

SOLDERING WITH LEAD-FREE SOLDERS

Most of the lead-free alloys proposed or sold to date are very rich in tin, so one must be especially careful to monitor tip corrosion and erosion. Solder tips usually consist of a copper core, plated with iron and flashed with chromium. Tin and iron together form an intermetallic compound, usually FeSn_2 , which coats the tip and makes it difficult to wet (like most chemical reactions, it proceeds much more rapidly when heated); also, once the iron/chromium plating is abraded or cracked, tin reacts with the copper - devouring it, if you will - and destroys the tip. More active fluxes at high temperatures serve to exacerbate this condition.

You may also want to consider adding nitrogen (N_2) to the system (v. infra). Nitrogen is heavier than oxygen (O_2) and will 'push' the oxygen away from the soldering area. With less oxygen there is of course less oxidation, hence less corrosion, and the wetting process is improved somewhat. The solder joints formed in a nitrogen atmosphere will be bright and shiny, not dull, which may be a benefit.