

Product Safety Information Sheet

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| Format: Dräger-Tubes™ (which are classified as dangerous goods, PG III)_various_P SIS_st_167e.doc | Status: released |

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Trade name: **Dräger-Tubes™** (which are classified as dangerous goods, PG III)
 Part nos. : various

1.2 Use of the substance/preparation:

Detection of gases, measuring of gas concentrations.

1.3 Company/undertaking name:

Dräger Safety AG & Co. KGaA
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1.5 Relevant products:

| Part-No. | Trade Name | Part-No. | Trade Name |
|----------|-------------------------|----------|-----------------------------|
| 8103691 | Benzene 0,25/a | 8103581 | Hydrocarbons 2/a |
| 8101741 | Benzene 15/a | 6728161 | Methyl Acrylate 5/a |
| 8101231 | Benzene 2/a | 3706301 | Methyl Bromide 0,1/a |
| 6728071 | Benzene 5/b | 6728371 | Oil 10/a-P |
| 6728351 | Carbon Disulphide 5/a | 6733031 | Oil Mist 1/a |
| CH29901 | Carbon Monoxide 0.3 %/b | 8103111 | Oil PN |
| CH20601 | Carbon Monoxide 10/b | 6728081 | Oxygen 5 %/B |
| 6733051 | Carbon Monoxide 2/a | 8103261 | Oxygen 5 %/C |
| 6728511 | Carbon Monoxide 5/a-P | CH28301 | Phosgene 0,25/c (10) |
| CH25601 | Carbon Monoxide 5/c | 8103511 | PID-Pre-filter Tube Benzene |
| CH19701 | Carbon Monoxide 8/a | CH28401 | Polytest |
| 8103911 | Chloromethane 10/a | 6733141 | Styrene 10/b |
| 6728861 | Chloroform 2/b | 8103501 | Tetra 0,1/a |
| 8103671 | Cyclohexane 40/a | 6733161 | Xylene 10/a |
| 8103541 | Ethyl Formate 20/a | 6728241 | Ethylene Oxide 25/a |
| 8103681 | Hexane 10/a | CH20201 | Ethyl Acetate 200/a |
| 8103571 | Hydrocarbons 0.1 %/c | | |

2. Hazards identification

2.0 General information:

Dräger-Tubes™ are articles which are not subject to labelling. The requirements of EC regulations 1907/2006 (Reach) and 1272/2008 (GHS/CLP) do not apply to such products. Hence, the information in this Product Safety Information Sheet is purely voluntary!

2.1 Classification: n.a.

“Nature of hazard”: n.a.

“H302”, “H312”, “H332”
 “H314”
 “H318”

2.2 Particular hazards for man and environment:

These products are non-flammable, granulate filled glass tubes. Improper handling, leaks, and/or damage to the tubes may release strong caustic/corrosive and/or irritant/harmful granulate material in solid form. The chemicals and preparations in the detector tubes may cause different irritation, injury or corrosive damage to the skin, eyes, gastrointestinal tract and may cause corrosive damage to the respiratory tract. If the glass tubes are broken, the sharp edges may cause cuts or scratches.

3. Composition/Information on ingredients

3.1 Chemical characterisation (constituent):

not applicable

3.2 Chemical characterisation (preparation):

Dräger-Tubes™ are glass tubes usually containing small amount of inert carrier materials which have been impregnated with different chemicals. In the following table such chemicals are listed; for detailed information about the ingredients in the different tubes please see the Dräger-Tubes™/CMS Handbook.

| EG-No. | CAS-No. | Designation acc. to the EC Regulation | Content* | Unit | GHS-Pictogram | H-Phrases |
|-------------------------------------|-------------------------------------|--|----------|--------------|-----------------|--|
| 215-607-8 232-043-8 232-140-5 | 1333-82-0 7784-01-2 7789-00-6 | Chromium(VI) salts Chromium(VI) Oxide Silver Chromate Potassium Dichromate | <1 | w/w per cent | GHS06, GHS09 | H301, H312, H315, H317, H318, H330, H335, H400, H410 |
| 202-088-8 | 91-66-7 | N,N-Diethylaniline | 0-0.2 | w/w per cent | GHS06, GHS09 | H301, H311, H330, H331, H373, H411 |
| 200-01-8 | 50-00-0 | Formaldehyde | 0-0.5 | w/w per cent | GHS07 | H302, H315, H317, H319, H332, H335, |
| 231-595-7 | 7647-01-0 | Hydrochloric acid | < 9 | w/w per cent | GHS05 | H314, H335 |
| 206-114-9 | 302-01-2 | Hydrazine-Hydrate | 0-1 | w/w per cent | GHS06, GHS09 | H301, H311, H314, H317, H330, H331, H400, H410 |
| 234-740-2 | 12029-98-0 | Iodinepentoxide | 0-0,5 | w/w per cent | GHS07 | H315, H319 |
| 231-596-2 | 13566-03-5 7647-10-1 | Palladium compounds Palladium (II) Sulfat Palladium (II) Chloride | 0-0,5 | w/w per cent | GHS05 | H314 |
| 202-429-0 | 95-53-4 | o-Tolidine | 0-0,0005 | w/w per cent | GHS06, GHS09 | H302, H411 |
| 231-194-7 | 7446-08-4 | Selenium Dioxide | <1 | w/w per cent | GHS06, GHS09 | H330, H331, H373, H400, H410 |
| 231-639-5 | 7664-93-9 | Sulphuric acid | < 9 | w/w per cent | GHS05 | H314, H290 |
| 231-976-8 | 8014-95-7 | Fuming sulphuric acid | < 9 | w/w per cent | GHS05 | H314, H290 |
| 231-728-9 | 7705-07-9 | Titane (III) Chloride | 0-5 | w/w per cent | GHS05 | H314 |
| 202-819-0 | 100-10-7 | 4-Dimethylaminobenzaldehyd | 0-2 | % | ./. | --- |

* based on the gross weight of the Draeger Tube™. -

The information contained in this Product Information Sheet is applicable to the hazardous contents of the Draeger Tubes™.

3.3 Other information:

Dräger-Tubes™ are closed glass tubes which are filled with several preparation layers. The preparation layers are usually fixed by holding and separative elements within the glass tube. Partially the Dräger-Tubes™ contain filled glass ampullas also with reactive liquids.

Substantial ingredients in preparations used for the Dräger-Tubes™:

- inorganic acid,
- inorganic salts, and
- organic chemicals/indicators in small quantities and in concentrations below the limit for marking-requiring in acc. to the German GefStoffV.

Substantial ingredients of the ampullas used in the Dräger-Tubes™:

- inorganic acids,
- organic solvents.

Dräger-Tubes™ contain no ozone-depleting chemicals and no volatile organic chemicals (except special ampoules). During the manufacturing process for the Dräger-Tubes™ (except special calibration procedures) no ozone-depleting chemicals (group I-IV of the Montreal Protocol) were used.

4. First-aid measures

4.1 After inhalation:

If dusts of this product is inhaled, remove person immediately to fresh air. Seek medical attention if symptoms develop or persist.

4.2 After contact with skin:

Wash with plenty of water. Tube contents can be neutralized with lime and water, or rinsed with plenty of water, then treated with polyethylene glycol 400. If irritation persists, get medical advice. Discard any shoes or clothing items that cannot be decontaminated.

4.3 After contact with the eyes:

Immediately flush eyes with plenty of water (for at least 15 minutes), while holding eyelids open. Seek medical advice at once. Danger of corneal clouding.

4.4 After ingestion:

If the material is swallowed, get immediate medical attention or advice. Do not induce vomiting (Danger of perforation!).

4.5 Information for the doctor:

After ingestion there is a danger of the oesophagus and the stomach becoming perforated.

5. Fire-fighting measures

5.1 Suitable extinguishing media:

Dry chemical, carbon dioxide. Adapt extinguishing media to the environment. Materials in the glass tubes are non-flammable. Avoid direct contact of this product with water since this may cause an exothermic reaction.

5.2 Extinguishing media which must not be used for safety reasons:

not checked

5.3 Special exposure hazards arising from substances or preparation itself, combustion products, resulting gases:

Non-Flammable. Thermal decomposition of the tube contents may produce weak amount of harmful, irritant or toxic gases (sulphur oxides, carbon monoxide, etc.). When using water as an extinguishing media, take care of the resulting slight acidic fire-fighting water.

Contents of the tubes are corrosive to the eyes, skin, gastrointestinal tract and may cause irritation to the respiratory tract. Improper handling, leaks, and/or damage to the tube may release caustic granulate material in solid form. From the contents of the tubes small quantities of corrosive or toxic gases could be released by thermal decomposition or burning.

5.4 Special protective equipment for fire-fighters:

Recommendation: Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

6. Accidental release measures

6.1 Personal precautions:

Do not inhale released vapour, fumes, or dusts from the spilled material. Do not allow spilled materials to contact eyes or skin, use protective gloves (e.g. PE/PP, Latex, rubber) resistant against acidic materials and safety goggles. Isolate area. Keep unnecessary personnel away. Use dust mask with P2/FFP2 filters.

6.2 Environmental precautions:

Block any potential routes to water systems. Do not discharge into the sewer system. Do not allow to enter drains/surface water/groundwater.

6.3 Methods for cleaning up:

Sweep up dry while avoiding formation of dusts. Do not pick up glass with bare hands. Dilute tube contents with water and baking soda. Shovel material into appropriate container for disposal. Thoroughly wash the area with water after a spill or leak clean-up. Sweep up or scrape broken tubes into container for disposal.

6.4 Additional information:

Follow all Local, State, Federal and Provincial regulations for disposal.

7. Handling and storage

7.1 Handling:

Precautions for safety handling:

Observe the Instructions for Use.

Information for protection against fire and explosion:

These products are non-flammable.

7.2 Storage:

Requirements for storage and containers:

Keep containers tightly closed and dry. Do not store at temperatures exceeding 77°F (25°C).

Handling according to the Instructions for Use. Store the product in the original packaging. The expiry date on the packaging must be considered.

Information on storage together with other materials:

Observe VCI-concept for storing chemicals.

Further information on storage conditions:

Contents are corrosive. Avoid contact with water. Open tubes should be stored in the container in a well ventilated area until they are disposed of.

Storage class:

LGK 8 (recommendation) (VCI-Concept)

7.3 Certain application:

n/a

8. Exposure controls/Personal protection

8.1 Components with exposure limit values:

Some, in relation to the chemicals in the tubes (see Section 2). But with normal handling of the Dräger-Tubes™ there should be no exposure to contents. However, if exposure does occur, follow the national exposure limits for the relevant chemicals. For detailed information about the ingredients in the different tubes, please see the Dräger-Tubes™ -/CMS Handbook.

| EC, Land | CAS-No. | Description of material | Type | Content | Unit |
|----------|-----------|--|---------------------|--------------------------------------|-------------------|
| D | 7664-93-9 | Sulphuric acid | MAK | 0,1 E** | mg/m ³ |
| UK | 7664-93-9 | Sulphuric acid | TLV | [1] | mg/m ³ |
| EU | 7664-93-9 | Sulphuric acid | TLV | 0,05 | mg/m ³ |
| D | n/a | Chromium(VI) compounds | TRK | ./. | ./. |
| D/EU/UK | 1333-82-0 | Chromium trioxide | EU | Carc. Cat 1 / S | ./. |
| D/EU/UK | 7778-50-9 | Potassium dichromate | EU | Carc. Cat 1 / Muta. Cat. 2 / S | |
| | | E = inhalable fraction | MAK = German TLV | | |
| | | Carc. Cat 1 = Carcinogen to human body | | | |
| | | Carc. Cat 2 = Carcinogen to human body is possible. | | | |
| | | Muta. Cat 2 = Reproductive toxic to human body is possible. | | | |
| | | S = Hazard of sensitization | | | |

8.2 Exposure controls:

8.2.1 Occupational exposure controls:

General protection and hygiene measures:

With normal handling of the Dräger-Tubes™ there should be no exposure to contents. However, if exposure does occur, follow the exposure limits.

Use good industrial hygiene practice.

Personal protection:

8.2.1.1 Respiratory protection:

Not necessary when handled according to the Instructions for use.

8.2.1.2 Hand protection:

With normal handling of the Dräger-Tubes™ there should be no exposure to contents. In case of accidents use suitable protective gloves made from PE/ PP, Latex, butyl or nitrile rubber. Please observe the glove manufacturers instructions on permeability and rupture times as well as the specific workplace conditions.

8.2.1.3 Eye protection:

Not necessary when handled according to the Instructions for use.

Recommendation: Wear safety glasses with side shields.

8.2.1.4 Skin protection:

Prophylactic skin protection is recommended. Wash thoroughly after handling. Skin care.

8.2.2 Additional information on plant design:

Handling according to the Instructions for Use.

9. Physical and chemical properties

9.1 General information:

Form: Glass tubes containing colourless and/or coloured solids.
 Colour: various
 Odour: slightly pungent/odourless

9.2 Important information about the protection of health, safety and the environment:

Method (67/548/EEC):

| | |
|-----------------------|-----------------------|
| Solubility: | n/a |
| pH-value: | n/a (acidic reaction) |
| Boiling point: | n/a |
| Melting point: | n/a |
| Flame point: | n/a |
| Inflameability: | n/a |
| Explosion limits: | |
| lower: | n/a |
| upper: | n/a |
| Ignition temperature: | n/a |
| Vapour pressure: | n/a |
| Mass density: | n/a |
| Further information: | n/a |

9.3 Other information

n/a

10. Stability and reactivity

General information:

Stable under normal conditions and appropriate commerce.

10.1 Conditions to avoid:

Do not mix other substances with contents of tubes. Avoid contact with water. Stable under normal conditions. Hazardous polymerisation will not occur. Do not store above 25°C (77°F).

10.2 Materials to avoid:

Tubes contents react with bases. Possibility of an exothermic reaction.

10.3 Hazardous decomposition products:

Decomposition of the granulate in the tubes may produce toxic substances (e.g. sulphur oxides).

Possibility of a dangerous exothermic reaction:

Avoid contact with bases/water, tube contents may react with bases and water in an exothermic reaction.

Dangerous products of decomposition at contact with water:

Acids and solutions of (heavy) metal salts

10.4 Further information:

n/a

11. Toxicological information

11.1 Toxicity tests:

Classification-relevant LD/LC₅₀-values: No toxicity data are available for the contents of the tubes (carrier materials impregnated with different chemicals!).

11.1.1 Specific symptoms in animal studies:

No data are available.

11.1.2 Irritant/corrosive effects:

Irritant and corrosive effects of the contents of the tubes cannot be excluded.

11.1.3 Sensitization:

Sensitisation effects of the contents of the tubes cannot be excluded.

11.1.4 Subacute and chronic toxicity:

Experiments: No data are available.

Species: No data are available.

11.1.5 Carcinogenic, mutagenic and reproductive toxic effects:

No data are available. See Section 11.3

11.1.6 Further information:

For detailed information about the ingredients in the different tubes and their hazards, please see the Dräger-Tubes™-/CMS Handbook and section 2.

11.2 Effects on human body/Experiments made in practice:

after inhalation:

Inhalation of dusts from the tube contents would cause irritation or injury to the respiratory system.

after ingestion:

Product contents would be harmful or fatal if swallowed. This product produces corrosive damage to the gastrointestinal tract if swallowed.

after eye contact:

Eye contact with contents of the tubes causes corrosive damage with irritation, and possible eye injury.

after skin contact:

Skin contact with the contents of the tubes may cause corrosive damage with irritation.

11.3 Additional toxicological information:

The toxicity of the impregnated carrier material contained in the tubes has not been tested in detail. With respect to the chemicals used for the impregnation these material should be handled in the same way as the pure chemicals. They may cause sensitisation, irritation or injury to the skin, eyes and mucous membrane. Carcinogenic, mutagenic and reproductive toxic effects can not be excluded, because some of the impregnation chemicals in pure form are classified accordingly.

Further information:

If the glass tube is broken, the sharp edges may cause cuts or scratches.

12. Ecological information

12.1 Ecotoxicity:

No ecotoxicity data are available for the preparations/components in the Dräger-Tubes™.

12.2 Mobility:

No data are available

12.3 Persistence and degradability:

Biological decompositionability:
 Behaviour in purification plants:

No data are available
 No data are available

12.4 Bioaccumulative potential:

No data are available

12.5 Other adverse effects:

No data are available

12.6 Additional information:

Dräger-Tubes™ themselves and also the chemical preparations/components in the tubes shouldn't be released into water because the chemicals on the carrier material could be dissolved and then contaminate the water. Normally water extracts from the impregnated carrier materials have a low pH-value and contain small amounts of the chemicals used for impregnation. So, it would be expected to produce ecotoxicity upon exposure to aquatic organisms and aquatic systems. Dräger-Tubes™ themselves and the chemical preparations/components in the tubes are not expected to accumulate in the food chain.

13. Disposal considerations

13.1 Product (recommendations):

If discarded, wastes may be classified as corrosive waste or reactive waste. Do not allow this material to drain into sewers/water supplies. Waste must be handled in accordance with all federal, state, provincial, and local regulations. Dräger-Tubes™ must be disposed in accordance with local waste disposal regulations. If discarded, wastes may be classified as hazardous waste.

European waste code:

17 02 04*

Waste designation:

Glass, plastic and wood containing or contaminated with dangerous substances.

Obligation to prove correct disposal:

yes

13.2 Not cleaned packaging material (recommendations):

The disposal of plastic containers and cardboard packages is possible by waste code 15 01 02, and fibre board boxes by waste code 15 01 01.

14. Transport information

14.1 Road transport ADR/RID and GGVSE (cross-border/domestic):

| | | | | | |
|----------|--|--------|---|----------------------|-----|
| UN-No.: | 3260 | Class: | 8 | Packing group: | III |
| Name: | Corrosive solid, acidic, inorganic, n.o.s. (Sulphuric acid, mixt.) | | | Classification code: | C2 |
| Remarks: | - | | | | |

14.2 Marine transport IMDG-Code/GGVSee:

| | | | | | |
|-------------------|----------|-------------------------|--|----------------|-----|
| UN-No. | 3260 | Correct technical name: | Corrosive solid, acidic, inorganic, n.o.s. (Sulphuric acid, mixt.) | | |
| Class: | 8 | Sub risk: | ./. | Packing group: | III |
| EmS-No.: | F-A, S-B | | | MFAG: | ./. |
| Marine pollutant: | ./. | | | | |
| Remarks: | - | | | | |

14.3 Air transport ICAO-TI und IATA-DGR:

| | | | | | |
|----------|------|-----------------------|--|-----|-----|
| UN-No. | 3260 | Proper shipping Name: | Corrosive solid, acidic, inorganic, n.o.s. (Sulphuric acid, mixt.) | | |
| Class | 8 | Sub risk: | ./. | PG: | III |
| Remarks: | - | | | | |

14.4 Transport/further information:

May be sent by post.

15. Regulatory information

15.1 Labelling according to EC Regulations:

Hazardous symbols and indicators of danger for dangerous substances and preparations: No labelling necessary.
Hazardous components to be indicated on label: contains: n/a

H-Phrases:

n/a

P-Phrases (recommendation):

P102 Keep out of reach of children.

P302+P352 IF ON SKIN: Wash with plenty of water.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308+P313 IF exposed or concerned: Get medical advice/attention.

15.2 National regulations:

Additional classification acc. to GefStoffV Annex II No. (only if differing from EC classification): n/a

Restrictions of occupation: n/a

Statutory order on hazardous incidents: n/a

Water pollution class: 2 (self-classification)

Information according 1999/13/EC about limitation of emissions of volatile organic compounds (VOC-guideline):

Further regulations, restrictions, and prohibition regulation:

(such as principles of industrial medicine and health and safety regulations)

Instruction Sheet BG-Chemie (Chemical Professional Association):

Other state regulations may apply. Check individual state requirements.

16. Other information

Use of the substance / preparation:

See section 1.2; additional information in the Instructions for Use.

Relevant H-Phrases:

| | |
|------|--|
| H290 | May be corrosive to metals |
| H301 | Toxic if swallowed. |
| H302 | Harmful if swallowed. |
| H311 | Toxic in contact with skin. |
| H312 | Harmful in contact with skin. |
| H314 | Causes severe skin burns and eye damage. |
| H315 | Causes skin irritation. |
| H317 | May cause an allergic skin reaction. |
| H318 | Causes serious eye damage. |
| H319 | Causes serious eye irritation. |
| H330 | Fatal if inhaled. |
| H331 | Toxic if inhaled. |
| H332 | Harmful if inhaled. |
| H335 | May cause respiratory irritation. |
| H373 | May cause damage to organs through prolonged or repeated exposure. |
| H400 | Very toxic to aquatic life. |
| H410 | Very toxic to aquatic life with long lasting effects. |
| H411 | Toxic to aquatic life with long lasting effects. |

Comments:

| | |
|-----------------|---|
| n. a.; n/a; ./. | not applicable |
| MAC: | Maximum allowable concentration |
| COD: | Chemical oxygen demand |
| BOD: | Biochemical oxygen demand |
| EWL: | European waste list |
| EU | European Union |
| VOC: | Volatile organic compounds |
| VCI: | Verband der Chemischen Industrie e.V. (Association of the German chemical industry) |
| WGK: | German water hazard class |

Further information:

The above information represents our current state of experience and describes the product only with respect to safety requirements. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. It is the responsibility of the customer to test whether the product is suitable for the purpose intended by the customer.

Any questions of warranty and liability for this product are subject to our General Terms and Conditions unless legislation imperatively provides otherwise.

Product information sheet issued by: Global EHS Management
Contact: Dr. Michaela Schatz, michaela.schatz@draeger.com

Changes to preceding version: changes in section 1.