

Superplastic Forming

Macrodyne Superplastic Forming Presses are used for deforming metal sheets with extreme plastic-strains to produce thin-walled components to a near-net-shape. These parts are most commonly used in the aerospace and automotive sector but are now being used in other industries that require advanced manufacturing that is only possible through the SPF process.



Macrodyne Advantages

Superplastic Forming Solutions

The SPF manufacturing process can produce large complex structural components without the need for welding or riveting parts together. When fine-grain alloys are deformed within a controlled strain rate at very high temperatures, they can produce up to a tenfold higher increase in elongation compared to that for conventional room-temperature processes.

Whether the SPF process is for metal alloys or intermetallics (including materials based in titanium, aluminum, magnesium, iron, and nickel), Macrodyne's Superplastic Forming Presses are designed for each specific application. The presses come standard with a proprietary closed-loop process control system to dynamically manage force, parallelism, argon gas pressure, time, and temperature in multiple zones, thus delivering the low-flow stress and high-uniformity plastic flow required for different products and materials.

Innovative Superplastic Forming Solutions

Macrodyne SPF Press Features:

- Down-acting, up-acting, and multi-action servo-hydraulic press designs
- Hot Forming, Superplastic Forming, and Diffusion Bonding operations are available
- Available with draw-cushions for the manufacturing of complex parts
- Precise and uniform multi-zone temperature control, up to 1,250 °C (2,282 °F)
- Precision Argon gas management systems with purity monitoring
- Closed-loop control of all manufacturing parameters
- Industry 4.0 Data acquisition system systems
- Heated Platens – Manufactured from high-nickel alloys, or ceramics for higher temperature applications
- Cooling platens – Protecting the press structure from excess heat
- Heat Management – Highly efficient heat shields, ceramic insulation, and automatic doors
- Automation – Die Handling – auto-clamping, die lifting, rolling bolsters, shuttles, parts loading/unloading
- Energy-efficient drives
- Preheating stations for tools and blanks

In addition to supplying new custom Superplastic Forming presses, Macrodyne provides comprehensive service, including rebuilds and upgrades, to old SPF presses of all makes and models.