GAS WELDING & CUTTING PROCESS

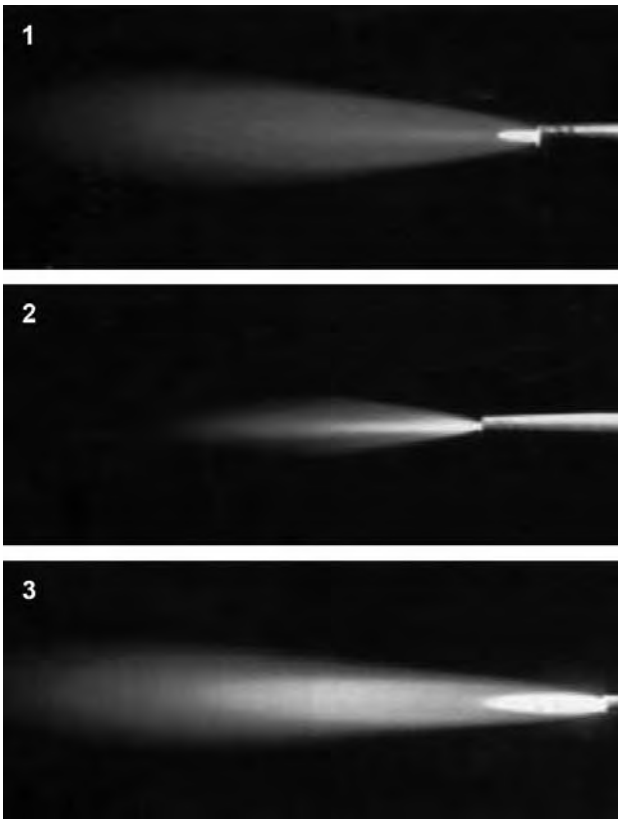
Oxyacetylene welding (gas welding), is a process which relies on combustion of oxygen and acetylene. The flame produced when mixed at correct proportion is of a temperature of about 3,200°C.

The chemical action of the oxyacetylene flame can be adjusted by changing the ratio of the volume of oxygen to acetylene.

Three distinct flame settings are used, neutral (pic.1), oxidising (pic.2) and carburising (pic.3).

Welding is generally carried out using the neutral flame setting which has equal quantities of oxygen and acetylene. The oxidising flame is obtained by increasing just the oxygen flow rate while the carburising flame is achieved by increasing acetylene flow in relation to oxygen flow.

Because steel melts at a temperature above 1,500°C, the mixture of oxygen and acetylene is used as it is the only gas combination with enough heat to weld steel. However, other gases such as propane, hydrogen and coal gas can be used for joining lower melting point non–ferrous metals, and for brazing and silver soldering.



EQUIPMENT

Marigases Welding Torch Handle and **3 Tubes Cutting Attachment** is portable and easy to use. It comprises oxygen and acetylene gases stored under pressure in gas cylinders. The cylinders are fitted with regulators and flexible hoses which lead to the Welding Torch Handle. Specially designed flashback arrestors are fitted between the hoses and the cylinder regulators. The flashback arrestor prevents flames generated by a 'flashback' from reaching the cylinders; principal causes of flashbacks are the failure to purge the hoses and overheating of the blowpipe nozzle.

When welding, the operator must wear protective clothing and tinted coloured goggles. As the flame is less intense than an arc and very little UV is emitted, general purpose tinted goggles provide sufficient protection.

OPERATING CHARACTERISTICS

The action of the oxyacetylene flame on the surface of the material to be welded can be adjusted to produce a soft, harsh or violent reaction by varying the gas flows. There are of course practical limits as to the type of flame which can be used for welding. A harsh forceful flame will cause the molten weld pool to be blown away, while too soft a flame will not be stable near the point of application. The blowpipe is therefore designed to accommodate different sizes of 'swan neck copper nozzle which allows the correct intensity of flame to be used. The relationship between material thickness, blowpipe nozzle size and welding speed, is shown in the chart.

When carrying out fusion welding the addition of filler metal in the form of a rod can be made when required.

The principal techniques employed in oxyacetylene welding are leftward, rightward and all–positional rightward. The former is used almost exclusively and is ideally suited for welding butt, fillet and lap joints in sheet thicknesses up to approximately 5mm.

The rightward technique finds application on plate thicknesses above 5mm for welding in the flat and horizontal–vertical position.

The all–positional rightward method is a modification of the rightward technique and is ideally suited for welding steel plate and in particular pipework where positional welding, (vertical and overhead) has to be carried out.

The rightward and all – positional rightward techniques enable the welder to obtain a uniform penetration bead with added control over the molten weldpool and weld metal. Moreover, the welder has a clear view of the weldpool and can work in complete freedom of movement.

These techniques are very highly skilled and are less frequently used than the conventional leftward technique.