SPERC European Metals (former Eurometaux) SPERC 1.1v2025: Manufacture and recycling of massive metal and metal powder

Author: European Metals
Version date: November 2025

Product/substance domain	Scope of the SPERC User group: Manufacture and recycling of massive metal or metal powder. Included: Manufacture of massive metal or metal powder from primary raw materials (derived from ores, concentrates) and recycling from secondary raw materials (from indigenous scrap and residues). Excluded: Mining and ore treatment at the mine site. Manufacture of inorganic metal compounds, which is described by a separate SPERC. Substance groups or functions: The SPERC is valid for metals with solid water partition coefficient for suspended matter between 10,000 L/kg and 400,000 L/kg. Included in the metal definition (European Metals SPERCs): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids and their compounds Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds. The SPERC is divided into sub-SPERCs: European Metals SPERC 1.1b.v2 Kd 10000-25000 L/kg European Metals SPERC 1.1c.v2 Kd 25000-60000 L/kg European Metals SPERC 1.1d.v2 Kd 60000-190000 L/kg European Metals SPERC 1.1e.v2 Kd 190000-400000 L/kg Types of products: The product of the industry is either refined metal (powder) or semis/semi manufactures, i.e. metal cast ingots or wrought shapes, extruded shapes, foil, sheet, strip, rod, etc.
Description of activities/processes	Manufacture and recycling of massive metal or metal powder. The range of raw primary and secondary materials available to the various installations is wide and this means that a variety of metallurgical production processes is used: hydrometallurgical and pyrometallurgical processes. The hydrometallurgical winning process with acids and alkalis involves roasting, leaching, purification, electrowinning and electrolysis. The pyrometallurgical winning process involves smelting, roasting, sintering, blast furnacing, electric arc furnacing, condensing and refining/casting. Loading of anodes in tank. Deposition of powder on cathodes. Discharge of powder, washing and drying. Removal of spent anodes. Since metal SPERCs are based on measured data at end-of-pipe on-site, all operations, processes and equipment are integrated in the release fractions from raw materials handling, auxiliary processes, cleaning and maintenance, etc...
Life cycle stage	Manufacture
Chemical product category	PC 7: Base metals and alloys
Sector of use	SU 14: Manufacture of basic metals, including alloys
Link to website	http://www.reach-metals.eu/

Conditions of use

Amount used, frequency and duration of use (or from service life)
Number of release days per year >= 218 days/year Explanation for the CSR: Number of emission days derived from a multi-metal background database of measured site-specific release factors.

218 days/year is the 10th percentile of reported number of emission days for 121 sites from production of massive metal and metal powder. For ES for communication: *Number of days per year the substance is released to the environment*
Technical and organisational conditions and measures
On site treatment of off-air: Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter according to the BAT Reference Document in the Non-Ferrous Metals Industry Explanation for the CSR: Direct air emissions should be reduced by implementing one or more of the following RMMs (air concentration range for which the RMM is suitable is specified in parenthesis): • Electrostatic precipitators using wide electrode spacing: 5 – 15 mg/Nm³ • Wet electrostatic precipitators: < 5 mg/Nm³ • Cyclones, but as primary collector: < 50 mg/Nm³ • Fabric or bag filters: high efficiency in controlling fine particulate (melting): achieve emission values < 5mg/Nm³. Membrane filtration techniques can achieve < 1 mg/Nm³ • Ceramic and metal mesh filters. PM10 particles are removed: 0.1 mg/Nm³ Wet scrubbers: < 4 mg/Nm3 For ES for communication: *Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter*
On site treatment of wastewater: Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange according to the BAT Reference Document in the Non-Ferrous Metals Industry (2017) applying minimum xx% removal efficiency Explanation for the CSR: Direct water emissions should be reduced by implementing one or more of the following RMMs: • Chemical precipitation: used primarily to remove the metal ions (e.g. the use of Ca(OH)2 to a pH 11: >99% removal efficiency; the use of Fe(OH)3 to a pH 11: 96% removal efficiency) • Sedimentation (e.g. Na2S, pH 11, >99% removal efficiency) • 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) • Electrolysis: for low metal concentration at about 2 g/L (e.g. electrodialysis: 13% removal efficiency within 2 hours, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency) • Reverse osmosis: extensively used for the removal of dissolved metals; Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptilolite and 100% removal efficiency for synthetic zeolite) Following the Integrated Pollution Prevention and Control – BAT Reference note document, the treatment methods are very much dependent on the specific processes and the metals involved. More information can be found in the BAT Reference Document for the Non-Ferrous Metals Industry (2017). For ES for communication: *Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange*
Conditions and measures related to biological sewage treatment plant
Biological STP : None [Effectiveness Water: 0%] Explanation for the CSR: Metal producing companies often have their own wastewater treatment plant (WWTP). The reported releases are after on-site WWTP and usually don't include an additional external treatment. For ES for communication: -
Conditions and measures related to external treatment of waste (including article waste)
Particular considerations on the waste treatment operations: Other Explanation for the CSR: Waste includes sludge, filter cakes and solid waste as scraps and dust. Waste shall be handled according to the Waste Framework Directive and disposed of according to national/local legislation. At elevated metal content in the waste, internal or external recovery/recycling is considered. For ES for communication: *Dispose of waste product or used containers according to local regulations.*
Other conditions affecting environmental exposure
Discharge rate of effluent >= 2E3 m3/day Explanation for the CSR: - For ES for communication: *Assumed effluent discharge flow from site >= 2E3 m3/day*
Dilution factor to freshwater <= 10

Explanation for the CSR: -
For ES for communication: Local freshwater dilution factor 10

Use amounts

Daily use amount at a site (tonnes/day): -
For ES for communication: Daily amount per site <= tonnes/day

Extrapolation factor for annual use amount: 218

Explanations for the release factors valid for all the sub-SPERCs

Releases to water: Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10 (0.043 – 0.915 x log(Kd)) of the 90th percentile of the release factors to water for 142 sites from the production of massive metal and metal powder (Verdonck et al. 2014).

Releases to air: Release factor after RMM derived from a multi-metal background database of measured site-specific release factors. The value is the 90th percentile of the reported release factors to air for 111 sites from the production of massive metal and metal powder (Verdonck et al. 2014).

Releases to non agricultural soil: There are no direct releases to soil at industrial site.

Releases to waste: Release factor derived from a multi-metal background database of site-specific release factors. The value is the 90th percentile of the reported release factors to solid waste for 62 manufacturing sites covering zinc, nickel, lead, cobalt, cadmium and antimony.

Sub-SPERC: European Metals SPERC 1.1b.v2025 Kd 10000-25000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.03	0.03	0	2.3

Sub-SPERC: European Metals SPERC 1.1c.v2025 Kd 25000-60000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.01	0.03	0	2.3

Sub-SPERC: European Metals SPERC 1.1d.v2025 Kd 60000-190000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.005	0.03	0	2.3

Sub-SPERC: European Metals SPERC 1.1e.v2025 Kd 190000-400000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.002	0.03	0	2.3

Chesar version: 3.9
Chesar SPERC modification date: 25/02/2026

SPERC European Metals (former Eurometaux) SPERC 1.2.v2025: Manufacture of metal compounds

Author: European Metals
Version date: November 2025

Product/substance domain	Scope of the SPERC User group: Manufacture of metal compounds. Included: Manufacture of inorganic metal compounds. Excluded: Manufacture of organic or metallo-organic substances; mining and ore treatment at the mine site; manufacture of massive metal. Manufacture of massive metal and metallic powder is described by a separate SPERC. Substance groups or functions: SPERC valid for metals with solid water partition coefficient for suspended matter between 1,000 L/kg and 400,000 L/kg. Included in the metal definition (European Metals SPERCs): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids and their compounds. Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds. The SPERC is divided into sub-SPERCs: European Metals SPERC 1.2b.v2 Kd 1000-10000 L/kg European Metals SPERC 1.2c.v2 Kd 10000-25000 L/kg European Metals SPERC 1.2d.v2 Kd 25000-60000 L/kg European Metals SPERC 1.2e.v2 Kd 60000-100000 L/kg European Metals SPERC 1.2f.v2 Kd 100000-190000 L/kg European Metals SPERC 1.2g.v2 Kd 190000-250000 L/kg European Metals SPERC 1.2h.v2 Kd 250000-400000 L/kg Types of products: Metal compounds in solid form or in solution as salts.
Description of activities/processes	Since this metal SPERC is 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.
Life cycle stage	Manufacture
Chemical product category	PC 7: Base metals and alloys
Sector of use	SU 14: Manufacture of basic metals, including alloys
Link to website	http://www.reach-metals.eu/

Conditions of use

Amount used, frequency and duration of use (or from service life)

Number of release days per year >= 182 days/year
Explanation for the CSR: Number of emission days derived from a multi-metal background database of measured site-specific release factors.
182 days/year is the 10th percentile of reported number of emission days for 168 sites from production of metal compounds.
For ES for communication: *Number of days per year the substance is released to the environment*

Technical and organisational conditions and measures

On site treatment of off-air: Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter according to the BAT Reference Document in the Non-Ferrous Metals Industry
Explanation for the CSR: Direct air emissions should be reduced by implementing one or more of the following RMMs (air concentration range for which the RMM is suitable is specified in parenthesis):

• Electrostatic precipitators using wide electrode spacing: 5 – 15 mg/Nm³
• Wet electrostatic precipitators: < 5 mg/Nm³
• Cyclones, but as primary collector: < 50 mg/Nm³
• Fabric or bag filters: high efficiency in controlling fine particulate (melting): achieve emission values < 5mg/Nm³. Membrane filtration techniques can achieve < 1 mg/Nm³
• Ceramic and metal mesh filters. PM10 particles are removed: 0.1 mg/Nm³
Wet scrubbers: < 4 mg/Nm3
For ES for communication: *Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter*

On site treatment of wastewater: Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange according to the BAT Reference Document in the Non-Ferrous Metals Industry (2017) applying minimum xx% removal efficiency
Explanation for the CSR: Direct water emissions should be reduced by implementing one or more of the following RMMs:
• Chemical precipitation: used primarily to remove the metal ions (e.g. the use of Ca(OH)2 to a pH 11: >99% removal efficiency; the use of Fe(OH)3 to a pH 11: 96% removal efficiency)
• Sedimentation (e.g. Na2S, pH 11, >99% removal efficiency)
• 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)
• Electrolysis: for low metal concentration at about 2 g/L (e.g. electrodialysis: 13% removal efficiency within 2 hours, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency)
• Reverse osmosis: extensively used for the removal of dissolved metals; Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptilolite and 100% removal efficiency for synthetic zeolite)
Following the Integrated Pollution Prevention and Control – BAT Reference note document, the treatment methods are very much dependent on the specific processes and the metals involved. More information can be found in the BAT Reference Document for the Non-Ferrous Metals Industry (2017).
For ES for communication: *Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange*

Conditions and measures related to biological sewage treatment plant

Biological STP : None [Effectiveness Water: 0%]
Explanation for the CSR: Metal compounds producing companies often have their own wastewater treatment plant (WWTP). The reported releases are after on-site WWTP and usually don't include an additional external treatment.
For ES for communication: -

Conditions and measures related to external treatment of waste (including article waste)

Particular considerations on the waste treatment operations: Other
Explanation for the CSR: Waste includes sludge, filter cakes and solid waste. waste shall be handled according to the Waste Framework Directive and disposed of according to national/local legislation. If the metal content of the waste is elevated, internal or external recovery/recycling is considered.
For ES for communication: *Dispose of waste product or used containers according to local regulations.*

Other conditions affecting environmental exposure

Discharge rate of effluent >= 2E3 m3/day
Explanation for the CSR: -
For ES for communication: *Assumed effluent discharge flow from site >= 2E3 m3/day*

Dilution factor to freshwater <= 10
Explanation for the CSR: -
For ES for communication: Local freshwater dilution factor 10

Use amounts

Daily use amount at a site (tonnes/day): -
For ES for communication: Daily amount per site <= tonnes/day

Extrapolation factor for annual use amount: 182

Explanations for the release factors valid for all the sub-SPERCs

Releases to air: Release factor after RMM derived from a multi-metal background database of measured site-specific release factors. The value is the 90th percentile of the reported release factors to air for 145 sites from

the production of metal compounds (Verdonck et al. 2014).

Releases to non agricultural soil: There are no direct releases to soil at industrial site.

Releases to waste: Release factor derived from a multi-metal background database of site-specific release factors. The value is the 90th percentile of the reported release factors to solid waste for 62 manufacturing sites covering zinc, nickel, lead, cobalt, cadmium and antimony.

Sub-SPERC: European Metals SPERC 1.2b.v2025 Kd 1000-10000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.2	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The value is the 90th percentile of the reported release factors to water since available data was too limited to develop robust regression (Verdonck et al. 2014).

Sub-SPERC: European Metals SPERC 1.2c.v2025 Kd 10000-25000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.2	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).

Sub-SPERC: European Metals SPERC 1.2d.v2025 Kd 25000-60000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient

for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.04	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).

Sub-SPERC: European Metals SPERC 1.2e.v2025 Kd 60000-100000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.01	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).

Sub-SPERC: European Metals SPERC 1.2f.v2025 Kd 100000-190000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.005	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:

Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).

Sub-SPERC: European Metals SPERC 1.2g.v2025 Kd 190000-250000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.002	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).

Sub-SPERC: European Metals SPERC 1.2h.v2025 Kd 250000-400000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 1

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.001	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).

Chesar version: 3.9
Chesar SPERC modification date: 25/02/2026

SPERC European Metals (former Eurometaux) SPERC 3.1.v2025: Formulation of massive metal or metal powder in alloys

Author: European Metals
Version date: November 2025

Product/substance domain	Limitations of coverage compared to ERC relate to: User groups: Alloying of massive metal or metal powder into alloys (special preparations). Substance groups or functions: release defaults are derived from measured emissions. Metal representativeness of background data: 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. SPERC valid for metals with solid water partition coefficient for suspended matter between 2,500 L/kg and 400,000 L/kg. Types of products: Metal (massive and/or powder)
Description of activities/processes	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.
Life cycle stage	Formulation or re-packing
Chemical product category	PC 7: Base metals and alloys
Sector of use	SU 14: Manufacture of basic metals, including alloys
Link to website	http://www.reach-metals.eu/

Conditions of use

Amount used, frequency and duration of use (or from service life)

Number of release days per year >= 225 days/year
Explanation for the CSR: Number of emission days derived from a multi-metal background database of measured site-specific release factors.
225 days/year is the 10th percentile of reported number of emission days for 83 sites from alloying of metal or metal powder.
For ES for communication: *Number of days per year the substance is released to the environment*

Technical and organisational conditions and measures

On site treatment of off-air: Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter according to the BAT Reference Document in the Non-Ferrous Metals Industry
Explanation for the CSR: Direct air emissions should be reduced by implementing one or more of the following RMMs (air concentration range for which the RMM is suitable is specified in parenthesis):
• Electrostatic precipitators using wide electrode spacing: 5 – 15 mg/Nm³
• Wet electrostatic precipitators: < 5 mg/Nm³
• Cyclones, but as primary collector: < 50 mg/Nm³
• Fabric or bag filters: high efficiency in controlling fine particulate (melting): achieve emission values < 5mg/Nm³. Membrane filtration techniques can achieve < 1 mg/Nm³
• Ceramic and metal mesh filters. PM10 particles are removed: 0.1 mg/Nm³
Wet scrubbers: < 4 mg/Nm3
For ES for communication: *Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter*

On site treatment of wastewater: Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange according to the BAT Reference Document in the Non-Ferrous Metals Industry (2017) applying minimum xx% removal efficiency
Explanation for the CSR: Direct water emissions should be reduced by implementing one or more of the following RMMs:

• Chemical precipitation: used primarily to remove the metal ions (e.g. the use of Ca(OH)2 to a pH 11: >99% removal efficiency; the use of Fe(OH)3 to a pH 11: 96% removal efficiency)
• Sedimentation (e.g. Na2S, pH 11, >99% removal efficiency)
• 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)
• Electrolysis: for low metal concentration at about 2 g/L (e.g. electrodialysis: 13% removal efficiency within 2 hours, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency)
• Reverse osmosis: extensively used for the removal of dissolved metals; Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptilolite and 100% removal efficiency for synthetic zeolite)
Following the Integrated Pollution Prevention and Control – BAT Reference note document, the treatment methods are very much dependent on the specific processes and the metals involved. More information can be found in the BAT Reference Document for the Non-Ferrous Metals Industry (2017).
For ES for communication: *Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange*

Conditions and measures related to biological sewage treatment plant

Biological STP : None [Effectiveness Water: 0%]
Explanation for the CSR: Alloying companies often have their own wastewater treatment plant (WWTP). The reported releases are after on-site WWTP and usually don't include an additional external treatment.
For ES for communication: -

Conditions and measures related to external treatment of waste (including article waste)

Particular considerations on the waste treatment operations: No (low concentration)
Explanation for the CSR: Particular risks from waste treatment unlikely due low concentration of substance in waste stream. Waste disposal according to national/local legislation is sufficient. If the metal content of the waste is elevated enough, internal or external recovery/recycling is considered.
For ES for communication: Dispose of waste product or used containers according to local regulations.

Other conditions affecting environmental exposure

Discharge rate of effluent >= 2E3 m3/day
Explanation for the CSR: -
For ES for communication: *Assumed effluent discharge flow from site >= 2E3 m3/day*

Dilution factor to freshwater <= 10
Explanation for the CSR: -
For ES for communication: Local freshwater dilution factor 10

Use amounts

Daily use amount at a site (tonnes/day): -
For ES for communication: Daily amount per site <= tonnes/day

Extrapolation factor for annual use amount: 225

Explanations for the release factors valid for all the sub-SPERCs

Releases to water: Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The value is the 90th percentile of the reported release factors to water for 73 sites from the production of alloys (Verdonck et al. 2014).

Releases to air: Release factor after RMM derived from a multi-metal background database of measured site-specific release factors. The value is the 90th percentile of the reported release factors to air for 71 sites from the production of alloys (Verdonck et al. 2014).

Releases to non agricultural soil: There are no direct releases to soil at industrial site.

Releases to waste: Release factor derived from a multi-metal background database of site-specific release factors. The value is the 90th percentile of the reported release factors to solid waste for 32 downstream user sites covering zinc, nickel, lead and antimony.

Sub-SPERC: European Metals SPERC 3.1.v2025 Formulation of massive metal or metal powder in alloys

Sub-SPERC applicability

Environmental release category	ERC 3		
Additional information on applicability domain: SPERC valid for metals with solid water partition coefficient for suspended matter between 2,500 L/kg and 400,000 L/kg.			
Release factors			
To water (%)	**To air (%)**	**To non agricultural soil (%)**	**To waste (%)**
0.005	0.005	0	1

Chesar version: 3.9
Chesar SPERC modification date: 25/02/2026

SPERC European Metals (former Eurometaux) SPERC 5.1.v2025: Industrial use of metals and metal compounds in metallic coating

Author: European Metals
Version date: November 2025

Product/substance domain	Scope of the SPERC User groups: Industrial use of metals and metal compounds in plating, galvanising. Substance groups or functions: Metal (compounds). Included in the metal definition (European Metals SPERCs): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids and their compounds. Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds. SPERC valid for metals with solid water partition coefficient for suspended matter between 25,000 L/kg and 400,000 L/kg. Types of products: Metal and/or metal compounds (solid, powder, salts in solution)
Description of activities/processes	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. A distinction can be made between hot dip batch process, continuous hot dip process and continuous electroplating process. Electroplating is a plating process that uses electrical current to reduce cations of a desired material from a solution and coat a conductive object with a thin layer of the material, such as a metal. Mechanical milling to remove oxide layers. Pickling. Chemical treatment or blasting of internal tube surfaces. Cleaning and stain removal. Polishing. Pre-patination. Raw materials handling and storing of produced substances are also included in this SPERC. Release defaults are derived from measured emissions.
Life cycle stage	Use at industrial sites
Chemical product category	PC 7: Base metals and alloys
Sector of use	SU 14: Manufacture of basic metals, including alloys
Link to website	http://www.reach-metals.eu/

Conditions of use

Amount used, frequency and duration of use (or from service life)

Number of release days per year >= 220 days/year
Explanation for the CSR: Number of emission days derived from a multi-metal background database of measured site-specific release factors.
220 days/year is the 10th percentile of reported number of emission days for 97 sites from metallic coating.
For ES for communication: *Number of days per year the substance is released to the environment*

Technical and organisational conditions and measures

On site treatment of off-air: Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter according to the BAT Reference Document in the Non-Ferrous Metals Industry
Explanation for the CSR: Direct air emissions should be reduced by implementing one or more of the following RMMs (air concentration range for which the RMM is suitable is specified in parenthesis):
• Electrostatic precipitators using wide electrode spacing: 5 – 15 mg/Nm³
• Wet electrostatic precipitators: < 5 mg/Nm³
• Cyclones, but as primary collector: < 50 mg/Nm³
• Fabric or bag filters: high efficiency in controlling fine particulate (melting): achieve emission values < 5mg/Nm³. Membrane filtration techniques can achieve < 1 mg/Nm³
• Ceramic and metal mesh filters. PM10 particles are removed: 0.1 mg/Nm³

Wet scrubbers: < 4 mg/Nm3 For ES for communication: *Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter*
On site treatment of wastewater: Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange according to the BAT Reference Document in the Non-Ferrous Metals Industry (2017) applying minimum xx% removal efficiency Explanation for the CSR: Direct water emissions should be reduced by implementing one or more of the following RMMs: • Chemical precipitation: used primarily to remove the metal ions (e.g. the use of Ca(OH)2 to a pH 11: >99% removal efficiency; the use of Fe(OH)3 to a pH 11: 96% removal efficiency) • Sedimentation (e.g. Na2S, pH 11, >99% removal efficiency) • 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) • Electrolysis: for low metal concentration at about 2 g/L (e.g. electrodialysis: 13% removal efficiency within 2 hours, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency) • Reverse osmosis: extensively used for the removal of dissolved metals; Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptilolite and 100% removal efficiency for synthetic zeolite) Following the Integrated Pollution Prevention and Control – BAT Reference note document, the treatment methods are very much dependent on the specific processes and the metals involved. More information can be found in the BAT Reference Document for the Non-Ferrous Metals Industry (2017). For ES for communication: *Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange*
Conditions and measures related to biological sewage treatment plant
Biological STP : None [Effectiveness Water: 0%] Explanation for the CSR: Metal coating companies often have their own wastewater treatment plant (WWTP). The reported releases are after on-site WWTP and usually don't include an additional external treatment. For ES for communication: -
Conditions and measures related to external treatment of waste (including article waste)
Particular considerations on the waste treatment operations: No (low concentration) Explanation for the CSR: Particular risks from waste treatment unlikely due low concentration of substance in waste stream. Waste disposal according to national/local legislation is sufficient. If the metal content of the waste is elevated enough, internal or external recovery/recycling is considered. For ES for communication: Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Discharge rate of effluent >= 2E3 m3/day Explanation for the CSR: - For ES for communication: *Assumed effluent discharge flow from site >= 2E3 m3/day*
Dilution factor to freshwater <= 10 Explanation for the CSR: - For ES for communication: Local freshwater dilution factor 10
Use amounts
Daily use amount at a site (tonnes/day): - For ES for communication: Daily amount per site <= tonnes/day
Extrapolation factor for annual use amount: 220
Explanations for the release factors valid for all the sub-SPERCs
Releases to water: Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The value is the 90th percentile of the reported release factors to water for 114 sites (Verdonck et al. 2014).
Releases to air: Release factor after RMM derived from a multi-metal background database of measured site-specific release factors. The value is the 90th percentile of the reported release factors to air for 97 sites (Verdonck et al. 2014).
Releases to non agricultural soil: There are no direct releases to soil at industrial site.

Releases to waste: Release factor derived from a multi-metal background database of site-specific release factors. The value is the 90th percentile of the reported release factors to solid waste for 32 downstream user sites covering zinc, nickel, lead and antimony.

Sub-SPERC: European Metals SPERC 5.1.v2025 Industrial use of metals and metal compounds in metallic coating

Sub-SPERC applicability	
Environmental release category	ERC 5

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.5	0.2	0	1

Chesar version: 3.9
Chesar SPERC modification date: 25/02/2026

SPERC European Metals (former Eurometaux) SPERC 5.2.v2025: Industrial use of metals and metal compounds in batteries

Author: European Metals
Version date: November 2025

Product/substance domain	Scope of the SPERC User groups: Industrial use of metals (compounds) in batteries. Substance groups or functions: Metal (compounds) included in the metal definition (European Metals SPERCs): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids and their compounds. Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds. SPERC valid for metals with solid water partition coefficient for suspended matter between 25,000 L/kg and 300,000 L/kg. Types of products: Metal and/or metal compounds (salts in solution)
Description of activities/processes	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. 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 containing 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.
Life cycle stage	Use at industrial sites
Chemical product category	PC 7: Base metals and alloys
Sector of use	SU 14: Manufacture of basic metals, including alloys
Link to website	http://www.reach-metals.eu/

Conditions of use

Amount used, frequency and duration of use (or from service life)

Number of release days per year >= 220 days/year
Explanation for the CSR: Number of emission days derived from a multi-metal background database of measured site-specific release factors.
220 days/year is the 10th percentile of reported number of emission days for 67 sites involved in battery production.
For ES for communication: *Number of days per year the substance is released to the environment*

Technical and organisational conditions and measures

On site treatment of off-air: Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter according to the BAT Reference Document in the Non-Ferrous Metals Industry
Explanation for the CSR: Direct air emissions should be reduced by implementing one or more of the following RMMs (air concentration range for which the RMM is suitable is specified in parenthesis):
• Electrostatic precipitators using wide electrode spacing: 5 – 15 mg/Nm³
• Wet electrostatic precipitators: < 5 mg/Nm³
• Cyclones, but as primary collector: < 50 mg/Nm³

• Fabric or bag filters: high efficiency in controlling fine particulate (melting): achieve emission values < 5mg/Nm³. Membrane filtration techniques can achieve < 1 mg/Nm³ • Ceramic and metal mesh filters. PM10 particles are removed: 0.1 mg/Nm³ Wet scrubbers: < 4 mg/Nm3 For ES for communication: *Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter*
On site treatment of wastewater: Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange according to the BAT Reference Document in the Non-Ferrous Metals Industry (2017) applying minimum xx% removal efficiency Explanation for the CSR: Direct water emissions should be reduced by implementing one or more of the following RMMs: • Chemical precipitation: used primarily to remove the metal ions (e.g. the use of Ca(OH)2 to a pH 11: >99% removal efficiency; the use of Fe(OH)3 to a pH 11: 96% removal efficiency) • Sedimentation (e.g. Na2S, pH 11, >99% removal efficiency) • 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) • Electrolysis: for low metal concentration at about 2 g/L (e.g. electrodialysis: 13% removal efficiency within 2 hours, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency) • Reverse osmosis: extensively used for the removal of dissolved metals; Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptilolite and 100% removal efficiency for synthetic zeolite) Following the Integrated Pollution Prevention and Control – BAT Reference note document, the treatment methods are very much dependent on the specific processes and the metals involved. More information can be found in the BAT Reference Document for the Non-Ferrous Metals Industry (2017). For ES for communication: *Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange*
Conditions and measures related to biological sewage treatment plant
Biological STP : None [Effectiveness Water: 0%] Explanation for the CSR: Battery producing companies often have their own wastewater treatment plant (WWTP). The reported releases are after on-site WWTP and usually don't include an additional external treatment. For ES for communication: -
Conditions and measures related to external treatment of waste (including article waste)
Particular considerations on the waste treatment operations: No (low concentration) Explanation for the CSR: Particular risks from waste treatment unlikely due low concentration of substance in waste stream. Waste disposal according to national/local legislation is sufficient. If the metal content of the waste is elevated enough, internal or external recovery/recycling is considered. For ES for communication: Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Discharge rate of effluent >= 2E3 m3/day Explanation for the CSR: - For ES for communication: *Assumed effluent discharge flow from site >= 2E3 m3/day*
Dilution factor to freshwater <= 10 Explanation for the CSR: - For ES for communication: Local freshwater dilution factor 10
Use amounts
Daily use amount at a site (tonnes/day): - For ES for communication: Daily amount per site <= tonnes/day
Extrapolation factor for annual use amount: 220
Explanations for the release factors valid for all the sub-SPERCs
Releases to water: Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The value is the 90th percentile of the reported release factors to water for 78 sites (Verdonck et al. 2014).
Releases to air: Release factor after RMM derived from a multi-metal background database of measured site-

specific release factors. The value is the 90th percentile of the reported release factors to air for 66 sites (Verdonck et al. 2014).
Releases to non agricultural soil: There are no direct releases to soil at industrial site.
Releases to waste: Release factor derived from a multi-metal background database of site-specific release factors. The value is the 90th percentile of the reported release factors to solid waste for 32 downstream user sites covering zinc, nickel, lead and antimony.

Sub-SPERC: European Metals SPERC 5.2.v2025 Industrial use of metals and metal compounds in batteries

Sub-SPERC applicability	
Environmental release category	ERC 5

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.003	0.003	0	1

Chesar version: 3.9
Chesar SPERC modification date: 25/02/2026

SPERC European Metals (former Eurometaux) SPERC 5.3.v2025: Industrial use of massive metal in shaping

Author: European Metals
Version date: November 2025

Product/substance domain	Scope of the SPERC User groups: Industrial use of massive metal or alloys including production of SEMIS, drawing of cables, production of ingots, shaping of massive metal or alloys. Release defaults are derived from measured emissions. Substance groups or function: Metal (compounds) SPERC valid for metals with solid water partition coefficient for suspended matter between 10,000 L/kg and 300,000 L/kg. Included in the metal definition (European Metals SPERC): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids and their compounds. Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds. Types of products: Metal (massive)
Description of activities/processes	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. 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 containing 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.
Life cycle stage	Use at industrial sites
Chemical product category	PC 7: Base metals and alloys
Sector of use	SU 14: Manufacture of basic metals, including alloys
Link to website	http://www.reach-metals.eu/

Conditions of use

Amount used, frequency and duration of use (or from service life)

Number of release days per year >= 216 days/year
Explanation for the CSR: Number of emission days derived from a multi-metal background database of measured site-specific release factors.
216 days/year is the minimum of the 10th percentile of reported number of emission days for shaping massive metal in different processes (Cables, ingots, alloys, products, SEMIS, ...).
For ES for communication: *Number of days per year the substance is released to the environment*

Technical and organisational conditions and measures

On site treatment of off-air: Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter according to the BAT Reference Document in the Non-Ferrous Metals Industry
Explanation for the CSR: Direct air emissions should be reduced by implementing one or more of the

following RMMs (air concentration range for which the RMM is suitable is specified in parenthesis):
• Electrostatic precipitators using wide electrode spacing: 5 – 15 mg/Nm³
• Wet electrostatic precipitators: < 5 mg/Nm³
• Cyclones, but as primary collector: < 50 mg/Nm³
• Fabric or bag filters: high efficiency in controlling fine particulate (melting): achieve emission values < 5mg/Nm³. Membrane filtration techniques can achieve < 1 mg/Nm³
• Ceramic and metal mesh filters. PM10 particles are removed: 0.1 mg/Nm³
Wet scrubbers: < 4 mg/Nm3
For ES for communication: *Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter*

On site treatment of wastewater: Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange according to the BAT Reference Document in the Non-Ferrous Metals Industry (2017) applying minimum xx% removal efficiency
Explanation for the CSR: Direct water emissions should be reduced by implementing one or more of the following RMMs:
• Chemical precipitation: used primarily to remove the metal ions (e.g. the use of Ca(OH)2 to a pH 11: >99% removal efficiency; the use of Fe(OH)3 to a pH 11: 96% removal efficiency)
• Sedimentation (e.g. Na2S, pH 11, >99% removal efficiency)
• 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)
• Electrolysis: for low metal concentration at about 2 g/L (e.g. electrodialysis: 13% removal efficiency within 2 hours, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency)
• Reverse osmosis: extensively used for the removal of dissolved metals; Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptilolite and 100% removal efficiency for synthetic zeolite)
Following the Integrated Pollution Prevention and Control – BAT Reference note document, the treatment methods are very much dependent on the specific processes and the metals involved. More information can be found in the BAT Reference Document for the Non-Ferrous Metals Industry (2017).
For ES for communication: *Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange*

Conditions and measures related to biological sewage treatment plant

Biological STP : None [Effectiveness Water: 0%]
Explanation for the CSR: Metal shaping companies often have their own wastewater treatment plant (WWTP). The reported releases are after on-site WWTP and usually don't include an additional external treatment.
For ES for communication: -

Conditions and measures related to external treatment of waste (including article waste)

Particular considerations on the waste treatment operations: No (low amount)
Explanation for the CSR: Particular risks from waste treatment unlikely due to small fraction of used substance entering into the waste stage. Waste disposal according to national/local legislation is sufficient. In case of elevated metal concentration, recycling is considered.
For ES for communication: Dispose of waste product or used containers according to local regulations.

Other conditions affecting environmental exposure

Dilution factor to freshwater <= 10
Explanation for the CSR: -
For ES for communication: Local freshwater dilution factor 10

Discharge rate of effluent >= 2E3 m3/day
Explanation for the CSR: -
For ES for communication: *Assumed effluent discharge flow from site >= 2E3 m3/day*

Use amounts

Daily use amount at a site (tonnes/day): -
For ES for communication: Daily amount per site <= tonnes/day

Extrapolation factor for annual use amount: 216

Explanations for the release factors valid for all the sub-SPERCs

Releases to water: Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The value is the maximum of the 90th

percentiles of the release factors to water 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%) (Verdonck et al. 2014).
Releases to air: Release factor after RMM derived from a multi-metal background database of measured site-specific release factors. The value is the maximum of the 90th percentiles of the 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%) (Verdonck et al. 2014).
Releases to non agricultural soil: There are no direct releases to soil at industrial site.
Releases to waste: Release factor derived from a multi-metal background database of site-specific release factors. The value is the 90th percentile of the reported release factors to solid waste for 32 downstream user sites covering zinc, nickel, lead and antimony.

Sub-SPERC: European Metals SPERC 5.3.v2025 Industrial use of massive metal in shaping

Sub-SPERC applicability	
Environmental release category	ERC 5
Additional information on applicability domain: SPERC valid for metals with solid water partition coefficient for suspended matter between 10,000 L/kg and 300,000 L/kg.	

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.003	0.02	0	1

Chesar version: 3.9
Chesar SPERC modification date: 25/02/2026

SPERC European Metals (former Eurometaux) SPERC 6A.1.v2025: Intermediate use of metal compounds

Author: European Metals
Version date: November 2025

Product/substance domain	Substance groups or functions: SPERC valid for metals with solid water partition coefficient for suspended matter between 1,000 L/kg and 400,000 L/kg. Included in the metal definition (European Metals SPERCs): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids and their compounds. Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds.
Description of activities/processes	Since this metal SPERC is 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.
Life cycle stage	Use at industrial sites
Chemical product category	PC 7: Base metals and alloys
Sector of use	SU 14: Manufacture of basic metals, including alloys
Link to website	http://www.reach-metals.eu/

Conditions of use

Amount used, frequency and duration of use (or from service life)

Number of release days per year >= 182 days/year
Explanation for the CSR: Number of emission days derived from a multi-metal background database of measured site-specific release factors.
182 days/year is the 10th percentile of reported number of emission days for 168 sites from production of metal compounds.
For ES for communication: *Number of days per year the substance is released to the environment*

Technical and organisational conditions and measures

On site treatment of off-air: Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter according to the BAT Reference Document in the Non-Ferrous Metals Industry
Explanation for the CSR: Direct air emissions should be reduced by implementing one or more of the following RMMs (air concentration range for which the RMM is suitable is specified in parenthesis):
• Electrostatic precipitators using wide electrode spacing: 5 – 15 mg/Nm³
• Wet electrostatic precipitators: < 5 mg/Nm³
• Cyclones, but as primary collector: < 50 mg/Nm³
• Fabric or bag filters: high efficiency in controlling fine particulate (melting): achieve emission values < 5mg/Nm³. Membrane filtration techniques can achieve < 1 mg/Nm³
• Ceramic and metal mesh filters. PM10 particles are removed: 0.1 mg/Nm³
Wet scrubbers: < 4 mg/Nm3
For ES for communication: *Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter*

On site treatment of wastewater: Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange according to the BAT Reference Document in the Non-Ferrous Metals Industry (2017) applying minimum xx% removal efficiency
Explanation for the CSR: Direct water emissions should be reduced by implementing one or more of the following RMMs:
• Chemical precipitation: used primarily to remove the metal ions (e.g. the use of Ca(OH)2 to a pH 11: >99% removal efficiency; the use of Fe(OH)3 to a pH 11: 96% removal efficiency)
• Sedimentation (e.g. Na2S, pH 11, >99% removal efficiency)
• 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)

• Electrolysis: for low metal concentration at about 2 g/L (e.g. electrodialysis: 13% removal efficiency within 2 hours, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency)
• Reverse osmosis: extensively used for the removal of dissolved metals; Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptilolite and 100% removal efficiency for synthetic zeolite)
Following the Integrated Pollution Prevention and Control – BAT Reference note document, the treatment methods are very much dependent on the specific processes and the metals involved. More information can be found in the BAT Reference Document for the Non-Ferrous Metals Industry (2017).
For ES for communication: *Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange*

Conditions and measures related to biological sewage treatment plant

Biological STP : None [Effectiveness Water: 0%]
Explanation for the CSR: Metal compounds producing companies often have their own wastewater treatment plant (WWTP). The reported releases are after on-site WWTP and usually don't include an additional external treatment.
For ES for communication: -

Conditions and measures related to external treatment of waste (including article waste)

Particular considerations on the waste treatment operations: No (low concentration)
Explanation for the CSR: Waste includes sludge, filter cakes and solid waste. waste shall be handled according to the Waste Framework Directive and disposed of according to national/local legislation. If the metal content of the waste is elevated, internal or external recovery/recycling is considered.
For ES for communication: Dispose of waste product or used containers according to local regulations.

Other conditions affecting environmental exposure

Discharge rate of effluent >= 2E3 m3/day
Explanation for the CSR: -
For ES for communication: *Assumed effluent discharge flow from site >= 2E3 m3/day*

Dilution factor to freshwater <= 10
Explanation for the CSR: -
For ES for communication: Local freshwater dilution factor 10

Use amounts

Daily use amount at a site (tonnes/day): -
For ES for communication: Daily amount per site <= tonnes/day

Extrapolation factor for annual use amount: 182

Explanations for the release factors valid for all the sub-SPERCs

Releases to air: Release factor after RMM derived from a multi-metal background database of measured site-specific release factors. The value is the 90th percentile of the reported release factors to air for 145 sites from the production of metal compounds (Verdonck et al. 2014).

Releases to non agricultural soil: There are no direct releases to soil at industrial site.

Releases to waste: Release factor derived from a multi-metal background database of site-specific release factors. The value is the 90th percentile of the reported release factors to solid waste for 62 manufacturing sites covering zinc, nickel, lead, cobalt, cadmium and antimony.

Sub-SPERC: European Metals SPERC 6A.1b.v2025 Kd 1000-10000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 6a

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.2	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The value is the 90th percentile of the reported release factors to water since available data was too limited to develop robust regression (Verdonck et al. 2014).

Sub-SPERC: European Metals SPERC 6A.1c.v2025 Kd 10000-25000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 6a

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.2	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).

Sub-SPERC: European Metals SPERC 6A.1d.v2025 Kd 25000-60000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 6a

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.04	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).

Sub-SPERC: European Metals SPERC 6A.1e.v2025 Kd 60000-100000 L/kg

Sub-SPERC applicability			
Environmental release category	ERC 6a		
Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.			
Release factors			
To water (%)	**To air (%)**	**To non agricultural soil (%)**	**To waste (%)**
0.01	0.03	0	2.3
Explanations specific to the Sub-SPERC			
Releases to water: Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).			

Sub-SPERC: European Metals SPERC 6A.1f.v2025 Kd 100000-190000 L/kg

Sub-SPERC applicability			
Environmental release category	ERC 6a		
Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.			
Release factors			
To water (%)	**To air (%)**	**To non agricultural soil (%)**	**To waste (%)**
0.005	0.03	0	2.3
Explanations specific to the Sub-SPERC			
Releases to water: Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).			

Sub-SPERC: European Metals SPERC 6A.1g.v2025 Kd 190000-250000 L/kg

Sub-SPERC applicability			
Environmental release category	ERC 6a		
Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.			
Release factors			
To water (%)	**To air (%)**	**To non agricultural soil**	**To waste (%)**

		(%)	
0.002	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).

Sub-SPERC: European Metals SPERC 6A.1h.v2025 Kd 250000-400000 L/kg

Sub-SPERC applicability

Environmental release category	ERC 6a

Additional information on applicability domain: A relationship between solid-water partitioning coefficient for suspended matter (Kd) and the release factor to water can be justified because the Kd expresses the distribution between aqueous phase and suspended matter. Kd is an important parameter impacting the removal efficiency especially in sedimentation and precipitation RMMs but also in on-site runoff, cleaning operations, wet processes, etc.

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.001	0.03	0	2.3

Explanations specific to the Sub-SPERC

Releases to water:
Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The different values were derived from realistic worst-case regression line (RF = 10(1.59 – 1.14 x log(Kd)) of the 90th percentile of the release factors to water for 201 sites from the production of metal compounds (Verdonck et al. 2014).

Chesar version: 3.9
Chesar SPERC modification date: 25/02/2026

SPERC European Metals (former Eurometaux) SPERC 10A.1.v2025: Service life of constructions of massive metal, alloys or metallic coating, outdoor

Author: European Metals
Version date: November 2025

Product/substance domain	Scope of the SPERC Substance groups or function: This SPERC is valid for metallic metal, alloys and metallic coatings. Included in the metal definition (European Metals SPERCs): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids. Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds. Type of products: Buildings and outdoor constructions.
Description of activities/processes	Service life of outdoor buildings and constructions. The service life covers processes with low releases such as run-off. Processes such as sanding, polishing, machining etc. are not covered.
Life cycle stage	Service life (professional worker) Service life (consumers)
Chemical product category	
Sector of use	
Use in: Non agriculture	
Link to website	http://www.reach-metals.eu/

Conditions of use

Conditions and measures related to biological sewage treatment plant
Biological STP : Standard [Effectiveness Water: -%] Explanation for the CSR: - For ES for communication: Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Particular considerations on the waste treatment operations: Dedicated recollection infrastructure required Explanation for the CSR: - For ES for communication: Dedicated recollection infrastructure required for waste
Other conditions affecting environmental exposure
Place of use: Outdoor Explanation for the CSR: - For ES for communication: Outdoor use
Water contact during use: Yes Explanation for the CSR: - For ES for communication: *water contact during use.*
Use amounts
Local daily fraction of regional tonnage for the use (widespread): 5.5E-6
Explanations for the release factors valid for all the sub-SPERCs
Releases to water: Realistic worst-case value based a literature study with runoff data and emission rates from metallic roofs of Cu, Zn, Pb, Cr, Al, Ni (in steel). A service life of 25 years was assumed. See background document for more information.
Releases to air: Metals and metal compounds do not volatilise. Due to the massive physical state in service life, there is no dust formation that can become air-borne.
Releases to non agricultural soil: Realistic worst-case value based a literature study with runoff data and

emission rates from metallic roofs of Cu, Zn, Pb, Cr, Al, Ni (in steel). A service life of 25 years was assumed. See background document for more information.
Releases to waste: Metals are permanent materials which can be recycled again and again, keeping their value in the European economy. There is currently in the EU 90% recycling rate from buildings, leaving 10% available for release to waste.

Sub-SPERC: European Metals SPERC 10A.1.v2025 Service life of constructions of massive metal, alloys or metallic coating, outdoor

Sub-SPERC applicability			
Environmental release category	ERC 10a		
Release factors			
To water (%)	**To air (%)**	**To non agricultural soil (%)**	**To waste (%)**
1.25	0	1.25	10

Chesar version: 3.9
Chesar SPERC modification date: 25/02/2026

SPERC European Metals (former Eurometaux) SPERC 10A.2.v2025: Service life of batteries, indoor/outdoor

Author: European Metals
Version date: November 2025

Product/substance domain	Scope of the SPERC Substance groups or function: Metals in batteries. Included in the metal definition (European Metals SPERCs): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids. Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds. Type of products: Batteries (lead-acid batteries, nickel-cadmium batteries etc.)
Description of activities/processes	Service life of batteries, indoor/outdoor Service life includes foreseen uses of batteries by consumers
Life cycle stage	Service life (professional worker) Service life (consumers)
Chemical product category	
Sector of use	
Use in: Non agriculture	
Link to website	http://www.reach-metals.eu/

Conditions of use

Conditions and measures related to biological sewage treatment plant

Biological STP : Standard [Effectiveness Water: -%]
Explanation for the CSR: -
For ES for communication: Municipal sewage treatment plant is assumed.

Conditions and measures related to external treatment of waste (including article waste)

Particular considerations on the waste treatment operations: Other
Explanation for the CSR: Dedicated recollection infrastructure required according to the EU Batteries and Accumulators Directive
For ES for communication: Dedicated recollection infrastructure required for waste

Other conditions affecting environmental exposure

Place of use: Indoor/Outdoor
Explanation for the CSR: -
For ES for communication: Indoor or outdoor use

Water contact during use: No
Explanation for the CSR: -
For ES for communication: No water contact during use.

Use amounts

Local daily fraction of regional tonnage for the use (widespread): 5.5E-6

Explanations for the release factors valid for all the sub-SPERCs

Releases to water: There is no release to water because batteries are closed containers during service life, there is no leaking during service life and accidental release is not to be considered (ECHA Guidance R.16, Feb 2016, p. 171-172: no losses during explosion or car accidents).

Releases to air: Metals and metal compounds do not volatilise. Due to the massive physical state in service life and the containment in a battery, there is no dust formation that can become airborne.

Releases to non agricultural soil: There is no release to soil because batteries are closed containers during service life.

Releases to waste: The EU Batteries and Accumulators Directive requires the following targets to be met: - a

45% collection rate for waste portable batteries to be met by September 2016; - a prohibition on the disposal by landfill or incineration of waste industrial and automotive batteries in effect setting a 100% collection and recycling target; and - the setting of recycling efficiencies to ensure that a high proportion of the weight of waste batteries is recycled (65% of lead acid batteries, 75% of nickel-cadmium batteries and 50% of other waste batteries). In practice, the recycling rates are larger. The EU automotive lead-based battery collection and recycling rate for the period 2010/2012 is 99% (Eurobat, ILA, ACEA). Portable battery collection varies in the EU between 19% and 71% for the year 2015 with an average around 40% (EPBA). Given that battery recycling rates have further increased since then and will further increase in the future (given the regulatory and economic drivers), a reasonable recycling rate of 80% and a potential release fraction of 20% to solid waste is assumed.

Sub-SPERC: European Metals SPERC 10A.2.v2025 Service life of batteries, indoor/outdoor

Sub-SPERC applicability	
Environmental release category	ERC 10a

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0	0	0	20

Chesar version: 3.9
Chesar SPERC modification date: 25/02/2026

SPERC European Metals (former Eurometaux) SPERC 10A.3.v2025: Service life of metallic articles with no emission

Author: European Metals
Version date: November 2025

Product/substance domain	Scope of the SPERC Substance groups or function: Included in the metal definition (European Metals SPERCs): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids. Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds. Type of products: Products are metallic articles where the metal is either encapsulated / there is a mechanical barrier (to avoid direct contact with water) or there is no intended contact with water because incompatible with water (because this would lead to disfunctioning of the article): electronic and electric devices such as screens, monitors, IT and telecommunication equipment (e.g. mobile phone), large household appliances, small household appliances, photovoltaic cells, vehicles, etc.. Excluded type of products: brake pads, tyres, monitoring instruments.
Description of activities/processes	Service life of metallic articles with no emission. Service life covers foreseen use of articles by consumers. The service life covers only uses with no water-contact (either by using the article away from water or if the metal in the article is encapsulated or coated to avoid water-contact) and uses with no emissions from the article. Processes such as sanding, polishing, machining etc. are not covered.
Life cycle stage	Service life (professional worker) Service life (consumers)
Chemical product category	
Sector of use	
Use in: Non agriculture	
Link to website	http://www.reach-metals.eu/

Conditions of use

Conditions and measures related to external treatment of waste (including article waste)
Particular considerations on the waste treatment operations: Dedicated recollection infrastructure required Explanation for the CSR: - For ES for communication: Dedicated recollection infrastructure required for waste
Other conditions affecting environmental exposure
Place of use: Indoor/Outdoor Explanation for the CSR: - For ES for communication: Indoor or outdoor use
Water contact during use: No Explanation for the CSR: - For ES for communication: *No water-contact during use. Avoid cleaning with water.*
Biological STP : Standard [Effectiveness Water: -%] Explanation for the CSR: - For ES for communication: Municipal sewage treatment plant is assumed.
Use amounts
Local daily fraction of regional tonnage for the use (widespread): 5.5E-6
Explanations for the release factors valid for all the sub-SPERCs

Releases to water: Metal in either encapsulated / there is a mechanical barrier (to avoid direct contact with water) or there is no intended contact with water because incompatible with water (because this would lead to disfunctioning of the article) AND there is no abrasion of the article.
Releases to air: Metals and metal compounds do not volatilise. Due to the massive physical state in service life, there is no dust formation that can become air-borne.
Releases to non agricultural soil: See releases to water.
Releases to waste: Recycling rates for WEEE in the EU was in 2016 46% (range between 30% and 96%) (Eurostat). Potential fraction for solid waste is then 54%.

Sub-SPERC: European Metals SPERC 10A.3.v2025 Service life of metallic articles with no emission

Sub-SPERC applicability	
Environmental release category	ERC 10a

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0	0	0	54

Chesar version: 3.9
Chesar SPERC modification date: 25/02/2026

SPERC European Metals (former Eurometaux) SPERC 12A.1.v2025: Industrial use of massive metal in shaping

Author: European Metals
Version date: November 2025

Product/substance domain	Scope of the SPERC User groups: Industrial use of massive metal or alloys including production of SEMIS, drawing of cables, production of ingots, shaping of massive metal or alloys. Release defaults are derived from measured emissions. Substance groups or function: Metal (compounds) SPERC valid for metals with solid water partition coefficient for suspended matter between 10,000 L/kg and 300,000 L/kg. Included in the metal definition (European Metals SPERC): alkali metals, alkaline earth metals, transition metals, post-transition metals, metalloids and their compounds. Excluded from the metal definition: non-metals, halogens, noble gases and metallo-organic compounds. Types of products: Metal (massive)
Description of activities/processes	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. 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 containing 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.
Life cycle stage	Service life (worker at industrial site)
Chemical product category	PC 7: Base metals and alloys
Sector of use	SU 14: Manufacture of basic metals, including alloys
Link to website	http://www.reach-metals.eu/

Conditions of use

Amount used, frequency and duration of use (or from service life)
Number of release days per year >= 216 days/year Explanation for the CSR: Number of emission days derived from a multi-metal background database of measured site-specific release factors. 216 days/year is the minimum of the 10th percentile of reported number of emission days for shaping massive metal in different processes (Cables, ingots, alloys, products, SEMIS, ...). For ES for communication: *Number of days per year the substance is released to the environment*
Technical and organisational conditions and measures
On site treatment of off-air: Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter according to the BAT Reference Document in the Non-Ferrous Metals Industry Explanation for the CSR: Direct air emissions should be reduced by implementing one or more of the following RMMs (air concentration range for which the RMM is suitable is specified in parenthesis): • Electrostatic precipitators using wide electrode spacing: 5 – 15 mg/Nm³

• Wet electrostatic precipitators: < 5 mg/Nm³
• Cyclones, but as primary collector: < 50 mg/Nm³
• Fabric or bag filters: high efficiency in controlling fine particulate (melting): achieve emission values < 5mg/Nm³. Membrane filtration techniques can achieve < 1 mg/Nm³
• Ceramic and metal mesh filters. PM10 particles are removed: 0.1 mg/Nm³
Wet scrubbers: < 4 mg/Nm3
For ES for communication: *Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter*

On site treatment of wastewater: Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange according to the BAT Reference Document in the Non-Ferrous Metals Industry (2017) applying minimum xx% removal efficiency
Explanation for the CSR: Direct water emissions should be reduced by implementing one or more of the following RMMs:
• Chemical precipitation: used primarily to remove the metal ions (e.g. the use of Ca(OH)2 to a pH 11: >99% removal efficiency; the use of Fe(OH)3 to a pH 11: 96% removal efficiency)
• Sedimentation (e.g. Na2S, pH 11, >99% removal efficiency)
• 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)
• Electrolysis: for low metal concentration at about 2 g/L (e.g. electrodialysis: 13% removal efficiency within 2 hours, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency)
• Reverse osmosis: extensively used for the removal of dissolved metals; Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptilolite and 100% removal efficiency for synthetic zeolite)
Following the Integrated Pollution Prevention and Control – BAT Reference note document, the treatment methods are very much dependent on the specific processes and the metals involved. More information can be found in the BAT Reference Document for the Non-Ferrous Metals Industry (2017).
For ES for communication: *Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange*

Conditions and measures related to biological sewage treatment plant

Biological STP : None [Effectiveness Water: 0%]
Explanation for the CSR: Metal shaping companies often have their own wastewater treatment plant (WWTP). The reported releases are after on-site WWTP and usually don't include an additional external treatment.
For ES for communication: -

Conditions and measures related to external treatment of waste (including article waste)

Particular considerations on the waste treatment operations: No (low amount)
Explanation for the CSR: Particular risks from waste treatment unlikely due to small fraction of used substance entering into the waste stage. Waste disposal according to national/local legislation is sufficient. In case of elevated metal concentration, recycling is considered.
For ES for communication: Dispose of waste product or used containers according to local regulations.

Other conditions affecting environmental exposure

Discharge rate of effluent >= 2E3 m3/day
Explanation for the CSR: -
For ES for communication: *Assumed effluent discharge flow from site >= 2E3 m3/day*

Dilution factor to freshwater <= 10
Explanation for the CSR: -
For ES for communication: Local freshwater dilution factor 10

Use amounts

Daily use amount at a site (tonnes/day): -
For ES for communication: Daily amount per site <= tonnes/day

Extrapolation factor for annual use amount: 216

Explanations for the release factors valid for all the sub-SPERCs

Releases to water: Release factor after on-site treatment of wastewater derived from a multi-metal background database of measured site-specific release factors. The value is the maximum of the 90th percentiles of the release factors to water 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%) (Verdonck et al. 2014).
Releases to air: Release factor after RMM derived from a multi-metal background database of measured site-specific release factors. The value is the maximum of the 90th percentiles of the 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%) (Verdonck et al. 2014).
Releases to non agricultural soil: There are no direct releases to soil at industrial site.
Releases to waste: Release factor derived from a multi-metal background database of site-specific release factors. The value is the 90th percentile of the reported release factors to solid waste for 32 downstream user sites covering zinc, nickel, lead and antimony.

Sub-SPERC: European Metals SPERC 12A.1.v2025 Industrial use of massive metal in shaping

Sub-SPERC applicability	
Environmental release category	ERC 12a
Additional information on applicability domain: SPERC valid for metals with solid water partition coefficient for suspended matter between 10,000 L/kg and 300,000 L/kg.	

Release factors

To water (%)	To air (%)	To non agricultural soil (%)	To waste (%)
0.003	0.02	0	1

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Chesar SPERC modification date: 25/02/2026