

Carbon monoxide**NOAL_0019**

Country : SE / Language : EN

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

Trade name : Carbon monoxide, Carbon monoxide N20, Kulilte, Carbon monoxide N47, Carbon monoxide N23

SDS no : NOAL_0019

Other means of identification : Carbon monoxide

CAS-No. : 630-08-0

EC-No. : 211-128-3

EC Index-No. : 006-001-00-2

REACH registration No : 01-2119480165-39

Chemical formula : CO

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

Relevant identified uses : Industrial and professional uses. Perform risk assessment prior to use.
See the list of identified uses and exposure scenarios in the annex of the safety data sheet.
Perform risk assessment prior to use.
Contact supplier for more information on uses.

Uses advised against : Consumer use.
Uses other than those listed above are not supported, contact your supplier for more information on other uses.

1.3. Details of the supplier of the safety data sheet**Company identification****Supplier**

AIR LIQUIDE GAS AB
Lundavägen 151
212 09 Malmö - SWEDEN
T +46 40 38 10 00
info.sweden@airliquide.com


E-Mail address (competent person) : eunordic-sds@airliquide.com

1.4. Emergency telephone number

Emergency telephone number : 112
Availability
(24 / 7)

SECTION 2: Hazards identification**2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No. 1272/2008 [CLP]**

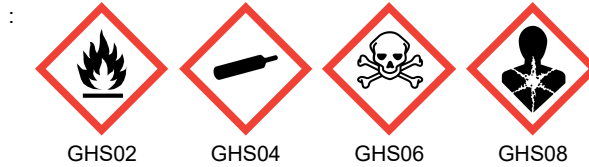
| | | |
|------------------|----------------------------------------------------------------|-------|
| Physical hazards | Flammable gases, Category 1A | H220 |
| | Gases under pressure : Compressed gas | H280 |
| Health hazards | Acute toxicity (inhalation:gas) Category 3 | H331 |
| | Reproductive toxicity, Category 1A | H360D |
| | Specific target organ toxicity – Repeated exposure, Category 1 | H372 |

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2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



Signal word (CLP)

: Danger

Hazard statements (CLP)

: H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.
H331 - Toxic if inhaled.
H360D - May damage the unborn child.
H372 - Causes damage to organs through prolonged or repeated exposure.

Precautionary statements (CLP)

- Prevention

: P280 - Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P271 - Use only outdoors or in a well-ventilated area.
P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

- Response

: P308+P313 - IF exposed or concerned: Get medical advice.
P311 - Call a POISON CENTER or doctor.
P321 - Specific treatment (see supplemental first aid instruction on this label).
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - In case of leakage, eliminate all ignition sources.

- Storage

: P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P405 - Store locked up.
P403 - Store in a well-ventilated place.
P410+P403 - Protect from sunlight. Store in a well-ventilated place.

- Disposal considerations

: P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

Supplemental information

: Restricted to professional users.

2.3. Other hazards


None.

Not classified as PBT or vPvB.

The substance/mixture has no endocrine disrupting properties.

SECTION 3: Composition/information on ingredients

3.1. Substances

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| Carbon monoxide | | | NOAL_0019 |
| | | | Country : SE / Language : EN |
| Name | Product identifier | Composition [V-%]: | Classification according to Regulation (EC) No. 1272/2008 [CLP] |
| Carbon monoxide | CAS-No.: 630-08-0 EC-No.: 211-128-3 EC Index-No.: 006-001-00-2 REACH registration No: 01-2119480165-39 | 100 | Flam. Gas 1A, H220 Press. Gas (Comp.), H280 Acute Tox. 3 (Inhalation:gas), H331 Repr. 1A, H360D STOT RE 1, H372 |

Contains no other components or impurities which will influence the classification of the product.

3.2. Mixtures

Not established.

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
Provide oxygen.
- Skin contact : Adverse effects not expected from this product.
- Eye contact : Adverse effects not expected from this product.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

Symptoms may include dizziness, headache, nausea and loss of co-ordination.
Delayed adverse effects possible.
See section 11.

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

Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media


- Suitable extinguishing media : Water spray or fog.
Dry powder.
- Unsuitable extinguishing media : Carbon dioxide.
Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : None that are more hazardous than the product itself.

5.3. Advice for firefighters

- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
Move containers away from the fire area if this can be done without risk.

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Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
Standard EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Act in accordance with local emergency plan.
Try to stop release.
Evacuate area.
Ensure adequate air ventilation.
Stay upwind.
See section 8 of the SDS for more information on personal protective equipment

For emergency responders : Monitor concentration of released product.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
See section 5.3 of the SDS for more information.

6.2. Environmental precautions

Try to stop release.

6.3. Methods and material for containment and cleaning up

Ventilate area.


6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product : Do not breathe gas.
Avoid release of product into atmosphere.
The product must be handled in accordance with good industrial hygiene and safety procedures.
Only experienced and properly instructed persons should handle gases under pressure.
Consider pressure relief device(s) in gas installations.
Ensure the complete gas system was (or is regularly) checked for leaks before use.
Do not smoke while handling product.
Avoid exposure, obtain special instructions before use.
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Installation of a cross purge assembly between the container and the regulator is recommended.
Avoid suck back of water, acid and alkalis.
Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment.
Purge air from system before introducing gas.
Take precautionary measures against static discharge.
Keep away from ignition sources (including static discharges).
Consider the use of only non-sparking tools.
Ensure equipment is adequately earthed.

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Safe handling of the gas receptacle : Refer to supplier's container handling instructions.
Do not allow backfeed into the container.
Protect containers from physical damage; do not drag, roll, slide or drop.
When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
If user experiences any difficulty operating valve discontinue use and contact supplier.
Never attempt to repair or modify container valves or safety relief devices.
Damaged valves should be reported immediately to the supplier.
Keep container valve outlets clean and free from contaminants particularly oil and water.
Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
Close container valve after each use and when empty, even if still connected to equipment.
Never attempt to transfer gases from one cylinder/container to another.
Never use direct flame or electrical heating devices to raise the pressure of a container.
Do not remove or deface labels provided by the supplier for the identification of the content of the container.
Suck back of water into the container must be prevented.
Open valve slowly to avoid pressure shock.

7.2. Conditions for safe storage, including any incompatibilities

Observe all regulations and local requirements regarding storage of containers.
Containers should not be stored in conditions likely to encourage corrosion.
Container valve guards or caps should be in place.
Containers should be stored in the vertical position and properly secured to prevent them from falling over.
Stored containers should be periodically checked for general condition and leakage.
Keep container below 50°C in a well ventilated place.
Store containers in location free from fire risk and away from sources of heat and ignition.
Keep away from combustible materials.
Segregate from oxidant gases and other oxidants in store.
All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

| | |
|-----------------------------------------------------------|------------------------------|
| Carbon monoxide (630-08-0) | |
| EU - Indicative Occupational Exposure Limit (IOEL) | |
| Local name | Carbon monoxide |
| IOEL TWA | 23 mg/m ³ |
| IOEL TWA [ppm] | 20 ppm |
| IOEL STEL | 117 mg/m ³ |
| IOEL STEL [ppm] | 100 ppm |
| Remark | SCOEL Recommendations (1995) |
| Austria - Occupational Exposure Limits | |
| Local name | Kohlenstoffmonoxid |

Carbon monoxide**NOAL_0019**

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| | |
|------------------------------------------------------|---------------------------------------|
| MAK (mg/m ³) | 33 mg/m ³ |
| MAK (OEL TWA) [ppm] | 30 ppm |
| MAK (OEL STEL) | 66 mg/m ³ |
| MAK (OEL STEL) [ppm] | 60 ppm |
| Belgium - Occupational Exposure Limits | |
| Local name | Carbone (oxyde de) # Koolstofmonoxide |
| OEL TWA | 29 mg/m ³ |
| OEL TWA [ppm] | 25 ppm |
| Bulgaria - Occupational Exposure Limits | |
| Local name | Въглероден оксид |
| OEL TWA | 40 mg/m ³ |
| OEL STEL | 200 mg/m ³ |
| Croatia - Occupational Exposure Limits | |
| Local name | Ugljikov monksid |
| GVI (OEL TWA) [1] | 35 mg/m ³ |
| GVI (OEL TWA) [2] | 30 ppm |
| KGVI (OEL STEL) | 232 mg/m ³ |
| KGVI (OEL STEL) [ppm] | 200 ppm |
| Remark | F+, T BVG |
| Czech Republic - Occupational Exposure Limits | |
| Local name | Oxid uhelnatý |
| PEL (OEL TWA) | 30 mg/m ³ |
| PEL (OEL TWA) [ppm] | 26.2 ppm |
| NPK-P (OEL C) | 150 mg/m ³ |
| NPK-P (OEL C) [ppm] | 131 ppm |
| Denmark - Occupational Exposure Limits | |
| Local name | Carbonmonoxid (Kulilte; Kulmonoxid) |
| OEL TWA [1] | 29 mg/m ³ |
| OEL TWA [2] | 25 ppm |
| Estonia - Occupational Exposure Limits | |
| Local name | Süsinikmonooksiid heitgaasina |
| OEL TWA | 4025 mg/m ³ |
| OEL TWA [ppm] | 3520 ppm |
| OEL STEL | 120 mg/m ³ |
| OEL STEL [ppm] | 100 ppm |

Carbon monoxide

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Finland - Occupational Exposure Limits

| | |
|----------------------|----------------------|
| Local name | Hillimonoksidi |
| HTP (OEL TWA) [1] | 35 mg/m ³ |
| HTP (OEL TWA) [2] | 30 ppm |
| HTP (OEL STEL) | 87 mg/m ³ |
| HTP (OEL STEL) [ppm] | 75 ppm |

France - Occupational Exposure Limits

| | |
|---------------------|----------------------------------------------------------------------------------------------|
| Local name | Oxyde de carbone |
| VME (OEL TWA) | 55 mg/m ³ |
| VME (OEL TWA) [ppm] | 50 ppm |
| Remark | Valeurs recommandées/admises; substance classée toxique pour la reproduction de catégorie 1a |

Germany - Occupational Exposure Limits (TRGS 900)

| | |
|-------------------|----------------------|
| Local name | Kohlenstoffmonoxid |
| AGW (OEL TWA) [1] | 35 mg/m ³ |
| AGW (OEL TWA) [2] | 30 ppm |
| Remark | DFG,Z |

Greece - Occupational Exposure Limits

| | |
|----------------|-----------------------|
| OEL TWA | 55 mg/m ³ |
| OEL TWA [ppm] | 50 ppm |
| OEL STEL | 330 mg/m ³ |
| OEL STEL [ppm] | 300 ppm |

Hungary - Occupational Exposure Limits

| | |
|---------------|----------------------|
| Local name | SZÉN-MONOXID |
| AK (OEL TWA) | 33 mg/m ³ |
| CK (OEL STEL) | 66 mg/m ³ |

Ireland - Occupational Exposure Limits

| | |
|----------------|-----------------------|
| Local name | Carbon monoxide |
| OEL TWA [1] | 23 mg/m ³ |
| OEL TWA [2] | 20 ppm |
| OEL STEL | 115 mg/m ³ |
| OEL STEL [ppm] | 100 ppm |

Latvia - Occupational Exposure Limits

| | |
|------------|--------------------------------------|
| Local name | Oglekļa(II)oksīds (oglekļamonoksīds) |
| OEL TWA | 20 mg/m ³ |

Carbon monoxide**NOAL_0019**

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Netherlands - Occupational Exposure Limits

| | |
|------------------|----------------------|
| Local name | Koolmonoxide |
| TGG-8u (OEL TWA) | 29 mg/m ³ |

Poland - Occupational Exposure Limits

| | |
|------------------|-----------------------|
| Local name | Tlenek węgla |
| NDS (OEL TWA) | 23 mg/m ³ |
| NDSCh (OEL STEL) | 117 mg/m ³ |

Portugal - Occupational Exposure Limits

| | |
|---------------|---------------------|
| Local name | Monóxido de carbono |
| OEL TWA [ppm] | 25 ppm |

Romania - Occupational Exposure Limits

| | |
|----------------|----------------------|
| Local name | Oxid de carbon |
| OEL TWA | 20 mg/m ³ |
| OEL TWA [ppm] | 17.5 ppm |
| OEL STEL | 30 mg/m ³ |
| OEL STEL [ppm] | 26 ppm |

Slovakia - Occupational Exposure Limits

| | |
|--------------------|----------------------|
| NPHV (OEL TWA) [1] | 35 mg/m ³ |
| NPHV (OEL TWA) [2] | 30 ppm |
| NPHV (OEL STEL) | 35 mg/m ³ |

Slovenia - Occupational Exposure Limits

| | |
|----------------|----------------------|
| Local name | ogljikov monoksid |
| OEL TWA | 35 mg/m ³ |
| OEL TWA [ppm] | 30 ppm |
| OEL STEL | 70 mg/m ³ |
| OEL STEL [ppm] | 60 ppm |

Spain - Occupational Exposure Limits

| | |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local name | Monóxido de carbono |
| VLA-ED (OEL TWA) [1] | 29 mg/m ³ |
| VLA-ED (OEL TWA) [2] | 25 ppm |
| Remark | TR1A (Cuando las pruebas utilizadas para la clasificación procedan principalmente de datos en humanos), VLB® (Agente químico que tiene Valor Límite Biológico específico en este documento). |

Sweden - Occupational Exposure Limits

| | |
|------------|------------------------|
| Local name | Avgaser som kolmonoxid |
|------------|------------------------|

Carbon monoxide

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| | |
|------------------------------------------------------|----------------------------------------------------------------------------------------------|
| NGV (OEL TWA) | 25 mg/m ³ 25 mg/m ³ Avgaser 40 mg/m ³ Se även Avgaser |
| NGV (OEL TWA) [ppm] | 20 ppm 20 ppm Avgaser 35 ppm Se även Avgaser |
| KTV (OEL STEL) | 120 mg/m ³ Se även Avgaser |
| KTV (OEL STEL) [ppm] | 100 ppm Se även Avgaser |
| United Kingdom - Occupational Exposure Limits | |
| Local name | Carbon monoxide |
| WEL TWA (OEL TWA) [1] | 35 mg/m ³ |
| WEL TWA (OEL TWA) [2] | 30 ppm |
| WEL STEL (OEL STEL) | 232 mg/m ³ |
| WEL STEL (OEL STEL) [ppm] | 200 ppm |
| Remark | BMGV (Biological monitoring guidance values are listed in Table 2) |
| Iceland - Occupational Exposure Limits | |
| Local name | Kolmónoxíð (kolsýrlingur) |
| OEL TWA | 29 mg/m ³ |
| OEL TWA [ppm] | 25 ppm |
| Norway - Occupational Exposure Limits | |
| Local name | Karbonmonoksid |
| Grenseverdi (OEL TWA) [1] | 29 mg/m ³ |
| Grenseverdi (OEL TWA) [2] | 25 ppm |
| Switzerland - Occupational Exposure Limits | |
| Local name | Kohlenmonoxid |
| MAK (OEL TWA) [1] | 35 mg/m ³ 35 mg/m ³ |
| MAK (OEL TWA) [2] | 30 ppm 30 ppm |
| KZGW (OEL STEL) | 70 mg/m ³ 70 mg/m ³ |
| KZGW (OEL STEL) [ppm] | 60 ppm 60 ppm |
| Remark | O ^L B SS _B - COHb ^{KT HU} - NIOSH |
| USA - ACGIH - Occupational Exposure Limits | |
| Local name | Carbon monoxide |
| ACGIH OEL TWA [ppm] | 25 ppm |

Carbon monoxide**NOAL_0019**

Country : SE / Language : EN

Carbon monoxide (630-08-0)**EU - Indicative Occupational Exposure Limit (IOEL)**

| | |
|-----------------|------------------------------|
| Local name | Carbon monoxide |
| IOEL TWA | 23 mg/m ³ |
| IOEL TWA [ppm] | 20 ppm |
| IOEL STEL | 117 mg/m ³ |
| IOEL STEL [ppm] | 100 ppm |
| Remark | SCOEL Recommendations (1995) |

Austria - Occupational Exposure Limits

| | |
|--------------------------|----------------------|
| Local name | Kohlenstoffmonoxid |
| MAK (mg/m ³) | 33 mg/m ³ |
| MAK (OEL TWA) [ppm] | 30 ppm |
| MAK (OEL STEL) | 66 mg/m ³ |
| MAK (OEL STEL) [ppm] | 60 ppm |

Belgium - Occupational Exposure Limits

| | |
|---------------|---------------------------------------|
| Local name | Carbone (oxyde de) # Koolstofmonoxide |
| OEL TWA | 29 mg/m ³ |
| OEL TWA [ppm] | 25 ppm |

Bulgaria - Occupational Exposure Limits

| | |
|------------|-----------------------|
| Local name | Въглероден оксид |
| OEL TWA | 40 mg/m ³ |
| OEL STEL | 200 mg/m ³ |

Croatia - Occupational Exposure Limits

| | |
|-----------------------|-----------------------|
| Local name | Ugljikov monksid |
| GVI (OEL TWA) [1] | 35 mg/m ³ |
| GVI (OEL TWA) [2] | 30 ppm |
| KGVI (OEL STEL) | 232 mg/m ³ |
| KGVI (OEL STEL) [ppm] | 200 ppm |
| Remark | F+, T BVG |

Czech Republic - Occupational Exposure Limits

| | |
|---------------------|-----------------------|
| Local name | Oxid uhelnatý |
| PEL (OEL TWA) | 30 mg/m ³ |
| PEL (OEL TWA) [ppm] | 26.2 ppm |
| NPK-P (OEL C) | 150 mg/m ³ |
| NPK-P (OEL C) [ppm] | 131 ppm |

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Denmark - Occupational Exposure Limits

| | |
|-------------|-------------------------------------|
| Local name | Carbonmonoxid (Kullite; Kulmonoxid) |
| OEL TWA [1] | 29 mg/m ³ |
| OEL TWA [2] | 25 ppm |

Estonia - Occupational Exposure Limits

| | |
|----------------|-------------------------------|
| Local name | Süsinikmonooksiid heitgaasina |
| OEL TWA | 4025 mg/m ³ |
| OEL TWA [ppm] | 3520 ppm |
| OEL STEL | 120 mg/m ³ |
| OEL STEL [ppm] | 100 ppm |

Finland - Occupational Exposure Limits

| | |
|----------------------|----------------------|
| Local name | Hillimonoksidi |
| HTP (OEL TWA) [1] | 35 mg/m ³ |
| HTP (OEL TWA) [2] | 30 ppm |
| HTP (OEL STEL) | 87 mg/m ³ |
| HTP (OEL STEL) [ppm] | 75 ppm |

France - Occupational Exposure Limits

| | |
|---------------------|----------------------------------------------------------------------------------------------|
| Local name | Oxyde de carbone |
| VME (OEL TWA) | 55 mg/m ³ |
| VME (OEL TWA) [ppm] | 50 ppm |
| Remark | Valeurs recommandées/admises; substance classée toxique pour la reproduction de catégorie 1a |

Germany - Occupational Exposure Limits (TRGS 900)

| | |
|-------------------|----------------------|
| Local name | Kohlenstoffmonoxid |
| AGW (OEL TWA) [1] | 35 mg/m ³ |
| AGW (OEL TWA) [2] | 30 ppm |
| Remark | DFG,Z |

Greece - Occupational Exposure Limits

| | |
|----------------|-----------------------|
| OEL TWA | 55 mg/m ³ |
| OEL TWA [ppm] | 50 ppm |
| OEL STEL | 330 mg/m ³ |
| OEL STEL [ppm] | 300 ppm |

Hungary - Occupational Exposure Limits

| | |
|---------------|----------------------|
| Local name | SZÉN-MONOXID |
| AK (OEL TWA) | 33 mg/m ³ |
| CK (OEL STEL) | 66 mg/m ³ |

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Ireland - Occupational Exposure Limits

| | |
|----------------|-----------------------|
| Local name | Carbon monoxide |
| OEL TWA [1] | 23 mg/m ³ |
| OEL TWA [2] | 20 ppm |
| OEL STEL | 115 mg/m ³ |
| OEL STEL [ppm] | 100 ppm |

Latvia - Occupational Exposure Limits

| | |
|------------|--------------------------------------|
| Local name | Oglekļa(II)oksīds (oglekļamonoksīds) |
| OEL TWA | 20 mg/m ³ |

Netherlands - Occupational Exposure Limits

| | |
|------------------|----------------------|
| Local name | Koolmonoxide |
| TGG-8u (OEL TWA) | 29 mg/m ³ |

Poland - Occupational Exposure Limits

| | |
|------------------|-----------------------|
| Local name | Tlenek węgla |
| NDS (OEL TWA) | 23 mg/m ³ |
| NDSCh (OEL STEL) | 117 mg/m ³ |

Portugal - Occupational Exposure Limits

| | |
|---------------|---------------------|
| Local name | Monóxido de carbono |
| OEL TWA [ppm] | 25 ppm |

Romania - Occupational Exposure Limits

| | |
|----------------|----------------------|
| Local name | Oxid de carbon |
| OEL TWA | 20 mg/m ³ |
| OEL TWA [ppm] | 17.5 ppm |
| OEL STEL | 30 mg/m ³ |
| OEL STEL [ppm] | 26 ppm |

Slovakia - Occupational Exposure Limits

| | |
|--------------------|----------------------|
| NPHV (OEL TWA) [1] | 35 mg/m ³ |
| NPHV (OEL TWA) [2] | 30 ppm |
| NPHV (OEL STEL) | 35 mg/m ³ |

Slovenia - Occupational Exposure Limits

| | |
|----------------|----------------------|
| Local name | ogljikov monoksid |
| OEL TWA | 35 mg/m ³ |
| OEL TWA [ppm] | 30 ppm |
| OEL STEL | 70 mg/m ³ |
| OEL STEL [ppm] | 60 ppm |

Carbon monoxide

NOAL_0019

Country : SE / Language : EN

Spain - Occupational Exposure Limits

| | |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local name | Monóxido de carbono |
| VLA-ED (OEL TWA) [1] | 29 mg/m ³ |
| VLA-ED (OEL TWA) [2] | 25 ppm |
| Remark | TR1A (Cuando las pruebas utilizadas para la clasificación procedan principalmente de datos en humanos), VLB® (Agente químico que tiene Valor Límite Biológico específico en este documento). |

Sweden - Occupational Exposure Limits

| | |
|----------------------|----------------------------------------------------------------------------------------------|
| Local name | Avgaser som kolmonoxid |
| NGV (OEL TWA) | 25 mg/m ³ 25 mg/m ³ Avgaser 40 mg/m ³ Se även Avgaser |
| NGV (OEL TWA) [ppm] | 20 ppm 20 ppm Avgaser 35 ppm Se även Avgaser |
| KTV (OEL STEL) | 120 mg/m ³ Se även Avgaser |
| KTV (OEL STEL) [ppm] | 100 ppm Se även Avgaser |

United Kingdom - Occupational Exposure Limits

| | |
|---------------------------|--------------------------------------------------------------------|
| Local name | Carbon monoxide |
| WEL TWA (OEL TWA) [1] | 35 mg/m ³ |
| WEL TWA (OEL TWA) [2] | 30 ppm |
| WEL STEL (OEL STEL) | 232 mg/m ³ |
| WEL STEL (OEL STEL) [ppm] | 200 ppm |
| Remark | BMGV (Biological monitoring guidance values are listed in Table 2) |

Iceland - Occupational Exposure Limits

| | |
|---------------|---------------------------|
| Local name | Kolmónoxíð (kolsýrlingur) |
| OEL TWA | 29 mg/m ³ |
| OEL TWA [ppm] | 25 ppm |

Norway - Occupational Exposure Limits

| | |
|---------------------------|----------------------|
| Local name | Karbonmonoksid |
| Grenseverdi (OEL TWA) [1] | 29 mg/m ³ |
| Grenseverdi (OEL TWA) [2] | 25 ppm |

Switzerland - Occupational Exposure Limits

| | |
|-------------------|----------------------------------------------|
| Local name | Kohlenmonoxid |
| MAK (OEL TWA) [1] | 35 mg/m ³ 35 mg/m ³ |
| MAK (OEL TWA) [2] | 30 ppm 30 ppm |

Carbon monoxide

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| | |
|---------------------------------------------------|------------------------------------------------------------------|
| KZGW (OEL STEL) | 70 mg/m ³ 70 mg/m ³ |
| KZGW (OEL STEL) [ppm] | 60 ppm 60 ppm |
| Remark | O ^L B SS _B - COHb ^{KT HU} - NIOSH |
| USA - ACGIH - Occupational Exposure Limits | |
| Local name | Carbon monoxide |
| ACGIH OEL TWA [ppm] | 25 ppm |

Carbon monoxide (630-08-0)

DNEL: Derived no effect level (Workers)

| | |
|------------------------------------------|---------|
| Acute - local effects, inhalation | 100 ppm |
| Acute - systemic effects, inhalation | 100 ppm |
| Long-term - local effects, inhalation | 20 ppm |
| Long-term - systemic effects, inhalation | 20 ppm |

Carbon monoxide (630-08-0)

DNEL: Derived no effect level (Workers)

| | |
|------------------------------------------|---------|
| Acute - local effects, inhalation | 100 ppm |
| Acute - systemic effects, inhalation | 100 ppm |
| Long-term - local effects, inhalation | 20 ppm |
| Long-term - systemic effects, inhalation | 20 ppm |

PNEC (Predicted No-Effect Concentration) : None established.

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Product to be handled in a closed system and under strictly controlled conditions.
 Provide adequate general and local exhaust ventilation.
 Preferably use permanent leak-tight installations (e.g. welded pipes).
 Systems under pressure should be regularly checked for leakages.
 Ensure exposure is below occupational exposure limits (where available).
 Gas detectors should be used when toxic gases may be released.
 Consider the use of a work permit system e.g. for maintenance activities.

8.2.2. Individual protection measures, e.g. personal protective equipment

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk.

The following recommendations should be considered:

PPE compliant to the recommended EN/ISO standards should be selected.

• Eye/face protection

: Wear safety glasses with side shields.

Standard EN 166 - Personal eye-protection - specifications.

• Skin protection

: Wear working gloves when handling gas containers.

- Hand protection

Standard EN 388 - Protective gloves against mechanical risk, performance level 1 or higher.

Carbon monoxide

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Country : SE / Language : EN

- Other : Consider the use of flame resistant anti-static safety clothing.
Standard EN ISO 14116 - Limited flame spread materials.
Standard EN 1149-5 - Protective clothing: Electrostatic properties.
Wear safety shoes while handling containers.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
- Respiratory protection : Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Consult respiratory device supplier's product information for the selection of the appropriate device.
Never use any kind of filtering respiratory protection equipment when working with this substance due to it having poor or no warning properties.
Keep self contained breathing apparatus readily available for emergency use.
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
- Thermal hazards : None in addition to the above sections.

8.2.3. Environmental exposure controls

Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|-------------------------------------------------|-----------------------------------------------------------------------|
| Appearance | |
| - Physical state at 20°C / 101.3kPa | : Gas |
| - Colour | : Colourless. |
| Odour | |
| | : Odourless. |
| | Odour threshold is subjective and inadequate to warn of overexposure. |
| pH | |
| | : Not applicable for gases and gas mixtures. |
| Melting point / Freezing point | |
| | : -205 °C |
| | : -205 °C |
| Boiling point | |
| | : -192 °C |
| Flash point | |
| | : Not applicable for gases and gas mixtures. |
| Flammability | |
| | : Extremely flammable gas |
| Explosive limits | |
| | : 10.9 – 76 vol % |
| Lower explosion limit | |
| | : Not available |
| Upper explosion limit | |
| | : Not available |
| Vapour pressure [20°C] | |
| | : Not applicable. |
| Vapour pressure [50°C] | |
| | : Not applicable. |
| Density | |
| | : Not applicable |
| Vapour density | |
| | : Not applicable for gases and gas mixtures. |
| Relative density, liquid (water=1) | |
| | : 0.79 |
| Relative density, gas (air=1) | |
| | : 1 |
| Water solubility | |
| | : 30 mg/l |
| Partition coefficient n-octanol/water (Log Kow) | |
| | : 1.78 |
| Auto-ignition temperature | |
| | : 605 °C |
| Decomposition temperature | |
| | : Not applicable. |
| Viscosity, kinematic | |
| | : No reliable data available. |
| Particle characteristics | |
| | : Not applicable for gases and gas mixtures. |

9.2. Other information

9.2.1. Information with regard to physical hazard classes

| | |
|---------------------------|-------------------|
| Explosive properties | : Not applicable. |
| Oxidising properties | : Not applicable. |
| Tci | : 15.2 % |
| Critical temperature [°C] | : -140 °C |

Carbon monoxide

NOAL_0019

Country : SE / Language : EN

9.2.2. Other safety characteristics

Molar mass : 28 g/mol
 Evaporation rate : Not applicable for gases and gas mixtures.
 Gas group : Compressed gas

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Reactivity : None.
 : This mixture contains components with the following reactivity : Can form explosive mixture with air. May react violently with oxidants.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).
 Avoid moisture in installation systems.

10.5. Incompatible materials

For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity : Toxic if inhaled.

| | |
|-----------------------------|----------------------------|
| LC50 Inhalation - Rat [ppm] | 3760 ppm/1h 1300 ppm/4h |
|-----------------------------|----------------------------|

Carbon monoxide (630-08-0)

| | |
|-----------------------------|----------------------------|
| LC50 Inhalation - Rat [ppm] | 3760 ppm/1h 1300 ppm/4h |
|-----------------------------|----------------------------|

Skin corrosion/irritation : No known effects from this product.
Serious eye damage/irritation : No known effects from this product.
Respiratory or skin sensitisation : No known effects from this product.
Germ cell mutagenicity : No known effects from this product.
Carcinogenicity : No known effects from this product.
Toxic for reproduction : Fertility : No known effects from this product.
Toxic for reproduction : unborn child : May damage the unborn child.
STOT-single exposure : Suppresses the oxygen uptake by red blood cells.
Target organ(s) : Blood.
STOT-repeated exposure : Causes damage to organs through prolonged or repeated exposure.
Target organ(s) : heart.

Carbon monoxide**NOAL_0019**

Country : SE / Language : EN

Aspiration hazard : Not applicable for gases and gas mixtures.**11.2. Information on other hazards**

Other information : The substance/mixture has no endocrine disrupting properties.

SECTION 12: Ecological information**12.1. Toxicity**

Assessment : No ecological damage caused by this product.
EC50 48h - Daphnia magna [mg/l] : Study scientifically unjustified.
EC50 72h - Algae [mg/l] : Study scientifically unjustified.
LC50 96 h - Fish [mg/l] : Study scientifically unjustified.

Carbon monoxide (630-08-0)

| | |
|---------------------------------|-----------------------------------|
| EC50 48h - Daphnia magna [mg/l] | Study scientifically unjustified. |
| EC50 72h - Algae [mg/l] | Study scientifically unjustified. |
| LC50 96 h - Fish [mg/l] | Study scientifically unjustified. |

12.2. Persistence and degradability

Assessment : Will not undergo hydrolysis.
Not readily biodegradable.

12.3. Bioaccumulative potential

Assessment : Not expected to bioaccumulate due to the low log Kow (log Kow < 4).
See section 9.

12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.
Partition into soil is unlikely.

12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

12.6. Endocrine disrupting properties

The substance/mixture has no endocrine disrupting properties.

12.7. Other adverse effects

Other adverse effects : No known effects from this product.
Effect on the ozone layer : None.
Effect on global warming : Contains greenhouse gas(es).

SECTION 13: Disposal considerations**13.1. Waste treatment methods**

Contact supplier if guidance is required.
Do not discharge into areas where there is a risk of forming an explosive mixture with air.
Waste gas should be flared through a suitable burner with flash back arrestor.
Must not be discharged to atmosphere.
Ensure that the emission levels from local regulations or operating permits are not exceeded.
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.
Return unused product in original container to supplier.

Carbon monoxide**NOAL_0019**

Country : SE / Language : EN

List of hazardous waste codes (from Commission Decision 2000/532/EC as amended) : 16 05 04 *: Gases in pressure containers (including halons) containing hazardous substances.

13.2. Additional information

External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transport information**14.1. UN number or ID number**

In accordance with ADR / RID / IMDG / IATA / ADN
UN-No. : 1016

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : CARBON MONOXIDE, COMPRESSED
Transport by air (ICAO-TI / IATA-DGR) : Carbon monoxide, compressed
Transport by sea (IMDG) : CARBON MONOXIDE, COMPRESSED

14.3. Transport hazard class(es)**Labelling**

2.3 : Toxic gases.
2.1 : Flammable gases.

Transport by road/rail (ADR/RID)

Class : 2
Classification code : 1TF
Hazard identification number : 263
Tunnel Restriction : B/D - Tank carriage : Passage forbidden through tunnels of category B, C, D and E. Other carriage : Passage forbidden through tunnels of category D and E

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.3 (2.1)
Emergency Schedule (EmS) - Fire : F-D
Emergency Schedule (EmS) - Spillage : S-U

14.4. Packing group

Transport by road/rail (ADR/RID) : Not established.
Transport by air (ICAO-TI / IATA-DGR) : Not established.
Transport by sea (IMDG) : Not established.

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.
Transport by air (ICAO-TI / IATA-DGR) : None.
Transport by sea (IMDG) : None.

14.6. Special precautions for user**Packing Instruction(s)**

Transport by road/rail (ADR/RID) : P200
Transport by air (ICAO-TI / IATA-DGR)
Passenger and Cargo Aircraft : Forbidden.
Cargo Aircraft only : Forbidden.
Transport by sea (IMDG) : P200

Carbon monoxide

NOAL_0019

Country : SE / Language : EN

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment.
 Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
 Before transporting product containers:
 - Ensure there is adequate ventilation.
 - Ensure that containers are firmly secured.
 - Ensure valve is closed and not leaking.
 - Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
 - Ensure valve protection device (where provided) is correctly fitted.

14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

SECTION 15: Regulatory information

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

EU-Regulations

Restrictions on use : Restricted to professional users (Annex XVII REACH).
 National legislation : Ensure all national/local regulations are observed.
 Seveso Directive : 2012/18/EU (Seveso III) : Covered.

National regulations

Ensure all national/local regulations are observed.

France

Occupational diseases

| Code | Description |
|-------|-------------------------------------------|
| RG 64 | Professional poisoning by carbon monoxide |
| RG 66 | Occupational rhinitis and asthma |

Germany

Water hazard class (WGK) : WGK 1, Slightly hazardous to water (Classification according to AwSV)
 National Rules and Recommendations : [German regulations] BetriebssicherheitsV mit TRBSen insbesondere TRBS 3145 / TRGS 725 Ortsbewegliche Druckgasbehälter", TRBS 2141, BGR Regel 500 Teil 2.33: "Umgang mit Gasen", GefahrstoffV mit Technischen Regeln Gefährliche Stoffe TRGS insbesondere TRGS 407 "Tätigkeiten mit Gasen - Gefährdungsbeurteilung", TRGS 400, 500, 510, 900." BGR 104, TRBS 2152.

Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed
 SZW-lijst van mutagene stoffen : The substance is not listed
 SZW-lijst van reprotoxische stoffen – Borstvoeding : The substance is not listed
 SZW-lijst van reprotoxische stoffen – Vruchtbaarheid : The substance is not listed
 SZW-lijst van reprotoxische stoffen – Ontwikkeling : The substance is not listed

Denmark


Danish National Regulations : Young people below the age of 18 years are not allowed to use the product
 Pregnant/breastfeeding women working with the product must not be in direct contact with the product

Switzerland

Storage class (LK) : LK 2 - Liquefied or pressurized gases

15.2. Chemical safety assessment

A CSA has been carried out.


| | | |
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SECTION 16: Other information

| | |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indication of changes | : Safety data sheet in accordance with commission regulation (EU) No 2020/878. |
| Abbreviations and acronyms | : ATE - Acute Toxicity Estimate CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008 REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006 EINECS - European Inventory of Existing Commercial Chemical Substances CAS# - Chemical Abstract Service number PPE - Personal Protection Equipment LC50 - Lethal Concentration to 50 % of a test population RMM - Risk Management Measures PBT - Persistent, Bioaccumulative and Toxic vPvB - Very Persistent and Very Bioaccumulative STOT- SE : Specific Target Organ Toxicity - Single Exposure CSA - Chemical Safety Assessment EN - European Standard UN - United Nations ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road IATA - International Air Transport Association IMDG code - International Maritime Dangerous Goods RID - Regulations concerning the International Carriage of Dangerous Goods by Rail WGK - Water Hazard Class STOT - RE : Specific Target Organ Toxicity - Repeated Exposure UFI : Unique Formula Identifier |
| Training advice | : Ensure operators understand the flammability hazard. Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard. |
| Further information | : Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP). Key literature references and sources of data are maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at http://www.Eiga.eu . |

| Full text of H- and EUH-statements | |
|------------------------------------|-----------------------------------------------------------------|
| Acute Tox. 3 (Inhalation:gas) | Acute toxicity (inhalation:gas) Category 3 |
| Flam. Gas 1A | Flammable gases, Category 1A |
| H220 | Extremely flammable gas. |
| H280 | Contains gas under pressure; may explode if heated. |
| H331 | Toxic if inhaled. |
| H360D | May damage the unborn child. |
| H372 | Causes damage to organs through prolonged or repeated exposure. |
| Press. Gas (Comp.) | Gases under pressure : Compressed gas |
| Repr. 1A | Reproductive toxicity, Category 1A |
| STOT RE 1 | Specific target organ toxicity – Repeated exposure, Category 1 |

| | |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DISCLAIMER OF LIABILITY | : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
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| | | Supersedes version of : 2021-06-22 |
| Carbon monoxide | | NOAL_0019 |
| | | Country : SE / Language : EN |

Annex to the safety data sheet

This Annex documents the Exposure Scenarios (ESs) related to the identified uses of the registered substance. The ESs detail protective measures for workers and the environment in addition to those described in sections 7, 8, 11, 12 and 13 of the SDS that are required to ensure that the potential exposure to workers and the environment remains within acceptable levels for each of the identified uses.

Table of contents of the Annex

| Identified Uses | Es N° | Short title | Page |
|-------------------------------------------------|-----------|----------------------------------------------|------|
| Formulation of mixtures in pressure receptacles | EIGA019-1 | Industrial uses, closed contained conditions | 23 |
| Metal treatment | EIGA019-1 | Industrial uses, closed contained conditions | 23 |
| Electronic component manufacture | EIGA019-1 | Industrial uses, closed contained conditions | 23 |
| Manufacture of pharmaceutical products | EIGA019-1 | Industrial uses, closed contained conditions | 23 |
| Intermediate (transported, on-site isolated) | EIGA019-1 | Industrial uses, closed contained conditions | 23 |
| Transfilling in pressure receptacles | EIGA019-1 | Industrial uses, closed contained conditions | 23 |
| Feedstock in chemical processes | EIGA019-1 | Industrial uses, closed contained conditions | 23 |
| Controlling agent in catalytic reaction | EIGA019-1 | Industrial uses, closed contained conditions | 23 |
| Monomer in polymer production | EIGA019-1 | Industrial uses, closed contained conditions | 23 |
| Calibration of analysis equipment | EIGA019-1 | Industrial uses, closed contained conditions | 23 |

1. EIGA019-1: Industrial uses, closed contained conditions

1.1. Title section

Industrial uses, closed contained conditions

ES Ref.: EIGA019-1
Revision date: 9/1/2016

| | |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Processes, tasks, activities covered | Industrial uses, including product transfers and associated laboratory activities within different closed or contained systems |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|

| Environment | Use descriptors |
|-------------|---------------------------|
| CS1 | ERC2, ERC6a, ERC6b, ERC8d |

| Worker | Use descriptors |
|--------|---------------------|
| CS2 | PROC1 |
| CS3 | PROC2, PROC3, PROC4 |
| CS4 | PROC8b, PROC9 |

| | |
|-------------------|----------------|
| Assessment method | ECETOC TRA 2.0 |
|-------------------|----------------|

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: ERC2, ERC6a, ERC6b, ERC8d

| | |
|-------|--------------------------------------------------------------------------------------------|
| ERC2 | Formulation into mixture |
| ERC6a | Use of intermediate |
| ERC6b | Use of reactive processing aid at industrial site (no inclusion into or onto article) |
| ERC8d | Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) |

Product (article) characteristics

| | |
|---------------------------------------|-----------------------------------------------------|
| Physical form of product | See section 9 of the SDS, No additional information |
| Concentration of substance in product | ≤ 100 % |

Amount used, frequency and duration of use (or from service life)

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| The actual tonnage handled per site is not considered to influence the immissions as such for this scenario as there is practically no release | |
| Covers frequency up to: | 5 days/week |
| Emission Days (days/year) | 220 |

Exposure scenario

Carbon monoxide

Annex to the safety data sheet
Reference number: NOAL_0019

CAS-No.: 630-08-0 Product form: Substance Physical state: Gas

Technical and organisational conditions and measures

Wastewater emission controls are not applicable as there is no direct release to wastewater

Soil emission controls are not applicable as there is no direct release to soil

Ensure operatives are trained to minimise releases

Conditions and measures related to sewage treatment plant

Not applicable as there is no release to wastewater

Conditions and measures related to treatment of waste (including article waste)

External treatment and disposal of waste should comply with applicable local and/or national regulations

See section 13 of the SDS

Other conditions affecting environmental exposure

No additional information

1.2.2. Control of worker exposure: PROC1

PROC1

Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product (article) characteristics

Physical form of product

See section 9 of the SDS, No additional information

Concentration of substance in product

≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.

Exposure duration

≤ 8 h/day

Covers frequency up to:

5 days/week

Technical and organisational conditions and measures

Handle product within a closed system

Ensure operatives are trained to minimise exposure

Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Exposure scenario

Carbon monoxide

Annex to the safety data sheet
 Reference number: NOAL_0019
 CAS-No.: 630-08-0 Product form: Substance Physical state: Gas

Conditions and measures related to personal protection, hygiene and health evaluation

Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

See section 8 of the SDS.

Other conditions affecting workers exposure

Indoor or outdoor use

1.2.3. Control of worker exposure: PROC2, PROC3, PROC4

| | |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PROC2 | Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions |
| PROC3 | Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition |
| PROC4 | Chemical production where opportunity for exposure arises |

Product (article) characteristics

Physical form of product See section 9 of the SDS, No additional information

Concentration of substance in product ≤ 100 %

Amount used (or contained in articles), frequency and duration of use/exposure

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential.

Exposure duration ≤ 8 h/day

Covers frequency up to: 5 days/week

Technical and organisational conditions and measures

Handle product within a closed system

Ensure operatives are trained to minimise exposure

Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Conditions and measures related to personal protection, hygiene and health evaluation

Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

See section 8 of the SDS.

Other conditions affecting workers exposure

Indoor or outdoor use

1.2.4. Control of worker exposure: PROC8b, PROC9

| | |
|--------|---------------------------------------------------------------------------------------------------------|
| PROC8b | Transfer of substance or mixture (charging and discharging) at dedicated facilities |
| PROC9 | Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |

| Product (article) characteristics | |
|---------------------------------------|-----------------------------------------------------|
| Physical form of product | See section 9 of the SDS, No additional information |
| Concentration of substance in product | ≤ 100 % |

| Amount used (or contained in articles), frequency and duration of use/exposure | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential. | |
| Exposure duration | ≤ 8 h/day |
| Covers frequency up to: | 5 days/week |

| Technical and organisational conditions and measures | |
|-------------------------------------------------------------------------------------------------------------------------------------|--|
| Handle product within a closed system | |
| Ensure operatives are trained to minimise exposure | |
| Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed | |

| Conditions and measures related to personal protection, hygiene and health evaluation | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems. | |

| Other conditions affecting workers exposure | |
|---------------------------------------------|--|
| Indoor or outdoor use | |

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: ERC2, ERC6a, ERC6b, ERC8d

The exposure of aquatic, terrestrial, sediment and sewage treatment microorganisms is considered to be negligible because the substance partitions primarily to air when released to the environment. The resulting environmental exposure is not expected to add significantly to already present background levels of the gas in the environment

1.3.2. Worker exposure: PROC1

| Route of exposure and type of effects | Exposure estimate | Assessment conditions | RCR |
|-------------------------------------------|-------------------------|-----------------------|--------|
| Inhalation - Long-term - systemic effects | 0.011 mg/m ³ | Indoor use , With LEV | < 0.01 |

Exposure scenario

Carbon monoxide

Annex to the safety data sheet

Reference number: NOAL_0019

CAS-No.: 630-08-0 Product form: Substance Physical state: Gas

| | | | |
|---------------------------------------|-------------------------|-----------------------|---------|
| Inhalation - Acute - systemic effects | 0.023 mg/m ³ | Indoor use , With LEV | < 0.001 |
|---------------------------------------|-------------------------|-----------------------|---------|

1.3.3. Worker exposure: PROC2, PROC3, PROC4

| Route of exposure and type of effects | Exposure estimate | Assessment conditions | RCR |
|-------------------------------------------|------------------------|--------------------------|-------|
| Inhalation - Long-term - systemic effects | 11.7 mg/m ³ | Indoor use , With LEV | 0.585 |
| | 11.7 mg/m ³ | Indoor use , Without LEV | 0.585 |
| Inhalation - Acute - systemic effects | 23.4 mg/m ³ | Indoor use , With LEV | 0.234 |
| | 23.4 mg/m ³ | Indoor use , Without LEV | 0.234 |

1.3.4. Worker exposure: PROC8b, PROC9

| Route of exposure and type of effects | Exposure estimate | Assessment conditions | RCR |
|-------------------------------------------|------------------------|--------------------------|-------|
| Inhalation - Long-term - systemic effects | 23.3 mg/m ³ | Indoor use , With LEV | 1.165 |
| | 23.3 mg/m ³ | Indoor use , Without LEV | 1.165 |
| Inhalation - Acute - systemic effects | 46.7 mg/m ³ | Indoor use , With LEV | 0.467 |
| | 46.7 mg/m ³ | Indoor use , Without LEV | 0.467 |

1.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

1.4.1. Environment

| | |
|------------------------|----------------------------------------------------------------------------|
| Guidance - Environment | Check that RMMs and OCs are as described above or of equivalent efficiency |
|------------------------|----------------------------------------------------------------------------|

1.4.2. Health

| | |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Guidance - Health | Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see : http://www.ecetoc.org/tra |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

End of document