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Safeguarding offshore EMS soldering quality: introducing the G3 SPA 1000 "all-in-one" 6-test solder paste analyser

The G3 SPA 1000 from Gen3 Systems offers OEMs a reliable and traceable way to verify offshore manufactured soldering quality by providing a unique, quantitative measurement of solder paste condition in accordance with the five solder paste tests of the IEC and IPC international standards bodies. The G3 SPA 1000 uniquely performs all these tests from a single platform plus an additional and completely unique sixth Open Time test developed by Gen3 Systems

FARNBOROUGH, UK – March 26, 2008 – Gen3 Systems Limited today introduces the SPA 1000 solder paste analyser that targets OEMs wishing to ensure globally recognised, international soldering quality standards are maintained no matter where in the world their products are manufactured.

The Gen3 Systems SPA 1000 is a robust and accurate, integrated soldering instrument that performs all solder quality testing detailed by IEC and IPC international standards including: slump; solder ball; tack and wetting in accordance with IEC 61189-5 and IPC-TM-650; the IPC-TM-650 spread test; and Gen3's own Open Time test to check the integrity of solder paste that has been sitting exposed (i.e. "open") to the atmosphere while "in-use" on an assembly line. Solder paste Open Time is a problem for assemblers because individual process conditions that can affect solder paste integrity will often vary from site-to-site, and sometimes, from line to line.

"If the recent woes of US toy manufacturer Mattel[1] demonstrate one thing: it's how even well managed companies can rapidly find themselves in hot water when the offshore manufacturing process goes wrong," comments Gen3 Systems Managing Director, Graham Naisbitt. "But this is exactly the risk run by Western-based electronics OEMs when seeking to reduce manufacturing costs by offshoring assembly processes to lower cost regions such as Eastern Europe, China, India, and more recently Russia, Brazil and Vietnam."

Naisbitt continues: "Offshoring to a manufacturing facility halfway around the world makes the manufacturing process doubly difficult to control. And in the electronics industry, analysis of manufacturing defects shows that solder problems are the largest single cause of failure. With surface mount technology now the dominant assembly method, many of these soldering failures can be traced back to poor housekeeping of solder paste creating problems during printing, placement and reflow."

The G3 SPA 1000 is designed to help OEMs avoid offshore solder paste defect issues by providing quantitative – i.e. measurable and scientific – data of solder paste quality on a manufacturer's line in accordance with every single major international standard soldering paste test from a single machine.

1. Reference: "*Mattel recalls 19 million toys sent from China*", International Herald Tribune, August 14, 2007. www.iht.com/articles/2007/08/15/business/15imports.php

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About the IPC and IEC International Solder Paste Test Standards
The International Electrotechnical Commission (IEC) and Association Connecting Electronics Industries (IPC) standards bodies have quantitative test standards for solder paste (although the current standards only cover tin/lead pastes with publication of equivalent standards for lead-free alloys planned for 2009). IEC 61189-5 and IPC-TM-650 include four and five solder paste characteristic tests respectively. These tests provide a framework for ensuring the solder paste is up to the job but are carried out by the solder paste manufacturer prior to despatch.

The IEC's solder paste tests (defined in IEC 61189) are slump (5X08), solder balling (5X09), tack (5X10) and wetting (5X11). IPC-TM-650 specifies five equivalent tests for solder paste: slump (2.4.35); solder balling (2.4.43); tack (2.4.44); wetting (2.4.45); and spreading (2.4.46).

The IPC test for **slump** specifies stencil printing on two coupons with defined pads of various sizes and spacings, then storing one for 10 to 20 minutes at 25 +/- 5^0C and 50 percent RH +/- 10 percent while heating the other to 150 +/- 10^0C for 10 to 15 minutes. The heated specimen is then cooled to ambient temperature and both specimens are examined for bridging.

The IPC test for **solder balling** calls for two specimens to be printed with stencils of 0.2 or 0.1 mm thickness and three holes of 6.5 mm or 1.5 mm diameter on a pitch of at least 10 mm. The specimens are then reflowed using a solder bath or hot plate and examined under magnification. The results are then compared with the visual samples.

The IPC test for **tack** measures the force required to separate a test probe from the printed paste sample at progressively increased intervals between printing and testing. The probe is applied to the paste at a rate of 2.5 mm/min +/- 0.5 mm/min with a force of 300 g +/- 30 g and then within 5 seconds withdrawn at the same rate. The data is presented in graphical format as the paste "ages". Typical measurements are time to reach 80 percent of the peak value; peak force in grams with expected variation or time over which the peak force is maintained or for the tack force to decline to 80 percent of its peak value.

The IPC **wetting** test calls for a copper specimen to be cleaned with liquid copper cleaner, washed with water, rinsed with isopropyl alcohol, dried and then placed in boiling deionised water for 10 minutes before being air dried. The specimen is then printed with solder paste, reflowed and examined under magnification for dewetting or non-wetting.

Spreading is tested under the IPC method by using five circular solder preforms and five copper coupons. The preforms are placed on the coupons and reflowed solder paste flux is then dissolved in reagent grade 2-propanol and 0.05 ml of this solution is dropped into the middle of the preform. By applying to a hotplate or solder bath for 15 seconds, the solder is melted. The flux residues are cleaned from the specimens and the spread (in mm^2) of solder is estimated by comparing with reference circles of known area.

See www.ipc.org/ContentPage.aspx?PageID=4.1.0.1.1.4 for more information.

About Gen3 Systems (http://www.gen3systems.com)
Gen3 Systems is dedicated to tackling the demanding electronics reliability challenges of lead-free assembly and further electronics miniaturisation. The company is a specialist manufacturer of test and measurement equipment used to predict the reliability of electronic circuits and systems in the field. In addition, the company designs and manufactures conformal coating process equipment in both in-line and bench-top formats.

Gen3 Systems' Managing Director Graham Naisbitt is a member of the IEC's TC91 WG3, the working group that formulates test standards for the assembly industry. He is also leader of Solderability Testing Standard IEC 60068-2-69, Co-leader of Solderability Testing Standard

IEC 60068-2-54, Co-Chair of IPC-TM-650 Test Methods Sub-Committee, and Member of IPC-J-STD 002 and IPC-J-STD 003, among many others.

Gen3 Systems is founded on the former Concoat Systems Limited. Concoat Systems and its company slogan "Engineering Reliability in Electronics" (which has been retained by Gen3 Systems) was a familiar name in Europe, Asia and much of North America. The new company was launched by its family owners after former sister company Concoat Limited was sold to US firm Chase Corporation in 2005.

Process Product Support is the new UK / Ireland market Division for Gen3 Systems, also bringing together many new distributed products from Marantz (AOI), ACE (Selective Soldering), Kirsten (Jet Wave Soldering), SAWA (specialist USC Systems) as well as R&D Technical Services (Vapour-Phase Systems), MB Tech (Cleaning Systems) and several others.

Gen3 Systems operates from new premises near Farnborough Business Park, on the M3 corridor and just 30 minutes from London's Heathrow Airport. The company has an entirely new management team focused on the needs and requirements of its customers around the world.

Gen3 Systems also provides training, equipment and expertise for manufacturers requiring assessment of their electronic products' reliability. The company also assists with standards development via both the IPC and IEC.

The company's product range and services include:

- **AUTOSIR** Surface Insulation Resistance (SIR) test system
- **MUST 3** solderability test system
- **SOLDAPRO** thermal profilers
- **CM** SERIES cleanliness test systems
- **SC** SERIES spray conformal coating systems, both batch and in-line
- **DC** SERIES dip conformal coating systems, both batch and in-line
- **TEST** SERVICES for circuit reliability, solderability and cleanliness

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