Safety Data Sheet

According To Regulation (EC) No 1907/2006 (REACH)

IRON(III) CHLORIDE SOLUTION

Version:	1.0	Preparation Date :	11/11/2013
Form No:	193231	Revision Date:	11/11/2013

1. IDENTIFICATION OF THE PRODUCT AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Product Name	**IRON(III) CHLORIDE SOLUTION**
SDS[1] No	193231
CAS[2] No	7705-08-0
EINECS[3] No	231-729-4
Chemical Name	Iron trichloride
Chemical Formula	Cl3Fe
Structural Formula	

1.2 Relevant Identified Uses Of The Product And Uses Advised Against

Relevant Identified Uses	- Potable and industrial water treatment - For manufacturing printed electronic circuits - Mud conditioning process - Copper abrasion - Production of ferrous oxide pigments - As mordant in textile
Uses Advised Against	See chapter 16 for a general overview

1.3 Details Of The Supplier Of The Safety Data Sheet

Supplier (Manufacturer)	**AK-KİM KİMYA SAN. VE TİC. A.Ş.** www.akkim.com.tr
Address – Factory	Denizçalı Köyü, Taşköprü Mevkii, P.K. 39 77600 Yalova / TÜRKİYE
Telephone	0 226 815 33 00
Fax	0 226 353 25 39

1.4 Information Providing Authority About Safety Data Sheet

	Ali Haydar KETİR – Environmental Engineer
Telephone	+90 (226) 815 33 00 / 33304
Fax	ali.ketir@akkim.com.tr

1.5 Emergency Telephone Number

Company Emergency	0 226 815 33 00

2. HAZARDS IDENTIFICATION

2.1 Classification Of The Product

2.1.1 Classification According to Regulation (EC) No 1272/2008

- Corrosive to metals, Category 1; H290
- Acute toxicity, Category 4, oral; H302
- Skin irritation, Category 2; H315

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- Serious eye damage, Category 1; H318

2.2 Label elements

2.2.1. Labeling According to Regulation (EC) No 1272/2008 [CLP[4]/GHS[5]]

Product Identifier

Hazard Component for Labeling

- İron trichloride

Hazard Pictograms

Signal Word

- Danger

Hazard Statements

H290	May be corrosive to metals
H302	Harmful if swallowed
H315	Causes skin irritation
H318	Causes serious eye damage

Precautionary Statements

General

- None

Prevention

P280	Wear protective gloves/ eye protection/ face protection

Response

P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P302+P352	IF ON SKIN: Wash with plenty of soap and water
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/physician

Storage

- None

Disposal

P501	Dispose of contens / container in accordance with local / regional / national / international regulations.

Supplemental Hazard Information (EU) Statements

None

2.2.2. Special Rules For Supplemental Label Elements For Certain Mixtures

None.

2.2.3. Additional Labeling

- Not Applicable

2.3 Hazard Identification

2.3.1. Skin Contact

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May be harmful if absorbed through skin. May cause skin irritation

2.3.2. Eye Contact

Causes eye burns.

2.3.3. Ingestion

Harmful if swallowed.

2.3.4. Inhalation

May be harmful if inhaled. May cause respiratory tract irritation.

2.3.5. Long term effects

Repeated oral uptake of the substance did not cause substance-related effects. Repeated inhalative uptake of the substance did not cause substance-related effects. The product has not been tested. The statement has been derived from products of a similar structure or composition.

2.3.6. Adverse Environmental Effects

No data available

2.4. Additional Information

· None

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Description Of The Substance: IRON(III) CHLORIDE SOLUTION

NAME	EINECS NO	CAS NO.	CONTENT (%)	CLASSIFICATION CLP
Iron trichloride	231-729-4	7705-08-0	25-45 %	 DANGER Acute toxicity, Category 4, oral; H302 Skin irritation, Category 2; H315 Serious eye damage, Category 1; H318

3.2 Additional information

· None

4. FIRST AID MEASURES

4.1 Description of first aid measures

4.1.1 General information

· Remove contaminated clothing.
· In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

4.1.2 Following inhalation

· Whilst protecting yourself remove the casualty from the hazardous area and take him to the fresh air.
· Lay the casualty down in a quiet place and protect him against hypothermia.
· If signs of difficulty in breathing or irritation appear
· As soon as possible repeatedly have the casualty deeply breath a glucocorticoid inhalation spray in.
· Arrange medical treatment.

4.1.3 Following skin contact

- Remove contaminated clothing while protecting yourself.
- Immediately cleanse the affected skin areas with soap under running water.
- Arrange medical treatment.

4.1.4 Following eye contact

- Rinse the affected eye with widely spread lids for 15 minutes under running water whilst protecting the unimpaired eye.
- Arrange medical treatment.

4.1.5 Following ingestion

- Rinse the mouth and spit the fluids out.
- If the casualty is conscious have him drink copious amounts of liquids (water).
- Do not make the casualty vomit.
- Arrange medical treatment.
- During spontaneous vomiting hold the head of the casualty low with the body in a prone position in order to avoid penetration of the vomit into the air tube.

4.1.6 Self-protection of the first aider

- Pay attention to self-protection

4.1.7 Notes for the doctor

- Most important symptoms and effects, both acute and delayed
- Spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Overdose of iron compounds may have a corrosive effect on the gastrointestinal mucosa and be followed by necrosis, perforation, and stricture formation. Several hours may elapse before symptoms that can include epigastric pain, diarrhea, vomiting, nausea, and hematemesis occur. After apparent recovery a person may experience metabolic acidosis, convulsions, and coma hours or days later. Further complications may develop leading to acute liver necrosis that can result in death due to hepatic coma., To the best of our knowledge, the chemical, hysical, and toxicological properties have not been thoroughly investigated.

5. FIRE-FIGHTING MEASURES

5.1 General Information and Flammable Properties

- The substance/product is non-combustible
- Flash Point study scientifically not justified.

5.2 Extinguishing media:

- Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.3 Unsuitable extinguishing media

- None known.

5.4 Special hazards arising from the product

- Hydrogen chloride.

5.5 Advice for fire-fighters

- Wear NIOSH [6] approved breathing apparatus, eye and face protector and chemical resistant clothes.

5.6 Additional information

- Based on the chemical structure there is no shock-sensitivity.

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- Contaminated extinguishing water must be disposed of in accordance with official regulations
- Do not allow the quenching water into sewage systems

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

- Avoid inhalation of vapours.
- Avoid vapour formation. Ensure adequate ventilation
- Refer to protective measures listed in section 7 and 8.
- Put on protective equipment before entering danger area.

6.2 Environmental precautions

- Cover drains.
- Do not allow to enter into soil/subsoil.
- Do not empty into drains or the aquatic environment..

6.3 Methods and material for containment and cleaning up

6.3.1 For containment

- Control personal contact by using protective equipment as required
- Take up contaminated material and pass on for further processing.
- Contain for disposal according to local / national regulations.

6.3.2 For cleaning up

- Soak up with inert absorbent material and dispose of as hazardous waste.
- Keep in suitable, closed containers for disposal.
- Only conduct maintenance and other work on or in the vessel or closed spaces after obtaining written permission.
- Only work with vessels and lines after they have been thoroughly rinsed.

6.3.3 Other information

- Dispose of waste material according to local, state and federal regulations.

6.4 Reference to other sections

- Dispose of contaminated material as waste in accordance with section 13.
- See Section 13.

7. HANDLING AND STORAGE

7.1.1 Precautions for safe handling

7.1.2 Protective measures

Personal preventions

- Avoid vapour formation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.

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- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Fire preventions

- The substance/product is non-combustible
- See section 5.

Environmental precautions:

- Dispose of waste material according to local, state and federal regulations.

7.1.3 Advice on general occupational hygiene

- Use good occupational work practice.
- Comply with the health and safety at work laws.
- Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage, including any incompatibilities

- Tanks manufactured from rubber coated carbon steel or plastic materials such as Polyethylene, Polypropylene, PVC,
- PTFE and FRP may be used in storage of Ferric 3 Chloride.

7.1 Advice on common storage

- Do not use any food containers - risk of mistake.
- Containers have to be labelled clearly and permanently.
- Store in the original container as much as possible.
- Keep container tightly closed.
- Recommended storage at room temperature.
- Store in a dry place.

7.2 Specific precautions on storage

- Storage class 8 B (Non-combustible corrosive substances)
- Only substances of the same storage class should be stored together.
- Collocated storage with the following substances is prohibited:
- - Pharmaceuticals, foods, and animal feeds including additives.
- - Infectious, radioactive und explosive substances.
- - Strongly oxidizing substances of storage class 5.1A.
- - Organic peroxides and self-reactive substances.
- Under certain conditions the collocated storage with the following sub-stances is permitted:
- - Other explosive substances of storage class 4.1A.
- - Spontaneously flammable substances.
- - Substances liberating flammable gases in contact with water.
- - Ammonium nitrate and preparations containing ammonium nitrate.
- The substance should not be stored with substances with which hazardous chemical reactions are possible.

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Preventive industrial and medical examinations must be carried out according to the application area.
Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

8.1.1 Occupational exposure limits

Components with workplace control parameters

- ACGIH : none listed
- OSHA (final) : none listed
- NIOSH : none listed

8.2 Exposure controls

- Adequate ventilation should be used during processing

8.2.1 Appropriate engineering controls:

- Provide local exhaust ventilation to control vapour.
- In the immediate working surroundings there must be: Emergency shower installed.
- Make available sufficient washing facilities.
- Provide eye shower and label its location conspicuously.
- See Section 7

8.2.2 Personal protection equipment

8.2.2.1 Eye / Face protection:

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly.

8.2.2.2 Skin protection

Hand protection

- The use of resistant protective gloves is recommended.
- Skin protection cremes do not protect as effectively against the substance as protective gloves. Therefore suitable protective gloves should be preferred as far as possible.
- The following information is valid for aqueous, saturated solutions of the salt.
- The following materials are suitable for protective gloves (Permeation time >= 8 hours):
- Polychloroprene - CR (0,5 mm)

- Nitrile rubber/Nitrile latex - NBR (0,35 mm)
- Butyl rubber - Butyl (0,5 mm)
- Fluoro carbon rubber - FKM (0,4 mm)
- Protective gloves of the following materials should not be worn longer than 4 hours continually (Permeation time >= 4 hours):
- Polyvinyl chloride - PVC (0,5 mm)
- Protective gloves of the following materials should not be worn longer than 2 hours continually (Permeation time >= 2 hours):
- Natural rubber/Natural latex - NR (0,5 mm) (use non-powdered and allergen free products)

- The times listed are suggested by measurements taken at 22 °C and constant contact. Temperatures raised by warmed substances, body heat, etc. and a weakening of the effective layer thickness caused by expansion can lead to a significantly shorter breakthrough time. In case of doubt contact the gloves' manufacturer. A 1.5-times increase / decrease in the layer thickness doubles / halves the breakthrough time. This data only applies to the pure substance. Transferred to mixtures of substances, these figures should only be taken as an aid to orientation.

Body protection

- Depending on the risk, wear a tight, long apron and boots or suitable chemical protection clothing
- Eye wash unit.

Other protection

- Handle in accordance with good industrial hygiene and safety practice.

8.2.2.3 Respiratory protection

- In an emergency (e.g.: unintentional release of the substance) respiratory protection must be worn. Consider the maximum period for wear.
- Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

8.2.3 Environmental exposure controls

- Legislation for the protection of the environment must be met in full.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance

Form/Physical state	Liquid
Color	Dark brown,
Odor	Like acid

	Value
pH (5 % in water solution) @ (20(°C)	<2,0
Freezing point/range (°C)	Not available
Boiling point/range (°C)101,3 kPa	110 °C (%32 w/w solution)

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Melting point (°C)	-12°C (% 40 w/w solution)
Flash Point (°C)closed cup	>160
Vapour Pressure	40 mmHg at 35°C
Vapour Density	1,55 - (Air = 1.0)
Relative Density	1430 kg/m³ at 20°C (% 40 w/w solution)
Solubility in water g/l @ 20°C	Completely Soluble
Partition coefficient n-Octanol/Water (log Po/w)	No data available
Explosive Property	None
Oxidation Property	None

Note: The above features were determined according to prescribed methods at the Classification, Packaging and Labeling of Hazardous. Substances Regulation Section A-3 or a method comparable to the other.

10. STABILITY AND REACTIVITY

10.1 Reactivity

- No data available

10.2 Chemical stability

- Stable under recommended storage and handling conditions. (See section 7.)

10.3 Possibility of hazardous reactions

- Risk of explosion in contact with:
  - alkali metals
  - ethylene oxide;
- The substance can react dangerously with:
  - water
  - strong bases
  - allyl chloride; aluminium (heat)

10.4 Conditions to avoid:

- Storage between 0-40 °C.

10.5 Incompatible materials:

- Bases, Alkali metals, Strong oxidizing agents, Potassium, Exothermic in contact with water, Forms shock- sensitive mixtures with certain other materials

10.6 Hazardous decomposition products:

- Hydrogen chloride
- Thermal decomposition: >200 °C

10.7 Hazardous polymerization:

- None.

11. TOXICOLOGICAL INFORMATION

11.1 General Information

- Routes of exposure:
- - During occupational handling of iron trichloride exposure is to be expected via the inhalative and dermal intake pathways.

11.2 Acute toxicity

Oral:

- Type of value: LD50
- Species: rat

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- Value: approx. 450 mg/kg

11.3 Skin corrosion/irritation and Eye damage/irritation:

Skin: no data available
Eye: no data available
Sensitization: Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals..

11.4 CMR effects (Carcinogenity) :

- IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

11.5 CMR effects (Mutagenicity and Toxicity for reproduction) :

- The substance was not mutagenic in bacteria. The substance was not mutagenic in a test with mammals.

11.6 Other Toxicological Effects:

Allergic Effects	May cause allergic reactions depends on sensitization
Effects on Repeated Doses Chronic Exposures	Repeated inhalative uptake of the substance did not cause substance-related effects. The product has not been tested. The statement has been derived from products of a similar structure or composition
Sensitization	Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals
Developmental Toxicity (Teratogenicity)	No data available concerning teratogenic effects. The chemical structure does not suggest such an effect.
Fertility	The results of animal studies gave no indication of a fertility impairing effect. The product has not been tested. The statement has been derived from products of a similar structure or composition. The chemical structure does not suggest such an effect.

11.7 STOT-single/repeated exposures:

STOT-single exposure	No data available
STOT-repeated exposure	No data available

11.8 Symptoms related to the physical, chemical and toxicological characteristics:

In case of inhalation	May be harmful if inhaled. May cause respiratory tract irritation
In case of skin contact	May be harmful if absorbed through skin. May cause skin irritation
In case of eye contact	Causes eye burns
In case of ingestion	Harmful if swallowed

11.9 Additional Toxicological Information:

- Signs and Symptoms of Exposure :
- Spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Overdose of iron compounds may have a corrosive effect on the gastrointestinal mucosa and be followed by necrosis, perforation, and stricture formation. Several hours may elapse before symptoms that can include epigastric pain, diarrhea, vomiting, nausea, and hematemesis occur. After apparent recovery a person may experience metabolic acidosis, convulsions and coma hours or days later. Further complications may develop leading to acute liver necrosis that can result in death due to hepatic coma. To the best of our knowledge, the chemical,

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physical, and toxicological properties have not been thoroughly investigated. Toxicological classifications are based on available knowledge and information

- EEC classification: Harmful.
- The special effects to health are considered by taking into account the information in section 3.
- RTECS: Not available

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity:

- Acute Fish Toxicity (LC50 96 hour): 21 mg/l
- Acute Crustaceans Toxicity (EC50 24 hour): 33,4 mg/l
- Acute Algea Toxicity (IC50 72 hour): No data available
- Acute Microorganisms Toxicity (EC50 72hour): No data available
- Acute Microorganisms Toxicity (EC10 17hour): No data available

12.2 Photo degradation

No data available.

12.3 Effects on Waste Water Treatment Plants

Not determined.

12.4 Mobility

Liquid
Solubility in water: Completely
Refer to ecotoxicity.

Water threat class	WGK 1 - low hazard to waters
Clean Water Impact	No data available
Known or predicted environmental distribution	No data available

12.5 Results of PBT and vPvB assessment

Biotic	
Ready biodegradability:	No data available
Abiotic:	
Hydrolysis as a function of pH:	No data available
Photolysis:	No data available
Atmospheric oxidation:	No data available

- **Persistence and degradability:**

Decomposition Potential of the products	No data available
The half-life of degradation	No data available
Potential degradation of product content in the evaluation of wastewater treatment plants	No data available

- **Bioaccumulation Potential :**

Biological environment (biota) accumulation potential	No data available
Potential - nutrients pass through	No data available
Reference Values - Log Kow , Sw and BCF	No data available

12.6 Additional information

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- See the sections 6, 7, 13, 14 and 15.

13. DISPOSAL CONSIDERATIONS

13.1 Product / Packaging disposal

- This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use.
- If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means.
- Shelf life considerations should also be applied in making decisions of this type.
- Note that properties of a material may change in use, and recycling or reuse may not always be appropriate
- When recycling of the product is not possible, disposal to landfill or incineration in accordance with all applicable government laws and regulations is recommended.
- Disposal according to local authority regulations.
- Contact waste disposal services

13.2 Contaminated packaging

- If there is product residue in the emptied container, follow directions for handling on the container's label.
- Contaminated packaging must be emptied of all residues and can be recycled following appropriate cleaning.

13.3 Disposal Methods

- Dispose of chemicals waste or in accordance with local regulations.
- Follow all applicable local laws, rules and regulations regarding the proper disposal of this material.
- If this product has been altered or contaminated with other hazardous materials, appropriate waste analysis may be necessary to determine proper method for disposal

13.4 European Waste Catalogue

- The final classification has to be done together with the local waste disposal company / authority.

14. TRANSPORT INFORMATION

UN 2582 FERRIC CHLORIDE SOLUTION

	ADR[7]/RID[8]	ADNR	IMDG[9]	ICAO[10]/IATA[11]
TRANSPORTATION	Road	River	Marine	Airways
PROPER SHIPPING NAME	FERRIC CHLORIDE SOLUTION			
UN/ID No.	2582	2582	2582	2582
SYMBOL				
CLASS	8	8	8	8
PACKAGING GROUP	III	III	III	III
LABELLING NO	8	8	8	8
CLASSIFICATION CODE	C1			

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HAZARD NO (HIN NO)	80			
EmS			F-A;S-B	
MARINE Pollutant			NO	
Road Transport Notes: This product is regulated as a hazardous material.				

15. REGULATORY INFORMATION

15.1 Safety, Health And Environmental Regulations / Legislation Specific For The Substance

Substance is found on the following regulatory lists;;

- "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)"

15.2 Chemical Safety Assessment

No data available

15.2.1 HAZARD

CLP classification according to Annex VI of CLP (Regulation (EC) No 1272/2008)

- Harmful if swallowed
- Causes skin irritation
- Causes serious eye damage

15.2.2 RISK

- Harmful if swallowed
- Irritating to skin
- Risk of serious damage to eyes

15.3 INTERNATIONAL REGULATIONS

- This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006 and ISO 11014:2009. This product is classified according to EU Directive 67/548/EC and GHS/CLP.

16. OTHER INFORMATION

16.1 Other information

- For additional information regarding **AK-KIM KIMYA SAN. VE TIC. ŞTİ.**products please contact the **AK-KIM KIMYA SAN. VE TIC. A.S** Vedat Ateşoğlu - vatesoglu@akkim.com.tr
- The above information complies with the 199/45/EC and 1907/2006 Directives and their amendments.
- In all cases of potential poisoning supportive therapy is of the utmost importance.

16.2 Related Person

- Vedat Ateşoğlu - vatesoglu@akkim.com.tr Ak-Kim Kimya San. Ve Tic. A.Ş
- Prepared by : Ali Haydar KETİR - Ak-Kim Kimya San. Ve Tic. A.Ş ali.ketir@akkim.com.tr
- **Competent Person Accreditation no : TSE GBF-0855 28.07.2011**

16.3 Revision Date, Version and SDS no

- Date : November 11, 2013
- Version : 1.0
- MSDS No : 193231

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16.4 Reason of re-issue

- *Compiling according to Regulation (EC) No 1272/2008*

16.5 Relevant R-, H- and EUH-phrases (number and full text):

H302	*Harmful if swallowed*
H315	*Causes skin irritation.*
H318	*Causes serious eye damage*

16.6 Legal disclaimer

- *The purpose of the above information is to describe the products only in terms of health and safety requirements.*
- *The information given should not, therefore, be construed as guaranteeing specific properties or as specification.*
- *Customers should satisfy themselves as to the suitability and completeness of such information for their own particular use.*
- *The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication.*
- *The above information relates only to the specific material(s) designated herein and may not be valid for such material(s) used in combination with any other materials or in any process or if the material is altered or processed, unless specified in the text.*
- *The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. Due to the many factors outside our control when using this product, we cannot accept liability for any injury, accident, loss or damage caused through its use.*

[1] SDS: Safety Data Sheet
[2] CAS: Chemical Abstract Service
[3] EINECS: European INventory of Existing Commercial
[4] CLP:Classification Laballing and Packaging
[5] GHS:Global Harmonised System
[6] NIOSH-National Institute of Occupational Safety and Health(Ulusal İş Sağlığı ve Güvenliği Enstitüsü)
[7] ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
[8] RID: Regulations Concerning the International Transport of Dangerous Goods by Rail
[9] IMDG: International Maritime Code for Dangerous Goods
[10] ICAO: International Civil Aviation Organization
[11] IATA: International Air Transport Association