

Phosphorylchlorid**714****SECTION 1. Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : Phosphorylchlorid
SDS Nr : 714
Chemical description : Phosphoryl trichloride
CAS No :10025-87-3
EC No :233-046-7
Index No :015-009-00-5
Registration-No. : Registration deadline not expired.
Chemical formula : POCl₃

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Use for manufacture of electronic/photovoltaic components. Contact supplier for more uses information.

1.3. Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE Deutschland GmbH
Hans-Günther-Sohl-Straße 5
D-40235 Düsseldorf GERMANY
Telefon: +49 (0)211 6699-0 - Fax: +49 (0)211 6699-222
E-Mail address (competent person) : Info.SDB@AirLiquide.de

1.4. Emergency telephone number

Emergency telephone number : +49 (0)2151 398668
- Availability : (24 / 7)

SECTION 2. Hazards identification**2.1. Classification of the substance or mixture****Hazard Class and Category Code(s), Regulation (EC) No 1272/2008 (CLP)**

• Health hazards : Acute toxicity, Oral - Category 4 - Warning - (CLP : Acute Tox. 4) - H302
Acute toxicity, Inhalation - Category 2 - Danger - (CLP : Acute Tox. 2) - H330
Skin corrosion - Category 1A - Danger - (CLP : Skin Corr. 1A) - H314
Specific Target Organ Toxicity - Repeated exposure - Category 1 - Danger - (CLP : STOT RE 1) - H372

Classification EC 67/548 or EC 1999/45

Classification : R14
T+; R26
T; R48/23
Xn; R22
R29
C; R35

2.2. Label elements**Labelling Regulation EC 1272/2008 (CLP)**

• Hazard pictograms



• Hazard pictograms code : GHS06 - GHS05 - GHS08



SAFETY DATA SHEET in accordance with REACH regulation 1907/2006/EC

Page : 2 / 10

Revised edition no : 3 - 00

Date : 6 / 2 / 2013

Supersedes : 30 / 11 / 2010

Phosphorylchlorid

714

SECTION 2. Hazards identification (continued)

- Signal words : Danger
- Hazard statements : H330 - Fatal if inhaled.
H314 - Causes severe skin burns and eye damage.
H302 - Harmful if swallowed.
H372 - Causes damage to organs through prolonged or repeated exposure.
- Supplemental hazard information : Reacts violently with water - (CLP : EUH014)
Contact with water liberates toxic gas - (CLP : EUH029)
- Precautionary statements
 - Prevention : P260 - Do not breathe gas, vapours.
P280 - Wear protective gloves, protective clothing, eye protection, face protection.
 - Response : P304+P340+P315 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice / attention.
P305+P351+P338+P315 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice / attention.
P303+P361+P353+P315 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Get immediate medical advice / attention.
P308+P313 - If exposed or concerned : get medical advice.
 - Storage : P403 - Store in a well-ventilated place.
P405 - Store locked up.

2.3. Other hazards

- Other hazards : Corrosive to respiratory tract.

SECTION 3. Composition/information on ingredients

3.1. Substance / 3.2. Mixture

Substance.

Substance name	Content [Vol-%]	CAS No EC No Index No Registration no.	Classification(DSD)	Classification(CLP)
Phosphoryl trichloride	100 %	10025-87-3 233-046-7 015-009-00-5 *2	R14 T+; R26 T; R48/23 Xn; R22 C; R35	Acute Tox. 1 (H330) Skin Corr. 1A (H314) Acute Tox. 4 (H302) STOT RE 1 (H372)

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

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y

Full text of R-phrases see chapter 16. Full text of H-statements see chapter 16



SAFETY DATA SHEET in accordance with REACH regulation 1907/2006/EC

Page : 3 / 10

Revised edition no : 3 - 00

Date : 6 / 2 / 2013

Supersedes : 30 / 11 / 2010

Phosphorylchlorid

714

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. Apply artificial respiration if breathing stopped.
- Skin contact : For liquid spillage - flush with water for at least 15 minutes. Obtain medical assistance.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Obtain medical assistance.
- Ingestion : If swallowed, rinse mouth with water (only if the person is conscious). Do NOT induce vomiting. Obtain medical assistance.

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

- : Redness, corneal injury, Cough, Shortness of breath, Dizziness, Headache, chest pain, Nausea, Vomiting, Kidney injury may occur., Abdominal pain

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

- : Obtain medical assistance.
Treat with corticosteroid spray as soon as possible after inhalation

SECTION 5. Fire-fighting measures

5.1. Extinguishing media

- Extinguishing media : The product does not burn. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Suitable extinguishing media : Carbon dioxide.
Dry powder.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

- Specific hazards : Water hydrolyzes material liberating acidic gas which in contact with metal surfaces can generate flammable and/or explosive hydrogen gas.
Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : Phosphorus oxides/acids.
Hydrogen chloride.

5.3. Advice for firefighters

- Specific methods : If possible, stop flow of product.
Use fire control measures appropriate to 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.
Use water spray or fog to knock down fire fumes if possible.
- Special protective equipment for fire fighters : In confined space use self-contained breathing apparatus.
Use self-contained breathing apparatus.
Standard EN 137 - self-contained open-circuit compressed air breathing apparatus with full face mask.
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
EN 469: Protective clothing for firefighters. EN 659: Protective gloves for firefighters.

Phosphorylchlorid**714****SECTION 6. Accidental release measures****6.1. Personal precautions, protective equipment and emergency procedures**

- : Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
- Ensure adequate air ventilation.
- Evacuate area.
- Gas tight chemically protective clothing in combination with self contained breathing apparatus.
- Try to stop release.
- Monitor concentration of released product.

6.2. Environmental precautions

- : Into the environment to arrive do not leave.
- Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
- Try to stop release.

6.3. Methods and material for containment and cleaning up

- : Soak up with inert absorbent material and dispose of as hazardous waste. Do not flush with water. Keep in suitable, closed containers for disposal.
- Ventilate area.

6.4. Reference to other sections

- 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**

- : Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Do not smoke while handling product.
- Protect eyes, face and skin from liquid splashes.
- Only experienced and properly instructed persons should handle this substance.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Installation of a cross purge assembly between the cylinder and the regulator is recommended.
- Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.
- The product must be handled in accordance with good industrial hygiene and safety procedures.
- Consider pressure relief device(s) in gas installations.
- Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
- 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.
- Never use direct flame or electrical heating devices to raise the pressure of a container.

7.2. Conditions for safe storage, including any incompatibilities**Storage**

- : Keep under inert gas.
- Keep container tightly closed in a cool, well ventilated place.
- At a place store, which is accessible to only entitled persons.
- Keep away from water. Never allow product to get in contact with water during storage.
- Keep storage area cool (< 40°C), dry, well ventilated and above the freezing point of phosphorus oxychloride.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Stored containers should be periodically checked for general condition and leakage.
- Observe all regulations and local requirements regarding storage of containers.
- Containers should be stored in the vertical position and properly secured to prevent toppling.



SAFETY DATA SHEET in accordance with REACH regulation 1907/2006/EC

Page : 5 / 10

Revised edition no : 3 - 00

Date : 6 / 2 / 2013

Supersedes : 30 / 11 / 2010

Phosphorylchlorid**714**

SECTION 7. Handling and storage (continued)

Container valve guards or caps should be in place.

7.3. Specific end use(s)

: None.

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Occupational Exposure Limits

Phosphoryl trichloride

: AGW (8h) - Germany [mg/m³] TRGS 900 : 1.3

: AGW (8h) - Germany [ppm] TRGS 900 : 0.2

8.2. Exposure controls

8.2.1. Appropriate engineering controls

: Provide adequate general and local exhaust ventilation.
Alarm detectors should be used when toxic gases may be released.
Systems under pressure should be regularly checked for leakages.
Ensure exposure is below occupational exposure limits (where available).
Consider work permit system e.g. for maintenance activities.

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

: Keep self contained breathing apparatus readily available for emergency use.
Wear goggles and a face shield when transfilling or breaking transfer connections
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 goggles and a face shield when transfilling or breaking transfer connections
Use equipment for eye protection tested and approved under appropriate government standards such as EN 166(EU).

• Skin protection

- Hand protection

: Wear chemical resistant protective gloves.
The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.
Splash protection
Material: Nitrile rubber
Minimum layer thickness: 0,4 mm
Break through time: > 30 min
Material tested: Camatril®
data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves.
This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.
Wear working gloves when handling gas containers.
Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
Standard EN 388 - Protective gloves against mechanical risk.

- Other

: Keep suitable chemically resistant protective clothing readily available for emergency use.
Standard EN ISO 14116 - Limited flame spread materials.
Wear safety shoes while handling containers.
Standard EN ISO 20345 Personal protective equipment - Safety footwear.
Standard EN943-1 - Full protective suits against liquid, solid and gaseous chemicals.

Phosphorylchlorid**714****SECTION 8. Exposure controls/personal protection (continued)**

- **Respiratory protection** : Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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 CEN (EU).
Keep self contained breathing apparatus readily available for emergency use.
Gas filters do not protect against oxygen deficiency.
Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known.
Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmosphere.
Standard EN 14387 - gas filter(s), combined filter(s) and full face mask - EN 136.
Consult respiratory device supplier's product information for the selection of the appropriate device.
Standard EN 137 - self-contained open-circuit compressed air breathing apparatus with full face mask.
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
- **Thermal hazards** : None necessary.
- 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** : Liquefied gas.
- Colour** : Colourless.
- Odour** : Pungent.
- Odour threshold** : Odour threshold is subjective and inadequate to warn for overexposure.
- pH value** : 1 bei 20°C
- Molar mass [g/mol]** : 153.33
- Melting point [°C]** : 1.25
- Boiling point [°C]** : 105.8
- Flash point [°C]** : Not applicable.
- Evaporation rate (ether=1)** : Not applicable.
- Flammability range [vol% in air]** : Not applicable.
- Vapour pressure [20°C]** : 36 hPa (mbar)
- Relative density, gas (air=1)** : 5.3 Heavier than air.
- Solubility in water [mg/l]** : Not applicable.
- Partition coefficient n-octanol/water [log Pow]** : Not applicable.
- Viscosity at 20°C [mPa.s]** : Not applicable.
- Explosive Properties** : Not applicable.

9.2. Other information

- Other data** : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.



SAFETY DATA SHEET in accordance with REACH regulation 1907/2006/EC

Page : 7 / 10

Revised edition no : 3 - 00

Date : 6 / 2 / 2013

Supersedes : 30 / 11 / 2010

Phosphorylchlorid**714****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

: Reacts violently with water.

10.4. Conditions to avoid: Heat.
Moisture.**10.5. Incompatible materials**: Alcohol.
Amine.
Metals and humidity.
Acetone.
Strong oxidizers.
Strong bases.
Water.
Moisture.**10.6. Hazardous decomposition products**: Phosphorous oxide.
Hydrogen chloride.**SECTION 11. Toxicological information****11.1. Information on toxicological effects**

- Acute toxicity** : No known toxicological effects from this product.
- Rat inhalation LC50 [ppm/4h]** : 32
- Rat oral LD50 [mg/kg]** : 36
- Skin corrosion/irritation** : Causes severe burns.
- Serious eye damage/irritation** : Causes severe burns.
- Respiratory or skin sensitisation** : No known effects from this product.
- Carcinogenicity** : IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- Germ cell mutagenicity** : No known effects from this product.
- Toxic for reproduction : Fertility** : No known effects from this product.
- Toxic for reproduction : unborn child** : No known effects from this product.
- STOT-single exposure** : Corrosive to respiratory tract.
- STOT-repeated exposure** : May cause damage to organs through prolonged or repeated exposure.
- Aspiration hazard** : No reliable data available.
- Signs and Symptoms of Exposure** :
Redness, corneal injury, Cough, Shortness of breath, Dizziness, Headache, chest pain, Nausea, Vomiting, Kidney injury may occur, Abdominal pain

Phosphorylchlorid**714****SECTION 12. Ecological information****12.1. Toxicity**

: No data available.

12.2. Persistence and degradability

: No data available.

12.3. Bioaccumulative potential

: No data available.

12.4. Mobility in soil

: No data available.

12.5. Results of PBT and vPvB assessment

: No data available.

12.6. Other adverse effects

: May cause pH changes in aqueous ecological systems.

Effect on ozone layer

: None.

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

: Residues and not against-usable solutions a appreciative disposal enterprise supply. Absorb excess liquid spillage on inorganic adsorbent material such as Vermiculite. Place spent adsorbent in sealed packages and contact specialist waste disposal contractor. Contact supplier if guidance is required.
Do not discharge into any place where its accumulation could be dangerous.
Ensure that the emission levels from local regulations or operating permits are not exceeded.

List of hazardous waste

: 16 05 07 - discarded inorganic chemicals consisting of or containing dangerous substances
15 02 02 - absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances

13.2. Additional information

: None.

SECTION 14. Transport information

UN number : 1810

Labelling ADR, IMDG, IATA



: 6.1 : Toxic substances.
8 : Corrosive substance.

Land transport (ADR/RID)

H.I. nr : X668

UN proper shipping name : PHOSPHORUS OXYCHLORIDE

Transport hazard class(es) : 6.1

Classification code : TC3 I



SAFETY DATA SHEET in accordance with REACH regulation 1907/2006/EC

Page : 9 / 10

Revised edition no : 3 - 00

Date : 6 / 2 / 2013

Supersedes : 30 / 11 / 2010

Phosphorylchlorid**714****SECTION 14. Transport information (continued)**

Packing Instruction(s) : P602
Tunnel Restriction : C/D : Passage forbidden through tunnels of category C when carried in tanks. Passage forbidden through tunnels of category D and E.
Environmental hazards : None.

Sea transport (IMDG)

Proper shipping name : PHOSPHORUS OXYCHLORIDE
Class : 6.1
Emergency Schedule (EmS) - Fire : F-A
Emergency Schedule (EmS) - Spillage : S-B
Packing instruction : P602
IMDG-Marine pollutant : No

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA) : PHOSPHORUS OXYCHLORIDE
Class : 6.1
Passenger and Cargo Aircraft : DO NOT LOAD IN PASSENGER AIRCRAFT.
Cargo Aircraft only : FORBIDDEN.

Special precautions for user

: - Ensure there is adequate ventilation.
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 that containers are firmly secured.
- Ensure cylinder 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.
Avoid transport on vehicles where the load space is not separated from the driver's compartment.

SECTION 15. Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****EU legislation**

Seveso directive 96/82/EC : Covered

National legislation

: Ensure all national/local regulations are observed.
- Water hazard class WGK (Germany) : 1 - schwach wassergefährdend
- Other regulations and technical rules : [German regulations]
(not complete) GefahrstoffV, BetriebssicherheitsV, BGR Regel 500 Teil 2.33: Umgang mit Gasen, Technische Regel Gase TRG 280, Technische Regeln Gefährliche Stoffe TRGS 400, 500, 510, 900.

15.2. Chemical safety assessment

: A CSA does not need to be carried out for this product.



**SAFETY DATA SHEET
in accordance with REACH
regulation 1907/2006/EC**

Page : 10 / 10

Revised edition no : 3 - 00

Date : 6 / 2 / 2013

Supersedes : 30 / 11 / 2010

Phosphorylchlorid

714

SECTION 16. Other information

- Indication of changes** : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010
- Training advice** : Users of breathing apparatus must be trained.
Ensure operators understand the toxicity hazard.
Receptacle under pressure.
- List of full text of R-phrases in section 3.** : R14 : Reacts violently with water.
R22 : Harmful if swallowed.
R26 : Very toxic by inhalation.
R35 : Causes severe burns.
R48/23 : Toxic : danger of serious damage to health by prolonged exposure through inhalation.
- List of full text of H-statements in section 3.** : H302 - Harmful if swallowed.
H314 - Causes severe skin burns and eye damage.
H330 - Fatal if inhaled.
H372 - Causes damage to organs through prolonged or repeated exposure.
- Further information** : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
Classification in accordance with calculation methods of regulation (EC) 1272/2008 CLP / (EC) 1999/45 DPD.
- 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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