


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

- **1.1 Product identifier**
 - Trade name: **PEROXAN A-50 M**
- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
 - No further relevant information available.
- **Application of the substance / the mixture**
 - Reaction initiator
 - For industrial use
- **1.3 Details of the supplier of the safety data sheet**
 - **Manufacturer/Supplier:** PERGAN GmbH
Hilfsstoffe für industrielle Prozesse
Schlavenhorst 71
D-46395 Bocholt
Tel: +49 2871 9902-0
Fax: +49 2871 9902-50
- **Further information obtainable from:**
 - Environment protection / Security of labour
 - Competent person:
* Sales Manager Germany: Mr. Ansgar Pappenheim, e-mail: a.pappenheim@pergan.com
* Export Sales Manager: Mr. Dr. Thomas Philipps, e-mail: dr.philipps@pergan.com
* Environment protection / : Mr. Christoph Wilting, e-mail: c.wilting@pergan.com
Security of labour
- **1.4 Emergency telephone number:**
 - Tel: +49 2871 9902-0

SECTION 2: Hazards identification

- **2.1 Classification of the substance or mixture**
 - **Classification according to Regulation (EC) No 1272/2008**
 - Flam. Liq. 3 H226 Flammable liquid and vapour.
 - Org. Perox. CD H242 Heating may cause a fire.
 - Acute Tox. 4 H332 Harmful if inhaled.
 - Skin Corr. 1C H314 Causes severe skin burns and eye damage.
 - Eye Dam. 1 H318 Causes serious eye damage.
 - Skin Sens. 1 H317 May cause an allergic skin reaction.
 - Muta. 2 H341 Suspected of causing genetic defects.
 - STOT SE 3 H335 May cause respiratory irritation.
 - Aquatic Chronic 3 H412 Harmful to aquatic life with long lasting effects.
- **2.2 Label elements**
 - **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.
 - **Hazard pictograms**

GHS02 GHS05 GHS07 GHS08
 - **Signal word**
Danger
 - **Hazard-determining components of labelling:**
tert-butyl hydroperoxide
2,4-Pentanedione, peroxide
4-hydroxy-4-methylpentan-2-one
pentane-2,4-dione
 - **Hazard statements**
H226 Flammable liquid and vapour.
H242 Heating may cause a fire.
H332 Harmful if inhaled.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H341 Suspected of causing genetic defects.
H335 May cause respiratory irritation.
H412 Harmful to aquatic life with long lasting effects.
 - **Precautionary statements**
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220 Keep away from dirt, rust, chemicals in particular concentrated acids, alkalis and accelerators (e. g. heavy metal compounds and amines).
P234 Keep only in original container.
P243 Take precautionary measures against static discharge.
P264 Wash thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

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P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor.
P405	Store locked up.
P410	Protect from sunlight.
P411+P235	Store at temperatures not exceeding +25°C. Keep cool.
P420	Do not mix with peroxide-accelerators or reducing agents.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards

Results of PBT and vPvB assessment

- **PBT:** Not applicable.
- **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

3.2 Chemical characterisation: Mixtures

Dangerous components:

CAS: 123-42-2 EINECS: 204-626-7 Index number: 603-016-00-1 Reg-No.:01-2119473975-21	4-hydroxy-4-methylpentan-2-one Flam. Liq. 3, H226; Eye Irrit. 2, H319; STOT SE 3, H335	40-50%
CAS: 37187-22-7 EINECS: 253-384-9	2,4-Pentanedione, peroxide Org. Perox. CD, H242; Eye Irrit. 2, H319; Skin Sens. 1, H317	20-25%
CAS: 75-91-2 EINECS: 200-915-7 Reg-No.:01-2119446670-40	tert-butyl hydroperoxide Flam. Liq. 3, H226; Org. Perox. CD, H242; Acute Tox. 3, H311; Acute Tox. 2, H330; Muta. 2, H341; Skin Corr. 1C, H314; Eye Dam. 1, H318; Aquatic Chronic 2, H411; Acute Tox. 4, H302; Skin Sens. 1A, H317	5-10%
CAS: 123-54-6 EINECS: 204-634-0 Index number: 606-029-00-0 Reg-No.:01-2119458968-15	pentane-2,4-dione Flam. Liq. 3, H226; Acute Tox. 3, H311; Acute Tox. 3, H331; Acute Tox. 4, H302	1.0-2.5%
CAS: 7722-84-1 EINECS: 231-765-0 Index number: 008-003-00-9 Reg-No.:01-2119485845-22	hydrogen peroxide solution Ox. Liq. 1, H271; Skin Corr. 1A, H314; Acute Tox. 4, H302; Acute Tox. 4, H332	1.0-2.5%

- **Additional information:** For the wording of the listed risk phrases refer to section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

- **General information:** Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.



Take care of personal protection for the first aider.

- **After inhalation:** Supply fresh air and to be sure call for a doctor.
In case of unconsciousness place patient stably in side position for transportation.
Take affected persons into fresh air and keep quiet.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
Immediately remove contaminated clothing.
- **After eye contact:** Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
- **After swallowing:** If symptoms persist consult doctor.

4.2 Most important symptoms and effects, both acute and delayed

No further relevant information available.

4.3 Indication of any immediate medical attention and special treatment needed

No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- **Suitable extinguishing agents:** CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

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- **5.2 Special hazards arising from the substance or mixture** Under certain fire conditions, traces of other toxic gases cannot be excluded. Hydrocarbons, carbon dioxide and -monoxid.
- **5.3 Advice for firefighters**
- **Protective equipment:** Mouth respiratory protective device. Do not inhale explosion gases or combustion gases.
- **Additional information** Cool endangered receptacles with water spray. Self-protection first!

SECTION 6: Accidental release measures


- **6.1 Personal precautions, protective equipment and emergency procedures** Keep away from ignition sources. In case of further temperature should be cooled with waterspray from a safe distance. Wear breathing apparatus with filter A during decomposition of materials. Wear protective equipment. Keep unprotected persons away.
- **6.2 Environmental precautions:** Inform respective authorities in case of seepage into water course or sewage system.



Do not allow to enter sewers/ surface or ground water.
- **6.3 Methods and material for containment and cleaning up:** Dispose contaminated material as waste according to item 13. Ensure adequate ventilation. Large quantities should be diluted with suitable desensitization agent to a concentration below 10 % before disposal. Soak up with absorbant material (e. g. Vermiculit) and dispose of in accordance with government regulations.
- **6.4 Reference to other sections** See Section 7 for information on safe handling. See Section 8 for information on personal protection equipment. See Section 13 for disposal information. In case of large spillage the environmental authority should be informed.

SECTION 7: Handling and storage

- **7.1 Precautions for safe handling**
 - Keep receptacles tightly sealed.
 - Store in cool, dry place in tightly closed receptacles.
 - Keep away from heat and direct sunlight.
 - Ensure good ventilation/exhaustion at the workplace.
 - Open and handle receptacle with care.
 - Prevent formation of aerosols.
 - Wear suitable respiratory protective device when decanting larger quantities without extractor facilities.
 - Do not refill residue into storage receptacles.
 - Restrict the quantity stored at the work place.
 - Use only in well ventilated areas.
 - Before break and at the end of work hands should be thoroughly washed.
 - Only use tools made of suitable materials (e. g. polyethylene or stainless steel).
 - Keep away from dirt, rust, chemicals in particular concentrated acids, alkalis and accelerators (e. g. heavy-metal compounds and amines).
 - Oxidizing because of releasing oxygene.
 - Avoid contact with skin and eyes.
 - While using do not eat, drink or smoke.
 - Do not generate flames or sparks.
 - Keep product and emptied container away from heat and sources of ignition.
 - Avoid shock and friction.
 - Take precautionary measures against static discharges.



Do not smoke.
- **Information about fire - and explosion protection:**
 - Protect from heat.
 - Protect against electrostatic charges.
 - Prevent impact and friction.
 - Use explosion-proof apparatus / fittings and spark-proof tools.
 - Fumes can combine with air to form an explosive mixture.

Wear shoes with conductive soles.

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Formation of flammable or explosive gas/air-mixtures is possible.

Avoid open flames, sparks, direct sunlight and other sources of ignition.

Keep ignition sources away - Do not smoke.

7.2 Conditions for safe storage, including any incompatibilities

- **Storage:** Pay attention to the special requirements of your local authorities for storing dangerous goods.
- **Requirements to be met by storerooms and receptacles:**
 - Store in a cool location.
 - Store only in the original receptacle.
 - Prevent any seepage into the ground.
 - Use only receptacles specifically permitted for this substance/product.
- **Information about storage in one common storage facility:** Do not store or park organic peroxide together with heavy metal compounds and amines. Store away from foodstuffs, drinks and feeding stuffs.
- **Further information about storage conditions:**
 - Keep container tightly sealed.
 - Store in cool, dry conditions in well sealed receptacles.
 - Protect from heat and direct sunlight.
 - Protect from contamination.
 - Store in a cool place.
- **Recommended storage temperature (To maintain quality):** +5 +25 °C
- **Storage class:** 5.2
- **7.3 Specific end use(s):** No further relevant information available.

SECTION 8: Exposure controls/personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.
- **8.1 Control parameters**

Ingredients with limit values that require monitoring at the workplace:

123-42-2 4-hydroxy-4-methylpentan-2-one

WEL (Great Britain) Short-term value: 362 mg/m³, 75 ppm
Long-term value: 241 mg/m³, 50 ppm

7722-84-1 hydrogen peroxide solution

WEL (Great Britain) Short-term value: 2.8 mg/m³, 2 ppm
Long-term value: 1.4 mg/m³, 1 ppm

DNELs

123-42-2 4-hydroxy-4-methylpentan-2-one

Dermal	DNEL Longterm System	9.4 mg/kg bw/day (Worker)
Inhalative	DNEL Longterm System	66.4 mg/m ³ (Worker)

75-91-2 tert-butyl hydroperoxide

Oral	DNEL Longterm System	0.26 mg/kg bw/day (Comsumer)
Dermal	DNEL Longterm System	12.5 mg/kg bw/day (Worker)
		7.5 mg/kg bw/day (Comsumer)
Inhalative	DNEL Acute Local	21.3 mg/m ³ (Worker)
		12.8 mg/m ³ (Comsumer)
	DNEL Acute Systemic	10.4 mg/m ³ (Worker)
		3.2 mg/m ³ (Comsumer)
	DNEL Longterm Local	0.83 mg/m ³ (Worker)
	0.75 mg/m ³ (Comsumer)	
	DNEL Longterm System	3.1 mg/m ³ (Worker)
		0.91 mg/m ³ (Comsumer)

123-54-6 pentane-2,4-dione

Oral	DNEL Longterm System	8.4 mg/kg bw/day (General population)
Dermal	DNEL Longterm System	12 mg/kg bw/day (Worker)
		8.4 mg/kg bw/day (General population)
Inhalative	DNEL Longterm System	84 mg/m ³ (Worker)
		24.7 mg/m ³ (General population)

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7722-84-1 hydrogen peroxide solution		
Inhalative	DNEL Acute Local	3 mg/m ³ (Worker) 1.93 mg/m ³ (General population)
	DNEL Longterm Local	1.4 mg/m ³ (Worker) 0.21 mg/m ³ (General population)
· PNECs		
123-42-2 4-hydroxy-4-methylpentan-2-one		
PNEC Freshwater		2 mg/l (AF 50)
PNEC Freshwater sed		9.06 mg/kg sed dw (-)
PNEC Marinewater		0.2 mg/l (AF 500)
PNEC Marinewater sed		0.91 mg/kg sed dw (-)
PNEC STP		82 mg/l (AF 10)
PNEC Soil		0.63 mg/kg soil dw (-)
75-91-2 tert-butyl hydroperoxide		
PNEC Freshwater		0.0015 mg/l (AF 1.000)
PNEC Freshwater sed		0.00621 mg/kg sed dw (-)
PNEC Seawater		0.00015 mg/l (AF 10.000)
PNEC Soil		0.00036 mg/kg soil dw (-)
PNEC Water		0.015 mg/l (AF 100)
123-54-6 pentane-2,4-dione		
PNEC Freshwater		0.026 mg/l (-)
PNEC Freshwater sed		0.155 mg/kg sed dw (-)
PNEC Marinewater		0.0026 mg/l (-)
PNEC Marinewater sed		0.0155 mg/kg sed dw (-)
PNEC STP		1.32 mg/l (-)
PNEC Soil		0.0158 mg/kg soil dw (-)
7722-84-1 hydrogen peroxide solution		
PNEC Freshwater		0.0126 mg/l (-)
PNEC Freshwater sed		0.047 mg/kg sed dw (-)
PNEC Marinewater sed		0.047 mg/kg sed dw (-)
PNEC STP		4.66 mg/l (-)
PNEC Soil		0.0023 mg/kg soil dw (-)

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

· **8.2 Exposure controls**

· **Personal protective equipment:**

· **General protective and hygienic measures:**

The usual precautionary measures are to be adhered to when handling chemicals.
 Keep away from foodstuffs, beverages and feed.
 Immediately remove all soiled and contaminated clothing
 Wash hands before breaks and at the end of work.
 Store protective clothing separately.
 Do not inhale gases / fumes / aerosols.
 Avoid close or long term contact with the skin.
 Avoid contact with the eyes and skin.
 Do not eat, drink, smoke or sniff while working.
 Use skin protection cream for skin protection.
 Be sure to clean skin thoroughly after work and before breaks.

· **Respiratory protection:**

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
 Use suitable respiratory device when it exceed exposure limit and when insufficiently ventilated.



Filter A2

· **Protection of hands:**

Only use chemical-protective gloves with CE-labelling of category III.



Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

Protective gloves

· **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
 Butyl rubber, BR
 Fluorocarbon rubber (Viton)
 Nitrile rubber, NBR
 Neoprene

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· **Penetration time of glove material**

The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.

· **Eye protection:**



Tightly sealed goggles

· **Body protection:**

Protective work clothing

SECTION 9: Physical and chemical properties

· 9.1 Information on basic physical and chemical properties	
· General Information	
· Appearance:	
· Form:	Fluid
· Colour:	Colourless
· Odour:	Characteristic
· Odour threshold:	Not determined.
· pH-value:	Not determined.
· Change in condition	
· Melting point/Melting range:	Not applicable.
· Boiling point/Boiling range:	Not applicable.
· Flash point:	60 °C
· Flammability (solid, gaseous):	Not applicable.
· Decomposition temperature:	> +60 °C (SADT)
· Self-igniting:	Product is not selfigniting.
· Danger of explosion:	Product is not explosive. However, formation of explosive air/vapour mixtures are possible.
· Explosion limits:	
· Lower:	Not determined.
· Upper:	Not determined.
· Vapour pressure:	Not determined.
· Density at 20 °C:	1.07 g/cm ³
· Relative density	Not determined.
· Vapour density	Not determined.
· Evaporation rate	Not determined.
· Solubility in / Miscibility with	
· water:	Undetermined.
· Partition coefficient (n-octanol/water): not determined	
· Viscosity:	
· Dynamic at 20 °C:	28 mPas
· Kinematic:	Not determined.
· 9.2 Other information	No further relevant information available.
· Active oxygen	5.1 - 5.3 %

SECTION 10: Stability and reactivity

· 10.1 Reactivity	No further relevant information available.
· 10.2 Chemical stability	
· Thermal decomposition / conditions to be avoided:	SADT (Self Accelerating Decomposition Temperature) is the lowest temperature at which self accelerating decomposition may occur with substance in the packaging as used in transport. A dangerous self-accelerating decomposition reaction and, under certain circumstances, explosion or fire can be cause decomposition at and above the temperature. Contact with incompatible substances can cause decomposition at or below the SADT. No decomposition if used and stored according to specifications. To avoid thermal decomposition do not overheat.
· 10.3 Possibility of hazardous reactions	Self-accelerating decomposition at SADT.
· 10.4 Conditions to avoid	No further relevant information available.

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- **10.5 Incompatible materials:** Rapid decomposition by dirt, rust, chemicals in particular concentrated acids, alkalis and accelerators (e. g. heavy-metal compounds and amines).
- **10.6 Hazardous decomposition products:** Hydrocarbons, carbon dioxide and -monoxid.
No hazardous decomposition products if used and stored according to specifications.
- **Additional information:** Emergency procedures will vary depending on conditions. The customer should have an emergency response plane in place.

SECTION 11: Toxicological information

- **11.1 Information on toxicological effects**
- **Acute toxicity** Harmful if inhaled.

· **LD/LC50 values relevant for classification:**

123-42-2 4-hydroxy-4-methylpentan-2-one

Oral	LD50	2520 mg/kg (rattus)
Dermal	LD50	13630 mg/kg (cuniculosus)

37187-22-7 2,4-Pentanedione, peroxide

Oral	LD50	>2000 mg/kg (rattus)
Dermal	LD0	>2000 mg/kg (rattus)

75-91-2 tert-butyl hydroperoxide

Oral	LD50	560 mg/kg (rattus)
Dermal	LD50	628 mg/kg (cuniculosus)
Inhalative	LC50 / 4h	1.85 mg/l (rattus)

123-54-6 pentane-2,4-dione

Oral	LD50	575 mg/kg (rattus)
Dermal	LD50	790 mg/kg (rattus)
Inhalative	LC50 / 4h	5.1 mg/l (rattus)

7722-84-1 hydrogen peroxide solution

Oral	LD50	800 mg/kg (rattus)
Dermal	LD50	6500 mg/kg (cuniculosus)

- **Primary irritant effect:**
- **Skin corrosion/irritation** Causes severe skin burns and eye damage.
- **Serious eye damage/irritation** Causes serious eye damage.
- **Respiratory or skin sensitisation** May cause an allergic skin reaction.
- **CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)**
- **Germ cell mutagenicity** Suspected of causing genetic defects.
- **Carcinogenicity** Based on available data, the classification criteria are not met.
- **Reproductive toxicity** Based on available data, the classification criteria are not met.
- **STOT-single exposure** May cause respiratory irritation.
- **STOT-repeated exposure** Based on available data, the classification criteria are not met.
- **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

- **12.1 Toxicity**

· **Aquatic toxicity:**

75-91-2 tert-butyl hydroperoxide

EC50	17 mg/l (activa sludge)
EC50 / 72h	1.5 mg/l (selenastrum capricornutum)
LC50 / 96h	29 mg/l (pimephales promelas)
	57 mg/l (poecilia reticulata)

123-54-6 pentane-2,4-dione

EC50 / 48h	75 mg/l (daphnia magna)
LC50 / 96h	72 mg/l (oncorhynchus mykiss)

7722-84-1 hydrogen peroxide solution

LC50 / 48h	2.4 mg/l (daphnia)
LC50 / 96h	16.4 mg/l (pimephales promelas)

- **12.2 Persistence and degradability** No further relevant information available.
- **12.3 Bioaccumulative potential** No further relevant information available.
- **12.4 Mobility in soil** No further relevant information available.


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- **Ecotoxicological effects:**
- **Remark:** Harmful to fish
- **Additional ecological information:**
- **General notes:** Water hazard class 3 (German Regulation) (Self-assessment): extremely hazardous for water
Do not allow product to reach ground water, water course or sewage system, even in small quantities.
Danger to drinking water if even extremely small quantities leak into the ground.
Harmful to aquatic organisms
- **12.5 Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

- **13.1 Waste treatment methods**
- **Recommendation**  After diluting with a suitable desensitisation agent to 10 %, the solution must be supplied to a special treatment (e. g. thermal utilization) under observance of all official regulations.
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
- **Waste disposal key:** Please contact your hazardous waste disposers to assign the right EWC-(European waste catalog)-number.
- **Uncleaned packaging:**
- **Recommendation:** This material and its container must be disposed of as hazardous waste.

SECTION 14: Transport information

· 14.1 UN-Number · ADR, IMDG, IATA	UN3105
· 14.2 UN proper shipping name · ADR · IMDG, IATA	3105 ORGANIC PEROXIDE TYPE D, LIQUID (ACETYL ACETONE PEROXIDE) ORGANIC PEROXIDE TYPE D, LIQUID (ACETYL ACETONE PEROXIDE)
· 14.3 Transport hazard class(es) · ADR  · Class · Label	5.2 (P1) Organic peroxides. 5.2
· IMDG, IATA  · Class · Label	5.2 Organic peroxides. 5.2
· 14.4 Packing group · ADR, IMDG, IATA	Void
· 14.5 Environmental hazards: · Marine pollutant:	No
· 14.6 Special precautions for user · Danger code (Kemler):	Warning: Organic peroxides. -
· 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code	Not applicable.
· Transport/Additional information:	
· ADR · Limited quantities (LQ) · Excepted quantities (EQ) · Transport category · Tunnel restriction code	125 ml Code: E0 Not permitted as Excepted Quantity 2 D

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· RID / GGVSEB:	like ADR
· IMDG	
· Limited quantities (LQ)	125 ml
· Excepted quantities (EQ)	Code: E0 Not permitted as Excepted Quantity

SECTION 15: Regulatory information

- **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
 - Directive 2012/18/EU
 - Named dangerous substances
 - ANNEX I None of the ingredients is listed.
 - National regulations:
 - Other regulations, limitations and prohibitive regulations
 - Please note: Take care of the respective local regulations.
- **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

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

- **Relevant phrases**
 - H226 Flammable liquid and vapour.
 - H242 Heating may cause a fire.
 - H271 May cause fire or explosion; strong oxidiser.
 - H302 Harmful if swallowed.
 - H311 Toxic in contact with skin.
 - H314 Causes severe skin burns and eye damage.
 - 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.
 - H341 Suspected of causing genetic defects.
 - H411 Toxic to aquatic life with long lasting effects.
- **Department issuing MSDS:** Environment protection / Security of labour
- **Contact:** Tel: +49 2871 9902-0
E-mail: mail@pergan.com
- **Abbreviations and acronyms:**
 - RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
 - ICAO: International Civil Aviation Organisation
 - ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
 - IMDG: International Maritime Code for Dangerous Goods
 - IATA: International Air Transport Association
 - GHS: Globally Harmonised System of Classification and Labelling of Chemicals
 - EINECS: European Inventory of Existing Commercial Chemical Substances
 - ELINCS: European List of Notified Chemical Substances
 - CAS: Chemical Abstracts Service (division of the American Chemical Society)
 - DNEL: Derived No-Effect Level (REACH)
 - PNEC: Predicted No-Effect Concentration (REACH)
 - LC50: Lethal concentration, 50 percent
 - LD50: Lethal dose, 50 percent
 - PBT: Persistent, Bioaccumulative and Toxic
 - vPvB: very Persistent and very Bioaccumulative
 - Flam. Liq. 3: Flammable liquids, Hazard Category 3
 - Ox. Liq. 1: Oxidising Liquids, Hazard Category 1
 - Org. Perox. CD: Organic Peroxides, Types C, D
 - Org. Perox. CD: Organic Peroxides, Types C, D
 - Acute Tox. 4: Acute toxicity, Hazard Category 4
 - Acute Tox. 3: Acute toxicity, Hazard Category 3
 - Acute Tox. 2: Acute toxicity, Hazard Category 2
 - Skin Corr. 1A: Skin corrosion/irritation, Hazard Category 1A
 - Skin Corr. 1C: Skin corrosion/irritation, Hazard Category 1C
 - Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1
 - Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2
 - Skin Sens. 1: Sensitisation - Skin, Hazard Category 1
 - Skin Sens. 1A: Sensitisation - Skin, Hazard Category 1A
 - Muta. 2: Germ cell mutagenicity, Hazard Category 2
 - STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3
 - Aquatic Chronic 2: Hazardous to the aquatic environment - Chronic Hazard, Category 2
 - Aquatic Chronic 3: Hazardous to the aquatic environment - Chronic Hazard, Category 3