ID Card
Flue dust, precious metal refining

Version 4 July 2023

Notes:

- *This ID card is used to support the substance sameness discussions and to describe the substance/group to the best of the members' knowledge.*
- *It also aims at grouping communications relevant to the request of available data or information and the registration strategy*
- *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).*

1. Identification of the group

Table 1. Identification of the group

	Original (in EC inventory)
Name	Flue dust, precious metal refining
EC number	308-496-3
CAS number	98072-44-7
Description	The dust obtained from the refining of materials from primary and secondary sources containing gold, iridium, osmium, palladium, platinum, rhenium, ruthenium and silver. Composed primarily of lead with traces of other metals.
*** EPMF Description**	Product resulting from the smelting, refining and/or use of precious metals and its alloys obtained from primary and secondary sources and including recycled plant intermediates. Recovered from exhaust air by filtration via cloth bags, arising from hygiene extraction systems on processes in the precious metals recovery flowsheet. Flue dust, precious metal refining mainly contain metal oxides, hydroxides, sulphides and chlorides in varying concentrations, with small quantities of precious metals.
Composition type	UVCB

***** The description has been further detailed by EPMF in the registration dossier IUCLID Reference substance record (Description field) and in the CSR.

2. Synonyms and other identifiers of the group

None

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

Although flue dusts resulting from other metals refining processes may be very similar to precious metals flue dust, 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.

Table 2. Substances also falling under this group

Name	EC number	CAS number	Description (EC inventory)
Flue dust, silver-refining	308-276-7	97926-57-3	Product resulting from the smelting, refining and/or use of silver and its alloys obtained from primary and secondary sources and including recycled plant intermediates. Consists primarily of oxides and halide compounds of silver and lead and may contain other residual non-ferrous metals and their compounds.

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

4. Boundary composition of the substance

Table 3. Typical composition

Element	Typical concentration (%)	Minimum concentration (%)	Maximum concentration (%)	Species
Silver	7.16	0.00	20.81	compound e.g selenide, oxide
Gold	0.36	0.00	1.20	
Iridium	0.17	0.00	0.50	
Palladium	0.45	0.00	2.00	
Platinum	0.26	0.00	1.00	
Rhodium	0.08	0.00	0.30	
Ruthenium	0.09	0.00	0.20	
Aluminium	2.85	0.00	18.00	oxide
Antimony	2.45	0.00	8.00	oxide
Arsenic	1.23	0.00	3.10	
Barium	1.67	0.00	5.80	mainly sulfate, oxide
Bismuth	1.34	0.00	3.00	oxide
Boron	0.17	0.00	1.51	
Cadmium	0.22	0.00	0.79	
Calcium	2.75	0.06	20.00	oxide
Cerium	2.95	0.00	4.50	oxide
Chlorine	2.33	0.00	8.00	

Chromium	0.12	0.00	0.30	
Copper	1.48	0.00	5.50	mainly sulfate, oxide
Iron	1.71	0.00	6.00	
Lead	16.37	1.50	46.26	mainly sulfate, oxide
Magnesium	0.87	0.00	6.00	oxide
Manganese	0.10	0.00	0.30	
Nickel	0.80	0.00	2.30	oxide
Oxygen	15.52	7.00	30.00	
Phosphorus	0.75	0.00	1.75	
Potassium	1.15	0.00	1.95	
Selenium	9.84	0.00	43.00	
Silicon	4.99	0.25	16.50	
Sodium	1.33	0.00	5.00	
Strontium	0.84	0.00	3.20	
Sulfur	4.34	1.30	12.30	
Tellurium	2.83	0.00	8.50	
Tin	1.18	0.00	2.60	oxide
Titanium	0.17	0.00	0.50	
Zinc	3.25	0.00	12.00	oxide
Zirconium	1.94	0.00	4.50	oxide
Elemental composition total: 96.1%				
Species	**Typical concentration (%)**	**Minimum concentration (%)**	**Maximum concentration (%)**	
sulphates/sulphides		35.00	3.90	depending on sources (sulfidic or not) more/less sulfates vs oxides will be present, or other metal species like hydroxides, chlorides can also occur
oxides		25.00	2.20	
Mineralogical composition total: 60.0%				

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

The composition given above represents the usual elemental/compound content available to the Members of the EPMF by July 2023. This usual content represents the majority of the Flue dust, precious metal refining 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 composition analysis.

5. Substance identity profile (SIP) of the substance

Substance Name **Flue dust, precious metal refining**	Substance Information Page			Legend	Decisive substance sameness criterion Indicative substance sameness criterion No substance sameness criterion
Substance description:	Product resulting from the smelting, refining and/or use of PMs and its alloys obtained from primary and secondary sources and including recycled plant intermediates. Recovered from exhaust air by filtration via cloth bags, arising from hygiene extraction systems on processes in the precious metals recovery flowsheet. Flue dust, precious metal refining mainly contain metal oxides and sulphides/sulphates in varying concentrations, with small quantities of precious metals.				
SIEF description:					
Substance Identity	EC/list name:	Flue dust, precious metal refining		SMILES:	not applicable
	IUPAC name:			InChI:	not applicable
	Other names			Type of substance:	UVCB
	EC/List no.:	308-496-3		origin:	Inorganic
	CAS no.:	98072-44-7			
	Molecular formula:	not applicable		Substance listed	
SID parameters		**Sameness criteria**			**Indication of variability** (fixed, low or high variation)
Sources (input materials)	Precious metal containing primary and secondary sources and recycled plant intermediates.				high variability
Process	Dust generated during several processes in production, processing, and refining of precious metal containing materials, and collected in appropriate facilities. These processes can include milling, thermal treatment, melting, smelting, grinding or polishing. Commonly, dusts from several processes are collected through a single exhaust gas filtering system at a site. This mixture of filter dusts is then sent to refining to reclaim the precious metals. For techniques used to collect and trap dust, fumes and gases -See IPPC NFM BREF notes , chapter 2, Section 2.4.3 and 2.9.2.				medium variability
Elemental composition	**Core**	**min (% w/w)**	**max (% w/w)**	**Typical (%w/w)**	
	Precious metals	0.5	25.0	8.6	medium variability
	Copper	0.0	5.5	1.5	low variability
	Lead	1.5	46.3	16.4	high variability
	Selenium	0.0	43.0	9.8	high variability
	Zinc	0.0	12.0	3.2	high variability
	Calcium	0.1	20.0	2.7	high variability
	Aluminium	0.0	18.0	2.9	medium variability
	Silicon	0.3	16.5	5.0	medium variability
	Sulphur	1.3	12.3	4.3	low variability
	Oxygen	7.0	30.0	15.5	medium variability
	Other constituents				high variability
	Sum=			70.0	
Mineralogical composition	Mixture of sulphates and oxides*	35.0	80.0	60.0	medium variability
	Other metal species like hydroxides, chlorides, sulphides				
	Sum=			60.0	
Physical characteristics	**physical state (at 20°C, 1013 hPa)**	Greyish solid powder with D50 < 20 µm			fixed
Conclusion	**Flue dust, precious metal refining is a greyish solid powder with D50 < 20 µm resulting from various refining processes which use various precious metal containing sources but that is physically collected via the same centralised exhaust ventilation system and cannot be separated per process/source. This results in a UVCB with a variable composition.**				

The substance identity profile (SIP) outlines the main substance identifier/qualifiers relevant for substance identity. It reports sameness information on physical state (solid, liquid, gas), physical form (massive, powder), source, process descriptions and composition. Parameters are given a color code depicting importance for substance sameness. Dark green for decisive/fixed/low variability identity criteria, light green for indicative parameters that support the substance identity but are less well defined and/or characterized by medium variability, and white for parameters not relevant for substance identity.

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

Table 4. Appearance / physical state / properties of the substance

Physical state	Solid
Appearance	Greyish colour of varying shades
Particle size*	Powder

* Nanoform: particles in the size range 1 - 100 nm (for full definition of a nanomaterial, see http://ec.europa.eu/environment/chemicals/nanotech/index.htm#definition). 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.

7. 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 5. 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*#	X		
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.

8. Lead Registrant

Aurubis (Germany) is 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.

9. Scope of the Registration Dossier

All UVCB precious metal Refinables have only uses as an intermediate. Moreover, UVCB exposure scenarios are developed on a company / site-specific basis.