Suppliers' Environmental Initiatives

The Tokyo Electron Group collaborates with suppliers to reduce the environmental impact of its products.

Suppliers Cooperate in Reducing Environmental Impact

The Tokyo Electron Group needs to use environment-conscious parts and materials as the basis to reducing the environmental impact of its products. Accordingly, we established our own green procurement guidelines for the materials and parts that we procure from suppliers to manufacture our semiconductor/FPD production equipment. The guidelines set out environmental impact reduction criteria and voluntary targets that are referred to by our suppliers. We will continue to cooperate with our suppliers using these guidelines and by conducting surveys on suppliers' environmental activities, exchanging information with them, and giving them instructions, in our efforts to reduce our environmental impact as part of our supply chain management. In this section, we introduce two of our suppliers who are committed to reducing their environmental impact.

Supplier's Environmental Efforts —Aval Nagasaki Corporation

Procurement from Aval Nagasaki

Aval Nagasaki Corporation develops, designs, manufactures, and sells its own electronic devices and OEM products. In 1988, the Tokyo Electron Group started to procure printed board assemblies for control units for use in semiconductor/FPD production equipment from Aval Nagasaki.

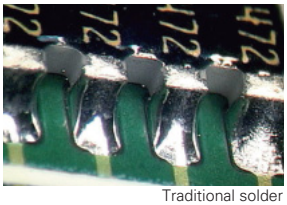
Acquisition of ISO 14001 Certification

Aval Nagasaki acquired ISO 14001 certification for its environmental management system in April 2006. The company measures its environmental impact, sets its objectives and goals, and pursues continuous improvement based on its ISO 14001-certified management system. Specifically, it endeavors to discontinue the use of lead in its manufacturing process and to reduce its consumption of electricity and chemicals.

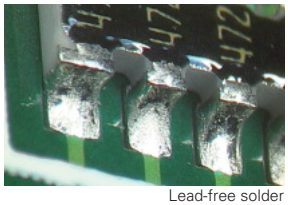
Lead-free Initiative

In response to requests from the Tokyo Electron Group and to regulations implemented in Europe, Aval Nagasaki established a new manufacturing line for lead-free printed circuit boards in July 2004. The company then conducted repeated reliability tests on the line, started to produce prototypes in February 2005, and finally began mass production of lead-free products in May 2005. In establishing the line, it introduced a nitrogen generator to prevent surface oxidization of the lead-free solder and expanded their dry warehouse for electronic parts.

Difference in Surface Luster between Traditional Solder and Lead-free Solder



Traditional solder



Lead-free solder

Aval Nagasaki established guidelines on lead-free processes. It also clearly separates the lead-free line from other lines by using the color green: all the items related to the lead-free line are colored green, including slips for lead-free parts, containers for lead-free paste solder, trowels for lead-free solder, and even the floor of the lead-free line. This prevents lead from commingling with lead-free products. Lead-free solder melts at a higher temperature than lead solder, and lead-free solder tends to peel off the printed circuit board and the solder surface tends to crack more easily. Aval Nagasaki has overcome these problems by improving the line management technology based on the results of reliability tests and succeeded in the mass production of lead-free products. In FY 2006, the company's use of lead-free solder accounted for approximately 20% of its total solder use, but the company plans to increase the percentage with further use of lead-free solder in its own products and OEM products now that it has obtained ISO 14001 certification.

Manual soldering using lead-free solder

Lead-free printed circuit boards

Our Comments

Aval Nagasaki established a system to mass-produce lead-free printed circuit boards for use in the Tokyo Electron Group's CLEAN TRACK LITHIUS, a coater/developer ahead of other suppliers. The company is able to develop products that meet each customer's needs in relation to the RoHS directive, except for certain parts. Aval Nagasaki is thus supplying products that meet the needs of the Tokyo Electron Group. We expect the company to maintain their efforts for further environmental conservation.

Suppliers' Environmental Efforts —SMC Corporation

Procurement from SMC Corporation

Since its foundation, SMC Corporation has been growing as a general manufacturer of pneumatic equipment, which is powered by compressed air and used for a variety of purposes. The Tokyo Electron Group procures pneumatic equipment such as air cylinders and solenoid valves as well as heat exchangers and thermo chiller from the company, and at least 90% of the products are customized for the Group.

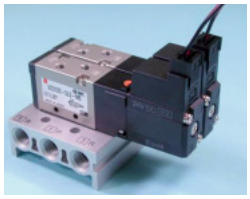
SMC's Environmental Policies and Environmental Measures for Products

Based on the policy that conservation of the global environment is one of the most important challenges facing humankind and that the company has to contribute to creating a comfortable global environment through all of its business operations, SMC acquired ISO 14001 certification in 1999. When the Tokyo Electron Group asked the company to discontinue the use of lead in its products, SMC responded to the request based on its Green Procurement Guide, which includes policies for the RoHS directive. At present, however, their products contain parts in which other substances of concern are used. Regarding their use of these substances, the use of hexavalent chromium in chrome coatings has the highest environmental impact, followed by the use of lead in solder and various metals, and the use of PBBs, PBDEs, and cadmium in resin parts. Although industrial products, including pneumatic equipment, are not subject to the RoHS directive, SMC is implementing measures to reduce or discontinue the use of these substances in response to its customers' requests.

Measures to Comply with the RoHS Directive (1): Solenoid Valves

Explaining SMC's measures at the interview
Mr. Yoichiro Okada, Green Procurement Secretariat, Technology Division, SMC Corporation

The Tokyo Electron Group uses a lot of solenoid valves in its products. Solenoid valves are used to control the flow of compressed air supplied to air cylinders and other components. SMC is reducing the use of lead and hexavalent chromium contained in the circuit boards and lead wires of the valves and will eventually discontinue their use.



Solenoid valve

Measures to Comply with the RoHS directive (2): Thermo Chiller

For its thermo chiller that is used in coaters/developers (system that supplies chemicals to the equipment under strict temperature control), SMC is implementing measures to comply with the RoHS directive by removing lead from the circuit boards and hexavalent chromium from the plates. By making major changes to the circuit design, the company discontinued the use of these substances without any extra cost. It completed the evaluation of a prototype in June 2006 and plans to provide a lead- and hexavalent chromium-free thermo chiller FY 2007.

Previous thermo chiller (left) and the new one (right)

New Methods and Ideas Learned from the Tokyo Electron Group

SMC has been implementing environmental measures in cooperation with the Tokyo Electron Group. In the course of this cooperation, it learned the concept and methods of change management (management of risks associated with changes made to the design of a product, its parts, processes, etc.) from the Group, which marked a turning point for SMC. Without the introduction of this method, SMC might not have been able to manage changes made to comply with the RoHS directive.

SMC's Future Environmental Measures

As a precondition for companies to continue in businesses, they have to conserve the global environment. SMC believes it possible to meet this requirement by using its comprehensive technological ability. For example, when depletion of the ozone layer by CFCs became a social concern, SMC was the first to develop a product using a new refrigerant that contains no chlorine, which resulted in the expansion of its share of the market. SMC therefore thinks that it can expand its business through environmental activities, including those necessary to comply with the RoHS directive and to promote green procurement.

Our Comments

SMC is ahead of other suppliers in setting out specific change management criteria for multiple parts and in filing related applications. In response to an increasing demand for environmental measures, including RoHS directive-related measures, the Tokyo Electron Group was able to identify and take relevant measures in cooperation with SMC and plans to make further progress in environment-friendly management and operation based on this experience.