

WORKSHOP

LAB MANUAL

OF

WELDING SHOP

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OBJECTIVES

The objectives of Welding Process laboratory are

- ✓ To study the different welding processes.
- ✓ Edge and sample preparation for SMAW and MIG Welding Process.
- ✓ To Perform SMAW and MIG Welding on prepared samples.

OUTCOMES

The expected outcome Welding lab is that the students will be able

- ✓ To practically relate to concepts discussed in Manufacturing Process course.
- ✓ To understand the operating principles of different welding techniques.
- ✓ To apply these learning to improve the performance of welded joints.

Tutorial Assignments

- ✓ To perform basic joining like butt joint and T- Joint.
- ✓ To learn the basic connection used in SMAW and MIG welding Process.
- ✓ Theoretical Aspect of SMAW and MIG Welding Process.

INTRODUCTION

Welding:

Welding is a fabrication process which is defined as a localized coalescence of metals or non-metals produced either by heating the materials to the welding temperature, with or without the application of pressure, or by the application of pressure alone, with or without the use of filler metal

Shielded Metal Arc Welding

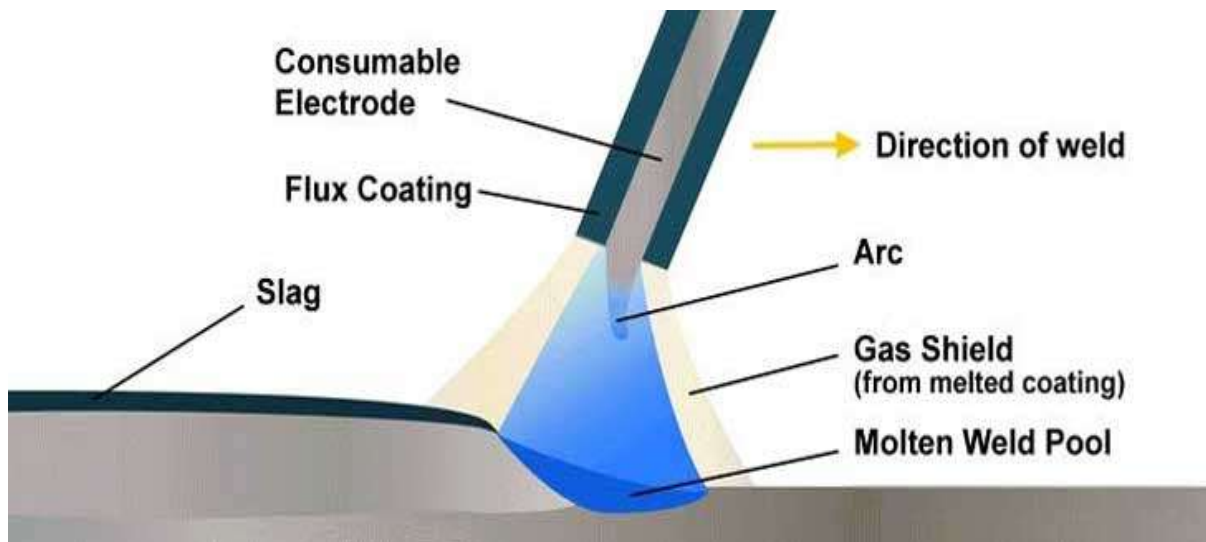


Fig. 1: Schematic diagram of Shielded Metal arc welding process

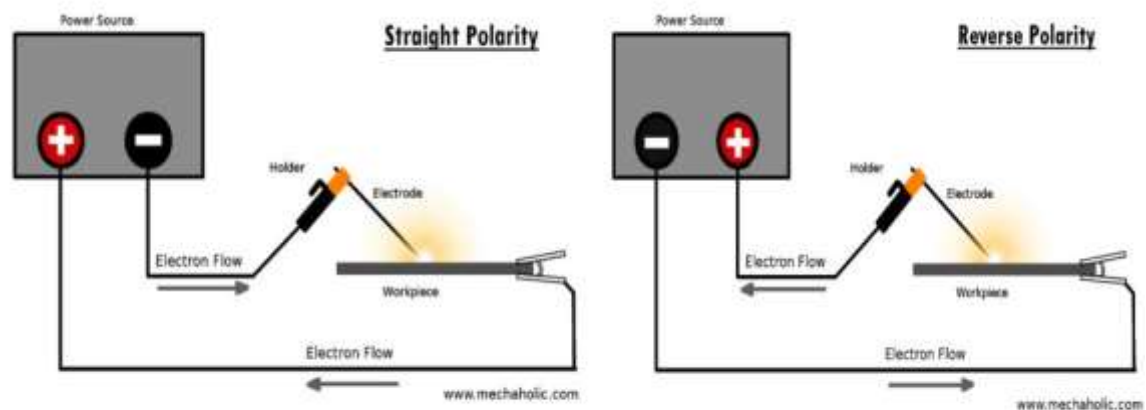
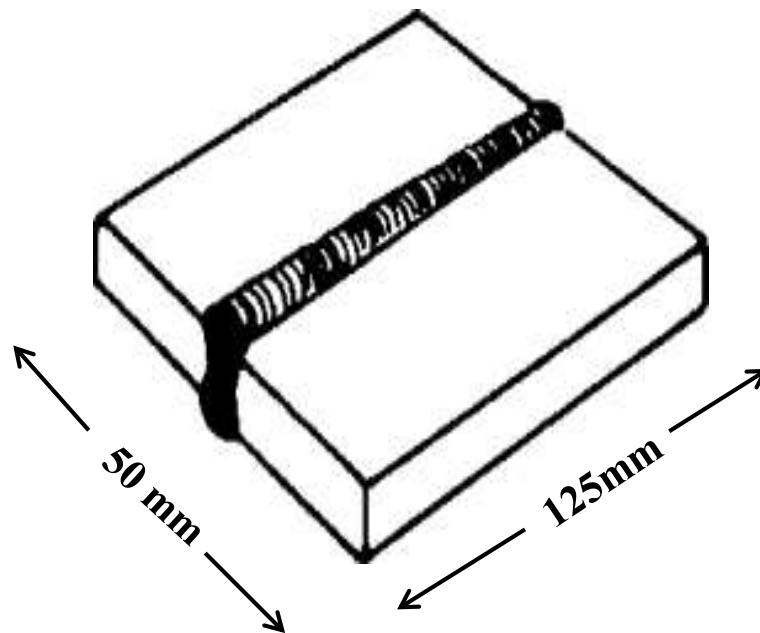
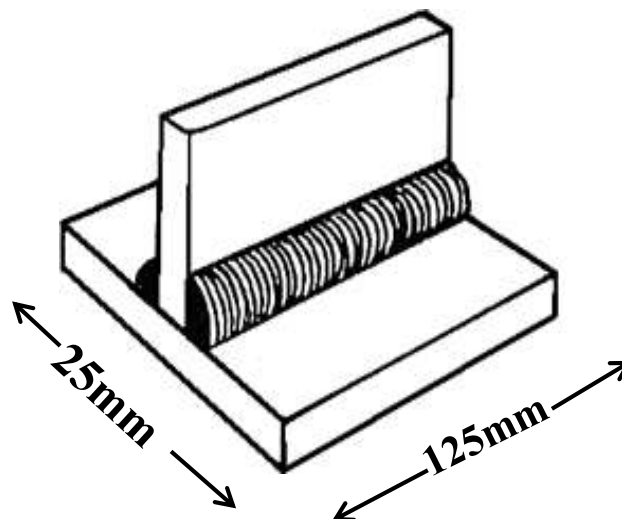


Fig. 2: Straight polarity Vs Reverse polarity

The various equipment's and accessories used in arc welding are as follows:

1. AC or DC welding machine
2. Electrode holder
3. Electrode
4. Cables & Cable connectors
5. Chipping hammers
6. Earthing Clamps
7. Wire brush
8. Auto Darkening helmet
9. Hand Gloves

Job 1. To make a Butt Joint**Job 2. To make a T- Joint**

MIG WELDING

MIG welding is an arc welding process in which a continuous solid wire electrode is fed through a welding gun and into the weld pool, joining the two base materials together. A shielding gas is also sent through the welding gun and protects the weld pool from contamination. In fact, MIG stands for metal inert gas. The technical name for it is gas metal arc welding (or GMAW), and the slang name for it is wire welding.

The MIG process enables the home-hobbyist, artist, farmer/rancher, motorsports enthusiast or DIY welder to make most types of fabrication and maintenance/repair welds on material from 24-gauge up to 1/2-inch thick. In addition to flexibility, many people turn to MIG welding because they've heard that it's an easy process to learn. Some claim it's no harder to use than a glue gun. While it's not quite that simple, it is true that most people can become competent MIG welders by following some basic advice. Safety, metal preparation, equipment operation, wire selection, gas selection, voltage and current. We have MIG welding setup, the students will learn the operation on the machine and will skilled in hands on.

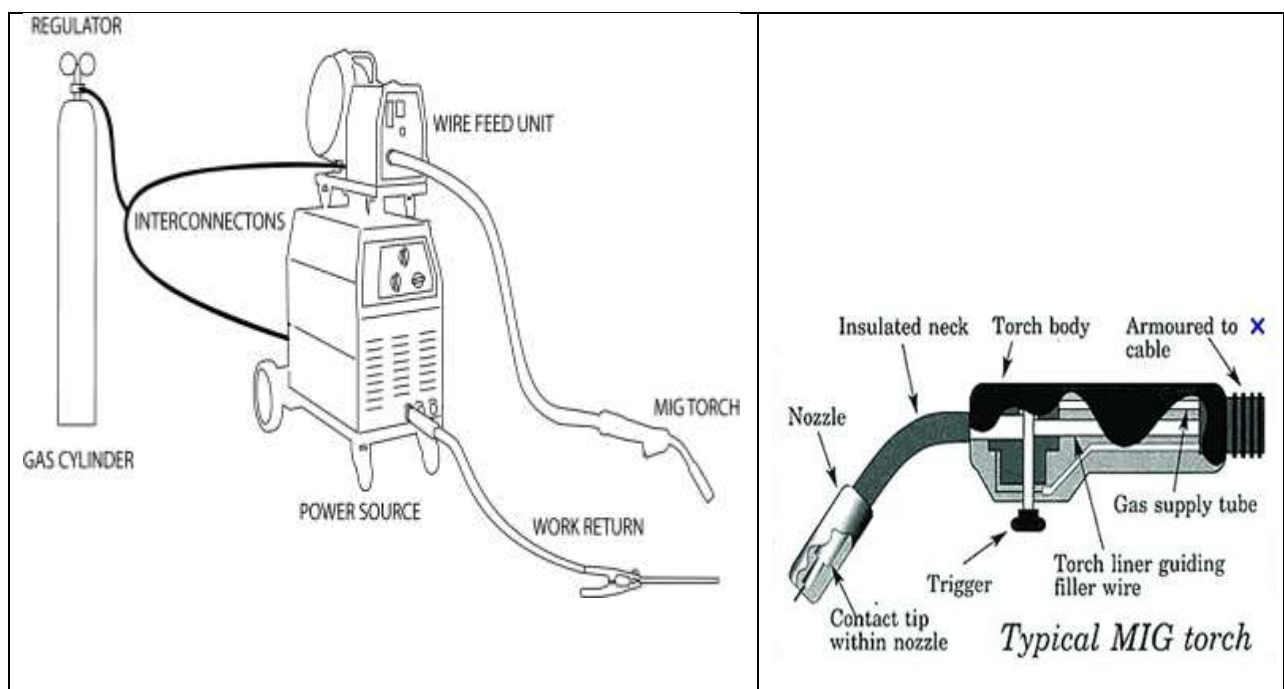


Fig. 3: A Typical MIG welding setup & MIG Torch

Plasma Arc Cutting

Objective:-

To prepare weld samples through Plasma arc cutting process,

Equipment require: - Plasma arc cutting unit, Mild steel plate, Stop watch, Steel scale, Marker.

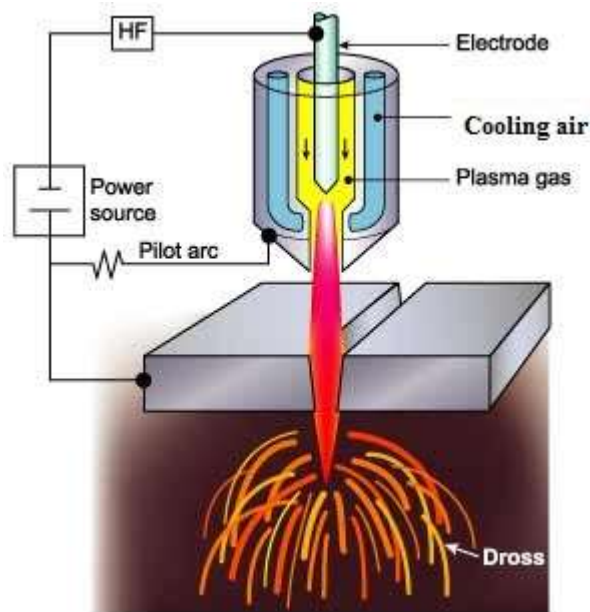


Fig. 4: Schematic diagram of Plasma cutting setup

Safety

- Safety Make sure there is proper ventilation in the area that you are welding in.
- Always wear a functional welding helmet while welding. Always wear a leather apron and leather gloves while welding.
- Long sleeved shirts are also recommended.
- People wearing nylon-topped shoes should wear a pair of leather spats when welding.
- Do not attempt to touch recently welded objects (even with gloves) until they have cooled.