RoHS Compliance and Pb-free Capability: One in the Same?

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Absolutely not. Though many in the industry would lead you to believe that a RoHS compliant product ensures lead-free process capability, in fact, nothing could be further from the truth. RoHS compliance simply means that a product or a material does not contain any of the hazardous substances banned under the legislation. But, just because a material is free of the RoHS list of excluded substances, doesn't mean it can withstand processing at the elevated temperatures of lead-free. There are countless examples of compliance versus capability but, in this case, we'll take a look at surface mount adhesives (SMAs).

SMA Evolution

Surface mount adhesives have been part of the assembly landscape for so long that they have almost become an afterthought. Until recently, these "glues" as they are so often referred to, were just expected to perform as required and, for the most part, they did. Older generation materials required a fairly high peak cure temperature of between 140° to 150°C. But some components – particularly some lower cost components – heavily relied upon in the high-volume consumer electronics market could not withstand the heat input required for adhesive cure and, thus, reliability was compromised. This led to the engineering of SMAs with lower cure temperatures that utilized a very unique approach so as to enable sufficient cured strength for maximum performance during soldering. Based on these requirements, a new formulation was developed that maintained historical chipbonder properties, yet allowed for a significantly lower cure temperature – as low as 85°C. The combination of lower cure temperature, material strength and reduced rate of temperature rise of these newer generation materials dramatically reduced thermal shock and improved reliability, enabling in-line, automated assembly of temperature-sensitive components.

Enter Lead-Free

Lower temperature cure adhesives became the industry standard, essentially resolving the dilemma of automated processing of temperature-sensitive components and allowing reliable, in-line surface-mount assembly for a wide range of devices. And, while the benefits of these materials were many, the advent of lead-free manufacturing pushed them to their performance limits and it became clear that yet another adhesive innovation would be required to meet the demands of lead-free process conditions.

With years of Pb-free research behind them, the materials scientists at Henkel worked diligently to develop an adhesive that maintained the low temperature cure, yet could withstand the elevated process temperatures of lead-free. Henkel's next –generation SMA, Loctite® 3629 delivers all of the capabilities of former generation low-temperature cure adhesives, yet is capable of retaining its strength during high-temperature soldering processes. Loctite 3629's advanced formulation maintains the benefits of lower energy input for cure, but also possesses lower yield points to enable faster dispensing and printing ability and higher adhesive strength to handle the extreme temperatures of lead-

free and the pull imposed on components resulting from the greater surface-tension of lead-free alloys.

RoHS Compliant and Pb-free Capable: The Best of Both Worlds

Many SMA suppliers would like you to believe that their "RoHS compliant" materials are ideal for lead-free manufacturing. But, with several of these products not able to tolerate the higher temperatures, components literally pop off the PCB during reflow due to insufficient adhesion strength.

Loctite 3629, however, provides both RoHS compliance and lead-free capability. Free of the legislation's banned substances, Loctite 3629 successfully meets the stringent criteria and delivers robust performance within a high-temperature environment, all while still imparting the proven benefits of lower temperature cure (110° - 120°C). So, not only is the material lead-free capable, its low temperature cure also makes Loctite 3629 extremely environmentally friendly, requiring much less energy for processing as compared to competitive materials. Furthermore, the innovative chemistry of Loctite 3629 delivers both long shelf-life and an extended floor life, which is particularly beneficial in hot climates because the material maintains its stability even after removal from refrigeration.

All of these advantages – low temperature cure, dispense and print capability, long shelf-life, stable rheology – of Loctite 3629 are made even more profound by its lead-free capability. With this material, manufacturers truly get the best of both worlds – complete RoHS compliance *and* lead-free process performance. And, remember these two features are not one in the same – make sure your materials meet them both or you'll pay the price in end-of-the-line yield.

For more information on Henkel's Loctite 3629 surface-mount adhesive, please e-mail electronics@us.henkel.com or call the electronics group of Henkel headquarters at 949-789-2500.