

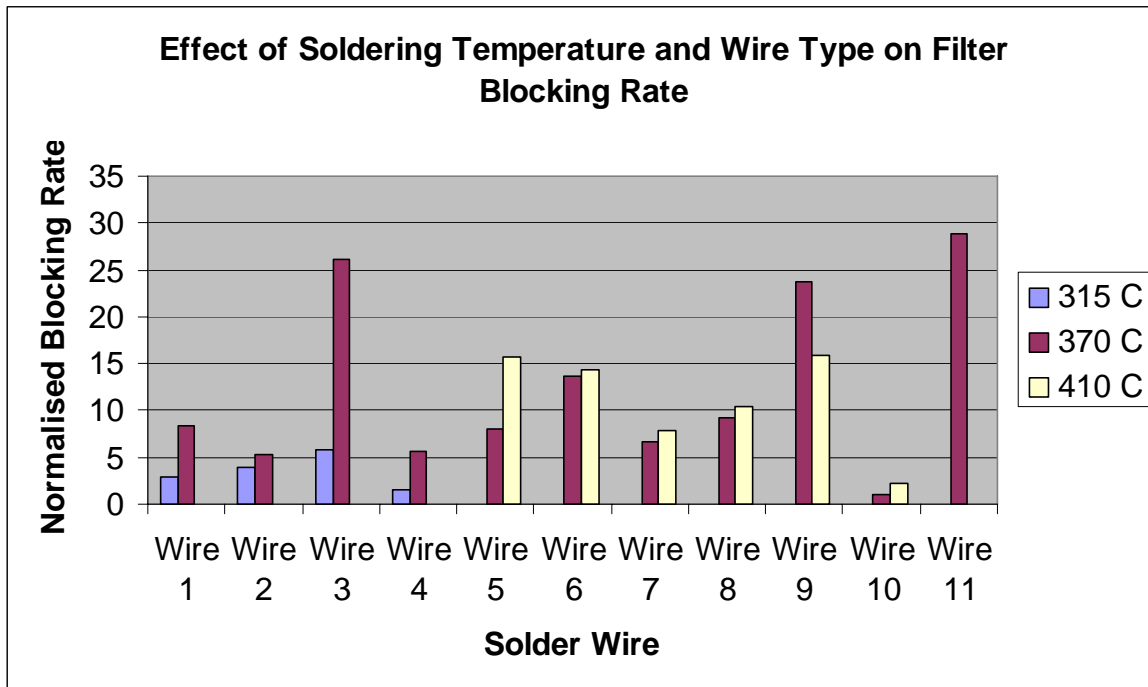


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Health and Safety - Flux Fume from Lead-Free Solder Wires

It has been known for some time that by inhalation, rosin-based flux fume generated from typical soldering processes is hazardous to health. Hand soldering using cored solder wires is a main concern in this area, because of the proximity of the operator to the point of fume generation; hence the recommended use of effective fume extraction equipment. With the enforced use of lead-free solder wires, employers need to understand the consequences if any, on the required efficiency of fume extraction and the frequency of filter change, of the generally higher flux contents and higher soldering temperatures of these materials.

To help address this issue, LEADOUT has carried out a comparison of 10 commercially available, rosin-cored solder wire products in terms of how quickly they can block an extraction filter under typical soldering conditions. Four tin/lead products (wires 1-4, with flux content between 0.9 and 2.0%), and six lead-free products (wires 5-10, flux content between 1.5 and 3.3%) were assessed at different soldering temperatures, by how quickly the generated flux fume would block a filter system. One lead-free, rosin-free product (wire 11, flux content 3.0%) was also tested, and the relative results are shown in the chart below.



The first point that can be made is that there is much variation, even between products using the same solder alloy; for example, the fume given off from wire 5 blocked the filter many times more quickly than wire 10, despite them both being of the same alloy (tin/silver/copper) and of similar flux content!

Secondly, at the 'normal' soldering temperatures used in this work for the respective alloys (315°C for tin/lead, 370°C for lead-free), fume from the rosin-cored lead-free wires blocked the filter on average about three times faster than that from the tin/lead wires.

Thirdly, as maybe expected for any given product, soldering at a higher temperature increased the filter blocking rate, with only one exception (wire 9).

And lastly, the fume from the rosin-free fluxed wire is generally considered less harmful than that from rosin fluxes (this is not yet proven), but it gave the highest filter blocking rate of all the products tested!

These findings suggest that companies should keep a close eye on the efficiency of their fume extraction units, and possibly expect to change filter parts more regularly than happened in the past.

Visit the Leadout website at www.leadoutproject.com for more information about lead-free soldering.