

Standard application format for RoHS exemption requests on the basis of Article 5(8) Directive 2011/65/EU

Final

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Exemption Request Form

Date of submission: January 15, 2015

1. Name and contact details

1) Name and contact details of applicant:

Company: Sensata Technologies Tel.: +31 546 879 564
Name: Albert van der Kuij E-Mail: a-vdkuij@sensata.com
Function: Business Development & Standards Engineer Address: Kolthofsingel 8, 7602 EM Almelo

2) Name and contact details of responsible person for this application (if different from above):

Company: _____ Tel.: _____
Name: _____ E-Mail: _____
Function: _____ Address: _____

2. Reason for application:

Please indicate where relevant:

- Request for new exemption in:
- Request for amendment of existing exemption in
- Request for extension of existing exemption in:
- Request for deletion of existing exemption in:
- Provision of information referring to an existing specific exemption in:
 - Annex III
 - Annex IV

No. of exemption in Annex III or IV where applicable: 8(b)

Proposed or existing wording:

Cadmium and its compounds electrical contacts for temperature sensing controls, thermal motor protectors and motor starter relays applied in various end applications

Duration where applicable: _____

Other: _____

3. Summary of the exemption request / revocation request

Sensata Technologies has been aggressively eliminating the use of Cadmium Oxide in contact systems since 2000 to remain fully committed to the intend of the RoHS directive. Where suitable alternatives have been found to provide comparable cycle reliability and product performance, the contact system is converted to a Cadmium-free alternative. All Sensata's new product development is being conducted without the use of Cadmium Oxide contacts. Significant progress has been made finding Cd free alternatives. However, Sensata Technologies supports a continuation to Annex III exemption number 8(b) "Cadmium and its compounds in electrical contacts." In alignment with RoHS Directive Article 5(1)(a), the exemption remains necessary for Sensata products which are applied as temperature sensing controls and motor starter relays. Our testing with substitute materials and design changes has shown that elimination of Cd in contacts in these applications results in a reduction in cycle life, thermal stability, and product performance. This could lead to safety issues for consumers employing EEE's which rely on Sensata's safety related products. Therefore it is Sensata's position that exemption number 8(b) needs to be extended for an additional period with respect to temperature sensing controls and motor starter relays.

See for detailed information:

Attached word document/report : „STAKEHOLDER CONSULTATION ON ADAPTION TO SCIENTIFIC AND TECHNICAL PROGRESS UNDER DIRECTIVE 2011/65/EU ON THE RESTRICTIONS OF THE USE OF CERTAIN HAZERDOUS SUBSTANCES IN ELECTRICAL AND ELECTRONIC EQUIPMENT FOR THE PURPOSE OF A POSSIBLE AMENDMENT OF ANNEX EXEMPTION 8(b) (CADMIUM AND ITS COMPOUNDS IN ELECTRICAL CONTACTS)“ dated December 17, 2014.

4. Technical description of the exemption request / revocation request

(A) Description of the concerned application:

1. To which EEE is the exemption request/information relevant?

Name of applications or products: electrical contacts in temperature sensing controls, thermal motor protectors and motor starter relays applied in various end applications

a. List of relevant categories: (mark more than one where applicable)

- | | |
|---------------------------------------|--|
| <input checked="" type="checkbox"/> 1 | <input checked="" type="checkbox"/> 7 |
| <input checked="" type="checkbox"/> 2 | <input checked="" type="checkbox"/> 8 |
| <input checked="" type="checkbox"/> 3 | <input checked="" type="checkbox"/> 9 |
| <input checked="" type="checkbox"/> 4 | <input checked="" type="checkbox"/> 10 |
| <input checked="" type="checkbox"/> 5 | <input checked="" type="checkbox"/> 11 |
| <input checked="" type="checkbox"/> 6 | |

b. Please specify if application is in use in other categories to which the exemption request does not refer: NA

c. Please specify for equipment of category 8 and 9:

The requested exemption will be applied in

- monitoring and control instruments in industry
- in-vitro diagnostics
- other medical devices or other monitoring and control instruments than those in industry

2. Which of the six substances is in use in the application/product?

(Indicate more than one where applicable)

Pb

Cd

Hg

Cr-VI

PBB

PBDE

Function of the substance: The technical function of cadmium in these protectors is to spread the arc energy that is created when the contacts open (or bounce upon closure). Given the high temperatures generated under these arc conditions, the cadmium oxide helps to minimize heat concentrations, minimize contact surface erosion, and prevent contact sticking. It is the Cadmium Oxide additive which prevents the contacts from welding to each other, as well as minimizes any arc damage to allow a significant number of open/close cycles. More details see attached word document/report.

3. Content of substance in homogeneous material (%weight):

10-15% w/w of the contact face layer. More details see attached word document/report.

4. Amount of substance entering the EU market annually through application for which the exemption is requested:

The amount of Cadmium Oxide used per contact varies by product and application requirements. The precious metal face layer of the contact (typically between 10 and 25% of the total contact thickness) contains a homogeneous mixture of Silver and Cadmium Oxide in which Cadmium Oxide occupies either 10% or 15% by weight. The amount of Cadmium Oxide used in each control range from 1 to 220 milligrams per device. The total amount of Cadmium Oxide used in Sensata Technologies' devices shipped globally in 2013 is in the range of 920 Kg (planned to be brought down to 350kg in 2016). Based on uncertainty of where our end customer's products end up in terms of global distribution, we can not predict the number of devices or the amount of Cadmium which is put into the EU market annually. More details see attached word document/report.

Please supply information and calculations to support stated figure.

5. Name of material/component: Cadmium and its compounds

6. Environmental Assessment:

LCA: Yes

No

(B) In which material and/or component is the RoHS-regulated substance used, for which you request the exemption or its revocation? What is the function of this material or component?

Cadmium and its compounds in electrical contacts

(C) What are the particular characteristics and functions of the RoHS-regulated substance that require its use in this material or component?

Details see attaced word document/report

5. Information on Possible preparation for reuse or recycling of waste from EEE and on provisions for appropriate treatment of waste

1) Please indicate if a closed loop system exist for EEE waste of application exists and provide information of its characteristics (method of collection to ensure closed loop, method of treatment, etc.)

NA

2) Please indicate where relevant:

Article is collected and sent without dismantling for recycling

Article is collected and completely refurbished for reuse

Article is collected and dismantled:

The following parts are refurbished for use as spare parts: _____

The following parts are subsequently recycled: _____

Article cannot be recycled and is therefore:

Sent for energy return

Landfilled

3) Please provide information concerning the amount (weight) of RoHS substance present in EEE waste accumulates per annum:

In articles which are refurbished _____

In articles which are recycled _____

In articles which are sent for energy return _____

In articles which are landfilled Globally 920kg (2013) to be brought down to 350 kg during 2016

6. Analysis of possible alternative substances

- (A) Please provide information if possible alternative applications or alternatives for use of RoHS substances in application exist. Please elaborate analysis on a life-cycle basis, including where available information about independent research, peer-review studies development activities undertaken

Fine silver, silver nickel alloys or AgSnO₂, but as demonstrated in figures 3, 4, 5 and 6 of attached word document, product life cycling is reduced significantly including operating temperature drift. This is also backed up by the identified references. See for detailed information attached word document/report.

- (B) Please provide information and data to establish reliability of possible substitutes of application and of RoHS materials in application

See for information attached word document/report.

7. Proposed actions to develop possible substitutes

- (A) Please provide information if actions have been taken to develop further possible alternatives for the application or alternatives for RoHS substances in the application.

Conversion with customers is planned to reduce the global use of cadmium oxide from 920kg (2013) to 350kg in 2016.

Please elaborate what stages are necessary for establishment of possible substitute and respective timeframe needed for completion of such stages.

For the eleven products where Cadmium-free contacts have not been found to perform adequately, we will continue to examine:

1) Additional potential material sources of supply.

2) Additional material alloys and additives.

3) Contact mating with dissimilar alloys.

4) Alternate contact attachment processes where feasible.

5) Product design modifications where feasible.

6) Alternate device series which will require customer re-application and agency re-certification.

8. Justification according to Article 5(1)(a):

- (A) Links to REACH: (substance + substitute)

- 1) Do any of the following provisions apply to the application described under (A) and (C)?

Authorisation CAS1306-19-0 (CdO) (CAS7440-43-9 Cd)

SVHC

Candidate list

Proposal inclusion Annex XIV

Annex XIV

Restriction

Annex XVII

Registry of intrusions

Registration

2) Provide REACH-relevant information received through the supply chain.

Name of document: Not needed w/i limits

(B) Elimination/substitution:

1. Can the substance named under 4(A)2 be eliminated?

Yes. Consequences? _____

No. Justification: As indicated earlier: the technical function of cadmium in these protectors is to spread the arc energy that is created when the contacts open (or bounce upon closure). Given the high temperatures generated under these arc conditions, the cadmium oxide helps to minimize heat concentrations, minimize contact surface erosion, and prevent contact sticking. It is the Cadmium Oxide additive which prevents the contacts from welding to each other, as well as minimizes any arc damage to allow a significant number of open/close cycles.

2. Can the substance named under 4(A)2 be substituted?

Yes.

Design changes:

Other materials:

Other substance:

No.

Justification: Partially, additional time is needed to replace Cadmium Oxide in the market with viable alternatives to comply with safety standards see for additional information attached word document/report

3. Give details on the reliability of substitutes (technical data + information): see report

4. Describe environmental assessment of substance from 4(A)2 and possible substitutes with regard to

1) Environmental impacts: _____

2) Health impacts: Information found at the ECHA website: Carcinogenic (Article 57a); Equivalent level of concern having probable serious effects to human health (Article 57 f)

3) Consumer safety impacts: See information in word document/report

⇒ Do impacts of substitution outweigh benefits thereof?

Please provide third-party verified assessment on this: _____

(C) Availability of substitutes:

- a) Describe supply sources for substitutes: Silver Nickel and Silver Tin Oxide under continuous evaluation.
- b) Have you encountered problems with the availability? Describe: Only a few suppliers are capable of producing Cd free contacts with the multilayer contact structure as required by our products
- c) Do you consider the price of the substitute to be a problem for the availability?
 Yes No
- d) What conditions need to be fulfilled to ensure the availability?
Successful testing, Customer approval and complete release versus the required standards.

(D) Socio-economic impact of substitution:

- ⇒ What kind of economic effects do you consider related to substitution?
- Increase in direct production costs
 - Increase in fixed costs
 - Increase in overhead
 - Possible social impacts within the EU
 - Possible social impacts external to the EU
 - Other: _____
- ⇒ Provide sufficient evidence (third-party verified) to support your statement: -

9. Other relevant information

Please provide additional relevant information to further establish the necessity of your request:

See for detailed information, the attached word document: „STAKEHOLDER CONSULTATION ON ADAPTION TO SCIENTIFIC AND TECHNICAL PROGRESS UNDER DIRECTIVE 2011/65/EU ON THE RESTRICTIONS OF THE USE OF CERTAIN HAZERDOUS SUBSTANCES IN ELECTRICAL AND ELECTRONIC EQUIPMENT FOR THE PURPOSE OF A POSSIBLE AMENDMENT OF ANNEX EXEMPTION 8(b) (CADMIUM AND ITS COMPOUNDS IN ELECTRICAL CONTACTS)“ dated December 17, 2014.

10. Information that should be regarded as proprietary

Please state clearly whether any of the above information should be regarded to as proprietary information. If so, please provide verifiable justification:

No
