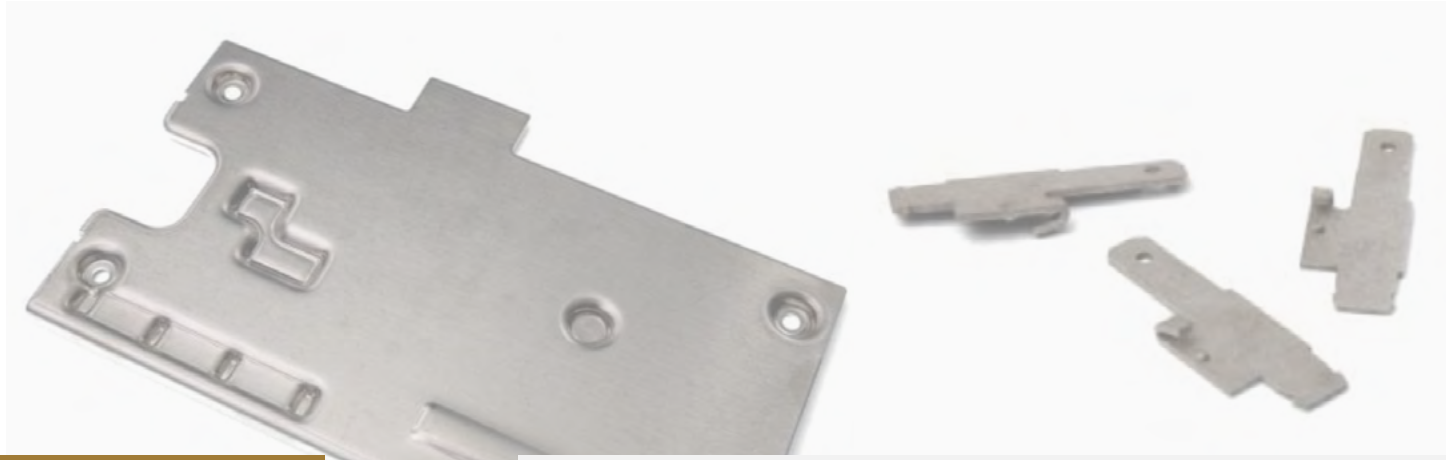


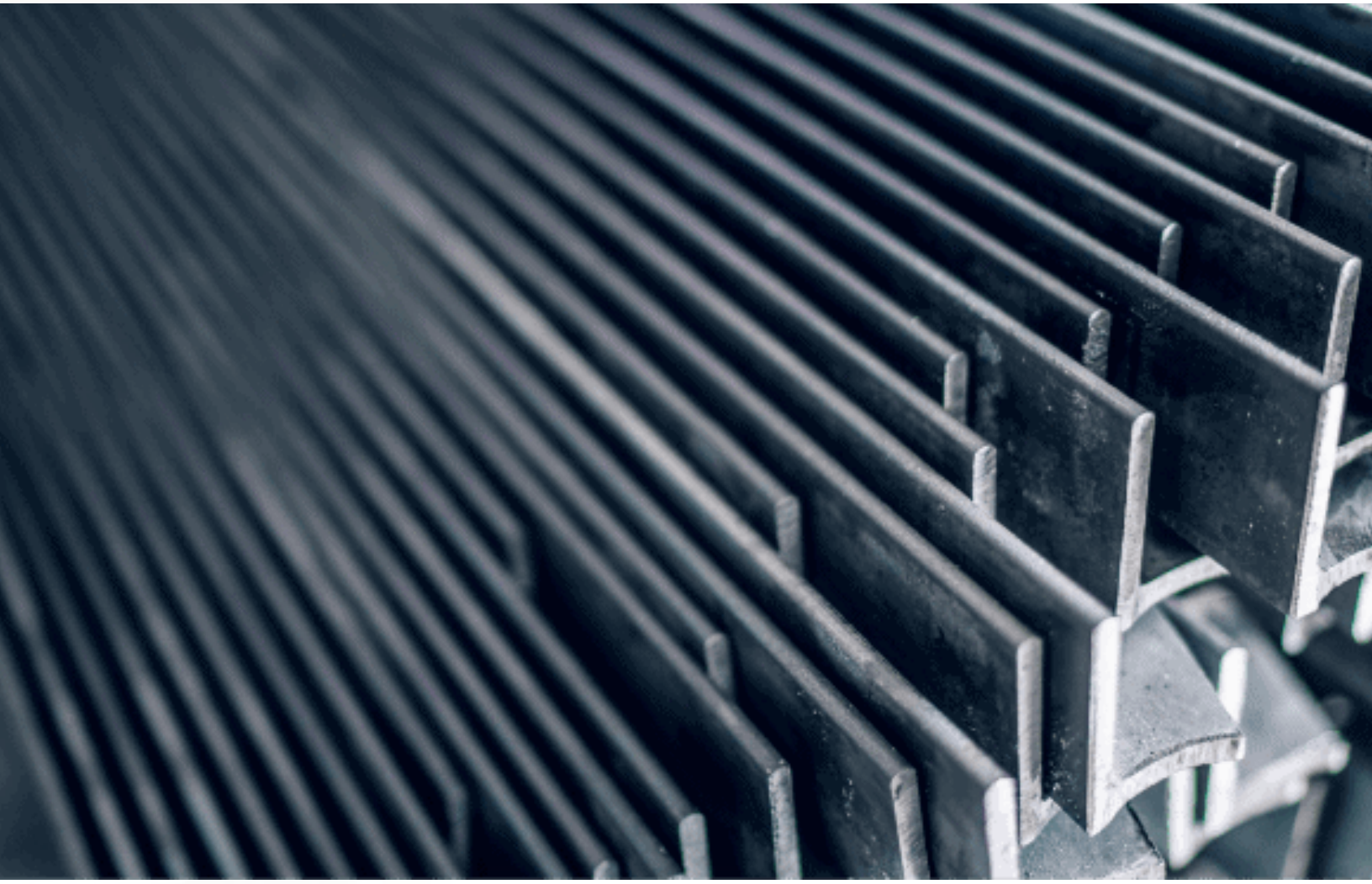
cep Technologies Corporation

Modular Tool Design:

CEP Technologies' Stamping Capabilities

Custom progressive metal stamping is a manufacturing process used to create large quantities of metal parts quickly. Traditionally, a unique die set is created and used for a single part. When a family of similar parts with minor differences is required, it may not be cost-effective to build new tooling for each variation. In these cases, modular tool design is an efficient and affordable solution.

At CEP Technologies Corporation, we serve customers in many industries including automotive, electrical/electronics, power protection, industrial equipment, lighting, medical devices, PCB/semiconductor, power tools, and telecommunications. We stamp custom, miniature to small parts from metal coil between about 0.002" and 0.080" thick, including many parts stamped with modular die sets. This eBook explains how our modular die sets work, as well as the benefits of this approach to progressive stamping.



What Is Modular Tool Design?

When something is modular, it is made of multiple components that fit together or that can be exchanged for other compatible components. This means it's possible to add or remove components to achieve a desired outcome. Examples in the consumer world include modular sofas or tables with removable extension "leaves," in which customers can modify the size and shape of the piece by swapping out components that all fit into a standard frame or base.

In progressive stamping, modular tool design works similarly: separate dies are created for the various part features so they can be interchanged based on the specifications of the finished parts. This makes it efficient to create parts that share many features but still have some differences, such as the placement of a tab or bend angle.

Components in a Modular Die Set

These expertly assembled components ensure that each stop in the series of operations lines up exactly with the strip and with the partially formed parts on it for high accuracy and repeatability, and therefore less scrap. The ability to maintain proper alignment directly impacts part quality:

- **Die shoes and plates.** These are milled or ground plates that are parallel to the dies sandwiched between them, holding the dies in place in the press. The dies are usually secured to the shoes with special high-strength screws.

- **Guide pins and bushings.** These keep the upper and lower dies in vertical and horizontal alignment as the press moves them together and apart.

- **Heel blocks and wear plates.** These absorb "side thrust" or other shifting/deforming of pins or bushings during the stamping process. They help to keep the coil and dies in proper alignment. Additional metal pads may also be used to hold coil in place horizontally during stamping.

- **Retainers, bolts, and screws.** These secure the various die components in place inside the actual dies, such as components for cutting, coining, or bending.

- **Springs.** These are the metal coil or compressed nitrogen gas springs inside the die set that create the forces required to open and close the tooling during operation.

All of these components are used in both conventional and modular die sets. In conventional dies the components are specifically assembled into a die set and used to create a single unique type of part. In modular die design, some or all of these components may be swapped for others in order to create different features or attributes. This allows the modular die set to be used for multiple types of similar parts instead of just one type.

CEP Technologies' Conventional Dies vs. Modular Dies

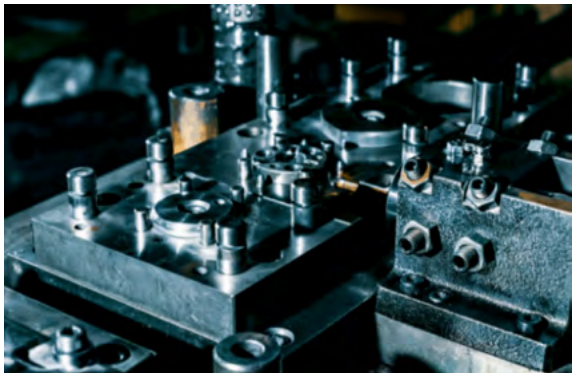
When working with a progressive stamping vendor, it's important to understand the difference between modular and conventional dies as they apply to your stamping project.

- **Conventional dies** are manufactured to produce a single stamping, in which the entire production run consists of the same part without multiple versions (e.g., a run of 100,000 identical copper battery contacts).

- **Modular dies** consist of a single set of die shoes that hold multiple, interchangeable dies. The dies correspond to different features in a family of similar parts so that all variations can be achieved using combinations of the dies instead of manufacturing a new die for each variation. The dies can be made of different metals (e.g., different alloys for different applications of the same part) or with different modifications to form part features (e.g., to allow for different terminal bend angles on three variants of the same base part).

CEP's Custom Progressive Metal Stamping Process: How We Work With You

We start by reviewing your CAD designs and part prints. Our team will review the details with you to gain a solid understanding of the part's design intent and critical features. Because there are so many decisions involved in progressive stamping, this process allows our engineers to determine the optimal sequence of operations and materials to meet your requirements.



We can also assist you with rapid prototyping as well as suggesting alternate metals or design adjustments. Our goal is always to achieve the highest-quality components while ensuring they are able to be manufactured with great efficiency and cost-effectiveness.

Benefits of Modular Progressive Stamping

Progressive stamping offers many benefits for medium- and high-volume production, including:

Reduced costs and capital investment.

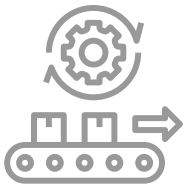
Parts are spaced efficiently on the coil strip, resulting in less scrap during manufacturing. What's more, even though modular dies require multiple dies to be built, because of overlap in part features between part family members, it's not necessary to create a full die for each one. That means savings for you due to smaller quantities of tool steel and generally smaller sizes of the modules.

Highly customizable dies.

This makes it possible to manufacture a range of parts like pins, clips, tabs, contacts, and more for hundreds of applications in many industries.

Automated manufacturing process.

Once tooling is set up, presses can run hundreds of strokes per minute, which results in many finished parts in a short time. What's more, our careful die manufacturing and maintenance mean that finished pieces are rarely out of tolerance. This is because dies can be adjusted or repaired before issues arise.

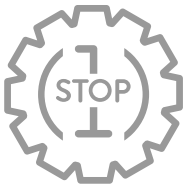


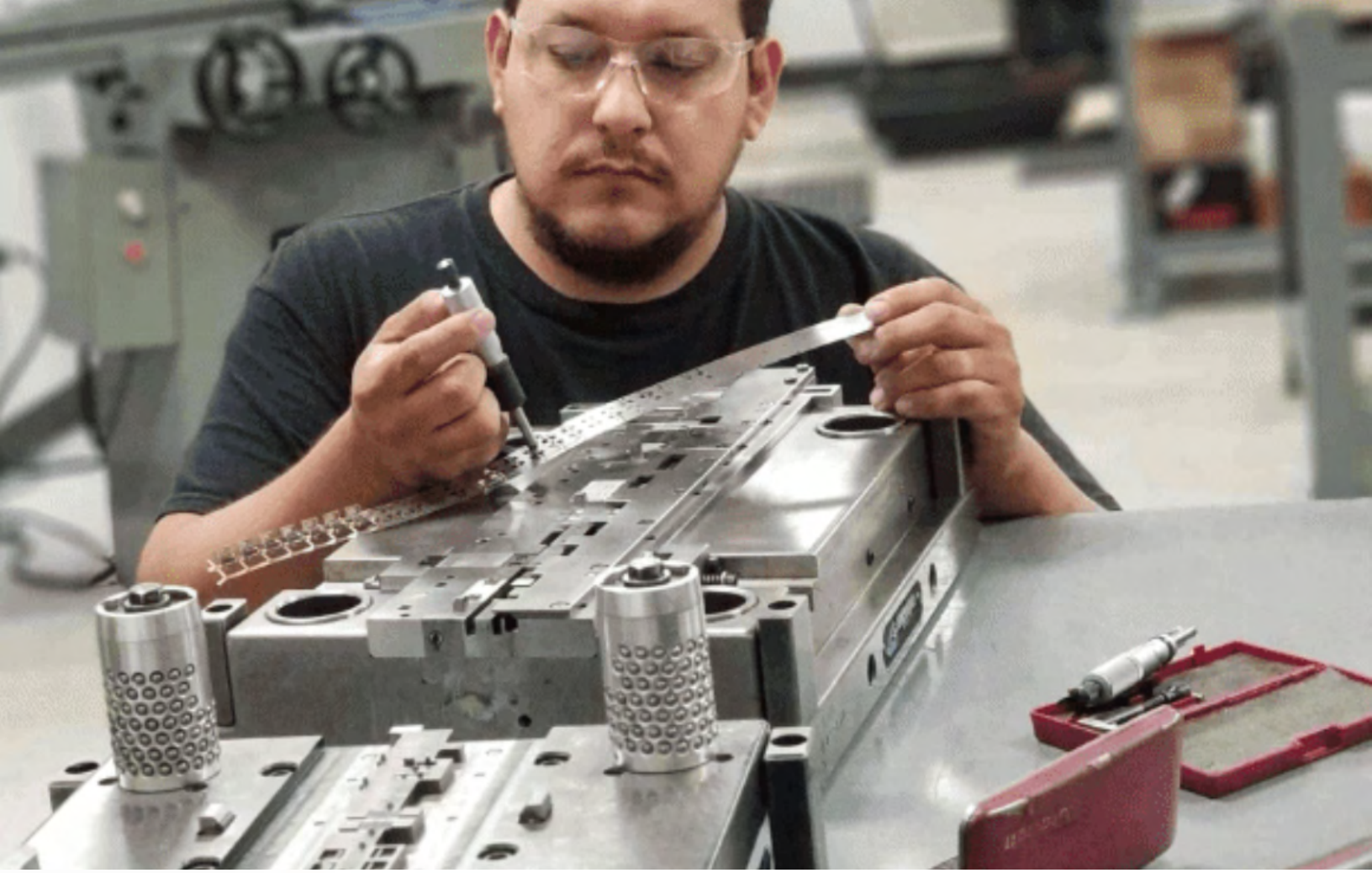
Fast production on demand.

Because of the quick nature of progressive stamping, and the fact that CEP stores your tooling for the lifetime of your project at our facility, you'll be able to keep up with the demand for parts, whether you are an OEM or supply other manufacturers.

One-stop production.

It's simply more cost-effective to work with a single vendor for end-to-end manufacturing. In addition to expert progressive stamping, we offer rapid prototyping as well as several options for finishing, cleaning, and packaging.





Lifetime Tooling Guarantee: Why CEP Is a Trusted Partner for Your Stamping Needs

With all the decisions, time, and materials that go into progressive stamping, it's important to protect your investment. CEP Technologies is proud to offer all our customers a unique lifetime guarantee for all tooling, including design, build, storage, and maintenance, with no retooling costs. We can also work with you to transfer your existing tooling, should you prefer that option.

We are IATF 16949:2016 and ISO 14001:2015 certified with global facilities and in-house engineering expertise to manufacture custom parts to your specifications. Our team is always ready to learn about your next project so please contact us or request a quote today!

About CEP Technologies

CEP Technologies Corporation is a family-owned company founded by Henry G. Kaufmann in 1960. Since then, we have grown into a leading supplier of miniature to small precision metal stampings for numerous industries and applications.

We provide high-volume custom metal stampings and rapid prototyping services for customers around the world. With decades of experience in progressive die metal stamping methods, our team manufactures custom stampings that deliver the highest quality and efficient production.

Contact Us | Resource Library | Request a Quote

CEP Technologies Corporation Headquarters
763 Saw Mill River Road
Yonkers, NY 10710
P: 914.968.4100
E: sales@ceptech.net

CEP Technologies San Antonio
5823 Rittiman Plaza
San Antonio, TX 78218
P: 914.968.4100
E: sales@ceptech.net

CEP Technologies (Chengdu) Co., Ltd.
No 5 South Sea Avenue, Jialong Industry Port, Shuangliu Park
P: +86.2885730206
E: sales@ceptech.net