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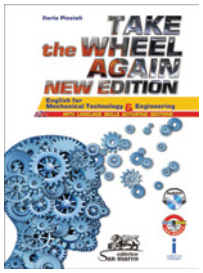
Take the Wheel Again
New Edition



Selecting the right brazing material

Before choosing a filler metal, you must understand and evaluate the three basic characteristics of filler metals: physical properties, melting behaviour and forms available.

The physical properties of a filler metal are based on its metallurgical composition. Brazing filler metals are alloys, made of two or more 'pure' metals. This composition determines whether the filler metal is compatible with the metals being joined; that is, capable of wetting them and flowing completely through the joint area without forming detrimental metallurgical compounds. Moreover, special service or production requirements may call for special properties. For example, if you are brazing in a vacuum, you need a filler metal free of any volatile elements, such as cadmium or zinc. Some electronic components require filler metals of very high purity. And corrosion-resistant joints need filler metals that are both corrosion-resistant and compatible with the base metals being joined.

Melting behaviour is also based on metallurgical composition. Alloys usually do not melt in the same way as pure metals which change from a solid to a .liquid state at one temperature. However, there is an important exception to this statement. There is a class of alloys, termed "eutectics", that do melt in the same manner as pure metals. This filler metal melts completely at a single temperature – 780 °C. In metallurgical terms, its melting point and flow point are identical.

In all brazing applications, the 'liquidus temperature' (that is, the lowest temperature at which the alloy is completely liquid) of the brazing filler metal is a critical factor. Since in brazing you never want – or need – to melt the base metals, you should select a filler metal whose liquidus temperature is lower than the solidus temperature of both of the base metals being joined. There are several brazing situations in which the liquidus temperature factor calls for special consideration. For example, when 'step brazing' an assembly – that is, brazing in the vicinity of a previously brazed joint, you don't want the second brazing operation to disturb the first joint. The way to prevent this is to use more than one type of filler metal. Make the second joint with a filler metal lower in liquidus temperature than that used for the first joint. In this way, you can be sure that the first joint will not be re- melted when making the second. Also consider liquidus temperature when brazing assemblies that must be heat treated. In these instances, you have two options. You can heat treat and then braze – in which case you should select a filler metal whose liquidus temperature is lower than the heat-treating temperature. This way the hardness properties won't be adversely affected by brazing. Or you can heat treat and braze simultaneously. In this case, the liquidus temperature of the filler metal should be closely equivalent to the heat treating temperatures.

ACTIVITIES

1 *Divide the text in sections, then summarize each of them.*

2 *Explain the meaning of the following words.*

1 Filler metal .....
2 Detrimental .....
3 Metallurgical composition .....
4 Melting behavior .....