

Uses description - Mill scale

(EU number 266-007-8, CAS number 65996-74-9)

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1. Background

This document does not intend to provide a full description of the uses of *Mill scale (ferrous metal)* [EC: 266-007-8] as such, but may be used as additional information and explanations on mill scale uses as reported in the REACH registration dossier.

The substance *Mill scale (ferrous metal)* [EC: 266-007-8] does not fulfil any of the criteria of the REACH Article 14(4) (see legislation extract on page 32). Consequently Exposure Scenario is not required under REACH regulation for this substance. Most of the uses of mill scale are patented.

According to REACH regulation, each registrant is obliged to include a brief description of the use of the substance according to a use descriptor system that is based on five separate descriptor-lists – environmental release category (ERC), process category (PROC), chemical product category (PC), sector of use category (SU), article category (AC) – combined with each other. The mapping of the uses was hence standardised and group of uses were defined according to uses descriptors.

In 2010, identified uses were completed in IUCLID registration software under the format of the version 5.2. In July 2010, the generic description of uses, consisting of uses descriptors has been reviewed and validated by Member Registrants.

In 2013, following the new reporting format in IUCLID 5.4 for the uses, mill scale uses were rearranged accordingly without adding fundamentally any new uses. The organization of the different uses in IUCLID is driven by Environmental Release Categories (ERC), see below:

- Manufacture (i.e. ERC 1)
- Formulation (i.e. ERC 2&3)
- Uses at industrial sites (i.e. ERC 4, 5, 6 a/b/c/d & 7)
- Uses by professional workers (i.e. ERC 8 a/b/c/d/e/f & 9 a/b)
- Consumer uses (i.e. ERC 8 a/b/c/d/e/f & 9 a/b)
- Article service life (i.e. ERC 10 a/b, 11 a/b & 12 a/b)

Information on uses descriptors (PROC, ERC, PC, AC...) can be found in the ECHA Guidance on *information requirements and chemical safety assessment - Chapter R.12: Use descriptor system* available at http://echa.europa.eu/documents/10162/13632/information_requirements_r12_en.pdf

2. Manufacture

Table 1. Manufacture

Identifiers	Use descriptors	Other information
M-1: Generation of mill scale	<p>Environmental release category (ERC): ERC 1: Manufacture of substances</p> <p>Process category (PROC): 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 PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</p>	Remarks: Mill scale is formed during the oxidation of the steel surface during reheating, conditioning, hot rolling, and hot forming operations. This substance is usually removed by process waters used for descaling, roll and material cooling, and other purposes. It is subsequently recovered by gravity separation techniques.

Manufacture of mill scale (*ferrous metal*)

Except for precious metals (e.g. gold, silver) oxides are the natural forms of metals. During hot processing and in presence of oxygen containing gases (including air) steel surface spontaneously corrodes into a ferrous oxide layer named scale. Process steps where hot metal surfaces are growing scales are:

- Steelmaking: continuous casting, flame scarfing,
- Hot rolling: reheating furnaces, rolling mill
- Hot press & hot forming (minor processes for very large products).

In most annealing furnaces the oxygen atmosphere is a too low to grow scale.

Process Category explanation¹:

PROC 2	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages
PROC 8a	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC 8b	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC 9	Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage
PROC 23	Sand and die casting, tapping and casting melted solids, drossing of melted solids, hot dip galvanising, raking of melted solids in paving Exposure related to dust and fumes to be expected

¹ ECHA Guidance on information requirements and chemical safety assessment - Chapter R.12: Use descriptor system (Version 2, March 2010)

3. Uses of mill scale

The following uses were considered in 2010. Examples of existing patents covering the uses of mill scale are reported in the table below. Note that other patents may exist for each type of uses.

Mill scale uses	Example of patent	Brief explanations	Link
Batteries	Negative electrode for alkaline storage batteries and method of manufacturing the same <i>US 2683182 A</i>	A method has been described aiming at the manufacture of negative electric plates for alkaline storage batteries. The plate is formed of a basic material which is copper in finely divided condition and consisting of for instance copper being thoroughly mixed with pulverulent iron or an iron compound in scale or flake form when hot rolling iron and also when forging operations are accomplished.	http://www.google.com/patents/US2683182
Catalysts, Chemicals	Preparation and use of catalysts <i>US 3051737 A</i>	Catalysts based on mixed iron oxide are used for the conversion of acetaldehyde to acetic acid with Roentgen rays. The preferred type of catalyst is based on alkali impregnated steel rolling-mill scale.	http://www.google.com/patents/US3051737
Cement, clinker	Process for using mill scale in cement clinker production <i>US 6709510 B1</i>	A process for forming cement clinker using mill scale that may have hydrocarbons associated therewith. Normal feedstock material is preheated and then transferred to a combustion area. The mill scale is also transferred to the combustion area where, during the process of burning a material, the unwanted hydrocarbons are volatilized and converted to harmless gaseous products (by combustion) that can be passed to the atmosphere. The combustion area may be a precalciner or may be the feed end of the rotary kiln if the rotary kiln has an adequate temperature profile. The remaining mill scale and feedstock material are thoroughly mixed and blended and the mill scale is diffused and combined with the feedstock material as the mill scale and the feedstock material move from the feed end toward the heat-source end of the rotary kiln to form cement clinker.	http://www.google.com/patents/US6709510
Counterweights	Composite counterweight and method of making same	A composite material comprises a particulate material generated as a waste or by-product of an industrial process, and a binder for binding the particulate material into a uniform mass. The counterweights can be prepared from a variety of materials such as mill scale, oxygen furnace clarifier grit, taconite mine tailings. The particulate material and binder are	http://www.google.com/patents/WO2008128021A2

Mill scale uses	Example of patent	Brief explanations	Link
	<i>WO 2008128021 A2</i>	combined in preselected proportions and compressed to form a counterweight having a preselected density and a fixed configuration. A counterweight is manufactured by selecting a first proportion of a particulate material generated as a waste or by-product of an industrial process, selecting a second proportion of a binder for binding the particulate material into a uniform mass, combining the first proportion of the particulate material with the second proportion of the binder into a uniform mass, forming the counterweight from the uniform mass, and incorporating the counterweight into a finished product.	
	Method for manufacturing counterweights for washing machines <i>EP 0812946 B1</i>	The present invention refers to a method for manufacturing counterweights for clothes washing machines. The method according to the present invention calls for replacing concrete with another filling material, such as preferably mill scale. For this material to be able to be used as a filling material in such counterweights, it shall be charged and mixed with a liquid additive, preferably water.	http://www.google.com/patents/EP0812946B1
Energy saving, Heat conservation	Operation of iron oxide recovery furnace for energy savings, volatile metal removal and slag control <i>EP 1863943 A4</i>	The present invention relates to the methods and processes for processing waste materials or by-products such as electric arc furnace dust (EAF), basic oxygen furnace sludge, mill scale, galvanizing sludge/dust, batteries and other materials while producing metal products and recovering iron and volatile metals. More particularly, the present invention relates to methods and process for processing waste materials or by-products that involve the separation of volatile metals, slag and iron in an energy efficient manner.	http://www.google.com/patents/EP1863943A4
Exothermic power	Reuse of metallurgical fines <i>WO 1996031630 A1</i>	Waste material containing heavy metals are mixed with the by-product mill scale or with reduced iron or fines and with a fine grained carrier material having a low density until a crumbly mixed product results, of which a fine fraction of between 0 and 6 mm in grain size is sievable for injection into a metallurgical furnace. Water may be added to the mixed product using wet carbon-containing slurries. Lime-containing dusts may be added.	http://www.google.com/patents/WO1996031630A1
Feedstock	Method for producing iron feedstock <i>EP 0795036 A4</i> (text	A method for producing an iron-based feedstock suitable for use as the feedstock for steel mills, from industrial waste and by-product streams, by treating the waste stream with an ammonium chloride leaching solution, separating the undissolved precipitates comprising iron compounds from	http://www.google.com/patents/EP0795036A4

Mill scale uses	Example of patent	Brief explanations	Link
	from WO1996017090A1)	the leachant solution, and further treating the undissolved precipitants by elevated temperature roasting, resulting in the iron-based feedstock. Iron-rich waste products or by-products, such as for example mill scale and used batteries, can be added to the waste and by-products stream feed.	
Ferro-alloys	Ferrophosphorus refining process <i>EP 0616041 A1</i>	A ferrophosphorus refining method entailing forming a ferrophosphorus melt and adding an oxidising agent to the melt to oxidise the impurities in the melt. The oxidised impurities then rise to the top of the melt and either go into the slag or escape in a gaseous form. The slag is removed and a refined ferrophosphorus is recovered. Suitable oxidising agent include solids such as ferrous oxide (Fe ₂ O ₃), ferric oxide (Fe ₃ O ₄), ferrous-ferric oxide (FeO), mill scale, limestone, dolomitic limestone, lime and any alkalide carbonate, and gaseous oxidising agents such as oxygen, air and mixtures thereof.	http://www.google.com/patents/EP0616041A1
	Method for preparing ferromolybdenum alloy briquette from powder mixture of mill scale and molybdenum oxide powder through solid-gas reaction, and briquette prepared by same <i>WO 2012026725 A3</i>	The present invention relates to a method for preparing a ferromolybdenum alloy in a briquette form, wherein the ferromolybdenum alloy is used for adjusting ingredients of a melt in a steelmaking process for manufacturing special steel. More particularly, the present invention relates to a method for preparing a ferromolybdenum alloy briquette, and a briquette prepared by same, wherein the ferromolybdenum alloy briquette is obtained by: mixing mill scale (mixture of Fe, FeO, and Fe ₂ O ₃) powders discharged from a steel forging process as an iron raw material and molybdenum oxide (MoO ₃) powders as a molybdenum raw material; reducing this mixture in a powdery state using a hydrogen gas; mixing the prepared ferromolybdenum alloy powders and wax and press-moulding the resulting mixture; sintering the press-moulded mixture at a high temperature in a hydrogen gas atmosphere; and then cooling down the sintered mixture to prepare a ferromolybdenum alloy in a briquette form.	http://www.google.com/patents/WO2012026725A3

Mill scale uses	Example of patent	Brief explanations	Link
Fertilizer	Magnetizing synergistic agent for mixed fertilizer <i>CN 1107457 A</i>	The synergist is prepared with magnetic carrier, N fertilizer synergist, adhesive, phytocide, disinfectant and some nutrients through pretreatment, proportioning, mixing, drying and magnetizing. If added with said synergist, magnetized compound fertilizer has higher fertility and more functions. The role of the magnetic carrier additives to improve performance and remanent magnetization fertilizer provides nutrients iron, recommend the use of iron ore mining tailings generated in the powder, steel rolling mill scale or permanent ferrite materials.	http://www.google.com/patents/CN1107457A
	Material for phosphate fertilizer and method for production thereof <i>EP 1391445 A1</i>	The desiliconization treatment may be given during the molten iron desiliconization step, (for example, desiliconization at cast house), or during the desiliconization in a vessel. For the case of desiliconization in vessel, the vessel may be molten iron pot, ladle such as charge pot, torpedo, or the like. By charging a desiliconization agent to the vessel to agitate the contents, efficient desiliconization is performed. Applicable desiliconization agent includes solid oxygen source (normally iron oxide such as mill scale) , gas oxygen source (gas oxygen or oxygen-laid gas), or both of them.	http://www.google.com/patents/EP1391445A1
Foundry	Process for producing foundry iron <i>WO 1996034988 A1</i>	A submerged arc furnace produces foundry iron from scrap iron and steel sources where little or no slag is produced. Scrap iron or steel is fed into the submerged arc furnace with a source of silica and a carbonaceous reducing agent. The scrap iron and steel is melted while simultaneously smelting the silica in the presence of the carbonaceous reducing agent. Suitable sources of iron for use in the present invention include mill scale	http://www.google.com/patents/WO1996034988A1
Friction products	Friction material containing mill scale <i>EP 0426713 B1</i>	In a friction material wherein sponge iron is a principle friction producing component especially on initial engagement during a brake application, the improvement wherein 10-50 % of the sponge iron is replaced with mill scale without a substantial change in the operational characteristics of the friction material.	http://www.google.com/patents/EP0426713B1

Mill scale uses	Example of patent	Brief explanations	Link
Glass	Manufacture of coloured glass <i>US 3830639 A</i>	Coloured glass is produced from a mixture of glass making ingredients including boiler slag compositions which may contain little or no sulphur but contain substantial amounts of iron, manganese or other metals required to produce the desired glass colorants. In the manufacture of glasses requiring the presence of iron to develop a colorant therein. It has been usual to add small amounts for example of mill scale.	http://www.google.com/patents/US3830639
Heavy concrete	Heavy concrete <i>WO 2009096359 A1</i>	A heavy concrete is provided which does not necessitate the addition of a thickener such as methyl cellulose, is reduced in separation between a heavy aggregate and the cement paste, and has high flowability and satisfactory applicability. The heavy concrete is one obtained by mixing at least cement, a heavy aggregate, and water, and is characterized by containing a heavy fine aggregate including hot-scarfing particles generated in the step of hot-scarfing steel slab surfaces. Mill scale can be mixed with the feedstock.	http://www.google.com/patents/WO2009096359A1
Iron oxides	Iron oxide pigments from mill scale <i>US 7347893 B2</i>	The current invention relates to a method of manufacturing iron oxide pigments from mill scale. The mill scale is mixed with alien iron oxide and the resultant mixture is heated to a temperature of 200° C. to 900° C. in an oxidizing atmosphere to produce iron oxide pigment which can be black, brown or red. The alien iron oxide used and the iron oxide pigment produced are predominantly Fe ₂ O ₃ or Fe ₃ O ₄ or a mixture of both. The iron oxide pigment produced as above or from any other sources can be turned into black by mixing it with mill scale and the resultant mixture is heated to a temperature of 200° C. to 900° C. in a non-oxidizing or reducing atmosphere to produce iron oxide black pigment.	http://www.google.com/patents/US7347893
Iron salts	Iron oxide precipitation from acidic iron salt solutions <i>WO 2005106053 A1</i>	The present invention relates to hydrometallurgical chemistry. More particularly, the invention relates to acid leaching of iron salts, and precipitation of selected hematites from a solution of iron salts. Methods described can be based upon leaching of mill scale at elevated pressure and temperature with nitric acid and the recovery of ferric oxide.	http://www.google.com/patents/WO2005106053A1
Melting charge	Apparatus and method for processing	Apparatus and methods for recycling iron fines, such as mill scale. In one form, mill scale is placed in containers that are then placed as part of the	http://www.google.com/patents/WO2007146430A2

Mill scale uses	Example of patent	Brief explanations	Link
	metallurgical 'fines' in (eaf) electric arc furnaces <i>WO 2007146430 A2</i>	charge in an electric arc furnace or other appropriate apparatus used in a metallurgical process. The capsule can be shaped so as to control the movement of the capsule during the melt cycle.	
Mineral wool	Method of making mineral wool <i>US 2576312 A</i>	Mill scale is one of the various fluxing ingredients used for the manufacture of mineral wool	http://www.google.com/patents/US2576312
Paint	Iron oxide paint pigment precursor <i>US 4432803 A</i>	The iron oxide paint pigment precursor used in a process for producing such paint pigment is found in scarfer spittings, a steel mill waste or by-product. The cores are characterized by a chemical composition comprised of between about 0.04 and 0.10 weight percent carbon, about 0.06 and 0.25 weight percent manganese, about 0.015 and 0.025 weight percent phosphorus, less than about 0.05 weight percent silicon, less than 0.01 weight percent sulphur, about 94 and 98 weight percent iron and the remainder oxygen and incidental impurities and a particle size within the range of 5 mm to 0.125 mm.	http://www.google.com/patents/US4432803
Radiation shielding	An electromagnetic radiation shielding material <i>WO 2002040799 A1</i>	A shielding material comprises at least one basic building material and at least one shielding component capable of reflecting or absorbing electromagnetic radiation. The shielding material optionally includes a hydraulically settable binder or cementitious material. The shielding components may be natural materials or direct or derived by-products of an industrial process. At least one shielding component comprises a ferrous material. Suitably, the ferrous material is mill scale which preferably comprises between 25 and 75% of the shielding material (w/w dry components)	http://www.google.com/patents/WO2002040799A1
Refractories	Refractory and process of making <i>US 2078086 A</i>	For the preparation of refractory material for such usages as in open hearth furnaces, etc., the dolomite is crushed to desired size, for example minus inch. A flux suspension or paint is prepared by grinding the flux and a suitable liquid vehicle binder. The flux component may be for instance mill scale	http://www.google.com/patents/US2078086

Mill scale uses	Example of patent	Brief explanations	Link
Road construction	Building material for road surfaces comprises mill scale, forging scale and/or grinding slurry which are added to the building material as additives <i>DE 202004012255 U1</i>	The invention is based is to develop a construction material for road surfaces with improved adhesion characteristics between tire and road surface and high resistance to abrasion, which advantageously as surface heating equally with heat conducting properties suitable for melting snow and ice the task. This object is achieved by the characterizing features of patent claim 1 according to the invention that the commonly used for road building material a certain amount of mill scale and / or rolling and forging scale and / or abrasive slurry is added.	http://www.google.com/patents/DE202004012255U1
Sinter, Recycling material	Method of sintering and sinter bed composition <i>EP 1263995 B1</i>	A method for agglomerating and sintering iron and zinc ore and ore concentrates, steel mill ferrous waste or by-product and zinc mill waste. The method has the steps; a) mixing the waste and by-products or ore with a combustion fuel source, and a sinter agglomeration agent selected from the group consisting of sodium silicate, water soluble polymers and aqueous emulsions of oils to form an agglomerated sinterable mixture comprising agglomerated particles; b) forming the sinterable mixture into a sinter bed on the grate of a sinter machine; and c) igniting the sinter bed to create a temperature sufficient to sinter the agglomerated particles.	http://www.google.com/patents/EP1263995B1
Slag formers	Composition and process to create foaming slag cover for molten steel <i>EP 0162679 A1</i>	It has been found that the foaming agent of this invention operates best when the amount of infoamed slag is from 10.16 to 20.32cms atop the molten steel. Of course, the formation of slag is a function of the amount of and stage of the melt cycle, when slag producing materials such as lime and mill scale (Fe2O3), etc., are introduced.	http://www.google.com/patents/EP0162679A1
Stone production	Process for producing high-content gulf red with magnetite ore <i>CN 1239120 A</i>	A process for producing high-content gulf red with magnetite ore as raw material includes dressing ordinary magnetite ore powder, purifying to make TFe more than 71.5% and SiO2 less than 0.3%, calcining at 50-1000 deg.C to obtain gulf red with Fe2O3 content more than 98%, and ball grinding. It features very low content of impurities, and can be used as high-grade magnetic material in food, medicine and military products. Iron mill scale can be used as raw material.	http://www.google.com/patents/CN1239120A
Tool steel	Process of producing ferrous metal articles	Mill scale can be used to anneal the casting in a packing containing an oxidizing agent, such as mill scale, in sufficient quantity to decarbonise only	http://www.google.com/patents/US2380385

Mill scale uses	Example of patent	Brief explanations	Link
	<i>US 2380385 A</i>	a very thin superficial film, but to reduce the carbon in the region, where free carbon might be objectionable, to from 1 to 1.3%.	
Water and soil treatment	Iron particles for purifying contaminated soil or ground water <i>EP 1318103 B1</i>	Soil or ground water contaminated with the organo halogen compounds may be purified by mixing and contacting with a purifying agent composed of iron-based particles, in particular, such as mill scale, granular iron or sponge iron particles produced in the steel-making processes.	http://www.google.com/patents/EP1318103B1
Welding electrodes	Electrode for arc welding in air <i>US 3767891 A</i>	An electrode for electric arc welding in air containing alkali metal composites which comprise an alkali metal oxide in combination with one or more metal compounds of acidic or amphoteric nature, preferably iron oxide, manganese oxide, aluminium oxide or silicon dioxide. Mill scale can be used as a source of iron oxides.	http://www.google.com/patents/US3767891
Concrete, Concrete aggregate, Weights	Heavy weight aggregates <i>US 20100326324 A1</i>	It is aimed at inexpensively providing a heavy aggregate comprising particles having particle diameters and densities suitable as a fine aggregate of a heavy concrete, heavy mortar, or the like, and there are provided: (i) a heavy aggregate comprising particles including, as a main constituent component, at least one of FeO, Fe ₂ O ₃ , and metal iron, characterized in that spherical particles are included in an amount of 20% or more in the whole of particles, and particles passing through a sieve having a nominal size of 0.15 mm are included in an amount of 10% to 20% in mass percentage in the whole of particles; and (ii) the above-described heavy aggregate characterized in that the heavy aggregate is obtained by mutually mixing at least two or more kinds selected from: mill scales brought about in a rolling process of steelmaking; coarse particle components sievedly caught at a particle diameter of 50µm from steelmaking converter dusts; and pig iron particles separated from blast furnace granulated slags.	http://www.google.com/patents/US20100326324

Sub-categories of uses as defined in IUCLID
Feedstock, Ferro-alloys, Foundry, Iron oxides, Recycling material, Sinter, Tool steel
Cement, Clinker, Concrete aggregate, Concrete, Heavy concrete, Mineral wool, Refractories, Road construction, Slag formers, Stone production
Conterweights, weights
Catalysts, Chemicals, Energy saving, Exothermic power, Heat consevation, Iron salts, Radiation shielding
Welding electrodes, graphite electrodes
Fertilizer, Water and soil treatment
Friction products
Glass, Painting
Batteries
Melting charge

Process Category explanation²:

PROC 1	Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
PROC 2	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages
PROC 3	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling
PROC 4	Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure
PROC 5	Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage
PROC 8a	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC 8b	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
PROC 9	Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage
PROC 13	Immersion operations Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes

² ECHA Guidance on information requirements and chemical safety assessment - Chapter R.12: Use descriptor system (Version 2, March 2010)

	<p>handling of treated objects (e.g. after dying, plating,).</p> <p>Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.</p>
PROC 14	<p>Processing of preparations and/or substances (liquid and solid) into preparations or articles. Substances in the chemical matrix may be exposed to elevated mechanical and/or thermal energy conditions. Exposure is predominantly related to volatiles and/or generated fumes, dust may be formed as well.</p>
PROC 15	<p>Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes</p>
PROC 16	<p>Covers the use of material as fuel sources (including additives) where limited exposure to the product in its un-burned form is expected. Does not cover exposure as a consequence of spillage or combustion.</p>
PROC 17	<p>Lubrication at high energy conditions (temperature, friction) between moving parts and substance; significant part of process is open to workers.</p> <p>The metal working fluid may form aerosols or fumes due to rapidly moving metal parts.</p>
PROC 22	<p>Activities at smelters, furnaces, refineries, coke ovens.</p> <p>Exposure related to dust and fumes to be expected. Emission from direct cooling may be relevant.</p>
PROC 23	<p>Sand and die casting, tapping and casting melted solids, drossing of melted solids, hot dip galvanising, raking of melted solids in paving</p> <p>Exposure related to dust and fumes to be expected</p>
PROC 25	<p>Welding, soldering, gouging, brazing, flame cutting</p> <p>Exposure is predominantly expected to fumes and gases.</p>
PROC 26	<p>Transfer and handling of ores, concentrates, raw metal oxides and scrap; packaging, un-packaging, mixing/blending and weighing of metal powders or other minerals</p>
PROC 27a	<p>Production of metal powders by hot metallurgical processes (atomisation, dry dispersion)</p>
PROC 27b	<p>Production of metal powders by wet metallurgical processes (electrolysis, wet dispersion)</p>

4. Identified uses as reported in IUCLID

Table 2. Formulation

Identifiers	Use descriptors	Other information
<p>F-1: Feedstock, Ferro-alloys, Foundry, Iron oxides, Recycling material, Sinter, Tool steel, Aluminothermy - Oil content <1%</p>	<p>Environmental release category (ERC): ERC 3: Formulation in materials</p> <p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected 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 25: Other hot work operations with metals PROC 26: Handling of solid inorganic substances at ambient temperature PROC 3: Use in closed batch process (synthesis or formulation) PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>Product Category formulated: PC 7: Base metals and alloys PC 19: Intermediate</p>	<p>Substance supplied to that use: In a mixture</p>
<p>F-2: Cement, Clinker, Concrete aggregate, Concrete, Heavy concrete, Mineral wool,</p>	<p>Environmental release category (ERC): ERC 3: Formulation in materials</p> <p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure</p>	<p>Substance supplied to that use: In a mixture</p>

Identifiers	Use descriptors	Other information
Refractories, Road construction, Slag formers, Stone production - Oil content <1%	<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> <p>PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</p> <p>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</p> <p>PROC 26: Handling of solid inorganic substances at ambient temperature</p> <p>PROC 3: Use in closed batch process (synthesis or formulation)</p> <p>Product Category formulated:</p> <p>PC 7: Base metals and alloys</p> <p>PC 19: Intermediate</p> <p>PC 0: Other: Refractory industry</p>	
F-3: Counterweights, weights - Oil content <1%	<p>Environmental release category (ERC):</p> <p>ERC 3: Formulation in materials</p> <p>Process category (PROC):</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 3: Use in closed batch process (synthesis or formulation)</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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p>	Substance supplied to that use: As such In a mixture

Identifiers	Use descriptors	Other information
	<p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</p> <p>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</p> <p>PROC 26: Handling of solid inorganic substances at ambient temperature</p> <p>Product Category formulated:</p> <p>PC 7: Base metals and alloys</p>	
F-4: Glass, Painting - Oil content <1%	<p>Environmental release category (ERC):</p> <p>ERC 3: Formulation in materials</p> <p>Process category (PROC):</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 3: Use in closed batch process (synthesis or formulation)</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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>PROC 17: Lubrication at high energy conditions and in partly open process</p> <p>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</p> <p>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</p>	Substance supplied to that use: In a mixture

Identifiers	Use descriptors	Other information
	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) Product Category formulated: PC 9a: Coatings and paints, thinners, paint removes PC 19: Intermediate	
F-5: Batteries - Oil content <3%	Environmental release category (ERC): ERC 3: Formulation in materials Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) 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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 17: Lubrication at high energy conditions and in partly open process 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 27a: Production of metal powders (hot processes) PROC 27b: Production of metal powders (wet processes) Product Category formulated: PC 7: Base metals and alloys	Substance supplied to that use: In a mixture

Identifiers	Use descriptors	Other information
	PC 13: Fuels PC 19: Intermediate	
F-6: Melting charge - Oil content <3%	<p>Environmental release category (ERC): ERC 3: Formulation in materials</p> <p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected 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 25: Other hot work operations with metals PROC 26: Handling of solid inorganic substances at ambient temperature</p> <p>Product Category formulated: PC 7: Base metals and alloys PC 19: Intermediate</p>	Substance supplied to that use: In a mixture

Table 3. Uses at industrial sites

Identifiers	Use descriptors	Other information
IW-1: Feedstock, Ferro-alloys, Foundry, Iron oxides, Recycling material, Sinter, Tool steel, Aluminothermy - Oil content <1%	<p>Environmental release category (ERC): ERC 5: Industrial use resulting in inclusion into or onto a matrix ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC 6b: Industrial use of reactive processing aids</p> <p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected 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 25: Other hot work operations with metals PROC 26: Handling of solid inorganic substances at ambient temperature PROC 3: Use in closed batch process (synthesis or formulation) PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>Product Category used: PC 7: Base metals and alloys PC 19: Intermediate</p> <p>Sector of end use: SU 14: Manufacture of basic metals, including alloys SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 24: Scientific research and development</p>	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no

Identifiers	Use descriptors	Other information
IW-2: Cement, Clinker, Concrete aggregate, Concrete, Heavy concrete, Mineral wool, Refractories, Road construction, Slag formers, Stone production - Oil content <1%	<p>Environmental release category (ERC):</p> <ul style="list-style-type: none"> ERC 5: Industrial use resulting in inclusion into or onto a matrix ERC 6b: Industrial use of reactive processing aids ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates) <p>Process category (PROC):</p> <ul style="list-style-type: none"> PROC 1: Use in closed process, no likelihood of exposure 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 PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation 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 3: Use in closed batch process (synthesis or formulation) <p>Product Category used:</p> <ul style="list-style-type: none"> PC 7: Base metals and alloys PC 19: Intermediate PC 0: Other: Refractory industry <p>Sector of end use:</p> <ul style="list-style-type: none"> SU 13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU 19: Building and construction work 	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no

Identifiers	Use descriptors	Other information
	SU 24: Scientific research and development	
IW-3: Counterweights, weights - Oil content <1%	<p>Environmental release category (ERC): ERC 5: Industrial use resulting in inclusion into or onto a matrix ERC 6b: Industrial use of reactive processing aids</p> <p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) 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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation 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</p> <p>Product Category used: PC 7: Base metals and alloys</p> <p>Sector of end use: SU 14: Manufacture of basic metals, including alloys SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU 15: Manufacture of fabricated metal products, except machinery and equipment</p>	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: yes
IW-4: Catalysts, Chemicals, Energy saving, Exothermic	<p>Environmental release category (ERC): ERC 5: Industrial use resulting in inclusion into or onto a matrix ERC 6b: Industrial use of reactive processing aids</p>	Substance supplied to that use: As such

Identifiers	Use descriptors	Other information
<p>power, Heat conservation, Iron salts, Radiation shielding - Oil content <1%</p>	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) 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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 15: Use as laboratory reagent 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</p> <p>Product Category used: PC 7: Base metals and alloys PC 13: Fuels PC 19: Intermediate PC 21: Laboratory chemicals</p> <p>Sector of end use: SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 24: Scientific research and development</p>	<p>In a mixture Subsequent service life relevant for that use: yes</p>
<p>IW-5: Welding electrodes, graphite</p>	<p>Environmental release category (ERC): ERC 5: Industrial use resulting in inclusion into or onto a matrix</p>	<p>Substance supplied to that use:</p>

Identifiers	Use descriptors	Other information
electrodes - Oil content <1%	<p>Process category (PROC):</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 3: Use in closed batch process (synthesis or formulation)</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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</p> <p>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</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>Product Category used:</p> <p>PC 7: Base metals and alloys</p> <p>PC 19: Intermediate</p> <p>PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products</p> <p>Sector of end use:</p> <p>SU 14: Manufacture of basic metals, including alloys</p> <p>SU 15: Manufacture of fabricated metal products, except machinery and equipment</p> <p>SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment</p> <p>SU 24: Scientific research and development</p>	In a mixture Subsequent service life relevant for that use: no
IW-6: Glass, Painting - Oil content <1%	<p>Environmental release category (ERC):</p> <p>ERC 5: Industrial use resulting in inclusion into or onto a matrix</p>	Substance supplied to that use:

Identifiers	Use descriptors	Other information
	<p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) 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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 17: Lubrication at high energy conditions and in partly open process 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 27a: Production of metal powders (hot processes) PROC 27b: Production of metal powders (wet processes)</p> <p>Product Category used: PC 9a: Coatings and paints, thinners, paint removes PC 19: Intermediate</p> <p>Sector of end use: SU 13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU 24: Scientific research and development</p>	<p>In a mixture Subsequent service life relevant for that use: no</p>
IW-7: Batteries - Oil content <3%	<p>Environmental release category (ERC): ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)</p> <p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure</p>	<p>Substance supplied to that use: In a mixture Subsequent service life</p>

Identifiers	Use descriptors	Other information
	<p>PROC 2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC 3: Use in closed batch process (synthesis or formulation)</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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>PROC 17: Lubrication at high energy conditions and in partly open process</p> <p>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</p> <p>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</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>Product Category used:</p> <p>PC 7: Base metals and alloys</p> <p>PC 13: Fuels</p> <p>PC 19: Intermediate</p> <p>Sector of end use:</p> <p>SU 14: Manufacture of basic metals, including alloys</p> <p>SU 15: Manufacture of fabricated metal products, except machinery and equipment</p> <p>SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment</p> <p>SU 24: Scientific research and development</p>	<p>relevant for that use: yes</p>
<p>IW-8: Melting charge - Oil content <3%</p>	<p>Environmental release category (ERC):</p> <p>ERC 5: Industrial use resulting in inclusion into or onto a matrix</p> <p>ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)</p>	<p>Substance supplied to that use: In a mixture</p>

Identifiers	Use descriptors	Other information
	<p>ERC 6b: Industrial use of reactive processing aids</p> <p>Process category (PROC):</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 3: Use in closed batch process (synthesis or formulation)</p> <p>PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected</p> <p>PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting</p> <p>PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature</p> <p>PROC 25: Other hot work operations with metals</p> <p>PROC 26: Handling of solid inorganic substances at ambient temperature</p> <p>Product Category used:</p> <p>PC 7: Base metals and alloys</p> <p>PC 19: Intermediate</p> <p>Sector of end use:</p> <p>SU 14: Manufacture of basic metals, including alloys</p> <p>SU 15: Manufacture of fabricated metal products, except machinery and equipment</p> <p>SU 24: Scientific research and development</p>	<p>Subsequent service life relevant for that use: no</p>

Table 4. Uses by professional workers

Identifiers	Use descriptors	Other information
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Identifiers	Use descriptors	Other information
PW-1: Fertilizer, Water and soil treatment - Oil content <1%	<p>Environmental release category (ERC): ERC 8e: Wide dispersive outdoor use of reactive substances in open systems</p> <p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) 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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation 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 27a: Production of metal powders (hot processes) PROC 27b: Production of metal powders (wet processes) PROC 15: Use as laboratory reagent</p> <p>Product Category used: PC 12: Fertilisers PC 19: Intermediate PC 37: Water treatment chemicals</p> <p>Sector of end use: SU 1: Agriculture, forestry and fishing SU 24: Scientific research and development</p>	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no
PW-2: Cement, Clinker,	Environmental release category (ERC):	Substance supplied to that

Identifiers	Use descriptors	Other information
Concrete aggregate, Concrete, Heavy concrete, Mineral wool, Refractories, Road construction, Slag formers, Stone production - Oil content <1%	ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8d: Wide dispersive outdoor use of processing aids in open systems ERC 8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure 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 PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation 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 3: Use in closed batch process (synthesis or formulation) Product Category used: PC 7: Base metals and alloys PC 19: Intermediate PC 0: Other: Refractory industry Sector of end use: SU 13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU 15: Manufacture of fabricated metal products, except machinery and equipment	use: In a mixture Subsequent service life relevant for that use: no

Identifiers	Use descriptors	Other information
	SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU 19: Building and construction work SU 24: Scientific research and development	
PW-3: Counterweights, weights - Oil content <1%	<p>Environmental release category (ERC): ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8d: Wide dispersive outdoor use of processing aids in open systems ERC 8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix</p> <p>Process category (PROC): PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) 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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation 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</p> <p>Product Category used: PC 7: Base metals and alloys</p> <p>Sector of end use: SU 14: Manufacture of basic metals, including alloys SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment</p>	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: yes

Identifiers	Use descriptors	Other information
	SU 15: Manufacture of fabricated metal products, except machinery and equipment	
PW-4: Catalysts, Chemicals, Energy saving, Exothermic power, Heat conservation, Iron salts, Radiation shielding - Oil content <1%	<p>Environmental release category (ERC):</p> <ul style="list-style-type: none"> 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 ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems <p>Process category (PROC):</p> <ul style="list-style-type: none"> PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) 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 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 13: Treatment of articles by dipping and pouring PROC 15: Use as laboratory reagent 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 <p>Product Category used:</p> <ul style="list-style-type: none"> PC 7: Base metals and alloys PC 13: Fuels PC 19: Intermediate PC 21: Laboratory chemicals 	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: yes

Identifiers	Use descriptors	Other information
	Sector of end use: SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 14: Manufacture of basic metals, including alloys SU 24: Scientific research and development	

Table 5. Article service life

Identifiers	Use descriptors	Other information
SL-1: Friction products - Oil content <1%	<p>Article category related to subsequent service life (AC): AC 2: Machinery, mechanical appliances, electrical/electronic articles AC 7: Metal articles</p> <p>Environmental release category (ERC): ERC 12a: Industrial processing of articles with abrasive techniques (low release) ERC 12b: Industrial processing of articles with abrasive techniques (high release)</p> <p>Process category (PROC): PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation 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</p>	Article used by: workers

Technical function of the substance:

- Agents adsorbing and absorbing gases or liquids
- Binding agents
- Colouring agents, pigments
- Conductive agents
- Fertilisers
- Heat transfer agents
- Intermediates
- Laboratory chemicals
- Lubricants and lubricant additives
- Viscosity adjustors
- Additives

5. REACH legislation extract – REACH Article 14

Article 14(3). A chemical safety assessment of a substance shall include the following steps:

- (a) human health hazard assessment;
- (b) physicochemical hazard assessment;
- (c) environmental hazard assessment;
- (d) persistent, bioaccumulative and toxic (PBT) and very persistent and very bioaccumulative (vPvB) assessment.

Article 14(4). If, as a result of carrying out steps (a) to (d) of paragraph 3, the registrant concludes that the substance meets the criteria for classification as dangerous in accordance with Directive 67/548/EEC or is assessed to be a PBT or vPvB, the chemical safety assessment shall include the following additional steps:

- (a) exposure assessment including the generation of exposure scenario(s) (or the identification of relevant use and exposure categories if appropriate) and exposure estimation;
- (b) risk characterisation.

The exposure scenarios (where appropriate the use and exposure categories), exposure assessment and risk characterisation shall address all identified uses of the registrant.