

Oxygen Acetylene Welding (OAW)

Oxygen Acetylene Welding - OAW

At the end of this presentation you will be able to:

Understand the OAW process

Prepare materials for OAW

Assemble and setup OAW equipment

Select welding equipment, settings and consumables.

Recognize the OHS issues relevant to OAW

OAW - Introduction

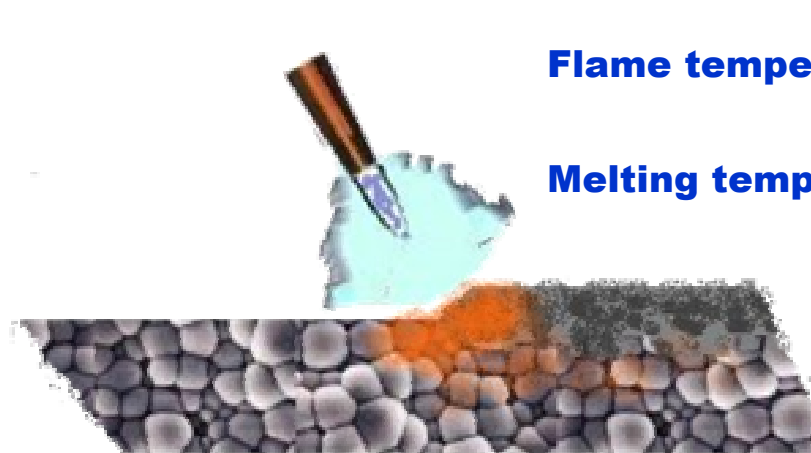
OAW is a fusion process.

Metals are made up of microscopic grains.

Heat melts the metals grains creating a weld pool.

Additional metal may be added to the weld pool with a filler rod.

When the weld pool cools the material are fused together.



Melting of metal grains

Flame temperature = 3100°C

Melting temperature of steel = 1850°C



Addition of filler rod

OAW - Introduction

In today's workshops OAW is often a last choice for use, as it is a manual and slow process.

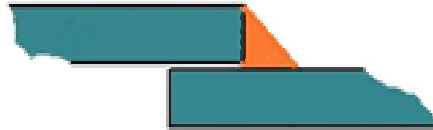
However it can still be found on farms and home workshops as it is a cheap, portable process and the equipment may also be used for Oxy-Acetylene cutting.

OAW can be used in the light fabrication industry as a method of joining e.g. Car panels, sheet metal components (mufflers) or furniture.

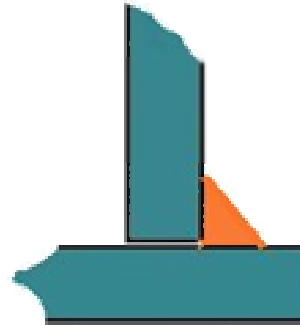
OAW may also be used for building up worn components such as cogs in machinery or repairing car panels.

OAW - Introduction

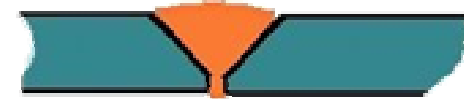
OAW uses standard welding type joints.



Lap joint



Fillet joint



Butt joint

OAW applications.

Furniture



Exhaust



Prepare materials for OAW

You must remove all coatings such as grease, oils, paint, rust, galvanizing from the weld area. Exposing clean metal to weld.

Solvents may be used to clean oils and grease, grinding is the best method of removing paint and galvanizing. Wear safety glasses and face mask.



Angle Grinder

Rusted guard



Prepare materials for OAW

The materials to be welded have to be positioned ready for tacking and welding into place.

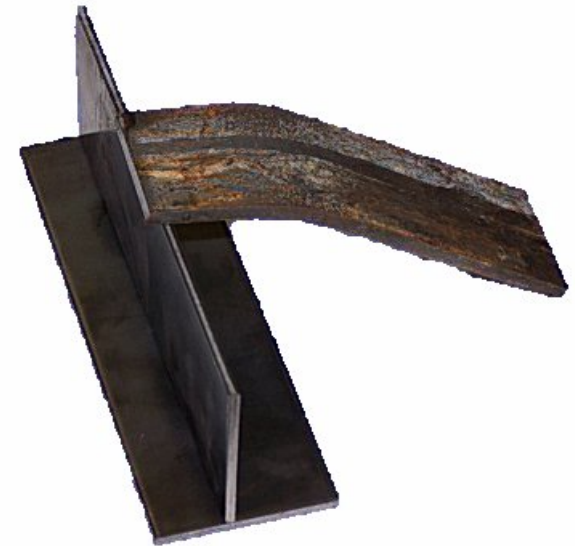
Positioning materials can be done with magnets, jigs, clamps or props.



Magnet



Jig



Prop

OAW equipment setup

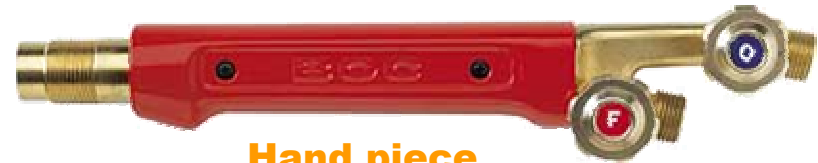
Equipment required for OAW:



Oxy Acetylene welding plant



Gauges



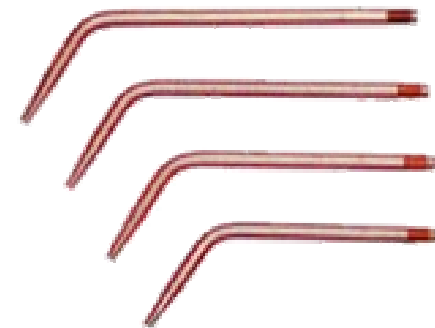
Hand piece



Mixer



Hoses



Welding tips

OAW equipment setup

Information regarding OAW equipment set up may be obtained from:

- **Your supervisor.**
- **Experienced trades person**
- **Previous knowledge of OAW setup.**

Equipment is colour coded: ➤ **Oxygen - Black/ blue. With right hand thread fittings.**

➤ **Acetylene - Maroon. With left hand thread fittings.**

All fittings should be tight and hoses free of damage.

Check OAW equipment for any leakages before use.

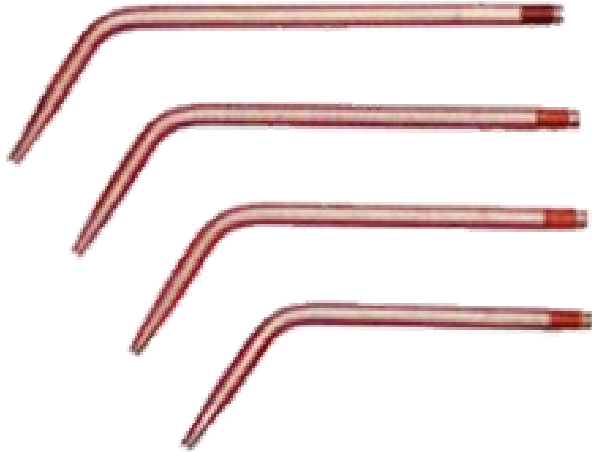
Damaged equipment should be fixed immediately.

If you cannot fix the equipment report to the supervisor for attention.

Selecting OAW Equipment settings & consumables

The thickness of the material being welded is a good indication of welding tip size.

Use small tip sizes for thin material and larger tip sizes for thicker materials.



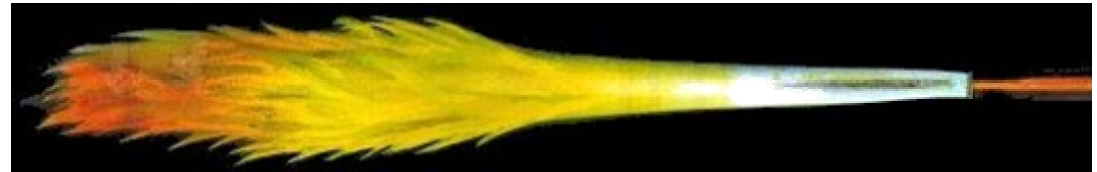
For welding of sheet metals a tip size of 8 – 12



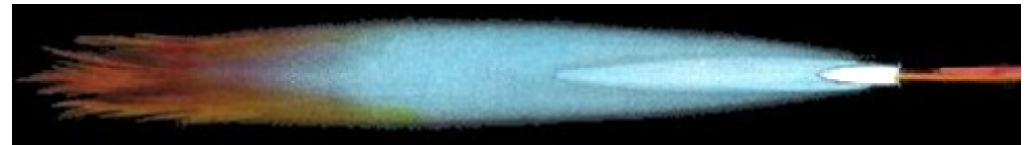
Gauge settings of 50kpa are used for both the oxygen and acetylene gas.

Selecting OAW Equipment settings & consumables

OAW uses a “neutral” flame type.



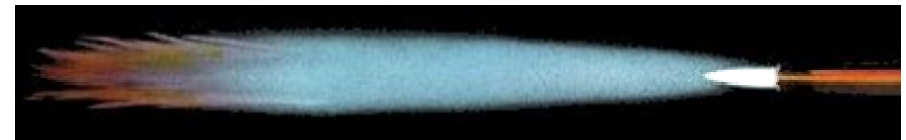
Pure acetylene



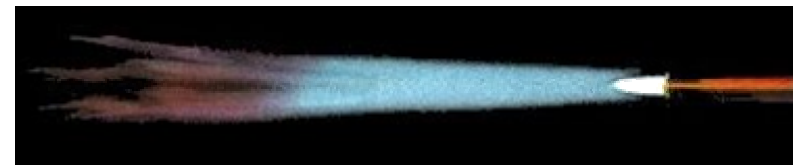
Carburizing

Start with a pure acetylene flame.

Add oxygen slowly until a neutral flame appears.



Neutral



Oxidizing

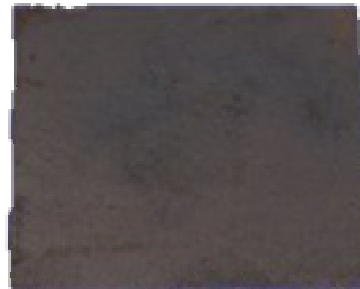
Selecting OAW Equipment settings & consumables

The metal to be welded has to be identified and the suitable consumables such as filler rods and fluxes chosen.

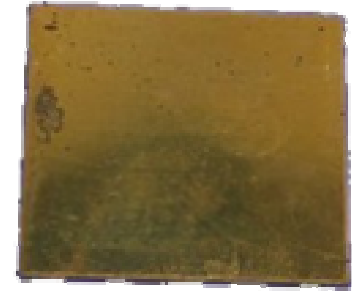
Copper



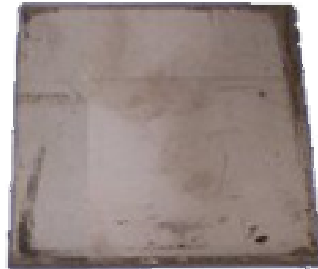
Steel



Brass



Stainless steel



Cast iron



OAW OH&S

At all times we must follow Occupational Health and Safety best practice.

Everyone is responsible for the safety of themselves and others.

To achieve this we must:

- **Identify hazards**
- **Use personal protection equipment**



OAW OH&S

Heat in the form of flames, hot metal, molten metal which can burn the skin.

Heat starts fires, clear the area of flammable materials e.g. wood or paper.

Noise from grinding and preparing materials. Wear ear muffs or ear plugs.

Sparks from grinding and preparing materials. Wear eye protection.

Bright light from the flame can damage the eyes. Wear oxy goggles

Fumes generated from OAW. Have ventilation.

Gases should be stored and used correctly.

Fuel gases can cause fire or explosion. Check OAW plant for leakages.

Safety with OAW gases

All fittings should be tight and hoses free of damage.

Check OAW equipment for any leakages before use.

Damaged equipment should be fixed or replaced immediately.

If you cannot fix or replace the equipment report to your supervisor.

Never lay acetylene cylinders down horizontally. Doing so cause liquid acetate to leave the cylinder. Liquid acetate is up to 6 times more flammable than acetylene gas.

OAW P.P.E.



Gloves



Pliers



**Full length
100% cotton clothing**



**Oxy goggles
shade 5 / 6**



**Steel capped
leather boots**

OAW P.P.E.

Ensure you have adequate ventilation



Open doorways and windows for natural ventilation



Fume extraction



Fans



A respirator must be worn if there is inadequate ventilation