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

1.1 Product identifier
Trade name: Potassium permanganate
CAS number: 7722-64-7
EC number: 231-760-3
Index number: 025-002-00-9
REACH registration number: 01-2119480139-34-0001

1.2 Relevant identified uses of the substance or mixture and uses advised against
Application of the substance / the preparation:
Production in continuous design
Production in batch design
Repacking, industrial
Water treatment, oxidant
Waste water decontamination
Blending, solution, industrial
Use as laboratory chemicals
Spraying water solution
Waste water decontamination
Customers use.

1.3 Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Chongqing Changyuan Group Limited
Dujiaba Industrial Park, Rongchang County, Chongqing, China 402460

Further information obtainable from:
REACH Only Representative
B-Lands Consulting WTC
5 Place Robert Schuman
BP 1516 38025 Grenoble
FRANCE
Tel: +33 476 295 869
Fax: +33 476 295 870
Email: clients@reachteam.eu
Web: www.reachteam.eu

1.4 Emergency telephone number
NHS Direct: 111 (England and Scotland), 0845 46 47 (Wales).
Ireland - National Poisons Information Centre: +353 1 8379964.

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008:

Ox. Sol. 2	H272 May intensify fire; oxidiser.
Acute Tox. 4	H302 Harmful if swallowed.
Skin Corr. 1A	H314 Causes severe skin burns and eye damage.
STOT RE 2	H373: May cause damage to organs (liver) through prolonged or repeated (oral) exposure.
Aquatic Acute 1	H400 Very toxic to aquatic life.
Aquatic Chronic 1	H410 Very toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008:
The substance is classified and labelled according to the CLP regulation.

Hazard pictograms:

GHS03 GHS05 GHS07 GHS08 GHS09

Signal word: Danger

Hazard statements:
H272 May intensify fire; oxidiser.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H373 May cause damage to organs (liver) through prolonged or repeated (oral) exposure.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements:

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P220	Keep/Store away from clothing/combustible materials.
P260	Do not breathe dust.
P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P314	Get medical advice/attention if you feel unwell.
P501	Dispose of contents/container in accordance with local/international regulations.

2.3 Other hazards

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

SECTION 3: Composition/information on ingredients

3.1 Substances

Hazardous components:		
CAS: 7722-64-7 EINECS: 231-760-3 Index number: 025-002-00-9	Potassium permanganate Ox. Sol. 2; Acute Tox. 4; Skin Corr. 1A; Aquatic Chronic 1	>99 % wt.

SECTION 4: First aid measures

4.1 Description of first aid measures

After inhalation:
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

After skin contact:
Wash off with soap and plenty of water. Consult a physician.

After eye contact:
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

After swallowing:
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
No further relevant information available.

4.3 Indication of any immediate medical attention and special treatment needed
No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No further relevant information available.

5.3 Advice for firefighters

Protective equipment:
Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
Discharge into the environment must be avoided.

6.3 Methods and material for containment and cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Keep away from combustible material.

Information about fire - and explosion protection:
No special measures required.

7.2 Conditions for safe storage, including any incompatibilities

Requirements to be met by storerooms and receptacles:
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Information about storage in one common storage facility:
No further relevant information available.

Further information about storage conditions:
None.

7.3 Specific end use(s)
No further relevant information available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with limit values that require monitoring at the workplace:	
109-66-0 Pentane	
WEL (Great Britain)	Long-term value: 5 mg/m³ as Mn

DNELs:		
Inhalative	Workers; Long-term; Systemic effects	0.218 mg/m3
Inhalative	General population; Long-term; Systemic effects	0.0389 mg/m3
Oral	General population; Long-term; Systemic effects	0.01111 mg/kg bw/day

PNECs:	
Freshwater	0.06 mg/L
stp	1.64 mg/L

Additional information: The lists valid during the making were used as basis.

8.2 Exposure controls

Personal protective equipment

General protective and hygienic measures:
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Respiratory protection:
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Protection of hands:

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it. Handle with gloves.

Eye protection:

Safety glasses with side-shields conforming to EN166.

Skin and body protection:
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information

Appearance:	
Form:	Solid, crystalline.
Colour:	Dark purple or bronze-like.
Odour:	Odourless
Odour threshold:	Not determined.
pH-value:	Not determined.
Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	Not determined
Flash point:	Not applicable.
Flammability (solid, gaseous):	Non-flammable.
Ignition temperature:	Not determined.
Decomposition temperature:	< 240 °C
Danger of explosion:	Product is not explosive.
Explosion limits:	Not determined.
Oxidizing properties	Oxidising.
Vapour pressure at 20℃:	Not applicable.
Density at 20℃:	2.7 g/cm³
Vapour density	Not determined.
Evaporation rate	Not determined.
Solubility in / Miscibility with water at 20℃:	>= 64 g/L
Partition coefficient (n-octanol/water):	Not applicable.
Viscosity:	
Dynamic:	Not applicable.
Kinematic:	Not applicable.

9.2 Other information

No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity

No further relevant information available.

10.2 Chemical stability

Thermal decomposition / conditions to be avoided:
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No further relevant information available.

10.4 Conditions to avoid

No further relevant information available.

10.5 Incompatible materials

Strong reducing agents, Powdered metals, Peroxides, Zinc, Copper.

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Potassium oxides, Manganese/manganese oxides.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD/LC50 values:		
Oral	LD50	> 2000 mg/kg (Rat) (EU Method B.1 tris)
Dermal	LD50	>2000 mg/kg (Rat) (EU Method B.3)

Skin corrosion/irritation
Corrosive, rabbit, EU Method B.4.

Serious eye damage/irritation
Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation
Not sensitising, guinea pig, OECD 406.

Germ cell mutagenicity
Negative, rat, EU Method B.12.

Carcinogenicity
Based on available data, the classification criteria are not met.

Reproductive toxicity

NOAEL values		
Oral	Reproduction toxicity Developmental toxicity	80 mg/kg bw/day, rat, EU Method B.34 20 mg/kg bw/day, rat, EU Method B.31

Repeated dose toxicity

NOAEL values	
Oral Dermal	40 mg/kg bw/day, rat, EU Method B.7 150 mg/kg bw/day, rat, OECD 410

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity:	
LC50 (96 h)	0.47 mg/L, fish, EU Method C.1
EC50 (48 h)	0.06 mg/L, *Daphnia magna*, EU Method C.2
EC50 (72 h)	0.8 mg/L, algae, EU Method C.3
EC50 (3 h)	164 mg/L, micro-organisms, EU Method C.11

12.2 Persistence and degradability
Hydrolysis: DT50 > 1 yr (25 °C, PH=4, 7, 9).

12.3 Bioaccumulative potential
No further relevant information available.

12.4 Mobility in soil
No further relevant information available.

12.5 Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

12.6 Other adverse effects
No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Product:
Observe all state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.
Contaminated packaging:
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN Number
ADR, IMDG, IATA UN 1490

14.2 UN proper shipping name
ADR 1490 POTASSIUM PERMANGANATE, ENVIRONMENTALLY HAZARDOUS

IMDG, IATA POTASSIUM PERMANGANATE

14.3 Transport hazard class(es)
ADR, IMDG, IATA

Class 5.1 Oxidising substances.
Label 5.1

14.4 Packing group
ADR, IMDG, IATA II

14.5 Environmental hazards
Environmentally hazardous substance, solid
Marine pollutant: Yes

14.6 Special precautions for user
Warning: Oxidising substances
Danger code (Kemler): 50
EMS Number: F-H,S-Q
Segregation groups: Permanganates

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable.

Transport/Additional information:
ADR
Excepted quantities (EQ) Code: E2
Maximum net quantity per inner packaging: 30 g
Maximum net quantity per outer packaging: 500 g

Tunnel restriction code: E
IMDG
Limited quantities (LQ) 1 kg
Excepted quantities (EQ) Code: E2
Maximum net quantity per inner packaging: 30 g
Maximum net quantity per outer packaging: 500 g

SECTION 15: Regulatory information

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

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Relevant phrases

H272 May intensify fire; oxidiser.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H410 Very toxic to aquatic life with long lasting effects.

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
RID: Reglement concernant le transport International ferroviare des merchandises Dangereuses par chemin de fer (European Agreement concerning the International Carriage of Dangerous Goods by Rail)
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
DNEL: derived no-effect level
PNEC: predicted no-effect concentration
NOAEL: No observed adverse effect level
LL50: lethal loading rate, 50 percent
NOEC: No Observed Effect Concentration
EL50: effective loading, 50 percent

Annex: Exposure scenarios

Title of Exposure scenario1: Industrial and professional use of potassium permanganate

Exposure scenario no. 1: Industrial and professional use of potassium permanganate	
1. Short title of the exposure scenario	
Sector of Use (SU)	SU 1: Agriculture, forestry and fishing
Preparation Category (PC)	PC21 Laboratory chemicals. PC37 Water treatment chemicals.
Process category (PROC)	PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. sampling). Industrial setting. PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). PROC 11: Non industrial spraying PROC 15: Use as laboratory reagent.
Article category (AC)	Not determined
2. Processes and activities covered by the exposure scenario	
Waste water decontamination. Water treatment, oxidant. Use as laboratory chemicals. Spraying water solution.	
Operational Conditions of Use	
3. Duration and frequency of use	
Workers: 15 minutes – 1 hour a day	
4.1 Physical form of substance or preparation; surface to volume ratio of articles	
Final product is a solid crystalline substance with dark purple crystals. Particle size varies according to the required properties of the final product. Mean particle size is approx. 85 microns. Dustiness of the product is qualified as medium. Aqueous solution of potassium permanganate is a violet liquid, water solubility is je 6,4 g/L (20°C).	
4.2 Concentration of substance in preparation or article	
Substance is dissolved in water to concentration <0,1% wt or 5 – 25% wt.	
4.3 Amount used per time or activity	
Substance is used in maximum amount of 3 kg a day or 500 kg a year.	
5. Other relevant operational conditions of use	
Technical precautions: good ventilation, use of protective equipment.	
Risk Management Measures	
6.1 Risk management measures related to human health (workers or consumers)	
Avoid contact with eyes. Avoid contact with skin. Do not breathe dust. Use good ventilation or fume cupboard Use protective goggles. Use protective gloves against corrosives. Use dust or gas filter mask. In case of spraying water solution use gas mask. First aid After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of warm water and soap. If swallowed, immediately rinse mouth with water and drink half a liter of lukewarm water. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In all severe cases of injury, after contact with eyes or if swallowed, seek medical advice and provide the physician with information about the substance.	
6.2 Risk management measures related to the environment	

Avoid release to the environment – water. Do not mix with acids and organic compounds. Respect good hygiene and housekeeping.
7. Waste management measures
Packaging and remnants of the substance shall be treated as hazardous waste. 15 01 10 N Packaging containing remnants of hazardous substances or packaging contaminated with such substances 16 09 01 N Permanganates, e.g. potassium permanganate
Information on estimated exposure and DU guidance
8. Exposure estimation and reference to its source
For workers exposure, the ECETOC TRA tool (http://www.ecetoc.org/tra) was used. Results: Inhalation exposure: 0,002 mg/m3 , Inhalative Risk Characterisation Ratio: 0,002 Dermal exposure: 0,37 mg/kg/day , Dermal Risk Characterisation Ratio: 0,10 For workers inhalation exposure, the EMKG-EXPO-TOOL (http://www.reach-clp-helpdesk.de) was used. Results: Predicted inhalation exposure is 0,001 – 0,01 mg/m3 with low or medium exposure potential.

Exposure scenario no. 2: Industrial and professional use of potassium permanaganate
9. Guidance to DU to evaluate whether he works inside the boundaries set by the ES
Derived No Effect Level (DNEL) dermal toxicity for workers = 1,25 mg/kg bw/day PEL in working environment for manganese substances = 1 mg/m3. Recommendations for assessment of workers exposure: • Measurement of working environment and comparing its results to DNEL • Use of the ECETOC TRA model (http://www.ecetoc.org/tra). The value of Predicted no effect concentration (PNEC) for potassium permanganate in aquatic environment is 0,06 µg/l. The very low PNEC indicates toxicity of potassium permanganate to aquatic environment. It is necessary to secure devices against elusion of the substance to the aquatic environment. Potassium permanganate reacts with manganese and ferrous ions in water forming compounds of manganese in lower oxidation degree. According to the notice of the Ministry of environment of the Czech Republic no. 205/2009 Sb., general emission limit for dust of compounds with manganese content with mass flow higher than 50 g/h is set to 5 mg/ m3. For environmental exposure estimate, it is possible to use the EUSES model or results of authorized measurements.

Exposure estimation

Workers exposure

Assigned values Derived No Effect Level (DNEL):

DNEL dermal toxicity for workers= 1,25 mg/kg bw/day

DNEL for inhalation toxicity is not assigned, no data available. For exposure estimate, value of PEL = 1mg/m3 for manganese substances in working environment expressed as manganese (NV 178/2001 Sb.) was used.

Workers exposure estimate:

Estimate of workers exposure using mathematical models:

1) Inhalation exposure using the EMKG-EXPO-TOOL model for estimate of inhalation exposure of workers for solid substances.

Input parameters:

Dustiness: medium Used quantity: small (up to kg/day)*

Exposure: <15 minutes a day Precautions for risk limitation: good ventilation

Predicted inhalation exposure is 0,001 – 0,01 mg/m3 with low or medium exposure potential.
** Note: The model counts with small amount of the substance (up to kg/day), because maximum of kilograms of the substance per day is expected to be used. The result is considerably overrated if medium amount (1 – 1000 kg /day) is used.*
2) Exposure of workers using the ECETOC Targeted Risk Assessment model for dissolution of potassium permanganate in water (using solid substances)
Input parameters:
Process category: PROC 5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Substance is solid
Duration of activity: < 15 min a day
Is LEV present: good ventilation or fume cupboard
Use respiratory protection: 90%
Results:
Inhalation exposure: 0,002 mg/m3, Inhalative Risk Characterisation Ratio: 0,002
Dermal exposure: 0,37 mg/kg/day, Dermal Risk Characterisation Ratio: 0,10
Total Risk Characterisation Ratio: 0,11
2) Exposure of workers using the ECETOC Targeted Risk Assessment model for potassium permanganate dissolved in water
Input parameters:
Process category: PROC 2 Use in closed, continuous process with occasional controlled exposure (e.g. sampling).
Substance is liquid
Duration of activity: < 15 min a day
Is LEV present: good ventilation or fume cupboard
Use respiratory protection: yes
Results:
Dermal exposure: 0,13 mg/kg/day, Dermal Risk Characterisation Ratio: 0,11
Input parameters:
Process category: PROC 5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Substance is liquid
Duration of activity: < 15 min a day
Is LEV present: good ventilation or fume cupboard
Use respiratory protection: yes
Results:
Dermal exposure: 0,07 mg/kg/day, Dermal Risk Characterisation Ratio: 0,05
Input parameters:
Process category: PROC 11: Non industrial spraying
Substance is liquid
Duration of activity: 15 min to 1 hour
Is LEV present: good ventilation or fume cupboard
Use respiratory protection: 95%

Results:
Dermal exposure: 2,14 mg/kg/day, Dermal Risk Characterisation Ratio: 1,7
Use risk management measures: use skin protective equipment with protective effect 90%
Dermal exposure: 0,214 mg/kg/day, Dermal Risk Characterisation Ratio: 0,17
3) Exposure of workers using the ECETOC Targeted Risk Assessment model for potassium permanganate in PROC 15
Input parameters:
Process category: PROC 15: Use as laboratory reagent
Substance is solid Duration of activity: < 15 min a day
Is LEV present: good ventilation or fume cupboard
Use respiratory protection: no
Results:
Inhalation exposure: 0,002 mg/m3, Inhalative Risk Characterisation Ratio: 0,002
Dermal exposure: 0,034 mg/kg/day, Dermal Risk Characterisation Ratio: 0,027
Total Risk Characterisation Ratio: 0,029

Consumer exposure
Not relevant.

Indirect exposure of humans via the environment (oral)
Exposure of workers using the ECETOC Targeted Risk Assessment model
Risk characterization ratio (RCR) for humans via the environment regional 0,0001

Environmental exposure
Environmental releases
According to small amount of the substance used (kg/day, eventually 500 kg/year), emissions to the air are not significant. Information about water compartment exposure is in next sections. Solid waste generates from substance remnants and packaging.

Exposure concentration in sewage treatment plants (STP)
Predicted no effect concentration (PNEC) for potassium permanganate in sewage treatment plants is 1,64 mg/L. Potassium permanganate is used for water treatment. Potassium permanganate is reduced in a chemical reaction forming compounds insoluble in water which are consequently filtered. Safe amount of potassium permanganate is used in this process.

In other processes, potassium permanganate is used in small amounts, exposure of the STP does not exceed safe amount.

Exposure concentration in aquatic pelagic compartment
Potassium permanganate is used for removal of manganese (Mn2+) and ferrous (Fe2+) ions from water, for it is a strong oxidizer. Manganese (Mn2+) and ferrous (Fe2+) ions are oxidized while permanganate is reduced in the reaction and resulting insoluble compounds are filtered at sand filters. It is therefore no longer potassium permanganate, which is classified as hazardous to the environment, only mixture of manganese compounds is

present.

In other processes, potassium permanganate is used in small amounts, eventual contaminated water is drained to the STP and filtered in the process described above.

Water entering the aquatic compartment is monitored.

Exposure concentration in sediments
Not relevant.

Exposure concentrations in soil and groundwater
Not relevant.

Atmospheric compartment
According to the models discussed in section 9.2.2.1, the highest predicted concentration of potassium permanganate dust in the air is 0,002 mg/m3, which means safe concentration for workers and no risk to the environment.

Exposure concentration relevant for the food chain (Secondary poisoning)
Not relevant.

Title of Exposure scenario2: Consumer use of potassium permanganate

Exposure scenario no. 2: Consumer use of potassium permanganate	
1. Short title of the exposure scenario	
Sector of Use (SU)	SU21 Private households (= general public = consumers). SU22 Public domain (administration, education, entertainment, services, craftsmen)
Preparation Category (PC)	Not determined
Process category (PROC)	PROC0 Other Process or activity, PROC 15 Use a laboratory reagent
Article category (AC)	Not determined
2. Processes and activities covered by the exposure scenario	
Consumer use of potassium permanganate.	
Operational Conditions of Use	
3. Duration and frequency of use	
Max. 15 minutes a day	
4.1 Physical form of substance or preparation; surface to volume ratio of articles	
Final product is a solid crystalline substance with dark purple crystals. Particle size varies according to the required properties of the final product. Mean particle size is approx. 85 microns. Dustiness of the product is qualified as medium. Aqueous solution of potassium permanganate is violet liquid, water solubility is 6,4 g/L (20°C).	
4.2 Concentration of substance in preparation or article	
Solid substance contains minimum of 99,2 % wt., water solution according to requirements.	
4.3 Amount used per time or activity	
Substance is used in maximum amount of 100 g/day or 1 kg/year.	
5. Other relevant operational conditions of use	
Good ventilation when handling with the substance, use of protective equipment. Avoid release to the environment, namely to water.	
Risk Management Measures	
6.1 Risk management measures related to human health (workers or consumers)	
Avoid contact with eyes. Avoid contact with skin. Do not breathe dust. Use protective goggles. Use protective gloves against corrosives. Use dust or gas filter mask. Respect good hygiene and housekeeping. Keep out of the reach of children. When using, do not eat, drink or smoke. Wash hands after use. *First aid* After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of warm water and soap. If swallowed, immediately rinse mouth with water and drink half a litre of lukewarm water. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In all severe cases of injury, after contact with eyes or if swallowed, seek medical advice and provide the physician with information about the substance.	
6.2 Risk management measures related to the environment	
Avoid release to the environment – water. Do not mix with acids and organic compounds. Respect good hygiene and housekeeping.	
7. Waste management measures	

Treat substance remnants and packaging as hazardous waste. Remnants of the substance and contaminated packaging submit at specified place.
Information on estimated exposure and DU guidance
8. Exposure estimation and reference to its source
Dermal exposure: the most likely exposure for this use. Inhalation exposure: not likely, according to small amounts of the substance used. Oral exposure: likely only in case of an accident. If safely handled and if all precautions are respected, oral exposure is not likely. If all instructions for safety manipulation are followed, the risk is minimized.
9. Guidance to DU to evaluate whether he works inside the boundaries set by the ES
Respect the measures listed in section 6.

Exposure estimation

9.3.2.1. Workers exposure

Exposure of workers using the ECETOC Targeted Risk Assessment model for process 15
Input parameters:
Process category: PROC 15: Use as laboratory reagent
Substance is solid
Duration of activity: less than 15 min
Is LEV present: No
Use respiratory protection: no
Results:
Inhalation exposure: 0,05 mg/m3, Inhalative Risk Characterisation Ratio: 0,05
Dermal exposure: 0,34 mg/kg/day, Dermal Risk Characterisation Ratio: 0,27
Total Risk Characterisation Ratio: 0,37

9.3.2.2. Consumer exposure

The most significant exposure for this use is dermal exposure.
Small amount of the substance is used (up to 100 g/day) and the exposure is controlled if the suggested precautions are respected.

9.3.2.3.Indirect exposure of humans via the environment (oral)

Exposure of workers using the ECETOC Targeted Risk Assessment model
Risk characterization ratio (RCR) for humans via the environment regional 0,0001

9.3.2.4. Environmental exposure

9.3.2.4.1. Environmental release

The most significant exposure for this use is the exposure of aquatic environment. Potassium permanganate is a strong oxidizer and is therefore reduced in contact with water containing ions, especially ferrous and manganese. Due to small amount of the substance used (up to 100 g/day, eventually 1 kg/year) and its strong oxidizing properties, the risk resulting from the exposure is controlled if all the precautions described above are respected.

Exposure to the air is not likely, due to small amount of the substance used (up to 100 g/day, eventually 1 kg/year).

9.3.2.4.2. Exposure concentration in sewage treatment plants (STP)

Predicted no effect concentration (PNEC) for potassium permanganate in sewage treatment plants is 1,64 mg/L.

For amount of approx. 100 g/day diluted in approx. 120 l of water (daily consumption per citizen), the resulting concentration (0,83 g/l) is lower than PNEC for STP.

9.3.2.4.3. Exposure concentration in aquatic pelagic compartment

Not relevant

9.3.2.4.4. Exposure concentration in sediments

Not relevant

9.2.2.4.5. Exposure concentrations in soil and groundwater

Not probable.

9.3.2.4.6. Atmospheric compartment

Exposure to the air is not likely, due to small amount of the substance used (up to 100 g/day, eventually 1 kg/year).

9.3.2.4.7. Exposure concentration relevant for the food chain (Secondary poisoning)

Potassium permanganate does not have bioaccumulation potential, this route of exposure is not relevant.