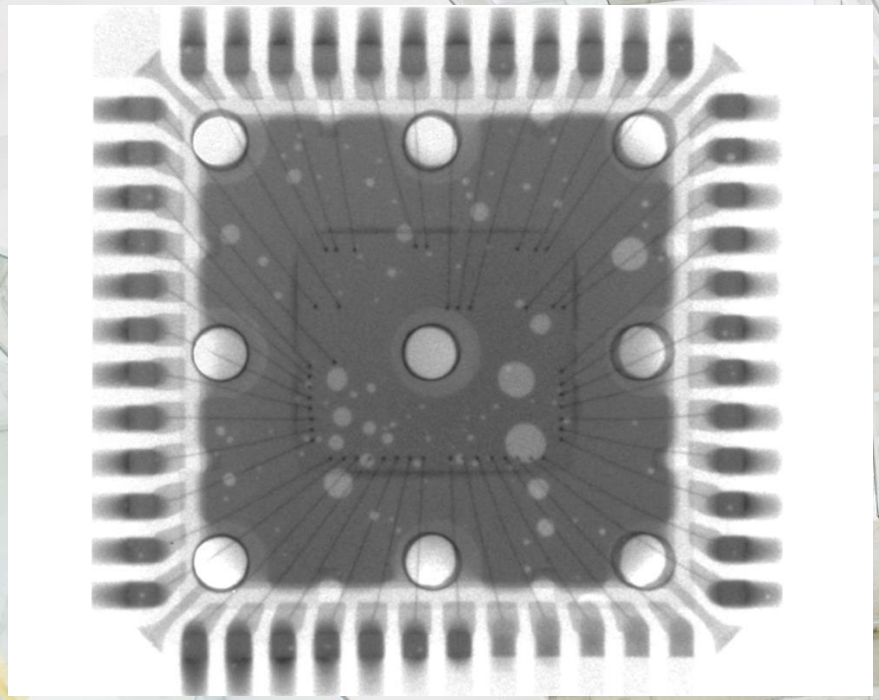
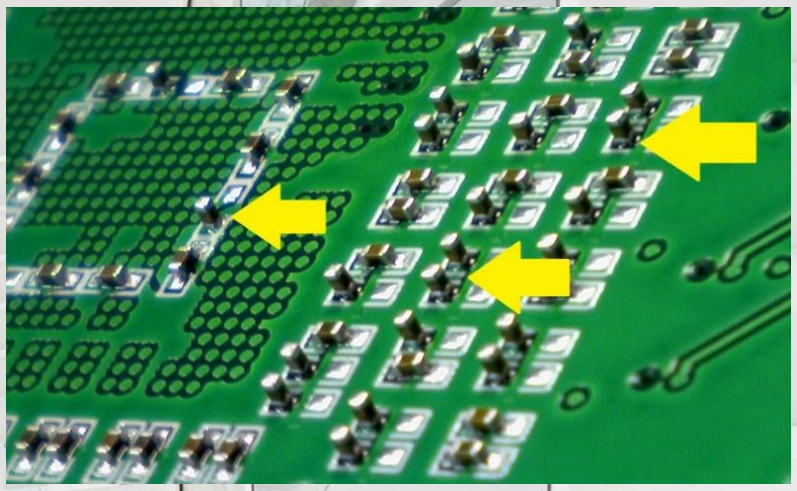
Litavimo defektai

Soldering process defects





ETS

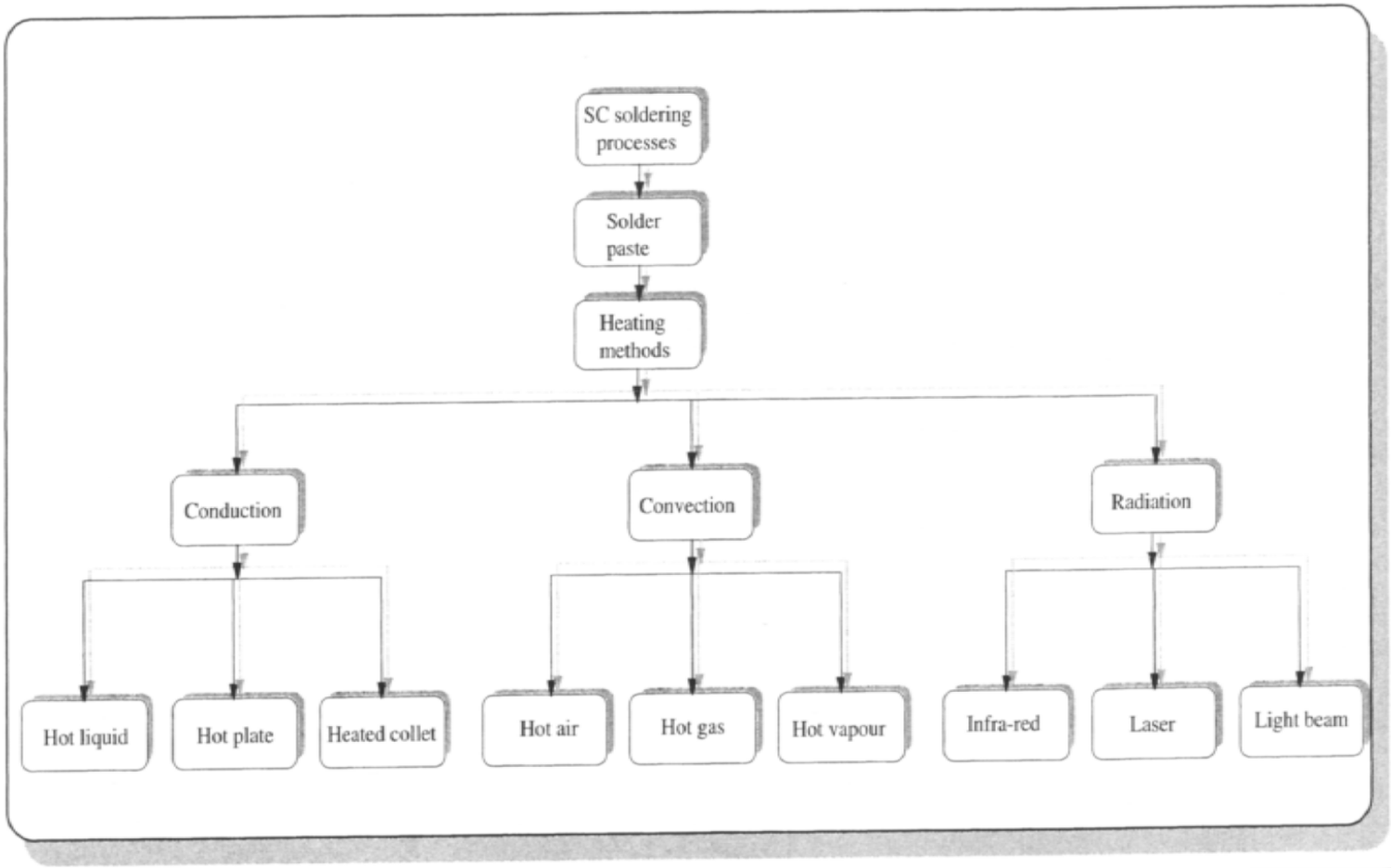
Three basic ways heat can be transferred

conduction - hot liquid, hot belt, heated collet

convection - hot air, hot gas, hot vapour

radiation w infra-red, laser, light beam.

Three basic ways heat can be transferred



Manual soldering

Manual soldering has almost become an obsolete technique since more precise and robust processes have been created. While once a good technology, manual soldering has for good reason outlived its usefulness and has been for the most part been replaced by selective soldering.

Wave soldering

Wave soldering, also known as flow soldering, is normally performed in a protective gas atmosphere
since the use of nitrogen offers an opportunity to reduce solder defects. While the wave soldering process can be designed to be more secure, it has distinct technological limitations. Selective soldering
is also a form of flow soldering and offers the only possible soldering method where through-hole components must be soldered on both sides of a two-sided printed circuit board assembly.

Wave soldering. Disadvantages.

Wave soldering can be used successfully for large unit volume production, since it is a form of mass soldering it has several disadvantages including:

Higher consumption of solder

Higher consumption of flux

Higher consumption of electricity

Higher consumption of nitrogen

Additional masking of sensitive points on PCBs

Increased need for post-wave solder rework

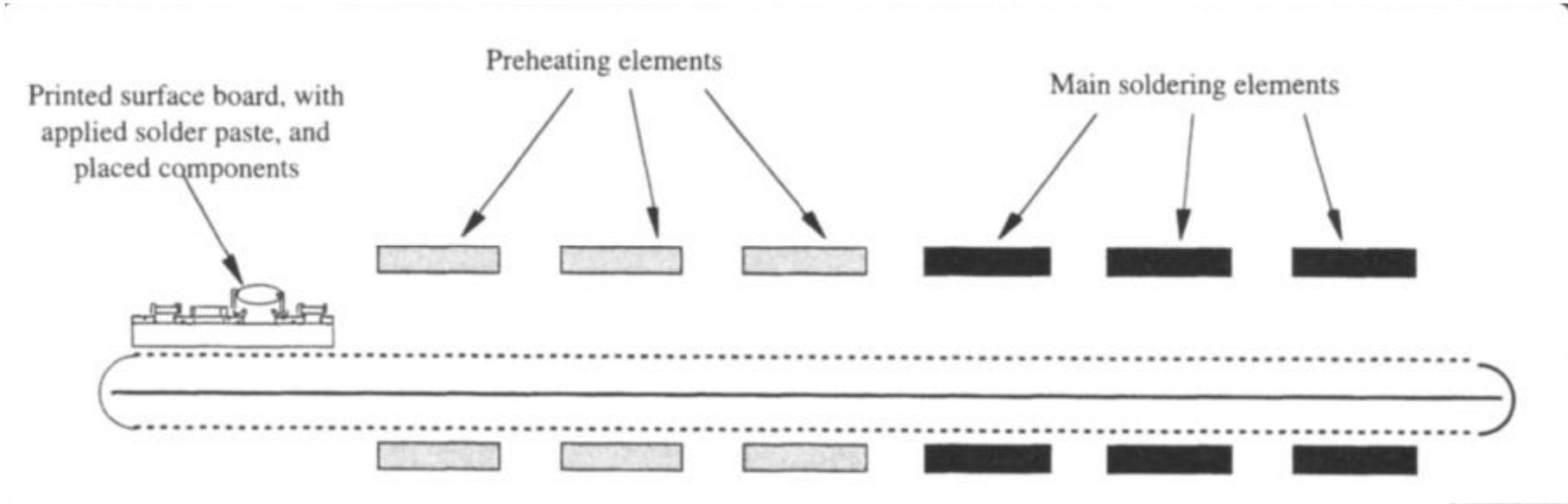
Additional cleaning of wave solder aperture pallets or masks

Additional need for cleaning of the soldered assemblies

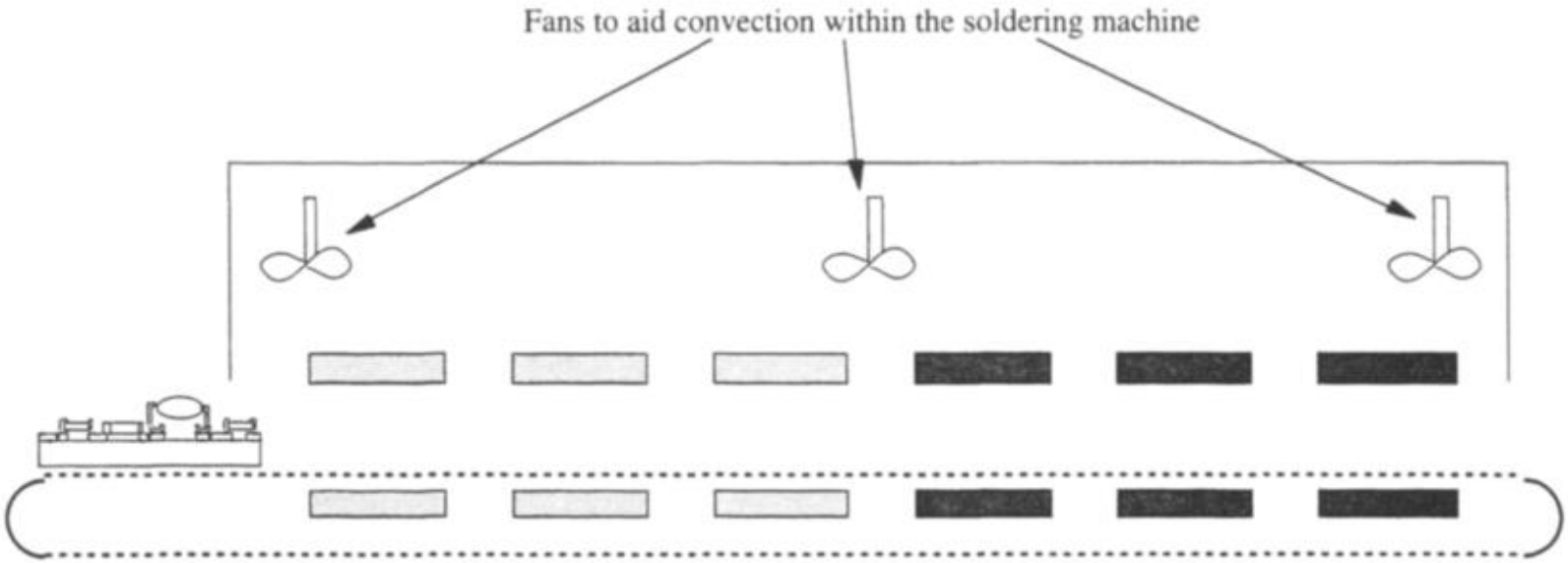
Selective soldering

Wave soldering soldering vs Selective soldering

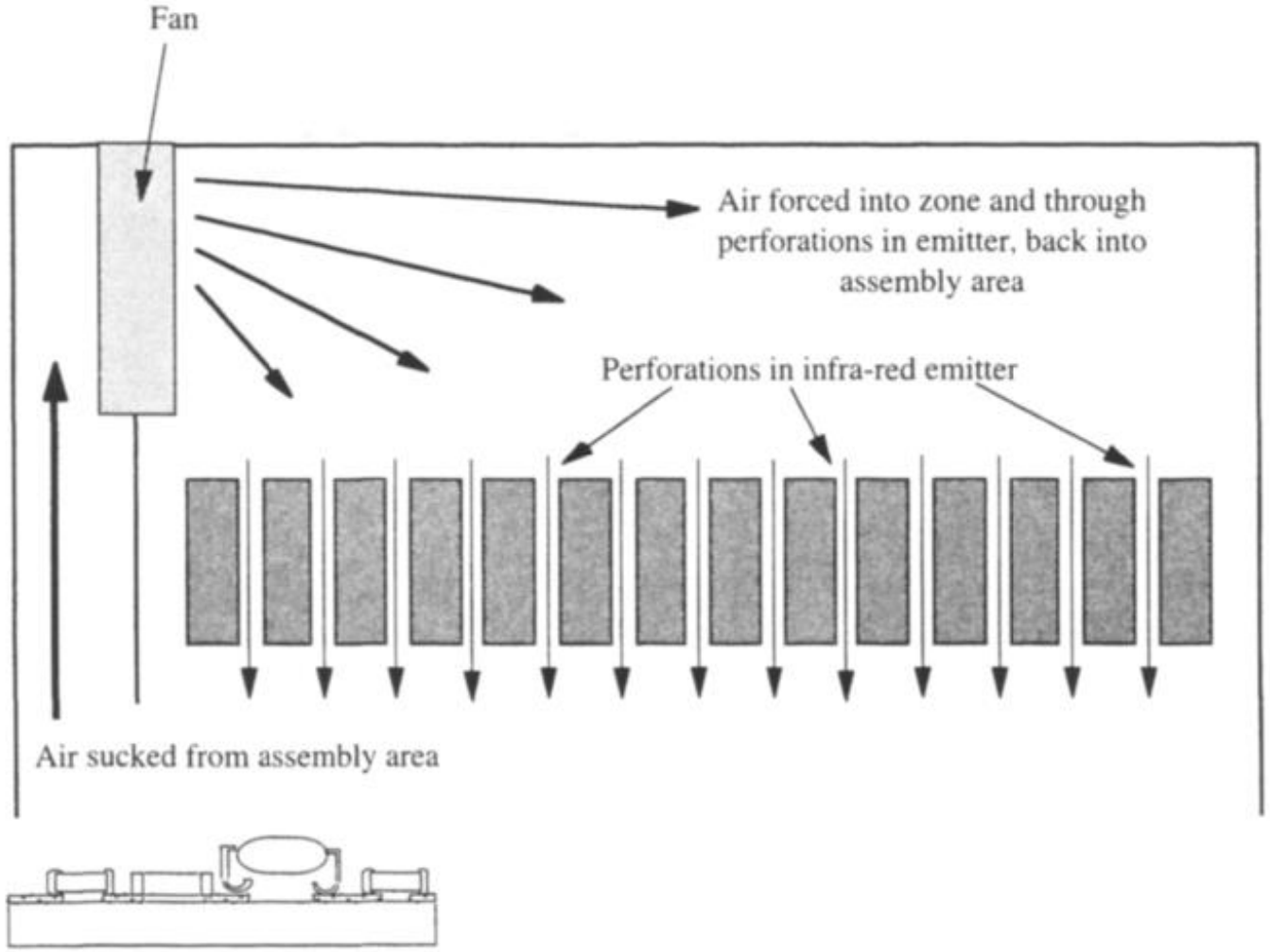
Heating elements in infra-red soldering machines are positioned above and below assemblies



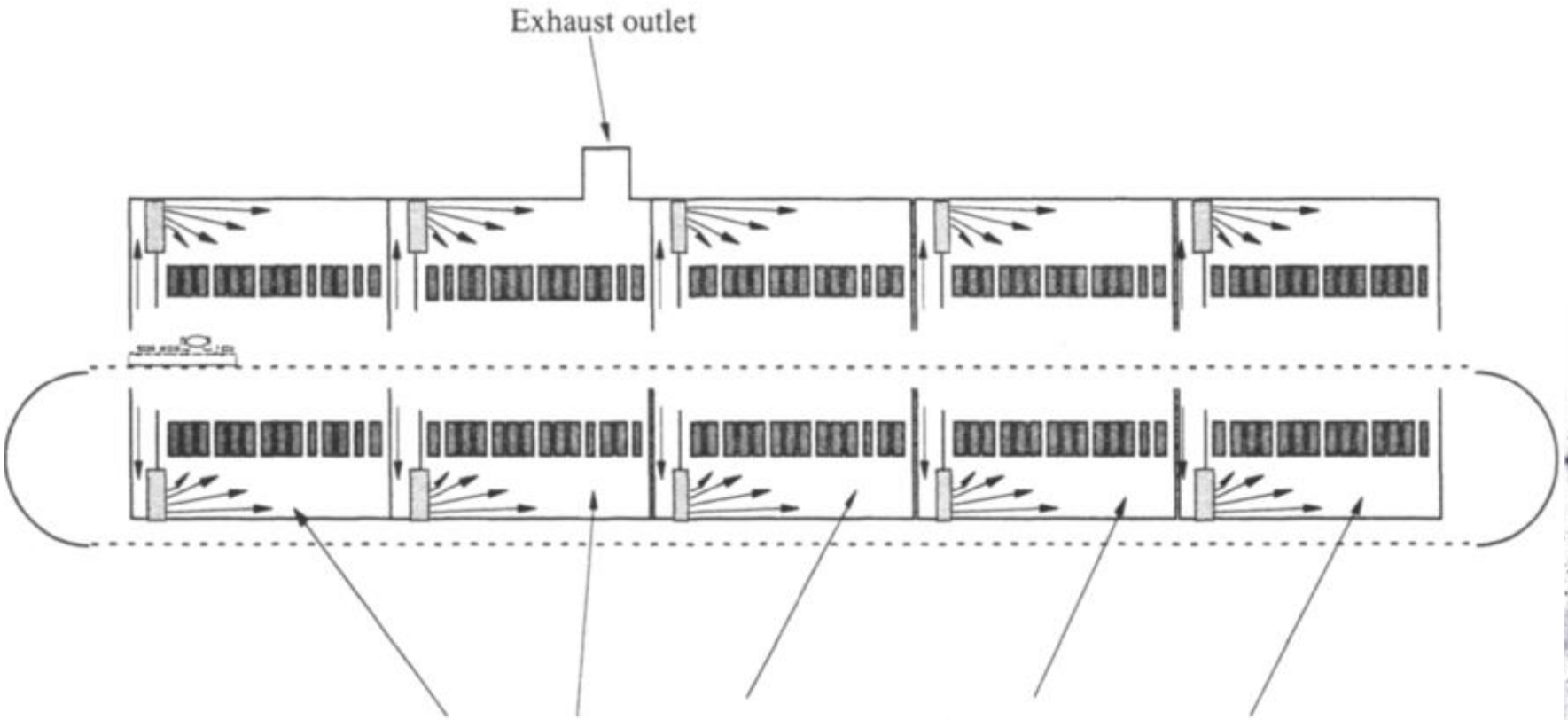
Forced convection infra-red soldering



Principle of a typical zoned, forced convection heating element

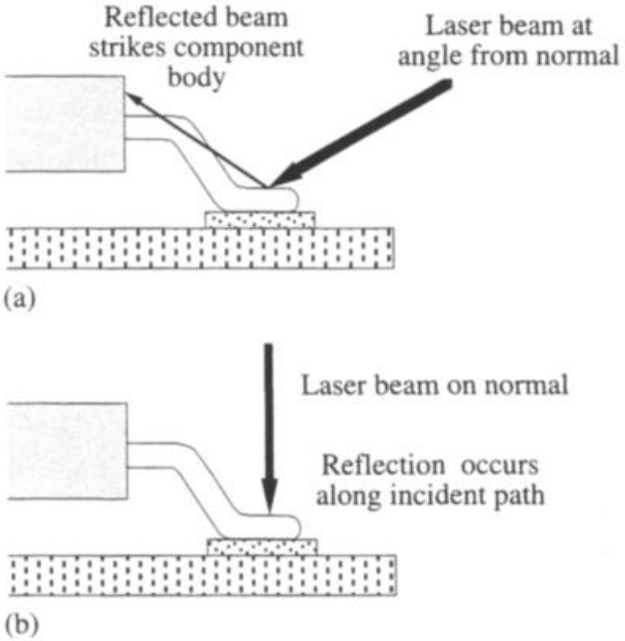


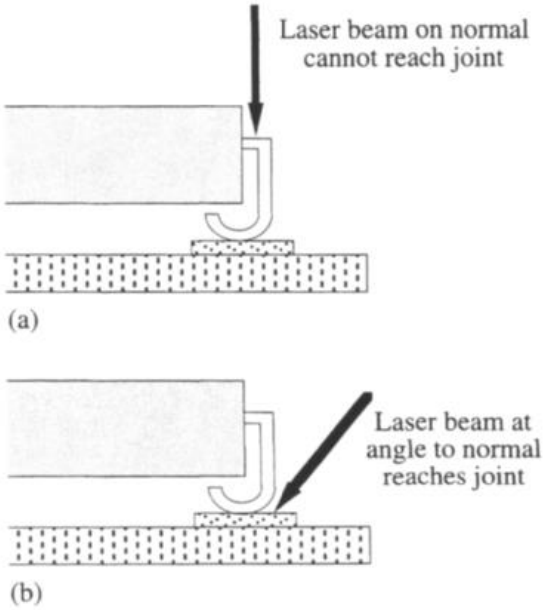
Infra-red soldering using zoned, forced convection



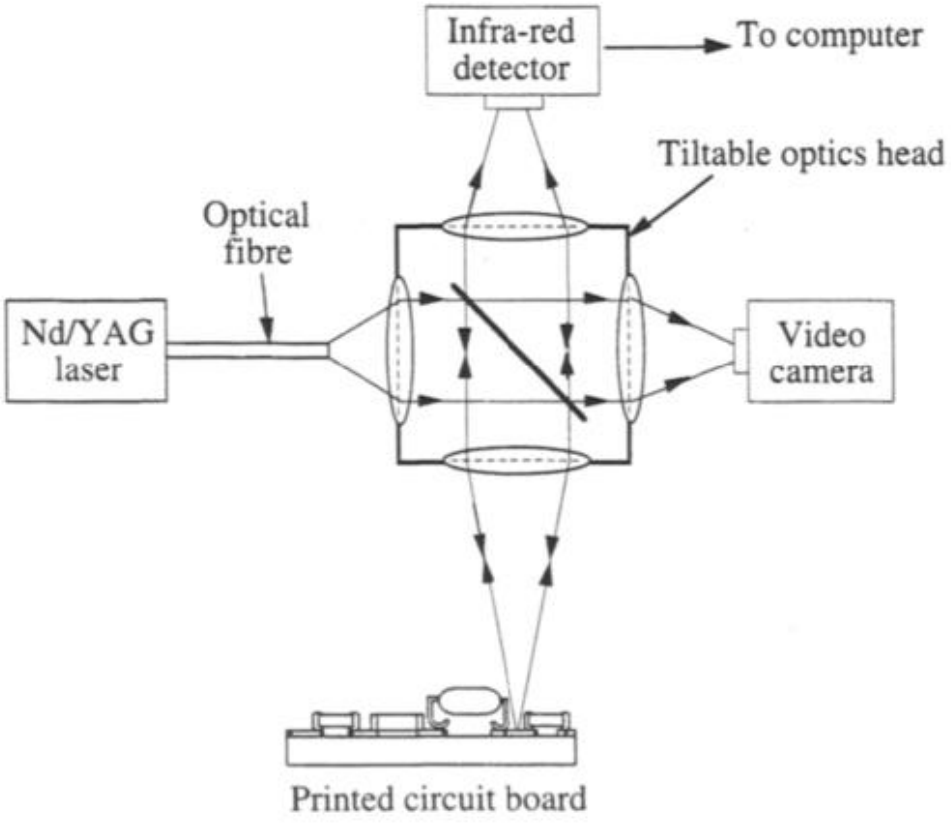
Temperature within each zone is accurately controlled, so assembly undergoes a progressive heating as it passes through machine

Laser soldering

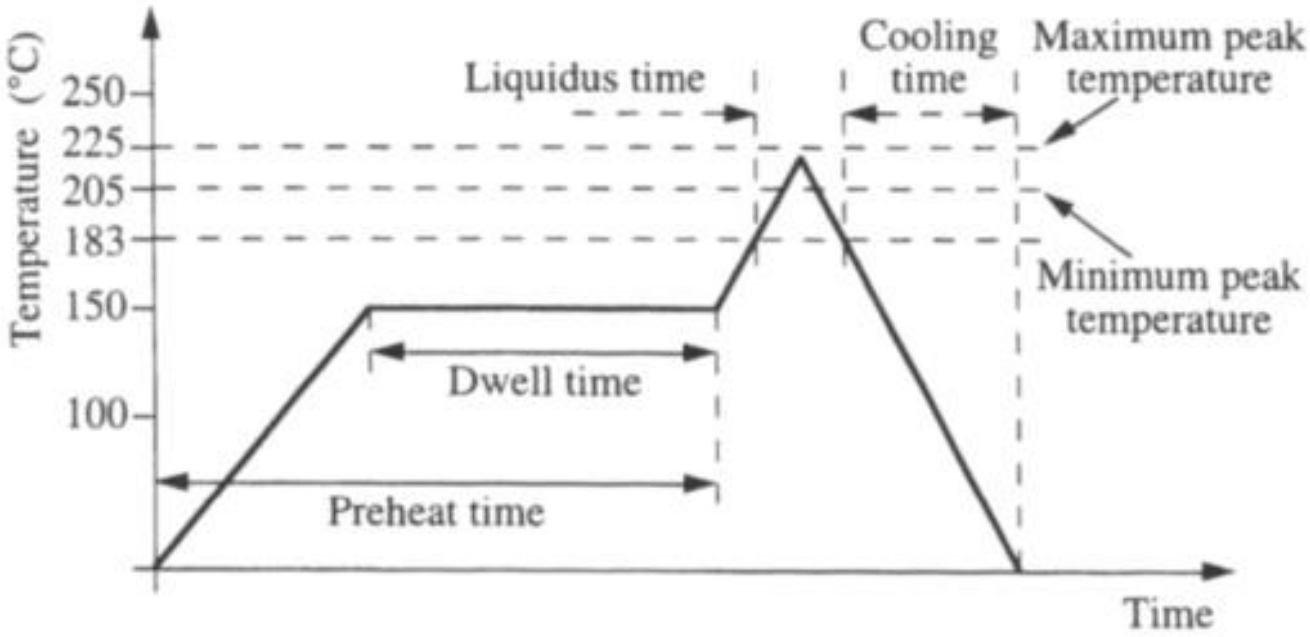




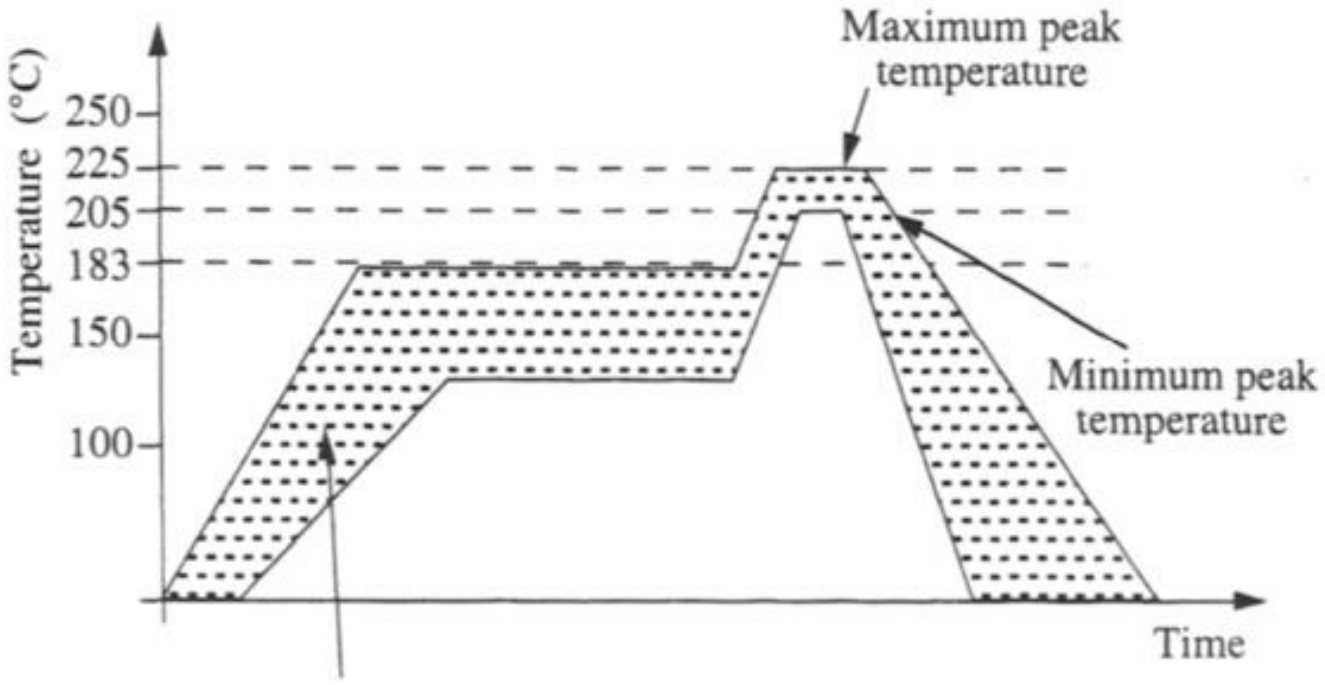
Laser soldering



Basic machine temperature profile, main stages

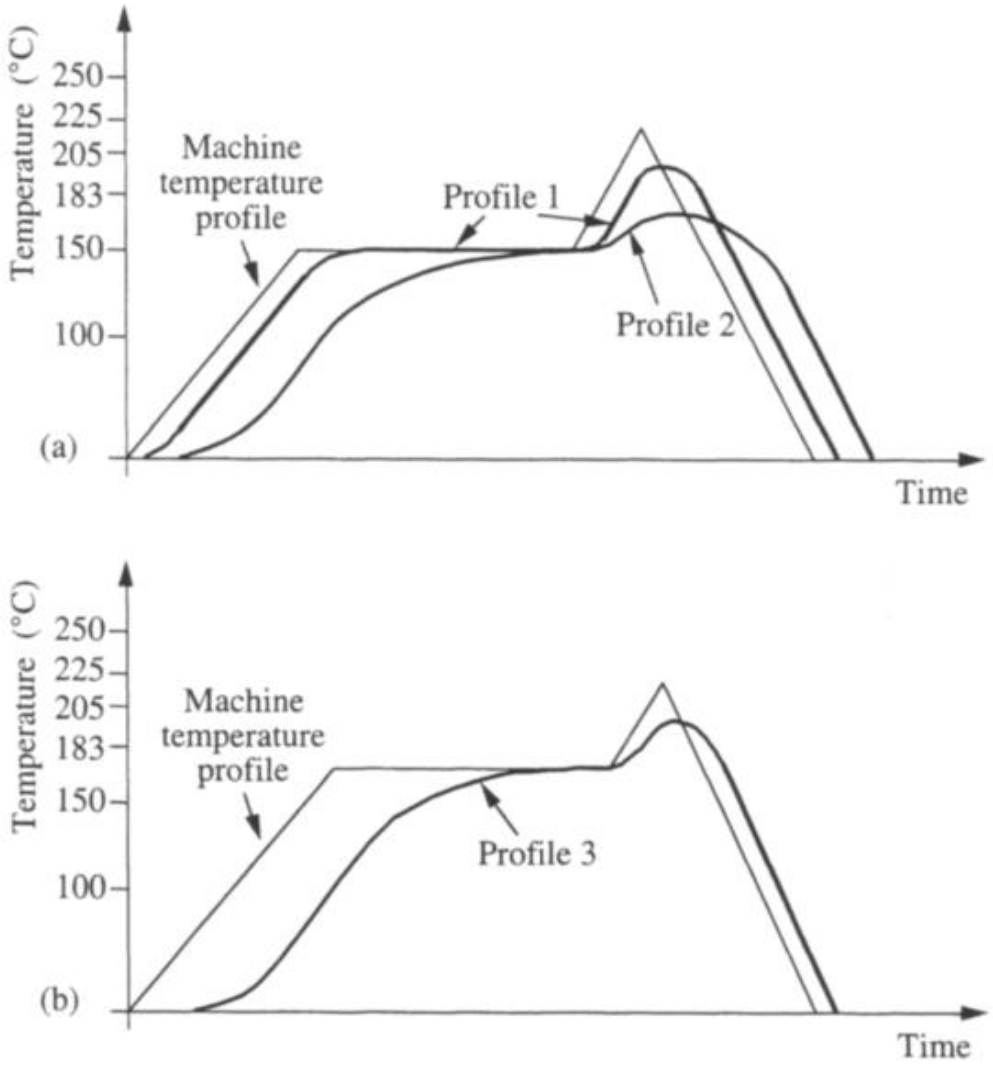


Basic machine temperature profile, main stages



Profile band, rather than profile ideal

Basic machine temperature profile



Vapor phase profile