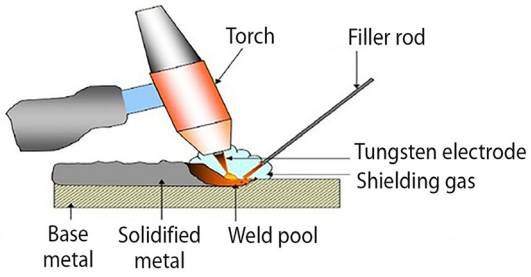
TIG welding notes

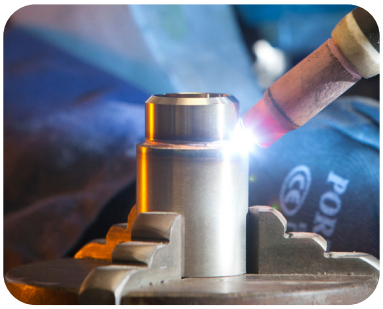
TIG stands for **tungsten inert gas welding**. TIG welding uses a tungsten electrode that has an extremely high melting point. In TIG welding, the electrode is non-consumable, which means that it does not melt but becomes part of the weld. In a lot of other welding processes, the electrode melts and becomes filler metal, these are classified as consumable electrodes.

TIG works by melting the base metal and making the two workpieces join together as if they were glued together. The heat is generated by an electric arc that forms between the base metal and the tungsten-electrode. A foot pedal or a thumb wheel on the torch can control the amount of heat.

The type of electrical current used in TIG welding

For most metals, especially for steel, the current used is a direct current. In DC TIG welding, the electrode is usually the negative term and the workpiece is the positive (this is also called *straight polarity*). However, AC can be used, too. In AC welding, the positive and negative voltages switch back and forth between the electrode and the workpiece: this puts more heat on the electrode and has a cleaning effect on the workpiece. For example, aluminum forms oxides • that float to the top of the weld pool and prevent a good weld; AC current helps control these oxides.





Filler metal

TIG welding can work with or without a filler metal. If you want to add filler metal to a TIG weld, you have to use a filler metal rod • • made of a specific non-ferrous alloy with a melting point lower than the base metal. In this case the filler metal must be compatible with the base metal and must have the strength required to do the job.

Shielding gas

In TIG welding, the molten metal is protected by a shielding gas. This gas is usually argon •• or helium because it keeps the molten metal from reacting with oxygen, water or steam in the atmosphere. This shielding gas is stored in high pressure cylinders in which the pressure is reduced to a usable level by a device called a regulator. The shielding gas flows through a hose and comes out right at the point of the weld.

to float: *galleggiare*
rod: *bacchetta*
thumb: *pollice*

• Aluminum oxide is formed by the chemical reaction between aluminum and oxygen at very high temperatures.

•• Argon makes up 1.28% of the Earth's atmosphere. It was the first noble gas to be discovered. It is a colourless, odourless and non-toxic material.

1 Complete the sentences with a maximum of four words.

1 Tungsten has got a very high .....

2. Non-consumable electrodes are those that do not melt but become .....

3. In TIG welding, the metal bases of the workpieces are .....

4. In DC TIG welding, the electrode is the positive while ..... is the negative term.

5. With AC welding, the ..... voltages move between the electrode and the workpiece.

6. AC current helps control the ..... that would otherwise spoil the weld.

7. The filler metal rod in a TIG weld must be made of specific .....

8. The shield gases used in a TIG weld are usually .....

2 PAIR WORK Take it in turns to ask questions and answers about the properties of TIG welding. Follow the prompts.

- How TIG welding works
- DC current in TIG welding
- AC current in TIG welding
- The function of shielding gaes in TIG welding.

➤ A: *How does TIG welding work?*
B: *It uses a tungsten electrode that forms an electric arc that melts the base metal.*

3 Search the web looking for the types of filler metals used in TIG welding. List at least three of them with their properties.

1. .....

2. .....

3. .....