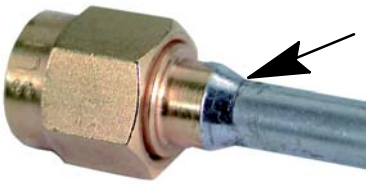
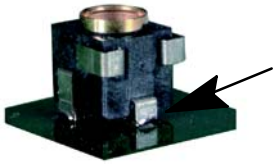
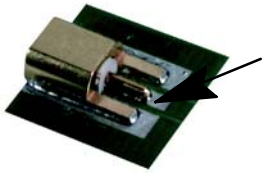
SOLDERING

Soldering is an important technique in the assembly of electronic products. It is the process of joining two metals by the use of a solder alloy, and it is one of the oldest known joining techniques.
Good soldering quality as a prerequisite for reliable joints can be achieved only through a soldering process in which a great many variables both with respect to materials and to techniques have been optimised in a integrated system. The various mass-soldering processes all have their own particular characteristics. They differ in the way in which the solder flux and the solder alloy are applied to the parts to be joined and in the manner by which the heat is supplied. The following information describes the soldering methods, temperature and dwell time. This information should be considered as a recommendation. Depending on the specific application, it is up to the user to select the most suitable method.

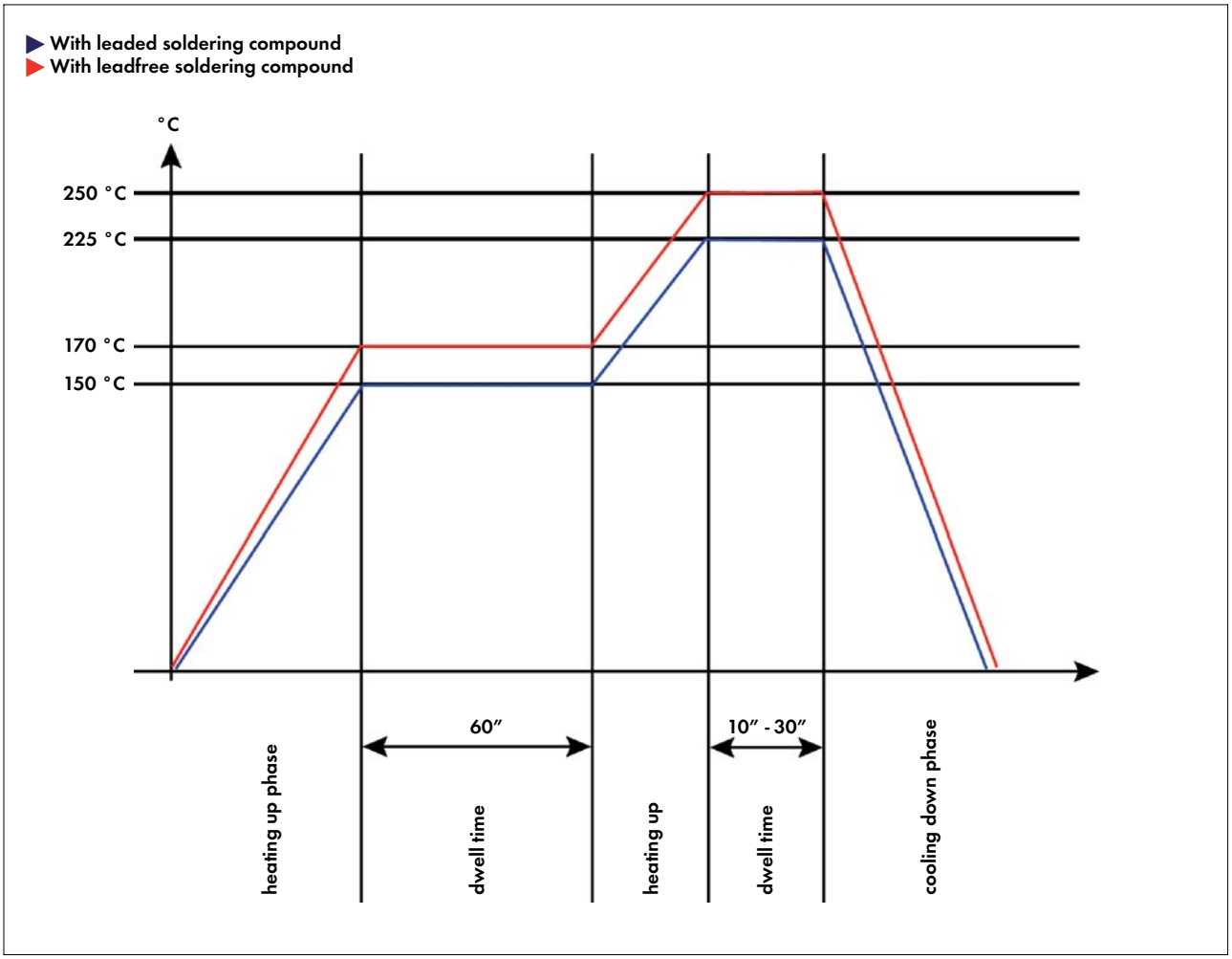
ITEM TO BE SOLDERED		USUAL METHODS
Centre conductor of coaxial cable		• Soldering iron • Resistance heating
Outer conductor of Semi-Rigid cable		• Inductive (RF) • Soldering iron • Resistance heating
Connector for printed circuit board **through-hole version**	 Soldered underneath PC-Board	• **Wave soldering** • Reflow soldering • Soldering iron
Connector for printed circuit board **surface-mount version**		• **Reflow soldering** • Soldering iron
Connector with solder tab		• Soldering iron • Reflow soldering

In addition to the soldering method, temperature and dwell time, parameters such as the flux, surface, material and geometry of the parts to be soldered must be taken into account.

Soldering temperature and dwell time

	TEMPERATURE	DWELL TIME
• **Wave soldering** Single wave Double wave	 max. 260° / 500 °F max. 260° / 500 °F	 approx. 3 sec. approx. 5 sec.
• **Reflow soldering** Infrared Heating plate	temperature profile depending on component (typical profile see below)	
Condensation	215 °C / 419 °F lead solder 230 °C / 446 °F leadfree solder	10 – 30 sec. 10 – 30 sec.
• **Other methods** Iron soldering	 variable	 approx. 2 sec.

Typical profile for reflow soldering



Commonly used solder

Depending on components, soldering termperature etc., the folowing solders are used:

SnPb	**63/37**	**183 °C lead solder**
SnPb	**60/40**	**188 °C lead solder**
SnPbAg	**62/36/2**	**179 °C lead solder**
SnAgCu	**50/48.5/1.5**	**215 °C leadfree solder**
SnAg	**96.5/3.5**	**221 °C leadfree solder**

The higher melting temperature during leadfree soldering is critical for the cable stripping dimensions during assembly. The expansion of the cable dielectric will be larger.

How do you judge the quality of a solder joint?

A good (reliable) solder joint will, during the lifetime of the equipment in which the joint is situated, perform its mechanical and electrical functions without failures. Visual aspects of good soldered joints are:

1. Good wetting
2. Correct amount of solder
3. Sound and smooth surface

All soldered joints on a printed board should give a uniform impression regardless of their location on the printed board. Solder should flow evenly over the surfaces to be soldered and run out thinly towards the edges of the joint. The contact angle should be well under 30° if the surfaces are sufficiently large. Good wetting of both the component and the solder land with the correct amount of solder is so important that this is the major criterion in the assessment of soldered joints. The solder should wet the entire periphery of the termination to be soldered, and from the edge of the solder land the thickness of the solder coat should increase uniformly up to the termination.
Leadfree solder joints have a different appearence from their tinlead counter parts.

- grainy and less bright
- larger wetting angle