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An: hse-rohs@oeko.info

Cc: Stanley Rothschild

Betreff: Is Cobalt hazardous or non-hazardous?

Gentlemen,

We have just recently been made aware of the new "Hazardous Substances in EEE- high priority" list via an Interconnect Printed Circuit (IPC) email, and are very surprised at the substances, which you have deemed "hazardous", particularly cobalt. As a manufacturer of solder products used in the electronics industry, one of which contains minute amounts of cobalt, we wonder how your list was derived and upon what basis and authority the individual substances were deemed hazardous. All of the cobalt data we have been able to obtain indicates it is no more hazardous than silver and less hazardous than numerous other metals.

When one retreats to the original RoHS directive, one objective was to limit lead content to less than .1% (it had traditionally been used at concentrations of 37-40% in electronic solders). This, in essence, mandated lead free electronics assemblies. Solder is used in the manufacture of circuit boards and all solders going into the European Union had to become lead free as of July 1, 2006. The industry responded by solder manufacturers eliminating lead and substituting silver and other elements (such as cobalt) in varying percentages. This accomplished your substitution principle of "replacing or reducing hazardous substances in products and processes by less hazardous or non hazardous substances" (your words).

Some solder manufacturers experimented with other elements to overcome the problems inherent with silver containing solder alloys, resulting in alloys that neither contained lead nor silver, but still performed well and were cost effective. Our tin/copper/cobalt solder alloy is an example of this.

Much to our surprise, we now find out that cobalt is deemed by your organization to be a hazardous element of high priority. The "R" and "S" Warnings associated with cobalt are R42/43: May cause sensitization by inhalation and skin contact. R53: May cause long term adverse effects in the aquatic environment. Indication of danger: Xi (irritating). S2, 22, 24, 37, and 61 warnings are common and generally prescribed on msds sheets for just about all products. Cobalt is not inhaled in a solder alloy because it is solid until melted into the alloy. As a solder, it is not a powder which can be inhaled and cause irritation. Just about any product in powder form is hazardous if inhaled. Fumes cannot exist until 2,212°C (typical operating temperatures for lead free solders are 275°C) so there is no inhalation hazard. The "R" warnings state only that cobalt "may cause", not "does cause" something, so there is no definitive basis to label cobalt "hazardous" based on product warnings.

After extensive review, we have not been able to find any research that shows cobalt to be anywhere near as hazardous as lead. This again begs the question, on what basis was cobalt deemed to be hazardous and added to your list since it seems to be as benign as silver, and the same warnings appear on literally thousands of products used safely by industry and consumers which are not deemed hazardous.

Let us take just one example of current research on cobalt. If one examines the Indiana Relative Chemical Hazard Score (Indiana Clean Manufacturing Technology and Safe Materials Institute) for silver, nickel, and cobalt, one finds that the total Hazard Value Score (IRCH) is 20 for cobalt, 32 for nickel and 17 for silver on a scale from 1 to 200, 1 being the least hazardous and 200 being the most hazardous. The cobalt IRCH score again is 20, indicating the substance is a very low hazard to both humans and the environment. Again, everyday household chemicals are more hazardous than either silver or cobalt. Cobalt is not seen as having a major impact on the environment or as being a risk to human health. The scores for silver and cobalt are very similar, and both show low health and environmental hazards. So if silver is not hazardous, certainly cobalt is also not hazardous.

The United States National Pollutant Inventory (NPI) categorizes cobalt and cobalt compounds at a hazard score of 27 out of 400. This again shows a low risk to humans and the environment.

Cobalt is used in the medical field to make artificial body parts, such as hips and knee joints, and to fight cancer. It is used in animal feeds and fertilizers. It is used to make automobile parts.

At what percentage does cobalt, nickel, or silver become a hazard? How is this percentage derived? Upon what basis is this percentage determined?

To sum up, all the available research which we have been able to locate since we prepared for RoHS shows that cobalt poses little hazard to the environment or to humans. We are at a loss to understand how and why cobalt appeared on your list. Common sense and solid research would dictate that cobalt does not belong on this list. If you believe cobalt should be on the list, then silver along with numerous other metals certainly should also be included.

This letter is intended to answer the four questions posed by your organization in your February 28, 2008 email.

1. Are there other substances that should be included in the present list of hazardous substances in EEE? **Yes, silver should also be certainly included if cobalt is seen as hazardous.**
2. In which specific components are the listed hazardous substances contained, including their concentration ranges? **Cobalt is found in solid bar and wire solder and solder paste at percentages of less than 0.1%.**
3. Are there risk/exposure assessments available for the listed hazardous substances beyond the EU Risk Assessment Reports? **Yes, as indicated above. They show cobalt to be a very low risk and hazard. Cobalt should not be in this list, just as silver is not on this list.**
4. Information on possible substitutes/alternatives for the listed hazardous substances in EEE? Advantages and disadvantages of substitutes? **Unknown as of this time.**

We would appreciate a response to this letter.

Sincerely,

Howard P. Stevens

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