Safety Data Sheet
acc. to OSHA HCS

Printing date 01/11/2018 Reviewed on 01/11/2018

1 Identification

· **Product identifier**

· **Trade name: Karl Fischer Reagent**
3 mg/ml Titrant

· **Article number:** THE394

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Aqua Solutions, Inc.
6913 Highway 225
DEER PARK, TX 77536
USA
800-256-2586

· **Information department:**
Technical Coordinator
Sherman Nelson sherman@aquasolutions.org
· **Emergency telephone number:**
Chemtrec: 800-424-9300
Canutec: 613-996-6666

2 Hazard(s) identification

· **Classification of the substance or mixture**

GHS02 Flame

Flam. Liq. 1 H224 Extremely flammable liquid and vapor.

GHS06 Skull and crossbones

Acute Tox. 3 H331 Toxic if inhaled.

GHS08 Health hazard

Repr. 1 H360 May damage fertility or the unborn child.
STOT RE 1 H372 Causes damage to organs through prolonged or repeated exposure.

GHS05 Corrosion

Eye Dam. 1 H318 Causes serious eye damage.

GHS07

Acute Tox. 4 H302 Harmful if swallowed.
Acute Tox. 4 H312 Harmful in contact with skin.
Skin Irrit. 2 H315 Causes skin irritation.

· **Label elements**
· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

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· **Hazard pictograms**

GHS02 GHS05 GHS06 GHS08

· **Signal word** Danger

· **Hazard-determining components of labeling:**
Ethylene Glycol Monomethyl Ether
Sulfur Dioxide
Pyridine
Iodine *DEA regulated item

· **Hazard statements**
Extremely flammable liquid and vapor.
Harmful if swallowed or in contact with skin.
Toxic if inhaled.
Causes skin irritation.
Causes serious eye damage.
May damage fertility or the unborn child.
Causes damage to organs through prolonged or repeated exposure.

· **Precautionary statements**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/fume/gas/mist/vapors/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
If swallowed: Call a poison center/doctor if you feel unwell.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed or concerned: Get medical advice/attention.
Immediately call a poison center/doctor.
Get medical advice/attention if you feel unwell.
Specific treatment (see on this label).
Rinse mouth.
If skin irritation occurs: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use for extinction: CO2, powder or water spray.
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.

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· **Classification system:**
· **NFPA ratings (scale 0 - 4)**

Health = 3
Fire = 4
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = *3
Fire = 4
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:** Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:**		
	Ethylene Glycol Monomethyl Ether	58.0%
CAS: 110-86-1	Pyridine	34.0%
CAS: 7553-56-2	Iodine *DEA regulated item	4.0%
CAS: 7446-09-5	Sulfur Dioxide	4.0%

4 First-aid measures

· **Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
Remove breathing apparatus only after contaminated clothing have been completely removed.
In case of irregular breathing or respiratory arrest provide artificial respiration.
· **After inhalation:**
Supply fresh air or oxygen; call for doctor.
In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** Immediately call a doctor.
· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

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5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:**
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **For safety reasons unsuitable extinguishing agents:** Water with full jet
· **Special hazards arising from the substance or mixture** No further relevant information available.
· **Advice for firefighters**
· **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**

· **PAC-1:**		
	Ethylene Glycol Monomethyl Ether	0.3 ppm
CAS: 110-86-1	Pyridine	3 ppm
CAS: 7553-56-2	Iodine *DEA regulated item	0.1 ppm
CAS: 7446-09-5	Sulfur Dioxide	0.20 ppm

· **PAC-2:**		
	Ethylene Glycol Monomethyl Ether	14 ppm
CAS: 110-86-1	Pyridine	19 ppm
CAS: 7553-56-2	Iodine *DEA regulated item	0.5 ppm
CAS: 7446-09-5	Sulfur Dioxide	0.75 ppm

· **PAC-3:**		
	Ethylene Glycol Monomethyl Ether	2000* ppm
CAS: 110-86-1	Pyridine	3600* ppm
CAS: 7553-56-2	Iodine *DEA regulated item	5 ppm
CAS: 7446-09-5	Sulfur Dioxide	30 ppm

7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.

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· **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Keep respiratory protective device available.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store in a cool location.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:**
Keep receptacle tightly sealed.
Do not gas tight seal receptacle.
Store in cool, dry conditions in well sealed receptacles.
Protect from heat and direct sunlight.
· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**	
Ethylene Glycol Monomethyl Ether	
PEL	Long-term value: 80 mg/m³, 25 ppm Skin
REL	Long-term value: 0.3 mg/m³, 0.1 ppm Skin
TLV	Long-term value: 0.3 mg/m³, 0.1 ppm Skin; BEI
WEEL	Skin; B
CAS: 110-86-1 Pyridine	
PEL	Long-term value: 15 mg/m³, 5 ppm
REL	Long-term value: 15 mg/m³, 5 ppm
TLV	Long-term value: 3.1 mg/m³, 1 ppm
CAS: 7553-56-2 Iodine *DEA regulated item	
PEL	Ceiling limit value: 1 mg/m³, 0.1 ppm
REL	Ceiling limit value: 1 mg/m³, 0.1 ppm
TLV	Short-term value: 1 mg/m³, 0.1** ppm Long-term value: 0.1* mg/m³, 0.01* ppm *as inhalable fraction and vapor;**vapor
CAS: 7446-09-5 Sulfur Dioxide	
PEL	Long-term value: 13 mg/m³, 5 ppm
REL	Short-term value: 13 mg/m³, 5 ppm Long-term value: 5 mg/m³, 2 ppm
TLV	Short-term value: 0.65 mg/m³, 0.25 ppm

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· **Ingredients with biological limit values:**

Ethylene Glycol Monomethyl Ether	
BEI	1 mg/g creatinine LD50 Intraperitoneal: urine Time: end of shift at end of workweek LD50: 2-Methoxyacetic acid

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the skin.
Avoid contact with the eyes and skin.
· **Breathing equipment:**
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
· **Protection of hands:**

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:**

Tightly sealed goggles

· **Body protection:** Protective work clothing

9 Physical and chemical properties

· **Information on basic physical and chemical properties**
· **General Information**
· **Appearance:**

Form:	Liquid
Color:	Brown

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· **Odor:**	Characteristic
· **Odor threshold:**	Not determined.
· **pH-value:**	Not determined.
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	-10 °C (14 °F)
· **Flash point:**	17 °C (62.6 °F)
· **Flammability (solid, gaseous):**	Not applicable.
· **Ignition temperature:**	310 °C (590 °F)
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
· **Explosion limits:**	
Lower:	1.7 Vol %
Upper:	20.6 Vol %
· **Vapor pressure at 20 °C (68 °F):**	20 hPa (15 mm Hg)
· **Density:**	Not determined.
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Organic solvents:	58.0 %
VOC content:	58.00 % 580.0 g/l / 4.84 lb/gl
Solids content:	8.0 %
· **Other information**	No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.

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· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**

· LD/LC50 values that are relevant for classification:		
ATE (Acute Toxicity Estimate)		
Oral	LD50	1,597 mg/kg (rat)
Dermal	LD50	1,261 mg/kg
Inhalative	LC50/4 h	9.9 mg/l

Ethylene Glycol Monomethyl Ether		
Oral	LD50	500 mg/kg (ATE)
Dermal	LD50	1,100 mg/kg (ATE)
Inhalative	LC50/4 h	11 mg/l (ATE)
CAS: 110-86-1 Pyridine		
Oral	LD50	500 mg/kg (ATE)
Dermal	LD50	1,100 mg/kg (ATE)
Inhalative	LC50/4 h	11 mg/l (ATE)
CAS: 7446-09-5 Sulfur Dioxide		
Inhalative	LC50/4 h	3 mg/l (ATE)

· **Primary irritant effect:**
· **on the skin:** Irritant to skin and mucous membranes.
· **on the eye:** Strong irritant with the danger of severe eye injury.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Toxic
Harmful
Irritant

· **Carcinogenic categories**

· IARC (International Agency for Research on Cancer)		
CAS: 110-86-1	Pyridine	3
CAS: 7446-09-5	Sulfur Dioxide	3

· NTP (National Toxicology Program)
None of the ingredients is listed.

· OSHA-Ca (Occupational Safety & Health Administration)
None of the ingredients is listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.

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· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 2 (Self-assessment): hazardous for water
Do not allow product to reach ground water, water course or sewage system.
Must not reach bodies of water or drainage ditch undiluted or unneutralized.
Danger to drinking water if even small quantities leak into the ground.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **UN-Number**
· **DOT, IMDG, IATA** UN1993

· **UN proper shipping name**
· **DOT** Flammable liquids, n.o.s. (Ethylene glycol monomethyl ether, Pyridine)
· **IMDG, IATA** FLAMMABLE LIQUID, N.O.S. (ETHYLENE GLYCOL MONOMETHYL ETHER, PYRIDINE)

· **Transport hazard class(es)**

· **DOT**

· **Class** 3 Flammable liquids
· **Label** 3

· **IMDG, IATA**

· **Label** 3

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· **Packing group**	
· **DOT, IMDG, IATA**	III
· **Environmental hazards:**	
· **Marine pollutant:**	No
· **Special precautions for user**	Warning: Flammable liquids
· **Danger code (Kemler):**	30
· **EMS Number:**	F-E,S-E
· **Stowage Category**	A
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **Quantity limitations**	On passenger aircraft/rail: 60 L On cargo aircraft only: 220 L
· **IMDG**	
· **Limited quantities (LQ)**	5L
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **UN "Model Regulation":**	UN 1993 FLAMMABLE LIQUIDS, N.O.S. (ETHYLENE GLYCOL MONOMETHYL ETHER, PYRIDINE), 3, III

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**

· **Section 355 (extremely hazardous substances):**	
CAS: 7446-09-5	Sulfur Dioxide

· **Section 313 (Specific toxic chemical listings):**	
	Ethylene Glycol Monomethyl Ether
CAS: 110-86-1	Pyridine

· **TSCA (Toxic Substances Control Act):**
Ethylene Glycol Monomethyl Ether
Pyridine
Iodine *DEA regulated item
Sulfur Dioxide

· **Proposition 65**

· **Chemicals known to cause cancer:**	
CAS: 110-86-1	Pyridine

· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**
Ethylene Glycol Monomethyl Ether

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· **Chemicals known to cause developmental toxicity:**	
	Ethylene Glycol Monomethyl Ether
CAS: 7446-09-5	Sulfur Dioxide

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**
None of the ingredients is listed.

· **TLV (Threshold Limit Value established by ACGIH)**		
CAS: 110-86-1	Pyridine	A3
CAS: 7553-56-2	Iodine *DEA regulated item	A4
CAS: 7446-09-5	Sulfur Dioxide	A4

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.

· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**

GHS02 GHS05 GHS06 GHS08

· **Signal word** Danger

· **Hazard-determining components of labeling:**
Ethylene Glycol Monomethyl Ether
Sulfur Dioxide
Pyridine
Iodine *DEA regulated item
· **Hazard statements**
Extremely flammable liquid and vapor.
Harmful if swallowed or in contact with skin.
Toxic if inhaled.
Causes skin irritation.
Causes serious eye damage.
May damage fertility or the unborn child.
Causes damage to organs through prolonged or repeated exposure.
· **Precautionary statements**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/fume/gas/mist/vapors/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
If swallowed: Call a poison center/doctor if you feel unwell.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

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IF INHALED: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed or concerned: Get medical advice/attention.
Immediately call a poison center/doctor.
Get medical advice/attention if you feel unwell.
Specific treatment (see on this label).
Rinse mouth.
If skin irritation occurs: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use for extinction: CO2, powder or water spray.
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.
· **Chemical safety assessment:** *A Chemical Safety Assessment has not been carried out.*

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:** *Environment protection department.*
· **Contact:**
· **Date of preparation / last revision**
01-11-2018: review SDS for accuracy. STN
Creation date for SDS 06-18-2014. STN
01/11/2018 / -
· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
BEI: Biological Exposure Limit
Flam. Liq. 1: Flammable liquids – Category 1
Acute Tox. 4: Acute toxicity – Category 4
Acute Tox. 3: Acute toxicity – Category 3
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Repr. 1: Reproductive toxicity – Category 1
STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1