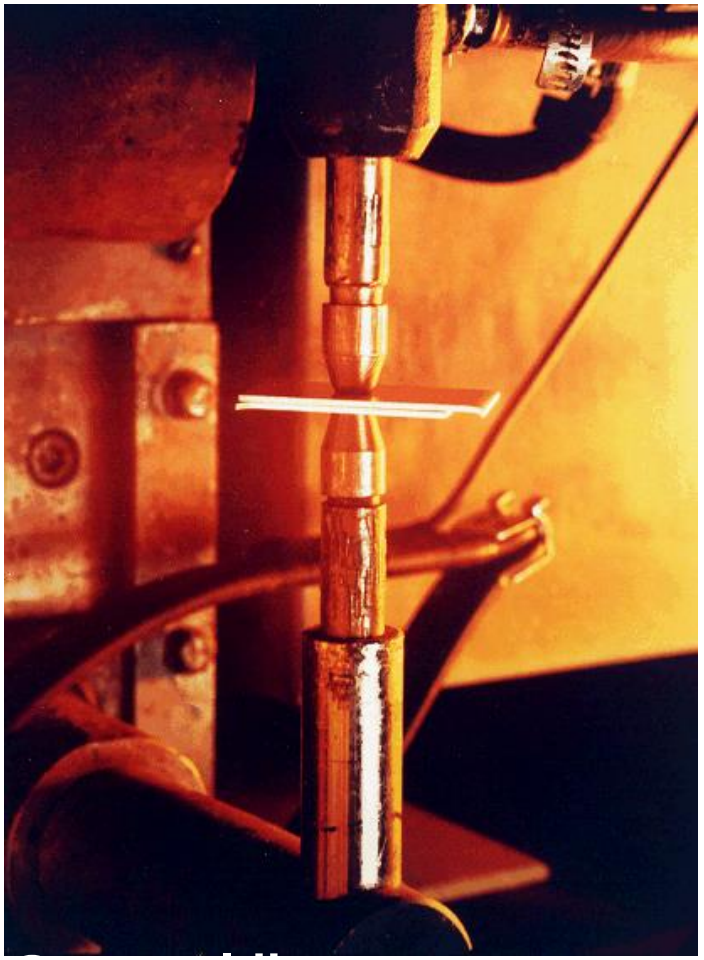
Resistance Welding

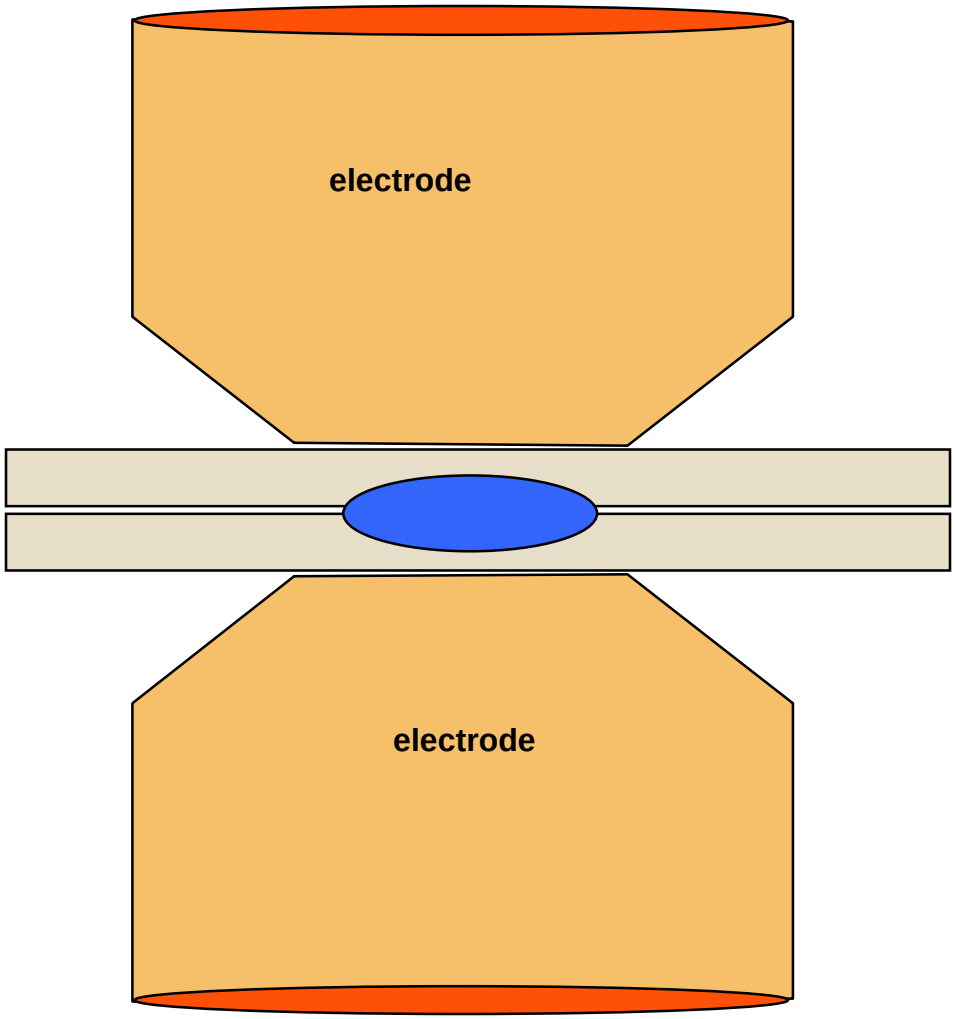
- The resistance of metal to the localized flow of current produces heat
- Process variables
  - Current
  - Time
  - Force
- Spot and seam welding



Resistance Welding

- Resistance welding processes are a fast and reliable means of joining thin sheets of metal together.
- The weld is created by first applying pressure on the two parts to be joined.
- Once the correct amount of pressure is applied, current is passed between the two (or more) overlapped sheets.
- Resistive heating results in melting and the formation of a “weld nugget” or a “weld seam”.

- Resistance spot welding is the most common of the resistance welding processes.
- It is used extensively in the automotive, appliance, furniture, and aircraft industries to join sheet materials.
- In this process, water-cooled, copper electrodes are used to clamp the sheets to be welded into place.
- The force applied to the electrodes insures intimate contact between all the parts in the weld configuration.
- A current is then passed across the electrodes through the sheets.


electrode
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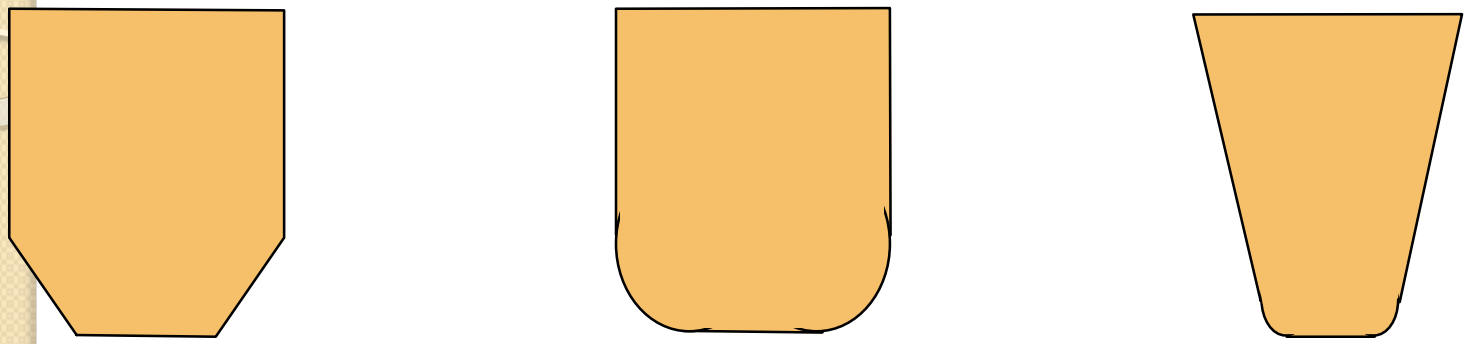
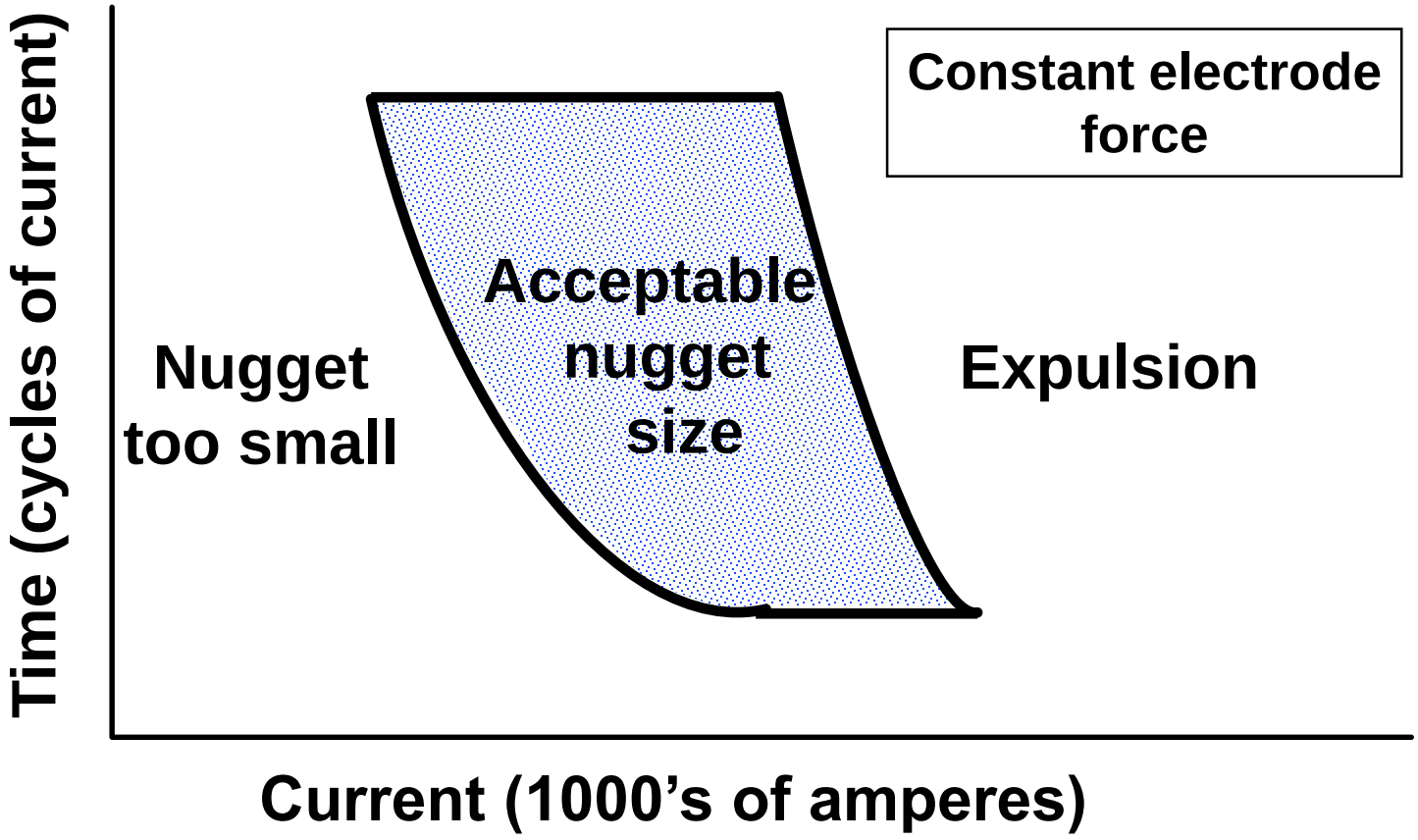
Electrodes

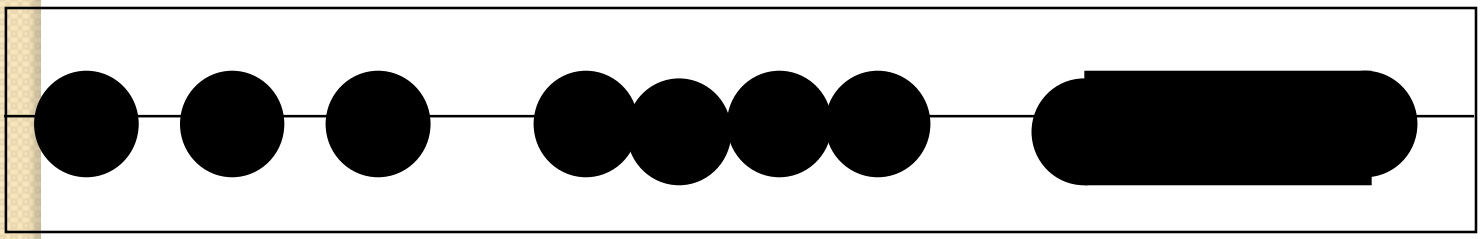


Truncated cone **Dome** **Pointed**

- Electrode tips wear during service, causing nugget size to decrease
- Zinc-coating on steel alloys with copper electrodes to form brass
- Copper base materials, divided into classes

Operating Window - Lobe Curve



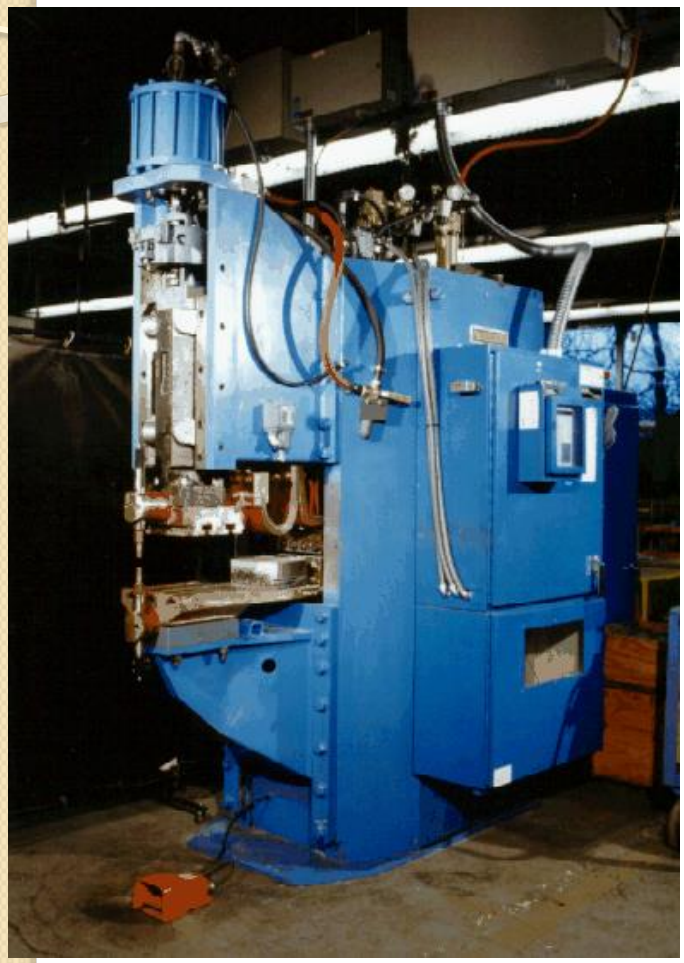


Roll spot weld **Overlapping seam weld** **Continuous seam weld**

Resistance Welding Advantages

- High speed, < 0.1 seconds in automotive spot welds
- Excellent for sheet metal applications, < ¼-inch
- No filler metal

Process Disadvantages and Limitations



- Higher equipment costs than arc welding
- Power line demands
- Nondestructive testing
- Low tensile and fatigue strength
- Not portable
- Electrode wear
- Lap joint requires additional metal