



LEAD FREE AND RoHS COMPLIANCY

DECEMBER 2004

Introduction

There is a continual worldwide environmental movement away from the use of lead and other hazardous substances towards 'non-toxic' products. Added to this, there are now a series of worldwide initiatives that outline targets for electronic equipment re-use and recycling. In such initiatives, the use of hazardous materials, such as Lead, Mercury, Cadmium, Hexavalent Chromium and Polybrominated Biphenyls (PBB) or Polybrominated Diphenyl Ethers (PBDE) are eliminated in order to reduce the risks to health and the environment.

Legislation directly affecting the electronic equipment industry was passed on February 13, 2003 by the European Commission in the WEEE (Waste Electrical and Electronic Equipment) and RoHS (Restriction of Hazardous Substances) directives. Member states must ensure that by July 1 2006, new electrical and electronic equipment placed on the market does not contain lead or any of the restricted hazardous materials identified in the directives. Other countries such as Japan have adopted similar requirements. These regulations impact all components such as IC's, electromechanical and passive components including communication magnetics.

In anticipation of International Laws and Regulations related to the elimination of hazardous materials in electronic components, HALO initiated a project to investigate, evaluate, and qualify the use of *RoHS compliant* materials in all standard products and processes in early 2003. As a result of this investigation, HALO has developed and is currently releasing a new product line to provide RoHS compliant products meeting the requirements of the European Union's Law on Waste Electrical and Electronic Equipment (WEEE), and, Restriction of Hazardous Substances (RoHS).

Industry Concerns

There are several concerns in the electronics industry that must be addressed and managed. The most obvious is the probability of inserting mixed technologies components onto boards in a specific process. The lead free reflow process must be modified to increase the thermal profile to a peak temperature of 260°C. Many standard components may not survive this higher temperature required to reflow the lead free solders. Conversely, *RoHS* components used in a standard reflow process (225°C peak temperature) may create a reliability issue due to cold solder joints of the leads to the printed circuit board.

Studies conducted by organizations including the National Electronics Manufacturing Initiative (NEMI) suggest a reliability concern when lead-free solder is mixed with a lead solder alloy. Additionally, there is a concern of "tin whiskers" occurring over time when using, lead-free, tin based solders.

The magnetics industry faces some unique challenges in moving to these higher reflow temperature processes. Most high-speed communication magnetics utilize ferrite cores. These cores can be thermal sensitive and have the propensity to crack during fast thermal excursions above 235°C.

As well, we have the industry-wide concerns regarding plastic and potting compounds used in the assembly of the final product. The *RoHS compliant* devices must be capable of withstanding a maximum of 260°C peak temperature with no mechanical degradation such as cracking, warping or causing any other reliability concerns.

In addition most magnetics products contain internal solder joints. These solder connections must be made with a solder that has a melting point that is higher than that of the solders used in our customers' final assembly to ensure that the internal solder joints do not reflow during the manufacturers' PCB reflow process.

Road map

HALO's standard products will be available in *RoHS compliant* versions. To assist our customers during the transition period, from Lead to *Lead-free* solders, HALO will identify all RoHS devices with a new part number suffix, "RL". This suffix will be added to the existing part number to clearly identify the part as *RoHS compliant*. For example, HALO leaded product, TG110-S050N2 will become TG110-S050N2RL. The *RoHS compliant* parts will be footprint interchangeable with our standard leaded products. HALO will also continue to offer our existing products utilizing tin-lead lead frames for those customers who desire to use lead in their processes. Customers who intend to use the RL products in their existing tin-lead reflow processes should verify that reliable solder joints are achieved in their specific reflow thermal profile.

The *RoHS* directive has provided an exemption for components that contain high temperature internal solder joints. For these solder connections, tin-lead solder alloys containing more than 85% lead are acceptable (RoHS ANNEX, Paragraph 7). The HALO "RL" products will utilize this high temp solder on the internal solder joints.

Simultaneously, HALO is developing a "Lead-Free" or "Green" series of transformer/CMR Choke devices. This new series will be identified with the suffix "LF". These products will be available on a part by part basis in late 2005.

We are committed to providing robust *RoHS compliant* solutions for our standard transformer, CMR choke, modules and single level FastJack™ products. Most popular products will be available in Q1, 2005. All HALO *RoHS compliant* products will be available by December 2005.

The *RoHS compliant* products will be released "family by family". Customers that have a need to convert to RoHS compliant products are advised to contact their local HALO sales office. We will do our best to prioritize the families as needed to meet our valued customers' requirements.

Contacts

For questions regarding HALO RoHS compliant or Lead-Free products or product availability, please contact your local HALO Representative. For technical questions regarding the materials, qualifications, profiles or other technical issues, please contact the HALO Electronics location nearest you.

HALO Electronics, Inc.

1861 Landings Drive, Mountain View, CA 94043

Phone: 650-903-3800

Fax: 650-903-9300

E-mail: info@haloelectronics.com

Web: www.haloelectronics.com