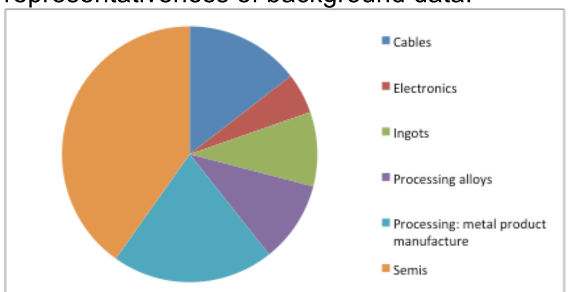
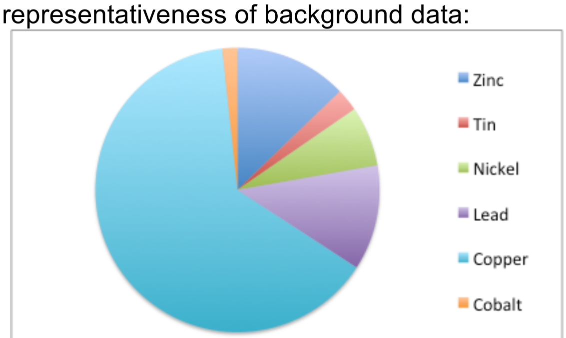
| Section | Content |
|---|---|
| Title of spERC | Industrial use of massive metal in shaping |
| spERC code | Eurometaux 12a.1.v2.1 |
| Scope | Limitations of coverage compared to ERC relate to:<br><br>**User groups:**<br>Industrial use of massive metal or alloys. This includes production of SEMIS, drawing of cables, production of ingots, shaping of massive metal or alloys. Release defaults are derived from measured emissions. Sector representativeness of background data:<br><br><br>**Substance groups or functions**:<br>Release defaults are derived from measured emissions. Metal representativeness of background data:<br><br>Metal (compound) is defined here in a broad sense. The definition includes alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids and their compounds but excludes non-metals, halogens, noble gases and metallo-organic compounds.<br>SPERC valid for metals with solid water partition coefficient for suspended matter between 10,000 L/kg and 300,000 L/kg.<br><br>**Types of products**:<br>Metal (massive)<br><br>**Geographical and Time:**<br>Release defaults are derived from measured emissions from various EU member states and between 1993-2007. |

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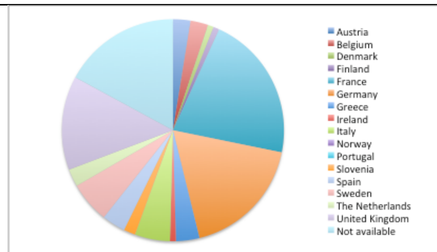
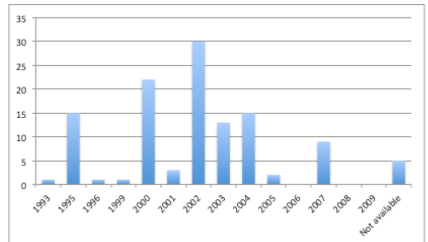
| |   |
| Related use descriptors | PROC6, PROC8b, PROC9, PROC14, PROC21, PROC 23, PROC24, PROC25, PROC 26<br>SU 14, ERC12a |
| Operational conditions | Since metal SPERCs are based on measured data at end-of-pipe on-site, all processes are integrated in the release fractions from raw materials handling to cleaning and maintenance.<br><br>**Size of installations:** Amount used can vary between 100 and 300,000 Tonnes/year.<br>**Processing conditions:** Open and closed systems, wet and dry processes. |
| Obligatory onsite RMMs | **Air**<br>Direct air emissions should be reduced by implementing one or more of the following RMMs:<br>• Electrostatic precipitators using wide electrode spacing: 5 – 15 mg/Nm$^3$<br>• Wet electrostatic precipitators: < 5 mg/Nm$^3$<br>• Cyclones, but as primary collector: < 50 mg/Nm$^3$<br>• Fabric or bag filters: high efficiency in controlling fine particulate (melting): achieve emission values < 5mg/Nm$^3$. Membrane filtration techniques can achieve < 1 mg/Nm$^3$<br>• Ceramic and metal mesh filters. PM10 particles are removed: 0.1 mg/Nm$^3$<br>• Wet scrubbers: < 4 mg/Nm<br>One or more of these RMMs (of which fabric or bag filters and wet scrubbers are more common) were reported to be present in more than 90% of the sites. Reported RMM efficiencies range between 95% and >99%.<br><br>Fugitive emissions should be reduced from material storage and handling, reactors or furnaces and from material transfer points by following hierarchical measures: process optimization and minimization of emissions, sealed reactors and furnaces, targeted fume collection.<br><br>**Water**<br>Following IPPC-BAT document, the treatment methods are very much dependent on the specific processes and the metals involved. Direct water emissions should be reduced by implementing one or more of the following RMMs:<br>• Chemical precipitation: used primarily to remove the metal ions (e.g. Ca(OH)2, pH 11 precipitation: >99% removal efficiency; Fe(OH)3, pH 11: 96% removal efficiency)<br>• Sedimentation (e.g. Na2S, pH 11, >99% removal efficiency)<br>• Filtration: used as final clarification step (e.g. ultrafiltration, pH 5.1: 93% removal efficiency, nanofiltration: 97% removal efficiency, reverse osmosis, pH 4-11: 99% removal efficiency)<br>• Electrolysis: for low metal concentration (e.g. electrodialysis: 13% removal efficiency within 2 hours at 2g/L, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency)<br>• Reverse osmosis: extensively used for the removal of dissolved metals |

<table>
<tr><td></td><td>

- Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptinolite and 100% removal efficiency for synthetic zeolite)

One or more of these RMMs were reported to be present in <90% of the sites for production (of which chemical precipitation is most common). The range of reported site-specific removal efficiency is between 99.3% and 99.80%.

More information can be found in EC (2001), Integrated Pollution Prevention and Control (IPCC): reference document on Best Available Techniques in the Non Ferrous Metals Industries.

**Waste**

Releases to the floor, water and soil are to be prevented. If the metal content of the waste is elevated enough, internal or external recovery/recycling might be considered.
</td></tr>
<tr><td>Substance use rate</td><td>Assessment defaults as set by ERC 12a. It is recommended to use a realistic substance use rate.</td></tr>
<tr><td>Days emitting</td><td>

Default number of emission days are derived from a multi-metal background database of measured site-specific release factors collected under the former Directive of New and Existing Substances and REACH 2010 registration dossiers.

<table>
<tr><td>216 days/year</td><td>

The minimum of the 10th percentiles of reported site-specific number of emission days for

- 17 sites from cable drawing (260 d/yr)
- 9 sites from ingots (216 d/yr)
- 5 sites from processing alloys (235 d/yr)
- 19 sites from metal product manufacture (250 d/yr)
- 46 sites from Semis production (220 d/yr)
</td></tr>
</table>
</td></tr>
<tr><td>Integrated release factors (air, water, soil)</td><td>

Default release factors are derived from a multi-metal background database of measured site-specific release factors collected from peer-reviewed EU Risk Assessment Reports under the former Directive of New and Existing Substances and REACH 2010 registration dossiers.

**Air**

<table>
<tr><td>0.02% (release after STP)</td><td>

The maximum of the 90th percentiles of reported site-specific release factors to air for

- 11 sites from cable drawing (0.002%)
- 8 sites from ingots (0.02%)
- 17 sites from processing alloys (0.02%)
- 20 sites from metal product manufacture (0.001%)
- 24 sites from Semis production (0.002%)
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</table>

**Water**

<table>
<tr><td>0.003% (release after STP)</td><td>

The maximum of the 90th percentiles of reported site-specific release factors to wastewater for

- 14 sites from cable drawing (0.0002%)
- 9 sites from ingots (0.00009%)
- 12 sites from processing alloys (0.003%)
- 22 sites from metal product manufacture (0.0005%)
- 44 sites from Semis production (0.0007%)
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| | **Soil**<br>Assessment default as set by ERC<br><br>**Waste**<br><table><tr><td>1%</td><td>The 90th percentile of reported site-specific release factors to solid waste for 32 downstream user sites covering zinc, nickel, lead, antimony</td></tr></table> |
| Optional risk management measures for iteration | For iteration purposes (if SPERC default release factors do not demonstrate safe use), it is recommended to measure/monitor the air and/or water releases as a first refinement step. In case further iterations are required, a combination of multiple obligatory on-site measures can be considered. |
| Narrative description | Since metal SPERCs are based on measured data at end-of-pipe on-site, all indicated PROCs are integrated in the release fractions from raw materials handling to cleaning and maintenance.<br>Semi-finished products are further processed through a variety of mechanical processes to a variety of metal and alloy industrial and consumer products: machining (all processes in which a workpiece is modified by removing unwanted material in the form of turnings with the aim to obtain the desired shape, includes: turning, drilling, countersinking, reaming, planning, shaping, broaching, sawing, filing, rasping and grinding), cold forming, mechanical polishing (mechanical abrasion). Batch annealing where each workpiece is loaded into a furnace for static exposure to heat. Strand annealing where the workpiece passes continuously through the controlled atmosphere.Conform, heating and forming under pressure. Forging, heating of the workpiece; manual or automatic loading of the workpiece into a press containig two halves of a die; closing the dies around the metal to form the desired piece; ejection of workpiece; removal of the excess metal (flash) around the piece.<br>Hazardous wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately to hazardous waste incineration plants or hazardous waste landfills as hazardous waste. |
| Scaling | If a site does not comply with the conditions stipulated in the SPERC, it is recommended to monitor the air and water releases and apply the Metals DU scaling tool in order to perform a site-specific assessment. Each site can evaluate whether he works inside the boundaries set by the ES through scaling. The Metal EUSES calculator for DUs is freely available to metal industry DUs and can be downloaded from [http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool](http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool). |

| **Determinant Label**[1] | **Quali-/ Quanti-tative**[2] | **Value**[3] | **Description of Value**[4] |
|---|---|---|---|
| On site treatment of wastewater | Qual | Chemical precipitation or sedimentation or filtration or electrolysis or reverse | Following IPPC-BREF note document, the treatment methods are very much dependent on the specific processes and the metals involved. Direct water emissions should be reduced by implementing one or more of the following RMMs:<br>• Chemical precipitation: used primarily to remove the metal ions (e.g. Ca(OH)2, pH 11 precipitation: >99% |

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| | | osmosis or ion exchange | removal efficiency; $Fe(OH)_3$, pH 11: 96% removal efficiency)<br>• Sedimentation (e.g. $Na_2S$, pH 11, >99% removal efficiency)<br>• Filtration: used as final clarification step (e.g. ultrafiltration, pH 5.1: 93% removal efficiency, nanofiltration: 97% removal efficiency, reverse osmosis, pH 4-11: 99% removal efficiency)<br>"• Electrolysis: for low metal concentration (e.g. electrodialysis: 13% removal efficiency within 2 hours at 2g/L, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency)<br>• Reverse osmosis: extensively used for the removal of dissolved metals<br>Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptinolite and 100% removal efficiency for synthetic zeolite)<br>More information can be found in EC (2001), Integrated Pollution Prevention and Control (IPCC): reference document on Best Available Techniques in the Non Ferrous Metals Industries. |
| On site treatment of off-air | Qual | Electrostatic precipitator or wet electrostatic precipitator or cyclones or fabric/bag filter or ceramic/metal mesh filter or wet scrubber | Direct air emissions should be reduced by implementing one or more of the following RMMs:<br>· Electrostatic precipitators using wide electrode spacing: 5 – 15 mg/Nm³<br>· Wet electrostatic precipitators: < 5 mg/Nm³<br>· Cyclones, but as primary collector: < 50 mg/Nm³<br>· Fabric or bag filters: high efficiency in controlling fine particulate (melting): achieve emission values < 5mg/Nm³. Membrane filtration techniques can achieve < 1 mg/Nm³<br>· Ceramic and metal mesh filters. PM10 particles are removed: 0.1 mg/Nm³<br>Wet scrubbers: < 4 mg/Nm<br>Fugitive emissions should be reduced from material storage and handling, reactors or furnaces and from material transfer points by following hierarchical measures: process optimization and minimization of emissions, sealed reactors and furnaces, targeted fume collection. |