# GROUP 3. Slags

Version 22 January 2010

(**N.B.:** The content of this ID Card may be adjusted as the Refiners Project develops)



## 1. Identification of the group

**Table 1.** Identification of the group

| | Proposed by PMC Refiners Work Group | Original (in EC inventory) |
|---|---|---|
| **Name** | Slags, precious metal refining | Slags, precious metal refining |
| **EC number** | 308-515-5 | 308-515-5 |
| **CAS number** | 98072-60-7 | 98072-60-7 |
| **Description** | Solids (e.g.: lumps) resulting from pyro-metallurgy processes applied on primary and secondary feeds with high and low precious metal content.<br>Slags may contain non ferrous metal oxides and silicates and/or fused salts, and some quantities of precious metals. | None |

N.B.: The description proposed above will be further detailed by PMC for Registration purposes.

## 2. Synonyms (and/or commercial names)

None

## 3. Substances that are similar or can be considered as the same

**Table 2.** Synonyms and similar/same substances belonging to the group

| Name | EC number | CAS number | Description (EC inventory) |
|---|---|---|---|
| Slags, silver-smelting | 308-315-8 | 97926-95-9 | Product resulting from the smelting of silver and its alloys obtained from primary and secondary sources and including recycled plant intermediates. Consists primarily of SiO2 and other gangue constituents and may contain other residual non-ferrous metals and their compounds. |
| Slags, dore furnace | 266-975-1 | 67711-98-2 | Slag produced as a by-product in the furnace smelting of metal wastes rich in gold and silver. Principal components are usually tellurium, selenium and copper |

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| | | | |
|---|---|---|---|
| | | | with minor amounts of lead, antimony and other metals. |
| Slags, precious metal recovery lead refining | 273-826-4 | 69029-85-2 | Inorganic slags produced from treatment of calcined scrap metals and oxides with borax, litharge and sodium carbonate followed by fusion. |

**N.B.:** No registration dossier will be prepared by the PMC for the materials listed in the above table. PMC Members are recommended to register their material using the identifiers provided in Table 1, for which a dossier will be prepared by the PMC.

Although slags resulting from other metals refining processes may be very similar to precious metals slags, they are not listed here as they are covered by other consortia and must hence, not be registered using the same information or in the same Registration Dossier.

## 4. Usual composition

**Table 3.** Usual composition

| Type | Name of the element | Symbol | Species present *(one line per species)* | Most recent classification of species | Source of classification | Usual concentration range (%) |
|---|---|---|---|---|---|---|
| **Precious metals** | Silver | Ag | Metallic, AgO, Ag2O? | | | 0-22,9 |
| | Gold | Au | Metallic? | None | GHS/CLP | 0-10 |
| | Platinum Group Metals | PGM | Metallic? | None | GHS/CLP | 0-5 |
| **Other metals** | Aluminium | Al | AlO2 | None | GHS/CLP | 0-20 |
| | *Aluminium silicate* | | Al2SiO5 | None | GHS/CLP | 0-35 |
| | Antimony | Sb | Sb2O3 | Likely to be class. | | 0-14 |
| | Arsenic | As | As2O3? | Carc. Cat. 1; R45; T+; R28; C; R34; N; R50-53 | GHS/CLP | 0-7 |
| | Barium | Ba | BaO | None | GHS/CLP | 0-22 |
| | *Barium sulphate* | | BaSO4 | None | GHS/CLP | 0-28 |
| | Bismuth | Bi | Bi2O3 | None | GHS/CLP | 0-8 |
| | *Sodium borate (borax)* | | Na2B4O7 | None | 31st ATP | 0-10 |
| | Calcium | Ca | CaO | F; R15 | GHS/CLP | 0-20 |
| | *Calcium silicate* | | Ca2SiO4 | None | GHS/CLP | 0-11 |
| | Cerium | Ce | | None | GHS/CLP | 0-2 |
| | *Chromium silicate* | | Cr2(SiO4)3 | None | GHS/CLP | 0-6 |
| | Copper | Cu | Metallic?, Cu2O | Xn; R22; N; R50-53 | GHS/CLP | 0-40 |
| | Lead | Pb | Metallic?, PbO, silicate | Repr. Cat. 1; R61 - Repr. Cat. 3; R62 - Xn; R20/22 - R33 - N; R50-53 | GHS/CLP | 0-97 |
| | Iron | Fe | Fe2SiO4 | None | GHS/CLP | 0-30 |
| | Magnesium | Mg | MgO | None | GHS/CLP | 0-20 |
| | Nickel | Ni | NiO | Carc. Cat. 1; | GHS/CLP | 0-13 |

| Type | Name of the | Symbol | Species present | Most recent | Source of | Usual |
|---|---|---|---|---|---|---|
| | | | | R49; R43; R53 | | |
| | Phosphate | PO4 | | None | GHS/CLP | 0-5 |
| | Selenium | Se | Se2-, SeO | Xn; R22 - Xi; R36/38 - N; R50-53 | GHS/CLP | 0-8 |
| | Silicon | Si | SiO2 | None | GHS/CLP | 0-75 |
| | Sodium | Na | NaO, Na2O? | F; R14/15 - C; R34 | GHS/CLP | 0-20 |
| | *Calgon* | | Na6O18P6 | None | | 0-75 |
| | *Sodium silicate* | | Na2SiO3 | None | GHS/CLP | 30-60 |
| | Strontium | Sr | | None | GHS/CLP | 0-2 |
| | Tellurium | Te | TeO2 | None | GHS/CLP | 0-20 |
| | Tin | Sn | SnSiO4, SnO2 | None | GHS/CLP | 0-15 |
| | Titanium | Ti | TiO2 | None | GHS/CLP | 0-3 |
| | Zinc (metal) | Zn | ZnO | N; R50-53 | GHS/CLP | 0-15 |
| | *Zinc silicate* | | Zn3Si4O10(OH)2 | None | GHS/CLP | 0-7 |
| | Zirconium | Zr | ZrO | None | GHS/CLP | 0-4 |
| **Other constituents** | Chlorine | Cl | NaCl | T; R23 - Xi; R36/37/38 - N; R50 | ESIS | 0-5 |

The composition given above represents the usual elemental content available to the Members of the Consortium by 7 of December 2009. This usual content represents the majority of the Precious Metal Slags that are placed on the EEA market.

Composition of slags resulting from precious metals refining may contain a variety of constituents, comprising compounds present in the process such as metal oxides, together with added fluxing agents, which may include sodium borate or borax (Na2B4O7), sodium carbonate (Na2CO3), sodium phosphate (Na3PO4), and silica (SiO2) (sometimes as aluminium silicate (Al2O3). Thus several constituents may be present, in the form of oxides, borates, silicates, aluminates and carbonates, sometimes with entrained metals.

Concentration ranges outside the ones given above do not exclude sameness and are usually referred to as unusual or exceptional situations. For instance, concentrations higher than 65% of gold, 65% of PGM, and 50% of zinc have been declared by some Members of the Consortium. Each potential registrant is responsible for performing its own elemental analysis (PMC will specify preferred method in due course).

## 5. Classification (*additive - based on composition provided in table 2 above*)

To be completed

## 6. Basic physico-chemical characteristics and properties

**Table 4.** List of physico-chemical characteristics of the substance to facilitate sameness confirmation

| Characteristic | Description/value | Comment |
|---|---|---|
| **Physical state** (solid, liquid, gaseous) | | |
| **Physical form** (Aerosol, Compact, Crystalline, Dispersion, Fibre, Filaments, Flakes, Liquified gas, Particulates, Paste, Pellets, | | |

| Characteristic | Description/value | Comment |
|---|---|---|
| Powder, Suspension, Viscous, Refrigerated Liquid, Other) | | |
| **Usual particle size range(s)** (D10, D50, D90 in nm, µm or mm) | | |
| **Colour** | | |
| **Odour** (Ammonia-like, Biting, Characteristic of sulfur-containing compounds, Characteristic of aromatic compounds, Faint, Garlic-like, Pungent, Slight, Sweetish, Odourless, Other) | | |
| **Substance type** (Element, Inorganic, Natural substance, Organic, Organo-metallic, Petroleum Product) | | |
| **Water solubility** | | |
| **Relative density** ($g/cm^3$) **or specific gravity** | | |
| **Specific surface area** ($m^2/g$) | | |

## 7. Lead Registrant

Umicore volunteers to be the Lead Registrant for this intermediate.

## 8. REACH Strategy

**Table 5.** REACH strategy for the group (basis for REACH Registration preparation)

| Subject | Description | Comment |
|---|---|---|
| **SIEF** | As pre-registered | |
| **REACH category** | UVCB | |
| **Intermediate status** | Transported | At least one Member of the PMC has declared this material as transported > 1000 t/a. This will be considered as the reference to produce the Dossier as other forms (on-site and/or below 1000 t/a are covered by the requirements of transported > 1000 t/a). |
| **Tonnage band** | > 1000 | |
| **Information requirements** | Available + Annex VII | |
| **(Likely) Classification** | Carc. Cat. 1, Repr. Cat. 3 and R50-53 | Depends on confirmation of composition/species. |
| **Resulting registration deadline** | 2010 | |
| **Other** | | |