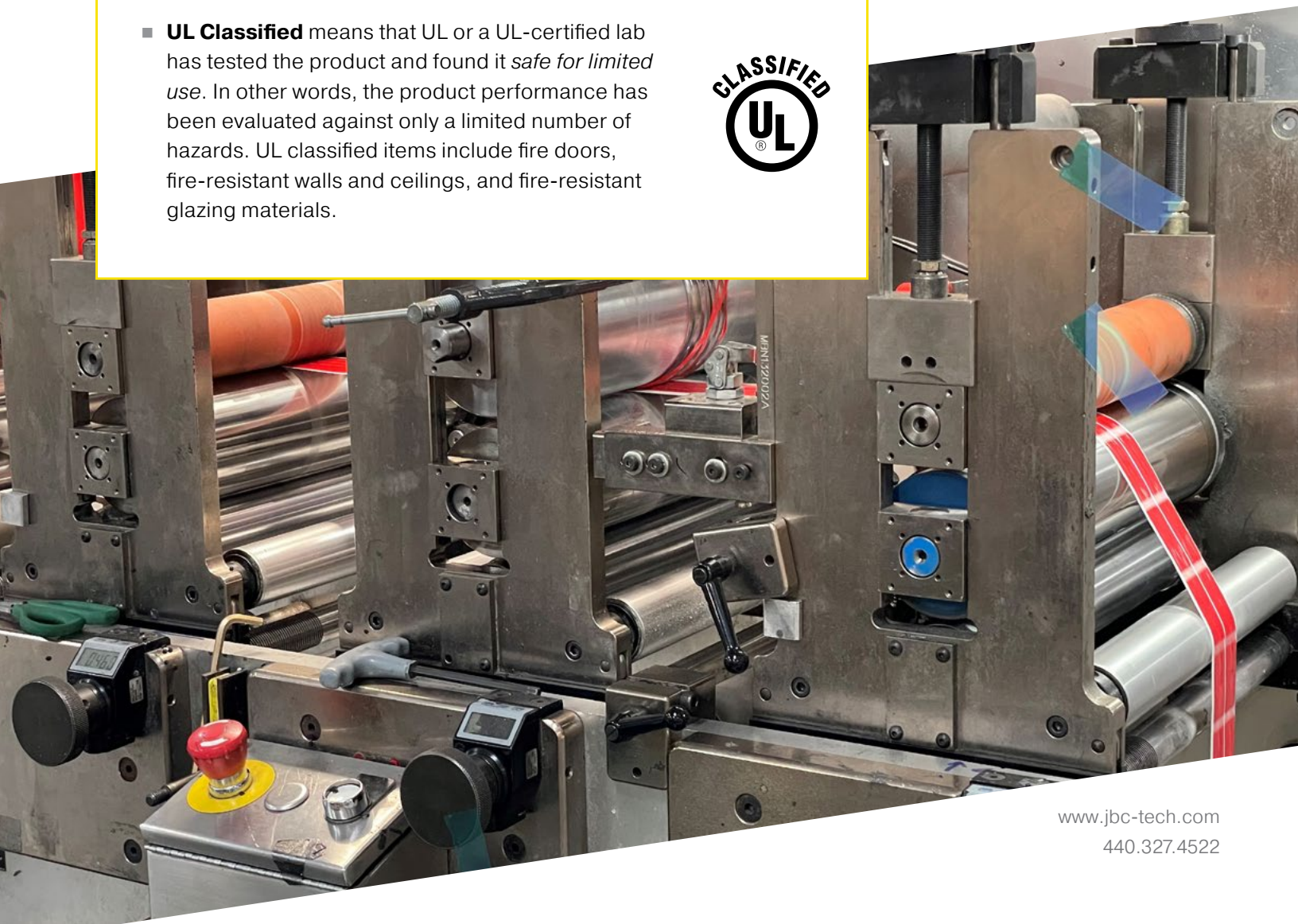
- **UL standards** are the guidelines for safety. UL has designed these standards to cover a wide range of products and industries to ensure they meet specific safety requirements. For example, there may be a UL standard for electrical safety or fire resistance. UL experts design these standards based on research, testing, and industry best practices.
- **UL certification**, on the other hand, is the process of evaluating products against these safety guidelines and certifying that they meet the necessary safety requirements. When a product is UL certified, UL or a UL certified testing lab has tested it and found it meets the safety requirements outlined in the relevant UL standards.



UL Certification Levels

The term “UL certification” is a blanket term that encompasses several levels, each with its own test standards and benefits. Here is a look at the three main levels of UL certification:

- **UL Listed** means that UL or a UL-certified lab has tested the product and that it will work well and safely. *The product is complete and finished and ready for use by people immediately.* Examples of UL listed products are things like appliances, extension cords, and other electronics.
- **UL Recognized** means that UL or a UL-certified lab has tested the part and found it safe to use in something else. *These are not finished products. They are components* designed to be used as part of a finished product later. UL recognized components include adhesive tapes, electrical insulation materials, and various gaskets and seals.
- **UL Classified** means that UL or a UL-certified lab has tested the product and found it *safe for limited use.* In other words, the product performance has been evaluated against only a limited number of hazards. UL classified items include fire doors, fire-resistant walls and ceilings, and fire-resistant glazing materials.



SECTION 2

COMMON UL TESTING STANDARDS FOR DIE-CUT PRODUCTS

For a complete product or component to be “UL Certified” (UL Listed/Recognized/Classified) it must successfully meet the requirements outlined by the tests found within the appropriate UL standard.

➔ *Here are a few of the most common UL standards that you are likely to run into when working with JBC on your custom die cutting project:*



- **UL 94 – Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.** This is by far one of the most popular and often-cited UL standards we see within the gasketing and sealing worlds. UL-94 provides a method for rating the ignition characteristics of plastic materials.
- **UL 50E – Compression Set for Gaskets & Seals.** This standard applies to the seals and gaskets used in electrical equipment enclosures. UL 50E measures the ability of a compressible material to prevent air and moisture from entering an enclosure.
- **UL 181A/B –** This pair of HVAC standards covers closure systems for factory-made rigid air ducts or air connectors. Closure systems consist of pressure-sensitive tapes, heat-activated tapes, and mastics.
- **UL 510A –** Covers the safety of adhesive tapes for use in electrical and electronic equipment. This standard applies to adhesive tapes used for insulating and protecting electrical connections and components and for securing electrical components in place.
- **UL 723 –** Covers the fire-resistance ratings of building materials. The standard provides testing and evaluation methods for determining the fire-resistance ratings of building materials, such as wall and floor assemblies, and the fire-resistance ratings of fire-stopping systems.
- **UL 746C –** Covers the testing and evaluation of materials used in the construction of electrical and electronic equipment. The standard provides a set of tests and evaluation procedures to determine the performance of materials used in the construction of electrical and electronic equipment, including both solid and liquid materials.
- **UL 969 –** The standard provides guidelines for product markings and labeling of electrical and electronic products, including information such as product certifications, labeling requirements, and marking requirements.

SECTION 3

COMMON POINTS OF CONFUSION

In speaking with our customers and prospective customers, we have determined that there are two common points that people tend to get tripped up on:

1. **UL certified materials do not necessarily make UL certified products** —This simple statement is a significant point of confusion for many of our customers. If the adhesive and the foam used to make your custom gaskets are both UL Certified, it should make sense that the gaskets are UL certified. The reality is that this is not necessarily true.
2. **You can have a UL certified product made with materials that are not themselves UL certified.** For a die-cut component to meet UL certification, it must be tested as a complete construction, regardless of the UL ratings of its individual components. A foam gasket with an adhesive backing can be UL certified even if the foam and PSA (Pressure Sensitive Adhesive) are not.

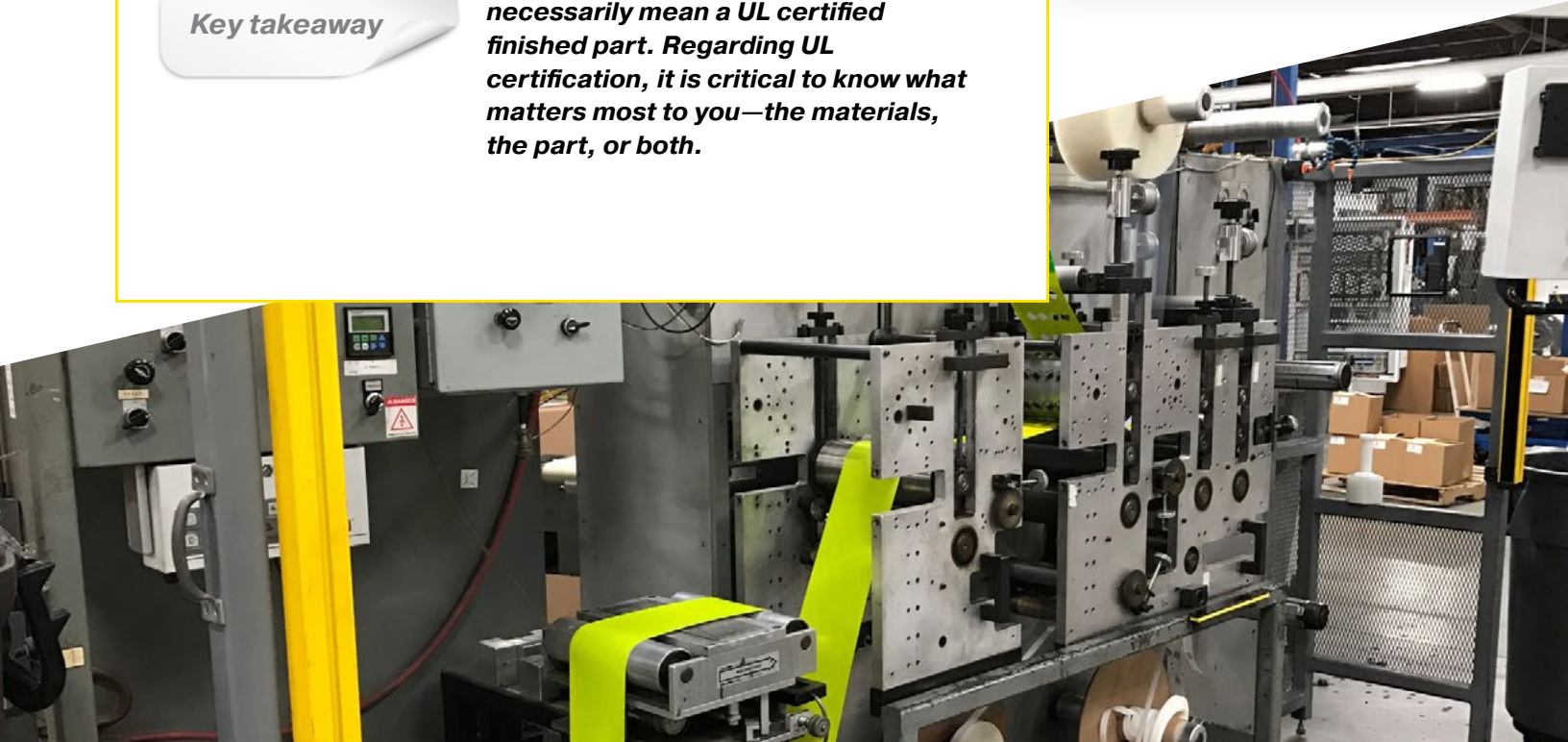
These are critical distinctions because many die-cut parts are made from multiple materials. For example, we can laminate a pressure-sensitive adhesive tape to one side of a polyurethane foam rubber, and a thin aluminum foil to the other side, before we slit it down and run it through a die cutting press to produce individual gaskets. In this case, the finished gaskets are constructed of three individual performance materials.

Key takeaway

UL certified materials do not necessarily mean a UL certified finished part. Regarding UL certification, it is critical to know what matters most to you—the materials, the part, or both.

Examples of UL certified Materials

- **3M™ 3340 Foil Tape**
(UL181A-P and UL181B-FX Listed)
- **3M™ VHB™ Acrylic Foam Tapes**
(UL 746C Recognized)
- **Avery Dennison FASSON® 0827** (UL 723 Classified)
- **tesa® 51408 High-Temperature Polyimide Tape**
(UL 510 Recognized)
- **Armacell® Ensolite® IV2 NBR/PVC/CR Foam**
(UL 94 V-0 Recognized)
- **Rogers BISCO® HT-820 Firm Silicone Foam**
(UL 94 V-0 HF-1 Recognized)
- **ITW Formex® Electrical Insulation**
(UL 94 VTM-0/V-0, 746A/B Recognized)



MATERIAL SELECTION: WHAT TO LOOK FOR

If UL certification is important to you, be sure to look for materials that have been tested against UL standards and that have the results to prove it. If you are Googling for answers, do not go looking for PSA tapes and XLPE foams with the UL mark on them. Chances are, you will not find them. Instead, look for phrases like.

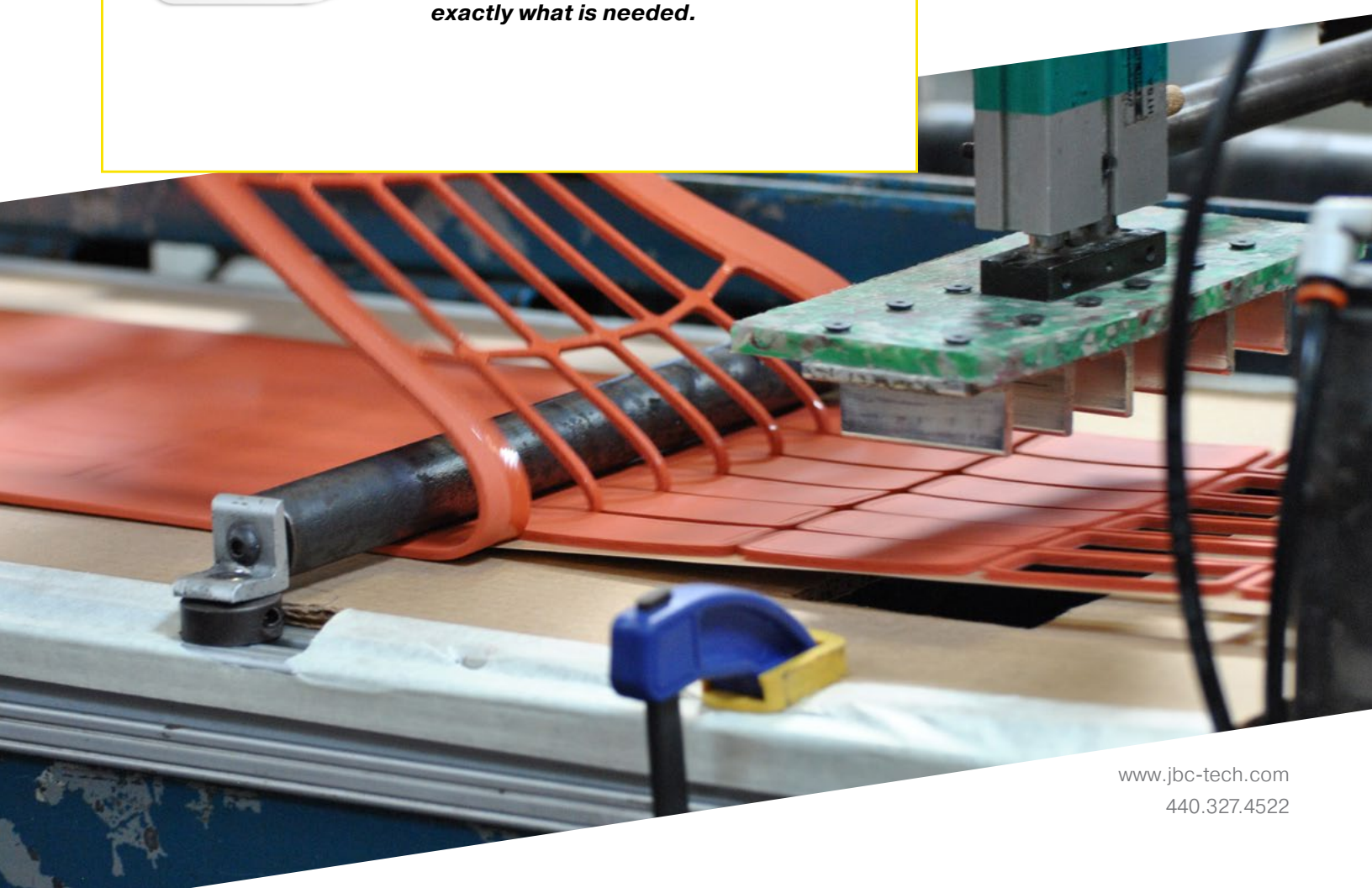
- This material has been tested against UL 94
- Meets UL 50E Standard

This is not to say that there are not some UL listed adhesives, foams, and other thin, flexible materials we are likely to use at JBC technologies. They are out there. You just need to look.

When in doubt, try searching the UL listing database to confirm or look up any material you are likely to run across.

Key takeaway

Oftentimes, having a material that has been successfully tested against a UL standard, rather than UL certified is exactly what is needed.



NARROWING YOUR OPTIONS

As a custom converter and die-cutting manufacturer, the team at JBC Technologies is often approached by individuals who have questions about UL certification that can impact the designs of their custom die-cut parts. The challenge for us is often ensuring that we are on the same page as our customers when it comes to the meanings of the various terms and phrases that are floating around in the marketplace regarding UL.

Coming to us prepared to answer some key questions will help our team determine how UL applies to your project, if certification is needed, and which materials we should use to make your parts.

- What is the application of your custom die-cut component?
- What is the UL standard or standards you require for your components?
- Does the finished part need to be UL certified or the materials only?
- If the part is composed of multiple layers of dissimilar materials, do all of them need to be UL certified, or only some of them?

Armed with this information, the JBC Technologies team will work with our raw material manufacturers to find materials that meet your performance and value requirements.

Key takeaway

The more you know about how your custom die-cut components are going to be used, the better we can help you find the material that can meet your cost and performance benefits.

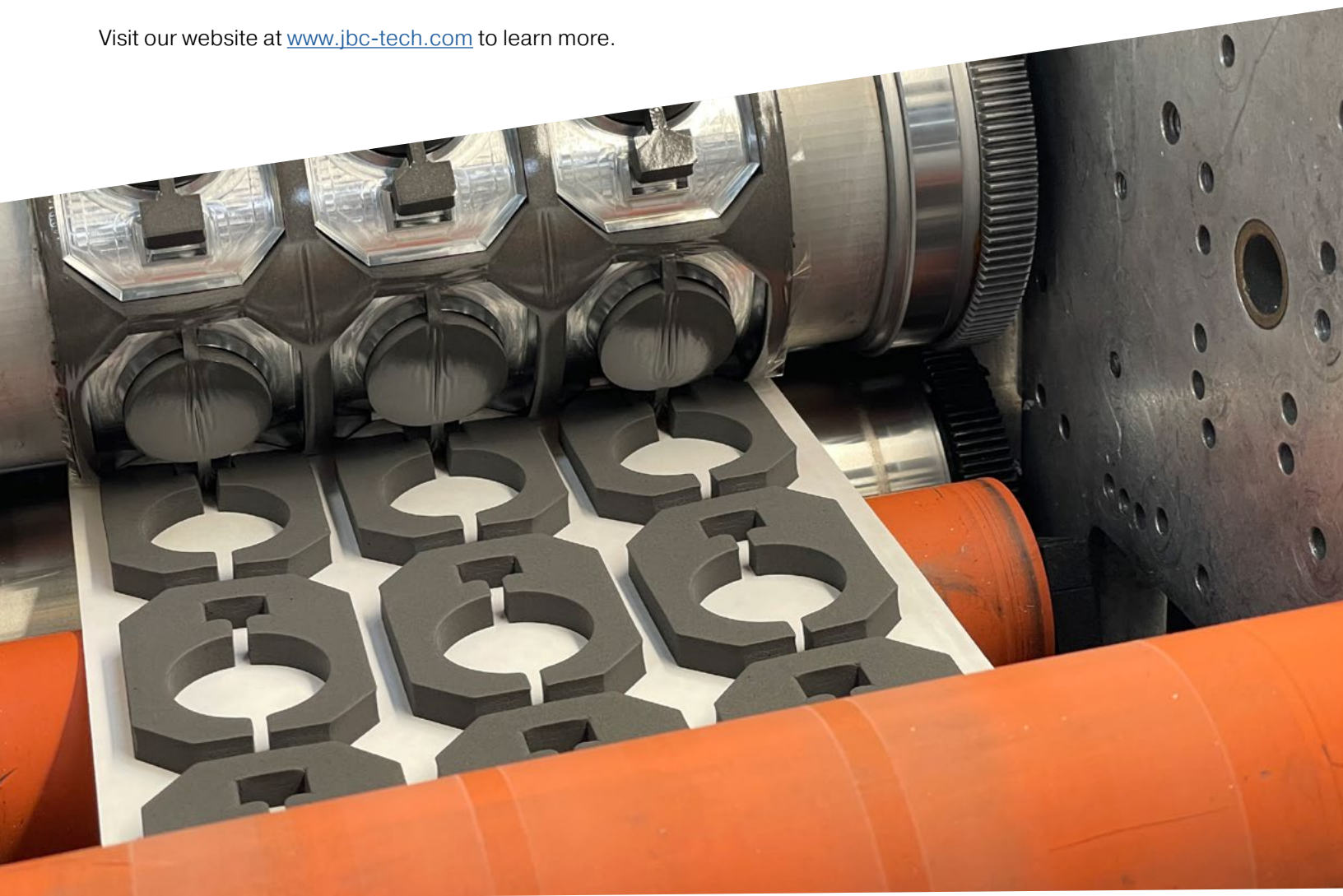


About JBC Technologies

JBC Technologies is a specialized manufacturing partner that converts flexible materials into custom die-cut parts that solve critical challenges for thermal management, electrical insulation, gasketing, sealing, bonding, heat shielding, buzz, squeak and rattle/NVH, and more. Our customers benefit from our strong engineering focus and emphasis on providing value during the full product lifecycle.

If you are in the market for a custom die-cut solution or looking to learn more about UL certification, we encourage you to contact us directly to speak with one of our experts. We are here to help you make informed decisions and ensure that your custom die-cut parts meet the safety standards that are important to you and your customer.

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