

**TRIFORM**  
Manufactured by Beckwood

# PRECISION FORMING EQUIPMENT





## Experience Matters

Nearly half a century of engineering and manufacturing experience across dozens of industries and applications goes into every press that we build. This “cross-industrial” experience uniquely positions Triform on the forefront of technology, allowing us to introduce innovative solutions that you may not have known existed.

Triform machines are frequently used in the aerospace & defense industry where low-volume, high-mix production is common. They are also optimal for job shops where tool changes occur multiple times each hour. Experts from the automotive, medical, lighting, energy, and oil & gas industries are also discovering the competitive advantages of our precision forming equipment.

## An Evolution in Sheet Hydroforming

### Breathing New Life into Old Technology

Prior to Triform’s launch in 2008, sourcing reliable sheet hydroforming equipment was a challenge. New machinery was extremely scarce, and prices reflected the lack of competition. Used equipment was 50+ years old and presented countless hazards.

Beckwood developed the Triform line of sheet hydroforming presses, stretch formers, ring expanders, and joggle presses in direct response to this unmet need in the marketplace. With such an extensive product line, we provide complete turn-key forming facilities, minimizing sub-tier supplier issues and maximizing your manufacturing flexibility. Today, Triform is the only OEM in the world able to provide such a diverse mix of forming technologies, making us the preferred single-source manufacturing partner.

### Powerful, Intuitive Controls

Triform has found the perfect balance between advanced control capabilities and a user-friendly interface. The result is a press system that doesn’t require extensive experience to operate yet offers more flexibility than you ever dreamed possible.

The ability to precisely control pressure and punch position (deep draw) for up to 30 recipe steps in each cycle allows you to make fast, accurate adjustments, greatly accelerating new part development. Tears or wrinkles are quickly eliminated with simple program changes, and recipes can be saved for future use. Additionally, since all of our machines use the same technology framework, training and support are a breeze.

### Accuracy, Repeatability, Consistency

Triform presses use an intuitive system to tightly control diaphragm pressure (to 1% of full scale) and punch position (+/-0.002”) via a user-friendly interface. This precise control over the forming process and the ability to save and recall proven recipes greatly accelerates new part development and improves part consistency due to the repeatable nature of the process.

By producing an accurate, repeatable process, Triform has taken sheet hydroforming from an artform to a science. We didn’t invent sheet hydroforming, but we re-invented the way it works for our customers!

### Proprietary Diaphragm Technology

One of the primary reasons we developed sheet hydroforming presses was to combat the substantial downtime associated with replacing diaphragms. Triform diaphragm changes take ~30 minutes for small presses and only 3-4 hours on larger models. This is in stark contrast to our competition, which can require several days or weeks to source and change.

Our diaphragms are made from high-performance neoprene and urethane for ultimate durability. Unlike natural rubber diaphragms, which require specialized components and an abrasive castor oil system, our diaphragms can be used with standard, petroleum-based products, minimizing viscosity variances and cavitation issues.





## Unparalleled Forming Capability

Triform sheet hydroforming is quickly becoming the go-to solution for complex forming challenges thanks to the flexible diaphragm which creates parts with smooth, uniform, scratch-free surfaces that typically require no additional finishing. Eliminating secondary operations (annealing, hammering, buffing, and other hand work) significantly reduces labor costs and dramatically improves part consistency.

The uniform pressure exerted by the diaphragm is optimal for creating complex geometric shapes which are difficult using traditional forming methods. Parts that normally require multiple steps or expensive progressive dies can often be formed in a single cycle through sheet hydroforming.

## Why Sheet Hydroforming?

### Two Processes, Infinite Possibilities

Triform offers sheet hydroforming presses in both 'fluid cell' and 'deep draw' configurations. During the fluid cell process, blank sheet material is placed on a single, unmated tool resting unsecured on the working surface. A pressurized diaphragm extends over the tool and blank, exerting equal pressure on every square inch of the part's surface. Even application of pressure offers net shape part production – minimizing wrinkles, improving part definition, and reducing hand finishing.

Deep-Draw sheet hydroforming is often used for applications requiring a controlled flow of material, such as drawn parts or those with the potential to wrinkle during formation. During the deep-draw process, a pressurized diaphragm holds a blank in place as the tool extends on a hydraulic punch cylinder. This draws the material into the diaphragm and allows it to flow as needed.

Through a simple deactivation of the punch cylinder, a Triform deep draw press quickly transforms into a fluid cell machine, offering even greater forming flexibility. Whether fluid cell or deep draw, both configurations offer near-net-shape part production in a single cycle.

### Lower Tool, Material, & Development Costs

Since the diaphragm acts as a universal female die, mated tools are not required. This can reduce tooling costs by 50-90%

compared to conventional forming methods! Additionally, hydroform tools can be made from a variety of materials including steel, aluminum, 3D printed substrates, poured epoxies, and even wood.

Sheet hydroforming can result in less than 10% variation in blank-to-finished-part thickness due to uniform elongation of the material. The multi-directional forces applied during the cycle draw the material around the tool smoothly and evenly which reduces thinning and allows you to decrease the thickness of your starting material.

Triform's proprietary 'In-Sight' feature allows you to pause a deep draw cycle at any point and open the press for a visual inspection of the results. Depending on the outcome, you can either continue the cycle or abort it to modify the recipe. This ability to look inside the chamber during formation greatly expedites new part development while significantly reducing scrap.

### Improved Efficiency

The use of non-mated tooling allows for faster setup and change-over, particularly within the fluid cell process. Triform presses frequently reduce tool change time by 60-70%, making the process ideal for low-volume / high-mix environments. Additionally, tray-style models can form multiple parts in a single cycle and facilitate continuous production via a dual shuttle system.

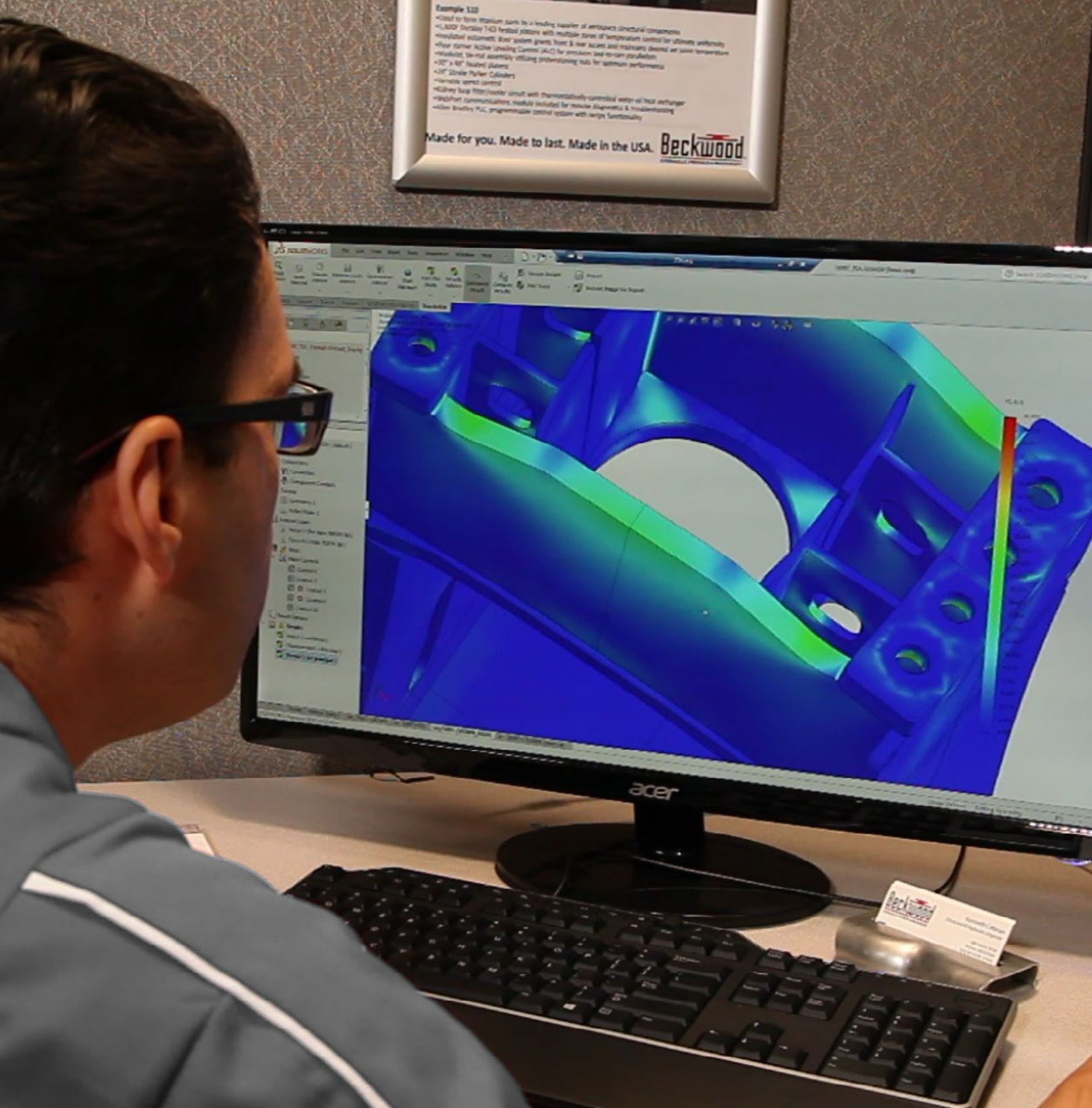


Sample Fluid Cell Parts



Sample Deep Draw Parts





## Engineering Integrity

### Premium Products for Demanding Applications

Every Triform press is designed, engineered, and built in our 55,000+ sq. ft. headquarters in St. Louis, Missouri. Our commitment to manufacturing in the United States results in machines that are safe, robust, and easy to maintain and support.

From structures engineered for Infinite Life to top-of-the-line components from industry leaders, Triform solutions exist to tackle the most demanding industrial applications. We understand the critical role our equipment plays in your organization, which is why we consistently deliver the most reliable, highest-quality custom machinery.

At Triform, quality is a way of life. We take pride in our work, uphold strict quality standards, and stand behind our commitment to manufacturing presses that are “Built for you. Built to Last. Built in the USA.”

### Processes & People for Quality Assurance

We maintain tight control over quality and lead-time due to our 360-degree engineering and manufacturing capabilities. Every Triform order is assigned a dedicated project manager whose sole mission is to ensure your project progresses with a unified understanding of success. Teams of structural, hydraulic and electrical engineers

collaborate with you to design the ideal solution, and our in-house machining, fabrication, assembly, and testing capabilities ensure your machine is built to exceed your expectations.

We conduct strategic departmental reviews at various milestones throughout the project and use a strict traceability system to verify every component is manufactured to the proper specifications. Once the press is built, extended duration testing mimics real-world conditions in an effort to uncover any issues prior to shipment.

Our dedicated team of support technicians provide industry-leading service including PM packages, retrofits, and troubleshooting assistance while integrated technologies, such as our PressLink Remote Connect Module, improve up-time and overall machine performance.

### Quality In, Quality Out

Triform understands the importance of quickly and cost-effectively sourcing replacement parts. By using standard, catalogued components readily available from local suppliers, our customers don’t experience the extended down-time associated sourcing custom parts. Component part numbers match those of the original manufacturer, making replacements quick and easy to find.

## Building Machinery for Infinite Life

Every Triform press structure is designed to the Infinite Life classification using Finite Element Analysis (FEA) software. FEA is a computerized method for predicting how a structure will react to real-world forces (vibration, heat, fluid flow, and other physical effects). By breaking down an object into a large number of finite elements and using mathematical equations, our engineers are able to predict the behavior of each element. The resulting computer-aided simulations ensure the design is robust enough to handle the most taxing applications. If at any point during the engineering process the structure does not meet our internal standards, design adjustments are made to account for structural deflection and stress - before approval drawings are ever submitted.





## Unrivaled Service & Support

### **It Starts with the Team...**

At Triform, we have cultivated the best Service and Support team in our industry with experience, dedication, and availability no competitor can match. Our commitment to rapid response results in minimized downtime and increased productivity for your organization.

Offering efficient service and support requires a strong team of dedicated individuals. Our technicians are exhaustively trained in the disciplines of structural, hydraulic, electrical, and controls technologies to ensure your investment will continue running long into the future.

### **...and is Enhanced with Strategic Technologies**

As manufacturing technology continually advances, so do production expectations. That's why we situate ourselves on the leading edge of technology, developing proprietary systems to ensure our machines not only meet today's challenges but position you to handle the challenges of tomorrow.

Using closed-loop monitoring, our on-board Pre-Preventive Maintenance system (PPM) measures component and system performance in real-time and relays critical maintenance data to key users via on-screen notifications and

email. This advance-notification system shifts maintenance efforts from reactive to proactive, allowing you to schedule downtime when it's most convenient.

Our PressLink connect module remotely joins Triform technicians with your press in the field. In addition to fast, complimentary support and troubleshooting, PressLink facilitates program updates and training without the need for costly on-site visits.

The on-board diagnostic system acts as a 'check engine light' for your machine. If an issue occurs, the diagnostics program gives your maintenance crew real-time information and takes them directly to the source of the problem so they can address it quickly and resume production.

### **Service After the Sale**

Triform offers a variety of post-installation services designed to maximize the life and performance of your equipment. These include:


- Preventive Maintenance Packages
- Comprehensive Spare Parts Packages
- Control System Upgrades / Retrofits
- Hydraulic System Upgrades / Retrofits
- Replacement Components
- Safety Systems Audits
- Oil Sampling & Analysis
- And More...

## A Trusted Long-Term Partner

At Triform, our mission is to create a lasting partnership with our clients. From first contact, you'll be impressed with our responsiveness and knowledge. We work to understand your unique application and use our wealth of resources to propose the best solution for your operation.

Designing parts for optimal formability is the key to achieving consistent quality and cost-effective production. By predicting the forming characteristics of a part early in the design process, you will reduce engineering time and minimize project delays. With Triform, initial forming consultation is complimentary and intended to offer preliminary feedback on part formability and equipment recommendations. Beyond the initial consultation, our experts offer application training which includes tooling and blank development guidance, forming process optimization advice, and more.





*"The Triform team is very supportive. Their Sales, Application, and Engineering teams are very helpful to a new-entry company in the aerospace industry. We ultimately chose Triform because of their total solution."*

Victor Chung  
Jinpao Precision Industry Co. Ltd.

*"We're running whatever we can fit inside our Triform press. We typically produce 10-30 parts per setup, then change tooling. We might change tools 15 times or more per shift. Tool changes in the Triform literally take seconds. Conversely, changing tools on our larger hydroforming presses can take 30 minutes or more."*

James Priest  
Piper Aircraft

*"We had been forming parts for years which we now know were tailor-made for the Triform. We were often forming flanges and complex part geometries in a press brake. Many of our parts would require secondary finishing in a traditional press with male/female tooling. With the Triform, we can bypass those processes and form our parts quickly and efficiently in a single step."*

Joseph Dust  
Steelville Manufacturing Co.

*"Our Triform is able to handle a significant percentage of our parts, allowing us to cycle our larger Verson press only when required, due to either part size or overall production requirements. The redundancy and additional capacity, along with our in-house engineering/tool design capabilities, gives us the ability to respond more quickly to our customers' requests."*

Bill Carson  
Cutting Dynamics

## What Our Customers Say

Real-life manufacturing success stories are more convincing than any white paper, case study or spec sheet. Don't just take our word for it; discover the dramatic improvements our customers have achieved using Triform manufacturing solutions.



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