REAGENTS DUKSAN

SAFETY DATA SHEET

According to OSHA Hazcom Standard 29 CFR 1910.1200

KarlFischer Aquazero composite 5

Date of issue: 2019-10-04 **Revision date: 2024-09-06** **Version: R0004.0001**

1. IDENTIFICATION

A. Product name

- KarlFischer Aquazero composite 5

B. Recommended use and restriction on use

- General use : for experimental, research and industrial use
- Restriction on use : Never drink, Not used except for experimental, research and industrial applications.

C. Manufacturer / Supplier / Distributor information

○ **Manufacturer information**

- Company name : DUKSAN PURE CHEMICALS
- Address : 53,SINWONRO 133BEONGIL, DANWONGU, ANSANSHI, GYUNGGIDO, KOREA
- Emergency telephone number : 82-31-495-4055

○ **Supplier/Distributer information**

- Company name : DUKSAN PURE CHEMICALS
- Address : 53,SINWONRO 133BEONGIL, DANWONGU, ANSANSHI, GYUNGGIDO, KOREA
- Telephone number : 82-31-495-4055
- Emergency telephone number : 82-31-495-4055
- Fax number : 82-31-495-4058

2. HAZARD IDENTIFICATION

A. GHS Classification

- Acute toxicity (oral) : Category4
- Skin corrosion/irritation : Category1A
- Serious eye damage/irritation : Category1
- Respiratory sensitization : Category1
- Reproductive toxicity : Category2
- Specific target organ toxicity(Single exposure) : Category3(Respiratory tract irritation)
- Specific target organ toxicity(Repeated exposure) : Category1

B. GHS label elements

○ **Hazard symbols**



○ **Signal words**

- Danger

○ **Hazard statements**

- H302 Harmful if swallowed
- H314 Causes severe skin burns and eye damage
- H318 Causes serious eye damage
- H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled
- H335 May cause respiratory irritation.

- H361 Suspected of damaging fertility or the unborn child
- H372 Causes damage to organs through prolonged or repeated exposure (Refer Section SDS 11)

○ **Precautionary statements**

1) Prevention

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P260 Do not breathe gas/mist/vapours/spray.
- P261 Avoid breathing gas/mist/vapours/spray.
- P264 Wash hands thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P285 In case of inadequate ventilation wear respiratory protection.

2) Response

- P301+P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P308+P313 If exposed or concerned: Get medical advice/attention.
- P310 Immediately call a POISON CENTER or doctor/physician.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P314 Get medical advice/attention if you feel unwell.
- P321 Specific treatment
- P330 Rinse mouth.
- P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
- P363 Wash contaminated clothing before reuse.

3) Storage

- P403+P233 Store in a well-ventilated place. Keep container tightly closed.
- P405 Store locked up.

4) Disposal

- P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards which do not result in classification : (NFPA Classification)

○ **NFPA grade (0 ~ 4 level)**

- Health : 3, Flammability : 0, Reactivity : 0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
2-(2-Ethoxyethoxy)ethanol	Diethylene glycol monoethyl ether ; Ethyl digol ; Transcutol ; 3,6-Dioxaoctan-1-ol ; Ethanol, 2,2'-oxybis-, monoethyl ether ; Ethoxy diglycol ; Ethylene diglycol monoethyl ether ; 2-(Beta-ethoxyethoxy)ethanol	111-90-0	60~70
1H-Imidazole	1H-Imidazole ; 1,3-Diaza-2,4-cyclopentadiene ; Glyoxaline ; Methanimidamide, N,N'-1,2-ethenediyl- ; 1,3-Diazole ; Miazole ;	288-32-4	10~20
Sulfur dioxide	Sulfur dioxide, liquid ; Sulfur oxide (SO2) ; Sulfur superoxide ; Sulfurous acid anhydride ; Sulfurous oxide ;	7446-09-5	1~10
Iodine	Diiodine ; Eranol ;	7553-56-2	10~20

4. FIRST AID MEASURES

A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.
- Get medical attention immediately.
- Remove contact lenses if worn.

B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Wash contaminated clothing thoroughly before re-using.
- Get medical attention immediately.
- Wash thoroughly after handling.

C. Inhalation contact

- When exposed to large amounts of steam and mist, move to fresh air.
- Take specific treatment if needed.
- Get medical attention immediately.
- Go to the hospital immediately if symptoms(flare, irritate) occur.
- If breathing is stopped or irregular, give artificial respiration and supply oxygen.

D. Ingestion contact

- Please be advised by doctor whether induction of vomit is demanded or not.
- Rinse your mouth with water immediately.
- Get medical attention immediately.

E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.
- If exposed or concerned, get medical attention/advice.
- Remove to fresh air and keep at rest in a position comfortable for breathing.

5. FIREFIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media

- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray
- Avoid use of water jet for extinguishing

B. Specific hazards arising from the chemical

- Not available

C. Special protective actions for firefighters

- Notify your local firestation and inform the location of the fire and characteristics hazard.
- In case of conflagration, use automatic fire sprinkler. Major fire may require withdrawal, allowing the object itself to burn.
- Avoid inhalation of materials or combustion by-products.
- Do not approach the tank surrounded by fire until it is extinguished.
- Use appropriate extinguishing measure suitable for surrounding fire.
- Keep containers cool with water spray.
- Vapor or gas is burned at distant ignition sources can be spread quickly.

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures

- Must work against the wind, let the upwind people to evacuate.
- Move container to safe area from the leak area.
- Remove all sources of ignition.

- Do not direct water at spill or source of leak.
- Avoid skin contact and inhalation.
- Cleanup and disposal under expert supervision is advised.
- Keep unauthorized people away,isolate hazard area and deny entry.

B. Environmental precautions

- Prevent runoff and contact with waterways, drains or sewers.
- If large amounts have been spilled, inform the relevant authorities.

C. Methods and materials for containment and cleaning up

- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notify the central and local government if the emission reach the standard threshold.
- Disposal of waste shall be in compliance with the Wastes Control?Act
- Appropriate container for disposal of spilled material collected.
- Small leak: sand or other non-combustible material, please let use absorption.
- Wipe off the solvent.
- Dike for later disposal.

7. HANDLING AND STORAGE

A. Precautions for safe handling

- Wash thoroughly after handling.
- Avoid direct physical contact.
- Avoid contact with incompatible materials.
- Refer to Engineering controls and personal protective equipment.
- Do not inhale the steam prolonged or repeated.
- Contaminated work clothing should not be allowed out of the workplace.

B. Conditions for safe storage, including any incompatibilities

- Do not use damaged containers.
- Do not apply direct heat.
- Store according to current laws and regulations
- Avoid direct sunlight.
- Keep in the original container.
- By specifying a storage area for carcinogenic substances.
- Collected them in sealed containers.
- Do not eat, drink or smoke when using this product.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits

○ **ACGIH TLV**

- [Sulfur dioxide] : STEL 0.25 ppm (0.65 mg/m3)
- [Iodine] : TWA, 0.01 ppm (0.1 mg/m3)-Iodine and iodides as inhalable Fraction and Vapor STEL, 0.1 ppm (1 mg/m3) - Iodine Vapor

○ **OSHA PEL**

- [Sulfur dioxide]:5ppm 13mg/m3
- [Iodine]:(C) 0.1 (C) 1

B. Engineering controls

- Business owner is recommended to maintain below recommended exposure limits for the working place with general exhaust of gas/vapour/mist/fume.

C. Individual protection measures, such as personal protective equipment

○ **Respiratory protection**

- Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.
- Respiratory protection is ranked in order from minimum to maximum.
- Consider warning properties before use.

- Any chemical cartridge respirator with organic vapor cartridge(s).
- Any chemical cartridge respirator with a full facepiece and organic vaporcartridge(s).
- Any air-purifying respirator with a full facepiece and an organic vapor canister.
- For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

○ **Eye protection**

- Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.
- Provide an emergency eye wash station and quick drench shower in the immediate work area.

○ **Hand protection**

- Wear appropriate glove.

○ **Skin protection**

- Wear appropriate clothing.

○ **Others**

- Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance	
- Appearance	Liquid
- Color	dark brown
B. Odor	Not available
C. Odor threshold	Not available
D. pH	Not available
E. Melting point/Freezing point	Not available
F. Initial Boiling Point/Boiling Ranges	Not available
G. Flash point	Not available
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	Not available
K. Vapour pressure	Not available
L. Solubility	Not available
M. Vapour density	Not available
N. Specific gravity(Relative density)	Not available
O. Partition coefficient of n-octanol/water	Not available
P. Autoignition temperature	Not available
Q. Decomposition temperature	Not available
R. Viscosity	Not available
S. Molecular weight	Not available

10. STABILITY AND REACTIVITY

A. Chemical Stability

- This material is stable under recommended storage and handling conditions.

B. Possibility of hazardous reactions

- Hazardous Polymerization will not occur.

C. Conditions to avoid

- Avoid contact with incompatible materials and condition.
- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces

D. Incompatible materials

- Not available

E. Hazardous decomposition products

- May emit flammable vapour if involved in fire.

11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

○ **(Respiratory tracts)**

- May cause allergy or asthma symptoms or breathing difficulties if inhaled
- May cause respiratory irritation.

○ **(Oral)**

- Harmful if swallowed

○ **(Eye·Skin)**

- Causes serious eye damage
- Causes severe skin burns and eye damage

B. Delayed and immediate effects and also chronic effects from short and long term exposure

○ **Acute toxicity**

*** Oral**

- Product (ATEmix) : 300mg/kg < ATEmix <= 2000mg/kg
- [2-(2-Ethoxyethoxy)ethanol] : LD50 = 1920 ㎎/㎏ Rat (IUCLID)
- [1H-Imidazole] : LD50 970 ㎎/㎏ Rat (OECD Guideline 401)
- [Iodine] : LD50 14000 ㎎/㎏ Rat (NITE)

*** Dermal**

- Product (ATEmix) : >5000mg/kg
- [2-(2-Ethoxyethoxy)ethanol] : LD50 = 8500 ㎎/㎏ Rabbit (IUCLID)
- [Iodine] : LD50 > 2000 ㎎/㎏ Rabbit (EPA OPPTS 870.1200)

*** Inhalation**

- Product (ATEmix) : >50.0mg/L
- [Sulfur dioxide] : Gas LC50 1000 ppm 4 hr Mouse
- [Iodine] : Vapor LC50 > 4588 ㎎/ℓ 4 hr Rat (OECD TG 403, GLP)

○ **Skin corrosion/irritation**

- Causes severe skin burns and eye damage

○ **Serious eye damage/irritation**

- Causes serious eye damage

○ **Respiratory sensitization**

- May cause allergy or asthma symptoms or breathing difficulties if inhaled

○ **Skin sensitization**

- Not available

○ **Carcinogenicity**

*** IARC**

- [Sulfur dioxide] : Group 3

*** OSHA**

- Not available

*** ACGIH**

- [Sulfur dioxide] : A4
- [Iodine] : A4

*** NTP**

- Not available

*** EU CLP**

- Not available

○ **Germ cell mutagenicity**

- Not available

○ **Reproductive toxicity**

- Suspected of damaging fertility or the unborn child

○ **STOT-single exposure**

- May cause respiratory irritation.

○ **STOT-repeated exposure**

- Causes damage to organs through prolonged or repeated exposure

○ **Aspiration hazard**

- Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity

○ **Fish**

- [2-(2-Ethoxyethoxy)ethanol] : LC50 = 13400 ㎎/ℓ 96 hr Salmo gairdneri (IUCLID)
- [1H-Imidazole] : LC50 327 ㎎/ℓ 96 hr (SIDS)
- [Iodine] : LC50 1.67 ㎎/ℓ 96 hr Oncorhynchus mykiss

○ **Crustaceans**

- [2-(2-Ethoxyethoxy)ethanol] : EC50 = 3940 ~ 4670 ㎎/ℓ 48 hr Daphnia magna (IUCLID)
- [1H-Imidazole] : EC50 341 ㎎/ℓ 48 hr Daphnia magna (SIDS)
- [Iodine] : LC50 0.55 ㎎/ℓ ~ 0.59 ㎎/ℓ 48 hr Daphnia magna

○ **Algae**

- [1H-Imidazole] : ErC50 133 ㎎/ℓ 72 hr Scenedesmus subspicatus (SIDS)
- [Iodine] : EC50 0.13 ㎎/ℓ 72 hr (Test species: Desmodesmus subspicatusOECD TG 201, GLP)

B. Persistence and degradability

○ **Persistence**

- [2-(2-Ethoxyethoxy)ethanol] : log Kow = -0.54
- [1H-Imidazole] : log Kow -0.08

○ **Degradability**

- Not available

C. Bioaccumulative potential

○ **Bioaccumulative potential**

- Not available

○ **Biodegration**

- [2-(2-Ethoxyethoxy)ethanol] : Biodegradability = 90 (%) 28 day (OECD TG 301E, IUCLID)
- [1H-Imidazole] : 98 (%) 18 day (SIDS)

D. Mobility in soil

- [Iodine] : (Kd 0.13, 20℃)

E. Other adverse effects

- Not available

13. DISPOSAL CONSIDERATIONS

A. Disposal methods

- Stabilization and minimization treatment by incineration or similar method can be applied, if more than two kinds of designated wastes are in mixture state and it is impractical to separate them
- Oil water separation technology shall be applied as pre-waste treatment if it is applicable
- It shall be treated by incineration

B. Special precautions for disposal

- Anyone with business license number who generates industrial wastes shall treat the waste by him/herself or by entrusting to the legal entities who treat the wastes, recycle the wastes of others or install and operate the waste treatment facilities according to the Wastes Control Act
- Dispose of waste in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

A. UN No. (IMDG CODE/IATA DGR)

- 1760

B. Proper shipping name

- CORROSIVE LIQUIDS, N.O.S.

C. Hazard Class

- 8

D. IMDG CODE/IATA DGR Packing group

- Ⅲ

E. Marine pollutant

- Not applicable

F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : F-A (General fire schedule)
- EmS SPILLAGE SCHEDULE : S-B (Corrosive substances)

15. REGULATORY INFORMATION

A. National and/or international regulatory information

○ **POPs Management Law**

- Not applicable

○ **Information of EU Classification**

*** Classification**

- [Sulfur dioxide] : H331, H314
- [Iodine] : H332, H312, H400

○ **U.S. Federal regulations**

*** OSHA PROCESS SAFETY (29CFR1910.119)**

- [Sulfur dioxide] : 453.599 kg 1000 lb

*** CERCLA Section 103 (40CFR302.4)**

- Not applicable

*** EPCRA Section 302 (40CFR355.30)**

- [Sulfur dioxide] : 226.7995 kg 500 lb

*** EPCRA Section 304 (40CFR355.40)**

- [Sulfur dioxide] : 226.7995 kg 500 lb

*** EPCRA Section 313 (40CFR372.65)**

- Not applicable

○ **Rotterdam Convention listed ingredients**

- Not applicable

○ **Stockholm Convention listed ingredients**

- Not applicable

○ **Montreal Protocol listed ingredients**

- Not applicable

16. OTHER INFORMATION

A. Reference

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.
- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

B. Issue date

- 2019-10-04

C. Revision number and Last date revised

- 3 times, 2024-09-06

D. Other

- This SDS is prepared according to the Globally Harmonized System (GHS).