

## 1 MANUFACTURE AND USES

### 1.1 Manufacture

The following lead manufacturing processes have been assessed:

- Primary lead production (IU1)
- Secondary lead production (IU2)

### 1.2 Identified uses

#### 1.2.1 Formulation use and use at industrial sites

In addition to the manufacturing, the following industrial uses which employ lead metal are identified in the registration dossier:

- Lead battery production (IU3)
- Lead sheet production (IU4)
- Use of Lead in production of Hot-Dip Galvanized Steel (IU5)
- Use of lead metal in the production of a range of lead articles (e.g. cast, rolled and extruded products, ammunition, lead shot) (IU6)
- Use of lead metal in the production of leaded steels (IU7)
- Lead powder production (IU8)
- Use of lead metal in lead oxide manufacture (IU9)
- Use of lead metal in stabiliser production (IU9)
- Use of molten lead as heat transfer fluid in closed process (IU10)
- Use of lead as a laboratory agent and in chemical analysis (IU26)
- Use of lead metal in the production of leaded copper alloys (IU27)

#### 1.2.2 Uses by professional workers

- Professional use of lead solder (IU11)

#### 1.2.3 Article service life

- Professional use of lead ammunition (IU12)
- Professional use of articles with expected dermal contact (IU13)
- Installation and maintenance of Lead sheet by professional users (IU14)
- Professional assembly of lead acid batteries (IU15)
- Professional use of leaded steels (IU16)
- Professional use of inert anodes (IU17)
- Consumer use of articles with expected dermal exposure (IU18)
- Consumer use of external lead sheet (IU19)
- Consumer use of internal lead sheet (IU20)
- Consumer use of articles with no expected exposure (IU21)
- Consumer use of sealed batteries (IU22)
- Consumer use of lead ammunition (IU24)
- Consumer use of lead during the process of reloading spent ammunition rounds (IU25)

## 1.3 Uses advised against

In addition to the legal restrictions applying to the use of lead, the following activities are uses advised against:

- Consumer use of solder
- Use of lead shot for hunting in wetlands

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## MANUFACTURE

**Table 1 Manufacture**

Confidential	IU number	Identified Use (IU) name	Substance supplied to that use	Use descriptors
	1	Primary lead production		<p>Process category (PROC):</p> <p>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</p> <p>PROC 26: Handling of solid inorganic substances at ambient temperature</p> <p>PROC 28: Cleaning and repair</p> <p>PROC 21: Low energy manipulation of substances bound in materials and/or articles</p> <p>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</p> <p>PROC 1: Use in closed process, no likelihood of exposure</p> <p>PROC 2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>Market sector by type of chemical product:</p> <p>PC 7: Base metals and alloys</p> <p>Environmental release category (ERC):</p> <p>ERC 1: Manufacture of the substance</p>
	2	Secondary lead production		<p>Process category (PROC):</p> <p>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</p> <p>PROC 21: Low energy manipulation of substances bound in materials and/or articles</p> <p>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises</p>

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Confidential	IU number	Identified Use (IU) name	Substance supplied to that use	Use descriptors
				<p>PROC 26: Handling of solid inorganic substances at ambient temperature                      PROC 28: Cleaning and repair</p> <p>Market sector by type of chemical product:                      PC 7: Base metals and alloys</p> <p>Environmental release category (ERC):                      ERC 1: Manufacture of the substance</p>

## FORMULATION USE AND USE IN INDUSTRIAL SETTINGS

**Table 1 Formulation use and use in industrial settings**

	3	Lead battery production	<p>as such (substance itself)</p> <p>in a mixture</p>	<p>Process category (PROC):</p> <p>PROC 3: Use in closed batch process (synthesis or formulation)                      PROC 21: Low energy manipulation of substances bound in materials and/or articles                      PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature.                      Industrial setting                      PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature                      PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises                      PROC 25: Other hot work operations with metals                      PROC 28: Cleaning and repair                      PROC 26: Handling of solid inorganic substances at ambient temperature</p> <p>Market sector by type of chemical product: PC 7</p> <p>Environmental release category (ERC):                      ERC 5: Use at industrial site leading to inclusion into/onto article                      ERC 6a: Use of intermediate</p>
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				<p>Sector of use (SU):</p> <ul style="list-style-type: none"> <li>SU 16: Manufacture of computer, electronic and optical products, electrical equipment</li> <li>SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment</li> </ul> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC):</p> <ul style="list-style-type: none"> <li>AC1: Vehicles</li> <li>AC2: Machinery, mechanical appliances, electrical/electronic articles</li> <li>AC3: Electrical batteries and accumulators</li> </ul>
	4	Lead sheet production	as such (substance itself)	<p>Process category (PROC):</p> <ul style="list-style-type: none"> <li>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</li> <li>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</li> <li>PROC 26: Handling of solid inorganic substances at ambient temperature</li> <li>PROC 21: Low energy manipulation of substances bound in materials and/or articles</li> <li>PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles</li> <li>PROC 28: Cleaning and repair</li> <li>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises</li> </ul> <p>Market sector by type of chemical product:</p> <ul style="list-style-type: none"> <li>PC 7: Base metals and alloys</li> </ul> <p>Environmental release category (ERC):</p> <ul style="list-style-type: none"> <li>ERC 5: Use at industrial site leading to inclusion into/onto article</li> </ul> <p>Sector of use (SU):</p> <ul style="list-style-type: none"> <li>SU 14: Manufacture of basic metals, including alloys</li> <li>SU 15: Manufacture of fabricated metal products, except machinery and equipment</li> </ul> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC):</p>

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				AC 7: Metal articles
	5	Use of Lead in production of Hot-Dip Galvanized Steel	as such (substance itself)	<p>Process category (PROC):</p> <p>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature            PROC 13: Treatment of articles by dipping and pouring</p> <p>Market sector by type of chemical product:</p> <p>PC 14: Metal surface treatment products, including galvanic and electroplating products</p> <p>Environmental release category (ERC):</p> <p>ERC 5: Use at industrial site leading to inclusion into/onto article</p> <p>Sector of use (SU):</p> <p>SU 15: Manufacture of fabricated metal products, except machinery and equipment</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC):</p> <p>AC 7: Metal articles</p>
	6	Use of lead metal in the production of a range of lead articles (e.g. cast, rolled and extruded products, ammunition, lead shot)	as such (substance itself)  in a mixture	<p>Process category (PROC):</p> <p>PROC 26: Handling of solid inorganic substances at ambient temperature            PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting            PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature            PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles            PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation            PROC 21: Low energy manipulation of substances bound in materials and/or articles            PROC 25: Other hot work operations with metals            PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises            PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>Market sector by type of chemical product:</p> <p>PC 7: Base metals and alloys</p>

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				<p>PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products</p> <p>Environmental release category (ERC):</p> <p>ERC 5: Use at industrial site leading to inclusion into/onto article</p> <p>Sector of use (SU):</p> <p>SU 15: Manufacture of fabricated metal products, except machinery and equipment  SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC):</p> <p>AC 1: Vehicles  AC 2: Machinery, mechanical appliances, electrical/electronic articles  AC 3: Electrical batteries and accumulators  AC 7: Metal articles</p>
	7	Use of lead metal in the production of leaded steels	as such (substance itself)	<p>Process category (PROC):</p> <p>PROC 21: Low energy manipulation of substances bound in materials and/or articles  PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting  PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature  PROC 26: Handling of solid inorganic substances at ambient temperature  PROC 28: Manual maintenance (cleaning and repair) of machinery  PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)  PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles  PROC 25: Other hot work operations with metals</p> <p>Market sector by type of chemical product:</p> <p>PC 7: Base metals and alloys</p> <p>Environmental release category (ERC):</p> <p>ERC 3 Formulation into solid matrix</p>

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				<p>Sector of use (SU): SU 14: Manufacture of basic metals, including alloys</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC): AC 7: Metal articles</p>
8	Lead powder production	as such (substance itself)	<p>Process category (PROC):</p> <p>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</p> <p>PROC 25: Other hot work operations with metals</p> <p>PROC 26: Handling of solid inorganic substances at ambient temperature</p> <p>PROC 27a: Production of metal powders (hot processes)</p> <p>PROC 27b: Production of metal powders (wet processes)</p> <p>PROC 21: Low energy manipulation of substances bound in materials and/or articles</p> <p>Market sector by type of chemical product:</p> <p>PC 0: Other: Metal Powders</p> <p>PC 7: Base metals and alloys</p> <p>Environmental release category (ERC): ERC 2 Formulation into mixture</p> <p>Sector of use (SU): SU 14: Manufacture of basic metals, including alloys</p> <p>Subsequent service life relevant for that use?:</p> <p>Article category related to subsequent service life (AC):</p>	
9	Use of lead metal in lead oxide production and	as such (substance itself)	<p>Process category (PROC):</p> <p>PROC 21: Low energy manipulation of substances bound in materials and/or articles</p> <p>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</p>	



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		use of lead oxide in stabiliser production		<p>PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles</p> <p>PROC 26: Handling of solid inorganic substances at ambient temperature</p> <p>PROC 1: Use in closed process, no likelihood of exposure</p> <p>PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>Market sector by type of chemical product:</p> <p>PC 19: Intermediates</p> <p>Environmental release category (ERC):</p> <p>ERC 6a: Use of intermediate</p> <p>Sector of use (SU):</p> <p>SU 8: Manufacture of bulk, large scale chemicals (including petroleum products)</p> <p>Subsequent service life relevant for that use?: No</p> <p>Article category related to subsequent service life (AC):</p> <p>N/A</p>
	10	Use of molten lead as heat transfer fluid in closed process	As such	<p>Process category (PROC):</p> <p>PROC 2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</p> <p>PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles</p> <p>PROC 26: Handling of solid inorganic substances at ambient temperature</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>Market sector by type of chemical product:</p> <p>PC 16: Heat transfer fluids</p> <p>Environmental release category (ERC):</p>

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				<p>ERC 7: Use of functional fluid at industrial site</p> <p>Sector of use (SU):</p> <p>SU 14: Manufacture of basic metals, including alloys  SU 15: Manufacture of fabricated metal products, except machinery and equipment</p> <p>Subsequent service life relevant for that use?: No</p> <p>Article category related to subsequent service life (AC): N/A</p>
	26	Use of lead as a laboratory reagent and in chemical analysis	as such (substance itself)	<p>Process category (PROC):</p> <p>PROC 15: Use as laboratory reagent</p> <p>Market sector by type of chemical product:</p> <p>PC 21: Laboratory chemicals</p> <p>Environmental release category (ERC):</p> <p>ERC 6b: Use of reactive processing aid at industrial site (no inclusion into or onto article)</p> <p>Sector of use (SU): SU 14</p> <p>Subsequent service life relevant for that use?: No</p>
	27	Use of lead metal in the production of copper alloys	as such (substance itself)	<p>Process category (PROC):</p> <p>PROC 21: Low energy manipulation and handling of substances bound in/on materials or articles</p> <p>PROC 22: Manufacturing and processing of minerals and/or metals at substantially elevated temperature</p> <p>PROC 23: Open processing and transfer operations at substantially elevated temperature</p> <p>PROC 24: High (mechanical) energy work-up of substances bound in /on materials and/or articles</p> <p>PROC 25: Other hot work operations with metals</p> <p>PROC 28: Manual maintenance (cleaning and repair) of machinery</p> <p>Market sector by type of chemical product:</p> <p>PC 7: Base metals and alloys</p> <p>Environmental release category (ERC):</p> <p>ERC 3 Formulation into solid matrix</p> <p>Sector of use (SU):</p> <p>SU 14: Manufacture of basic metals, including alloys</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC):</p>

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				AC 7: Metal articles
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## USES BY PROFESSIONAL WORKERS

**Table 2 Uses by professional workers**

Confidential	IU number	Identified Use (IU) name	Substance supplied to that use	Use descriptors
	11	Professional use of lead solder	as such (substance itself) in a mixture	<p>Process category (PROC):</p> <p>PROC 0: Other: use of lead solder</p> <p>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC 25: Other hot work operations with metals</p> <p>PROC 15: Use as laboratory reagent</p> <p>Market sector by type of chemical product:</p> <p>PC 7: Base metals and alloys</p> <p>PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products</p> <p>Environmental release category (ERC):</p> <p>ERC 0: Other: professional use of lead solder</p> <p>ERC 8c: Widespread use leading to inclusion into/onto article (indoor)</p> <p>Sector of use (SU):</p> <p>SU 0: Other: Professional use of lead solder</p> <p>SU 15: Manufacture of fabricated metal products, except machinery and equipment</p> <p>SU 16: Manufacture of computer, electronic and optical products, electrical equipment</p> <p>SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment</p> <p>SU 19: Building and construction work</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC):</p> <p>AC 7: Metal articles</p> <p>AC 3: Electrical batteries and accumulators</p>

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## ARTICLE SERVICE LIFE

**Table 3 Article Service Life**

Confidential	IU number	Identified Use (IU) name	Substance supplied to that use	Use descriptors
	12	Professional use of lead ammunition (non-military)	in a mixture	<p>Process category (PROC): PROC 0: Other: Professional use of lead ammunition</p> <p>Market sector by type of chemical product:</p> <p>Environmental release category (ERC): ERC 10a: Widespread use of articles with low release (outdoor) ERC 11a: Widespread use of articles with low release (indoor)</p> <p>Sector of use (SU):</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC): AC 7: Metal articles</p>
	13	Professional use of articles with expected dermal contact	as such (substance itself) in a mixture	<p>Process category (PROC): PROC 0: Other: Use of lead articles with expected dermal contact</p> <p>Market sector by type of chemical product: PC 7: Base metals and alloys</p> <p>Environmental release category (ERC): ERC 10a: Widespread use of articles with low release (outdoor) ERC 11a: Widespread use of articles with low release (indoor)</p> <p>Sector of use (SU):</p> <p>Subsequent service life relevant for that use?: yes</p>

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Confidential	IU number	Identified Use (IU) name	Substance supplied to that use	Use descriptors
				Article category related to subsequent service life (AC): AC 7: Metal articles
	14	Installation and maintenance of Lead sheet by professional users	as such (substance itself)	<p>Process category (PROC):</p> <p>PROC 0: Other: Installation and maintenance of Lead sheet</p> <p>PROC 21: Low energy manipulation of substances bound in materials and/or articles</p> <p>Market sector by type of chemical product:</p> <p>PC 7: Base metals and alloys</p> <p>Environmental release category (ERC):</p> <p>ERC 10a: Widespread use of articles with low release (outdoor)</p> <p>ERC 11a: Widespread use of articles with low release (indoor)</p> <p>Sector of use (SU):</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC): AC 7: Metal articles</p>
	15	Professional assembly of lead acid batteries	as such (substance itself)  in a mixture	<p>Process category (PROC):</p> <p>PROC 0: Other: Lead acid batteries</p> <p>Market sector by type of chemical product:</p> <p>Environmental release category (ERC):</p> <p>ERC 10a: Widespread use of articles with low release (outdoor)</p> <p>ERC 11a: Widespread use of articles with low release (indoor)</p> <p>Sector of end use (SU):</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC):</p>

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Confidential	IU number	Identified Use (IU) name	Substance supplied to that use	Use descriptors
				AC1: Vehicles AC2: Machinery, mechanical appliances, electrical/electronic articles AC3: Electrical batteries and accumulators
	16	Professional use of leaded steels	as such (substance itself)  in a mixture	Process category (PROC): PROC 0: Other: Leaded steels  Market sector by type of chemical product: PC 7: Base metals and alloys  Environmental release category (ERC): ERC 0: Other: Professional use of leaded steels ERC 10a: Widespread use of articles with low release (outdoor) ERC 11a: Widespread use of articles with low release (indoor)  Sector of use (SU): SU 16: Manufacture of computer, electronic and optical products, electrical equipment  Subsequent service life relevant for that use?: yes  Article category related to subsequent service life (AC): AC 7: Metal articles
	17	Professional use of inert anodes	as such (substance itself)	Process category (PROC): PROC 0: Other: Professional use of inert anodes  Market sector by type of chemical product: PC 0: Other: Inert anodes  Environmental release category (ERC): ERC 10a: Widespread use of articles with low release (outdoor)ERC 11a: Widespread use of articles with low release (indoor)

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Confidential	IU number	Identified Use (IU) name	Substance supplied to that use	Use descriptors
				Sector of use (SU): Subsequent service life relevant for that use?: Article category related to subsequent service life (AC):

Confidential	IU number	Identified Use (IU) name	Use descriptors
	18	Consumer use of articles with expected dermal exposure	Chemical product category (PC): PC 7: Base metals and alloys  Environmental release category (ERC): ERC 10a: Widespread use of articles with low release (outdoor) ERC 11a: Widespread use of articles with low release (indoor)  Subsequent service life relevant for that use?: yes  Article category related to subsequent service life (AC): AC 7: Metal articles
	19	Consumer use of external lead sheet	Chemical product category (PC): PC 7: Base metals and alloys  Environmental release category (ERC): ERC 10a: Widespread use of articles with low release (outdoor)  Subsequent service life relevant for that use?: yes  Article category related to subsequent service life (AC): AC 7: Metal articles

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Confidential	IU number	Identified Use (IU) name	Use descriptors
	20	Consumer use of internal lead sheet	<p>Chemical product category (PC): PC 7: Base metals and alloys</p> <p>Environmental release category (ERC): ERC 11a: Widespread use of articles with low release (indoor)</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC): AC 7: Metal articles</p>
	21	Consumer use of articles with no expected exposure	<p>Chemical product category (PC): PC 7: Base metals and alloys</p> <p>Environmental release category (ERC): ERC 10a: Widespread use of articles with low release (outdoor) ERC 11a: Widespread use of articles with low release (indoor)</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC): AC 7: Metal articles</p>
	22	Consumer use of sealed batteries	<p>Chemical product category (PC):</p> <p>Environmental release category (ERC): ERC 10a: Widespread use of articles with low release (outdoor) ERC 11a: Widespread use of articles with low release (indoor)</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC): AC 3: Electrical batteries and accumulators AC 2: Machinery, mechanical appliances, electrical/electronic articles</p>



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Confidential	IU number	Identified Use (IU) name	Use descriptors
			AC 1: Vehicles
	24	Consumer use of lead ammunition	<p>Chemical product category (PC): PC 7: Base metals and alloys</p> <p>Environmental release category (ERC): ERC 10a: Widespread use of articles with low release (outdoor) ERC 11a: Widespread use of articles with low release (indoor)Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC): AC 7: Metal articles</p>
	25	Consumer use of lead during the process of reloading spent ammunition rounds	<p>Chemical product category (PC): PC 0: Other: Consumer use of lead during the process of reloading spent ammunition rounds PC 7: Base metals and alloys</p> <p>Environmental release category (ERC): ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix</p> <p>Subsequent service life relevant for that use?: yes</p> <p>Article category related to subsequent service life (AC): AC 7: Metal articles</p>