QuantiPlate™ Kit for Microcystins

Highlights:

- *Quantitative laboratory detection of Microcystin toxin in surface water*
- *Detects from 0.2 to 2.0 ppb*

Contents of Kit:

- *12 strips of 8 antibody-coated wells each, in plate frame*
- *1 vial of Negative Control*
- *1 vial of 0.2 ppb Microcystin LR Calibrator*
- *1 vial of 0.6 ppb Microcystin LR Calibrator*
- *1 vial of 2.0 ppb Microcystin LR Calibrator*
- *1 bottle of Assay Diluent*
- *1 bottle of Microcystin-enzyme Conjugate*
- *1 packet of Wash Solution salts*
- *1 bottle of Substrate*
- *1 bottle of Stop Solution*

Precision

	Recovery (%CV)	OD (%CV)
Intra-Assay	**n=11**	
0.4 ppb	8.3%	4.1%
1.0 ppb	4.6%	5.9%
Inter-Assay	**n=11**	
0.4 ppb	8.7%	8.7
1.0 ppb	3.6%	11.7

Cross-Reactivity

Compound	50% B_0	LOD 80% B_0
Microcystin LR	0.53	0.21
Microcystin LA	0.91	0.16
Microcystin RR	0.69	0.27
Microcystin YR	0.84	0.36
Nodularin	0.30	0.12

Catalog Number EP 022

Intended Use

The EnviroLogix QuantiPlate Kit for Microcystins is designed for the quantitative laboratory detection of Microcystin toxin in surface water samples, with an assay quantitation range from 0.2 to 2 parts per billion (ppb)

How the Test Works

This QuantiPlate Kit for Microcystins is a competitive Enzyme-Linked ImmunoSorbent Assay (ELISA).

In the test, Microcystin toxin in the sample competes with enzyme (horseradish peroxidase)-labeled Microcystin for a limited number of antibody binding sites on the inside surface of the test wells.

After a simple wash step, the outcome of the competition is visualized with a color development step. As with all competitive immunoassays, sample concentration is inversely proportional to color development.

Darker color = Lower concentration
Lighter color = Higher concentration

Limit of Detection

The Limit of Detection (LOD) of this Kit is 0.10 ppb. The LOD was determined by interpolation at 91.6% B_0* from a standard curve. 91.6% B_0 was determined to be 3 standard deviations from the mean of a population of negative water samples.

*100% B_0 equals the maximum amount of Microcystin-enzyme conjugate that is bound by the antibody in the absence of any Microcystin in the sample (i.e. negative control). %B_0 = (OD of Sample or Calibrator/OD of Negative Control) x 100.

Limit of Quantification

The Limit of Quantification (LOQ) of this Kit was validated at 0.2 ppb. The LOQ was determined by fortifying a population of negative water samples at 0.2 ppb. The mean recovery was 96.4% with a coefficient of variation (CV) [(standard deviation/mean) x 100] of 8.2%.

Precision

Microcystin-fortified control solutions were repetitively analyzed both within a single assay, and in different assays on different days. The data is expressed as %CV for both the recovered concentration and for absorbance (OD).

Fortification and Recovery

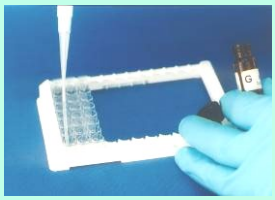
Four surface water samples were fortified with Microcystin to a concentration of 1.0 ppb. The average recovery was 102%, with a CV of 4.2%.

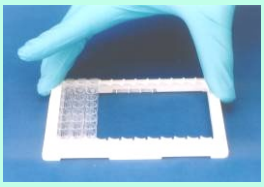
Cross-Reactivity

This Kit does not distinguish between the Microcystin toxin variants, but detects their presence to differing degrees. The accompanying table shows the value for 50% B_0 and the value for the 80% B_0 for four Microcystin toxin variants and nodularin toxin. Concentration is in ppb. Humic acid did not interfere in the assay up to a concentration of 100 ppm.


Remove unneeded strips


Select Calibrators and Control


Add controls/calibrators/sample


Mix plate


Incubate


Bottle Wash method

Materials Needed

- disposable tip adjustable air-displacement pipette which will measure 50 µL and 100 µL
- marking pen (indelible)
- tape or Parafilm®
- timer (30 minutes)
- distilled water for preparing Wash Solution
- glassware for storing Wash Solution
- wash bottle for washing strips with Wash Solution
- microtiter plate reader or strip reader
- microtiter plate washer (optional)
- twelve or 8-channel pipette that will measure 50 µL and 100 µL (optional)
- racked (glass) dilution tubes for loading samples into the plate with a 12-channel pipette (optional)
- orbital plate shaker (optional)

Preparation of Solutions

Wash Buffer:
To make 1 L, add the contents of one packet of phosphate-buffered saline - Tween 20, pH 7.4 (**Wash Solution salts**) to 1 L of distilled water. Mix thoroughly to dissolve the salts. This can be stored at room temperature.

How to Run the Assay

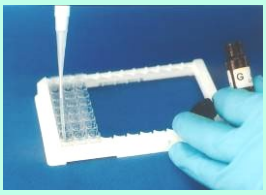
- Read all of these instructions before running the kit.
- Allow all reagents to reach room temperature before beginning (at least 30 minutes with un-boxed strips and reagents at room temperature - do not remove strips from bag with desiccant until they have warmed up).
- Organize all samples, reagents and pipettes so that steps 1 and 2 can be performed in 10 minutes or less.
- If more than three strips are to be run at one time, the 10 minutes is likely to be exceeded, and the use of a multi-channel pipette is recommended (see "Note" below).
- If three or fewer strips are to be run, use a disposable-tip air-displacement pipette and a clean pipette tip to add each Calibrator and sample to the wells. Assay Diluent, Conjugate, Substrate, and Stop Solution may be added in the same manner; alternatively, use a repeating pipette with a disposable tip on the end of the Combitip for these three reagents.
- If fewer than all twelve strips are used, reseal the unneeded strips and the desiccant in the plastic bag provided.
- Use the well identification markings on the plate frame to guide you when adding the samples and reagents. Two strips may be used to run the Negative Control (NC), three Calibrators (C1-C3) and four samples, in duplicate. More samples require more strips. For an example plate layout see Figure 1.

1. Rapidly add **50 µL** of **Microcystin Assay Diluent** to each well that will be used, preferably with a repeating or multi-channel pipetter.

2. Immediately add **50 µL** of **Negative Control** (NC), **50 µL** of each **Calibrator** (C1-C3) and **50 µL** of each **sample** (S1-S8) to their respective wells, as shown at left. (Follow this same order of addition for all reagents.) **Do not add Microcystin-enzyme Conjugate in this step.**



Strip Plate Wash option

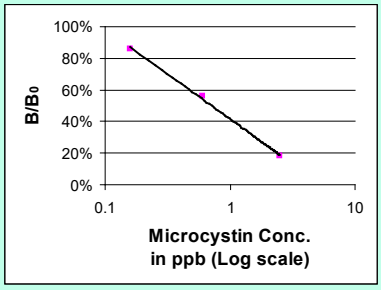


Complete protocol and add Stop Solution



Read plates in a Plate Reader within 30 minutes of the addition of Stop Solution

Illustrative standard curve



3. Thoroughly mix the contents of the wells by moving the strip holder in a rapid circular motion on the benchtop for a full 20-30 seconds. Be careful not to spill the contents!

NOTE: In order to minimize setup time it is recommended that a multi-channel pipette be used in steps 1, 2, 5, 8 and 10 when more than 3 strips are used.

4. Cover the wells with tape or Parafilm to prevent evaporation and incubate at ambient temperature for 30 minutes. If an orbital shaker is available shake at 200 rpm.

5. Add **50 µL** of **Microcystin-enzyme Conjugate** to each well. Do not empty the well contents or wash the strips at this time.

6. Thoroughly mix the contents of the wells as in step 3. Cover the wells with tape or Parafilm and incubate at ambient temperature for 30 minutes. Use orbital shaker if available.

7. After incubation, carefully remove the covering and vigorously shake the contents of the wells into a sink or other suitable container. Flood the wells completely with **Wash Solution**, then shake to empty. Repeat this wash step four times. Slap the plate on a paper towel to remove as much Wash Solution as possible. Alternatively, use a microtiter plate washer with **Wash Solution** for the wash step.

8. Add **100 µL** of **Substrate** to each well.

9. Thoroughly mix the contents of the wells, as in step 3. Cover the wells with new tape or Parafilm and incubate for 30 minutes at ambient temperature. Use orbital shaker if available.

Caution: Stop Solution is 1.0 N Hydrochloric acid. Handle carefully.

10. Add **100 µL** of **Stop Solution** to each well and mix thoroughly. This will turn the well contents yellow.

NOTE: Read the plate within 30 minutes of the addition of Stop Solution.

How to Interpret the Results

Spectrophotometric Measurement

1. Set the wavelength of your microtiter plate reader to 450 nanometers (nm). (If it has dual wavelength capability, use 600, 630 or 650 nm as the reference wavelength.)

2. If the plate reader does not auto-zero on air, zero the instrument against 200 µL water in a blank well. Measure and record the optical density (OD) of each well's contents. Alternatively, measure and record the OD in every well, then subtract the OD of the water blank from each of the readings.

3. A semi-log curve fit should be used for the standard curve if the microtiter plate reader you are using has data reduction capabilities. If not, calculate the results manually as described in the next section.

How to Calculate the Quantitative Results

1. After reading the wells, average the OD of each set of calibrators and samples, and calculate the $\%B_0$ as follows:

$$\%B_0 = \frac{\text{average OD of Calibrator or sample}}{\text{average OD of Negative Control}} \times 100$$

Precautions and Notes

- *Store all components at 4°-8°C (39°-46°F) when not in use.*
- *Do not expose components to temperatures greater than 37°C (99°F) or less than 2°C (36°F).*
- *Allow all reagents to reach ambient temperature (18°C to 27°C or 64°F to 81°F) before use.*
- *Do not use kit components after the expiration date.*
- *Do not use reagents or test well strips from one QuantiPlate Kit with reagents or test well strips from a different QuantiPlate Kit.*
- *Do not expose **Substrate** to **sunlight** during pipetting or while incubating in the test wells.*
- *Do not dilute or adulterate test reagents or use samples not called for in the test procedure.*
- *As with all tests, it is recommended that results be confirmed by an alternate method when necessary.*
- *Observe any applicable regulations when disposing of samples and kit reagents.*
- *Microcystin LR in aqueous solution will stick to plastics such as polypropylene. Collect and process samples in glass containers. Clear samples free of organic material can be stored refrigerated for up to two weeks before analysis.*

The $\%B_0$ calculation is used to equalize different runs of an assay. While the raw OD values of Negative Controls, Calibrators, and samples may differ from run to run, the $\%B_0$ relationship of calibrators and samples to the Negative Control should remain fairly constant.

The CV for each pair of Calibrator and sample OD values should not exceed 15%.

2. Graph the $\%B_0$ of each Calibrator against its Microcystin concentration on a semi-log scale (see Illustrative Standard Curve, left).
3. Determine the Microcystin concentration of each sample by finding its $\%B_0$ value and the corresponding concentration level on the graph.
4. Interpolation of sample concentration is only possible if the $\%B_0$ of the sample falls within the range of $\%B_0$'s of the Calibrators.

If the $\%B_0$ of a sample is higher than that of the lowest Calibrator, the sample must be reported as less than 0.2 ppb.

If the $\%B_0$ of a sample is lower than that of the highest Calibrator, the sample must be reported as greater than 2.0 ppb. If a concentration must be determined for these high level samples, dilute the sample 1:8 in distilled water. Run this dilution in a repeat of the immunoassay. If the result now falls within the range of the $\%B_0$'s of the Calibrators, you must then multiply the concentration measured in the diluted sample by a factor of 8.

Figure 1a. Example of a typical plate setup. (1 x 8 strips)

	1	2	3	4	5	6	7	8	9	10	11	12
A	NC	NC										
B	C1	C1										
C	C2	C2										
D	C3	C3										
E	S1	S1										
F	S2	S2										
G	S3	S3										
H	S4	S4										

Figure 2a. Illustrative quantitative calculations

Well contents	OD	Average OD	%CV	$\%B_0$	Microcystin Concentration (ppb)
Negative Control	1.398 1.347	1.373	2.628	100	NA
0.2ppb Calibrator	1.184 1.177	1.181	0.419	86	NA
0.6 ppb Calibrator	0.773 0.776	0.775	0.274	56.4	NA
2.0 ppb Calibrator	0.246 0.250	0.248	1.14	18.1	NA
Sample	0.573 0.567	0.570	0.744	41.5	1.01

**Actual values may vary; this data is for demonstration purposes only.*



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ENVIROLOGIX™

Safety Data Sheet
According to OSHA 29CFR 1910.1200

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

1.1 Product identifier
Trade name: **Wash Buffer Salts**
Part number: 50-0091, 10099
1.2 Relevant identified uses of the substance or mixture and uses advised against application of the substance / the preparation: Laboratory chemicals
1.3 Details of the supplier of the safety data sheet
Manufacturer/Supplier: EnviroLogix Inc., 500 Riverside Industrial Pkwy. Portland ME 04103, USA (207) 797-0300
1.4 Emergency telephone number: (207) 797-0300 Technical Service

SECTION 2. Hazards identification

2.1 Classification of the Substance or Mixture:
Classification according to OSHA 29CFR 1910.1200 (Hazard Communication): Not a hazardous substance or mixture

2.2 Label Elements: None required according to 29CFR 1910.1200

Other indications: None

2.3 Additional Information: No other information

SECTION 3. Composition/information on ingredients

3.2 Mixture: Powdered solid
Synonyms: PBS

Hazardous Components

Chemical name	CAS No	EC No	Amount (%)	Classification
Potassium Chloride	7447-40-7	231-211-8	1-5 %	Aquatic Acute 3, Aquatic Chronic 3; H412

Based on the amount of hazardous ingredients in this product, it is not considered hazardous according to 29CFR 1910.1200

SECTION 4. First aid measures

4.1 Description of first aid measures:
After inhalation ..... Supply fresh air; consult doctor in case of breathing difficulties.
After skin contact ..... Flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing. Seek medical attention if irritation develops.
After eye contact ..... Rinse opened eye for several minutes under running water. Seek medical attention if irritation develops.
After swallowing ..... If swallowed, consult with medical staff or poison control center to determine if any immediate response or follow up actions are recommended. Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed: None

4.3 Indication of any immediate medical attention and special treatment needed: No special treatment is required

SECTION 5. Firefighting measures

5.1 Extinguishing media:
Suitable extinguishing agents: CO_2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

5.2 Special hazards arising from the substance or mixture: Carbon oxides, Oxides of Phosphorous, Potassium, Sodium, Hydrogen Chloride gas

5.2 Advice for firefighters: Wear protective equipment appropriate for fire conditions including respiratory protective gear

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: Use PPE, avoid dust formation, ensure adequate ventilation, avoid breathing dust

6.2 Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge to the environment must be avoided.

6.3 Methods and material for containment and clean up: Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable closed containers for disposal

6.4 Reference to other sections: For safe handling refer to Section 7; For information on PPE refer to Section 8. For disposal, refer to Section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling: Practice good chemical hygiene when handling. Avoid contact with eyes, skin and clothing. Prevent formation of dust.

7.2 Conditions for safe storage, including any Incompatibilities: Keep containers closed, store in a dry, well ventilated space.

7.3 Specific end use(s): Apart from the uses mentioned in section 1.2, no other end uses are stipulated.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters:
Components with workplace control Parameters: Contains no substances with occupational exposure limit values

8.2 Exposure controls
8.2.1 Appropriate engineering controls: Ensure eyewash and safety shower are nearby; provide ventilation if necessary

8.2.2 Personal Protective Equipment:
Eyes: Safety glasses with side shields, goggles. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU). Eye and face protection regulations are described by OSHA (US) in 29CFR1910.133. Do not wear contact lenses when working with chemicals

Hands: Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection: Appropriate respiratory protection should be determined according to local conditions using risk analysis protocols. An approved disposable air purifying particulate respirator may be used as a backup to engineering controls. Always use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Body: Use body protection relative to its type and amount of material being handled

8.2.3 Environmental controls: Sweep or wipe up spills, do not allow into sewers or drains

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties:

a) Appearance:	White powder.
b) Odor:	None
c) Odor Threshold:	No data available
d) pH:	7.4
e) Melting point/freezing point:	No data available
f) Boiling point/Boiling range:	No data available
g) Flash point:	Not data available
h) Evaporation rate:	No data available
i) Flammability (solid, gaseous):	No data available
j) Upper/lower flammability or explosive limits:	No data available
k) Vapor pressure:	No data available
l) Vapor density	No data available
m) Relative density:	No data available
n) Solubility(ies):	Water soluble
o) Partition Coefficient: n-Octanol/water:	No data available
p) Auto-ignition temperature:	No data available
q) Decomposition temperature:	No data available
r) Viscosity:	No data available
s) Explosive properties:	No data available
t) Oxidizing properties:	No data available

9.2 Other information: No further relevant information available.

SECTION 10. Stability and reactivity

10.1 Reactivity:	No data available
10.2 Chemical stability:	Stable under normal recommended storage conditions.
10.3 Possibility of hazardous reactions :	No data available.
10.4 Conditions to avoid :	No data available
10.5 Incompatible materials:	Strong oxidizing agents and strong acids.
10.6 Hazardous decomposition products:	No data available

SECTION 11. Toxicological information

Acute toxicity:	No data available
Inhalation:	No data available
Dermal:	No data available
Skin corrosion/irritation:	No data available
Serious eye damage:	No data available
Respiratory or skin sensitization:	No data available
Mutagenicity and toxicity for reproduction):	No data available
Carcinogenity:	No component of this product at levels greater than 0.1 % is identified as probable, possible, or confirmed human carcinogen by IARC, ACGIH, NTP, or OSHA.

SECTION 12. Ecological information

12.1 Toxicity	No data available
12.2 Persistence and degradability:	No data available
12.3 Bio accumulative potential:	No data available
12.4 Mobility in soil:	No data available
12.5 Results of PBT and vPvB assessment:	Not available as a chemical safety assessment, not required/not conducted.
12.6 Other adverse effects:	No data available

SECTION 13. Disposal considerations

Dispose of excess or unused product in accordance with Local, State and Federal regulations. Contact a licensed professional waste disposal service to dispose of this material.

SECTION 14. Transport information

14.1 UN-Number DOT, ADR, ADN, IMDG, IATA :	Not dangerous goods
14.2 UN proper shipping name DOT, ADR, ADN, IMDG, IATA :	Not dangerous goods.
14.3 Transport hazard class(es) (DOT, ADR, ADN, IMDG, IATA):	Not applicable.
14.4 Packing group (DOT, ADR, IMDG, IATA):	Not applicable.
14.5 Environmental hazards	Not applicable.
14.6 Special precautions for user :	Not applicable.
14.7 Transport in bulk according to Annex II of MARPOL73/78	Not applicable.

SECTION 15. Regulatory information

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

US Federal Regulations	
SARA Section 302 (Extremely Hazardous Substances)	Not listed
Clean Air Act	Not listed
Clean Water Act	Not listed
OSHA	Not listed
US State Regulations	
Massachusetts Right to Know	Disodium Hydrogenarsthophosphate CAS No 7558-79-4 Rev Date: 2007-03-01
California Prop. 65 Components	Contains no chemicals known to cause cancer, birth defects, or reproductive harm.
15.2 Chemical Safety Assessment	Not carried out

SECTION 16. Other information

Hazard Code

H412 Harmful to aquatic life with long lasting affects

This information is true based on our present knowledge. However, Envirologix makes no representation of its accuracy or completeness. Persons receiving this information must exercise their independent judgment in determining the product's safety and suitability for its intended use. This document shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship

EHS Department
EnviroLogix Inc.

ENVIROLOGIX

Material Safety Data Sheet
OSHA 29CFR 1910.1200

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

1.1 Product identifier
Trade name: **Stop Solution**
Synonyms: **1.0 N HCl**
Part number: 10825, 10827, 10828, 11193, 11776 (XGD007)

1.2 Relevant identified uses of the substance or mixture and uses advised against application of the substance / the preparation : Laboratory chemicals

1.3 Details of the supplier of the safety data sheet
Manufacturer/Supplier: Envirologix Inc., 500 Riverside Industrial Pkwy. Portland ME 04103, USA Phone: (207) 797-0300

1.4 Emergency telephone number: (207) 797-0300 Technical Service

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture
Classification according to OSHA 29 CFR 1910.1200

Hazard Classes
Metal Corrosive (Cat. 1) H290
Skin Irritation (Cat 2) H315
Serious Eye damage (Cat. 1) H318

2.2 Label elements
Labeling according to OSHA 29CFR 1910.1200

Hazard pictograms :



Signal word : Warning

Hazard statements: H290 May be corrosive to metals
H315 Causes skin irritation
H318 Causes serious eye damage

Precautionary statements:
P281 Use personal protective equipment as required
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.

2.3 Other Statements None

SECTION 3. Composition/information on ingredients

3.2 Mixture
Aqueous solution 1N Hydrochloric Acid (1N HCl, 3 % HCl)

Chemical name	Amount (%)	CAS No / EC No	Classification According to OSHA 29CFR 1910.1200	
			Hazard Classification	Hazard Code
Hydrochloric acid	1-4 %	7647-01-0 / 231-595-7	May be Corrosive to Metals	H290
			Causes Skin Irritation	H315
			Causes Serious Eye Damage	H318

SECTION 4. First aid measures

4.1 Description of first aid measures
After inhalation : In case of inhalation. Remove to fresh air. If not breathing give artificial respiration. Get medical attention immediately.
After skin contact : In case of skin contact. Remove contaminated clothing and shoes immediately. Wash affected area with mild soap or detergent for at least 10 minutes or until no evidence of chemical remains.
After eye contact : In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Lifting eyelids occasionally, until no evidence of chemical remains. Get medical attention immediately.
After swallowing : In case of ingestion. DO NOT Induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Call a physician immediately.

4.2 Most important symptoms and effects, both acute And delayed: May cause skin irritation and eye damage

4.3 Indication of any immediate medical attention and special treatment needed: DO NOT use sodium bicarbonate in an attempt to neutralize the acid.

SECTION 5. Firefighting measures

5.1 Extinguishing media: CO_2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

5.2 Special hazards arising from the substance or mixture: Hydrogen Chloride gas

5.3 Advice for firefighters: Wear protective gear appropriate for fire conditions including respiratory protective gear.

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: In the case of spilled mixture wear gloves to prevent skin contact. In the case of a large spill, additional protection is recommended.

6.2 Environmental precautions: Do not discharge mixture to sewer system or waterways.

6.3 Methods and material for containment and cleanup: Absorb in paper towel and discard in appropriate waste. Clean with water afterwards. Large spills may be neutralized with dilute solutions of sodium carbonate or calcium oxide.

6.4 References to other sections: For safe handling refer to Section 7. For information on PPE refer to Section 8. For disposal refer to Section 13

SECTION 7. Handling and storage

7.1 Precautions for safe handling: Practice good chemical hygiene when handling. Avoid contact with eyes, skin, and clothing.

7.2 Conditions for safe storage, including any Incompatibilities: Store in tightly closed, non-metal container, in a corrosive compatible area. Prevent direct sunlight and heat. Store in well aired storage rooms.

7.3 Specific end use(s): Apart from the uses mentioned in section 1.2, no other specific uses are stipulated

SECTION 8. Exposure controls/personal protection

8.1 Exposure limits:
Components with limit values that require monitoring at the workplace:

Hydrogen Chloride	European (Commission directive 96/94)	USA (OSHA)
	8Hr TWA = 5 ppm (7.5 mg/m3)	Ceiling Limit = 5 ppm (7.5 mg/m3)
	STEL = 10 ppm (15 mg/m3)	

8.2 Exposure Controls:
8.2.1 Engineering controls: Facilities using this mixture should be equipped with an eyewash and safety shower. Use general or local exhaust ventilation to keep airborne concentrations below permissible exposure limits.

8.2.2 General protective and hygienic measures: The usual precautionary measures should be adhered to when handling chemicals

Eye Protection: Safety glasses with side shields, goggles. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU). Eye and face protection regulations are described by OSHA (US) in 29CFR1910.133. Do not wear contact lenses when working with chemicals

Hand Protection: Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Breathing Equipment: Appropriate respiratory protection should be determined according to local conditions using risk analysis protocols. An approved disposable air purifying particulate respirator may be used as a backup to engineering controls. Always use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

8.2.3 Environmental exposure controls: Contain spills, do not allow into environment.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties:
a) Appearance: Clear liquid, colorless to slight yellow.
b) Odor: Pungent (slight)
c) Odor Threshold: No Data Available
d) pH: pH 1
e) Melting point/freezing point: No Data Available
f) Boiling point/Boiling range: No Data Available.
g) Flash point: Not applicable.
h) Evaporation rate: 0.36 (Water) compared with n-Butyl Acetate = 1
i) Flammability (solid, gaseous): No Data Available
j) Upper/lower flammability or explosive limits: No Data Available
k) Vapor pressure: No Data Available
l) Vapor density: No Data Available
m) Relative density: No Data Available
n) Solubility(ies): Fully miscible, water.
o) Partition Coefficient: n-Octanol/water: No Data Available
p) Auto-ignition temperature: No Data Available
q) Decomposition temperature: No Data Available
r) Viscosity: No Data Available but should be similar to that of water
s) Explosive properties: No Data Available.
t) Oxidizing properties: No Data Available

9.2 Other information: No further relevant information available.

SECTION 10. Stability and reactivity

10.1 Reactivity: No data available

10.2 Chemical Stability: Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions: Under normal conditions of storage and use, hazardous reactions will not occur.

10 4 Conditions to avoid: No specific data

10.5 Incompatible materials: Metals, Alkali metals, bases, Amines.

10.6 Hazardous decomposition products: Under normal conditions of storage and use, hazardous decompositions products should not be produced.

SECTION 11. Toxicological information

Information on Toxicological Effects
Acute effects (toxicity tests):

7647-01-0 HCl	Effect Dose	Species
Acute oral toxicity	LD50=900mg/kg	rabbit
Acute dermal toxicity	No data	
Acute inhalative toxicity	LC50 = 3124 mg/L	rat

Sensitization: No sensitizing effects known
CMR (carcinogenicity, mutagenicity and toxicity for reproduction) effects: No CMR effects.
Additional toxicological information: No Additional Information

SECTION 12. Ecological information

12.1 Toxicity:

Aquatic toxicity (1N HCl)	Effect dose	Exposure time	Species
Acute fish toxicity	LC50=820 mg/L	96h	Leuciscus idus
Acute daphnia toxicity	No data		
Acute algae toxicity	No data		

12.2 Persistence and degradability :	No Data Available
12.3 Bio accumulative potential:	No Data Available
12.4 Mobility in soil :	No Data Available
12.5 Results of PBT and vPvB assessment:	Not available as a chemical safety assessment, not required/not conducted.
12.6 Other adverse effects:	No Data Available

SECTION 13. Disposal considerations

Waste treatment methods:	Contact a licensed professional waste disposal service to dispose of this material. Disposal of surplus or waste solutions must be in accordance with applicable local, state, and national laws and regulations.

SECTION 14. Transport information

14.1 UN-Number DOT, ADR, ADN, IMDG, IATA :	UN1789
14.2 UN proper shipping name DOT, ADR, ADN, IMDG, IATA :	HYDROCHLORIC ACID SOLUTION
14.3 Transport hazard class(es) DOT, ADR, ADN, IMDG, IATA):	8
14.4 Packing group (DOT, ADR, IMDG, IATA):	III
14.5 Environmental hazards	Not hazardous to the environment.
14.6 Special precautions for user :	None
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC code:	No information available.

SECTION 15. Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture	
US Federal Regulations	
TSCA	CAS# 7647-01-0 is not listed on the TSCA inventory.
Health and Safety Reporting List	None listed.
Chemical Test Rule	None under a Chemical Test Rule.
CERCLA	CAS# 7647-01-0: 5000 lb final RQ; 2270 Kg final RQ.
SARA Section 302 (Extremely Hazardous Substances)	CAS# 7647-01-0: 500 lb TPQ.
Clean Air Act	CAS# 7647-01-0: is listed as a hazardous air pollutant (HAP).
Clean Water Act	CAS# 7647-01-0: is listed as a hazardous Substance under the CWA.
OSHA:	CAS# 7647-01-0: is considered highly hazardous by OSHA.
US State Regulations	CAS# 7647-01-0: can be found on the following state right to know lists: CA, NJ, PA, MN, MA. CA Prop 65: no Significant Risk Level none of the chemicals in this product are listed.
European/International Regulations	
REACH No:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
Canada – DSL/NDSL	CAS# 7647-01-0: 1
Canada – WHMIS	WHMIS classification of E, D2A.
Canadian Ingredient Disclosure List	CAS# 7647-01-0 is listed on the Canadian Ingredient Disclosure List.
15.2 Chemical Safety assessment	Not carried out

SECTION 16. Other information

This information is true based on our present knowledge. However, EnviroLogix makes no representation of its accuracy or completeness. Persons receiving this information must exercise their independent judgment in determining the product's safety and suitability for its intended use. This document shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship

EHS Department
EnviroLogix Inc.

Codes:

H290	May be Corrosive to Metals	P281	Use Personnel Protective equipment as Required
H315	Causes Skin Irritation	P302 + P352	IF ON SKIN: Wash with plenty of soap and water
H318	Causes Serious Eye Damage	P303+ P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so Continue rinsing.