

760 Vassar Avenue

# **Different Types of Welding Processes:**

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## MIG vs. TIG vs. SubArc - Why & When

## Introduction

At Roben Manufacturing, we understand that choosing the right welding process is critical for achieving superior results in the fabrication of pressure vessels, tanks, reactors, columns, and heat exchangers. Our welding techniques align with ASME and TEMA standards to ensure quality, safety, and compliance. Three of the most commonly used welding techniques—MIG (Metal Inert Gas), TIG (Tungsten Inert Gas), and Submerged Arc Welding (SubArc)—each have distinct advantages and applications. This guide will help you understand their differences and when to use them

Lakewood, NJ 08701

## MIG Welding (Metal Inert Gas Welding)



Single Pulse MIG Weld on Steel

**How It Works:** MIG welding uses a continuously fed wire electrode and shielding gas to create a weld pool. The process is fast, efficient, and relatively easy to learn.

## Advantages:

 $\checkmark$  High deposition rate for faster welding

✓ Suitable for a wide range of materials, including stainless and carbon steel, and nickel alloys

✓ Ideal for long seams welds and high volume production

## **Best Used For:**

- High-production environments
- Large-scale industrial pressure vessels
- Jacketed reactors and vessels with half pipe coils

# TIG Welding (Tungsten Inert Gas Welding)



**How It Works:** TIG welding utilizes a nonconsumable tungsten electrode to create a precise arc, while a separate filler material is added manually when needed. A shielding

gas, typically argon, protects the weld from contaminants.

#### Advantages:

Produces high-quality, precise welds
Ideal for thinner materials and complex welds

✓ Excellent for non-ferrous metals like aluminum and titanium

✓Essential for welding high-alloy materials, including Hastelloy and Inconel

## **Best Used For:**

- Root Passes on pressure vessels and heat exchangers
- Thin-gauge stainless steel tanks
- Materials requiring high weld aesthetics/polished
- Components requiring exceptional corrosion resistance

## SubArc Welding (Submerged Arc Welding – SAW)



**How It Works:** SAW employs a continuously fed electrode wire beneath a layer of flux, which melts to protect the weld pool. The flux layer prevents oxidation and contamination while also improving efficiency.

## Advantages:

✓ High deposition rates for heavy-duty applications

 $\checkmark$  Deep penetration for strong welds

✓ Minimal spatter and high automation potential

✓ Optimized for large-scale fabrication

## **Best Used For:**

- Heavy walled pressure vessels
- Heat Exchangers with thick tube sheets
- Structural components of large reactors and columns
- Automated welding applications for increased efficiency

## **Choosing the Right Welding Process**

Welding Type	Speed	Precision	Material Suitability	Best For
MIG	Fast	Moderate	Steel, aluminum, stainless steel	High- volume production
TIG	Slow	High	Aluminum, titanium, thin materials	Precision work & aesthetics
SubArc	Very Fast	Moderate	Thick plates & heavy structures	Industrial, automated welding

At **Roben Manufacturing**, we specialize in selecting the right welding technique for every project, ensuring durability, efficiency, and compliance with ASME and TEMA standards. Contact us today to learn more about how our expertise can benefit your manufacturing needs for Stainless & Carbon Steel, Nickel Alloys, Hastelloy as well as many other materials.

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