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MALEIC ANHYDRIDE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

a. Product name	MALEIC ANHYDRIDE
b. Recommend use of the chemical	Unsaturated Polyester resin, Modified Alkyd Resin, Plasticizer, Paper sizes
c. Restriction on use	No data available
d. Manufacture Information	
Factory	Yongsan Chemical, Inc. 32, Sapyeong-ro, Nam-gu, Ulsan, Korea 052 - 226 - 8861 / 5 Safety Environment Team
HEAD OFFICE	02-3274-9171

2. HAZARD IDENTIFICATION

a. Hazard-Risk Classification	Acute toxicity(oral):	Category 4
	Acute toxicity(inhalation):	Category 4
	Skin corrosion/Irritation:	Category 1
	Serious eye damage/Irritation:	Category 1
	Respiratory sensitization:	Category 1
	Skin sensitization:	Category 1
	Specific target organ systemic toxicity(single exposure):	Category 1 (Respiratory, digestive organ)
	Specific target organ systemic toxicity(single exposure):	Category 2 (Liver)
	Specific target organ systemic toxicity(repeated exposure):	Category 1 (Respiratory, Blood system)
	Specific target organ systemic toxicity(repeated exposure):	Category 2 (Kidney, Liver, Spleen)
b. Label elements including precautionary statements		

Symbol



Signal word

Danger

Hazard statement

H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage.
H318	Cause serious eye damage
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
H317	May cause an allergic skin reaction
H370	Cause damage to organs
H371	May Cause damage to organs
H372	Cause damage to organs through prolonged or repeated exposure
H373	May Cause damage to organs through prolonged or repeated exposure



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Precaution statement

Precaution

P260	Do not breathe dust/fume/gas/mist/vapor/spray.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray
P264	Wash hand. thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	If skin, irritaion occurs
P272	Contaminated work clothing should not be allowed out of the workplace.
P280	Wear protective gloves/protective clothing/eye protection/face protection
P284	In case of inadequate ventillation wear respiratory protection.

Response

P302+P352	If on skin : Wash with plenty of water.
P301+P312	If swallowed : Call a poison center or doctor/physician if you feel unwell.
P330	Rinse mouth
P332	If skin irritaion occurs
P301+P330+P331	If swallowed : Rinse mouth. Do not induce vomiting.
P303+P361+P353	If on skin(or hair) Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340	If inhaled : Remove person to fresh air and keep comfortable for breathing.
P321	Soecific treatment
P310	Immediately call a poinon center or doctor/physician.
P312	Call a Poison center/doctor... if you feel unwell.
P308+P311	If exposed or concerned : Call a poison center or doctor/physician.
P342+P311	If experiencing respiratory symptoms: Call a poison center or doctor/physician.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.
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.
P362+P364	Take off contaminated clothing and wash it before use
P363	Wash contaminated clothing before reuse.
Storage	
P405	Store locked up.
Disposal	
P501	Dispose of contents/container to waste local regulation.

c. Othe Hazard-Risk which are not included in the classification criteria (NFPA)

Heath	3
Fire	1
Reactivity	1

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Other name	CAS Number	EN Number	Content (%)
Maleic anhydride	cis-Butenedioic anhydride, 2,5-Furandione	108-31-6	203-571-6	99.5 (Min)
Other	-	-	-	0.5 (Max)

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4. FIRST AID MEASURE

- a. Inhalation
Move from exposure immediately if adverse effect.
If breathing has stopped, apply artificial respiration.
If breathing is difficult, qualified staff should control oxygen.
Immediately get medical attention.
- b. Skin contact
Immediately wash with soap and water for at least 15 minutes.
Immediately get medical attention.
Completely Wash and dry contaminated clothing and shoes before reuse
Throw away contaminated shoes.
- c. Ingestion
Contact local poison control center or physician immediately.
Never make an unconscious person vomit or drink fluids.
Give large amounts of water or milk.
Do not induce vomiting.
Allow vomiting to occur. When vomiting occurs, keep head lower than hips to help prevent aspiration.
If person is unconscious, turn head to side.
Get immediate medical advice/attention.
- d. Eye contact
Irrigate exposed eye with copious amounts of room temperature water 15 minutes.
Get immediate medical advice/attention.
- e. Note to physician
For inhalation, consider oxygen.
Avoid gastric lavage or emesis.

5. FIRE-FIGHTING METHOD

- a. Extinguish media
Carbon dioxide, Water, Regular foam
- b. Specific hazards arising from the chemical
Pyrolysis product
Oxides of carbon, Irritating fume/gas.
Fire and explosion hazards
Slight fire hazard. Dust/air mixture may ignite or explode.
- c. Specific protective equipment
and precaution for fire-fighter
Wear appropriate chemical resistance equipment.
Move container from fire area if it can be done without risk
Cool containers with water spray until after the fire is out.
Stay away from the ends of tank.
Water or foam may cause frothing.

6. Accidental release measure

- a. Personal precaution, protective equipment and emergency procedures
Do not touch spilled material.
Stop leak if possible without personal risk.
Wear appropriate personal protective equipment.
Use adequate ventilation.
- b. Environment precaution and protective procedure
Dike for not flowing down the drain (underground water, surface water) spill.
Absorb with activated carbon. Collect spilled using mechanical equipment.
- c. Methods and material for containment and cleaning up



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Small spills Collect spilled material in appropriate container for disposal.
Small spills : Move containers away from spill to a safe area.

large spills Dike for later disposal
Keep unnecessary people away, isolate hazard area

7. HANDLING AND STORAGE

Storage Store in cool/dry place
Store in a closed container. Keep away from ignition source.
Store in a well-ventillated place.

Handling Do not raise dust, adequately ventilate to raise dust.
Avoid contact direct with body. Wear appropriate personel protective equipment.

8. Exposure controls and personal protection.

a. Control parameter

- National regulation - TWA : 0.1 ppm, 0.4 mg/m³
- NIOSH regulation - TWA : 0.25 ppm, 1 mg/m³
- ACGIH regulation - TWA : 0.1 ppm

b. Appropriate engineerign controls

- Ensure compliance with applicable exposure limits
- Provide lacial exhaust ventillation system. Maintainging an appropriate wind speed.

c. Personal protective equipment

- Eye protection Wear splash resisitant safety goggles.
Provide an emergency eye wash fountain and quick drench shower in the immediate work area.
- Body protection Wear appropriate chemical resistance clothing.
- Hand protection Wear appropriate chemical resistance gloves.
- 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.
Self-contained breathing apparaus.

9. PHYSICAL AND CHEMICAL PROPERTIES

- a. Appearance Solid
- b. Color clear
- c. Odor Irritating odor
- d. Odor threshold 0.3 ppm
- e. pH Not applicable
- f. Melting point/freezing point 52.8 °C (127 °F)
- g. Initial boiling point 197 ~ 199 °C (387 ~ 390 °F)
- g. Flash point 102 °C (216 °F)
- i. Evaporation rate Not applicable
- j. Flammability(solid, gas) Not applicable
- k. Vapor pressure 1 mmHg at 44 °C
- l. Vapor density(air=1) 3.4



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m. Relative density(water=1)	1.314 at 60 °C, 1.48 at 20 °C
n. Solubility	Hydrosis
o. Auto ignition temperature	477 °C (891 °F)
p. Upper/lowew flammability or explosive limits	1.40% / 7.10%
q. Viscosity	16.1 MP/60 °C
r. Partition coefficient	1.62 (Estimated)

10. STABILITY AND REACTIVITY

a. Chemical stability	Stable at normal temperature and pressure. May react with evolution of heat on contact with water.
b. Condition to avoid	Avoid heat, flames, sparks and other sources of ignition. Dangerous gases may accumulate in confined spaces.
c. Incompatible material	Metal, Amine, Metal salt, Base, Combustible material, Oxidant
d. Hazardous decomposition	Thermal decomposition products : Oxides of carbon
e. Polymerization	Will not available polymerize

11. TOXICOLOGICAL INFORMATION

a. Information on the likely routes of exposure;

Inhalation	Harmful if inhaled. Fatal to mucosal cells and airway.
Ingestion	Harmful if swallowed
Skin contact	Harmful if adsorbed through skin, Damage to skin.
Eye Contact	Direct contact with the eye may cause damage.

b. Health Hazard

Acute oral toxic	400 mg/Kg-Rat LD50, 875 mg/kg- Rabbit LD50 390 mg/kg-Guinea pig LD50, 465 mg/kg-Mouse LD50
Acute dermal toxic	2,620 mg/kg-Rabbit LD50
Acute inhalation toxic	4.4 mg/l - Rat LC50 (Mist, dust)
Skin corrosive/irritant	Rabbit - highly irritating
Serious eye damage/eye irritation	Rabbit - highly irritating
Specific target organ toxicity (single exposure)	Possible to dyspnoea, asthma, liver obstacle, nausea.
Specific target organ toxicity (repeat exposure)	Possible to edema of the lungs, upper respiratory tract irritation, throat infection, asthma.
Genetic toxicity	Result : Negative
Toxicity to reproduction	No
Carcinogenicity	
IARC	Not classification
ACGIH	A4 - Not classification(Insufficient data)
NTP, OSHA, WISHA	Not classification

12. ECOLOGICAL INFORMATION

a. Aquatic and terrestrial ecotoxicity

Fish	230 mg/L 48 hr LC50 Leuciscus idus
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Crustacea	88 mg/L 24 hr EC50 Daphnia magna(Crustacea)
Aquatic plant	29 mg/L 72 hr EC50 Algae
b. Persistence and degradability	
Persistence	No data available
degradability	No data available
c. Bioaccumulative potential	
Bioaccumulative	No data available
Biodegradation	98 % degradation
d. Mobility in soil	
	No data available
e. Other adverse effect	
	No data available

13. DISPOSAL CONSIDERATION

a. Disposal method	Disposal in accordance with all applicable regulation.
b. Disposal precaution	Consideration to precaution all applicable regulation.

14. TRANSPORT INFORMATION

a. UN Number	2215	
b. UN proper shipping name	Maleic anhydride	
c. Transport hazard class	8	
d. Packing group(if applicable)	III	
e. Marine pollution	No	f. EMS No. : F-A, S-B
g. Other adverse effect	RQ : 5,000 lbs	

15. Regulatory information

a. Korea regulations	
Industrial Safety and Health Act	Working environment measurement, Managed hazardous material, Exposure limit set material
Chemical control Act	Not applicable
Dangerous Material Safety Control Act	Not applicable
Wastes Management Act	Not applicable
b. U.S regulation	
	TSCA 12(b) : Not listed
	CERCLA 103 (40 CFR 302.4) : 5,000 LBS RQ
	SARA 302 (40 CFR 355.30) : N
	SARA 304 (40 CFR 355.40) : N
	SARA 313 (40 CFR 372.65) : MALEIC ANHYDRIDE
	SARA hazard category, SARA 311/312 (40 CFR 370.21)
	Acute : Yes
	Chronic : No
	Fire : No
	Reactive : Yes
	Sudden release : No
	OSHA regulation (29 CFR 1910.119) : Not applicable
	TSCA Listed

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State Regulation California proposition 65 : N

EU Regulation R 22 Harmful if swallowed
R 34 Cause burns
R 42/43 May cause sensitization by inhalation and skin contact.
S 2 Keep out of the reach of children.
S 22 Do not breathe dust.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
R36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S45 In case of accident or if you feel unwell, seek medical immediately(show the label where possible)

INVENTORY STATUS	Canada	DSL	LISTED
	Australia	AICS	LISTED
	Philiphine	PICCS	LISTED
	China	IECSC	LISTED
	Japan	ENCS	LISTED
	New zealand	NZIoC	LISTED
	Korea	ECL	LISTED

16. Other information

a. Information source and reference

Korea Occupational Safety Health Agency MSDS information service [Http://www.kosha.net](http://www.kosha.net)
Croner's: Dangerous Substances.
Sax's Dangerous Properties of Industrial Materials, 12th Ed.
National Institute of Technology and Evaluation, Japan <http://www.safe.nite.go.jp>
HSNO CCID, New Zealand <http://www.ermanz.govt.nz/hs/compliance/chemicals.html>
EU Directive 1999/45/EC
EU Directive 67/548/EEC
European Chemical Substances Information System <http://ecb.jrc.ec.europa.eu/esis/>
EUN Recommendations on the Transport of Dangerous Goods—Model Regulations 16th Ed.
TOXNET, U.S. National Library of Medicine <http://toxnet.nlm.nih.gov>
ECOTOX Database, EPA <http://cfpub.epa.gov/ecotox>
IMDG Code 2008 edition (Amendment 34-08), IMO

b. Issuing date

25. June 1996

c. Revision number/date

Rev. 13/ 17. April 2019

d. Others

The information in this Safety Data Sheet is based on data and information currently available.
Use the information contained in the safety data sheet only as a reference for the safe handling of the material.
Our company does not guarantee the contents described in the safety data sheet.