cleanliness level. As expected, cleaning underneath low standoff components was more challenging (at least 25% or more) than cleaning around and top of the components.

As a conclusion of this study the use of cleaning agent 1 at a 3% concentration level, at 150°F wash temperature and 2.0 fpm belt speed would provide up to 111% better cleaning results (reaching 100% full cleanliness) underneath the low standoff components when compared to pure DI-water inline cleaning process!

The usage of chemistry in the long run seems to offer a number of previously unknown benefits. Despite the additional process cost of a cleaning agent, the "value added" benefits are sizable or should exceed the former.

They include but are not limited to better cleaning (i.e. lower ionic contamination), which in turn provides much higher product reliability. Recent studies have also demonstrated better bonding and coating after the introduction of chemistry assisted cleaning. To offset the added cost, users can operate at lower temperatures and with a wider process windows one clean not only OA but also RMA and no-clean fluxes. And that will become a requirement in the North American market as contract manufacturers are moving to lower volume, higher mix and a significantly more high reliability products. At the end, the introduction of a chemistry assisted cleaning process, will increase your cleaning process window and permit the de-fluxing of all production boards in a single cleaning process.

Despite all the valid arguments encouraging the use of aqueous processes, the authors would like to caution interested users as well. Most equipments currently using strict DI-water are not properly equipped to use a closed looped chemistry. This means that they do not have a chemical isolation section included. The latter is an essential part not only to conserve chemistry but also to minimize foaming for example. DI-water machines take advantage of cascading DI-water tanks from back to front. Employing a chemical product in the wash tank would lead to continuous dilution of the recommended application concentration by DI-water. Company's that are strategically planning their capital purchases are therefore well advised to incorporate the mechanical option to run aqueous chemistries. A slightly higher investment will provide significantly more process flexibility in years to come, and might lead to additional contracts.

OUTLOOK

Various customers are currently investigating our hypothesis in real-time. Results should be available shortly and will be presented at upcoming conferences.

AUTHORS

This research paper is the 4th in a series written by ZESTRON on optimizing electronic cleaning processes presented at the industry's known conferences SMTAI and IPC/APEX. Based on our findings, key market developments have been initiated and began to address current shortcomings observed in the industry.

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