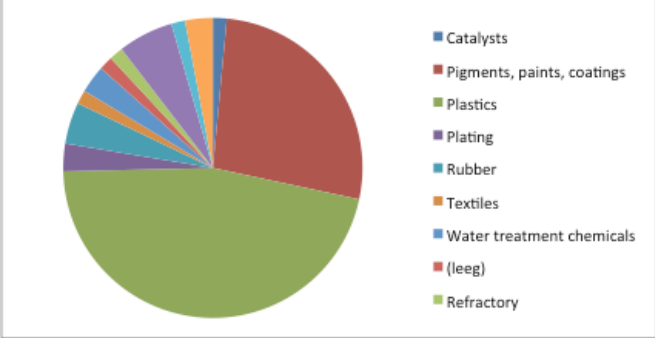
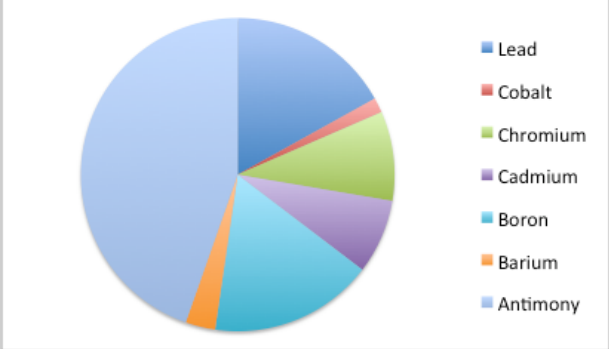
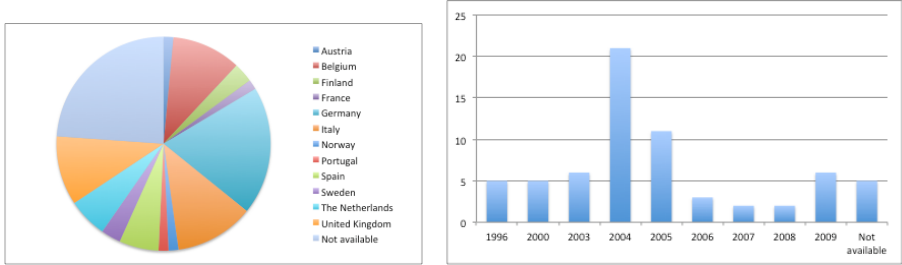


Section	Content
Title of spERC	Formulation of metal compounds
spERC code	Eurometaux 2.2a.v2.1 - Formulation of metal compounds in plastics and rubber industry sector Eurometaux 2.2b.v2.1 - Formulation of metal compounds in pigments, paints and coating industry sector Eurometaux 2.2c.v2.1 - Formulation of metal compounds in other than plastics and paint sectors
Scope	<p>Limitations of coverage compared to ERC relate to:</p> <p>User groups: User groups include: mixing and blending of metal compounds into preparations. The coverage of the main industries are pigments, paints, coatings and plastics, rubber. Other industries covered (but to a lesser extent) are catalysts, textiles, water treatment chemicals, refractory.</p>  <p>Substance groups or functions: Release defaults are derived from measured emissions. Metal representativeness of background data:</p>  <p>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 300,000 L/kg.</p> <p>Types of products: Metal compounds (use as flame retardant synergist, stabiliser, pigment, anti-corrosive agent, etc...)</p>

	<p>Geographical and Time: Release defaults are derived from measured emissions from various EU member states and between 1996-2009.</p> 
<p>Related use descriptors</p>	<p>PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC26 SU 3, 10, 14, ERC2</p>
<p>Operational conditions</p>	<p>Since metal SPERCs are based on measured data at end-of-pipe on-site, all processes are integrated in the release fractions from raw materials handling to cleaning and maintenance.</p> <p>Size of installations: Amount used can vary between 10 and 40,000 Tonnes/year.</p> <p>Processing conditions: Open and closed systems, wet and dry processes</p>
<p>Obligatory onsite RMMs</p>	<p>Air Direct air emissions should be reduced by implementing one or more of the following RMMs:</p> <ul style="list-style-type: none"> • 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/Nm <p>One or more of these RMMs (of which fabric or bag filters and wet scrubbers are more common) were reported to be present in more than 80% of the sites.</p> <p>Fugitive emissions should be reduced from material storage and handling, reactors or furnaces and from material transfer points by following hierarchical measures: process optimization and minimization of emissions, sealed reactors and furnaces, targeted fume collection.</p> <p>Water Following IPPC-BAT document, the treatment methods are very much dependent on the specific processes and the metals involved. Direct water emissions should be reduced by implementing one or more of the following RMMs:</p> <ul style="list-style-type: none"> • Chemical precipitation: used primarily to remove the metal ions (e.g. Ca(OH)₂, pH 11 precipitation: >99% removal efficiency; Fe(OH)₃, pH 11: 96% removal efficiency) • 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 (e.g. electrodialysis: 13% removal)

	<p>efficiency within 2 hours at 2g/L, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency)</p> <ul style="list-style-type: none"> • 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 clinoptinolite and 100% removal efficiency for synthetic zeolite) • Biological treatment plant <table border="1" data-bbox="492 443 1403 642"> <tr> <td data-bbox="492 443 781 506">Eurometaux 2.2a.v2.1 (plastics and rubber)</td> <td data-bbox="781 443 1084 506">98% (82.5% - 99.9%)</td> <td data-bbox="1084 443 1403 506">Based on data from 6 sites.</td> </tr> <tr> <td data-bbox="492 506 781 569">Eurometaux 2.2b.v2.1 (paints and coatings)</td> <td data-bbox="781 506 1084 569">91% (90% - 93%)</td> <td data-bbox="1084 506 1403 569">Based on data from 3 sites.</td> </tr> <tr> <td data-bbox="492 569 781 642">Eurometaux 2.2c.v2.1 (other sectors)</td> <td data-bbox="781 569 1084 642">No RMMs</td> <td data-bbox="1084 569 1403 642"></td> </tr> </table> <p>Waste Releases to the floor, water and soil are to be prevented. If the metal content of the waste is elevated enough, internal or external recovery/recycling might be considered.</p>	Eurometaux 2.2a.v2.1 (plastics and rubber)	98% (82.5% - 99.9%)	Based on data from 6 sites.	Eurometaux 2.2b.v2.1 (paints and coatings)	91% (90% - 93%)	Based on data from 3 sites.	Eurometaux 2.2c.v2.1 (other sectors)	No RMMs				
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Eurometaux 2.2c.v2.1 (other sectors)	No RMMs												
Substance use rate	Assessment defaults as set by ERC. It is recommended to use a realistic substance use rate.												
Days emitting	<p>Default number of emission days are derived from a multi-metal background database of measured site-specific release factors collected under the former Directive of New and Existing Substances and REACH 2010 registration dossiers.</p> <table border="1" data-bbox="492 1068 1403 1346"> <tr> <td data-bbox="492 1068 781 1157">Eurometaux 2.2a.v2.1 (plastics and rubber)</td> <td data-bbox="781 1068 935 1157">47 days/year</td> <td data-bbox="935 1068 1403 1157">The 10th percentile of reported site-specific number of emission days for 50 sites.</td> </tr> <tr> <td data-bbox="492 1157 781 1251">Eurometaux 2.2b.v2.1 (paints and coatings)</td> <td data-bbox="781 1157 935 1251">150 days/year</td> <td data-bbox="935 1157 1403 1251">The 10th percentile of reported site-specific number of emission days for 15 sites.</td> </tr> <tr> <td data-bbox="492 1251 781 1346">Eurometaux 2.2c.v2.1 (other sectors)</td> <td data-bbox="781 1251 935 1346">67 days/year</td> <td data-bbox="935 1251 1403 1346">The 10th percentile of reported site-specific number of emission days for 13 sites.</td> </tr> </table>	Eurometaux 2.2a.v2.1 (plastics and rubber)	47 days/year	The 10th percentile of reported site-specific number of emission days for 50 sites.	Eurometaux 2.2b.v2.1 (paints and coatings)	150 days/year	The 10th percentile of reported site-specific number of emission days for 15 sites.	Eurometaux 2.2c.v2.1 (other sectors)	67 days/year	The 10th percentile of reported site-specific number of emission days for 13 sites.			
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Eurometaux 2.2b.v2.1 (paints and coatings)	150 days/year	The 10th percentile of reported site-specific number of emission days for 15 sites.											
Eurometaux 2.2c.v2.1 (other sectors)	67 days/year	The 10th percentile of reported site-specific number of emission days for 13 sites.											
Integrated release factors (air, water, soil)	<p>Default release factors are derived from a multi-metal background database of measured site-specific release factors collected from peer-reviewed EU Risk Assessment Reports under the former Directive of New and Existing Substances and REACH 2010 registration dossiers.</p> <p>Air</p> <table border="1" data-bbox="492 1535 1403 1814"> <tr> <td data-bbox="492 1535 781 1623">Eurometaux 2.2a.v2.1 (plastics and rubber)</td> <td data-bbox="781 1535 967 1623">0.005% (after on-site RMM)</td> <td data-bbox="967 1535 1403 1623">The 90th percentile of reported site-specific release factors to air for 15 sites.</td> </tr> <tr> <td data-bbox="492 1623 781 1717">Eurometaux 2.2b.v2.1 (paints and coatings)</td> <td data-bbox="781 1623 967 1717">0.005% (after on-site RMM)</td> <td data-bbox="967 1623 1403 1717">The 90th percentile of reported site-specific release factors to water for 11 sites.</td> </tr> <tr> <td data-bbox="492 1717 781 1814">Eurometaux 2.2c.v2.1 (other sectors)</td> <td data-bbox="781 1717 967 1814">0.01% (after on-site RMM)</td> <td data-bbox="967 1717 1403 1814">The 90th percentile of reported site-specific release factors to water for 6 sites.</td> </tr> </table> <p>Water</p> <table border="1" data-bbox="492 1871 1403 1902"> <tr> <td data-bbox="492 1871 781 1902">Eurometaux 2.2a.v2.1</td> <td data-bbox="781 1871 967 1902">0.0002%</td> <td data-bbox="967 1871 1403 1902">The 90th percentile of reported</td> </tr> </table>	Eurometaux 2.2a.v2.1 (plastics and rubber)	0.005% (after on-site RMM)	The 90 th percentile of reported site-specific release factors to air for 15 sites.	Eurometaux 2.2b.v2.1 (paints and coatings)	0.005% (after on-site RMM)	The 90 th percentile of reported site-specific release factors to water for 11 sites.	Eurometaux 2.2c.v2.1 (other sectors)	0.01% (after on-site RMM)	The 90 th percentile of reported site-specific release factors to water for 6 sites.	Eurometaux 2.2a.v2.1	0.0002%	The 90th percentile of reported
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Eurometaux 2.2c.v2.1 (other sectors)	0.01% (after on-site RMM)	The 90 th percentile of reported site-specific release factors to water for 6 sites.											
Eurometaux 2.2a.v2.1	0.0002%	The 90th percentile of reported											

	(plastics and rubber)	(after on-site STP)	site-specific release factors to wastewater for 35 sites.		
	Eurometaux 2.2b.v2.1 (paints and coatings)	0.01% (after on-site STP)	The 90th percentile of reported site-specific release factors to wastewater for 16 sites.		
	Eurometaux 2.2c.v2.1 (other sectors)	2% (before on-site STP)	The 90th percentile of reported site-specific release factors to wastewater for 14 sites.		
	<p>Soil Not applicable to local scale</p> <p>Waste</p> <table border="1"> <tr> <td>1%</td> <td>The 90th percentile of reported site-specific release factors to solid waste for 32 downstream user sites covering zinc, nickel, lead, antimony</td> </tr> </table>			1%	The 90 th percentile of reported site-specific release factors to solid waste for 32 downstream user sites covering zinc, nickel, lead, antimony
1%	The 90 th percentile of reported site-specific release factors to solid waste for 32 downstream user sites covering zinc, nickel, lead, antimony				
Optional risk management measures for iteration	For iteration purposes (if SPERC default release factors do not demonstrate safe use), it is recommended to measure/monitor the air and/or water releases as a first refinement step. In case further iterations are required, a combination of multiple obligatory on-site measures can be considered.				
Narrative description	<p>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.</p> <p>Hazardous wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately to hazardous waste incineration plants or hazardous waste landfills as hazardous waste.</p>				
Scaling	<p>If a site does not comply with the conditions stipulated in the SPERC, it is recommended to monitor the air and water releases and apply the Metals DU scaling tool in order to perform a site-specific assessment. Each site can evaluate whether he works inside the boundaries set by the ES through scaling. The Metal EUSES calculator for DUs is freely available to metal industry DUs and can be downloaded from http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool.</p>				

Determinant Label ¹	Quali-/Quantitative ²	Value ³	Description of Value ⁴
On site treatment of wastewater	Qual	Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange or biological treatment	<p>Following IPPC-BREF note document, the treatment methods are very much dependent on the specific processes and the metals involved. Direct water emissions should be reduced by implementing one or more of the following RMMs:</p> <ul style="list-style-type: none"> • Chemical precipitation: used primarily to remove the metal ions (e.g. Ca(OH)₂, pH 11 precipitation: >99% removal efficiency; Fe(OH)₃, pH 11: 96% removal efficiency) • Sedimentation (e.g. Na₂S, pH 11, >99% removal efficiency) • Filtration: used as final clarification step (e.g.

			<p>ultrafiltration, pH 5.1: 93% removal efficiency, nanofiltration: 97% removal efficiency, reverse osmosis, pH 4-11: 99% removal efficiency)</p> <p>"• Electrolysis: for low metal concentration (e.g. electrodialysis: 13% removal efficiency within 2 hours at 2g/L, membrane electrolysis, electrochemical precipitation, pH 4-10, >99% removal efficiency)</p> <p>• Reverse osmosis: extensively used for the removal of dissolved metals</p> <p>Ion exchange: final cleaning step in the removal of heavy metal from process wastewater (e.g. 90% removal efficiency for clinoptinolite and 100% removal efficiency for synthetic zeolite)</p> <p>More information can be found in EC (2001), Integrated Pollution Prevention and Control (IPCC): reference document on Best Available Techniques in the Non Ferrous Metals Industries.</p>
On site treatment of off-air	Qual	<p>Electrostatic precipitator or wet electrostatic precipitator or cyclones or fabric/bag filter or ceramic/metal mesh filter or wet scrubber</p>	<p>Direct air emissions should be reduced by implementing one or more of the following RMMs:</p> <ul style="list-style-type: none"> · 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 <p>Wet scrubbers: < 4 mg/Nm</p> <p>Fugitive emissions should be reduced from material storage and handling, reactors or furnaces and from material transfer points by following hierarchical measures: process optimization and minimization of emissions, sealed reactors and furnaces, targeted fume collection.</p>