1st Stakeholder Consultation – Questionnaire for nickel sulphate (CAS 7786-81-4; EC 232-104-9) and nickel sulfamate (CAS 13770-89-3; EC 237-396-1)

Statement of the CMG concerning the planned restriction on Nickel Sulfate and Nickel Sulfamate

Introduction: The CMG (Connectors Manufacturers Group) is a consortium of 5 major manufacturers of connectors: SOURIAU, AMPHENOL, TE CONNECTIVITY, ITT CANNON and RADIALL.

The connectors are components, which will be installed in in EEE. Our markets are mainly Military and Aeronautics.

1 Applications in which nickel sulphate and nickel sulfamate are in use

a. Please provide information concerning products and applications in which the sub-stances are in use.

I. In your answer please specify if the applications specified are relevant to EEE products and applications or not.

ii. Please elaborate if substitution of the substance is already underway in some of these applications, and where relevant elaborate, which chemical or technological alternatives may be relevant for this purpose. For example, please specify possible alternatives to the use of these compounds in nickel plating (substance level substitution) or possible alternatives to nickel plating that would eliminate the need to use these compounds (technological level substitution).

We use Nickel sulphate and Nickel sulfamate in our plating baths, to deposit a metallic Nickel layer on the shells of our connectors or on the corresponding electrical contacts.
The process can be electrolytic plating or electroless plating.
The Nickel layer can be deposited as a finish layer or as an under layer for other plating like gold on electrical contacts.
It permits good corrosion resistance and electrical conductivity which are essential properties for our harsh environment connectors.

The Nickel layer is metallic Nickel. Some Phosphorous or other substances can be intentionally added to the deposit.

But from X-ray analysis, Nickel sulphate and Nickel sulfamate are not present in the metallic Nickel layer. This is also confirmed by plating Engineers.
Consequently we have not studied alternative to these substances in the frame of RoHS, as RoHS concerns only substances which are present in the EEE (at homogeneous material level).

b. Please specify if you are aware, if aside from actual use of the substances, it may be reintroduced in to the material cycle through the use of secondary materials.
i. Please detail in this case what secondary materials may contain impurities of nickel sulphate and nickel sulfamate and at what concentrations as well as in the production of what components/products such materials are used.
ii. If possible please provide detail as to the changing trends of concentrations of nickel sulphate and nickel sulfamate in such secondary materials as well as the
changing trend of use of the respective secondary material in EEE manufacture.

To the best of our knowledge, metallic layers obtain either from electrolytic process, either from electroless process do not contain Nickel sulfate or Nickel sulfamate.
We are not aware of any secondary material which could contain impurities of Nickel sulphate or Nickel sulfamate.

For electroless nickel deposition: the Nickel sulphate is reduced by sodium hypophosphite into metallic Nickel which precipitates and deposits on the surface of the article to be plated. The remaining sulphate dissolves in the plating bath as sulphuric acid.
So at the end there is no remaining Nickel sulfate in the plating layer.
For electrolytic Nickel deposition, Nickel ions from the electrolytic solution are reduced and Nickel metal is deposited on the cathode. Sulphate or sulfamate (depending on the process) stays in the electrolytic solution and are dissolved as sulfuric or amido sulfuric acid.
At the end there is no remaining Nickel sulfate or Nickel sulfamate in the plating layer. Only Nickel metal is there.

c. Please specify in which applications nickel sulphate and nickel sulfamate are used as a material constituent, as an additive or as an intermediate and what concentration of nickel sulphate and nickel sulfamate remains in the final product in each of these cases (on the homogenous material level).

Nickel sulfate and Nickel sulfamate are used as intermediate. They do not remain on the plating layer on the EEE.

d. If nickel sulphate and nickel sulfamate are considered to be intermediates, please explain the reaction processes and which substances remain in the final product/material?

Please see explanations above point 1b.

2. Quantities and ranges in which nickel sulphate and nickel sulfamate are in use a. Please detail in what applications your company/sector applies nickel sulphate and nickel sulfamate and give detail as to the annual amounts of use (please specify which data is relevant for which compound). If an exact volume cannot be specified, please provide a range of use (for example - 50-100 tonnes per annum).

For the 5 concerned CMG entities: < 10 tons a year

b. Please provide information as to the ranges of quantities in which you estimate that the substance is applied in general and in the EEE sector.

We are manufacturers of components. We have no idea of the quantities which are used globally in the EEE sector.

c. If substitution has begun or is expected to begin shortly, please estimate how the trend of use is expected to change over the coming years.

As explained above we are not working on substitution research in the frame of RoHS as these substances are not present in the plating of the EEE.

3. Potential emissions in the waste stream

a. Please provide information on how EEE applications containing nickel sulphate and nickel sulfamate are managed in the waste phase (with which waste is such EEE collected and what treatment routes are applied)? For example, how are nickel plated components managed in the waste phase?

As explained, for our case of Nickel plating, these substances are not in the EEE. In some other applications Nickel sulfate and Nickel sulfamate could be present in the EEE but we cannot state how it is managed.

b. Please detail potentials for emissions in the relevant treatment processes.

Our plating shops are in conformance regarding regulations on operators and environment (emissions, waste water). We are all under French legal supervision (DREAL…), and conform to the requirements (VLEP, rejections …).

4. Substitution

a. For which applications is substitution underway?

i. Please provide information in relation to specific applications on the substance level (for example substitutes for the nickel compounds in the nickel plating process) as well as for alternatives on the technological level (for example alternatives to the nickel plating process).

ii. For which applications is substitution scientifically or technically not practicable or reliable and why.

iii. Do certain constraints exist (provide details on costs, reliability, availability, roadmap for substitution, etc.) for the application of substitutes?

iv. Please specify in this respect which alternatives are available on the substance level (substitution) and which are understood to be available on the technological level (elimination).

We manufacture connectors for harsh environment, mainly for military and aeronautics markets.
Our main constraint is that Nickel plating is imposed by the different European and American standards (MIL-DTL-389999, EN 3645….,) related to our connectors.
An alternative to Nickel plating would mean to change these standards and qualify new classes of connectors, at a worldwide scale. No study has been made in this way. It would imply a global agreement and action plan which is not discussed at the moment.

In the same way, an alternative to Nickel sulphate/sulfamate would mean qualification of new processes, which is not discussed considering that these substances are not present in the final plating layer of the EEE.

5. Socio economic impact of a possible restriction
Please provide information as to the socio-economic impacts of a scenario in which nickel sulphate and sulfamate restricted under RoHS. Please specify your answers in relation to specific applications in which the substances are used and/or in relation to the phase-in of specific alternatives in related application areas. Please refer in your answer to possible costs and benefits of various sectors, users, the environment, etc. where possible; please support statements with quantified estimations.

As EEE does not contains Nickel sulphate and sulfamate, no socio-economic impact is expected.

Please note that restrictions on Nickel sulphate and sulfamate use in process would impact over 80% of our products range (Nickel plated connectors, all circular connectors and contacts). These would also impact the supply chains of all the aeronautics and defence sectors.

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