

Are Scandinavian Companies Ready for Production of Lead Free PCBs?

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Abstract

For more than two years, experts, authorities and sales people in the electronic industry have talked about WEEE and RoHS. In most cases, it has been theoretical and few companies in Scandinavia have any practical experience with lead free production. What is even more significant is that many OEMs don't have any knowledge about what actions they have to do to meet the requirements for a successful implementation of WEEE and RoHS. In addition to a lack of knowledge for EMS and OEM companies, the authorities in the Scandinavian countries have kept a very low profile which undermines the political system in European Union and the consequences of the WEEE and RoHS directives.

Introduction

While travelling around Scandinavia visiting and talking with OEM and EMS companies, it seemed like everyone I met was asking questions about the consequences of implementing WEEE and RoHS. While some have attended seminars and workshops around the world, they still seem confused about what to do regarding practical actions for implementation in their own product or production facility.

Another message I got was the anger many companies expressed against Naturvårdsverket (in charge of WEEE) and Kemikalieinspektionen (in charge of RoHS) and their lack of information and the difficulties in getting a straight answer.

In the beginning, the intention of this speech was only to investigate the situation at EMS companies but as the work went on, it was necessary to extend it as follows:

1. The authorities Naturvårdsverket and Kemikalieinspektionen.
2. OEM, Large, Medium and Small.
3. EMS, Large, Medium and Small.

A bank of questions were created for the following areas covering the implementation of WEEE and RoHS at EMS and OEM companies:

- A. Components
- B. CAD
- C. Bare boards
- D. Solder paste
- E. Solder bars
- F. Reflow methods
- G. Testing and inspection
- H. Marking
- I. Material declaration
- J. Existing articles
- K. New articles

Chapter 1 - Answers from Naturvårdsverket and Kemikalieinspektionen, the Authorities

Naturvårdsverket (WEEE):

The registration and statistical Internet based program that every OEM selling to consumers has to register is not ready yet. Naturvårdsverket hopes it will be in place Q1 2006 but it is not sure. They are late due lack of capacity but the law regarding WEEE in Sweden is still valid from August 13, 2005.

Kemikalieinspektionen (RoHS):

Are better prepared than Naturvårdsverket and are preparing three different tools to be able to check if Swedish companies are following the legislation regarding RoHS:

1. Demanding material declarations. For example, if cadmium is not used, companies must specify the replacement material. (Swedish regulation since many years).
2. Inspection raids planned for autumn 2006 to toy, TV and computer game companies. In July, many companies in Sweden are closed for vacation and this will give companies some time.
3. Renting a Niton XLt x-ray gun to be able to detect banned RoHS materials.

Chapter 2 - Answers from OEMs

Part A: WEEE:

A clear majority of the Scandinavian OEMs had the following answers regarding marking, recycling and recovery of electrical and electronic material:

1. What are you talking about?
2. Is this valid for us?
3. Is this something new?

Some OEMs claim that they are ready regarding marking but not recovery and recycling.

Part B: RoHS:

Bringing up the question that PB, Hg, Cd, Cr6 and FR PBB and PBDE are banned after July 1, 2006, you get the following answers:

1. We know, but we have an exception.
2. We know, but we don't have any time to control the BOM on running articles.
3. It will take the time it takes.
4. We know but we don't care.
5. We are working on it.
6. What are you talking about?
7. What shall I do?
8. This will kill my business.
9. The chance to get to court is less than zero.
10. If we not are an exception today, we must be tomorrow. (Manufacturers of music instruments).

Not one of the OEMs claimed that they are ready.

Chapter 3 - Answers from EMS Companies

Part A: WEEE

Part B: RoHS

Orders:

Q1: When do you expect the first order?

A1: Don't know.

A1: Beginning of next year, we hope.

Components:

Q1: Are you going to have 2 stocks of components?

A1: No, we are doing everything to use or sell all components with banned substances before July 1.

Q2: Do you now which components are banned?

A2: No, we have to investigate them all, one by one.

Q3: Who is going to pay for this investigation?

A3: Not we, the customer of course.

Q4: Do you have the technical knowledge to make changes in the BOM?

A4: No. We have to ask the customer. It will take long time.

Q5: What solutions are you discussing with your customers?

A5: Convince the customer to produce and put it on the market before July 1, 2006.

A5: Business as usual until the component stock is empty or the product has its EOL. Don't care about July 1, 2006.

Bare Board Base Material:

Q1: Are you aware of that many base materials specifications have to be updated due a higher reflow and wave soldering process?

A1: You must be kidding.

A1: What options to I have?

Bare Board Surface Finish:

Q1: Which Lead Free surface treatment do you prefer?

A1: Don't know, depends on the customer.

A1: Which are the best?

A1: Solderability is very important.

A1: HAL with SN110C.

A1: ENIG or Immersion Sn.

Q2: Have you made some tests for solderability?
A2: None of our customers want to be the first.
A2: Some, 10-15 boards without any components.

Solder Paste and Reflow:

Q1: How many different allows have you tested?
A1: Are there others outside of SAC 305?
A1: Special pastes are expensive.
A1: Patents are connected to many solder pastes.

Q2: Have you tested Lead Free Reflow?
A2: YES!!

Q3: Have you been running Lead Free Reflow in real production?
A3: NO, we don't have any orders.
A3: Yes, we have made some tests.
A3: Yes, 1-2 order.

Q4: Are you able to do lead free production in your factory?
A4: YES!!

Q5: Have you invested in any new reflow machines?
A5: No, we will use our old one.
A5: Yes, a new Hot Air machine.
A5: Yes, in a Vapor Phase.
A5: Yes, both Hot Air & Vapor Phase.

Q6: Are you going to use Nitrogen?
A6: No, too expensive.
A6: Yes, we love it.

Solder Bars and Wave Soldering:

Q1: How many different alloys have you tested?
A1: What's available outside of SN100C? (Sn/Cu+Ni).
A1: We can use the old machine if we buy SN100C.

Q2: Have you invested in any new solder wave machines?
A2: Yes, in an old second hand.
A2: Yes, a new one.

Q3: Have you been running lead free wave soldering in real production?
A3: NO, we don't have any orders.
A3: Yes, we have made some tests.
A3: Yes, 1-2 order.

PCB Quality:

Q1: What will the quality be of the ready PCB after July 1, 2006?
A1: Don't know, too many parameters to control.

Chapter 4 - Conclusions

Despite that WEEE legislation is valid today, neither the authorities nor OEMs are ready nor is there any control in the field.

From a production point, the EMS companies are prepared for RoHS but have very limited experience. At the component and logistic side, much more manual work has to be done for updating all old BOM to RoHS compliance.

The ultimate question in a close future will be "The solder joints are perfect but does the PCB work?"