

Material Safety Data Sheet

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 Format: Dräger-Tubes™ (which are classified as dangerous goods, PG II)_various (see section 1.5)_st_166e_28.1.2005.doc according to the EC Directive 91/155/EEC 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 II)**
 Part nos. : various (see section 1.5)

1.2 Use of the substance/preparation:

Detection of gases, measuring of gas concentrations, air current detection.

1.3 Company/undertaking name:

Dräger Safety AG & Co. KGaA
 Revalstr. 1
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1.5 Relevant products:

Part-No.	Trade Name	Part-No.	Trade Name
CH 00216	Air Current Detector Tube	CH 25301	Air Current Tubes
CH 20001	Natural gas Test	67 28 051	Ethylene 50/a

2. Composition/Information on ingredients

2.1 Chemical characterisation (constituent):

not applicable

2.2 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.

EINECS / ELINCS-No.	CAS-No.	Designation acc. to the EC Directive	Content*	Unit	Symbol	R-Phrases
234-740-2	12029-98-0	Iodinepentoxide	0-0.01	w/w per cent	Xi	8-36/38
231-760-3	772-64-7	Potassium permanaganate	0-0.2	w/w per cent	Xn, N	8-22-50/53
n/a	n/a	Sulphuric acid/fuming sulphuric acid	0-15	w/w per cent	C	14-35-37

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

The information contained in this MSDS is applicable to the hazardous contents of the Draeger Tube™.

2.3 Other information:

Dräger-Tubes™ are articles which are not subject to labelling. The requirements of EC directive 91/155/ECC do not apply to such products. Hence, the information in this Material Safety Data Sheet is purely voluntary!

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. .
 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 labelling-requirements in acc. to the German GefStoffV.

Dräger-Tubes™ contain no ozone-depleting chemicals and no volatile organic chemicals. 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.

3. Hazards identification

3.1 Classification:

Nature of hazard:	C, corrosive	
	R 20/21/22	Harmful by inhalation, in contact with skin and if swallowed.
	R 35	Causes severe burns.
	R 41	Risk of serious damage to eyes.

3.2 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.

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 causes 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, ...). 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 corrosive damage 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 Instruction 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 Exposure limit values:

Only one, 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
		E = inhalable fraction			

8.2 Exposure controls:

Additional information on plant design:

Handling according to the Instructions for Use.

8.2.1 Occupational exposure controls:

General protection and hygiene measures:
 Do not inhale vapour/aerosol and avoid skin/eye contact.

Personal protection:

- 8.2.1.1 Respiratory protection:
 Not necessary when handled according to the Instruction 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 Environmental exposure controls:
 n/a

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 (strong 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 a strong 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 a strong exothermic reaction.
Dangerous products of decomposition at contact with water:	Acids and solutions of iodine- and manganese compounds

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 strong corrosive effects of the contents of the tubes cannot be excluded.

11.1.3 Sensitization:
 No data available.

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 11.4

11.1.6 Further information:
 For detailed informations 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 causes 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 causes corrosive damage with irritation.

11.3 Additional toxicological information:
 The toxicity of the impregnated carrier material contained in the 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 con 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: No data are available
 Behaviour in purification plants: 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. Prior to disposal, carefully dilute tube contents with water. Add baking soda to neutralise acidity. 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 of in accordance with local waste disposal regulations. If discarded, wastes may be classified as hazardous waste. Applicable "waste numbers" (federal, state, provincial, and local) for this products or their components have not been checked in detail.

Waste category:	EWL (European waste list):	170204*
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 flexible packages is possible by EWL 150102, and fibre board boxes by EWL 150101.

14. Transport information

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

UN-No.:	3260	Class:	8	Packing group:	II
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:	II
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:	II
Remarks:					

14.4 Transport/further information:

./.

15. Regulatory information

15.1 Labelling according to EC Directive:

Hazardous symbols and indicators of danger for dangerous substances and preparations:

No labelling necessary

Hazardous components to be indicated on label: contains: n/a

R-Phrases:

n/a

S-Phrases:

S 2 Keep out of the reach of children.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 30 Never add water to this product.

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: 1 (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

Relevant R-Phrases:

R 8 Contact with combustible material may cause fire.

R 14 Reacts violently with water.

R 22 Harmful if swallowed.

R 35 Causes severe burns.

R 36/38 Irritating to eyes and skin.

R 37 Irritating to respiratory system.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Comments:

n/a, /.: not applicable

MAC: Maximum allowable concentration

COD: Chemical oxygen demand

BOD: Biochemical oxygen demand

EWL: European waste list

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.

Data sheet issued by: ag-cas Contact: Dr. H-Chr. Bechthold

Changes to preceding version: New format.