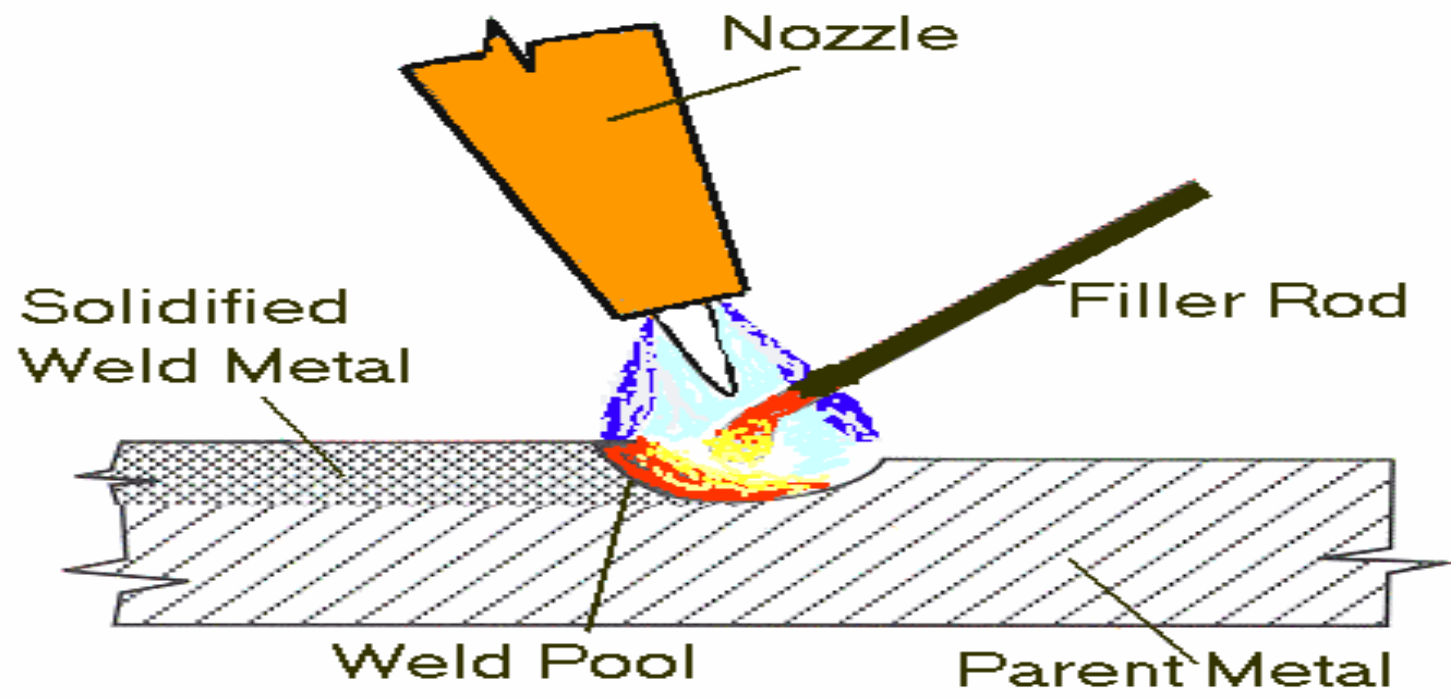
# Difference Between Arc Welding Gas Welding

| ARC WELDING | GAS WELDING |
| --- | --- |
| Electric arc is the source of heat. | Gas is the source of heat. |
| The arc temperature is about 400000C. | The gas temperature is about 32000C. |
| Filler rod functions as electrodes. | Filler rod is introduced separately. |
| Risk due to electric shock. | Risk due to gas pressure. |
| Arc welded joints have very high strength. | Gas welded joints have not much strength. |
| Brazing and soldering can not be done using electric arc. | Brazing and soldering are done using gas. |
| Filler metal should be same as or an alloy of parent metal. | Filler metal need not be same as the parent metal. |
| This is a non pressure fusion welding method. | This is also a non pressure fusion welding method. |

# OXY-ACTYLENE WELDING

- Sound weld is obtained by selecting proper size of flame, filler material and method of moving torch
- The temperature generated during the process is 33000c.
- When the metal is fused, oxygen from the atmosphere and the torch combines with molten metal and forms oxides, results defective weld
- Fluxes are added to the welded metal to remove oxides
- Common fluxes used are made of sodium, potassium. Lithium and borax.
- Flux can be applied as paste, powder, liquid. solid coating or gas.

# OXY-ACTYLENE WELDING

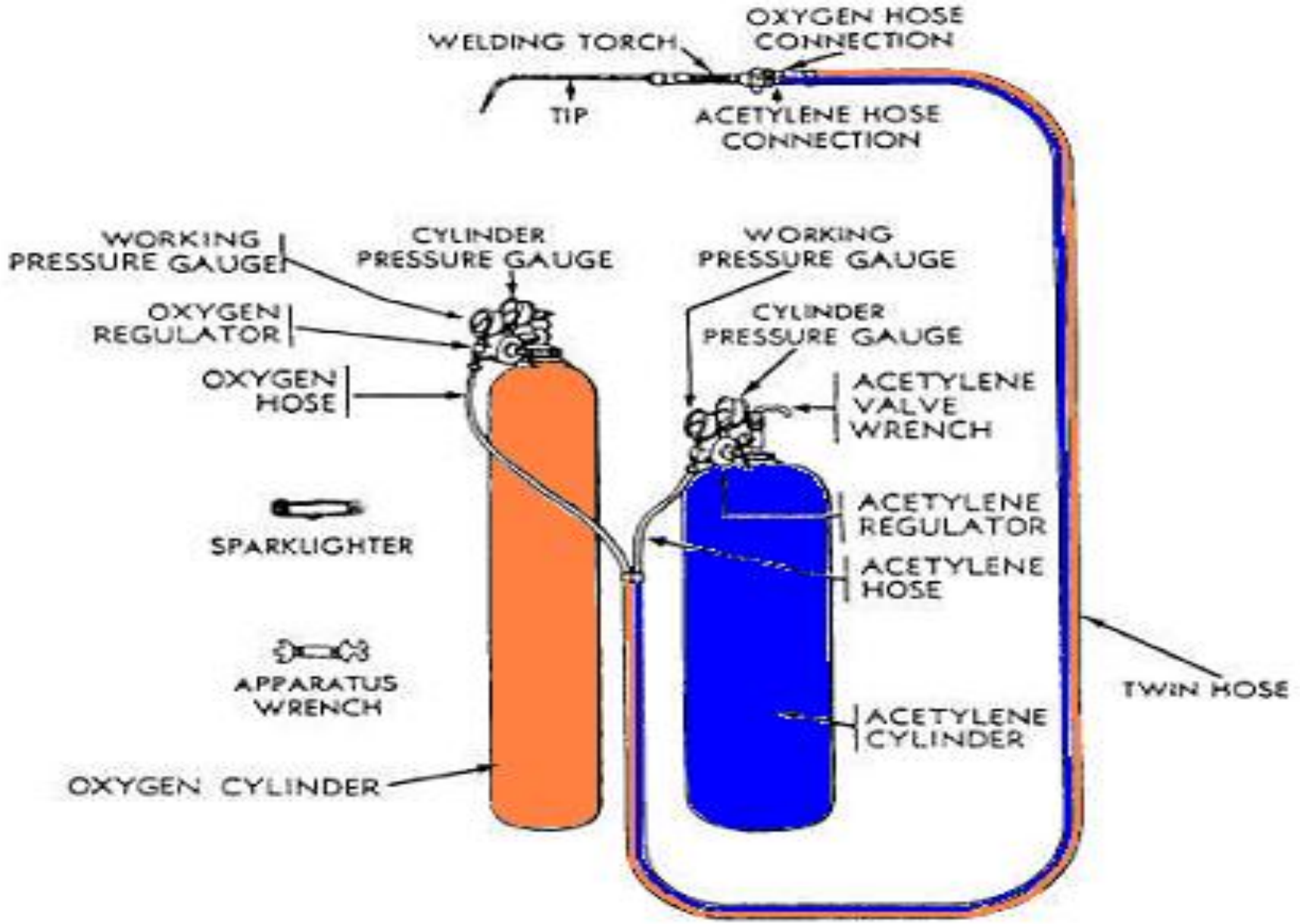



There are two types of oxy-acetylene system employed depending upon the manner in which acetylene is supplied for welding

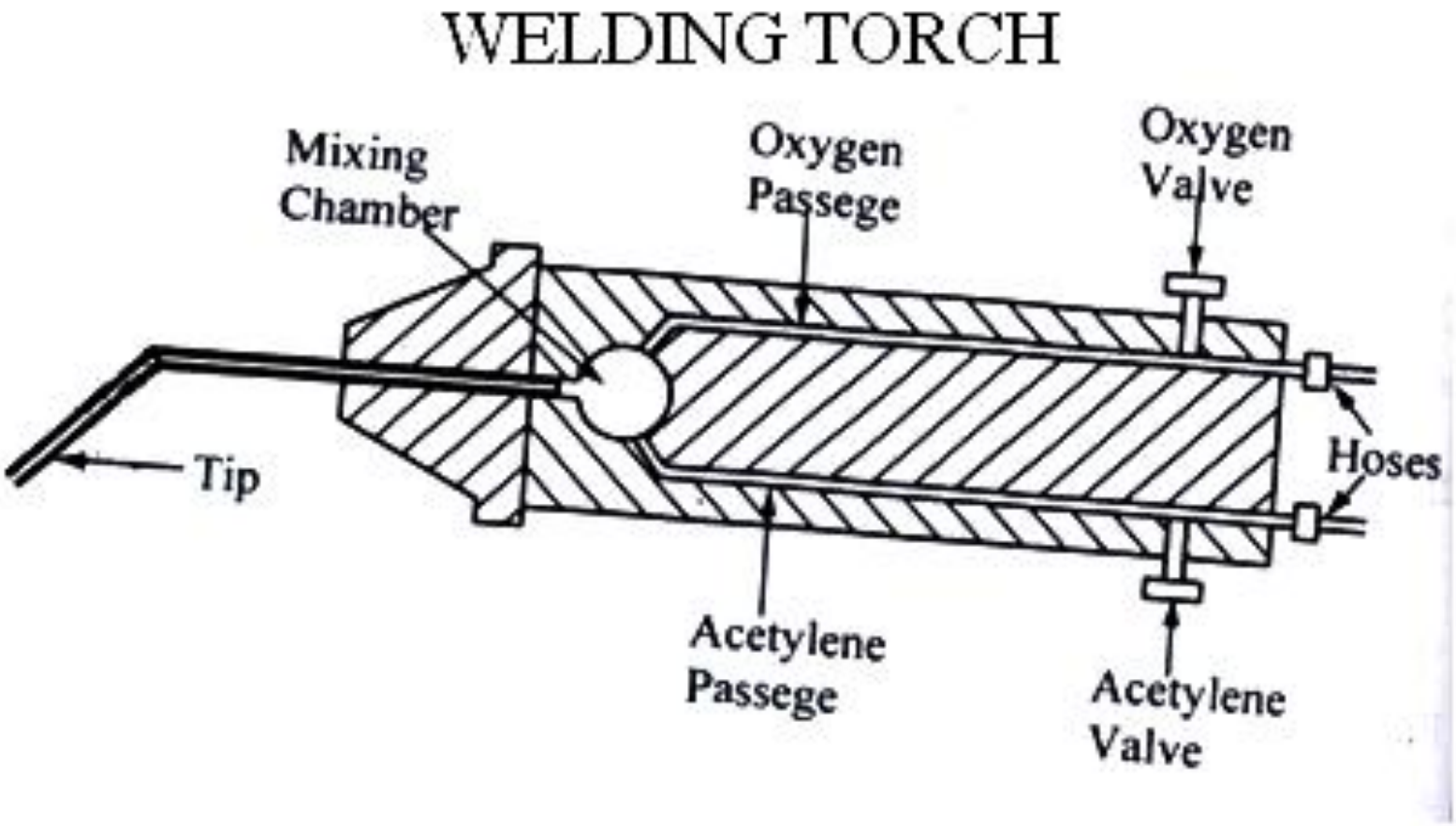
- ✓High- pressure system
- ✓Low- pressure system

The following are the most commonly used equipment for gas welding

- ✓ Gas cylinder
- ✓ Pressure regulators
- ✓ Pressure gauges
- ✓ Hoses
- ✓ Welding torch
- ✓ Goggles
- ✓ Welding gloves
- ✓ Spark lighter
- ✓ Wire brush


WELDING TORCH
OXYGEN HOSE CONNECTION
TIP
ACETYLENE HOSE CONNECTION
WORKING PRESSURE GAUGE
CYLINDER PRESSURE GAUGE
WORKING PRESSURE GAUGE
OXYGEN REGULATOR
CYLINDER PRESSURE GAUGE
OXYGEN HOSE
ACETYLENE VALVE WRENCH
ACETYLENE REGULATOR
SPARKLIGHTER
ACETYLENE HOSE
APPARATUS WRENCH
TWIN HOSE
ACETYLENE CYLINDER
OXYGEN CYLINDER

# WELDING TORCH



# Types of Flames

- Oxygen is turned on, flame immediately changes into a long white inner area (Feather) surrounded by a transparent blue envelope is called **Carburizing flame** (30000c)
- Addition of little more oxygen give a bright whitish cone surrounded by the transparent blue envelope is called **Neutral flame** (It has a balance of fuel gas and oxygen) (32000c)
- Used for welding steels, aluminium, copper and cast iron
- If more oxygen is added, the cone becomes darker and more pointed, while the envelope becomes shorter and more fierce is called **Oxidizing flame**
- Has the highest temperature about 34000c
- Used for welding brass and brazing operation

# FLAM CHARACTERISTICS

## Neutral flame:

$$C_2H_2 + O_2 \longrightarrow 2CO + H_2$$

## Carburizing:

The theoretical mixture of carburising flame is

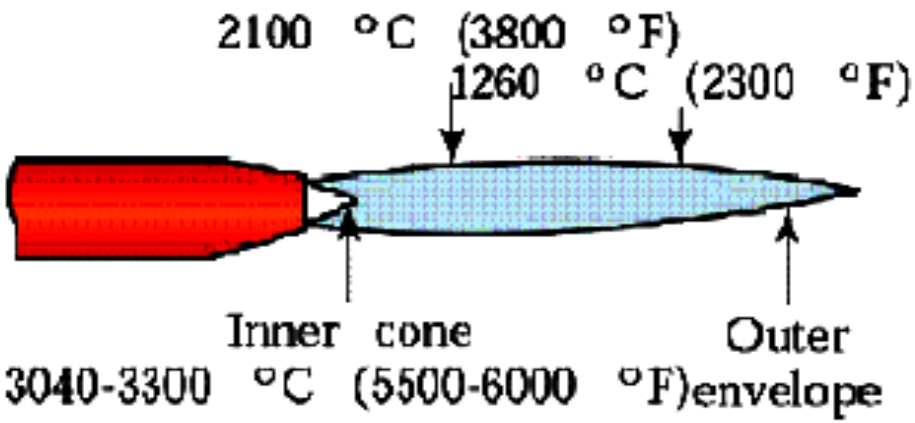
$O_2$: $C_2H_2$= 0.85 to 0.95

## Oxidizing:

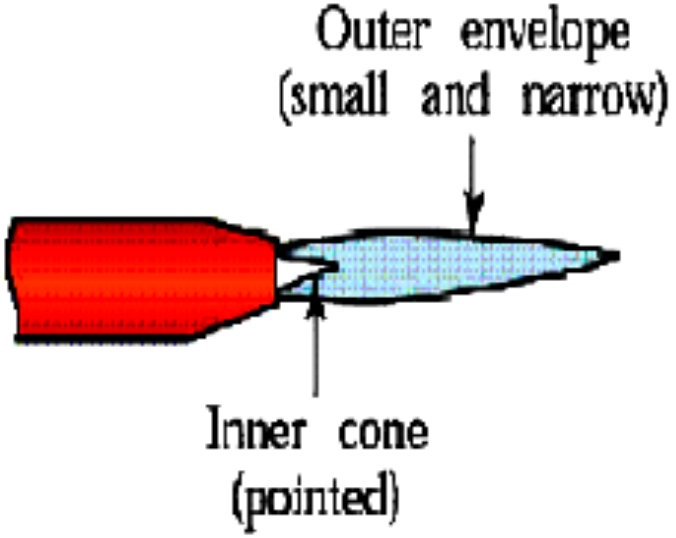
The theoretical mixture of carburising flame is

$O_2$: $C_2H_2$= 1.15 to1.5

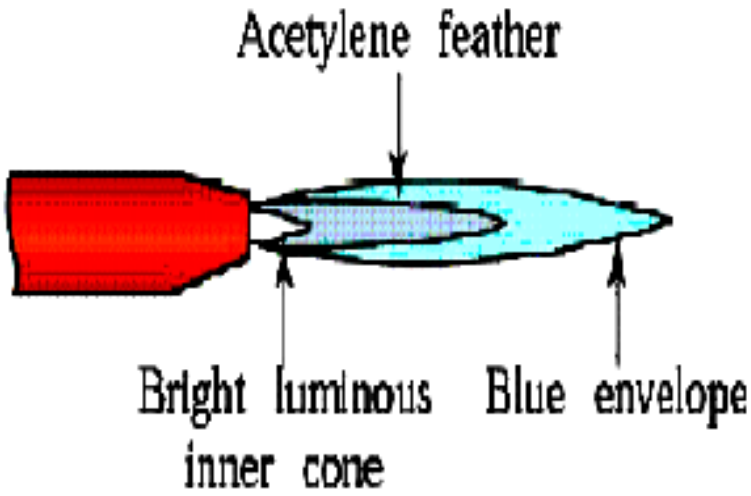
(a) Neutral flame




(b) Oxidizing flame




(c) Carburizing (reducing) flame

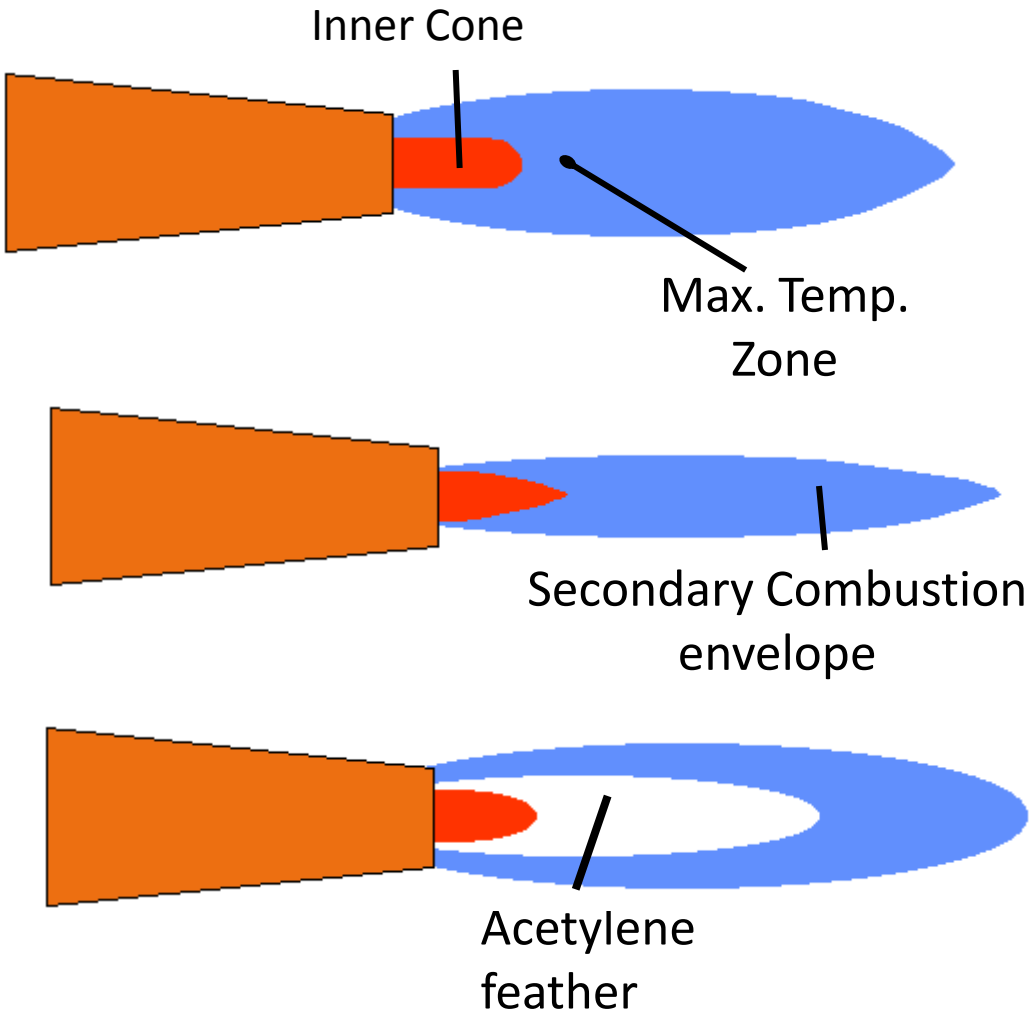


# The Oxy-acetylene welding Flame

Reducing or Carburizing
Excess acetylene(0.9:1)
(Alloy steels and aluminium alloys)

Oxidizing
Excess oxygen (1.5:1)
Brasses, Bronzes, copper)

**Neutral**
Equal acetylene & oxygen
(low carbon steel, mild steels).



# The Oxy-acetylene welding Flame

**Carburising**

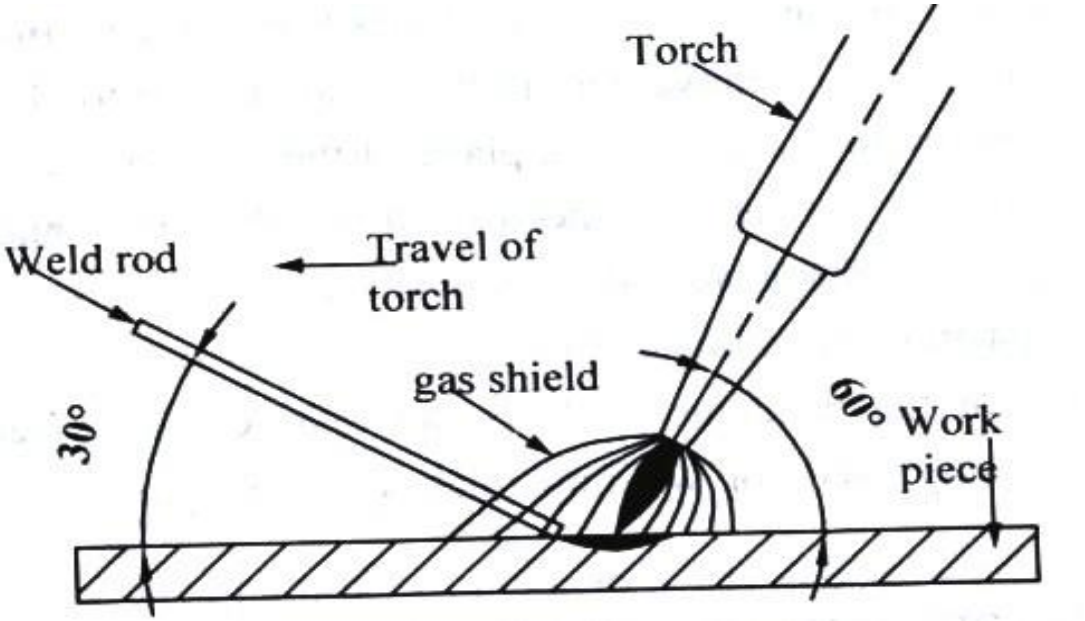
**Neutral**

**Oxidising**

# GAS WELDING TECHNIQUE

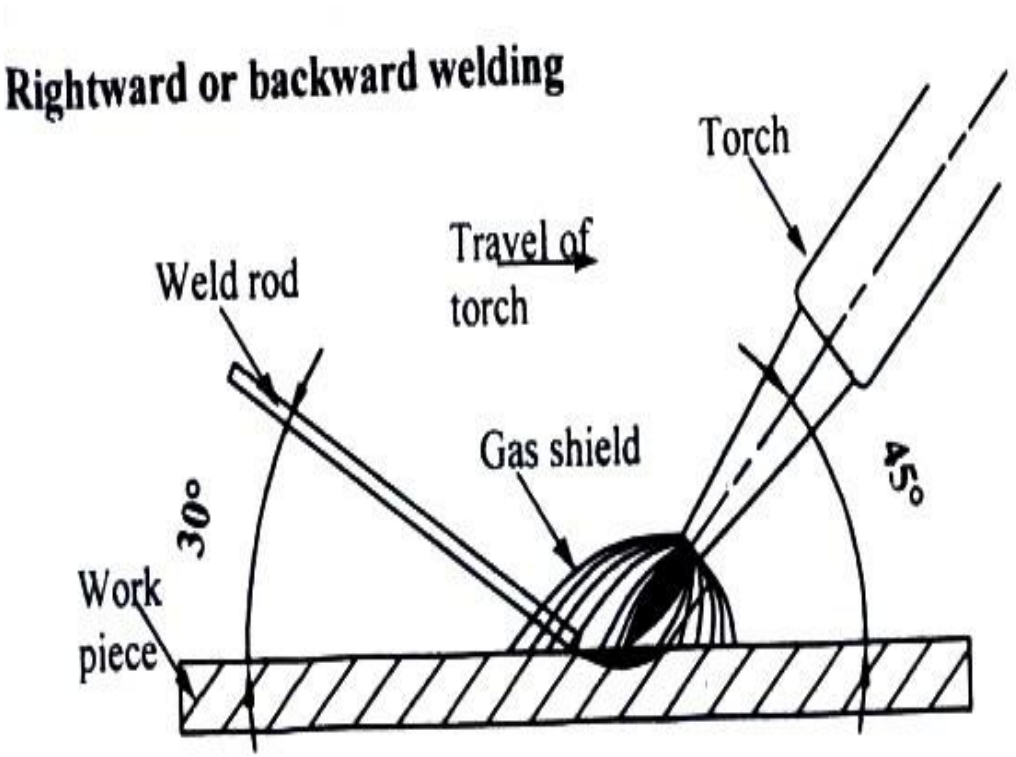
## ✓ Leftward or forward welding

- ✓ The torch flame moves from right to the left
- ✓ The torch is held on the right hand & the welding rod is held on left hand
- ✓ The torch is held at an angle of between 60º to 70º to the plane of the weld.
- ✓ The welding rod at 30º to 40º



# ✓Rightward or backward welding

- ✓ The torch flame moves from left to the right
- ✓ The torch is held at an angle of between 40º to 50º to the plane of the weld.
- ✓ The welding rod at 30º to 40º



## Advantages:

- ✓ Temperature of flame can be easily controlled
- ✓ The amount of filler metal deposits can be controlled easily
- ✓ The flame can be used for welding & cutting
- ✓ All types of metal can be welded
- ✓ Cost of equipment is less
- ✓ Maintenance cost of gas welding equipment is less

## Disadvantages:

- ✓ It is not suitable for joining thick plates
- ✓ It is slow process
- ✓ Strength of weld is not so good as arc welding
- ✓ Handling & storing of gas cylinder need more care
- ✓ Gas flame takes up a longer time to heat up the metal than an electric arc