

Exemption Request Form

Date of Submission: January, 19-2015

1. Name and contact details

1) Name and contact details of applicant:

Company: Bourns Inc.

Name: Cathy Godfrey

Function: Corporate EHS Manager

Telephone: 951-781-5008

email: cathy.godfrey@bourns.com

Address: 1200 Columbia Ave., Riverside, CA USA

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

Same as above

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:

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: 6c

Proposed or existing wording:

N/A

Duration where applicable:

standard extension at minimum

Other:

3. Summary of the exemption request / revocation request

Bourns, Inc. respectively requests to extend the current exemption 6c, copper alloy containing up to 4% lead by weight. Free-cutting brass (C36000) is a standard alloy of copper and zinc containing about 3% lead. Lead is added to the brass to enhance machinability. Due to the lead content, 360 brass is the easiest material to machine and is the global standard by which the machinability of other alloys is compared. It is known for its strength and resistance to corrosion with properties closely resembling steel. It can be precision machined easily. Brass is a strong material that maintains its strength even under harsh conditions. Brass forms a tin protective patina (unlike steel and iron) that will not rust when exposed to atmospheric conditions. Free-cutting brass is an old and thoroughly understood alloy. 360 Brass' applications include screw machine parts, couplings, bushings, connectors, electronic components, valve components, pump shafts, plumbing to name a few.

Bourns, an electronic component manufacturer, uses 360 brass for adjustment shaft screw fabrication and bushings. Screw machines are very precise. The diameters of the 360 brass rod available allow for minimal material removal. Brass turnings are 100% recyclable. If an alternate material was used, more material would be machines increasing time and waste. Without lead in the brass, the screw machines run one-quarter to one-half the standard speed. Tool changes are made 2-3 times as often due to wear. Other uses for some Magnetics products require non-magnetic material. Use of pure copper material is too soft.

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: Listed are electronic components used as subcomponents in various categories of EEE. Components including brass shafts/bushings/other brass applications include Counting Dials, Precision Potentiometers, Encoders, Panel Controls, Radial High Q Inductors, Rotary Sensors, and Trimming Potentiometers. These electronic components are typically used on circuit boards and other internal electronics of the various categories used by our customers.

- a. List of relevant categories: possibly 1-11 depending on EEE manufacturer using electronic components as part of their assembly.
- b. Please specify if application is in use in other categories to which the exemption request does not refer: N/A
- c. Please specify for equipment of category 8 and 9.

Our company does not manufacture equipment; our components may be used by manufacturers of categories 8 and 9.

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

Pb Cd Hg Cr-VI PBB PBDE

3. Function of the substance: Pb in 360 brass for machinability

4. Content of substance in homogeneous material (% weight): ≤4%

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

Name of material/component: 360 Brass included in:

Passive electronic components Counting Dials, Precision Potentiometers, Encoders, Panel Controls, Radial High Q Inductors, Rotary Sensors, and Trimming Potentiometers.

Since a majority of Bourns components are sold by distribution, it is not known exactly the amount of components including 360 Brass entering the EU per total components sold.

6. Environmental Assessment:

LCA: Yes for copper industry

There are examples of LCA for the copper industry available on the Internet. Both are overviews of the impacts of copper mining to refining.

Kennecott Utah Copper

http://www.kennecott.com/sites/kennecott.com/files/files/Copper_Environmental_Profile-2006.pdf

KME Germany AG & Co. KG

<http://www.kme.com/assets/uploads/files/datasheet/tecu/epd-kme-2010312-e-sv.pdf>

Stainless steel LCA information for comparison:

http://worldstainless.org/health_and_environment/life_cycle_inventory_and_analysis

(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?

Various electronic components use parts including brass shafts and bushings. 360 Brass which includes up to 4% lead is the copper alloy of choice due to its machinability. For screw machines, 360 Brass is offered in pertinent rod sizes to minimize waste and optimize time.

Examples of Bourns models utilizing 360 Brass include Counting Dials, Precision Potentiometers, Encoders, Panel Controls, Radial High Q Inductors, Rotary Sensors, and Trimming Potentiometers.

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

Free-cutting brass (C36000) is a standard alloy of copper and zinc containing about 3% lead. Lead is added to the brass to enhance machinability. Due to the lead content, 360 brass is the easiest material to machine and is the global standard by which the machinability of other alloys is compared. It is known for its strength and resistance to corrosion with properties closely resembling steel. It can be precision machined easily. Brass is a strong material that maintains its strength even under harsh conditions. Brass forms a tin protective patina (unlike steel and iron) that will not rust when exposed to atmospheric conditions. Free-cutting brass is an old and thoroughly understood alloy.

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.)

Electronic components alone are not typically listed as EEE. These components are a subassembly part used to build the inner electronics workings of specific EEE. Electronic components at end of life are typically classified as electronic waste. In the US, the EPA classifies electronic waste as universal waste and requires specific handling. It is unknown the methods of handling/treatment globally.

- 2) Please indicate where relevant: All answers may be applicable for various EEE manufacturers.

● Article is collected and sent without dismantling for recycling (example: electronic waste) or

● Article is collected and completely refurbished for reuse (components as a part of the EEE article), or

● Article is collected and dismantled (components as a part of the EEE article), or:

○ The following parts are refurbished for use as spare parts: ____

○ The following parts are subsequently recycled: ____

● Article cannot be recycled and is therefore (components as a part of an EEE article that is not recyclable)

○ 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 unknown
- In articles which are recycled unknown
- In articles which are send for energy return unknown
- In articles which are landfilled unknown

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:

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

(A)+(B) discussion: Lead is added to the C360 Brass to enhance machinability. Due to the lead content, 360 brass is the easiest material to machine and is the global standard by which the machinability of other alloys is compared. It is known for its strength and resistance to corrosion with properties closely resembling steel. It can be precision machined easily. Brass is a strong material that maintains its strength even under harsh conditions. Brass forms a tin protective patina (unlike steel and iron) that will not rust when exposed to atmospheric conditions. Free-cutting brass is an old and thoroughly understood alloy. 360 Brass' applications include screw machine parts, couplings, bushings, connectors, electronic components, valve components, pump shafts, plumbing to name a few.

Bourns uses 360 brass for adjustment shaft screw fabrication and some bushings. Screw machines are very precise. The diameters of the 360 brass rod available allow for minimal material removal. Brass turnings are 100% recyclable. If an alternate material was used, more material would be machines increasing time and waste. Without lead in the brass, the screw machines run one-quarter to one-half the standard speed. Tool changes are made 2-3 times as often due to wear. Other uses for some Magnetics products require non-magnetic material. Use of pure copper material is too soft.

Reviewing the LCA literature found for two copper companies, it does not appear changing from one type of copper to another would change anything in the LCA. The same process from mining to refining would occur. Copper scrap and turnings can be 100% recycled. For comparison, LCA information from the stainless steel industry was reviewed. It is very similar due to the mining to

refining process. The LCAs did provide information on their individual processes and typical LCA data. The steel industry also uses scrap material back into the process.

From a downstream user point of view, both copper and stainless steel are similar in the life cycle assessment. For our operation, the 360 Brass allows more efficient use of time due to the machinability, less scrap due to the rod sizes available for the screw machines, recyclability of scrap/turnings. The alternative using stainless steel is more expensive, has a slower machining rate which reduces production capacity and shortens tool life.

Comparing Brass Versus Stainless Steel Threaded Inserts, Machine Design
<http://machinedesign.com/materials/comparing-brass-versus-stainless-steel-threaded-inserts>

Free-Cutting Brass (Alloy 360) for Automatic Screw Machine Products, Copper Development Association, Inc.
<http://www.copper.org/applications/rodbar/alloy360/alloy360.html>

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 the application or alternatives for RoHS substances in application.

The only alternative is stainless steel which is inferior to the 360 Brass. Stainless steel has a higher cost of machining. Machinability ratings indicate that stainless steel is 40-50% as efficient as brass. Stainless steel is a poor conductor of heat compared to brass. This results in elevated temperatures during machining operations reducing the life of tooling. Rod sizes for screw machines are readily available in 360 brass; not available in stainless without more scrap/waste.

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

At this time, there is no suitable substitute for 360 Brass without reduced production and increased tooling costs. 360 Brass is the standard alloy for automatic screw machine products.

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)?
N/A

Authorisation

- 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:

(B) Elimination/substitution:

1. Can the substance named under 8(A)1 be eliminated: N/A

Yes. Consequences? _____

No. Justification: _____

2. Can the substance named under 8(A)1 be substituted?

Yes.

Design changes:

Other materials:

Other substance:

No:

Justification: _____

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

4. Describe environmental assessment of substance from 8(A)1 and possible substitutes with regard to:

1) Environmental impacts: _____

2) Health impacts: _____

3) Consumer safety impacts: _____

→ Do impacts of substitution outweigh benefits thereof?

Please provide third-party verified assessment on this: _____

(C) Availability of substitutes: N/A

a) Describe supply sources for substitutes:

b) Have you encountered problems with the availability? Describe: _____

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? _____

(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: no third party information. Direct production costs based on change from brass to stainless steel discussed in 7 A&B.

9. Other relevant information

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

We believe this exemption should not be eliminated. 360 Brass (copper alloy with $\leq 4\%$ Pb) is the standard alloy used for automatic screw machine products. There is no cost effective substitute.

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: N/A