Material Safety Data Sheet

Product Number **Z010**
Revision Number RN2.0

Revision Date 30 December 2021

1. Product and Company Identification

Product Name	Tissue Transglutaminase Assay Kit, chromogenic, Hydroxamate
CAS Registry Number	No data available, see section 2
Application	Determination of tissue transglutaminase activity
Unit Size	1 Kit
Manufacturer/Supplier	Zedira GmbH Rösslerstr. 83 64293 Darmstadt Germany Tel. +49(0)6151-66628-0 Fax.+49(0)6151-66628-19
Emergency Information	Tel. +49(0)6151-66628-0

2. Composition / Information on Components

Chemical characterization: Preparation, Data listed in section 2 - 16 were taken from external MSDS.

Hazardous ingredients:

Hydroxylamine	**CAS# 5470-11-1**, Conc.: 0.69% (w/v)
3-(N-Morpholino) propane-sulfonic acid (MOPS)	**CAS# 1132-61-2**, Conc.:2.4% (w/v) This item is not a hazardous substance and does not contain hazardous ingredients, substances with European Community workplace exposure limits or substances of very high concern (SVHC) above their respective disclosure limits. Hence, a safety data sheet is not required according to Regulation (EC) No. 1907/2006 (REACH) and also not available in this case.
Dithiothreitol (DTT)	**CAS# 3483-12-3**, Conc.: 0.6% (w/v)
Calcium Chloride Dihydrate	**CAS# 10035-04-8**, Conc.: 0.6% (w/v)
Z-QQPF-OH	**CAS# not available**, Conc.: 1% (w/v)
Hydrochloric acid	**CAS# not available**, Conc.: 4% (v/v)
$FeCl_3$ x 6 H_20	**CAS# 10025-77-1**, Conc.: 5% (w/v)

3. Hazards Identification

Emergency Overview: To our knowledge, the hazards of these materials have not been thoroughly investigated. We are not aware of any toxicity data for this product. We recommend handling all chemicals with caution.

Potential Health Effects

Hydroxylamine	Acute toxicity, Category 4, Oral, H302 Acute toxicity, Category 4, Dermal, H312 Carcinogenicity, Category 2, H351 Skin irritation, Category 2, H315 Eye irritation, Category 2, H319 Skin sensitisation, Category 1, H317 Specific target organ toxicity - repeated exposure, Category 2, Oral, H373 Acute aquatic toxicity, Category 1, H400 Corrosive to metals, Category 1, H290

Dithiothreitol (DTT)	Acute toxicity, Category 4, Oral, H302 Skin irritation, Category 2, H315 Eye irritation, Category 2, H319
Calcium Chloride Dihydrate	Eye irritation, Category 2, H319
Z-QQPF-OH	not applicable
Hydrochloric acid	Corrosive to metals, Category 1, H290 Skin corrosion, Category 1B, H314 Specific target organ toxicity – single exposure, Category 3, Respiratory System, H335
$FeCl_3$ x 6 H_20	Acute toxicity, Category 4, Oral, H302 Skin irritation, Category 2, H315 Serious eye damage, Category 1, H318

Full text of H-Statements referred to under this section.

H290	May be corrosive to metals.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.

4. First Aid Measures

Hydroxylamine

Description of first aid measures

After inhalation: fresh air. Call in physician.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

After eye contact: rinse out with plenty of water. Call in ophthalmologist.

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

Most important symptoms and effects, both acute and delayed

irritant effects, Allergic reactions

Dermatitis, Cyanosis

The following applies to ammonium salts in general: after swallowing: local irritation symptoms, nausea, vomiting, diarrhoea. Systemic effect: after the uptake of very large quantities: drop in blood pressure, collapse, CNS disorders, spasms, narcotic conditions, respiratory paralysis, haemolysis.

Dithiothreitol (DTT)	**Description of first aid measures** After inhalation: fresh air. After skin contact: wash off with plenty of water. Remove contaminated clothing. After eye contact: rinse of with plenty of water. Call in ophthalmologist. After swallowing: immediately make victim drink water (two glasses at most). Consult a physician. **Most important symptoms and effects, both acute and delayed** irritant effects, inebriation, Nausea, Vomiting, Headache, Convulsions, restlessness, Irregular cardiac activity
Calcium Chloride Dihydrate	**Description of first aid measures** After inhalation: fresh air. After skin contact: wash off with plenty of water. Remove contaminated clothing. After eye contact: rinse of with plenty of water. Call in ophthalmologist. After swallowing: immediately make victim drink water (two glasses at most). Consult a physician. **Most important symptoms and effects, both acute and delayed** irritant effects, Stomach/intestinal disorders
Z-QQPF-OH	Potentially harmful. Avoid prolonged or repeated exposure. Wash thoroughly after handling. If eye or skin contact occurs, wash affected area with water for 15 minutes and seek medical advice. If inhaled, move individual to fresh air and seek medical advice. If swallowed wash mouth with water and seek medical advice.
Hydrochloric acid	**Description of first aid measures** General Advice: First aider needs to protect himself. After inhalation: fresh air. Call in physician. In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Cal a physician immediately. After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. After swallowing: immediately make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Cal a physician immediately. Do not attempt to neutralize **Most important symptoms and effects, both acute and delayed** Irritation and corrosion, Cough, Shortness of breath, cardiovascular disorders, Risk of blindness!
$FeCl_3$ x 6 H_20	**Description of first aid measures** After inhalation: fresh air. After skin contact: wash off with plenty of water. Remove contaminated clothing. After eye contact: rinse of with plenty of water. Immediately call in ophthalmologist. After swallowing: immediately make victim drink water (two glasses at most). Consult a physician. **Most important symptoms and effects, both acute and delayed** irritant effects, Nausea, Vomiting, cardiovascular disorders, Risk of serious damage to eyes. The following applies to soluble iron compounds: nausea and vomiting after swallowing. The absorption of large quantities is followed by cardiovascular disorders. Toxic effect on liver and kidneys.

5. Fire Fighting Measures

Hydroxylamine	Water, Foam, Carbon dioxide (CO_2), Dry powder
Dithiothreitol (DTT)	Water, Foam, Carbon dioxide (CO_2), Dry powder
Calcium Chloride Dihydrate	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Z-QQPF-OH	Use dry chemical powder or appropriate foam extinguisher.
Hydrochloric acid	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
$FeCl_3$ x 6 H_20	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

6. Accidental Release Measures

Hydroxylamine	**Personal precautions, protective equipment and emergency procedures** Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. **Environmental precautions** Do not let product enter drains. Risk of explosion. **Methods and materials for containment and cleaning up** Cover drains. Collect, bind, and pump off spills. Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.
Dithiothreitol (DTT)	**Personal precautions, protective equipment and emergency procedures** Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. **Environmental precautions** Do not empty into drains. **Methods and materials for containment and cleaning up** Cover drains. Collect, bind, and pump off spills. Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.
Calcium Chloride Dihydrate	**Personal precautions, protective equipment and emergency procedures** Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. **Environmental precautions** Do not empty into drains. **Methods and materials for containment and cleaning up** Cover drains. Collect, bind, and pump off spills. Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.
Z-QQPF-OH	Use appropriate protective equipment and methods to clean up spilled substances promptly. Absorb spill onto an appropriate material. Collect and dispose of all waste in accordance with applicable laws.
Hydrochloric acid	**Personal precautions, protective equipment and emergency procedures** Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. **Environmental precautions** Do not empty into drains. **Methods and materials for containment and cleaning up** Cover drains. Collect, bind, and pump off spills. Take up with liquid-absorbent and neutralizing material. Dispose of properly. Clean up affected area.

$FeCl_3$ x 6 H_20	**Personal precautions, protective equipment and emergency procedures** Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. **Environmental precautions** Do not empty into drains. **Methods and materials for containment and cleaning up** Cover drains. Collect, bind, and pump off spills. Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

7. Handling and Storage

If not indicated otherwise, store at 4-8°C. Tightly closed and away from sources of ignition and heat. Desiccate.

Delivery is possible at ambient temperature

Hydroxylamine	Work under hood. Do not inhale substance/mixture.
Hydrochloric acid	Do not store in metal containers.
$FeCl_3$ x 6 H_20	Do not store in metal containers.

8. Exposure Controls / Personal Protection

If not indicated otherwise the following is valid for all kit components:

Control parameters
Contains no substances with occupational exposure limit values.

Exposure controls

Engineering measures
Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

Individual protection measures
Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye/face protection:	Tightly fitting safety glasses
Hand protection : (full and splash contact)	Glove material: Nitrile rubber Glove thickness: 0.11 mm Break through time: > 480 min
Other protective equipment:	Protective clothing
Environmental exposure controls	Do not let product enter drains.

Hydroxylamine	Risk of explosion. Respiratory protection required when dusts are generated. Recommended Filter type: Filter P 3 (acc. to DIN 3181) for solid and liquid particles of toxic and very toxic substances.
Dithiothreitol (DTT)	Respiratory protection required when dusts are generated. Recommended Filter type: Filter P 2 (acc. to DIN 3181) for solid and liquid particles of harmful substances.

Calcium Chloride Dihydrate	Respiratory protection required when dusts are generated. Recommended Filter type: Filter P 2 (acc. to DIN 3181) for solid and liquid particles of harmful substances.
Z-QQPF-OH	Wear appropriate gloves, protective clothing and eyewear and follow safe laboratory practices ACGIH/OSHA Permissible Exposure Limit Data: No data available
Hydrochloric acid	Other protective equipment: Acid-resistant protective clothing Respiratory protection required when vapours/aerosols are generated. Recommended Filter type: Filter E-(P2)
$FeCl_3$ x 6 H_20	Respiratory protection required when dusts are generated. Recommended Filter type: Filter B-(P2)

9. Physical and Chemical Properties

Hydroxylamine	Form	Solid
	Odour	slight chlorine
	Solubility	Aqueous buffers
	Specific Gravity	No data available
	pH	2.5-3.5 at 50 g/L, 20°C
	Boiling Point	No data available
	Melting Point	159°C
	Flash Point	No data available
	Vapour Pressure	No data available
3-(N-Morpholino) propane-sulfonic acid (MOPS)	Form	Solid
	Odour	Odourless
	Solubility	Aqueous buffers
	Specific Gravity	No data available
	pH	No data available
	Boiling Point	No data available
	Melting Point	284°C
	Flash Point	No data available
	Vapour Pressure	No data available
Dithiothreitol (DTT)	Form	Solid
	Odour	putrid
	Solubility	Aqueous buffers
	Specific Gravity	No data available
	pH	5.1 at 1ß g/L, 20°C
	Boiling Point	No data available
	Melting Point	40-43°C
	Flash Point	> 100°C
	Vapour Pressure	No data available
Calcium Chloride Dihydrate	Form	Solid
	Odour	Odourless
	Solubility	Aqueous buffers
	Specific Gravity	No data available
	pH	4.5-8.5 at 50 g/L, 20°C
	Boiling Point	No data available
	Melting Point	No data available
	Flash Point	does not flash
	Vapour Pressure	No data available

Z-QQPF-OH	Form	Solid
	Odour	Odourless
	Solubility	Aqueous buffers above pH 7
	Specific Gravity	No data available
	pH	No data available
	Boiling Point	No data available
	Melting Point	No data available
	Flash Point	No data available
	Vapour Pressure	No data available
Hydrochloric acid	Form	Liquid
	Odour	stinging
	Solubility	Aqueous buffers
	Specific Gravity	~1
	pH	<1 at 20°C
	Boiling Point	No data available
	Melting Point	ca. -50°C
	Flash Point	Not applicable
	Vapour Pressure	21.2 hPa at 20°C
$FeCl_3$ x 6 H_20	Form	Solid
	Odour	of chlorine
	Solubility	920 g/L in water at 20°C
	Specific Gravity	No data available
	pH	ca. 1.8 at 10 g/L, 25°C
	Boiling Point	Not applicable
	Melting Point	37°C
	Flash Point	does not flash
	Vapour Pressure	No data available

10. Stability and Reactivity

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dustexplosion potential may generally be assumed.

Hydroxylamine	Reactivity	Explosive, Mechanical sensitivity (friction)
	Chemical stability	The product is chemically stable under standard ambient conditions (room temperature).
	Possibility of hazardous reactions	Violent reactions possible with: alkaline substances Possible formation of: hydroxylamine Risk of explosion with: fire-promoting substances, Oxidizing agents
	Conditions to avoid	Heating (decomposition).
	Incompatible materials	Aluminium, Copper, Zinc, Tin, Metals
	Hazardous decomposition products	No data available

Dithiothreitol (DTT)	Reactivity	Forms explosive mixtures with air on intense heating. A range from approx. 15 Kelvin below the flash point is to be rated as critical.
	Chemical stability	The product is chemically stable under standard ambient conditions (room temperature).
	Possibility of hazardous reactions	Violent reactions possible with: Strong oxidizing agents
	Conditions to avoid	Strong heating
	Incompatible materials	No information available
	Hazardous decomposition products	No data available
Calcium Chloride Dihydrate	Reactivity	Exothermic dissolution process with water
	Chemical stability	The product is chemically stable under standard ambient conditions (room temperature).
	Possibility of hazardous reactions	Exothermic reaction with: boron trifluoride, vinylmethyl ether, Water Generates dangerous gases or fumes in contact with: Metals, Zinc
	Conditions to avoid	Exposure to moisture
	Incompatible materials	No information available
	Hazardous decomposition products	No data available
Z-QQPF-OH	Reactivity	No data available
	Chemical stability	No data available
	Possibility of hazardous reactions	No data available
	Conditions to avoid	No data available
	Incompatible materials	No data available
	Hazardous decomposition products	No data available
Hydrochloric acid	Reactivity	Corrosive in contact with metals
	Chemical stability	The product is chemically stable under standard ambient conditions (room temperature).
	Possibility of hazardous reactions	Exothermic reaction with: Amines, potassium, salts of oxyhalogenic acids, semimetallic oxides, semimetallic hydrogen compounds, Aldehydes, vinylmethyl ether; Risk of ignition or formation of inflammable gasses or vapours with: carbides, lithium silicide, Fluorine Generates dangerous gases or fumes in contact with: Aluminium, hydrides, formaldehyde, Metals, strong alkalis, sulphides Risk of explosion with: Alkali metals, conc. Sulfuric acid
	Conditions to avoid	Heating
	Incompatible materials	Metals, metal alloys. Gives off hydrogen by reaction with metals
	Hazardous decomposition products	No data available

$FeCl_3$ x 6 H_20	Reactivity	Corrosive in contact with metals
	Chemical stability	Sensitive to moisture
	Possibility of hazardous reactions	Risk of explosion with: Alkali metals, Ethylene oxide
	Conditions to avoid	Strong heating (decomposition), exposure to moisture
	Incompatible materials	Metals, Mild steel
	Hazardous decomposition products	No data available

11. Toxicological Information

Hydroxylamine	Acute oral toxicity	Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract. absorption
	Acute inhalation toxicity	Symptoms: Possible damages: mucosal irritations
	Acute dermal toxicity	Acute toxicity estimate : 1,100.1 mg/kg, Expert judgement absorption
	Skin irritation	Rabbit, Result: slight irritation (IUCLID), Causes skin irritation. Dermatitis
	Eye irritation	Causes serious eye irritation.
	Sensitisation	Human experience, Result: positive (Lit.), May cause an allergic skin reaction.
	Germ cell mutagenicity	This information is not available.
	Carcinogenicity	This information is not available.
	Reproductive toxicity	This information is not available.
	Teratogenicity	This information is not available.
	CMS effects	Carcinogenicity: Suspected of causing cancer.
	Specific target organ toxicity	
	- single exposure	This information is not available.
	- repeated exposure	May cause damage to organs through prolonged or repeated exposure.
	Aspiration hazard	This information is not available.
	Further information	After absorption: drop in blood pressure, Cyanosis, Risk of methaemoglobin formation. The following applies to ammonium salts in general: after swallowing: local irritation symptoms, nausea, vomiting, diarrhoea. Systemic effect: after the uptake of very large qantities: drop in blood pressure, collapse, CNS disorders, spasms, narcotic conditions, respiratory paralysis, haemolysis. This substance should be handled with particular care.
Dithiothreitol (DTT)	Acute oral toxicity	LD50 rat: 400 mg/kg, absorption Symptoms: Nausea, Vomiting
	Acute inhalation toxicity	Symptoms: Possible damages: mucosal irritations
	Acute dermal toxicity	This information is not available.
	Skin irritation	Causes skin irritation

	Eye irritation	Causes serious eye irritation
	Sensitisation	This information is not available.
	Germ cell mutagenicity	This information is not available.
	Carcinogenicity	This information is not available.
	Reproductive toxicity	This information is not available.
	Teratogenicity	This information is not available.
	CMS effects	This information is not available.
	Specific target organ toxicity - single / repeated exposure	This information is not available.
	Aspiration hazard	This information is not available.
	Further information	Systemic effects: Headache, inebriation, restlessness, convulsion, cardiac irregularities Damage to: Kidney The following applies to mercaptans in general: offensive odour Other dangerous properties can not be excluded.
Calcium Chloride Dihydrate	Acute oral toxicity	LD50 rabbit: 500-1000 mg/kg, OECD Test Guideline 401 (anhydrous substance) LD50 rat: 1000 mg/kg (anhydrous substance) (IUCLID) Symptoms: After uptake of large quantities: Stomach/intestinal disorders
	Acute inhalation toxicity	Symptoms: Possible damages: mucosal irritations
	Acute dermal toxicity	LD50 rat: 2630 mg/kg (anhydrous substance) (IUCLID)
	Skin irritation	Rabbit, Result: no irritation, OECD Test Guideline 401 (anhydrous substance)
	Eye irritation	Rabbit, Result: Eye irritation, OECD Test Guideline 405 (anhydrous substance), causes serious eye irritation
	Sensitisation	This information is not available.
	Germ cell mutagenicity	Genotoxicity in vitro, Ames test, Result: negative (anhydrous substance) (Lit.)
	Carcinogenicity	This information is not available.
	Reproductive toxicity	This information is not available.
	Teratogenicity	This information is not available.
	CMS effects	This information is not available.
	Specific target organ toxicity - single / repeated exposure	This information is not available.
	Aspiration hazard	This information is not available.
	Further information	Other dangerous properties can not be excluded. Handle in accordance with good industrial hygiene and safety practice.

Z-QQPF-OH	Acute oral toxicity	This information is not available.
	Acute inhalation toxicity	This information is not available.
	Acute dermal toxicity	This information is not available.
	Skin irritation	This information is not available.
	Eye irritation	This information is not available.
	Sensitisation	This information is not available.
	Germ cell mutagenicity	This information is not available.
	Carcinogenicity	This information is not available.
	Reproductive toxicity	This information is not available.
	Teratogenicity	This information is not available.
	CMS effects	This information is not available.
	Specific target organ toxicity - single / repeated exposure	This information is not available.
	Aspiration hazard	This information is not available.
	Further information	This information is not available.
Hydrochloric acid	Acute oral toxicity	Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.
	Acute inhalation toxicity	Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages: damage of respiratory tract
	Acute dermal toxicity	This information is not available.
	Skin irritation	Mixture causes burns.
	Eye irritation	Mixture causes serious eye damage. Risk of blindness!
	Sensitisation	This information is not available.
	Germ cell mutagenicity	This information is not available.
	Carcinogenicity	This information is not available.
	Reproductive toxicity	This information is not available.
	Teratogenicity	This information is not available.
	CMS effects	This information is not available.
	Specific target organ toxicity - single exposure - repeated exposure	Mixture may cause respiratory irritation. Target organs: Respiratory system This information is not available.
	Aspiration hazard	This information is not available.
	Further information	After uptake: -/-, After a latency period: cardiovascular disorders Other dangerous properties can not be excluded. Handle in accordance with good industrial hygiene and safety practice.

$FeCl_3$ x 6 H_20	Acute oral toxicity	LD50 rat: 316 mg/kg (anhydrous substance) (RTECS) LDLO rat: 900 mg/kg (RTECS) absorption Symptoms: Nausea, Vomiting, Irritation of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.
	Acute inhalation toxicity	Symptoms: Possible damages: Irritation symptoms in the respiratory tract
	Acute dermal toxicity	LD50 Dermal rat: >2000 mg/kg (External MSDS) (anhydrous substance)
	Skin irritation	Rabbit, Result: Irritations (anhydrous substance) (IUCLID), Causes skin irritation
	Eye irritation	Rabbit, Result: Severe irritations, IECD Test Guideline 405 (anhydrous substance), Causes serious eye damage
	Sensitisation	This information is not available.
	Germ cell mutagenicity	Genotoxicity in vivo: In vivo micronucleus test mouse, Result: negative (External MSDS) (anhydrous substance) Genotoxicity in vitro: Ames test, Result: negative, Method: OECD Test Guideline 471 (anhydrous substance) Mutagenicity (Mammal cell test): Micronucleus, Result: negative, Method: OECD Test Guideline 487 (anhydrous substance)
	Carcinogenicity	This information is not available.
	Reproductive toxicity	This information is not available.
	Teratogenicity	This information is not available.
	CMS effects	This information is not available.
	Specific target organ toxicity - single / repeated exposure	This information is not available.
	Aspiration hazard	This information is not available.
	Further information	After absorption of large quantities: cardiovascular disorders Toxic effect on: Liver, kidney Other dangerous properties can not be excluded. Handle in accordance with good industrial hygiene and safety practice.

12. Ecological Information

Hydroxylamine	Toxicity	No information available.
	Persistence and degradability	No information available.
	Bioaccumulative potential	Partition coefficient: n-octanol/water, log Pow: -2.66 (calculated), Bioaccumulation is not expected. (Lit.)
	Mobility in soil	No information available.
	Results of PBT and vPvB assessment	PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.
	Other adverse effects	Discharge into the environment must be avoided.

Dithiothreitol (DTT)	Toxicity	Toxicity to daphnia and other aquatic invertebrates: EC50 Daphnia magna (Water flea): 27 mg/L; 48h (ECOTOX Database)
	Persistence and degradability	No information available.
	Bioaccumulative potential	Partition coefficient: n-octanol/water log Pow: -0.48 (calculated) (Lit.) Bioaccumulation is not expected
	Mobility in soil	No information available.
	Results of PBT and vPvB assessment	No information available.
	Other adverse effects	Discharge into the environment must be avoided.
Calcium Chloride Dihydrate	Toxicity	Toxicity to fish: LD50 Lepomis macrochirus (Bluegill sunfish): 10650 mg/L; 96h (anhydrous substance) (IUCLID) Toxicity to daphnia and other aquatic invertebrates: EC50 Daphnia magna (Water flea): 144 mg/L; 48h (anhydrous substance) (IUCLID) Toxicity to algae: IC50 algae: 3130 mg/L, 120h (anhydrous substance) (IUCLID)
	Persistence and degradability	No information available.
	Bioaccumulative potential	No information available.
	Mobility in soil	No information available.
	Results of PBT and vPvB assessment	No information available.
	Other adverse effects	Discharge into the environment must be avoided.
Z-QQPF-OH	Toxicity	No information available.
	Persistence and degradability	No information available.
	Bioaccumulative potential	No information available.
	Mobility in soil	No information available.
	Results of PBT and vPvB assessment	No information available.
	Other adverse effects	No information available.
Hydrochloric acid	Toxicity	No information available.
	Persistence and degradability	No information available.
	Bioaccumulative potential	Partition coefficient: n-octanol/ water: not applicable
	Mobility in soil	No information available.
	Results of PBT and vPvB assessment	No information available.
	Other adverse effects	Forms corrosive mixtures with water even if diluted. Harmful effect due to pH shift. Discharge into the environment must be avoided.

$FeCl_3$ x 6 H_20	Toxicity	Toxicity to fish: LD50 Lepomis macrochirus (Bluegill sunfish): 20.3 mg/L; 96h (external MSDS) (anhydrous substance) Toxicity to daphnia and other aquatic invertebrates: Immobilization EC50 Daphnia magna (Water flea): 9.6 mg/L; 48h, OECD Test Guideline 202 (anhydrous substance) Toxicity to algae: ErC50 Pseudokrichneriella subcapitata (green algae): 6.9 mg/L; 72h, OECD Test Guideline 201 (anhydrous substance) NOEC Pseudokrichneriella subcapitata (green algae): 2.4 mg/L; 72h, OECD Test Guideline 201 (anhydrous substance) Toxicity to fish (Chronic toxicity): NOEC Pimeohales promelas (fathead minnow): 0.33 mg/L; 33d (external MSDS) (anhydrous substance) Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC Daphnia magna (Water flea): 0.7 mg/L; 21d (external MSDS) (anhydrous substance)
	Persistence and degradability	Biodegradability: The methods for determining the biological degradability are not applicable to inorganic substance.
	Bioaccumulative potential	No information available.
	Mobility in soil	No information available.
	Results of PBT and vPvB assessment	No information available.
	Other adverse effects	Biological effects: Discharge into the environment must be avoided. Product reacts with water. The following may develop after reaction of the product with water: hydrochloric acid

13. Disposal Considerations

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

Notice Directive on waste 2008/98/EC.

14. Transport Information

Hydroxylamine	**Land transport (ADR/RID)**	
	14.1 UN number	UN 2923
	14.2 Proper shipping name	CORROSIVE SOLID, TOXIC, N.O.S. (HYDROXYLAMMONIUM CHLORIDE)
	14.3 Class	8 (6.1)
	14.4 Packing group	III
	14.5 Environmentally hazardous	yes
	14.6 Special precautions for user	yes
	Tunnel restriction code	E
	Inland waterway transport (ADN)	Not relevant
	Air transport (IATA)	
	14.1 UN number	UN 2923

	14.2 Proper shipping name	CORROSIVE SOLID, TOXIC, N.O.S. (HYDROXYLAMMONIUM CHLORIDE)
	14.3 Class	8 (6.1)
	14.4 Packing group	III
	14.5 Environmentally hazardous	yes
	14.6 Special precautions for user	no
	Sea transport (IMDG)	
	14.1 UN number	UN 2923
	14.2 Proper shipping name	CORROSIVE SOLID, TOXIC, N.O.S. (HYDROXYLAMMONIUM CHLORIDE)
	14.3 Class	8 (6.1)
	14.4 Packing group	III
	14.5 Environmentally hazardous	yes
	14.6 Special precautions for user	yes
	EmS	F-A S-B
	Segregation Group	0001 Acids
	14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not relevant
Dithiothreitol (DTT)	**Land transport (ADR/RID)**	
	14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
	Inland waterway transport (ADN)	Nor relevant
	Air transport (IATA)	
	14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
	Sea transport (IMDG)	
	14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
	14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Nor relevant
Calcium Chloride Dihydrate	**Land transport (ADR/RID)**	
	14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
	Inland waterway transport (ADN)	Nor relevant
	Air transport (IATA)	
	14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
	Sea transport (IMDG)	
	14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
	14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Nor relevant
Z-QQPF-OH	**Land transport (ADR/RID)**	
	14.1 - 14.6	No data available
	Inland waterway transport (ADN)	No data available
	Air transport (IATA)	

	14.1 - 14.6	No data available
	Sea transport (IMDG)	
	14.1 - 14.6	No data available
	14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	No data available
Hydrochloric acid	**Land transport (ADR/RID)**	
	14.1 UN number	UN 1789
	14.2 Proper shipping name	HYDROCHLORIC ACID
	14.3 Class	8
	14.4 Packing group	II
	14.5 Environmentally hazardous	--
	14.6 Special precautions for user	yes
	Tunnel restriction code	E
	Inland waterway transport (ADN)	Not relevant
	Air transport (IATA)	
	14.1 UN number	UN 1789
	14.2 Proper shipping name	HYDROCHLORIC ACID
	14.3 Class	8
	14.4 Packing group	II
	14.5 Environmentally hazardous	--
	14.6 Special precautions for user	no
	Sea transport (IMDG)	
	14.1 UN number	UN 1789
	14.2 Proper shipping name	HYDROCHLORIC ACID
	14.3 Class	8
	14.4 Packing group	II
	14.5 Environmentally hazardous	--
	14.6 Special precautions for user	yes
	EmS	F-A S-B
	14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not relevant
$FeCl_3$ x 6 H_20	**Land transport (ADR/RID)**	
	14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
	Inland waterway transport (ADN)	Nor relevant
	Air transport (IATA)	
	14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
	Sea transport (IMDG)	
	14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
	14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Nor relevant

15. Regulations

Hydroxylamine	**Safety, health and environmental regulations/ legislation specific for the substance or mixture**	
	EU regulations Major Accident Hazard Legislation	SEVESO III ENVIRONMENTAL HAZARDS E1; Quantity 1: 100 t; Quantity 2: 200 t
	Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.
	Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated
	Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated
	Substances of very high concern (SVHC)	This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w).
	National legislation Storage class German explosives Act	 4.1A applies, C, III.
	Chemical Safety Assessment	For this product a chemical safety assessment was not carried out.
Dithiothreitol (DTT)	**Safety, health and environmental regulations/ legislation specific for the substance or mixture**	
	EU regulations Major Accident Hazard Legislation	 96/82/EC Directive 96/82/EC does not apply
	Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.
	Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated
	Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated
	Regulation (EC) No 689/2008 concerning the export	not regulated

	and import of dangerous chemicals	
	Substances of very high concern (SVHC)	This product does not contain substances of very high concern according above the respective regulatory concentration limit (> 0.1 % (w/w) Regulation (EC) No 1907/2006 (REACH), Article 57).
	National legislation	
	Storage class	10 – 13
	Chemical Safety Assessment	For this product a chemical safety assessment was not carried out.
Calcium Chloride Dihydrate	**Safety, health and environmental regulations/ legislation specific for the substance or mixture**	
	EU regulations	
	Major Accident Hazard Legislation	96/82/EC Directive 96/82/EC does not apply
	Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work.
	Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated
	Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated
	Regulation (EC) No 689/2008 concerning the export and import of dangerous chemicals	not regulated
	Substances of very high concern (SVHC)	This product does not contain substances of very high concern according above the respective regulatory concentration limit (> 0.1 % (w/w) Regulation (EC) No 1907/2006 (REACH), Article 57).
	National legislation	
	Storage class	10 – 13
	Chemical Safety Assessment	For this product a chemical safety assessment was not carried out.
Z-QQPF-OH	**Safety, health and environmental regulations/ legislation specific for the substance or mixture**	
	EU regulations	
	Major Accident Hazard Legislation	No data available
	Occupational restrictions	No data available
	Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	No data available
	Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on	No data available

	persistent organic pollutants and amending Directive 79/117/EEC	
	Regulation (EC) No 689/2008 concerning the export and import of dangerous chemicals	No data available
	Substances of very high concern (SVHC)	No data available
	National legislation Storage class	No data available
	Chemical Safety Assessment	For this product a chemical safety assessment was not carried out.
Hydrochloric acid	**Safety, health and environmental regulations/ legislation specific for the substance or mixture**	
	EU regulations Major Accident Hazard Legislation	SEVESO III Not applicable
	Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work.
	Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated
	Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated
	Substances of very high concern (SVHC)	This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w).
	National legislation Storage class	8B
	Chemical Safety Assessment	For this product a chemical safety assessment was not carried out.
$FeCl_3$ x 6 H_20	**Safety, health and environmental regulations/ legislation specific for the substance or mixture**	
	EU regulations Major Accident Hazard Legislation	96/82/EC Directive 96/82/EC does not apply
	Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.
	Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated

	Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated
	Regulation (EC) No 689/2008 concerning the export and import of dangerous chemicals	not regulated
	Substances of very high concern (SVHC)	This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w).
	National legislation Storage class	10 – 13
	Chemical Safety Assessment	For this product a chemical safety assessment was not carried out.

16. Other Information

This material is sold for research purposes only. It is not intended for food, drug, household, agricultural or cosmetic use. Its use must be supervised by a technically qualified individual experienced in handling potentially hazardous chemicals. The above information is correct to the best of our knowledge. Users should make independent decisions regarding completeness of the information based on all sources available. Zedira GmbH shall not be held liable for any damage resulting from handling or contact with the above product.