

An Extensive Study of TIG welding

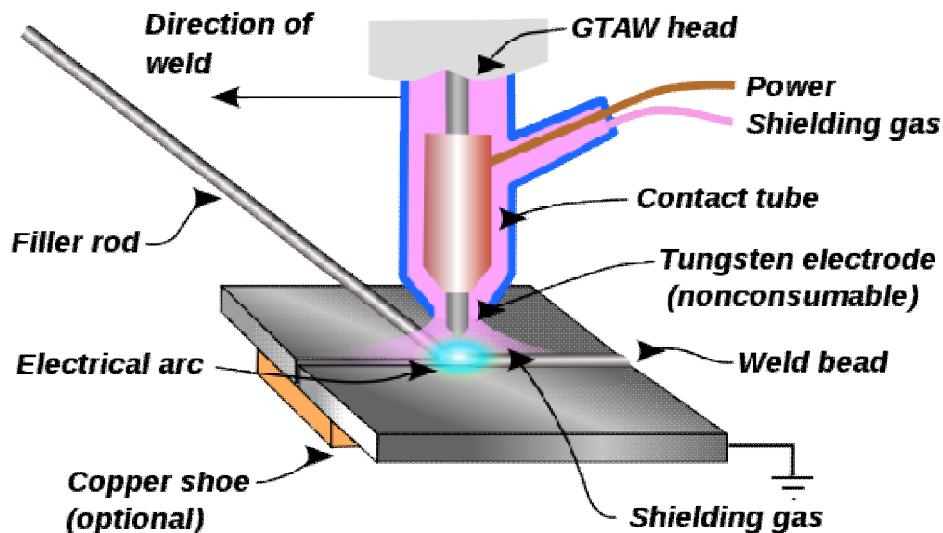
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INTRODUCTION

Gas tungsten arc welding (GTAW) also referred as Tungsten Inert Gas (TIG) welding, is a flexible and accurate welding technique that is frequently employed in a variety of industries, including manufacturing, automotive, and aerospace. The welded area is protected from atmospheric contamination by an inert shielding gas (argon or helium), and a filler is normally used to weld thick plate.

Principle of TIG Welding

TIG welding utilizes a non-consumable tungsten electrode to create the weld. The electrode, along with a shielding gas (typically argon), protects the weld pool from atmospheric contamination. Unlike other welding processes, TIG welding allows for greater control over the heat input, resulting in cleaner and more precise welds.



Equipment Needed

To start TIG welding, you'll need the following equipment:

TIG welding machine : This power source provides the electrical energy needed to generate the arc.

Tungsten electrode : Choose the appropriate electrode based on the material you're welding.

Welding torch : The torch holds the tungsten electrode and allows you to control the welding arc.

Shielding gas : Argon is the most commonly used shielding gas for TIG welding.

Filler metal : Depending on the application, you may need to add filler metal to the weld pool.

Experimental Setup

Before you begin welding, ensure your workspace is clean, well-ventilated, and free from flammable materials. Secure the workpiece in a stable position, and ensure proper grounding of the welding machine to prevent electrical hazards.

Basic Welding Techniques

Arc Starting : To initiate the arc, lightly tap the tungsten electrode against the workpiece while simultaneously pressing the foot pedal or activating the torch switch. Once the arc is established, slowly withdraw the electrode to create a stable welding arc.

Torch Control : Practice controlling the torch angle and travel speed to achieve consistent weld bead formation. Keep the torch at a slight angle (~10-15 degrees) and maintain a steady forward motion to avoid excessive heat buildup.

Filler Metal Addition : When welding thicker materials or creating fillet welds, you'll need to add filler metal to the weld pool. Dip the filler rod into the leading edge of the weld pool while maintaining the arc to ensure proper fusion.

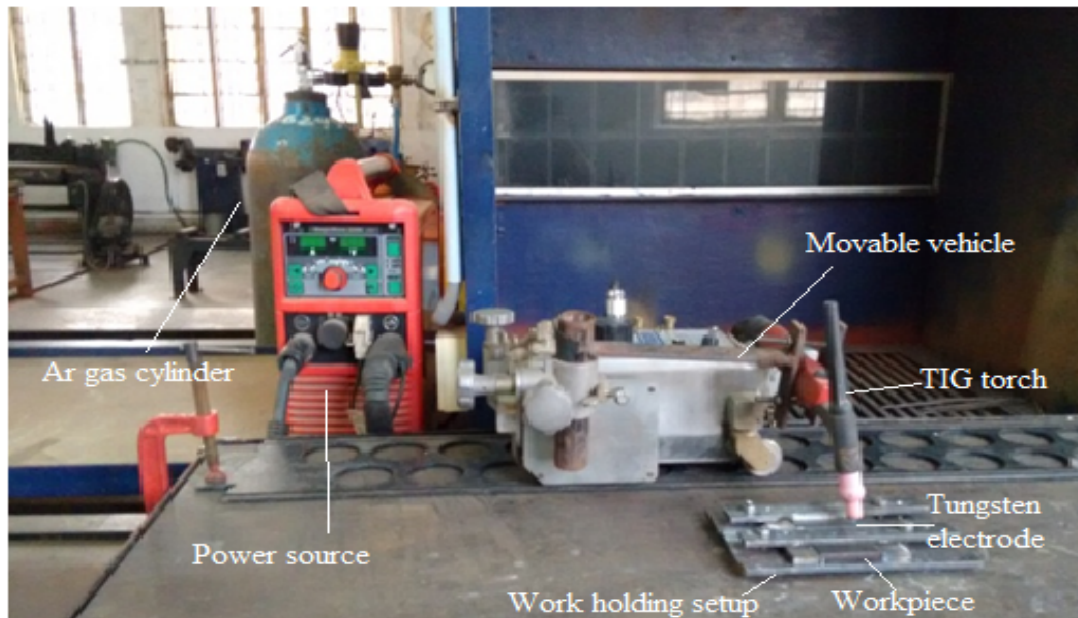
Shielding Gas Coverage : Maintain a consistent flow of shielding gas to protect the weld zone from atmospheric contamination. Adjust the gas flow rate based on the welding current and nozzle size to achieve adequate coverage.

Safety Precautions :

Always wear appropriate personal protective equipment, including welding gloves, a welding helmet with a proper shade lens, and flame-resistant clothing.

Avoid welding in confined spaces without proper ventilation to prevent exposure to hazardous fumes and gases.

Inspect your equipment regularly and replace any damaged or worn components to ensure safe and reliable operation.



Practice Makes Perfect :

TIG welding requires patience and practice to master. Start with simple projects and gradually work your way up to more complex welds. Don't be discouraged by initial setbacks—perseverance and dedication will lead to improvement over time.

CONCLUSION

For anyone interested in metal fabrication and manufacturing, TIG welding is an invaluable skill since it provides accuracy, adaptability, and excellent weld quality. You'll quickly master the technique of TIG welding if you adhere to this tutorial and put in the practice. So take your welding supplies and get to work making durable, elegant welds right now.