

SAFETY DATA SHEET

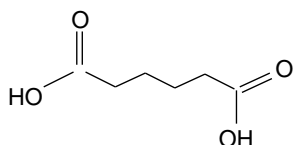
In accordance with Annex II to Regulation (EC) 1907/2006, as amended by Regulation 453/2010

Date of issue: 1 December 2010

1 IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1 Product identifier.

Substance name: ADIPIC ACID
Synonyms: Adipic acid; 1,4-Butanedicarboxylic acid; food additive E355.
Chemical name and formula: ADIPIC ACID, HOOC(CH₂)₄COOH
Trade name: ADIPIC ACID
CAS: 124-04-9
EINECS : 204-673-3
Molecular weight: 146
Structural formula:



RTECS: AU8400000
REACH Registration number: 01-2119457561-38-*

* - Last 4 digits of the registration numbers are omitted due to the confidentiality issues. CGT – Chemical Trading General Limited is committing to provide the full numbers upon further legitimate request.

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

- Use of adipic acid as intermediate or monomer
- Preparation and uses of formulations
- Use of adipic acid in the production of dish washing machine tablets and their further use by consumers.
- Use of adipic acid in flue gas desulphurization
- Use of adipic acid in laboratory chemicals

No uses identified against

1.3 Details of the supplier of the safety data sheet

Name: Close Joint Stock Company «Severodonetskoe Azot Association»
Address 5, Pivovarova str., Severodonetsk], Lugansk region, 93403, Ukraine

2 HAZARD IDENTIFICATION

2.1 Classification of the substance

2.1.1 Classification according to regulation (EC) 1272/2008

Eye Irrit. 2 (Hazard statement: H319: Causes serious eye irritation.)

Eye Damage 1 (Hazard statement: H318: Causes serious eye damage.)

2.1.2 Classification according to Directive 67/548/EEC

Xi; R36 Irritant; Irritating to eyes.

Xi; R41 Irritant; Risk of serious damage to eyes.

2.2 Label elements

2.2.1 Labeling according to Regulation (EC) 1272/2008

Signal word: Warning

Hazard pictogram

GHS07: exclamation mark



Hazard statements

H319: Causes serious eye irritation

Signal word: Danger

Hazard pictogram

GHS05: corrosion



Hazard statements

H318: Causes serious eye damage

2.2.2 Labelling according to Directive 67/548/EEC

Indication of danger:

Xi – irritant



R-phrases:

R36 - irritating to eyes

2.3 Other hazards

Adipic acid is neither a PBT nor a vPvB substance.

No other hazards identified.

3 INFORMATION ON SUBSTANCE COMPOSITION/INGREDIENTS

3.1 Substances

Main constituent

Name: Adipic acid

CAS: 124-04-9

EINECS: 204-673-3

Impurities

No impurities relevant for classification and labeling.

4 FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Provide piece and resting position in a warm place. remove to fresh air and provide conditions for unlaboured breathing.

Following inhalation:

Provide access to fresh air and warm conditions. Loosen tight clothing (collar, tie, belt). If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Following skin contact:

Remove contaminated clothing, shoes, gear. Flush skin with plenty of running water and soap for

15 minutes. If irritation or pain does not pass off, get medical attention.

Following eye contact:

Immediately flush eyes with plenty of water (for at least 15 minutes) raising lower and upper eyelids. But before remove contact lenses if any. If irritation, pain, swelling, eye watering or photophobia do not pass off, get an ophthalmologist attention.

After ingestion:

Rinse the mouth with water. If the person exposed is conscious, give him/her to drink plenty of water or milk. Loosen tight clothing (collar, tie, belt). Get medical attention. Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

Inhaling the substance dust in high concentration may cause mucosa swelling, pulmonary edema. Ingestion of the big quantity of the substance may cause irritation of the gastrointestinal tract.

4.3 Indications of any immediate medical attention and special treatment needed

Follow the advises given in section 4.1

5 FIREFIGHTING MEASURES

5.1 Extinguishing media

5.1.1 Suitable extinguishing media

Water spray with wetting agents, aero-mechanical foam, refrigerants, sand, earth. In case of large fire sources – foam, PSB-3 powder (sodium bicarbonate); indoors – total flooding fire extinguishing (CO₂ refrigerants). In case of local fires – PSB-3, CO₂, asbestos cloth, powder and carbon dioxide fire extinguishers.

5.1.2 Unsuitable extinguishing media

No information available.

5.2 Special hazards arising from the substance or mixture

As most solid organic substances, adipic acid is fire hazardous when affected by heat or fire. Substance melt may spatter especially in case of water entry. Containers with the substance located in the fire area may explode, so it is necessary to cool them with water spray. Airborne dust in high enough concentration in presence of ignition sources may explode. Contact with some substances as specified in *Section 10* results in hazardous reaction.

5.3 Advice for fighters.

In case of fire use full protective clothing and self-contained breathing apparatus in accordance with the applicable legislation and European standard requirements. Do not stay in hazardous area without breathing apparatus.

6 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

Wear suitable protective clothing. Work rooms must be equipped with extract- and- input ventilation and local ventilation. All equipment and lines must be sealed. All equipment and devices must be protected from electrostatic discharge (grounded). Use intrinsically safe tools and equipment. Avoid contacting the substance. Avoid inhaling the dust.

6.1.2 For emergency responders

Use suitable personal protection (goggles, dust mask, gloves, protective clothing, breathing apparatus to prevent dust inhaling) as required by the industry sector norms approved in accordance

with the established procedure.

6.2 Environment precautions

The substance does not form toxic compounds in air and waste water in presence of other substances, but do not allow entry of the substance into water supply and sewerage systems. Process equipment should be leak sealed.

6.3 Methods and material for containment and cleaning up

Prevent dust spreading. Cover the place of spill with spray water. Collect the spilled substance into a properly labeled plastic container and close it, or into any other suitable can. Avoid airborne dust formation. Prevent contact with skin and eyes. Do not inhale the dust. Follow fire safety rules. Clean places of spill with water and detergents (soda). In case of solution spill: collect the spilled liquid with adsorbing materials (earth, sand), put into a properly labeled container for further disposal. Flush contaminated surface with plenty of water.

6.4 Reference to other sections

For more information on exposure controls/personal protection or disposal considerations, please check section 8 and 13 and annex of this safety data sheet.

7 HANDLING AND STORAGE

7.1 Precautions for safe handling

7.1.1 Protective measures

Use tightly sealed equipment with dust collectors. Keep the equipment clean. Wear protective clothing. In case of insufficient ventilation use respiratory protection. Keep the work area clean and dry. Avoid contact with the substance. Avoid spillage of the substance. Avoid dust formation. In case of loading or reloading use tightly sealed equipment. Provide exhaust-and-input ventilation. Fill the substance only into properly labeled packaging. It is forbidden to eat, drink, and smoke in the working area. In case of contact with the substance – wash your hands.

7.1.2 Advice on general occupational hygiene

Do not keep food, drinks and other products in the working area where adipic acid is handled to avoid their contamination. A special place should be provided where to eat. Prevent the substance contact with skin. Prevent contact with eyes. Do not inhale the dust. Prevent your clothing exposure to the substance. In case of contamination – clean the clothing. Special places should be provided for: taking a shower, washing the clothing, storing the work clothes separately from everyday wear clothes.

7.2 Conditions for safe storage, including any incompatibilities

7.2.1 Storage

Store indoors in a cool, ventilated place. Recommended storage temperature - not higher than 25°C. Equipment and lines must be protected from static electricity buildup. Store in tightly closed containers. Protect containers from damage and static electricity. Keep away from heat and ignition sources. Store separately from oxidants and incompatible substances and materials. Empty packaging with product residues in it may be fire hazardous. Containers must have clear and correct labeling.

7.2.2 Incompatibilities

Acids, alkali, strong oxidants (sodium hypochlorite, sodium chlorite), strong reducers, alcohols, glycols, aldehydes, epoxides and polymerizable compounds. Absorbs moisture from air. In wet condition destroys iron, steel, and aluminum

7.3 Specific end use(s)

For more information please see the relevant exposure scenario in ANNEX of this SDS and check Control for worker exposure.

8 HAZARD EXPOSURE CONTROL / PERSONAL PROTECTION MEASURES

8.1 Control parameters

8.1.1 National occupational exposure limit values and/or biological limit values

ACGIH TLV – TWA - 5 mg/m³
TLV_{wa} -4 mg/m³

8.1.2 Recommended monitoring procedures

In accordance with Directives 80/1107/EEC and 88/642/EEC.

8.1.3 DN(M)EL and PNEC

Please refer to below Sections 11 and 12 respectively.

8.1.4 Specific control binding recommendations

See information in ANNEX on each specific use.

8.2 Exposure control

Ventilation: provide exhaust ventilation system to prevent dust dissipation in the working area in accordance with the norms and requirements.

Equipment: electric equipment, lighting equipment, pipelines must be grounded; equipment and pipelines to be tightly sealed; dust collectors are required.

Preventive measures: avoid spillage, avoid contact with the substance, avoid airborne dust formation, avoid inhaling the dust, wear protective clothing, and avoid incompatible materials.

For more information, please refer to the relevant exposure scenario in Annex to this SDS.

8.2.1 Appropriate engineering controls

Local and/or general ventilation system is recommended to maintain the concentration at lowest possible level. Wet cleaning of the work area is recommended. It is recommended to provide a special place for hand washing and eye flushing. Keep dust concentration level below the level recommended or provided for by the law.

8.2.2 Individual protection measures, such as personal protective equipment

8.2.2.1 Eye/face protection

Splash goggles in accordance with established standards (European standard EN166) or protecting masks.

8.2.2.2 Skin protection

Full protective suit and footwear in accordance with established standards. After work – take warm shower. The clothing is to be thoroughly cleaned after use. The footwear is to be thoroughly cleaned and aired after use.

8.2.2.3 Respiratory protection

In case it is not possible to provide engineering control of the dust concentration in places of possible dust formation or on case there is a risk of reaching threshold limit concentration, it is necessary to use respiratory organ protection means (respirators type N95 or equivalent); if dispersed particles are present in the air – use respirators type R or P approved by European Agency OSHA (29 CFR 1910.134), NIOSH or European standard EN 149. In case of necessity, when exposure level is not known, use protective masks with air filter. WARNING: respirators with air filter do not protect from lack of oxygen in the workplace air. If oxygen concentration is lower than 17% vol., use self-contained breathing apparatus.

8.2.2.4 Hand protection

Gloves are to meet Directive 89/686/EEC specification and EN 374 standard. Glove material is to meet European standard (permeation time ≥ 8 hours): natural rubber/natural latex – NR (0,5 mm); Polyvinylchloride – PVC (0,5 mm), or equivalent. Before use check gloves for tightness. After work before removing the gloves thoroughly wash them, then put in ventilated storage place. Before breaks and after the work wash hands with water and soap. After washing apply hand cream.

8.2.3 Environmental exposure control

Please refer to the relevant exposure scenario in Annex to this SDS.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance	solid
Odour	odorless.
pH	3,2 (0,1% solution at 25°C).
Melting point/freezing point	150.85 °C at 1013 hPa
Initial boiling point and boiling range	337.5 °C at 1013 hPa
Flash point	196°C.
Flammability (solid, gas)	non flammable
Vapor pressure (mmHg) at 20°C	9.7 Pa at 291.65 K
Relative density	1.36 at 20°C
Solubility(ies)	
- water	23000 mg/L at 25 °C
- fat	insoluble.
- organic solvents	easily soluble in ether; soluble in acetone, ethyl acetate; almost insoluble in benzene.
- other liquids	easily soluble in ethanol, methanol
Partition coefficient: n-octanol/water	Log Kow (Pow): 0.09 at 20 °C
Auto-ignition temperature	>400°C
Decomposition temperature	210-240
Explosive properties	non explosive
Oxidizing properties	no

10 STABILITY AND REACTIVITY

10.1 Stability and reactivity

10.1.1 Reactivity

Can form salts (most of them dissolve in water), amides, anhydride, acid chlorides; is polycondensed and cyclized (into cyclopentanone (II)); can recover. Is easily esterified in mono- and diesters; forms polyesters with glycols; in interaction with NH₃ and amines forms ammonium salts, which turn into adipamids during dehydration; forms polyamides with diamides; forms adypodinitrile with NH₃ over catalyst at the temperature (300-400)°C. The substance is hygroscopic. Water solutions of adipic acid are caustic, cause weak corrosive effect.

10.2 Chemical stability

Stable under normal conditions of storage and use.

10.3 Possibility of hazardous reactions.

- Water solution or melt can react with active metals with formation of hydrogen.
- Reaction with cyanides forms hydrogen cyanide.
- Dicarboxylic acids on contact with dithiocarbonates, isocyanates, mercaptans, nitrides and sulphides form highly flammable and/or toxic gases.
- Water solutions react with sulphites, nitrites, thiosulphates (form H₂S and SO₂), dithionites (SO₂), forming flammable and/or toxic gases and releasing heat.

- During the reaction with carbonates and bicarbonates carbon dioxide is formed and heat is released.
- Adsorbs moisture from air. In wet condition destroys iron, steel and aluminium.

10.4 Conditions to avoid

- Do not store in open container.
- Do not store in unventilated premises.
- Avoid humidifying.
- Avoid dust formation
- Avoid static electricity.
- Avoid sources of ignition, sparks, high temperatures.
- Avoid physical actions with substance.

10.5 Incompatible materials

Acids, alkali, strong oxidants (sodium hypochlorite, sodium chlorite), strong reducers, alcohols, glycols, aldehydes, epoxides and polymerizable compounds. Absorbs moisture from air. In wet condition destroys iron, steel, and aluminum.

10.6 Hazardous decomposition products

Cyclopentane. Carbon oxides. Adipic acid is not stable in alcohol. The corresponding ester is formed.

11 TOXICITY

11.1 Information on toxicological effects

Absorption

Adipic acid is absorbed after oral administration, partially metabolized to various metabolites and CO₂ which are excreted via urine and breath.

Acute toxicity

Adipic acid is of very low acute toxicity

Oral LD50: 5560 mg/kg bw

Dermal discriminating dose: 7940 mg/kg bw

Inhalation discriminating conc.: 7700 mg/m³ air

Irritation/corrosion

Eye irritation: moderately irritating

Skin irritation / corrosion: slightly irritating

Respiratory inhalation: irritating. Long-term exposure can cause irritation of nasal mucosa and throat. Can cause cough and pain in the throat.

Adipic acid is classified R36 in 67/548/EWG annex 1 and as an eye irritant Category 2 in regulation no. 1272/2008 (GHS). The results obtained in the most recent eye irritation study (LPT 2004) translate to R41 according to the classification criteria "risk of serious damage to eyes" and an eye irritant Category 1 "irreversible effects on the eye" according to GHS. not sensitising

Sensitization

Repeated dose toxicity

(route: oral): NOAEL: 750 mg/kg bw/day

Mutagenicity

Genetic toxicity: negative

Carcinogenicity

(route: oral): NOAEL: 750 mg/kg bw/day

Toxicity for reproduction

Based on the available data there is no reason to expect specific reproductive toxicity of adipic acid.

(oral, rat): NOAEL (maternal toxicity): \geq 288 mg/kg bw/day

NOAEL developm. tox. : \geq 288 mg/kg bw/day

(oral, rabbit): NOAEL (maternal toxicity): \geq 250 mg/kg bw/day

NOAEL developm. tox. : \geq 250 mg/kg bw/day

(oral, mouse): NOAEL (maternal toxicity): \geq 263 mg/kg bw/day

NOAEL developm. tox. : \geq 263 mg/kg bw/day

In limited studies adipic acid was not embryo- or fetotoxic and not teratogenic after oral administration to rats, mice, and rabbits.

Adipic acid is of low toxicity after repeated oral application; no classification is required according to the EU classification criteria 67/548/EWG and regulation no. 1272/2008 (GHS).

DN(M)ELs for workers

Acute - systemic effects

(dermal) 38 mg/kg bw/day

NOAEL: 760 mg/kg bw/day (based on AF of 20)

(inhalation) 264 mg/m³

NOAEC: 1,320 mg/m³ (based on AF of 5)

Long-term - systemic effects

(dermal) 38 mg/kg bw/day

NOAEL: 760 mg/kg bw/day (based on AF of 20)

inhalation) 264 mg/m³

NOAEC: 1,320 mg/m³ (based on AF of 5)

DN(M)ELs for the general population

Acute - systemic effects

(dermal) 19 mg/kg bw/day

NOAEL: 760 mg/kg bw/day (based on AF of 40)

(inhalation) 65 mg/m³

NOAEC: 650 mg/m³ (based on AF of 10)

(oral) 19 mg/kg bw/day

NOAEL: 760 mg/kg bw/day (based on AF of 40)

Long-term - systemic effects

(dermal) 19 mg/kg bw/day

NOAEL: 760 mg/kg bw/day (based on AF of 40)

(inhalation) 65 mg/m³

NOAEC: 650 mg/m³ (based on AF of 10)

(oral) 19 mg/kg bw/day

NOAEL: 760 mg/kg bw/day (based on AF of 40)

12 ECOLOGICAL INFORMATION

12.1 Toxicity

12.1.1 Acute/prolonged toxicity to fish

LC0 (96 h) for freshwater fish: \geq 1000 mg/L test mat. (nominal) (*Brachydanio rerio* (new name: *Danio rerio*))

LC50 (14 d): 80 mg/L test mat. (nominal)

LC50 (96 h) for freshwater fish: $>$ 100 test mat. (nominal) (*Oryzias latipes*)

LC50 (96 h): 230 mg/L test mat for freshwater fish. (nominal) (*Leuciscus idus*)

12.1.2 Acute/Prolonged toxicity to aquatic invertebrates

12.1.2.1 Short-term effects on aquatic invertebrates

LC50 (48 h) for freshwater invertebrates: 46 mg/L test mat. (nominal) based on: immobilization (*Daphnia magna*)

EC50 (48 h) for freshwater invertebrates : 85.7 mg/L test mat. (nominal) based on: immobilization (*Daphnia magna*)

12.1.2.2 Long-term toxicity to aquatic invertebrates

NOEC (21 d) for freshwater invertebrates: 6.3 mg/L test mat. (nominal) based on: reproduction (*Daphnia magna*)

12.1.3 Acute/Prolonged toxicity to aquatic plants

EC50 (72 h) for freshwater plants: 59 mg/L test mat. (nominal) based on: growth rate (*Selenastrum capricornutum* (new name: *Pseudokirchnerella subcapitata*) (algae)

NOEC (72 h) for freshwater plants: 41 mg/L test mat. (nominal) based on: growth rate (*Selenastrum capricornutum* (new name: *Pseudokirchnerella subcapitata*) (algae)

EC50 (72 h) for freshwater plants: 39.8 mg/L test mat. (nominal) based on: growth rate (*Scenedesmus subspicatus* (new name: *Desmodesmus subspicatus*) (algae)

EC10 (72 h) for freshwater plants: 13.96 mg/L test mat. (nominal) based on: growth rate (*Scenedesmus subspicatus* (new name: *Desmodesmus subspicatus*) (algae)

12.1.4 Toxicity to aquatic micro-organisms

EC50 (3 h) for freshwater micro-organisms: 4747 mg/L related to the conc. of adipic acid (estimated) based on: respiration rate (activated sludge)

EC50 (3 h) for freshwater micro-organisms: 7910 mg/L test mat. (60 % adipic acid (production residue)) (nominal) based on: respiration rate (activated sludge)

inhibitory growth concentration IGC50 (40 h) for freshwater micro-organisms: 591.02 mg/L test mat. (nominal) based on: growth inhibition (*Tetrahymena pyriformis*)

EC10 (17 h) for freshwater micro-organisms: 65 mg/L test mat. (nominal) based on: growth inhibition (*Pseudomonas putida*)

EC50 (17 h) for freshwater micro-organisms: 91.9 mg/L test mat. (nominal) based on: growth inhibition (*Pseudomonas putida*)

12.1.5 Chronic toxicity to aquatic organisms

No information available.

12.1.6 Toxicity to soil dwelling organisms

For a substance being considered as „readily biodegradable“, it can be assumed that it will be biodegraded within the STP process and as a consequence a transfer to the soil compartment is not expected.

12.1.7 Toxicity to terrestrial plants

12.1.7.1 Short-term toxicity (laboratory study) seed germination/root elongation toxicity test

Astragalus sinicus: EC0 (5 d): ca. 10 mg/l test mat. (nominal) based on: Root length

Raphanus sativus: EC50 (6 d): ca. 1000 mg/l test mat. (nominal) based on: germination

Raphanus sativus: EC0 (6 d): ca. 134 mg/l test mat. (nominal) based on: germination

Lactuca sativa: EC50 (3 d): 6722 mg/l test mat. (nominal) based on: germination

12.1.7.2 Short-term toxicity (laboratory study) early seedling growth toxicity test

Triticum aestivum: EC50 (3 d): ca. 170 mg/L test mat. (nominal) based on: growth

12.1.8 General effect

PNEC sediment (freshwater): 0.484 mg/kg sediment dw

PNEC sediment (marine water): 0.0484 mg/kg sediment dw

PNEC soil: 0.0228 mg/kg soil dw

PNEC STP: 59.1 mg/L

12.2. Persistence and degradability

The substance is “readily biodegradable” as well as “inherent biodegradable”.

12.3 Bioaccumulative potential

The substance has no bioaccumulation potential.

12.4 Mobility in soil

Highly mobile in soil. (Kos 26). In environment it exists as anion.

12.5 Results of PBT and VPvB assessment

Adipic acid is neither a PBT nor a vPvB substance.

12.6 Other adverse effects

No other adverse effects are identified

13 DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods



Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

Neutralizing agent for acids and corrosive substances: washing with dilution of sodium carbonate solution.

Place substance into special accumulative labelled container. The container should be designated for generating of pH value 2-5.

Fire disposal. Burial. Return in production cycle. Disposal and burial of wastes, which are not subject for subsequent processing should be carried out according to the current regulations, the waste should be removed to disposal site under instructions of local bodies of sanitary inspection. Empty tare should be cleaned from residues of product and, if it can not be reused, should be utilized according to the current regulations.

14 TRANSPORTATION INFORMATION

14.1 UN-number

Not regulated

14.2 UN proper shipping name

Not regulated

14.3 Transport hazard (class)

Not regulated

14.4 Packing group

Not regulated

14.5 Environmental hazards

None

14.6 Special precautions for user

Avoid spillage, avoid contact with the substance, avoid airborne dust formation, avoid inhaling the dust, wear protective clothing, and avoid incompatible materials.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC code

Not regulated

15 REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance REACH/CLP

Authorization: Not regulated

Restrictions on use: None

Other EU regulations:

- Directive 94/33/EC on the protection of young people at work.
- Water hazard class 1 (Assessment by list): slightly hazardous for water.
- EINECS/ELINCS listings - EINECS Number: 204-673-3
- CAS No. Description: 124-04-9 adipic acid

National regulations:

GOST 12.1.005-88 Occupational safety standards system. General sanitary requirements for working zone air.

GOST 12.1.007-76 Occupational safety standards system. Hazardous substances. Classification and general safety requirements.

International Chemical Safety Cards. ADIPIC ACID. ICSC: 0369

15.2 Chemical safety assessment

A chemical safety assessment has been carried out for this substance.

16 ADDITIONAL INFORMATION

16.1 Hazard statements

H319: Causes serious eye irritation

H318: Causes serious eye damage

16.2 Precautionary Statements

P280-Wear protective gloves/protective clothing/eye protection/face protection.

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

P337+P313-If eye irritation persists: get medical advice/attention.

6.3 Risk Phrases

R36: irritating to eyes.

R41: risk of serious damage to eyes.

16.4 Safety Phrases

S2: Keep out of the reach of children

S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

S39: Wear eye/face protection

16.5 Abbreviations

EC₅₀: median effective concentration

LC₅₀: median lethal concentration

LD₅₀: median lethal dose

NOEC: no observable effect concentration

OEL: occupational exposure limit

PBT: persistent, bioaccumulative, toxic chemical

PNEC: predicted no-effect concentration

STEL: short-term exposure limit
TWA: time weighted average
vPvB: very persistent, very bioaccumulative chemical

16.6 Key literature references

1. EU Directive 67/548/EEC. On approximation of laws, regulations, and administrative provisions relating to classification, packaging and labeling of hazardous substances.
2. EU Directive 89/686/EEC. Requirements for personal protection equipment.
3. The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR). United Nations Organization, New York and Geneva, 2008.
4. IATA Dangerous Goods Regulations (DGR) (Resolution IATA 618 Annex A), 50th edition, 2008. International Maritime Dangerous Goods Code (including Amendments 34-08).
5. The International Civil Aviation Organization, 2003, Montreal - Geneva.
6. International Maritime Organization, London, 2006.
7. Regulations concerning the International Carriage of Dangerous Goods by Rail (Annex 1 to Addition B "Uniform rules concerning the International Carriage of Dangerous Goods by Rail (COTIF)" (Convention concerning International Carriage by Rail). United Nations Organization, New York and Geneva, 2007.
8. Dangerous Goods Regulations. Annex 2 to the Agreement concerning the international railways freight traffic, as of 2007.
9. Regulation (EC) No. 1907/2006 of the European Parliament and of the Council concerning the evaluation, authorization, and restriction of chemicals and preparations (REACH).
10. Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labeling and packaging of substances and mixtures.
11. Recommendations on the transport of dangerous goods. Standard rules. (ST/SG/AC.10/1/Rev. 15). United Nations Organization, New York and Geneva, 2007.
12. Globally Harmonized System of Classification and Labeling of Chemicals (GHS). United Nations Organization, New York and Geneva, 2007.
13. Technical instructions for safe transportation of dangerous goods by air (ICAO).

Disclaimer

This safety data sheet (SDS) is based on the legal provisions of the REACH Regulation (EC 1907/2006; Title IV and Annex II), as amended. Its contents are intended as a guide to the appropriate precautionary handling of the material. It is the responsibility of recipients of this SDS to ensure that the information contained therein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. Information and instructions provided in this SDS are based on the current state of scientific and technical knowledge at the date of issue indicated. CGT – Chemical Trading General Limited and/or CJSC «Severodonetskoe Azot Association» make no warranties which extend beyond the description contained herein. Nothing herein shall constitute any warranty of merchantability or fitness for a particular purpose. It should not be construed as any guarantee of technical performance, suitability for particular applications, and does not establish a legally valid contractual relationship. No liability can be accepted in respect of the use of CJSC «Severodonetskoe Azot Association» products in conjunction with other materials. The information contained herein relates exclusively to our products when not used in conjunction with any third party materials. This version of the SDS supersedes all previous versions.

ANNEX. EXPOSURE ASSESSMENT

End of the Safety Data Sheet