



ID Card

Slags, doré furnace

Version 8 April 2014

Please note that discussions on the ID Cards are currently ongoing.
Should you need further information / detail, please contact info@epmf.be
The content of this ID Card may be adjusted as the Refinables Project develops.

Notes:

- This ID card is used to support the substance sameness discussions in SIEFs and to describe the substance/group to the best of the SIEF members' knowledge.
- It also aims at grouping communications relevant to the request of available data or information, the approval of the proposed Lead Registrant and the registration strategy with the SIEF.
- It is the responsibility of each individual registrant to identify their substance and to report company-specific identity in their Registration Dossier (section 1 of IUCLID).

DISCLAIMER

The proper identification and characterisation of a substance or intermediate is the responsibility of each registering legal entity. All data and information contained in this document shall be treated by the receiving party (i) in full confidence with the adequate respect of any confidential and/or proprietary nature of such information and (ii) only in the framework of the purpose of agreeing on substance sameness, Lead Registrant and overall REACH Strategy for the concerned Substance under REACH (the 'Purpose'). The receiving party (and any representative) shall not be allowed to use or circulate any or all parts of this document for any other purpose than the Purpose, without the prior written consent of the European Precious Metals Federation (EPMF). The content provided in this document is given for the Purpose and as such, no guarantee or warranty whatsoever (expressed or implied) is given as to its accuracy, completeness, merchantability or fitness for any particular purpose which the receiving party may have. In any case, any use by the receiving party would be made at its sole risk and liability.

1. Identification of the group

Important note: The EPMF agreed to explore criteria and approaches which could be considered to split the group registered in 2010 in an objective manner. Based on process information, it was decided to split the group in 2:

- 1) Slags, doré furnace
- 2) Slags, production of precious metals containing materials other than doré

Separate ID cards were generated for these 2 groups but they will be registered together in April 2014 and separate registrations are foreseen once we have clarity on the procedure for registration. For the April 2014 registration the same identifiers (name, EC number, CAS number, description) will be used as for 2010 registration. Slags, doré furnace will be referred to as grade 1 in the joint dossier.

Table 1. Identification of the group

	Proposed by EPMF Refiners Work Group	Original (in EC inventory)	2010 Registration
Name	Slags, doré furnace	Slags, doré furnace	Slags, precious metal refining
EC number	266-975-1	266-975-1	308-515-5
CAS number	67711-98-2	67711-98-2	98072-60-7



Description	Slags produced as by-products in the production (smelting, reduction, converting, and refining processes) of Slags, doré furnace. They generally contain copper and lead and small amounts of silver, antimony, tellurium and other metals. Depending on the fluxing agent used, slags in this group may contain metal oxides, phosphates, silicates, sulphides/sulphates and/or fused salts in varying concentrations.	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 with minor amounts of lead, antimony and other metals.	Heterogeneous solids (e.g.: lumps) resulting from pyro-metallurgy processes applied on precious metals containing-primary and secondary feeds, using several fluxing agents such as sodium borate or borax, sodium carbonate, sodium phosphate, silica, and aluminium silicate amongst others. Depending on the fluxing agent used, slags resulting from the refining of precious metals may contain ferrous and non-ferrous metal oxides, carbonates, phosphates, silicates, and/or fused salts in varying concentrations, with some quantities of precious metals.
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N.B.: The description proposed above will be further detailed by EPMF for Registration purposes.

2. Synonyms and other identifiers of the group

None

3. Substances (with core identifiers) also falling under this group (with justification)

Although slags resulting from other metals refining processes may be very similar to Slags, doré furnace, 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 of the substance

Table 2. Usual composition

Type	Name of the element	Symbol	Species present	Typical concentration (%)	Concentration range (%)
Precious metals	Silver	Ag	Metallic, oxides	2,9	0 – 7,1
	Gold	Au	Metallic?	0,4	0 - 3
	Platinum Group Metals	Ir, Pd, Pt, Rh, Ru		0,01	0 – 0,05
Other metals/ constituents	Aluminium	Al	Oxides?	0,3	0 - 2,9
	Arsenic	As	Oxides	1,1	0 - 3,9
	Boron	B	Borate, oxides	0,4	0 - 2,7
	Barium	Ba	Oxides, sulphate	3,6	0 - 16,4
	Bismuth	Bi	Oxides	0,9	0 - 2,7
	Calcium	Ca	Oxides	0,3	0 - 2,1
	Chromium	Cr	Oxides?	0,06	0 - 0,35
	Copper	Cu	Oxides, metallic	10	0,9 - 38
	Iron	Fe	Oxides	2,7	0 - 19
	Potassium	K		0,11	0 - 1
	Magnesium	Mg		0,01	0 - 0,1
	Manganese	Mn		0,002	0 - 0,02
	Sodium	Na	Oxides, carbonate, salts	3,7	0 - 14



Nickel	Ni	Oxides	0,76	0 - 2,7
Lead	Pb	Silicate, oxides	23	0 - 44
Sulphur	S	Metal sulfides/sulphates	0,44	0 - 4
Antimony	Sb	Oxides	2,6	0 - 10
Selenium	Se		0,57	0 - 3,8
Silicon	Si	Silicates	5,3	0 - 12
Tin	Sn		1,9	0 - 8,7
Strontium	Sr		0,04	0 - 0,4
Tellurium	Te	Oxides, metallic, salts	2	0 - 10
Zinc	Zn	Oxide, silicate?	1,5	0 - 5,1
Total			64,9	

N.B.1: Classification drivers are indicated in red (see also



Table 6).

Metal species were determined based on information available to registrants and/or mineralogical analysis (by means of XRD analysis).

The composition given above represents the usual elemental/compound content available to the Members of the EPMF by 28 February 2014. This usual content represents the majority of the Slags, doré furnace that is placed on the EEA market.

Composition of Slags, doré furnace 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 ($\text{Na}_2\text{B}_4\text{O}_7$), sodium carbonate (Na_2CO_3), and silica (SiO_2) (sometimes as aluminium silicate (Al_2O_3)). Thus several constituents may be present, in the form of oxides, borates, silicates, aluminates and carbonates, sometimes with entrained metals.

In a UVCB substance, the number of constituents is relatively large and/or; the composition is, to a significant part, unknown and/or; the variability of composition is relatively large or poorly predictable. Hence, concentration ranges outside the ones given above do not exclude sameness and are usually referred to as unusual or exceptional situations. Each potential registrant is responsible for performing its own elemental analysis.

5. Information on appearance, physical state and properties of the substance

Table 3. Appearance / physical state / properties of the substance

Physical state	Solid
Appearance	Green-black
Particle size*	Coarse lump

* Fine powder: particles in the size range 100 – 2.500 nm. Coarse powder: particles in the size range 2.500 nm – 1 mm. Massive object: particles in the size range > 1 mm.

6. Analytical data

Annex VI of REACH requires the registrant to describe the analytical methods and/or to provide the bibliographical references for the methods used for identification of the substance and, where appropriate, for the identification of impurities and additives. This information should be sufficient to allow the methods to be reproduced.

In addition to analytical data, all registrants should use expert judgment and process knowledge to characterize their substance.

Table 4. Analytical methods for identification of the substance

Parameter / Method	Recommended for substance identification and sameness check	Applicable	Not applicable or not recommended
Elemental analysis			
ICP (ICP-MS or ICP-OES)	X		
Atomic absorption spectroscopy (AAS)			
Glow discharge mass spectrometry (GDMS)			
Molecular analysis			
Infrared (IR) spectroscopy			
Raman spectroscopy			
Mineralogical analysis			



X-Ray Fluorescence (XRF)			
X-Ray Diffraction (XRD)	X		
Morphology and particle sizing			
Optical microscopy and electron microscopy (SEM, TEM, REM)* #	X		
Laser diffraction* #			
Particle size by other means (e.g. sieve analysis)#			
Surface area by N-BET* #			
Other			
Magnetite analyser		X	
S/C analyzer		X	
Separation technique: ion exchange chromatography		X	

* Analytical techniques particularly (but not exclusively) relevant for nanomaterials.

The choice of the technique for particle size depends on the size of the material as manufactured/imported/placed on the market/used.

7. Lead Registrant

Umicore PMR (Belgium) volunteers to be the Lead Registrant for this intermediate. The European Precious Metals Federation (EPMF) will provide support to the Lead Registrant as laid down in the EPMF Agreement.

8. REACH Strategy

The table below presents the overall Registration Strategy for Slags, doré furnace based on the information available to the EPMF by the date given above on the document.

The Registration Dossier will be prepared for the highest substance status (information requirements associated to a substance or Article 10 Registration being higher than an intermediate handled under strictly controlled conditions or Article 17 or 18 one) and associated tonnage band.

The recap below therefore reflects the scope of work of the EPMF for Slags, doré furnace and sets the minimum and maximum set of information that will be gathered and/or produced when preparing the Registration Dossier for Slags, doré furnace as described in this ID Card.

If higher information requirements are necessary, these can be included in the Registration dossier (if EPMF is made aware of these additional requirements in-time) as an update to the already submitted dossier.

Important note: The table below presents the registration strategy that will be followed once we have confirmation from ECHA on how this will affect registration fees. For the April 2014 registration Slags, doré furnace will be registered together with Slags, production of precious metals containing materials other than doré under "Slags, precious metal refining" (using the same identifiers as for 2010 registration). Slags, doré furnace will be referred to as grade 1 in the joint dossier.

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

Item	Description	Comment
SIEF	New/sub-SIEF	Need to split SIEF 308-515-5 in two, including one sub-SIEF for Slags, doré furnace. Requires sameness discussion in pre-SIEF, split "Slags, precious metal refining" SIEF, creating an ad hoc SIEF, and linking registration under EC number 266-975-1 with previous EC number.
REACH category	UVCB	The composition of Slags, doré furnace will depend on the flux used; the selection of the analytical technique will depend on whether the composition is dominated by oxides, carbonates, silicates, etc. Part of the composition can remain unknown if the (combination of) analytical technique(s) used to determine the composition is not fully



		<p>suitable to identify all types of constituents.</p> <p>The variability of the composition of Slags, doré furnace both intra- and inter-registrants is large because of the potentially different feed material and flux.</p> <p>Slags, doré furnace are truly substances of variable and partially unknown composition.</p>
Highest status	Non-SCC intermediate	At least one Member of the EPMF has declared this material as an intermediate not handled under strictly controlled conditions (SCC), meaning an Article 10 dossier is required for joint submission.
Intermediate status		Slags, doré furnace are the result of <u>intentional</u> pyro-metallurgical processes to produce doré. Slags serve as a collector of impurities in varying forms (depending on whether or not a flux is used and on the type of flux used) to separate these from the main source of (precious) metals in order to contribute to the concentration and purification of these. Slags containing valuable contents of precious metals are fed back into the pyro-metallurgical processes to be <u>chemically transformed</u> in order to recover the valuable metal content.
Highest tonnage band	> 1000 t/a	
Information requirements	Available / Existing + Annex VII – VIII – IX - X	
Existing classification	See Table 6	Classifications for Slags, doré furnace are proposed in Table 6 as grouped classifications based on composition profile. Compositions or triggers associated to each classification provide a non-exhaustive list of those constituents which can be present in the Refinable.
Registration deadline	2010	Slags, doré furnace was registered as an SCC intermediate in 2010 (Article 17/18 dossier) under the entry 'Slags, precious metal refining' and will be registered separately under a full substance registration (Article 10 dossier) in 2014



Table 6. Classification for the group

	Classification CLP	Composition / classification drivers
1	ENV Ac 1, ENV Ch 1, STOT Rep 1, Repro. 1A, Carc. 1A, Skin sens 1, Eye dam. 1, Skin 1B, Acute tox oral 3, Acute tox inh 4	$\%As_2O_3 \geq 5\%$ $\%CaO + \%Ag_2O \geq 3\%$ $\%CdO < 1\%$ $\%NiO \geq 0,1\%$ or $\%As_2O_3 \geq 0,1\%$ $\%Pb \text{ comp} \geq 0,3\%$ $\%SiO_2 \geq 10\%$ $100 / ((\%Se)/100 + (\%Cu_2O + \%Pb \text{ comp} + \%Pb \text{ powder} + \%BaO_2 + \%CoO + \%MnO_2)/ 500)$ between 50 and 300 mg/kg $100 / ((\%Se)/700 + (\%Cu_2O + \%Pb \text{ comp} + \%Pb \text{ powder} + \%BaO_2 + \%MnO_2)/4500)$ between 1 and 5 mg/L $(\%As_2O_3 + \%CdO \times 10 + \%CoO \times 10 + \%Cu_2O + \%Pb \text{ comp} \times 10 + \%Se \text{ comp} \times 10 + \%ZnO + \%Ag \text{ comp} \times 1000 + \%Au \text{ comp} + \%Pd \text{ comp} \times 10 + \%Pt \text{ comp} \times 10 + \%Ti \text{ comp} + \%Rh \text{ comp} + \%Ru \text{ comp}) > 25\%$ $(\%As_2O_3 + \%CdO \times 100 + \%CoO \times 10 + \%Cu_2O + \%Pb \text{ comp} + \%Se \text{ comp} + \%ZnO + \%Ag \text{ comp} \times 100 + \%Au \text{ comp} + \%Pd \text{ comp} \times 10 + \%Pt \text{ comp} + \%Ti \text{ comp} + \%Rh \text{ comp} + \%Ru \text{ comp}) > 25\%$

N.B.1: Fluxes used influence composition and hence, resulting classification

N.B.2: In most slags, presence of free silica cannot be ruled out (and would have no improvement on the classification in any case)

N.B.3: Refinement for silica where relevant can be done with XRD and dustiness data that would show amorphous silica instead of crystalline one, and no potential for inhalation

N.B.4: B presence as sodium borate/borax in Borate/borax slag only; present as boron oxide in remaining slags

N.B.5: STOT drivers: Pb comp, NiO

N.B.6: Classification drivers are (worst-case) assumptions and do not necessarily represent real species/mineralogical composition

N.B.7: Classification group has a CMR profile

9. Scope of the Registration Dossier

The uses included in this Registration Dossier are summarised in the table below and accompanied with the appropriate text.



Table 7. Reported uses of the substance

Description of use	Sector of Use (SU)	Process Category (PROC)	Environmental Release Category (ERC)
Manufacture of an intermediate	NA	<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 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 15: Use as laboratory reagent• PROC 21: Low energy manipulation of substances bound in materials and/or articles• PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting• PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature• PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles• PROC 26: Handling of solid inorganic substances at ambient temperature• PROC 27b: Production of metal powders (wet processes)	<ul style="list-style-type: none">• ERC 1: Manufacture of substances



Description of use	Sector of Use (SU)	Process Category (PROC)	Environmental Release Category (ERC)
Use as an intermediate in metal manufacturing	<ul style="list-style-type: none">• SU 14: Manufacture of basic metals, including alloys	<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 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 15: Use as laboratory reagent• PROC 21: Low energy manipulation of substances bound in materials and/or articles• PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting• PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature• PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles• PROC 26: Handling of solid inorganic substances at ambient temperature• PROC 27b: Production of metal powders (wet processes)	<ul style="list-style-type: none">• ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)