



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ





R E S I S T A N C E S P O T W E L D I N G

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WELDING

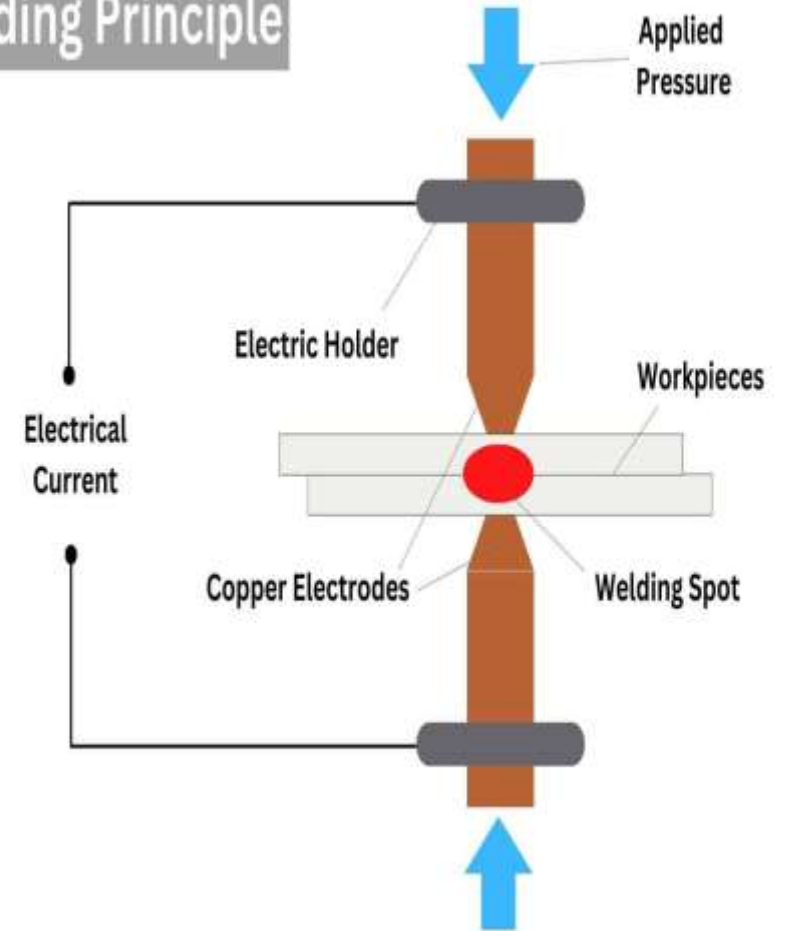
- Welding is a fabrication method where materials are joined by melting and fusing them together. There are various types based on how fusion and pressure are applied during the process.
- **Types Based on Fusion and Pressure:**
- **Fusion Welding:**
 - Fusion welding processes involve melting the base materials to form a joint. Examples include Arc Welding, Gas Welding, and Electron Beam Welding.
- **Pressure Welding:**
 - Pressure welding methods create joints by applying force without necessarily melting the materials. Examples include Resistance Spot Welding and Friction Welding.



RESISTANCE SPOT WELDING

- Resistance Spot Welding (RSW) is a welding process that joins two or more metal sheets by applying heat and pressure. This is achieved by passing an electric current through electrodes, creating resistance at the point of contact, and forming a weld when the metal becomes molten.
- **Process:**
- **Preparation:** Two or more metal sheets are overlapped or stacked, with the weld location marked.
- **Electrodes:** Electrodes, typically made of copper, are brought into contact with the metal sheets at the designated weld spot.

Spot Welding Principle





CONTINUE

- **Application of Pressure:** The electrodes exert pressure on the metal sheets to ensure good contact.
- **Electric Current Flow:** A high electric current is passed through the electrodes, creating resistance at the weld spot.
- **Heat Generation:** The resistance generates heat, causing the metal at the weld spot to melt and form a molten pool.
- **Weld Formation:** Once molten, the pressure is maintained until the metal solidifies, creating a weld. The duration of current flow is precisely controlled.
- **Melting Point:**
 - For Steel is 1460 °C
 - For Aluminum Alloys is 660 °C





ADVANTAGES

Advantages	Explanation
High Speed	RSW is a fast process, making it well-suited for high-volume production lines, such as in the automotive industry.
Minimal Filler Material Required	The process doesn't typically require additional filler material, reducing costs and simplifying the welding setup.
Strong and Durable Welds	Resistance spot welds are known for providing strong and reliable joints, contributing to the structural integrity of the welded components.
Clean Finish	The welding process produces clean and neat welds without the need for extensive post-welding finishing operations.
Automation Capability	RSW can be easily integrated into automated manufacturing processes, ensuring consistency and efficiency.



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DISADVANTAGES

Disadvantages	Explanation
Limited to Thin to Medium Thickness	RSW is most effective on thin to medium-thickness materials, limiting its applicability for thicker sections.
Not Ideal for Dissimilar Materials	The process is less suitable for welding dissimilar materials or materials with significant differences in thickness.
Equipment Cost	The initial setup cost for resistance spot welding equipment can be relatively high, impacting the overall investment for smaller operations.
Electrode Maintenance	Regular maintenance of electrodes is required to ensure consistent and quality welds, contributing to operational costs.
Heat-Affected Zone	Like many welding processes, RSW creates a heat-affected zone, which may affect the mechanical properties of the welded material.



○ Applications

- Automotive Manufacturing
- Aerospace Industry
- Electronics Manufacturing
- Appliance Manufacturing
- Construction
- Metal Furniture Production
- Sheet Metal Fabrication
- Pipelines and Oil Industry
- Railway Industry
- Metal Packaging Industry



○ **SAFETY PRECAUTIONS**

- Eye Protection
- Protective Clothing
- Insulated Gloves
- Welding Curtains
- Respiratory Protection
- Ear Protection
- Fire Safety Measures
- Training and Certification
- Safe Handling of Welding Equipment



SPOT WELDING





THANK
YOU!