Exemption Request Form – Exemptions #6(a) & #6(a)-I

Date of submission:

1. Name and contact details

1) Name and contact details of applicant:

Machining steels:

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Batch Galvanized steels:

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On behalf of the Company/Business organisations/Business associations listed below participants in the **RoHS Umbrella Industry Project ("the Umbrella Project")**:

We will be inserting in this table endorsing Associations: (i) names, (ii) EU Transparency Register IDs (where applicable) and (iii) Logos.			

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: #6(a) & #6(a)-I

Proposed or existing wording: *Lead as an alloying element in steel for machining purposes containing up to 0,35 % lead by weight and in batch hot dip galvanised steel components containing up to 0,2 % lead by weight.*

Duration where applicable: We apply for renewal of these exemptions for the categories marked in section 4 further below for the respective maximum validity periods foreseen in the RoHS2 Directive, as amended. For these categories, the validity of these exemptions may be required beyond those timeframes. With regard to Category 11, we would like to kindly request that this application is not processed earlier than the applicable latest application date envisaged in RoHS2, as amended (i.e. 18 months before the respective maximum validity periods foreseen in RoHS2).

☐ Other: _____

3. Summary of the exemption request / revocation request

Steel containing lead for machining purposes

As of today, no alternatives have been identified that can effectively replace lead as a machinability enhancer in steel in all respects. Lead-free alternatives may show acceptable results in single machinability tests, but the overall performance of the lead-free steels is worse than that of leaded steel. The lack of hot workability of the lead-free alternatives is also an important obstacle towards the substitution.

If a variety of machining operations is required or if deep drilling of material is required, lead is still considered, by far, the best machinability enhancer for industrial production. Customer demand (in the EEE sector) supports the view that leaded steels are required rather than the alternatives which are currently offered by European steel manufacturers.

Batch galvanized steel

The batch hot dip galvanizing process allows the complete coverage of manufactured steel components with a metallurgically-bonded metallic coating that is formed through diffusion of iron and zinc (giving no clear delineation between coating and steel substrate). Lead performs no function in the process or the performance of the coating. Lead has had some influence on the process used to apply the coating but this has largely been addressed by advances in process technology, hardware and other techniques. However, more importantly, the batch galvanizing industry is a significant user of recycled zinc ingots that originate from sources that contain lead at levels that would result in exceeding the 0,1% Pb threshold if applied to the coating according to the RoHS Directive. The existing exemption for up to 0,2 % Pb in the steels that have been hot dip galvanized was lowered from 0,35 % Pb with effect July 2019, following careful examination of Pb levels in recycled zinc. There have been no significant changes to prevailing lead levels in recycled zinc or major technical advances in processing techniques since this reduction in the exemption threshold. The existing exemption therefore remains necessary. The exemption is therefore requested primarily to ensure continued use of recycled zinc in many processing facilities and, secondarily, to satisfy technical functions that cannot be replaced in some processing facilities and product types.

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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:

   Machining steels are used in a diverse range of final applications within electrical and electronic equipment, including finished products, fixed installations etc.

   Batch galvanized steel is used in a variety of small components (e.g. brackets/fixings) and fasteners used in electrical equipment within the scope of WEEE.

   An exhaustive list of applications is not feasible. Batch galvanized items may include ancillary items such as fasteners and support brackets/fixings for a range of EEE items such as lighting units that require high levels of durability in outdoor or aggressive environments. Specific components include transformer housings and heat exchangers (although some of these items may be outside the current scope of the EEE directive). It must be emphasized that the term 'small' is a relative one and is used in the renewal request in the context of the range of items that are batch galvanized – a range that includes large structural steelwork of up to 25m length. Components that are termed 'small' in this request may not be 'small' in the wider context of EEE components.

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

☒ 1	☒ 7
☒ 2	☒8
☒ 3	☒9
☒ 4	☒ 10
☒ 5	☒ 11*
☒ 6	

We apply for renewal of the Exemptions 6(a) & 6(a)-I for the categories marked above in section 4A for the respective maximum validity periods foreseen in the RoHS2 Directive, as amended. For these categories, the validity of this exemption may be required beyond those timeframes. With regard to Category 11, we would like to kindly request that this application is not processed earlier than the applicable latest application date envisaged in RoHS2, as amended (i.e. 18 months before the respective maximum validity periods foreseen in RoHS2).

b. Please specify if application is in use in other categories to which the exemption request does not refer: With regard to Category 11, we would like to kindly request that this application is not processed earlier than the applicable latest application date envisaged in RoHS2, as amended (i.e. 18 months before the respective maximum validity periods foreseen in RoHS2).

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

3. Function of the substance:

Machining steels – Lead improves machinability in machining processes allowing deep drilling and/or high-speed operations. The lead provides a great hot workability as well, which is essential for the production of free cutting steels.

Batch galvanized steel – Lead is primarily present as an inadvertent impurity in recycled zinc used in the process.

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

Machining steels – Up to 0,35%

Batch galvanized steel – Pb levels range from <0,03% up to 0,8%Pb in the coating if this is considered the ‘homogeneous material’. Steel items that have been batch hot dip galvanized would therefore be below the exemption limit of 0,2 % Pb.

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

   Machining steels – in 2013 the import of steel products for machining purposes amounted to approximately 73,000 tons. Assuming that the lead content in steel for machining purposes is between 0,2 and 0,35%, this means that the lead annually entering in the EU market through the import of free cutting steels can vary between 146 to 255 tons[1]. However, note that these figures do not correspond solely to steel intended for EEE (which was not possible to estimate) and that also contains the volumes of steel intended for automotive.

   Batch galvanized steel – the amount of Pb metal used intentionally for applications in the scope of WEEE/ROHS is estimated to be less than 1 tonne p.a. The amount of Pb circulating within the recycling loop is difficult to establish, but this volume is not 'entering the EU market' for EEE products (it is already in the wider market).

6. Name of material/component: Steel

7. Environmental Assessment:

   Machining steels:

   The addition of lead into low carbon free cutting steels enhances machinability and can increase the production rate of a component by up to 40% depending upon part and machining process design, and a potential reduction in energy usage of approximately 27% when machining parts using the leaded steel are compared to the non-leaded steel. It is also important to consider the wider environmental implications of material choice. The lower energy consumption of machining leaded steels means that there is a potential benefit of reduced electricity consumption and CO_2 emissions in fabrication. However, to assess the full environmental benefit, a more detailed environmental assessment is required, which covers the full life cycle of the product.

   LCA: ☒ Yes. Please, refer to Annex I for additional information.
   ☐ No

   Galvanized steels: Please, go to section 6 for further information.

   LCA: ☒ Yes
   ☐ No

[1] Source: EUROFER statistics (considering the CN codes related to the free cutting steel semifinhed products)

(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?

Lead is used in a number of steel alloys.

The exemption is for the specific application where individual components require machining as part of their production route. As indicated previously, machining steels are used in a diverse range of final applications within the electrical and electronic equipment, also in finished products and in fixed installations. Further explanation on the function is provided in the following answers.

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

<u>Machining steels:</u> Fundamentally, lead is added to enable improved machinability. The specific function of lead in steel is to provide a lubricant effect from the material itself when that material is being machined into a component. Through this lubricant effect, the steel becomes more machinable.

Machinability can be considered as meaning any of the following: a reduced cutting force when machining steel, appropriate chip formation (length and force), facilitation of a smooth surface finish, facilitation of a good dimensional achievement under commercial production conditions or reduced “tool wear” during the machining operation.

Machining encompasses a number of production operations, including: turning, grinding, rough forming, fine forming, drilling and parting.

<u>Batch Galvanized Steel:</u> Lead has a low solubility in the zinc-iron alloys that are formed during the galvanizing reaction. Hence, the quantity of lead present in the coating is normally significantly lower than the lead present in the process bath – typically half as much. For a given bath composition, the variations of lead concentrations in the coating mainly depend on the steel type (reactivity with molten zinc).

Generally galvanized steel items are used in applications such as fasteners, brackets, lighting supports and many others. Advantages of batch galvanized components include:

- Highly durable corrosion protection,
- Resistance to mechanical damage,
- Increased durability allowing lighter steel sections,
- Recyclable within existing steel recycling circuit.

Lead is present in the zinc coating of galvanised steels. Lead has no beneficial (or adverse) effect on the coated product, but may have a technical influence on the galvanizing process in a small number of plants:

- Fluidity – optimal drainage reduces excess zinc on the product (i.e. better resource efficiency)
- Avoidance of “floating dross” during galvanizing of complex geometries which may lead to adverse surface finishes.

The importance of each of these factors varies according to the nature of the component to be coated, the technical features of the plant (often related to the age of the plant) and the type of work that is required of the plant (range of work). It must be emphasized that the intentional addition of lead to the galvanizing bath for the purposes described above is rapidly declining due to technical innovation. The primary justification for the exemption is the inadvertent presence of Pb as an impurity in recycled zinc.

Recycled zinc may be from two main sources:

• Recovery and remelting of scrap zinc sheets from roofing/gutter applications. Many of these scrap arisings are from roofs of cities such as Paris that have been installed >100 years ago. These roofing sheets/gutters were historically joined with lead-based solders. These solders are impossible to separate from the scrap zinc sheets and enter the recycling circuits – giving rise to lead levels in recycled zinc of 0.3-1.0%

• Recovery and remelting of metallic zinc that is entrained in zinc ash generated during the galvanizing process (through surface oxidation). These residues are fully recyclable and the metallic zinc part is separated and returned to the galvanizing bath. In a particular region, the lead content of the recycled zinc from this route will reflect the lead content of the galvanizing bath(s) that supply residues to a specific recycler. Note that those prevailing levels may be influenced by both intentional use and use of recycled zinc. Levels are therefore variable and can be in the range 0.5 – 1.0%.

In some cases, recycled zinc may be produced from a mix of the above routes. Note that there is not a direct correlation between the lead content of the process bath and the lead content of the galvanized steel component. Typically, the lead content of the coating is lower than the content of the bath from which it is produced.

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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.)**

The steel industry has in place the appropriate practice and processes to ensure that metals like lead are recovered and made available for recycling and re-use.

Both steel production routes (blast furnaces and electric arc furnaces) recycle the scrap coming from machining of cutting steel and process it into new steel. In practical terms, the lead enters into the process as a component of the scrap. (it does not matter whether it is charged into a converter or into an electric arc furnace). Because of its low melting and vaporisation temperatures (327 ºC and its boiling point is 1749ºC respectively), lead is one of the first elements to melt. Once vaporised, it is sent to the dedusting system, which is commonly used in the steel industry for the treatments of the OFF gases. The recovery ratio of lead in the dust is about 90%, and the remaining 10 % stays in the liquid steel.

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:** No data available

☐ In articles which are refurbished _____
☐ In articles which are recycled _____
☐ In articles which are sent for energy return _____
☐ In articles which are landfilled _____

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, per-review studies development activities undertaken

Machining steels:

The European steel industry collaborated in the past in the project *technically and commercially viable alternatives to lead as machinability enhancers in steels used for automotive components manufacture (REF7210-PR/306)*[2] funded by the European Coal and Steel Research (ECSC) with the objective of assessing the potential alternatives to lead for low carbon free cutting steels and carbon/alloy grades. The results of this project were presented in the frame of the ELV Directive review of exemptions back in 2008. It needs to be noted though that the effects of lead in steel apply irrespective of the steel final use. Thus, the conclusions of the project are also applicable to RoHS related applications as the basic requirements for machinability are the same as for the automotive applications. Moreover, these results were included in the Öko-Institut final report on the Adaptation to scientific and technical progress of Annex II to Directive 2000/53/EC (ELV) and of the Annex to Directive 2002/95/EC (RoHS) published in 2010.

As indicated in the Öko-Institut final report, the machinability tests performed included measurement of tool life, tool wear, surface finish, chip form, tool force and tool temperature. The steel grades selected for these tests were free-cutting steels (11SMn30), steels for hardening and tempering (C45) and case hardening steels (16MnCr5) with the following machinability enhancing additions: lead, bismuth (which is often considered as a potential alternative to lead due to its proximity in the periodic table and its lower health and environmental impacts), increased sulphur (with and without tellurium), tin (with low and high copper), phosphorus and calcium.

[2] http://cordis.europa.eu/project/rcn/66565_en.html

Table 1 Comparison of bismuth and lead metal environmental and health impacts[3]

Impact	Units	Lead	Bismuth	Bismuth / lead ratio
Fresh water eutrophication	kgP-eq/kg	0.0022	0.022	10.00
Cumulative energy demand	MJ eq/kg	18.9	697	36.88
Terrestrial acidification	kg SO2 eq/kg	0.028	0.38	13.57
Global Warming Potential	kg CO2-eq/kg	1.3	58.9	45.31

The relative environmental impact of bismuth (proposed a substitute) and lead, based on life cycle assessment, are given in Table 1.

Moreover bismuth, it is a ‘critical raw material’ as defined by from the European Commission (2017) and is in limited supply. The current production of bismuth is directly linked to the production of lead, as a byproduct. Therefore, if the usage of lead were to decline in the future, production rates of bismuth would be proportionately impacted. More than 80% of bismuth is mined and produced in China.

The general conclusion of these tests is that leaded steels showed the best performance in tests at lower cutting speeds, with high speed steel tools and in deep hole drilling. Non-leaded alternative grades generally gave poorer chip form and surface finish. It was shown that of all the alternatives, bismuth is best able to substitute lead under certain conditions, the hot workability of bismuth steels is reduced compared to leaded steels. Hot workability is a fundamental requirement for steel production. This parameter is of significance when the steel is being rolled to the required size for a customer from a piece with a larger (as-cast) cross sectional area. The reduced hot-workability of bismuth steels effectively means that it is not possible for a steel roller to produce a bar with the same machining properties and surface integrity if the steel obtains its machining properties from bismuth rather than lead.

In accordance with the study, industry emphasized the importance of the 10% reduction in hot workability compared to low-carbon free-cutting steel. Free-cutting steels are already close to the limit of what can be conventionally rolled, making the rolling of bismuthed steel nearly impossible. This means that the

[3] *Nuss P, Eckelman MJ (2014) Life Cycle Assessment of Metals: A Scientific Synthesis. PLoS ONE 9(7): e101298. doi:10.1371/journal.pone.0101298*

bismuthed steel requires more energy to be rolled in order to increase its ductility. However, this can create ruptures in the steel surface which cannot be rectified and can be difficult to detect, causing problems with material integrity and performance if these ruptures are not detected.

It is therefore expected that the energy cost associated with bismuth would be higher as well as potentially higher error rates (i.e. increased waste).

Although the machining properties of bismuth-treated steels approach those of lead-treated steels for certain machining operations, in the majority of machining operations lead remains the most effective machinability additive through its wide range of machining characteristics.

It was further concluded in the report that calcium can substitute lead in C45 steels for use at higher cutting speeds. However, calcium treated steels require higher cutting forces, have poorer chip form and have their best performance limited to a narrower range of machining speeds in comparison with the leaded product. The more limited benefits of calcium treated grades may not be able to match the benefits of leaded grades in many instances since it is very likely that a large variety of machining operations are required for many engineering components.

Steels containing tin generally did not show good performance in the machinability tests and thus, was not considered as a suitable replacement for lead in steel.

In conclusion, leaded free cutting steels offer advantages in machinability over the non-leaded grades including higher production rates, reduced cutting forces, lower tool wear rates, more finely broken chip morphology and improved surface finish. Since lead additions result in lower cutting forces, the energy required to machine leaded steels should be lower than that required to machine the equivalent steels without lead additions.

Batch galvanized steel

Research is ongoing within the industry to develop new zinc-based alloys for general galvanizing. Principal research goals are: (i) more zinc-efficient coatings (thinner coatings regardless of steel type); and (ii) coatings of more consistent appearance and surface finish. These goals are accompanied with a desire to reduce the presence of hazardous substances, including lead. Intentional use of lead is now limited to a narrow, but important, set of processes and products.

More importantly, requiring lower lead content to meet ROHS default limits will result in reduced use of recycled zinc (remelt). The galvanizing industry is an important user of remelt zinc from roofing applications (where Pb-containing solders are mixed with scrap zinc sheets that are removed after service lives that often exceed 100 years) and remelting of zinc entrained in galvanizers' ashes (which will have a Pb content that reflects the prevailing Pb content of the galvanizing bath).

A life-cycle comparison of the embodied energy of (i) remelt secondary zinc and (ii) primary zinc has been published in ‚Sachbilanz Zink', Prof. J. Krüger, Institut für Metallhüttenkunde und Elektrometallurgie der RWTH Aachen (ISBN 3-89653-939-6, 2001). This publication reports that: „*The energy required for the extraction of zinc from scrap to obtain alloys capable of further use demands a primary energy input of only approximately 2.5 GJ/t. During the extraction of zinc from ores, the primary energy requirement for mining and ore dressing is around 5-9 GJ/t metal content in the concentrate. Concentrate processing to obtain a pure metal however calls for a primary energy input of 46-48 GJ/t zinc*." Based on this information, the use of remelt secondary zinc reduces the embodied energy of the zinc used in batch galvanizing by over 20 times.

As a proportion of a total 7 million tonnes of steel that is batch galvanized in Europe, the volume of components in the scope of ROHS and ELV is extremely small (they are technically important but low volume to the batch galvanizing industry). Also, no other components in the scope of ROHS/ELV interface with the recycling circuits mentioned above. However, there are other factors that will eventually lower the lead levels – for example, customer-driven requirements for lower lead levels in markets outside EEE/ELV and the occasionally higher price of lead than zinc (affecting intentional use). There will also, in the longer term (> ~30-50 years due to the very long product life), be a reduction in the lead-content of recycled zinc arising from scrap roofing/gutters (as new solders are introduced).

Some batch galvanizing plants that are either (i) not using recycled zinc in their input material and/or (ii) are not processing components of complex geometry (for all their product mix) may operate with lead levels in the galvanizing bath that would comply with the default requirements of ROHS requirements in the

EEE products they would process and would not require exemption. It would not be appropriate to describe this as ‘substitution’ and could not presently be extended across the whole industry or for all components.

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

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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.

The steel mills are continuously researching for new alternatives (elements and processing) in order to find efficient substitutes to avoid the use of lead in steel. The element which has been more extensively investigated is the bismuth. However, as further explained in question 6, lead continues showing the best machinability performance. Again, the alternatives do not show the same hot workability as lead, which is a fundamental requirement for the production of machining steels. In fact, this issue alone is enough to rule out the possibility of using bismuthed steels as a replacement of leaded steels.

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

<u>Machining steels:</u> Substitutes would need first to show the same level of hot workability as lead, which has not occurred so far with the identified alternative materials. The availability and the price of possible substitutes are also important aspects to consider. Not further information can be provided at this stage on a respective timeframe for the substitution.

<u>Batch galvanized steel:</u> Whilst the use of lead within the process have largely (but not completely) been replaced by other techniques, the inadvertent presence of lead in the recycling chain will require the exemption for a further period of 5 years and, likely, much longer.

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

- ☐ SVHC
- ☐ Candidate list
- ☐ Proposal inclusion Annex XIV
- ☐ Annex XIV

☐ Restriction

- ☐ Annex XVII
- ☐ Registry of intentions

☐ Registration Provide REACH-relevant information received through the supply chain.

Name of document: _____

Based on the current status of Annexes XIV and XVII of the REACH Regulation, the requested exemptions would not weaken the environmental and health protection afforded by the REACH Regulation. The requested exemptions are therefore justified as other criteria of Art. 5(1)(a) apply

(B) Elimination/substitution:

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

   ☐ Yes. Consequences? _____

   ☒ No. Justification: Please, see the answers to questions 6 and 7.

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

   ☐ Yes.

   - ☐ Design changes:
   - ☐ Other materials:
   - ☐ Other substance:

   ☒No.

   Justification: Please, see the answers to questions 6 and 7.

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

Machining steels:

As previously explained, to date no substitutes have been identified that can effectively replace lead for the machining of free cutting steels. Some of the tested alternatives such as bismuth or sulphur present the following disadvantages:

- Regarding sulphur, industry has been trying to substitute the effect of the lead by adding bigger quantities of sulphur to free-machining steels. The final result is that the properties are not comparable. In deep drilling operations or high-speed machining, the results of the high sulphur grades are really disappointing compared to those achieved with addition of lead. The machining speed without lead decreases, the tooling wear increases and there is a great amount of parts that cannot be manufactured without lead. In addition to this, the increase of sulphur leads to a big increase in fragility and reduction in hot workability, with an important increase of yield losses due to extra-trimming, cobbles and rejection owing to quality issues such as cracks, scabs, hidden defects etc.
- Regarding bismuth, the main issue is the lack of ductility during the hot rolling process. This is a situation which has not yet been solved by the steel industry. The hot workability of the grades with bismuth is really low and, in the majority of cases, this does not allow a correct rolling process, leading finally to major production stoppages and high rejection rates. Moreover, the results achieved with bismuth in terms of machinability are worse than those obtained with lead. Lead still presents a higher machining speed and a lower tooling wear, not to mention that the surface is more easily controlled with lead.

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

    Machining steels: Please, see answer to question 6A. As mentioned earlier, the lack of hot workability of possible substitutes is a very significant technical disadvantage. This issue alone is enough to dismiss the possibility of using bismuth as a replacement of lead. It is also important to consider the wider environmental implications of the selection of the material. The lower energy consumption of machining leaded steels means that there is a potential benefit of reduced electricity consumption and CO_2 emissions in fabrication.

Batch galvanized steels: Please see the LCA related information provided in section 6.

2) Health impacts
3) Consumers safety impacts

⇨ Do impacts of substitution outweigh benefits thereof?

Please provide third-party verified assessment on this:

Galvanized steels- Please, see the LCA related information provided in section 6 *Analysis of possible alternative substances*

(C) Availability of substitutes:

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: _____

9. Other relevant information

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

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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 information given in this application is regarded as proprietary.

Annex I

Assessment of the environmental impact of leaded and non-leaded low carbon free cutting steels including energy used during machining