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Material Safety Data Sheet

Product name	NWK99 (Pail)

1. Product and company identification

a) Product Name: (to indicate the same name or code as shown in label)

NWK99 (Electric & electronic communication equipment Dust Cleaner)
HS CODE 3814.00.1090

b) Recommended use of the chemical and restrictions on use:

Recommended use of the product

National Power Grid: Switchgear (Underground, Processing), Substation (Electric Panel, Telecom Room, etc.) Power plants (hydro, thermal, solar, nuclear): Inverter, UPS, PLC, SCADA, LCU, Server etc. elevator(Inverter), Semiconductor Factory (Inverter, Electrical Panel, etc.), IDC Center (UPS, Server), Communication base stations (Digital Optical Repeater & Server Cards, etc.), railways, automobiles, Road traffic (Hi-Pass, TCS, VDS controller, signaler, electric panel), shipyard (inverter, electric panel etc.) Public facilities and industrial facilities (Inverters, electrical panels, etc.)

Limitations on use of the product

Products (PLC, Inverter, etc.) that can not escape pollution dust when cleaning are disassembled Clean.

※ 1) Test fine coated plastic and rubber products before use.

2) Remove the wire chip and other foreign matter around the object to be cleaned.

c) Manufacturer/Supplier/Distributor Information

Name: NaeWoi Korea.,Ltd.

Address: 205 Woolim B/D, 22-9 255Pankyoro Bundanggu, Seongnam si, Gyunggido Republic of Korea

Emergency phone number: +82-31-734-0350

2. Hazards identification

a) Hazard .Risk Classification:
b) Label elements including precautionary statements

No general hazards or risks

Symbol: Not applicable Not applicable

Signal Word: H335 May cause respiratory irritation.

Hazard.Risk Statement:

Precautionary Statement:

Prevention

P261 Avoid inhalation (dust, fumes, gas, mist, vapor, spray).

P271 Handle only outdoors or in a well-ventilated area.

P280 Wear protective gloves / protective clothing / eye protection / face protection.

Response

P304+P340 If inhaled, remove to fresh air and keep at rest in a position comfortable for breathing.

P312 If you feel unwell, seek medical advice / attention.

Stage

P410+P403 Avoid direct sunlight and keep in a well-ventilated place.

Disposal

P501 Dispose of contents container according to relevant regulations.

3. Composition/Information on ingredients

Chemical Name	Other name	CAS number	Content (%)
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxybutane		163702-07-6	1~5
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutane		163702-05-4	5~15
Dimethyl carbonate		616-38-6	10~25
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl ether		406-78-0	50~60
Business secret (S1)			quantumsatis

4. First aid measures

a) Eye contact:

If it gets on your eyes, wash it carefully with water for a few 15 minutes. If possible, remove contact lenses. Continue to wash.

If eye irritation persists seek medical advice / advice.

b) Skin contact:	If skin (or hair) gets on the skin, remove all contaminated clothing. Wash skin with water / shower. Wash skin with soap and water. If you feel uncomfortable, seek medical advice. Prevent spread of contamination on mild skin contact
c) Inhalation:	Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. If excessive dust or fumes are present, remove with clean air and seek medical attention if coughing or other symptoms occur.
d) Ingestion:	Get emergency medical attention. If the patient's consciousness is complete, let him drink a cup of water. Do not induce vomiting without medical advice. Never give anything by mouth to a person who has lost consciousness.
e) Indication of immediate medical attention and notes for physician:	Have the medical personnel know about the material and take protective measures.

5. Fire-Fighting measures

a) Suitable (and unsuitable) extinguishing media:	Non-combustible products, use carbon dioxide or Haron, water spray when extinguishing the substance.
b) Specific hazards arising from the chemical (e.g. nature of any hazardous combustion products):	This product is not subject to fire at room temperature and normal atmospheric pressure. However, this material can ignite when exposed to strong sources of ignition. In case of fire, decomposition products may include carbon dioxide, carbon monoxide, and halogenated compounds: If a fire occurs or is heated, the pressure increases, pail-can may explode
c) Special protective equipment and precautions for fire-fighters:	Fire fighters should wear appropriate protective equipment. Use extinguishing media suitable for surrounding fire. Wear rescuers appropriate protective equipment (face masks).

6. Accidental release measures

a) Personal precautions, protective equipment and emergency procedures:	Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid unnecessary and unprotected personnel. Do not touch damaged containers or leaks unless proper protective clothing is worn. Evacuate people to a safe location immediately. Remove all sources of ignition. Let the ventilation.
b) Environmental precautions and protective procedures:	Do not discharge into the environment. Prevent entry into waterways, sewers, basements and confined spaces. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
c) Methods and materials for containment and cleaning up:	Let it evaporate. Absorb spillage with inert materials (eg dry sand or earth) and place in a chemical waste container.

7. Handling and storage

a) Precautions for safe handling:	In areas where this material is handled, stored and handled, it should be prohibited to eat, drink or smoke. Avoid breathing dust/fume/gas/mist/vapors/spray. Do not use where there is no adequate ventilation. Wash thoroughly after handling. Do not pressurize, cut, weld, braze, bond, punch, grind or expose to containers, open flames, sparks, static electricity or other sources of ignition. Follow all MSDS / label precautions as product residues may remain after emptying containers. Handle / store carefully. Refer to engineering controls and personal protective equipment.

b) Conditions for safe storage (including any incompatibilities):	Keep away from high fever - no smoking Keep container tightly closed in a well-ventilated place. Pressure vessel. Avoid exposure to sunlight and temperatures above 50 ° C.

8. Exposure controls & personal protection

a)Controlparameters (e.g. occupational exposure limit values, biological limit values):

1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	TWA 200ppm
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutane	TWA 400ppm
Dimethyl carbonate	No data available
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available

b)Appropriate engineering controls:	There must be sufficient general ventilation to control the exposure of workers to the air Equipment for storing and using this material must be worn and fitted with a safety shower.

c)Personal protective equipment

Respiratory protection	Wear respiratory protective equipment certified by Korea Occupational Safety and Health Agency according to the physical and chemical properties of the material being exposed. Choose an air purifier or air-supply respirator that fits your approval criteria.
Eye protection	Wear eye protection to protect your eyes from scattering materials.
Hand protection	Wear chemical resistant gloves to avoid direct contact with chemicals.
Body protection	Wear chemical resistant protective clothing to prevent skin exposure.

9. Physical and chemical properties

a) Appearance	
physical state	Liquid
color	Transparent
b) Odour:	A slight smell
c) Odour threshold:	No data available
d) pH:	Not applicable
e) Meting point/freezing point:	-91℃
f) Initial boiling point and boiling range:	No data available
g) Flash point :	No flash point [KS M ISO 2592:2007/ Cleveland open test method]
h) Evaporation rate:	No data available
i) Flammability (solid, gas):	Not applicable
j) Upper/lower flammability or explosive limits:	Not applicable
k) Vapor pressure:	2.1 hpa
l) Solubility:	No data available
m) Vapor density:	No data available
n) Relative density:	1.29 [Reference standard : water = 1]
o) Partition coefficient: n-octanol/water:	No data available
p) Auto-ignition temperature:	421℃
q) Decomposition temperature:	Not applicable
r) Viscosity:	No data available
s) Molecular mass:	No data available
t) density (15ºC)	More than 1100kg/m3
u) Pressure resistance capability	35℃ Vapor pressure or internal pressure <0.5Mpa
v) Aniline Poin	60.1℃

10. Stability and reactivity

a) Chemical stability and possibility of hazardous reactions:

Chemical stability	Stability Under normal conditions of storage and use, hazardous reactions will not occur. Do not mix with other materials.
Dangerous reactivity	pail-can may explode upon heating.

	Some can ride, but not easily ignite.
	May cause irritation and poisonous gas in case of fire.
b) Conditions to avoid (e.g. static discharge, shock or vibration, etc):	Keep away from high fever - no smoking.
	Pressure vessel. Avoid exposure to sunlight and temperatures above 50 ° C.
c) Incompatible materials:	Strong oxidizing agent.
d) Hazardous decomposition products:	During burning, pyrolysis or combustion may produce irritating and highly toxic gases.
	Exposure to abuse or extreme heat can cause toxic decomposition products, including hydrogen fluoride and perfluoroisobutylene, carbon monoxide, carbon dioxide, halogenated carbonyl, and gaseous hydrogen chloride.

11. Toxicological information

Toxicity data for ingredients may not be reflected in the classification and / or signs of exposure and symptoms. Because the ingredient may be below the label threshold, the ingredient may not be exposed, or the data may not be entirely related to the data.
a) Information on the likely routes of exposure:

b) Health hazards information

Acute toxic:

oral	ATEmix =2,347mg/kg
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	LD50 >5,000mg/kg, rat
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	LD50 1,707mg/kg, rats
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	LD50 >2,000mg/kg, rats
Percutaneous	ATEmix = 4,583mg/kg
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	LD50 >5,000mg/kg, rabbit
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	LD50 4,301mg/kg, rat
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available
inhale	ATEmix = 30.78mg/l (vapor (steam)) ,
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	LC50 114mg/l ,rat(4h)
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	LC50 46.22mg/l, rat(4h)
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	LC50>3,000ppm(rats 4h),(24.8mg/l)
Skin corrosive/irritant:	
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No skin irritation (rabbit)
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No skin irritation (rabbit)
Dimethyl carbonate	No skin irritation (rabbit)
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No skin irritation (rabbit)
Serious eye damage/eye irritation:	
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No irritation (rabbit) No
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	irritation (rabbit)
Dimethyl carbonate	Weak stimulation(rabbit)
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	Causes irritation
Respiratory sensitization:	
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No data available
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	No data available
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	May cause irritation
Skin sensitization:	
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	Does not cause sensitization
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	Does not cause sensitization in laboratory animals
Dimethyl carbonate	Repeated skin allergic skin disorders are not seen
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available
Carcinogenicity:	
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No data available
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available

Dimethyl carbonate	No data available
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available

Germcell mutagenicity

1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No data available No data available
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	Negative mouse dominant lethality test result, positive micronucleus test result by mouse bone marrow cells
Dimethyl carbonate	No data available
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	

Reproductive toxicity

1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	Not shown reproductive toxicity in animal experiments
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	Not shown reproductive toxicity in animal experiments
Dimethyl carbonate	Delayed fetal development, delayed ossification of the sternum and skull in pregnant rats, testicular abnormalities in male rats exposed orally or inhaled, decreased delivery rate, increased stillbirth rate, decreased birth rate
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available

SpecificTarget Organ Systemic Toxicity (Single Exposure)

1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No data available
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	Lungs, chest, breathing, stomach, blood, central nervous system
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available

SpecificTarget Organ Systemic Toxicity (Repeated Exposure)

1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No data available
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	Liver, kidney
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available

Aspiration hazard

1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No data available
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	No data available
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available

Otheradverse effects	No data available

12. Ecological information

a. Ecotoxicity

1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	LC50 96h 13.9mg/l (rainvow trout), 27.2mg/l (fathead minnow), 13mg/l (zebra fish) LC50 72h 120mg/l (green algae) , LC50 48h 11.7mg/l (Water flea) 21d 1.72mg/l (Water flea)
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	LC50 96h 45mg/l (rainvow trout) source ECHA EC50 48h 66mg/l (Water flea) source ECHA
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available

b.Persistence and Degradability

Persistence

1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No data available No data available log Kow 0.23(Estimated value) No data available
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	
Dimethyl carbonate	
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	

Degradability

1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	Not easily biodegradable
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	No data available
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available

c.Bioaccumulative potential:

Concentration

1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No data available

1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	No data available
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available
Biodegradable	
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	Low chance of accumulation in vivo
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available No data available
Dimethyl carbonate	BOD=2%, GC=0%
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	
d. Soil mobility	
1,1,1,2,2,3,3,4,4-Nonafluoro-4-Methoxy bu	No data available
1-ethoxy-1,1,1,2,2,3,3,4,4-nonafluorobutan	No data available
Dimethyl carbonate	No data available
1,1,2,2-Tetrafluoroethyl 2,2,2-trifluoroethyl	No data available
e.Otheradverse effects	No data available

13. Disposal considerations

a) Disposal method:	If possible, avoid or minimize waste generation These products, solutions and all by-products must at all times comply with the requirements of environmental protection and waste disposal legislation and local authorities. Dispose of contents and container in accordance with local regulations.
b) Disposal precaution (including the disposal method of contaminated container and packaging):	(As specified in the relevant legislation) Dispose of the container contents.

14. Transport information

a) UN number:	Not applicable Not applicable Not regulated as a hazardous
b) UN proper shipping name:	material by DOT, IMO, or IATA
c) Transport hazard class:	
d) **IATANOT REGULATE**	

15. Regulatory information

a) Industrial Safety and Health Act:	Not applicable
b) Regulation under the Chemicals Control Act:	Not applicable
c) Dangerous Material Safety Control Act:	Not applicable
d) Wastes Management Act:	No data available
e) Other requirements in domestic and other countries:	
Domestic regulation	
Residual Organic Pollutant Control Act	Not applicable
Foreign regulation	
US Management information(OSHA)	Not applicable
US Management information(CERCLA)	Not applicable
US Management information(EPCRA 302)	Not applicable
US Management information(EPCRA 304)	Not applicable
US Management information(EPCRA 313)	Not applicable
US Management information(Rotterdam Convention material)	Not applicable
US Management information(Stockholm Convention substance)	Not applicable
US Management information(Montreal Protocol substance)	Not applicable
EU classification information (confirmed classification result)	
Dimethyl carbonate	F; R11
EU classification information (risk phrases)	
Dimethyl carbonate	R11
EU classification information (Safety phrases)	

Dimethyl carbonate	S2, S9, S16

16. Other information

a) Information source and references:	MSDS of raw material supplier and MSDS of Korea Occupational Safety and Health Agency
b) Issuing date:	2018-01-12
c) Revision number and date:	
Number of revisions	6
Date of last revision	2020-07-14
d) others:	

As far as we know, the information contained herein is correct. However, the above-named supplier or its subsidiaries are not responsible for their accuracy or completeness.
The final determination of the suitability of all materials is the sole responsibility of the user. All materials must be used with caution, as they may indicate unknown hazards. Although specific risks are described here, we can not guarantee that these risks are the only risk.