

# Certified Inertia / Friction Welding For Piston Rod Assemblies and Cylinder Body Fabrication

- Able to join dissimilar metals
- Does not require fillers
- 100% welded interface
- Tensile and yield strengths equal or stronger than parent materials
- 75% less welding time compared to MIG
- Lower cost per weld
- Less expensive weld preparation
- More durable weld joints
- Controllable heat-affected zone

Rods 1" to 8.5" in diameter for  
single-piece manufacturing.

Swanson maintains six inertia  
welding machines, including  
the **MH700**, one of the largest  
in the world.



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I N D U S T R I E S

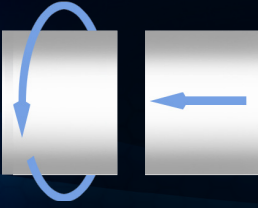
*Global Leader In Engineered Hydraulics*

**HYDRAULIC CYLINDER CUSTOM DESIGN » MANUFACTURING » REMANUFACTURING**

Highly-Engineered to OEM Standards for Rigorous Applications in the Mobile,  
Industrial, Marine and Offshore Markets

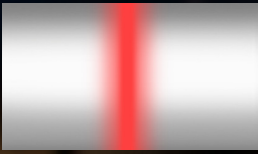
**800-327-6203 | [swansonindustries.com](http://swansonindustries.com)**

ISO-9001:2015



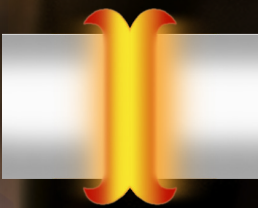
### BEFORE WELDING

1. Parts are mounted in the Friction Welder
2. Rotating Part is spun up to speed of 1,000 RPM.



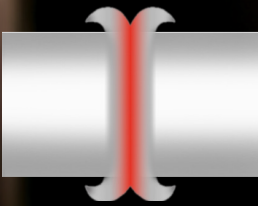
### PHASE 1 (FIRST FRICTION)

1. Parts are rubbing together, at low force, to accomplish a clean-up of the two surfaces and initialize generation of heat.
2. The force applied during First Friction is -30% of the Second Friction.



### PHASE 2 (SECOND FRICTION)

1. The increased pressure brought about during second friction causes the metal to become "plastic" and flows outward from center to form the characteristic "Flash".
2. Once the designed Flash is accomplished, the rotation is rapidly stopped. The Process then moves to the Forge Phase.



### PHASE 3 (FORGE)

1. The Forge is caused by the application of the highest of the three process pressures. The forge phase takes place while the components are at a complete stop.
2. The pressure is maintained until the weld joint is sufficiently cooled.
3. This step promotes refinement of the microstructure of the weld.



### FLASH REMOVAL

The flash is removed (if desired) by conventional machining practices. Removal of the Weld Flash is optional.



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