ID Card – Rhenium

Version 26 May 2014

Notes:

- *This ID card is used to support the substance sameness discussions in SIEFs and to describe the substance 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).*

1. Identification of the substance

Table 1. Identification of the substance

	Original (in EC inventory)
Name	Rhenium
EC number	231-124-5
CAS number	7440-15-5
Description	Not available
Composition type	Mono-constituent substance

2. Synonyms and other identifiers of the substance

None

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

None

4. Information related to molecular and structural formula of the substance

Table 2. Information related to molecular and structural formula of the substance

Molecular formula	Re
Structural formula	Not applicable
Smiles notation	[Re]
Optical activity	Not applicable
Typical ratio of (stereo) isomers	Not applicable
Molecular Weight / Molecular Weight range	186,21 g/mol

5. Typical composition of the substance

Table 3. Typical composition

	Name	Symbol / Formula	Typical concentration (%)	Concentration range (%)
Main constituent(s)*	Rhenium	Re	≥ 99,9	99,9 - 100
Other impurities##	Other	B, Hf, Nb, Ta, V, Co, Cr, Mg	≤ 0,1	0 - 0,1

* ≥ 80 % (w/w) for mono-constituent substances; ≥ 10 % (w/w) and < 80 % (w/w) for multi-constituent substances.
** ≥ 1 % (or lower if contributing to the hazard). An additive is a substance that has been intentionally added to stabilise the substance and which cannot be removed without changing the chemical nature to which it is added.
# ≥ 1 %. An impurity is an unintended constituent present in a substance, as produced. It may originate from the starting materials or be the result of secondary or incomplete reactions during the production process. While impurities are present in the final substance, they were not intentionally added.
< 1 % and potentially influencing the classification of the substance.

The composition given above is typical and should therefore represent the majority of Rhenium as manufactured and/or imported in the EEA market. Rhenium containing less than 99,9 % Re may still be considered to be the same for the purpose of registration under REACH and may be referred to as impure Rhenium to distinguish if from the typically pure Rhenium.

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

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

Physical state	Solid
Physical form*	Crystalline
Appearance	Metal grey powder or pellets
Particle size**	Fine powder / coarse powder / massive object
Does the substance contain 'bound water'?#	No
Does the substance contain 'crystallisation water'?#	No
Does the solid hydrolyse?##	No
Is the solid hygroscopic?§	No

* Crystalline form: solid material whose constituent atoms, molecules, or ions are arranged in an ordered pattern extending in all three spatial dimensions. Amorphous form: solid material whose constituent atoms, molecules, or ions are randomly arranged.
** 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.
# 'Bound water': water molecules that are coordinated as bound ligands. 'Crystallisation water' or hydration water: water that occurs in crystals (necessary for the maintenance of crystalline properties) but which is not directly bound to the metal ion (a hydrate contains a definite % of crystallisation water e.g. CuSO4 x 5 H2O, an anhydride does not contain any water)
Hydrolysis: decomposition (cleavage of chemical bonds) by the addition of water.
§ Hygroscopic substance: readily attracts moisture from its surroundings in open air, through either absorption or adsorption. Cf. also water/moisture content in Table 3.

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.

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)	X		
Molecular analysis			
Infrared (IR) spectroscopy			X
Raman spectroscopy			X
Mineralogical analysis			
X-Ray Fluorescence (XRF)			X
X-Ray Diffraction (XRD)	X		
Morphology and particle sizing			
Electron microscopy (SEM, TEM, REM)* #		X	
Laser diffraction* #		X	
Particle size by other means (e.g. sieve analysis)#		X	
Surface area by N-BET* #		X	
Other			
Specific oxygen analyser by combustion and CO2 Infrared titration (powder and solid)		X	
Specific nitrogen analyser by fusion and N2 titration (powder and solid)		X	
Specific carbon analyser by combustion and CO2 Infrared titration (powder and solid)		X	
Specific sulfur analyser by combustion and SO2 Infrared titration (powder and solid)		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.

PMC Recommendation:
Based on guidance and knowledge available to PMC and its consultants by July 2012, below recommended characterisation should be performed by each legal entity for each type of nano Rhenium (in addition to any method performed to confirm the identity and composition of the material) in order to satisfy the requirements/expectations of ECHA and other authorities:

- Select and prepare adequate sample: cf. OECD's "Preliminary Guidance Notes on Sample Preparation and Dosimetry for the Safety Testing of Manufactured Nanomaterials" (2010) available online: http://www.oecd.org/officialdocuments/displaydocument/?cote=env/jm/mono(2010)25&doclanguage=en and ISO 14887:2000;
- Determine particle size: DLS / laser diffraction + number based distribution (can theoretically be calculated from the volume based distribution);
- Determine surface area: BET for dry powders. For suspensions, estimate surface area on the basis of particle size distribution (if shape of nano Rhenium particles is more or less spherical);
- Report detailed morphology: Digital light microscopic images AND either TEM or REM to qualitatively describe the shape and the agglomeration behaviour of the particles.

The results of this characterisation work will need to be attached to the individual IUCLID 5 files.

8. Lead Registrant

KGHM Ecoren (Poland) volunteers to be the Lead Registrant for Rhenium. The PMC will provide support to the Lead Registrant as laid down in the PMC Agreement.

9. REACH Strategy

The table below presents the overall Registration Strategy for Rhenium based on the information available to the PMC 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 PMC for Rhenium and sets the minimum and maximum set of information that will be gathered and/or produced when preparing the Registration Dossier for Rhenium as described in this ID Card.
If higher information requirements are necessary, these can be included in the Registration dossier prior to its first submission to ECHA (if PMC is made aware of these additional requirements in-time) or as an update to the already submitted dossier.

Table 6. REACH strategy for the substance (basis for REACH Registration preparation)

Item	Description
REACH category	Mono-constituent
Highest status	Substance
Highest tonnage band	1-10
Information requirements	Available / Existing + Annex VII
Existing classification*	None
Registration deadline	2018

***** For the pure form, as per latest CLP notification exercise (December 2010 & March 2012)

10. 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	• 3: Industrial uses: Uses of substances as such or in preparations at industrial sites • 9: Manufacture of fine chemicals • 14: Manufacture of basic metals, including alloys	• 3: Use in closed batch process (synthesis or formulation) • 4: Use in batch and other process (synthesis) where opportunity for exposure arises • 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) • 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) • 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation	• 1: Manufacture of substances

		• 22: Potentially closed processing operations with minerals/metals at elevated temperature - Industrial setting • 23: Open processing and transfer operations with minerals/metals at elevated temperature • 26: Handling of solid inorganic substances at ambient temperature • 27a: Production of metal powders (hot processes) • 27b: Production of metal powders (wet processes)	
Manufacture of alloys	• 3: Industrial uses: Uses of substances as such or in preparations at industrial sites • 14: Manufacture of basic metals, including alloys • 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment	• 4: Use in batch and other process (synthesis) where opportunity for exposure arises • 22: Potentially closed processing operations with minerals/metals at elevated temperature - Industrial setting • 23: Open processing and transfer operations with minerals/metals at elevated temperature • 24: High (mechanical) energy work-up of substances bound in materials and/or articles	• 2: Formulation of preparations • 5: Industrial use resulting in inclusion into or onto a matrix
Formation of fabricated metal products	• 3: Industrial uses: Uses of substances as such or in preparations at industrial sites • 14: Manufacture of basic metals, including alloys • 15: Manufacture of fabricated metal products, except machinery and equipment	• 4: Use in batch and other process (synthesis) where opportunity for exposure arises • 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities • 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) • 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation • 22: Potentially closed processing operations with minerals/metals at elevated temperature -	• 1: Manufacture of substances

		Industrial setting • 24: High (mechanical) energy work-up of substances bound in materials and/or articles • 25: Other hot work operations with metals	
Manufacture of computer, electronic and optical products, electronic equipment	• 3: Industrial uses: Uses of substances as such or in preparations at industrial sites • 14: Manufacture of basic metals, including alloys • 16: Manufacture of computer, electronic and optical products, electrical equipment	• 3: Use in closed batch process (synthesis or formulation) • 4: Use in batch and other process (synthesis) where opportunity for exposure arises • 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities • 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) • 27a: Production of metal powders (hot processes)	• 5: Industrial use resulting in inclusion into or onto a matrix

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