2.1. Manufacture

Table 2.2. Manufacture

	Manufacture
M-1	**Manufacture of zinc metal** Further description of manufacturing process: In the hydrometallurgical, or "RLE" (= Roasting, Leaching, Electrolysis) process, zinc bearing material (e.g. ore concentrate containing zinc sulphide) is roasted to ZnO, which is then dissolved in sulphuric acid to make zinc sulphate solution. This solution is purified in several steps and, subsequently subjected to electrolysis. Electro-winning - The Zinc sulphate solution circulates continuously between the electrolytic-cells in the cell-house and the atmospheric coolers outside the building - The temperature is kept around ~37°C and current is applied between the series of Pb-anodes and Al-cathodes - Zinc deposits at the cathode and O2 evolves at the anode - A foaming agent is added in order to have a blanket of foam at the solution surface in the cells, and occasionally a cover on the cells, i.o.t. prevent aerosols emissions - The zinc deposit is removed mechanically from the cathodes, washed and melted in automated furnaces - The anodes need also to be cleaned from occasional deposits (PbO2/MnO2/…) every 2-3 weeks and replaced by new anodes every ~18 months - The cells need to be cleaned up regularly from accumulating cellmud - The zinc cathodes are melted to produce the final ingots. The acid solution is recycled in the process. Manufacture of zinc metal by ISF (Imperial Smelting Furnace): Distillation process - zinc bearing materials (recycling stream, sintered calcines, zinc cakes, briquettes, ...) are fed to the furnace, molten and distilled. - the zinc vapor is further cooled in the condenser zone; the liquid zinc stream is optionally refined again in distillation columns. - Zn-slabs or ingots are then cast and packed Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC1)**

	- Discharge via additional off-site sewage treatment plant (ERC1) Contributing activity/technique for the workers : **- Raw material handling: ore/concentrate delivery, loading/unloading, and furnace feed mixing (PROC 26)** **- Roasting (PROC 22)** **- Transfer to leach tanks (PROC 8b)** **- Refining (closed) (PROC 2)** **- Electrolysis (open) (PROC 4)** **- Casting (PROC 23)** **- Internal logistics, storage, shipment, intra-facility transport (PROC 21)** **- Maintenance (PROC28)** registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=2640000 Tonnage (tonnes/year) (total manufactured tonnage within EU) *Related assessment: use assessed in a joint CSR*
M-2	**Zinc (passivated) powder manufacturing** <u>Further description of manufacturing process:</u> - Zn metal in the liquid phase can be quenched (depending on the morphology of the desired powder) in water or in inert gas streams - both processes occur in closed containers - alloying occurs in liquid phase - oxygen addition are controlled as to obtain a passivation layer on the surface of the grains - The desired powder fraction, after careful drying and “classification” (sorting), is packed for further use Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC1)** **- Discharge via additional off-site sewage treatment plant (ERC1)** Contributing activity/technique for the workers : **- Delivering and stockpiling of the Zinc slabs or ingots (PROC 26)** **- Manufacturing and processing of minerals and or metals at substantially elevated temperature (PROC 22)** **- Production of metal powders (hot processes) (PROC 27a)**

	- Production of metal powders (wet processes) (PROC 27b) **- Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)** **- Maintenance (PROC28)** **- Mixing or blending in batch processes (PROC 5)** registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=85000 Tonnage (tonnes/year) (total manufactured tonnage within EU) *Related assessment: use assessed in a joint CSR*

2.2. Identified uses

Table 2.3. Formulation

	Formulation
F-1	**Industrial use of zinc powder (pure or alloyed) as additive in paintings, coatings and inks** Further description of the use: Contributing activity/technique for the environment : **- Discharge via off-site sewage treatment plant (ERC2)** Contributing activity/technique for the workers : **- Transfer of substance or mixture (charging and discharging) at dedicated facilities (Raw material assembly and charging - raw material dispensing manually from bulk storage or packaged goods – solids - indoor (PROC 8a)** **- Blending/dissolving/dispersion - mixing, milling, dispersing, completion - continuous – closed - no sampling (PROC 1)** **- Blending/dissolving/dispersion - mixing, milling, dispersing, completion – continuous – closed - sampling (PROC 2)** **- Blending/dissolving/dispersion - mixing, milling, dispersing, completion - batch – closed - sampling (PROC 3)** **- Blending/dissolving/dispersion - mixing, milling, dispersing, completion – batch – open - sampling (PROC 5)** **- Filtering and filling - filtering or sieving and filling - dedicated lines - enclosed – or open (PROC 9)** **- Maintenance and cleaning (PROC28)** **Product Category formulated:** PC 7: Base metals and alloys ; PC 9a: Coatings and paints, thinners, paint removers

	Technical function of the substance: antiscaling agent ; corrosion inhibitor registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=75000 Tonnage (tonnes/year) (total tonnage within EU for the use) Substance supplied to that use: *Related assessment: use assessed in a joint CSR*
F-2	**Zinc melting & alloying incl. brass and Al-alloys** <u>Further description of the use:</u> - Zn metal is alloyed with different elements in the liquid phase - then it is fed to a casting wheel which dimension determines the final cast Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC3)** **- Discharge via additional off-site sewage treatment plant (ERC3)** **- No emissions to water (ERC3)** Contributing activity/technique for the workers : **- Manufacturing and processing of minerals and or metals at substantially elevated temperature (PROC 22)** **- Casting (PROC 23)** **- Processing into defined shape for further use (PROC 14)** **- Internal logistics, storage, shipment, intra-facility transport (PROC 21)** **- Maintenance (PROC28)** **Product Category formulated:** PC 7: Base metals and alloys **Technical function of the substance:** alloying element registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=2280000 Tonnage (tonnes/year) (total tonnage within EU for the use) Substance supplied to that use: *Related assessment: use assessed in a joint CSR*

Table 2.4. Uses at industrial sites

	Uses at industrial sites
IW-1	**Industrial application of zinc-based paint** Further description of the use: Contributing activity/technique for the environment : **- Spraying process (ERC5)** **- Non-spraying process (ERC5)** Contributing activity/technique for the workers : **- Product delivery/storage in bulk or packaged outdoor/indoor (PROC 8b)** **- Preparation of material, continuous (PROC 2)** **- Preparation of material, batch (PROC 5)** **- Application - on-line - roller, spreader, flow coating or printing - open equipment - large scale - liquid coatings : metal packaging, coil coating, automotive OEM, wallcoverings (PROC 10)** **- Industrial spraying, online automated-robotic, online manual, offline manual (PROC 7)** **- Dipping (fluidized bed, automatic or manual) (PROC 13)** **Product Category used:** PC 7: Base metals and alloys ; PC 9a: Coatings and paints, thinners, paint removers **Sector of end use:** SU 15: Manufacture of fabricated metal products, except machinery and equipment ; SU 0: Other: **Technical function of the substance:** antiscaling agent ; corrosion inhibitor registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=75000 Tonnage for this use (tonnes/year) (total tonnage within EU for the use) Substance supplied to that use: Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*
IW-2	**Industrial use of zinc (alloys) for melting and casting to form articles** Further description of the use: Zinc metal in the liquid phase can be fed to a casting wheel which dimension determines the final cast of zinc sheets. Sacrificial anodes are pressure diecast

	Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC5)** **- Discharge via additional off-site sewage treatment plant (ERC5)** **- No emissions to water (ERC5)** Contributing activity/technique for the workers : **- Transfer of substance or mixture (charging and discharging) at dedicated facilities (raw material) (PROC 8b)** **- Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting (PROC 22)** **- Open processing and transfer operations with minerals/metals at elevated temperature (PROC 23)** **- High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)** **- Internal logistics, storage, shipment, intra-facility transport (PROC 21)** **Product Category used:** PC 7: Base metals and alloys **Sector of end use:** SU 2b: Offshore industries ; SU 14: Manufacture of basic metals, including alloys ; SU 15: Manufacture of fabricated metal products, except machinery and equipment ; SU 19: Building and construction work ; SU 0: Other: **Technical function of the substance:** antiscaling agent ; corrosion inhibitor ; Main or unique component registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=730000 Tonnage for this use (tonnes/year) (total tonnage within EU for the use) Substance supplied to that use: Subsequent service life relevant for that use: yes Link to the subsequent service life: Industrial use of zinc (alloys) for shaping into articles ; Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*
IW-3	**Industrial use of zinc (alloy) powders to produce articles via sintering** Further description of the use: Articles manufactured from materials of controlled purity or from mixtures of several different materials that are fused (melted or sintered) together to form a new alloy of material of known purity and/or composition. This covers friction lining, targets, carbon brushes, diamond tools, ...

	Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC5)** **- Discharge via additional off-site sewage treatment plant (ERC5)** Contributing activity/technique for the workers : **- Transfer of substance or mixture (charging and discharging) at (non)-dedicated facilities (PROC 8a)** **- Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)** **- Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)** **- Tabletting, compression, extrusion, pelletisation, granulation (PROC 14)** **- Solid formation by stoving (200-900°C) (PROC 22)** **- High (mechanical) energy work-up of substances bound in materials and/or articles, brazing, grinding, sharpening (PROC 24)** **- Handling of solid inorganic substances at ambient temperature (PROC 26)** **- Low energy manipulation of substances bound in materials and/or articles (PROC 21)** **Product Category used:** PC 7: Base metals and alloys **Sector of end use:** SU 15: Manufacture of fabricated metal products, except machinery and equipment ; SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment ; SU 0: Other: **Technical function of the substance:** antiscaling agent ; conductive agent ; corrosion inhibitor ; heat transferring agent ; Bonding powder registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=0 Tonnage for this use (tonnes/year) Substance supplied to that use: Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*
IW-4	**Zinc used as lab reagent** <u>Further description of the use:</u> Contributing activity/technique for the environment : **- Discharge via either on-site or off-site sewage treatment plant (ERC6a)** Contributing activity/technique for the workers :

	- Use as laboratory reagent (PROC 15) **Product Category used:** PC 21: Laboratory chemicals **Technical function of the substance:** intermediate registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=0 Tonnage for this use (tonnes/year) Substance supplied to that use: Subsequent service life relevant for that use: no *Related assessment: use assessed in a joint CSR*
IW-5	**Industrial use of zinc as an intermediate in the manufacture of catalysts** <u>Further description of the use:</u> The catalyst industry only uses zinc as zinc massive (ingots, briquettes, shot), then it is dissolved Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC6a)** **- Discharge via additional off-site sewage treatment plant (ERC6a)** Contributing activity/technique for the workers : **- Handling & transfer of massive objects (PROC 21)** **- Chemical production or refinery in closed process (PROC 1)** **- Chemical production or refinery in closed process (PROC 2)** **- Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)** **- Chemical production where opportunity for exposure arises (PROC 4)** **- Transfer of substance (PROC 8b)** **- Transfer of substance or mixture into small containers (PROC 9)** **- Tabletting, compression, extrusion, pelletisation, granulation (PROC 14)** **- Cleaning and maintenance (PROC28)** **Product Category used:** PC 7: Base metals and alloys **Sector of end use:** SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) ; SU 9: Manufacture of fine chemicals **Technical function of the substance:** intermediate

	registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=0 Tonnage for this use (tonnes/year) Substance supplied to that use: Subsequent service life relevant for that use: no *Related assessment: use assessed in a joint CSR*
IW-6	**Industrial use of zinc to produce other zinc compounds (intermediate use)** <u>Further description of the use:</u> • In case of wet processes: Reception of the Zn metal, transfer to the reaction tank • In case of dry process: Reception of zinc metal, transfer to the furnace • Maintenance activities Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC6a)** **- Discharge via additional off-site sewage treatment plant (ERC6a)** Contributing activity/technique for the workers : **- Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)** **- Transfer of substance of mixture into small containers (dedicated filling line, including weighing) (PROC 9)** **- Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions – closed wet process (PROC 2)** **- Chemical production where opportunity for exposure arises – open wet process (PROC 4)** **- Manufacturing and processing of minerals and/or metals at substantially elevated temperature - dry process (PROC 22)** **Product Category used:** PC 7: Base metals and alloys **Sector of end use:** SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) ; SU 9: Manufacture of fine chemicals **Technical function of the substance:** component registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=325000 Tonnage for this use (tonnes/year) (total tonnage within EU for the use) Substance supplied to that use:

	Subsequent service life relevant for that use: no *Related assessment: use assessed in a joint CSR*
IW-7	**Industrial use of zinc in precious metals recovery (Parkes process)** <u>Further description of the use:</u> Silver is removed from lead bullion by the Parkes process, which consists of adding zinc to the molten phase. Zinc reacts rapidly and completely with gold and silver, forming very insoluble compounds that float to the top of the bullion. These are skimmed off and their zinc content recovered by vacuum retorting. Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC6a)** **- Discharge via additional off-site sewage treatment plant (ERC6a)** Contributing activity/technique for the workers : **- Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)** **- Mixing or blending in batch processes (PROC 5)** **- Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting (PROC 22)** **- Open processing and transfer operations with minerals/metals at elevated temperature (PROC 23)** **Product Category used:** PC 7: Base metals and alloys **Sector of end use:** SU 14: Manufacture of basic metals, including alloys ; SU 0: Other: **Technical function of the substance:** alloying element registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=5000 Tonnage for this use (tonnes/year) (total tonnage within EU for the use) Substance supplied to that use: Subsequent service life relevant for that use: no *Related assessment: use assessed in a joint CSR*
IW-8	**Industrial use of active (pure or alloyed) zinc powder in alkaline batteries** <u>Further description of the use:</u> Contributing activity/technique for the environment :

	- Direct discharge to water after on-site treatment (ERC5) **- Discharge via additional off-site sewage treatment plant (ERC5)** Contributing activity/technique for the workers : **- Transfer (PROC 8b)** **- Mixing or blending in batch processes (zinc gel) (PROC 5)** **- Transfer into small containers (PROC 9)** **Product Category used:** PC 7: Base metals and alloys ; PC42: Electrolytes for batteries **Sector of end use:** SU 0: Other: **Technical function of the substance:** Battery element registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=10000 Tonnage for this use (tonnes/year) (total tonnage within EU for the use) Substance supplied to that use: Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of batteries *Related assessment: use assessed in a joint CSR*
IW-9	**Industrial use of zinc (pure or alloyed, including Zn-Al alloys) in hot dip galvanizing** <u>Further description of the use:</u> The galvanizing process consists of three basic steps: surface preparation, galvanizing, and inspection. During the actual galvanizing step of the process, the material is completely immersed in a bath of molten zinc. The bath requires at least 98% pure zinc maintained at approximately 840 F (449 °C). While immersed in the kettle, the zinc reacts with the iron in the steel to form a series of zinc/iron intermetallic alloy layers. Once the fabricated items' coating growth is complete, they are withdrawn slowly form the galvanizing bath, and the excess zinc is removed by draining, vibrating, and/or centrifuging. The metallurgical reaction will continue after the articles are withdrawn from the bath, as long as the article remains near bath temperature. Articles are cooled either by immersion in a passivation solution or water or by being left in open air. Steel sheet, pipe and wire are continuously galvanized in specially developed galvanizing processes which allow accurate control of coating thickness, ductility and other characteristics of the zinc coating, producing a wide range of products to suit the varying requirements of subsequent manufacturing operations and end usage.

	Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC5)** **- Discharge via additional off-site sewage treatment plant (ERC5)** **- No emissions to water (ERC5)** Contributing activity/technique for the workers : **- Open processing and transfer operations with minerals/metals at elevated temperature (PROC 23)** **- Low energy manipulation of substances bound in materials and/or articles (PROC 21)** **Product Category used:** PC 7: Base metals and alloys ; PC 14: Metal surface treatment products **Sector of end use:** SU 15: Manufacture of fabricated metal products, except machinery and equipment ; SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment ; SU 0: Other: **Technical function of the substance:** antiscaling agent ; corrosion inhibitor registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=1150000 Tonnage for this use (tonnes/year) Substance supplied to that use: Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*
IW-10	**Industrial use of zinc powder for mechanical plating** <u>Further description of the use:</u> Mechanical zinc plating is accomplished by tumbling small parts in a drum with zinc and proprietary chemicals. Small iron and steel parts – usually limited in size to about 8-9 inches (200-300 mm) and weighing less than one pound (0.5 kg) – are cleaned and flash copper coated before loading into a plating barrel. The barrel is then loaded with proprietary chemicals, glass beads and zinc powder and tumbled. During tumbling, the glass beads peen zinc powder onto the part. Once finished, the parts are dried and packaged, or post-treated with a passivation film, dried, and packaged. Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC5)** **- Discharge via additional off-site sewage treatment plant (ERC5)** Contributing activity/technique for the workers : **- Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)**

	- Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3) **- High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)** **- Low energy manipulation of substances bound in materials and/or articles (PROC 21)** **Product Category used:** PC 7: Base metals and alloys **Sector of end use:** SU 15: Manufacture of fabricated metal products, except machinery and equipment ; SU 0: Other: **Technical function of the substance:** antiscaling agent ; corrosion inhibitor registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=0 Tonnage for this use (tonnes/year) Substance supplied to that use: Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*
IW-11	**Industrial use of zinc or zinc alloys to make granules or prills** Further description of the use: Prilling and pelletizing are typically processes that solidify molten metal in air or water flow or solid running band. Contributing activity/technique for the environment : **- Direct discharge to water after on-site treatment (ERC5)** **- Discharge via additional off-site sewage treatment plant (ERC5)** Contributing activity/technique for the workers : **- Transfer raw material (PROC 8b)** **- Open processing and transfer operations with minerals/metals at elevated temperature (PROC 23)** **- High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)** **- Tabletting, compression, extrusion, pelletisation, granulation (PROC 14)** **- Low energy manipulation of substances bound in materials and/or articles (PROC 21)** **Product Category used:** PC 7: Base metals and alloys ; PC 14: Metal surface treatment products

	Sector of end use: SU 14: Manufacture of basic metals, including alloys ; SU 15: Manufacture of fabricated metal products, except machinery and equipment **Technical function of the substance:** Main or unique component registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=0 Tonnage for this use (tonnes/year) Substance supplied to that use: Subsequent service life relevant for that use: yes Link to the subsequent service life: Industrial use of zinc (alloys) for shaping into articles ; Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*

Table 2.5. Uses by professional workers

	Uses by professional workers
PW-1	**Professional Use of zinc containing paints, coating or inks** Further description of the use: SPERCS available + RMM Contributing activity/technique for the environment : **- Professional roller/brush application indoor (ERC8c)** **- Professional roller/brush application outdoor (ERC8f)** **- Professional spraying indoor (ERC8c)** **- Professional spraying outdoor (ERC8f)** Contributing activity/technique for the workers : **- Preparation of material for application closed/continuous (PROC 3)** **- Preparation of material for application batch/indoor (PROC 5)** **- preparation of material for application batch/outdoor (PROC 5)** **- Preparation of material for application - transfer of material from one container to another - indoor (PROC 8a)** **- preparation of material for application - transfer of material from one container to another - outdoor (PROC 8a)** **- Application - manual spraying – coatings - outdoor (PROC 11)**

	- Application - manual spraying – coatings - indoor (PROC 11) **- Application online or manual - brush, roller, spreader - coatings - indoor (PROC 10)** **- Application online or manual - brush, roller, spreader - coatings - outdoor (PROC 10)** **- Application - hand - paints, pastels, pigment powders - indoor (PROC 19)** **- Equipment cleaning - open – indoor (PROC28)** **- Equipment cleaning - open – outdoor (PROC28)** **Product Category used:** PC 9a: Coatings and paints, thinners, paint removers ; PC 18: Ink and toners **Sector of end use:** SU 19: Building and construction work ; SU 0: Other: **Technical function of the substance:** antiscaling agent ; corrosion inhibitor registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=0 Tonnage (tonnes/year) Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*
PW-2	**Professional use of zinc-based wire or powder for zinc thermal spraying** <u>Further description of the use:</u> Zinc spraying, or metallizing, is accomplished by feeding zinc powder or wire into a heated gun, where it is melted and sprayed onto the part using combustion gases and/or auxiliary compressed air to provide the necessary velocity. Prior to metallizing, the steel must be abrasively cleaned. Contributing activity/technique for the environment : **- Professional spraying indoor (ERC8c)** **- Professional spraying outdoor (ERC8f)** Contributing activity/technique for the workers : **- Non industrial spraying (PROC 11)** **- Open processing and transfer operations with minerals/metals at elevated temperature (PROC 23)** **Product Category used:** PC 7: Base metals and alloys **Sector of end use:** SU 14: Manufacture of basic metals, including alloys ; SU 15: Manufacture of fabricated metal products, except machinery and equipment ; SU 19: Building and construction work **Technical function of the substance:** antiscaling agent ; corrosion inhibitor

	registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=0 Tonnage (tonnes/year) Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*
PW-3	**Professional use of zinc based brazing and soldering products** Further description of the use: Contributing activity/technique for the environment : **- Professional indoor use (ERC8c)** **- Professional outdoor use (ERC8f)** Contributing activity/technique for the workers : **- Low energy manipulation of substances bound in materials and/or articles (PROC 21)** **- Other hot work operations with metals (PROC 25)** **Product Category used:** PC 7: Base metals and alloys **Sector of end use:** SU 15: Manufacture of fabricated metal products, except machinery and equipment ; SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment **Technical function of the substance:** alloying element ; heat transferring agent registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=0 Tonnage (tonnes/year) Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*

Table 2.6. Consumer uses

	Consumer uses
C-1	**Consumer use of zinc-based paints, coatings and ink** Further description of the use: Contributing activity/technique for the environment:

	- Consumer roller/brush application indoor (ERC8c) **- Consumer roller/brush application outdoor (ERC8f)** Contributing activity/technique for consumers: **- Consumer use of zinc-based paints & coatings (PC 9a)** **- Consumer use of zinc-based ink (PC 18)** **Technical function of the substance:** antiscaling agent ; corrosion inhibitor registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=0 Tonnage (tonnes/year) Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*
C-2	**Consumer use of zinc-based brazing/soldering products** Further description of the use: Contributing activity/technique for the environment: **- Consumer indoor use (ERC8c)** **- Consumer outdoor use (ERC8f)** Contributing activity/technique for consumers: **- Consumer use of zinc-based brazing/soldering products (PC 7)** **Technical function of the substance:** alloying element ; heat transferring agent registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=0 Tonnage (tonnes/year) Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of metallic articles with no emission ; Service life of constructions of massive metal, alloys or metallic coating *Related assessment: use assessed in a joint CSR*

Table 2.7. Article service life

	Article service life
SL-1	**Industrial use of zinc (alloys) for shaping into articles**

	Further description of the use: Massive zinc and alloys stock are made available in a variety of forms including plate, sheet, strip, foil, rod, bar, wire, and billet depending on the final application. Semi-products will then be extruded, machined, rolled, cut, shaped into the final articles. Wires and rods are manufactured by a process that forms metal work stock by reducing its cross section. This is accomplished by forcing the work through a mold, (die), of smaller cross sectional area than the work. Metal drawing is very similar to metal extrusion, the difference being in the application of force. In extrusion the work is pushed through the die opening, where in drawing it is pulled through. It is usually a low temperature process. The wires/rods are then cut to adequate size. The wires/rods can then be calendared to produce strips and eventually further stamped to make coins. Article used by: workers Substance intended to be released from article: no **Article category related to subsequent service life (AC):** AC 7: Metal articles Contributing activity/technique for the environment: **- Direct discharge to water after on-site treatment (ERC12a)** **- Discharge via additional off-site sewage treatment plant (ERC12a)** **- No emissions to water and air (ERC12a)** Contributing activity/technique for consumers: Contributing activity/technique for the workers: **- Low energy manipulation of substances bound in/on materials or articles (PROC 21)** **- High (mechanical) energy work-up of substances bound in/on materials and/or articles (PROC 24)** **Technical function of the substance:** alloying element ; heat transferring agent ; Main or unique component; Battery anode registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=400000 Tonnage (tonnes/year) *Related assessment: use assessed in a joint CSR*
SL-2	**Service life of metallic articles with no emission** Further description of the use: Article used by: consumers Substance intended to be released from article: no **Article category related to subsequent service life (AC):** Contributing activity/technique for the environment:

	- Service life of metallic articles with no emission (ERC11a) Contributing activity/technique for consumers: **- Consumer in contact with zinc articles (AC 7)** Contributing activity/technique for the workers: **Technical function of the substance:** alloying element ; Main or unique component registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=2000000 Tonnage (tonnes/year) *Related assessment: use assessed in a joint CSR*
SL-3	**Service life of batteries** Further description of the use: Article used by: consumers Substance intended to be released from article: no **Article category related to subsequent service life (AC):** Contributing activity/technique for the environment: **- Service life of batteries (ERC11a)** Contributing activity/technique for consumers: **- Consumer in contact with zinc containing batteries (AC 3)** Contributing activity/technique for the workers: **Technical function of the substance:** Battery component registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=10000 Tonnage (tonnes/year) *Related assessment: use assessed in a joint CSR*
SL-4	**Service life of constructions of massive metal, alloys or metallic coating** Further description of the use: Article used by: consumers Substance intended to be released from article: no **Article category related to subsequent service life (AC):** Contributing activity/technique for the environment:

	- Service life of constructions of massive metal, alloys or metallic coating (ERC10a ; ERC11a) Contributing activity/technique for consumers: **- Consumer in contact with zinc articles (AC 7)** Contributing activity/technique for the workers: **Technical function of the substance:** alloying element ; Main or unique component registration according to REACH Article 10; total tonnage manufactured/imported >=10tonnes/year per registrant Tonnage of substance for this use: <=2000000 Tonnage (tonnes/year) *Related assessment: use assessed in a joint CSR*