SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Revision Date 01/11/2018 Version 4.2

SECTION 1.Identification

Product identifier

Product number	188005
Product name	CombiTitrant 5 one-component reagent for volumetric Karl Fischer titration 1 ml ≙ ca. 5 mg H_2O Aquastar™

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

Identified uses	Use restricted under TSCA to research and development or as analytical reagent. Uses regulated under FDA or FIFRA are not affected. Reagent for analysis

Details of the supplier of the safety data sheet

Company	EMD Millipore Corporation | 400 Summit Drive | Burlington | Massachusetts 01803 | United States of America | General Inquiries: +1 800-645-5476 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5) MilliporeSigma is a business of Merck KGaA, Darmstadt, Germany.

Emergency telephone	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2. Hazards identification

GHS Classification

Skin irritation, Category 2, H315
Serious eye damage, Category 1, H318
Carcinogenicity, Category 2, H351
Reproductive toxicity, Category 1B, H360
Specific target organ systemic toxicity - repeated exposure, Category 1, thyroid, H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS-Labeling

Hazard pictograms

Signal Word
Danger

Hazard Statements
H360 May damage fertility or the unborn child.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H351 Suspected of causing cancer.
H372 Causes damage to organs (thyroid) through prolonged or repeated exposure if swallowed.

Precautionary Statements
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ eye protection/ face protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. Composition/information on ingredients

Chemical nature: Mixture of inorganic and organic compounds

Hazardous ingredients

Chemical name (Concentration)
CAS-No.
Iodine (>= 10 % - < 30 %)
7553-56-2

Exact percentages are being withheld as a trade secret.
imidazole (>= 1 % - < 5 %)
288-32-4

Exact percentages are being withheld as a trade secret.
2-Methylimidazole (>= 1 % - < 5 %)
693-98-1

Exact percentages are being withheld as a trade secret.

SECTION 4. First aid measures

Description of first-aid measures

Inhalation
After inhalation: fresh air. Call in physician.

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

Eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

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

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed
Cough, Shortness of breath, Dizziness, narcosis, Diarrhea, Nausea, Vomiting
Irritation and corrosion
Risk of serious damage to eyes.

Indication of any immediate medical attention and special treatment needed
No information available.

SECTION 5. Fire-fighting measures

Extinguishing media
Suitable extinguishing media
Water, Foam, Carbon dioxide (CO2), Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

Special hazards arising from the substance or mixture
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapors possible in the event of fire.
Fire may cause evolution of:
nitrogen oxides, Sulfur oxides, hydrogen iodide

Advice for firefighters
Special protective equipment for fire-fighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

SECTION 7. Handling and storage

Precautions for safe handling
Observe label precautions.

Work under hood. Do not inhale substance/mixture. Avoid generation of vapors/aerosols.

Conditions for safe storage, including any incompatibilities
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Store at +15°C to +25°C (+59°F to +77°F).

SECTION 8. Exposure controls/personal protection

Exposure limit(s)
Ingredients

Basis	Value	Threshold limits	Remarks
Iodine 7553-56-2			
NIOSH/GUIDE	Ceiling Limit Value and Time Period (if specified):	0.1 ppm 1 mg/m³	
OSHA_TRANS	Ceiling Limit Value:	0.1 ppm 1 mg/m³	
Z1A	Ceiling Limit Value:	0.1 ppm 1 mg/m³	
ACGIH	Short Term Exposure Limit (STEL):	0.1 ppm	Form of exposure: Vapor and aerosol.
	Time Weighted Average (TWA):	0.01 ppm	Form of exposure: Inhalable fraction and vapor.

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

Individual protection measures
Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures
Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance.

Eye/face protection
Tightly fitting safety goggles

Hand protection

full contact:

Glove material:	natural latex
Glove thickness:	0.6 mm
Break through time:	> 480 min

splash contact:

Glove material:	Nitrile rubber
Glove thickness:	0.11 mm
Break through time:	> 120 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 706 Lapren® (full contact), KCL 741 Dermatril® L (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet and supplied by us as well as to the purpose specified by us. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment:
protective clothing

Respiratory protection
required when vapors/aerosols are generated.
Recommended Filter type: filter ABEK
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are performed according to the instructions of the producer. These measures have to be properly documented.

SECTION 9. Physical and chemical properties

Physical state	liquid
Color	dark brown
Odor	No strong odor known.
Odor Threshold	No information available.
pH	No information available.
Melting point	No information available.
Boiling point	No information available.

Flash point	No information available.
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	No information available.
Upper explosion limit	No information available.
Vapor pressure	No information available.
Relative vapor density	No information available.
Density	1.19 g/cm3 at 68 °F (20 °C)
Relative density	No information available.
Water solubility	No information available.
Partition coefficient: n-octanol/water	No information available.
Autoignition temperature	No information available.
Decomposition temperature	No information available.
Viscosity, dynamic	No information available.
Explosive properties	Not classified as explosive.
Oxidizing properties	none

SECTION 10. Stability and reactivity

Reactivity

Forms explosive mixtures with air on intense heating.

Chemical stability

Reacts with air to form peroxides.

Possibility of hazardous reactions

Exothermic reaction with:

Strong oxidizing agents

Generates dangerous gases or fumes in contact with:

Aluminum

Possible formation of:

Hydrogen

Violent reactions possible with:

metals, Acid chlorides, Acid anhydrides, acids, Strong oxidizing agents

Iron, in powder form

Risk of explosion with:

Reducing agents, Alkali metals, Acetylene, Ammonia, Potassium, copper compounds, sodium, oxyhalogenic compounds, Boron, halogen oxides, iodides, azides, ammonium compounds, antimony

mercury oxide, with, Methanol, and, ethanol

Risk of ignition or formation of inflammable gases or vapors with:

Powdered metals, Zinc, semimetals, halogen-halogen compounds, nonmetals, nonmetallic oxides, alkali salts, Iron, Fluorine, formaldehyde, hydrides, sodium phosphite, phosphorus, sulfur, Titanium, powdered aluminum, acetylidene, powdered magnesium, petrol, butadiene, CALCIUM HYDRIDE

Diethyl ether, with, Aluminum

Conditions to avoid
Strong heating.

Incompatible materials
Aluminum, artificial and/or natural resins, Copper

Hazardous decomposition products
Peroxides

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure
Eye contact, Skin contact

Target Organs
Eyes
Skin
Respiratory system
Central nervous system
cardiovascular system

Acute oral toxicity
Symptoms: Nausea, Vomiting, Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.

Acute toxicity estimate: > 2,000 mg/kg
Calculation method

Acute inhalation toxicity

Symptoms: Possible symptoms:, mucosal irritations

Acute toxicity estimate: > 20 mg/l; 4 h ; vapor
Calculation method

Acute dermal toxicity
Acute toxicity estimate : > 2,000 mg/kg
Calculation method

Skin irritation
Mixture causes skin irritation.

Eye irritation
Mixture causes serious eye damage.

Sensitization

Sensitization possible in predisposed persons.

CMR effects
Carcinogenicity:Suspected of causing cancer.
Teratogenicity / Reproductive toxicity: May damage fertility or the unborn child.

Specific target organ systemic toxicity - single exposure
The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ systemic toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure if swallowed.
Target Organs: thyroid

Aspiration hazard
Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Further information
After absorption:
Dizziness, Diarrhea, narcosis, hemolysis
Damage to:
Lungs, Liver, Kidney
Other dangerous properties can not be excluded.
This substance should be handled with particular care.

Ingredients

Iodine

Acute oral toxicity
LD50 Rat: 14,000 mg/kg (RTECS)

Acute dermal toxicity
LD50 Rabbit: 1,425 mg/kg
US-EPA

Skin irritation
In vitro study
Result: non-corrosive
OECD Test Guideline 435

In vitro study
Result: Irritations
OECD Test Guideline 439

Sensitization
In animal experiments: Mouse
Result: negative
Method: OECD Test Guideline 429

Repeated dose toxicity
Rat
female
Oral
100 d
daily
NOAEL: 3 mg/l
LOAEL: 10 mg/l
OECD Test Guideline 408
thyroid
(as aqueous solution)

Rat
male and female
Oral
29 - 47 d
daily
NOAEL: 10 mg/kg
OECD Test Guideline 422

Germ cell mutagenicity
Genotoxicity in vitro
Mutagenicity (mammal cell test):
MOUSE LYMPHOMA TEST
Result: negative
Method: OECD Test Guideline 476

UDS (Unscheduled DNA synthesis assay)
Result: negative
Method: OECD Test Guideline 482

imidazole

Acute oral toxicity
LD50 Rat: 970 mg/kg
OECD Test Guideline 401

Skin irritation
Rabbit
Result: Corrosive
OECD Test Guideline 404

Eye irritation
Rabbit
Result: Causes serious eye damage.
OECD Test Guideline 405

Germ cell mutagenicity
Genotoxicity in vivo
In vivo micronucleus test
Mouse
Result: negative
Method: OECD Test Guideline 474

Genotoxicity in vitro
unscheduled DNA synthesis assay
rat hepatocytes
Result: negative
Method: OECD Test Guideline 482

Ames test
Salmonella typhimurium
Result: negative
Method: OECD Test Guideline 471

In vitro mammalian cell gene mutation test
Chinese hamster lung cells
Result: negative
Method: OECD Test Guideline 476

2-Methylimidazole

Acute oral toxicity
LD50 Rat: 1,500 mg/kg (External MSDS)

Germ cell mutagenicity
Genotoxicity in vitro
Mutagenicity (mammal cell test):
Result: negative
(Lit.)

Ames test
Result: negative
(National Toxicology Program)

SECTION 12. Ecological information

Ecotoxicity

No information available.

Persistence and degradability

No information available.

Bioaccumulative potential

No information available.

Mobility in soil

No information available.

Ingredients

Iodine

Toxicity to fish
static test LC50 Oncorhynchus mykiss (rainbow trout): 1.67 mg/l; 96 h (ECHA)

Toxicity to daphnia and other aquatic invertebrates
static test EC50 Daphnia magna (Water flea): 0.55 mg/l; 48 h (ECHA)

Toxicity to algae
Growth inhibition ErC50 Desmodesmus subspicatus (green algae): 0.13 mg/l; 72 h
OECD Test Guideline 201

Toxicity to bacteria
EC50 activated sludge: 280 mg/l; 3 h
OECD Test Guideline 209

Biodegradability

The methods for determining the biological degradability are not applicable to inorganic substances.

Substance does not meets the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

imidazole

Toxicity to fish
LC50 Leuciscus idus (Golden orfe): ca. 280 mg/l; 48 h
DIN 37 412 T 15 (External MSDS)

Toxicity to daphnia and other aquatic invertebrates
static test EC50 Daphnia magna (Water flea): 341.5 mg/l; 48 h
OECD Test Guideline 202

Toxicity to algae
static test ErC50 Desmodesmus subspicatus (green algae): 133 mg/l; 72 h
DIN 38412

Toxicity to bacteria
Respiration inhibition EC50 activated sludge: > 1,000 mg/l; 30 min
OECD Test Guideline 209

Biodegradability
90 - 100 %; 18 d; aerobic
OECD Test Guideline 301A
Readily biodegradable.

Partition coefficient: n-octanol/water
log Pow: -0.02
OECD Test Guideline 107
Bioaccumulation is not expected. (Lit.)

Substance does not meets the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

2-Methylimidazole

Toxicity to fish
LC50 Leuciscus idus (Golden orfe): 190 mg/l; 96 h (External MSDS)

Toxicity to daphnia and other aquatic invertebrates
EC50 Daphnia magna (Water flea): 225 mg/l; 48 h (External MSDS)

Toxicity to algae
IC50 Desmodesmus subspicatus (green algae): 190 mg/l; 72 h (External MSDS)

Toxicity to bacteria
EC50 activated sludge: 190 mg/l; 17 h (External MSDS)

Biodegradability
> 60 %
OECD Test Guideline 301A

SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)

Not classified as dangerous in the meaning of transport regulations.

Air transport (IATA)

Not classified as dangerous in the meaning of transport regulations.

Sea transport (IMDG)

Not classified as dangerous in the meaning of transport regulations.

SECTION 15. Regulatory information

United States of America

SARA 313

The following components are subject to reporting levels established by SARA Title III, Section 313:

Ingredients

diethylene glycol monoethyl ether	111-90-0	*55.11 %*

SARA 302

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

DEA List I

Listed

Ingredients

Iodine	7553-56-2

DEA List II

Not listed

US State Regulations

Massachusetts Right To Know

Ingredients

Iodine

Pennsylvania Right To Know

Ingredients

diethylene glycol monoethyl ether
Iodine

New Jersey Right To Know

Ingredients

diethylene glycol monoethyl ether
Iodine

California Prop 65 Components

WARNING: this product contains a chemical known in the State of California to cause cancer.

Ingredients

2-Methylimidazole

Notification status

TSCA:	Not Listed on TSCA inventory. For Research and Development Use only. Not For Manufacturing or Commercial Purposes.
DSL:	This product contains one or several components that are not on the Canadian DSL nor NDSL.

SECTION 16. Other information

Training advice

Provide adequate information, instruction and training for operators.

Labeling

Hazard pictograms

Signal Word

Danger

Hazard Statements

H315 Causes skin irritation.
H318 Causes serious eye damage.
H351 Suspected of causing cancer.
H360 May damage fertility or the unborn child.
H372 Causes damage to organs (thyroid) through prolonged or repeated exposure.

Precautionary Statements

Prevention
P201 Obtain special instructions before use.
P280 Wear eye protection.
Response
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.
P314 Get medical advice/ attention if you feel unwell.

Restricted to professional users.

Full text of H-Statements referred to under sections 2 and 3.

H315	Causes skin irritation.
H318	Causes serious eye damage.
H351	Suspected of causing cancer.
H360	May damage fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

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