

SAFETY DATA SHEET

BENZENE

August 2013, Version 04

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Complying with 1907/2006/EEC Regulation of 18 December 2006 ("REACH Regulation"),
COMMISSION REGULATION (EU) No 453/2010 and REGULATION (EC) No 1272/2008
(CLP)

Section 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/ UNDERTAKING

1.1 Product identifier

Substance Name: BENZENE
Trade name: BENZENE
Synonyms: Benzol, Cyclohexatriene, Phenyl hydride.
Chemical formula: C₆H₆
Product type: Aromatic hydrocarbon
CAS number: 71-43-2
EC number: 200-753-7
REACH registration no(s): 01-2119447106-44-0084

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

Identified Uses:

Use as an intermediate

Uses advised against: This product is not recommended for any industrial, professional or consumer use other than the Identified Uses above.

1.3 Details of the supplier of the safety data sheet

Company/undertaking identification

Supplier/Manufacturer: GADIV PETROCHEMICAL INDUSTRIES Ltd.

P.O.B 4 HAIFA

Tel: +972-4-8788020
Fax: +972-4-8788018
E-mail: Gadiv@bazan.co.il

E-mail address of person responsible for this SDS: telena@bazan.co.il

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1.4 Emergency telephone number

Emergency telephone number (including hours of operation): +972-4-8788512

Section 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification in accordance to Regulation (EC) No. 1272/2008 (CLP/GHS)

Physical / Chemical Hazards:

Flammable liquid, Category 2

Health Hazards:

Skin irritation, Category 2

Eye irritation, Category 2

Aspiration toxicity, Category 1

Germ cell mutagenicity, Category 1B

Carcinogenicity, Category 1A

Specific target organ toxicity - repeated exposure, Category 1. Affected organs: haematopoietic system.

Environmental Hazards:

Not classified

Classification according to Directive 67/548/EEC (DSD) or 1999/45/EC

F; R11 Highly flammable

Xn; R65 Harmful: may cause lung damage if swallowed

T; R48/23/24/25 Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed

Xi; R36/38 Irritating to eyes and skin

Carc. Cat. 1; R45 May cause cancer

Muta. Cat. 2; R46 May cause heritable genetic damage

2.2 Label elements

Labeling in accordance with Regulation 1272/2008 (CLP)

Hazard pictograms:



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Signal word: Danger

Hazard statements:

H225: Highly flammable liquid and vapour.
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H304: May be fatal if swallowed and enters airways.
H340: May cause genetic defects.
H350: May cause cancer.
H372: Causes damage to organs

Precautionary Statements:

P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P243: Take precautionary measures against static discharge.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353: IF ON SKIN (or hair): Remove / take off immediately all contaminated clothing. Rinse skin with water / shower.
P308+P313: IF exposed or concerned: Get medical advice/attention.
P331: Do NOT induce vomiting.
P202: Do not handle until all safety precautions have been read and understood.

Labelling according to Directive 67/548/EEC (DSD) or 1999/45/EC



F – highly flammable



T – toxic



Xn – harmful

R11: Highly flammable
R45: May cause cancer.
R46: May cause heritable genetic damage.
R36/38: Irritating to eyes and skin.
R48/23/24/25: Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with the skin and if swallowed.
R65: Harmful: may cause lung damage if swallowed

2.3 Other hazards

Does not meet the criteria for PBT or vPvB.

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Section 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/preparation

Formula: C₆H₆

Molecular weight: 78.11

Ingredient name	CAS number	EC number	%	EU Classification	GHS Classification
Benzene	71-43-2	200-753-7	>99.8	F; R11, Xi; R36/38 Xn; R65 T; Muta Cat. 2 R46 T; Carc Cat. 1 R45 T; R48/23/24/25	Flam. Liq. 2 H225 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Asp. Tox. 1 H304 Muta. 1B H340 Carc. cat. 1A H350 STOT RE 1 H372

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in section 8.

See section 16 for the full text of the H-statements and R-phrases declared above.

Section 4. FIRST AID MEASURES

4.1 Product-specific hazards

Highly flammable liquid and vapour.

May be fatal if swallowed.

May cause cancer.

May cause genetic defects.

May cause serious eye and skin irritation.

May cause damage to organs through prolonged or repeated exposure.

4.2 General advice

Warning ! Flammable liquid

Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed

Irritating to skin

Irritating to eyes

Harmful: May cause lung damage if swallowed.

IN CASE OF HEAVY OR PERSISTENT DISTURBANCES, CALL A DOCTOR OR SEEK MEDICAL ADVICE URGENTLY

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4.3 Description of first aid measures

Inhalation :

Remove victim to fresh air and keep at rest in a position comfortable for breathing.
seek medical advice immediately.
if necessary, give oxygen
Check for possible heart rate problems
if breathing has stopped: administer artificial respiration.
Keep under medical surveillance

Skin contact :

Take off immediately all contaminated clothing
after contact with skin, wash immediately with plenty of water, for at least 15 minutes.
Risk of subcutaneous penetration
in case of serious contamination, seek immediate hospital treatment

Eye contact :

Do not wear contact lenses in any work area.
may cause irritation on prolonged contact.
flush immediately with plenty of water, holding the eyelids open (>15 min)
Get medical advice (ophthalmologist)

Ingestion:

If swallowed, rinse mouth with water (only if the person is conscious (give nothing to drink and do not induce vomiting (risk of pulmonary aspiration).Risk of serious damage if inhaled into lungs, (caused e.g by vomiting), seek medical advice urgently.

Protective equipment for first-aiders:

if exposure is likely to exceed the occupational exposure limit, in a ventilated space, use an approved respiratory protective equipment; in confined space, use an autonomous breathing apparatus.

4.4 Advice to physician

Section 5: FIRE-FIGHTING MEASURES

Technical measures:

call the safety and environment service immediately.
evacuate non-essential personnel
use fine spray or fog to control fire by preventing its spread and absorbing some of its heat.
keep tankage cool by continuous spraying with water (for non cryogenic storage).

5.1 Extinguishing media:

Suitable:

for minor fires : carbon dioxide (CO₂) or powder

for more extensive fires : foam. water spray (mist) to cool the surfaces exposed to the fire.

Not to be used:

do not use water jets (stick jets) for extinguishing fire since they could help to spread the

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flames

5.2 Special exposure hazards:

the vapour is heavier than air and explosive mixtures can accumulate in low spots: it may be

ignited at some distance away from the spill resulting in flashbacks.

fire may cause pressure rise with risk of bursting and subsequent explosion

spreading of fire- and explosion hazard by liquid layers on the water surface

Special peril:

complete combustion, with an excess of oxygen forms: carbon dioxide (CO₂), water vapour , NO_x.

partial combustion forms also: carbon monoxide (CO), soot and cracked products: aldehydes, ketones , carbon , polycyclic aromatic hydrocarbons (PCA or PAH) , etc...

5.3 Protective equipment for firefighters:

wear suitable breathing equipment, in case of risk of exposure to vapour or fumes.

protective clothing, goggles and self-contained breathing equipment should be made available for firemen.

Section 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions:

according to exposure conditions, wear suitable:

industrial gloves

goggles/spectacles

breathing apparatus

Avoid contact with skin and eyes and inhalation.

spills or leaks on soil may cause damage to surfaces making them slippery.

spills or leaks may cause a hight risk of fire and explosion.

6.2 Environmental precautions:

installations must be designed to avoid accidental spill on soil and water.

avoid discharge of the material in a stream or a sewerage system or cause ground contamination.

in case of spillage, call the emergency services if the situation is not readily contained

6.3. Methods and material for containment and cleaning up

call the safety and environment service immediately.

evacuate non-essential personnel

stop the spill at source if possible, without endangering the operator.

the vapour is heavier than air and explosive mixtures can accumulate in low spots: it may be ignited at some distance away from the spill resulting in flashbacks.

avoid proximity or contact with hot surfaces, flames, electrostatic charges or sparks.

no smoking

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maintain the level of gases under the explosion limits by artificial aeration.

on soil:

soil recovery by physical means.

never use dispersant.

take up small spills with dry chemical absorbent.

absorb product with an adequate material such as paper, rags, sawdust,...

dispose safely in accordance with local or national regulations.

dispose to an hazardous or special waste collection point.

on water:

use floating absorbent material to be removed mechanically.

if the material has been discharged into a stream or a sewerage system, inform the authorities of the possible presence of floating materials.

dispose safely in accordance with local or national regulations.

6.6 Reference to other sections

See Section 1 for emergency contact information.

See Section 8 for information on appropriate personal protective equipment.

See Section 13 for additional waste treatment information.

Section 7: HANDLING AND STORAGE

Important: refer to any national measures that may be relevant.

7.1. Precautions for safe handling

handle under adequate ventilation or wear suitable Personal Protective Equipment where exposure can arise. In use, may form flammable / explosive vapour-air mixture. Avoid producing or diffusing fumes, vapour or spray into the air (particulary during loading or unloading product). The vapour is heavier than air and explosive mixtures can accumulate in low spots: it may be ignited at some distance away from the spill resulting in flashbacks. All possible sources of ignition must be removed. Avoid proximity or contact with hot surfaces, flames, electrostatic charges or sparks. Where exposure is likely, protective clothing must be worn including gloves, suitable anti-static safety shoes and protective clothing. Shower and eye fountain must be available. When using, do not eat, drink or smoke. Technical measures: cleaning, inspection and maintenance of storage tanks requires the implementation of strict procedures. Working has to be made only on cold, degassed and ventilated storage tanks (risk of explosive atmosphere). Take precautionary measures against static discharge during blending and transfer operations. Use explosion proof electrical equipment all conductive materials must be electrically earthed. Do not use air for transfers.

7.2. Conditions for safe storage, including any incompatibilities

use only containers, joints, pipes, etc...made in a material suitable for use with aromatic hydrocarbons. Store away from heating source.

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Avoid static electricity build up with connection to earth. Keep away from sources of ignition - No smoking.

Keep in a well-ventilated place.

Keep substance in closed container equipped with a floating roof.

Retain in the original container; if other containers are used: transfer, if necessary, all labelling information to the new container can form explosive mixture with air particularly in empty uncleared receptacles.

Installations must be designed to avoid any propagation of burning slick.

Provide a retention storage tankspreventing of fire- and explosion hazard by liquid layers on the water surfaceaccording to local regulations. Incompatible materials: avoid contact with strong oxidizing materials, acids and bases, halogens (Fluorine, Chlorine, Bromine, Iodine) Suitable containers: carbon steel, stainless steel.

7.3. Specific end use(s)

Benzene is manufactured and used as an intermediate and distributed under strictly controlled conditions in that it is rigorously contained by technical means during its whole lifecycle (Regulation 1907/2006, Article 17 §3).

Section 8: EXPOSURE CONTROL / PERSONAL PROTECTION

8.1. Control parameters

ACGIH® TLV® - TWA: 0.5 ppm Skin A1

ACGIH® TLV® - STEL [C]: 2.5 ppm

NIOSH NIOSH REL (TWA) (ppm) 0.1 ppm

NIOSH NIOSH REL (STEL) (ppm) 1 ppm

OSHA OSHA PEL (TWA) (ppm) 1 ppm

OSHA OSHA PEL (STEL) (ppm) 5 ppm

UK: HSE EH40/2005:

IRL(2002): OEL (8h): 1 ppm – 3.25 mg/m³

EC (1999): 1 ppm - 3.25 mg/m³

8.2 Exposure controls

The substance is handled under Strictly Controlled Conditions as defined under REACH Article 18(4) throughout its life cycle. Specifically the substance is rigorously contained by technical means during its whole lifecycle; procedural and control technologies are used to minimise emissions and any resulting exposures; only properly trained and authorised personnel handle the substance; special procedures such as purging and washing are applied during cleaning and maintenance works, in cases of accident and where waste is generated, procedural and/or control technologies are used to minimise emissions and the resulting exposures; and substance-handling procedures are well documented and strictly supervised by the site operator.. In addition, exposure is controlled by regular ambient monitoring of benzene at the workplace.

Respiratory protection:

local exhaust ventilation may be needed when working in a closed area; if exposure is likely

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to exceed the occupational exposure limit, in a ventilated space, use approved respiratory protective equipment; in confined space, use an autonomous breathing apparatus.
Recommended filter type : EN140 with Type A or better

Hands protection :

gloves resistant to aromatic hydrocarbons (tested to EN374)

In case of immersion:

recommended material: fluorinated polymer or polyvinyl alcohol
layer thickness : all thicknesses
penetration time according to norm EN 374-3 > 480 minutes

In case of contact with spray:

recommended material: nitrile
layer thickness > 0,45 mm
penetration time according to norm EN 374-3 > 30 minimum

Remarks:

Gloves may degrade in contact with this chemical.

- Carefully check the glove for cracks or damage before reusing it, dispose of gloves where the penetration time is exceeded.
- The penetration time depends on temperature, glove material, thickness and construction. Penetration time is measured against EN 374 in laboratory conditions corresponding to permanent static contact and is not necessarily representative of the risk in the workplace. Contact the gloves' supplier for further information on the selection and resistance of gloves.

Skin and body protection:

shower and eye fountain available.

Eye protection:

goggles/spectacles; do not wear contact lenses in any work area.

Other personal protection:

where exposure is likely, protective clothing must be worn including gloves safety non-slip shoes in areas where spills or leaks can occur. Safety shoes (keg / gas cylinder manipulation)

Industrial health measures:

General: handle in accordance with good industrial hygiene and safety procedures; avoid producing or diffusing fumes, vapour or spray into the air (particularly during loading or unloading product); avoid contact with skin and eyes; avoid splashes (suitable protective clothing, screen, aprons, etc...); do not wipe hands with cloths or rags which have been used for cleaning; remove all contaminated clothing and remove protective clothing when the work is completed; wash skin as soon as possible with soap and water; do not store near food products. When using, do not eat, drink or smoke.

Specific: benzene manufacture and use as intermediate is performed either in closed process with no likelihood of exposure or in closed, continuous process with occasional situations where controlled exposure can occur. Tasks where the intervention

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of workers is required are performed according to the following Risk Management Measures (RMM):

- Handled substance within a closed system (e.g. sampling collected under closed loop system) or use sophisticated forms of respiratory protection that require specialised maintenance or, at minimum, wear a mask conforming to EN140 with Type A filter or better.
- Wear suitable gloves tested to EN374
- Wear suitable eye protection (goggles/spectacles)

Specific: Transfer of benzene (charging/discharging) from or to vessels/large containers is performed at dedicated facilities. Tasks where the intervention of workers is required are performed according to the following RMM:

- Handle substance within a closed system or ensure material transfers are under containment or extract ventilation and provide extract ventilation to points where emissions occur or use sophisticated forms of respiratory protection that require specialised maintenance or, at minimum, wear a mask conforming to EN140 with Type A filter or better.
- Wear suitable gloves tested to EN374.
- Wear suitable eye protection (goggles/spectacles)

Specific: Use of benzene in laboratory is performed at some occasions, i.e. for analyses of product samples. Tasks are performed according to the following RMM:

- Perform the tasks indoor provided that the substance is handled in a fume cupboard or under extract ventilation. Local Exhaust Ventilation (LEV) efficiency must be at least 70 %
- Wear suitable gloves tested to EN374.
- Wear suitable eye protection (goggles/spectacles)

Environmental exposure controls: Benzene is manufactured and used as an intermediate and distributed under strictly controlled conditions in that it is rigorously contained by technical means during its whole lifecycle (Regulation 1907/2006, Article 17 §3).

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

General information

Physical state:	Liquid
Colour:	Colourless
Odour:	Benzene-like
Molecular weight:	78.11

Safety data

pH:	Not available
Boiling point/boiling range:	80.1 °C
Flash point:	-11°C
Self-Ignition temperature:	498°C
Flammability (solid, gas):	Not available
Explosive properties:	Not applicable
Oxidizing properties:	Not applicable

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Vapor pressure:	10kPa at 20°C and 100kPa at 79.7°C
Water solubility:	1.88g/l at 23.5°C
Relative density:	0.88 g*cm ⁻³ at 15°C
Log Octanol/Water partition coefficient:	2.13
Viscosity:	0.56 mPa s at 25°C
Vapor density:	Not available
Evaporation rate (butyl acetate=1):	Not available
Other information:	
Melting point/melting range:	5.5 °C
Auto-ignition temperature:	480°C

Section 10: STABILITY AND REACTIVITY

10.1 Stability:

stable under normal operating conditions of storage, handling and use
the product is combustible if heated above the flash point.

10.2 Chemical stability

Stable under normal conditions of use.

10.3 Hazardous reactions:

Highly flammable

10.4 CONDITIONS TO AVOID:

Keep away from sources of ignition - No smoking.
avoid proximity or contact with hot surfaces, flames, electrostatic charges or sparks.

10.5 MATERIALS TO AVOID:

avoid strong acids and oxidizing materials
halogens (Fluorine, Chlorine, Bromine, Iodine)

10.6 Decomposition products:

complete combustion, with an excess of oxygen forms: carbon dioxide (CO₂) and water vapour.

partial combustion, forms also: carbon monoxide (CO), soot and cracked products:
aldehydes, ketones

Section 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity:

Product / ingredient name	Test	Species	Dose
Benzene	LD50, Oral LC50, Inhalation	Rat Rat	>2000 mg/kg 44.5 mg/l/4H

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	LD50, Dermal	Rabbit	8260 mg/kg
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Skin irritation or corrosion: Irritating

Eye irritation: irritating

Skin sensitization: Not sensitizing.

Mutagenicity: Genetic toxicity: positive

Benzene is an in vivo mutagen in mammals, inducing chromosomal aberrations and micronuclei. Benzene is therefore classified as Mutagenic Cat 2, R46 under Dir 67/548/EEC and Cat 1B, H360 under Regulation (EC) No 1272/2008 of the European Parliament.

Carcinogenicity: It is concluded that benzene is carcinogenic in animals and humans and therefore is classified as follows: Carcinogenic Cat 1, R45 according to Dir 67/548/EEC and Cat 1A, H350 under Regulation (EC) No 1272/2008 of the European Parliament.

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure): Not classified

Repeated dose exposure - (route: inhalation):

NOAEC: 11.2 mg/m³ air

Target organs: cardiovascular / hematological: hematopoiesis

Section 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Acute Toxicity

Fish: LC50 5.3 mg/L test mat. (*Oncorhynchus mykiss*)

Aquatic invertebrates: EC50 is 10 mg/l (*Daphnia magna*)

Algae/aquatic plants: 72 hour EC50 of 32 mg/l (*Pseudokirchnerella subcapitata*)

Chronic Toxicity

Fish: LOEC (32 d): 1.6 mg/L test mat. (*Pimephales promelas*)

Aquatic invertebrates: 7 day NOEC of 38 uM (*Ceriodaphnia dubia*)

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12.2 Persistence and Degradability

Readily biodegradable

12.3 Bioaccumulative potential

not bioaccumulative.

12.4 Mobility in soil

Do not allow to enter into soil/subsoil. If product enters soil, it will be mobile and may contaminate groundwater.

12.5 Results of PBT and vPvB assessment

This substance is considered not to be PBT and vPvB.

12.6 Other adverse effects

No information available

Section 13: DISPOSAL CONSIDERATIONS

Waste disposal :

hazardous waste

industrial treatment by distillation

incineration

dispose in a safe manner in accordance with local/national regulations.

authorized disposal

do not dispose off this product into the environment

Disposal of contaminated packaging:

empty bags may contain flammable or explosive vapour

dispose in a safe manner in accordance with local/national regulations.

authorized disposal

do not dispose off this product into the environment

Industrial waste number EC:

14 06 03: Other solvents and solvent mixes

07 01 08 : other still bottoms and reaction residues

Section 14: TRANSPORT INFORMATION

14.1 Land Transportation (ADR/RID)

UN number: 1114

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Proper shipping name: benzene
Hazard class: 3
Packing group: II
ADR/RID-Labels: 3 (flammable liquid)
Hazchem code: 3WE
Hazard identification number: 33
Classification code: F1
Remarks:
code tunnel D/E

14.2 Inland Waterway Transport (ADN(R))

UN number: 1114
Proper shipping name: BENZENE
Hazard class: 3
Packing group: II
Hazard labels: 3
Remarks
Hazards (3+N3+CMR)

14.3 Marine Transport (IMDG)

UN number: 1114
Proper shipping name: BENZENE
Chemical name: BENZENE
Hazard class: 3
Packing group: II
EmS number: F-E, S-D
Labels: 3
Marine pollutant: No

14.4 Air Transport (ICAO/IATA)

UN number: 1114
Proper shipping name: benzene
Chemical name: benzene
Hazard class: 3
Packing group: II
Labels: 3
Remarks
limited qty: Y305, 1L
passenger and cargo aircraft: 305, 5L
cargo aircraft: 307, 60L

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Section 15: REGULATORY INFORMATION

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

EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use.

EU Regulation (EC) No.1907/2006 (REACH)

EU Regulation (EC) No 1272/2008 (CLP)

COMMISSION REGULATION (EU) No 453/2010

15.2 Chemical safety assessment

In accordance with REACH article 14, a Chemical Safety Assessment has been carried out for this substance.

Section 16: OTHER INFORMATION

Full text of R-phrases referred to in sections 2 and 3:

R11: Highly flammable

R45: May cause cancer.

R46: May cause heritable genetic damage.

R36/38: Irritating to eyes and skin.

R48/23/24/25: Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with the skin and if swallowed.

R65: Harmful: may cause lung damage if swallowed

Safety phrases:

S45 - in case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

S53 - avoid exposure - obtain special instructions before use

Full text of Hazards Statements referred to in sections 2 and 3:

H225: Highly flammable liquid and vapour.

H315: Causes skin irritation.

H319: Causes serious eye irritation.

H304: May be fatal if swallowed and enters airways.

H340: May cause genetic defects.

H350: May cause cancer.

H372: Causes damage to organs

Precautionary Statements:

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P201: Obtain special instructions before use
P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233: Keep container tightly closed
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical/ventilating/lighting/.../ equipment.
P242: Use only non-sparking tools.
P243: Take precautionary measures against static discharge.
P260: Do not breathe dust/fume/gas/mist/vapours/spray.
P264: Wash ... thoroughly after handling.
P270: Do no eat, drink or smoke when using this product
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352: IF ON SKIN: Wash with plenty of soap and water
P303+P361+P353: IF ON SKIN (or hair): Remove / 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.
P308+P313: IF exposed or concerned: Get medical advice/attention.
P314: Get medical advice/attention if you feel unwell.
P321: Specific treatment (see ... on this label).
P332+P313: If skin irritation occurs: Get medical advice/attention.
P337+P313: If eye irritation persists: Get medical advice/attention.
P370+P378: In case of fire: Use ... for extinction.
P403+P235: Store in a well-ventilated place. Keep cool.
P405: Store locked up.
P501: Dispose of contents/container to
P202: Do not handle until all safety precautions have been read and understood.

Training advice: Before using/handling the product one must read carefully present MSDS.

Recommended restriction: N/A

Key Legend Information:

ACGIH- American Conference of Governmental Industrial Hygienists

OSHA- Occupational Safety and Health Administration

NTP- National Toxicology program

IARC- International Agency for Research on Cancer

ND- Not Determined

N/A- Not available

R-phrases- Risk phrases

S-phrases- Safety phrases

H-statements – Hazard statements

P-statements – Precautionary statements

UVCB - Substances of Unknown or Variable composition, Complex reaction products or Biological materials

Date of issue: 01/08/2013

Version no. 4