



ID Card

Residues, precious metal refining cementation and reduction

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

Table 1. Identification of the group

	Proposed by EPMF Refiners Work Group	Pre-registered as	
Name	Residues, precious metal refining cementation and reduction	Residues, precious metal refining cementation	Slimes and Sludges, precious metal refining
EC number	310-051-3	310-051-3	308-516-0
CAS number	102110-50-9	102110-50-9	98072-61-8
Description	Dry and wet residues recovered through cementation and/or reduction with a reducing agent (such as aluminium, copper, iron, zinc or organic agents) of precious metal refining streams before release to waste water treatment operations. Residues include cements and polishing sludges which generally contain precious metals, metal oxides, and metal chlorides in varying concentrations.	The residues obtained by the addition of aluminum or zinc to end liquors obtained from secondary refining of gold, iridium, osmium, palladium, platinum, rhenium, ruthenium or silver. Composed primarily of the precious metals, ammonium chloride and chlorides of aluminum, magnesium and zinc.	None

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



2. Synonyms and other identifiers of the group

- (Silver) Cements

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

Although cements resulting from other metals refining processes (e.g.: Cement copper – 266-964-1; 67711-88-0) may be very similar to precious metals cements, 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 and other	29	0 - 91
	Gold	Au	Metallic and other	6,5	0 - 40
	Iridium	Ir		6,5	0 - 40
	Palladium	Pd		1,8	0 - 12,5
	Platinum	Pt		6,3	0 - 40
	Rhodium	Rh		5,9	0 - 40
	Ruthenium	Ru		9,7	0 - 40
Other metals/ constituents	Aluminium	Al	Al ₂ O ₃	2	0 - 10
	Arsenic	As		0,46	0 - 3
	Bismuth	Bi		0,05	0 - 15
	Carbon	C		0,56	0 - 5
	Calcium	Ca		3,4	0 - 13,5
	Chlorine	Cl		1,4	0 - 6
	Cobalt	Co		0,11	0 - 1
	Chromium	Cr	Cr ₂ O ₃	0,22	0 - 1,5
	Copper	Cu	Metallic, carbonate, hydroxide, oxide, nitrate	23	0,04 - 68
	Iron	Fe	Metallic and other	3,8	0 - 12,5
	Potassium	K		0,11	0 - 1
	Magnesium	Mg		0,1	0 - 0,9
	Sodium	Na		0,05	0 - 0,5
	Nickel	Ni		0,3	0 - 1
	Lead	Pb	Chloride/Oxide (1:10)	4,5	0 - 15
	Sulphur	S	Sulfides, sulphates	1,5	0 - 7
	Antimony	Sb		0,56	0 - 10
	Selenium	Se		13	0 - 94
	Silicon	Si	SiO ₂	2,9	0 - 15
	Tin	Sn		0,11	0 - 1
	Tellurium	Te		2,8	0 - 10
Titanium	Ti		0,03	0 - 0,3	
Zinc	Zn		2,4	0 - 17,5	
Total				129	

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 9 February 2012. This usual content represents the majority of the Residues, precious metal refining cementation and reduction that is placed on the EEA market.

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	Grey-black or brown
Particle size*	Fine to coarse powder

* 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

Heraeus (Germany) 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 Residues, precious metal refining cementation and reduction 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 Residues, precious metal refining cementation and reduction and sets the minimum and maximum set of information that will be gathered and/or produced when preparing the Registration Dossier for Residues, precious metal refining cementation and reduction 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.

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

Item	Description	Comment
SIEF	If pre-registered as Slimes and sludges, precious metals refining – register using 310-051-3 instead	EPMF proposed to add “and reduction” to the name of this entry
REACH category	UVCB	The composition of cements will depend on the process they result from; the selection of the analytical technique will depend on the nature of the constituent(s) dominating the composition. Part of the composition can remain unknown if the (combination of) analytical technique(s) used to determine the composition is not fully suitable to identify all types of constituents. The variability of the composition of cements both intra- and inter-registrants is large as cements can result from various process steps having each its specific and potentially different feed material and reaction conditions. Cements are truly substances of variable and partially unknown composition.



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		Cements are the result of intentional hydro-metallurgical processes to produce (precious) metals via a number of reduction steps. Cements are chemically transformed to recover valuable metals contained in them e.g. in further smelting processes.
Highest tonnage band	100 - 1000 t/a	
Information requirements	Available / Existing + Annex VII – VIII – IX	
Existing classification	See Table 6	Classifications for Residues, precious metal refining cementation and reduction are proposed in Table 6 as grouped classifications based on cluster analysis and expert judgement. This is proposed for very large and variable groups, where many combinations are possible and hence there was a need to apply cluster analysis to identify conservative classification profiles to arrive at a reasonable number of possible classifications for the individual streams belonging to the UVCB substance. 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	Residues, precious metal refining cementation and reduction was registered as an SCC intermediate in 2010 (Article 17/18 dossier) and will be updated to a full substance registration (Article 10 dossier) in 2014

Table 6. Classification for the group

	Classification CLP	Composition / classification drivers
1	Acute tox oral 4, Acute tox inh 4, Skin sens 1, ENV Ac 1, ENV Ch 1, STOT Rep 2	<p>Sb₂O₃ < 1%; As₂O₃ < 0,1%; NiSO₄: 0,01% - 0,1% and NiO < 0,1% Pb comp < 0,3%; Se comp < 10%; MnSO₄ < 10%; CaO < 1% %SnCl₄ + %AgNO₃ + %As₂O₃ < 1% 10x(%SnCl₄ + %AgNO₃ + %As₂O₃ + %CaO + %CuSO₄) + NiSO₄ < 10%</p> <p>100 / ((%As₂O₃)/5 + (%Se comp + %Te/Te comp)/100 + (%CuSO₄ + %Pb com + %NiSO₄)/500) between 300 – 2000 mg/kg</p> <p>100 / ((%Se comp)/700 + (%Pb comp + %NiSO₄)/4500) between 1 and 5 mg/L</p> <p>(%As₂O₃ + %Pb comp x 10 + %Se comp x10 + %ZnO + %NiSO₄ + %AgNO₃ x 1000 + %Au comp + %Pd comp x 10 + %Rh/Rh comp + %Ru/Ru comp + %Pt/Pt comp x 10 + %Ti/Ti comp) > 25% * (%As₂O₃ + %Pb comp + %Se comp + %ZnO + %NiSO₄ + + %AgNO₃ x 100 + %Au comp + %Pd comp x 10 + %Rh/Rh comp + %Ru/Ru comp + %Pt/Pt comp + %Ti/Ti comp) > 25% *</p>



2	Acute tox oral 3, Acute tox inh 3, Skin 1B, Eye dam. 1, Resp/skin sens 1, Muta 2, Repro. 1A, Carc. 1A, STOT SE 3, STOT Rep 1, ENV Ac 1, ENV Ch 1	NiSO4 >= 1%; As2O3 >= 0,1% or NiSO4 >= 0,1% or NiO >= 0,1% Pb comp >= 0,3%; NiSO4 >=1% or NiO >= 10%; %SnCl4 + %AgNO3 + %As2O3 >= 3% 100 / ((%As2O3)/5 + (%Se comp + %Te/Te comp)/100 + (%CuSO4 + %Pb com + %NiSO4)/500) between 50 – 300 mg/kg 100 / ((%Se comp)/700 + (%Pb comp + %NiSO4)/4500) between 0,5 and 1 mg/L (%As2O3 + %Pb comp x 10 + %Se comp x10 + %ZnO + %NiSO4 + %AgNO3 x 1000 + %Au comp + %Pd comp x 10 + %Rh/Rh comp + %Ru/Ru comp + %Pt/Pt comp x 10 + %Ti/Ti comp) > 25% * (%As2O3 + %Pb comp + %Se comp + %ZnO + %NiSO4 + + %AgNO3 x 100 + %Au comp + %Pd comp x 10 + %Rh/Rh comp + %Ru/Ru comp + %Pt/Pt comp + %Ti/Ti comp) > 25% *
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N.B.1: STOT driver: NiSO4 or Pb comp

N.B.2: Classification drivers are (worst-case) assumptions and do not necessarily represent real species/mineralogical composition

N.B.3: Classification group 2 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)