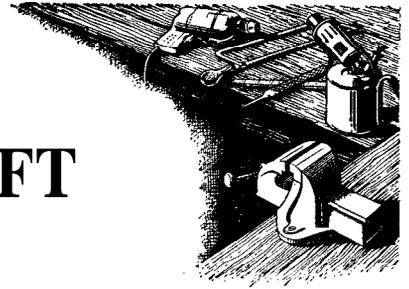


The ability to solder properly is an essential requirement for every engineer. In this article **GEOMETER** explains the processes involved in . . .



# SOFT SOLDERING

**T**HE SIMPLEST METHOD Of jointing metals is by soft soldering, which can be performed by a soldering iron or copper bit heated in a flame or the domestic fire. A variety of metals can be soldered in this way, including brass, copper, bronze, iron, steel, pewter and lead, on which the beginner should practise.

A typical soldering iron consists of a copper bit on a steel shank in a wooden handle. A common size for the bit is about 3/4 in. square and 2-1/2 in. long. Larger sizes are used for heavy work requiring much heat, and smaller ones for fine work like soldering wires.

Soldering irons may also be heated electrically or from a gas supply. These avoid the reheating process which is essential when the ordinary iron cools off.

## Using blowpipes

Many classes of soldering and tinning can be performed without a soldering iron, using only a suitable blowpipe. A simple blowpipe may use gas and air from a foot bellows, or small blower, or an oxy-acetylene blowpipe, or torch, can be used with a very small nozzle to keep down the ordinarily fierce heat.

A mouth blowpipe can be used for very small work. This consists of a tapered tube ending in a very small hole, and is held in the mouth to blow a fine jet of flame from the flame of a spirit lamp, the work to be soldered being held in the hands.

## Types of solder and fluxes

Solders consist of a mixture of pure tin and lead, and sometimes antimony to a proportion of not more than six per cent. The tin/lead proportion varies greatly from about 15 per cent. tin and 85 per cent. lead, to almost pure tin. For general purposes

a 50/50 solder of tin/lead is common. Solders may be obtained as sticks, wire, or in strips, cored with flux, or plain.

Fluxes are the medium for causing the molten solder to run and adhere to the metals, and are usually necessary even after surfaces have been well cleaned. Killed spirit or zinc chloride can be used for most of the metals mentioned in the first paragraph and a suitable preparation is Baker's Soldering Fluid, obtainable in tins. Tallow can be used for pewter and lead. Paste fluxes are also obtainable for general use, or for electrical work.

## Cleaning the metal

The surface to be soldered must be perfectly clean, and this is effected by scraping, filing or rubbing with emery cloth. Only surfaces already tinned will solder without preparation. With the surface clean, a quantity of flux is applied with a small brush or strip of wood, and it is then ready for tinning or soldering.

Tinning is performed by heating the metal in a flame and applying solder from a stick, the solder spreading, and being assisted in this by further applications of flux as required.

## Soldering details

Soldering can be carried out without preliminary tinning, though the latter process renders the work easier. The iron is heated to a point where it gives off a blue-green flame. It is then dipped at the end in a small quantity of flux in a jar, and is ready to work. If only a small quantity of solder is to be applied, the iron is touched on the solder, then on the work. Otherwise, both iron and solder are applied to the work and moved along the joint. It is important for the solder really to flow along and in the joint being made.

If an iron is overheated, the tinning

will be burnt off; its faces should then be filed clean, heated, dipped in flux, and solder applied.

## Typical operations

The drawing illustrates typical operations. Before a cable is cut, it should be soldered. (A). A frayed cable may be bound and soldered (B). Fillets should be formed at the edges of joints and round nipples (C and D). Solder may be placed as lumps in a vessel, and this heated over a flame to produce an internal fillet by revolving (E). A patch should be tacked and held with a screwdriver while soldering (F). A wire may be soldered round the base of a metal jug to absorb the wear (G). □

operations in soldering

