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SECTION 1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier:

Name: refined lead Trade name: LEAD IN GRADES: PB 985R; PB970R IUPAC name: lead UN No.: not assigned CAS No.: 7439-92-1 WE No: 231-100-4 Index number: not assigned REACH registration No.: 01-2119513221-59-0006

1.2 Relevant identified uses of the substance or mixture and uses advised against

<u>Identified uses:</u> for production of: batteries, alloys, sheet metal, pipes, grapeshot, glass, electric cables coatings, ionizing radiation protection.

<u>Uses advised against</u>: not known

1.3 Details of the supplier of the material safety data sheet:

Producer:

KGHM Polska Miedź S.A. "Legnica" Copper Smelter & Refinery ul. Złotoryjska 194 59-220 Legnica

Phone numbers:

Head of Lead Electrorefining Department: (48 76) 747 53 51 – available: Mon. – Fri. 7^{15} – 15^{15} , Head of Sales and Transport Section: (48 76) 747 28 00 – available: Mon. – Fri. 7^{15} – 15^{15} ,

Fax No: (48 76) 747 20 05

Person responsible for preparing the MSDS: phone No.: (+48 76) 747 52 06, e-mail: <u>karty.charakterystyki@kghm.pl</u>

1.4. Emergency telephone number

Manufacturer (Poland): (48 76) 747 50 02 – available 24/7

112 (General Emergency), **998** (Fire Dept.), **999** (Ambulance Service)

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture:

Classification according to Regulation No. 1272/2008 (CLP): Not classified Classification according to Directive 67/548/EWG: Not classified **2.2. Label elements:** None

2.3 Other hazards:

Although lead in its metallic form, in accordance with current regulations, is not classified as hazardous product there is a danger of poisoning when lead is processed or processing products are used. Lead compounds are hazardous through inhalation and when swallowed. May cause long-term adverse effects in the aquatic environment and damage fertility or the unborn child.

SECTION 3. Composition/information on ingredients



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3.1. Substances

Composition	Percentage content	Classification according to Directive No. 67/548/EWG	Classification according to the Regulation No. 1272/2008 (CLP)
Pb CAS Number: 7439-92-1 EC Number: 231-100-4 Index No: not assigned	> 99,99 % b. w.	none	none

3.2. Mixtures

n/a

SECTION 4. First Aid measures

4.1 Description of first aid measures:

Refined lead in a form of sows, if it is not subject to high temperature or chemical agents, does not present chemical danger to health and life. Because of a significant load of packets there is a great danger during transportation; therefore, relevant transport regulations should be observed.

This section considers all possible hazards caused by lead-containing materials and related to production and processing of lead.

<u>Inhalation</u>: In case of exposure to smoke and dust: remove victim immediately to fresh air, provide rest in a lying position, get medical attention.

Ingestion: Give plenty of lukewarm water and induce vomiting. Get medical attention.

<u>Eye Contact</u>: Promptly wash wide open eyes with plenty of lukewarm water for 15 minutes. Avoid using pressure water due to risk of eye damage. Get medical attention immediately.

<u>Skin Contact</u>: After contact with the substance use general hygiene measures: wash the skin immediately with cold water and soap. In case of contact with liquid product cool skin immediately with water and get medical attention. Do not remove melted material from skin to avoid skin damage. Cut wounds or sores should be disinfected immediately.

4.2. Most important symptoms and effects, both acute and delayed:

Not applicable.

Refined lead in a form of sows, if it is not subject to high temperature or chemical agents, does not present chemical danger to health and life; however, the presence of lead dust causes danger during production and processing of lead. This section considers possible hazards caused by lead-containing materials and related to production and processing of lead.

Symptoms of acute lead poisoning: acute poisoning symptoms may occur after exposure to highly concentrated dust or fumes lasting several days or in case of chronic exposure to lead in concentration exceeding limit values. Possibility of increased blood pressure and abdominal pain (colic) usually preceded by constipation lasting for several days. Ingested lead (accidentally or purposely) in a form of powder causes similar symptoms and sometimes results in jaundice or liver damage. Poisoning may also result in kidneys damage (usually short-lasting) and erythronormoblastic anaemia (decrease of haemoglobin and increase of reticulocytes in the blood). Symptoms of chronic lead poisoning: chronic absorption causes peripheral muscles weakness, changes in peripheral nerves (mainly in limbs), anaemia, central nervous system disorders and erythronormoblastic anaemia.

4.3 Indication of any immediate medical attention and special treatment needed:



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A physician is responsible for making decisions concerning treatment methods after detailed examination of patient's state of health.

SECTION 5. Firefighting measures

5.1 Extinguishing media:

<u>Appropriate extinguishing media</u>: Product in a form of sows is a non-combustible material. In case of fire, use fire-extinguishing media appropriate for surrounding materials. General fire safety regulations should be observed.

<u>Unsuitable extinguishing media</u> Do not pour water on molten metal.

5.2 Special hazards arising from the substance or mixture:

In case lead is subject to high temperature, harmful fumes may be formed.

5.3 Advice for fire-fighters:

All personnel involved in firefighting proceedings should use full protective clothing, self-contained breathing apparatus and a full face piece mask.

<u>General advice</u>: The substance in non-combustible. Use any means of extinction appropriate for the source of fire.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Avoid formation of dust.

Personnel involved in the rescue operations should wear protective clothing and self-contained breathing apparatus. Use personal protection as described in section 8.Wear suitable protective equipment.

6.2 Environmental precautions:

Do not release into the environment.

In case of releasing the material to surface waters or soil, clean it up immediately.

6.3 Methods and material for containment and cleaning up:

Not applicable for refined lead in a form of sows.

6.4 Reference to other sections

For personal protection, see section 8., For waste disposal, see section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling:

All rooms should be provided with working ventilation. Do not eat, drink and smoke when handling the substance. The product is non- combustible.

7.2 Conditions for safe storage, including any incompatibilities:

Indoor transport using a forklift truck or gantry crane. Do not exceed the permissible unit loads in the storage area. Avoid storing with acids, alkalis and materials described in point 10.5. Do not store with food and inflammable materials.

7.3 Specific end use(s):

The identified uses for this product are detailed in Section 1.2.

SECTION 8. Exposure control/personal protection

8.1 Control parameters:



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Occupational exposure limit values to be followed:

Lead and lead inorganic compounds – per Pb (TLV, TLV-STEL) – TLV: 0.5 mg/m³, TLV-STEL: not determined.

<u>Lead levels not harmful to the human body:</u>

DNEL (prolonged exposure) – 40 µg Pb/dL of blood (workers – men);

DNEL (prolonged exposure) – 30 µg Pb/dL of blood (workers – women);

DNEL (prolonged exposure) – 10 µg Pb/dL of blood (workers – pregnant women);

DNEL (prolonged exposure) – 20 µg Pb/dL of blood (general public);

DNEL (prolonged exposure) – 10 µg Pb/dL of blood (general public – pregnant women);

Lead levels not harmful to natural environment:

PNEC (Surface waters) – 6.5 µg/l PNEC (Marine waters) – 3.4 µg/l

PNEC (Surface waters deposits) – 174 mg/kg of dry mass

PNEC (Marine waters deposits) – 164.2 mg/kg of dry mass

PNEC (Soli) – 147 mg/kg of dry mass

PNEC (STP) - 0.1 mg/l

Additional advice:

Regulation of the Minister of Labour and Social Policy dated 29 November 2002 concerning maximum admissible concentrations and intensities of agents harmful to human health in the work environment (Journal of Laws, Dz.U.02.217.1833 as amended);

Regulation of the Minister of Health dated 30 December 2004 concerning occupational health and safety on protection of workers from risk related to exposure to chemical agents at work. (Journal of Laws, Dz.U.05.11.86 as amended);

Determination in air at the workplace:

PN-91/Z-04030.05 Total dust concentration using filter weight method in the range of 0.05-80.00 mg/m³;

PN-91/Z-04030.06 Respirable dust concentration using filter weight method in the range of 0.05- 80.00 mg/m^3 ;

PN-Z-04008-7.2002. Air purity protection – Air sampling – Principles of air sampling at workplace and results interpretation;

PN-EN 689:2002 Air in the workplace – Guidelines on evaluation of inhalation exposure to chemicals by comparing with admissible values and measurement strategy;

PN-EN 482:2006 Air in the workplace – General requirements concerning measurement procedures;

PN ISO 4225/Ak:1999 Air quality – General issues – Terminology (national appendix).

8.2 Exposure controls:

In case of exposure to lead and lead inorganic compounds at workplace, undertake all technical and organizational measures to decrease the level of lead. During refined lead processing provide local exhaust ventilation with housing and general ventilation of the room. Dust which generation cannot be avoided should be systematically removed using suitable industrial vacuum cleaners or central suction systems. Air can only be released to environment through suitable dust separators. Waste water produced during production process and as a result of cleaning should be purified in factory's wastewater treatment plant which allows for lead removal.

Workers should have a possibility to comply with basic principles of hygiene. In the area where lead is used and stored eating, drinking and smoking should be forbidden. Workers should wash hands



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and face before eating, drinking and smoking. Wash hands (whole body if necessary) at the end of work with the substance. Clean the contaminated clothing before reuse.

As part of personnel health control, it is necessary to implement biomonitoring programme which includes blood lead level control (PbB) using atomic absorption spectrometry or any equivalent method. A permissible lead level in biological material is 50 ng Pb/100 ml of blood. In case the permissible level is exceeded suitable measures should be taken to hinder the increase of lead level in blood (no overtimes, control of compliance with principles of hygiene and procedures for the use of personal protection equipment, delegation of a worker to another workplace away from the source of lead).

During lead processing, use personal protective equipment adequate for existing hazards considering national and European legislation.

Eye and face protection: not needed, in case of exposure to dust use safety goggles. Do not use contact lenses.

Hand protection: protective gloves (recommended material – leather, neoprene).

Skin protection: protective clothing.

<u>Respiratory protection</u>: in presence of dust use a purifying dust mask with filter suitable for limit levels in air.

<u>Hygiene considerations</u>: change contaminated clothes immediately. Clean the contaminated clothing before reuse. Wash hands and face at the end of work with the substance. When using, do not eat and drink

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties:

Appearance: silver-grey solid Odour: odourless Odour detection threshold: not applicable pH: not applicable Melting point: 326°C Boiling point: 1749°C Flash point: not applicable Auto ignitron temperature: not applicable Flash point: not applicable Evaporation Rate: not applicable Flammability: not applicable Explosive limits: not applicable Vapour Pressure: not applicable Vapour Density: not applicable Relative Density: not applicable Bulk density: approx. 11340kg/m³ (20°C) Solubility:

- In water: (20 °C): insoluble
- In acids: (20°C): depending on acid type and concentration In alkalis: (20°C): insoluble
- In organic solvents: (20°C): no data available

Octanol/water partition coefficient: not applicable



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Decomposition Temperature: no data available Viscosity: not applicable Explosive properties: not applicable

Oxidising properties: not applicable

9.2 Other information:

None

SECTION 10. Stability and reactivity

10.1. Reactivity: low-reactive substance.

10.2. Chemical stability: refined lead is stable under normal use conditions and if not exposed to chemical agents.

10.3 Possibility of hazardous reactions: none under normal use conditions

10.4 Conditions to avoid: high temperature, contact with incompatible materials.

10.5 Incompatible materials: fluorine, nitric acid, azides, picrates, strong oxidants.

10.6 Hazardous decomposition products: none

SECTION 11. Toxicological information

11.1 Information on toxicological effects:

Acute toxicity (oral):

On the basis of available data the classification criteria are not met. <u>Acute toxicity (inhalation):</u>

On the basis of available data the classification criteria are not met. <u>Skin corrosion/irritation:</u>

On the basis of available data the classification criteria are not met. <u>Serious eye damage/ eye irritating:</u>

On the basis of available data the classification criteria are not met. <u>Respiratory tract or skin sensitization:</u>

On the basis of available data the classification criteria are not met. <u>Germ cell mutagenicity:</u>

On the basis of available data the classification criteria are not met. <u>Carcinogenicity:</u>

On the basis of available data the classification criteria are not met. <u>Reproductive toxicity:</u>

On the basis of available data the classification criteria are not met. <u>STOT-single exposure/ STOT-repeated exposure:</u>

On the basis of available data the classification criteria are not met. <u>Aspiration hazard:</u>

On the basis of available data the classification criteria are not met. Lethal and toxic doses and concentrations:

Lead: no quantitative data available for lead in metallic form <u>Lead(II) oxide:</u>

 LD_{50} (rat, oral) > 2000 mg/kg body mass

LD₅₀ (rat, inhalation) > 5 mg/l/4h

LD₅₀ (unknown, rat) > 2000 mg/kg body mass



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11.2. Information on likely routes of exposure:

Entry routes: respiratory, ingestion, skin.

Due to slow respiratory and ingestive absorption and low skin absorption only high doses cause acute poisonings. Prolonged absorption causes peripheral muscles weakness, anaemia and central nervous system disorders. Accumulation in: bones, kidneys and other tissues.

11.3. Delayed and immediate effects as well as chronic effects from short and long-term exposure:

Detailed information concerning symptoms related to product properties and possible effects of exposure have been described in section 4.2.

SECTION 12. Ecological information

Product in a form of sows is not a source of ecological hazard.

Physical or chemical processing of lead may become a source of ecological hazard.

12.1. Toxicity:

According to data presented in the Chemical Safety Report, refined lead in a form of sows is not classified as harmful to aquatic environment mainly due to its low solubility. Inorganic lead compounds are considered as highly toxic for environment and may present a hazard to aquatic life. Solution toxicity depends on free lead ions level.

<u>Threshold limit value for substance in air</u>: is 0.5 µg/m³ averaged per calendar year.

Permissible contamination of sewage released into water and soil: for heating industry, 0.1 mg/dm³ for other types of sewage 0.5 mg/dm³.

Predicted concentration of lead with no effect on aquatic environment:

PNEC (communal wastewater treatment plant) – 0.1 mg/l

PNEC (birds, oral exposure) – 16.9 mg/kg of food

PNEC (mammals, oral exposure) – 10.9 mg/kg food

Toxic concentrations of lead in aquatic environment:

LC₅₀/96 h fish (Pimephales promelas): 40.79 µg Pb/l

LC₅₀/96 h fish (*Salmo gairderi*): 107 μg Pb/l

LC₅₀/48 h crustaceans (Ceriodaphnia dubia): 26.4 µg Pb/l

LC₅₀/48 h crustaceans (Daphnia magna): 107.03 µg Pb/l

EC₅₀ /48h crustaceans (Daphnia magna): 107.5 µg/l

NOEC crustaceans (Daphnia magna): 9.0 µg/l

LC₅₀/24h algae, growth inhibition (*Pseudokirchneriella subcapitata*): 21.7 µg Pb/l.

EC₅₀ /72h algae (Pseudokirchneriella subcapitata): 52 µg/l

NOEC algae (Pseudokirchneriella subcapitata): 11.9 µg/l

Lethal dose for fish per Pb from 1.4 mg/l.

12.2. Persistence and degradability: Not biodegradable.

12.3. Bioaccumulative potential: Risk of accumulation in organisms.

12.4. Mobility in soil: Low mobility in soil and aquatic environment.

12.5. Results of PBT and vPvB assessment: Not applicable - inorganic substance.

12.6. Other adverse effects: No data available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods



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Lead wastes and scrap should be recycled or disposed as hazardous wastes.

Prevent from contamination of surface and ground waters and soil. Do not dispose together with municipal waste.

Classification of wastes:

Waste Catalogue (Journal of Laws, Dz. U.O1. 112.1206):

- 17 04 03 Lead
- 06 04 05 Wastes containing other heavy metals

OECD Green List of Wastes:

- GA 150 Lead wastes and scrap

OECD Amber List of Wastes:

AA 030 Lead ashes and residues

Legal basis: Waste Act dated 27.04.2001 (Journal of Laws, Dz. U.2010.185.1243 and Journal of Laws, Dz.U.2010.203.1351 as amended).

SECTION 14: Transport information

General transport regulations should be used with the product. Covered transport is recommended.

- 14.1. UN number: n/a
- 14.2. UN proper shipping name: n/a
- 14.3. Transport hazard class(es): n/a
- 14.4. Packing group: n/a
- 14.5. Environmental hazards: n/a

14.6. Special precautions for user: secure packages against moving while shipping.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: n/a

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

<u>Not regulated</u> under the criteria set in Regulation (EC) No. 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer (Journal of Laws, Dz.U. L 244 from 29.9.2000 as amended) and Regulation (EC) No. 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC (Journal of Laws, Dz.U. L 158 of 30.4.2004 as amended).

<u>The substance is not subject to</u> the criteria set in Regulation (EC) No. 689/2008 of the European Parliament and of the Council of 17 June 2008 concerning the export and import of dangerous chemicals (Journal of Laws, Dz.U. L 204 of 31.7.2008 as amended).

<u>Lead compounds are not listed</u> in annex X Decision No. 2455/2001 of the European Parliament and of the Council of 20 November 2001 establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC (Journal of Laws, Dz.U. L 331, 15/12/2001). <u>Provisions of law:</u>

Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the registration, evaluation, authorization and restriction of chemicals (REACH), establishing the European Chemicals Agency, amending Directive

1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council



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Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC; Regulation No 1272/2008 dated 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/ EC and 1999/45/ EC and amending Regulation (EC) No 1907/2006 (D.U.L.353/1 as amended). Commission Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on registration, evaluation, authorization and restriction of chemicals (D. U. L 133/1 dated 31.05.2010).

Environmental Protection Law dated 27 April 2001 (Journal of Laws, Dz.U.01.62.627 as amended); Act dated 27 April 2001 on wastes (Journal of Laws, Dz. U. 2010.185.1243 and 2010.203.1351 as amended); Regulation of the Minister of Environment dated on 27 September 2001 in the matter of packages catalogue (Journal of Laws, Dz.U.01.112.1206 as amended); Act dated 11 May 2001 relating to packing and waste packages (Journal of Laws, Dz.U.01.63.638 as amended); Regulation of the Minister of Labour and Social Policy dated 29 November 2002 concerning maximum admissible concentrations and intensities of agents harmful to human health in the work environment (Journal of Laws, Dz.U.02.217.1833 as amended); Regulation of the Council of Ministers of 24 August 2004 concerning the list of work forbidden to juveniles and conditions of engaging them to do some jobs (Journal of Laws, Dz.U.04.200.2047 as amended); Act dated 28 October 2002 on road transport of hazardous goods (Journal of Laws, Dz. U. 02.199.1671 as amended); Act dated 31 March 2004 on rail transport of hazardous goods (Journal of Laws, Dz. U. 04.97.962); Regulation of the Minister for Economy dated 21 December 2005 in the matter of basic requirements for individual protection means (Journal of Laws, Dz.U.2005.259.2173 as amended); Regulation of the Minister of Health dated 20 April 2005 on studies and tests concerning occupational health hazards (Journal of Laws, Dz. U. 2005.73.645); Regulation of the Minister of Environment dated 20 August 2008 on the method of classifying the condition of uniform parts of surface waters (Journal of Laws, Dz. U. 2008.162.1008); Regulation of the Minister of Environment dated 28 January 2009 amending the regulation on conditions to be fulfilled at the discharge of effluents to water or soil and on substances posing particular threat to aquatic environment (Journal of Laws, Dz. U. 2009.27.169 as amended); Act dated 25 February 2011 on the chemical substances and their mixtures (Journal of Laws, Dz. U. 2011.63.322).

15.2. Chemical safety assessment

Chemical safety assessment of the substance has been carried out. Chemical Safety Report for lead is available at: KGHM Polska Miedź S.A. "Legnica" Copper Smelter & Refinery.

SECTION 16: Other information

Explanations of abbreviations and acronyms used in the MSDS:

CAS number – means numerical identification assigned to chemical substance by the American organization named Chemical Abstract Service (CAS), enabling substance identification.

Index number – it is an identification code given in part 3 of the annex VI to the Regulation of the European Parliament and Council (EC) No. 1272/2008 dated December 16th, 2008, on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006;

WE number – the number assigned to chemical substance in EINECS -. European Inventory of Existing Chemical Substances, or the number assigned to chemical substance in ELINCS – European List of Notified Chemical Substances or the number in chemical substances inventory included in "No-longer polymers" document.

Registration number – number given by ECHA after substance/intermediate registration by the manufacturer/importer according to REACH Regulation.

UN number – unequivocal marking of hazardous substances and goods assigned by United Nations Central Committee to provide international recognition and use.



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Name according to IUPAC – name of a substance given by IUPAC - International Union of Pure and Applied Chemistry Committee

TLV-TWA – the highest admissible concentration/threshold limit value – weighted average value – concentration of toxic chemical whose impact on a worker during 8-hour daily shift and average weekly time of work provided in the Labour Code during the period of his occupational activity should not cause negative changes of his health condition and of health condition of his next generations.

TLV-STEL – the highest admissible short term concentration/short term exposure limit – weighted average of concentration of the specified, toxic chemical compound which should not cause negative changes of a worker's health if present in the work environment for not longer than 15 minutes and not more often than twice per shift with occurrences separated by more than 1 hour. and not more often than twice per shift with occurrences separated by more than 1 hour.

LD₅₀ – lethal dose - dose of toxic substance expressed in milligrams per kilogram of body mass necessary to kill 50% of the examined population within specified time.

LC₅₀ – lethal concentration - concentration of a substance in the inhaled air, expressed in milligrams per litre, which causes death of 50% of the examined population after specified period of exposure.

 EC_{50} – effect concentration - substance concentration expressed in milligrams per litre causing the given pharmacological effect (e.g. inhibition of growth) at 50% of the examined population within specified time.

NOEC – no effect concentration - concentration of the substance expressed in milligrams per litre, at which no toxic effects can be observed.

DNEL - derived level with no effect on organisms.

PNEC - predicted concentration with no effect on environment.

<u>Necessary trainings</u>: on-site training related to safe using of substances with hazardous properties for human and adverse effects on environment.

Sources of information used to compile this material safety data sheet:

- Self-results of refined lead quantitative and qualitative analysis;
- Dangerous Substances Practical Handbook ALFA-WEKA;
- European Chemical Substance Information System;
- Technology Encyclopedia CHEMISTRY. WNT;
- CHEMISTRY structure and reactions. Milton K.Snyder;
- Chemical Safety Report.

<u>All information contained</u> herein is accurate and up-to-date to the best of our knowledge. Recipients of our products should consider existing provisions of law and other applicable regulations.

<u>This material safety data sheet</u> is the property of KGHM Polska Miedź S.A. "Legnica" Copper Smelter & Refinery and features only our product.

Further information: telephone contact at numbers provided in point 1.

Modifications to this document in accordance with Regulation (EC) No 453/2010 of 20 May 2010 in the scope of:

- Identification of the substance
- Classification and labelling of the substance
- First aid measures



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<u>Compiled by:</u> M.Sc. Hubert Opaczewski - Deputy Chief Process Safety Officer <u>Revised by</u>: Anna Majewska