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

MANUFACTURE

Table 1 Manufacture

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

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

FORMULATION USE AND USE IN INDUSTRIAL SETTINGS

Table 1 Formulation use and use in industrial settings

	3	Lead battery production	as such (substance itself) in a mixture	Process category (PROC): 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 Market sector by type of chemical product: PC 7 Environmental release category (ERC): ERC 5: Use at industrial site leading to inclusion into/onto article ERC 6a: Use of intermediate

				Sector of use (SU): SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment Subsequent service life relevant for that use?: yes Article category related to subsequent service life (AC): AC1: Vehicles AC2: Machinery, mechanical appliances, electrical/electronic articles AC3: Electrical batteries and accumulators
	4	Lead sheet production	as such (substance itself)	Process category (PROC): 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 21: Low energy manipulation of substances bound in materials and/or articles PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles PROC 28: Cleaning and repair PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises Market sector by type of chemical product: PC 7: Base metals and alloys Environmental release category (ERC): ERC 5: Use at industrial site leading to inclusion into/onto article Sector of use (SU): SU 14: Manufacture of basic metals, including alloys SU 15: Manufacture of fabricated metal products, except machinery and equipment Subsequent service life relevant for that use?: yes Article category related to subsequent service life (AC):

				AC 7: Metal articles
	5	Use of Lead in production of Hot-Dip Galvanized Steel	as such (substance itself)	Process category (PROC): PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature PROC 13: Treatment of articles by dipping and pouring Market sector by type of chemical product: PC 14: Metal surface treatment products, including galvanic and electroplating products Environmental release category (ERC): ERC 5: Use at industrial site leading to inclusion into/onto article Sector of use (SU): SU 15: Manufacture of fabricated metal products, except machinery and equipment Subsequent service life relevant for that use?: yes Article category related to subsequent service life (AC): AC 7: Metal articles
	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	Process category (PROC): 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 tabletting, 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) Market sector by type of chemical product: PC 7: Base metals and alloys

				PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products Environmental release category (ERC): ERC 5: Use at industrial site leading to inclusion into/onto article Sector of use (SU): SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment Subsequent service life relevant for that use?: yes Article category related to subsequent service life (AC): AC 1: Vehicles AC 2: Machinery, mechanical appliances, electrical/electronic articles AC 3: Electrical batteries and accumulators AC 7: Metal articles
	7	Use of lead metal in the production of leaded steels	as such (substance itself)	Process category (PROC): 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 Market sector by type of chemical product: PC 7: Base metals and alloys Environmental release category (ERC): ERC 3 Formulation into solid matrix

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

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

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

				AC 7: Metal articles

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	Process category (PROC): PROC 0: Other: use of lead solder 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) PROC 25: Other hot work operations with metals PROC 15: Use as laboratory reagent Market sector by type of chemical product: PC 7: Base metals and alloys PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products Environmental release category (ERC): ERC 0: Other: professional use of lead solder ERC 8c: Widespread use leading to inclusion into/onto article (indoor) Sector of use (SU): SU 0: Other: Professional use of lead solder SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU 19: Building and construction work Subsequent service life relevant for that use?: yes Article category related to subsequent service life (AC): AC 7: Metal articles AC 3: Electrical batteries and accumulators

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	Process category (PROC): PROC 0: Other: Professional use of lead ammunition Market sector by type of chemical product: Environmental release category (ERC): ERC 10a: Widespread use of articles with low release (outdoor) ERC 11a: Widespread use of articles with low release (indoor) Sector of use (SU): Subsequent service life relevant for that use?: yes Article category related to subsequent service life (AC): AC 7: Metal articles
	13	Professional use of articles with expected dermal contact	as such (substance itself) in a mixture	Process category (PROC): PROC 0: Other: Use of lead articles with expected dermal contact Market sector by type of chemical product: 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) Sector of use (SU): Subsequent service life relevant for that use?: yes

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)	Process category (PROC): PROC 0: Other: Installation and maintenance of Lead sheet PROC 21: Low energy manipulation of substances bound in materials and/or articles Market sector by type of chemical product: 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) Sector of use (SU): Subsequent service life relevant for that use?: yes Article category related to subsequent service life (AC): AC 7: Metal articles
	15	Professional assembly of lead acid batteries	as such (substance itself) in a mixture	Process category (PROC): PROC 0: Other: Lead acid batteries Market sector by type of chemical product: Environmental release category (ERC): ERC 10a: Widespread use of articles with low release (outdoor) ERC 11a: Widespread use of articles with low release (indoor) Sector of end use (SU): Subsequent service life relevant for that use?: yes Article category related to subsequent service life (AC):

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)

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

Confidential	IU number	Identified Use (IU) name	Use descriptors
	20	Consumer use of internal lead sheet	Chemical product category (PC): PC 7: Base metals and alloys Environmental release category (ERC): 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
	21	Consumer use of articles with no expected 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
	22	Consumer use of sealed batteries	Chemical product category (PC): 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 3: Electrical batteries and accumulators AC 2: Machinery, mechanical appliances, electrical/electronic articles

Confidential	IU number	Identified Use (IU) name	Use descriptors
			AC 1: Vehicles
	24	Consumer use of lead ammunition	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
	25	Consumer use of lead during the process of reloading spent ammunition rounds	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 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 Subsequent service life relevant for that use?: yes Article category related to subsequent service life (AC): AC 7: Metal articles